

Strategic Community Resiliency Plan

Prepared for The Town of Secaucus

In partnership with *The New Jersey Office of Homeland Security and Preparedness & The Edward J. Bloustein School of Planning and Public Policy at Rutgers University*

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I. Executive Summary

The Town of Secaucus is located in Hudson County, NJ. The Hackensack River forms the western boundary of the town, and to the east of the town are the Palisades - as a result, much of the town is fairly low-lying, especially when compared to the areas to the east. The town is a transportation hub- the eastern spur of the New Jersey Turnpike, New Jersey Route 3, and part of the main approach to the Lincoln Tunnel all run through Secaucus. Nearly all of New Jersey Transit's passenger rail lines run through the Secaucus Junction station; Amtrak's Northeast Corridor Line and numerous freight lines pass through the town as well. Additionally, the community's proximity to the Meadowlands Sports Complex and New York City is an additional area of concern.

In the wake of major natural disasters in recent years - such as Superstorm Sandy and Hurricane Irene - planning for more resilient communities has become an acknowledged necessity. While flooding, especially in the aftermath of Sandy, remains the top concern in Secaucus, flooding is not the only hazard of concern. The 2008 Hudson County All-Hazards Mitigation Plan identified several hazards, including severe winter storms, drought, extreme temperatures, ground failure and other geological hazards, earthquakes, and wildfires, coastal erosion and storms, and flooding. The plan also ranks these hazards according to their probability. Based on frequency, flooding, coastal storms, and severe winter weather all received high rankings.

The purpose of this Strategic Community Resiliency Plan (SCRP) is to inventory community assets, evaluate risks, and identify viable strategies to be implemented to increase resiliency. The SCRP uses The National Academies (2012) definition of resiliency, which is "the ability to prepare for, absorb, recover from, and more successfully adapt to adverse events." The goal of the SCRP is to increase overall preparedness and resiliency in Secaucus by identifying four functional areas including: (1) infrastructure, (2) planning and zoning, (3) emergency management, (4) community outreach and engagement. The SCRP will allow Secaucus to prioritize limited funding, leverage available assets and formulate innovative solutions to better protect the town and its residents.

The SCRP presents the findings of the Studio planning team's research and analysis through a series of maps, visual data, and narratives. Overall, the research showed that Secaucus is vulnerable to a variety of hazards that could negatively impact the town. At the same time, Secaucus has a breadth of valuable resources including: an interconnected transportation system of roadways and rail; a strong presence of the food distribution and storage industries; environmental resources including a large

expanse of natural and remediated wetlands; and a number of other civic assets that are important for resiliency. For example, the transportation system, although well connected, could be adapted to better accommodate evacuation plans in the case of emergency. The town has been successful at communicating with its residents through a range of means, but there are gaps in residents' knowledge regarding town assets such as berms, wetlands, emergency services, and post-disaster resources.

The findings from this research provided a foundation for identifying a series of resiliency strategies that Secaucus can implement to address the gaps and vulnerabilities identified as part of the planning process. The SCRP recommendations are as follows:

Infrastructure

1. Ensure that trees beside power lines are trimmed and the power lines are well-maintained.
2. Maintain auxiliary power supplies (generators) for crucial services (gas stations, hospitals, grocery stores).
3. Improve storm water management and road infrastructure.
4. Complete Secaucus' system of berms to mitigate flooding from the Hackensack River and surrounding marshlands.

Planning and Zoning

5. Establish parking restrictions near sensitive areas (flood-prone areas, hazardous materials routes, emergency response access zones) and restrict new housing in flood-prone areas.
6. Mandate appropriate flood-mitigation building techniques.
7. Reconstitute as much functional wetlands as possible to mitigate flooding, storm surge and sea-level rise.
8. Prepare for sea-level rise.
9. Consider a buy-out program

Emergency Management

10. Enhance the Secaucus' emergency operations plan by creating formalized written Standard Operating Procedures (SOPs) for key functions and activities.
11. Prepare a responsibility chart to make emergency response plans and

- actions more clear and transparent.
12. Formalize and expand the number of mutual-aid agreements Secaucus has with other jurisdictions and organizations.
 13. Create a Continuity of Operations Plan (COOP), a Continuity of Governance (COG) Plan, and prioritize reinstatement of essential services.
 14. Expand emergency response training to include town personnel outside traditional emergency response fields.
 15. Create volunteer management plan for emergencies.
 16. Create a database of previous disasters to document the type of disaster, the areas of Secaucus that were affected (geographic areas, structures, services), the actions that were taken and the results.
 17. Create hazardous materials routes and establish communication between Secaucus, materials shipper and transportation firm regarding the timeline of the shipment and the contents.
 18. Enhance Secaucus' emergency notification procedures by including pre-scripted messages.
 19. Create a network of shelters, both inside and outside of Secaucus, with neighboring jurisdictions and ensure sufficient food, water, provisions and medical supplies are available to support each shelter.
 20. Establish evacuation routes with different scenarios of mass transit functionality. Include a plan to transport people via mass transit and the elderly and disabled.

Community Outreach and Engagement

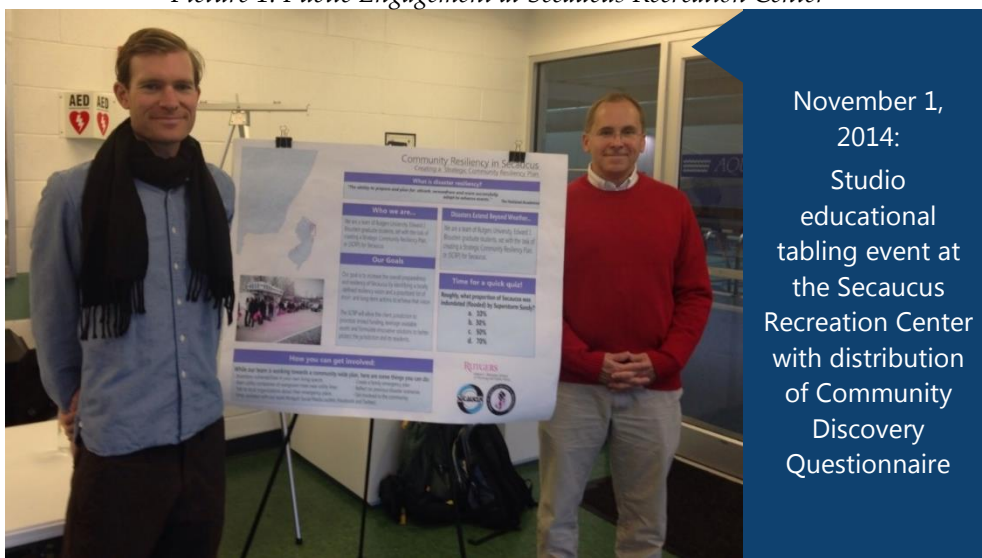
21. Create a public awareness campaign to help residents understand Secaucus' flood mitigation strategies what they can do to protect themselves.
22. Engage with Secaucus' business community to ensure business continuity after disaster and to help business plan for recovery before disasters occur.
23. Partner with the Meadowlands Commission to educate Secaucus residents about the value of wetlands.
24. Educate residents of emergency planning strategies.
25. Include residents in the planning process.
26. Create a "preparedness and mitigation tool kit".

II. Stakeholder and Public Engagement

Stakeholder and public engagement played an important role in the preparation of this plan. The Studio planning team: interviewed town officials; listened to expert presentations on various resiliency related topics, including: risk management and communication, emergency management, continuity of operations, hazard mitigation planning, flood-related data and mapping tools, climate change, planning for terrorist threats, Secaucus sustainability and resiliency initiatives, and Meadowlands resources and governance; conducted a public outreach tabling event at the Secaucus Recreation Center; conducted an online resident survey; and convened a focus group with town officials to discuss and assess the town's current state of resiliency using a resiliency index developed by the Office of Homeland Security and Preparedness (OHSP) to support the SCRP process.

A comprehensive Community Discovery Questionnaire (*Appendix E*) was created and distributed to gauge how Secaucus residents felt about vulnerability, risks, and resiliency issues in Secaucus. Residents were given the opportunity to take the survey in-person or online. For the in-person outreach, the studio group worked in conjunction with the Director of the Secaucus Recreation Department, John Voli, for a public tabling event at the recreation center. On Saturday, November 1st, studio group members (2 pictured below) used a poster and surveys to interact with community members. Paper copies of the survey were available in both English and Spanish, and flyers with an online link were handed out.

Picture 1: Public Engagement at Secaucus Recreation Center



The survey was likewise distributed through the official website and Facebook page of the town of Secaucus and public access television advertisements in English and

Spanish. A Twitter account (@Resilient_SecNJ) was created, which helped to create a more accessible online presence with updates and information.

Finally, public officials were engaged in a meeting focused on assessing Secaucus through a “resiliency index” which was developed for the purposes of the SCRP as a way to assess vulnerabilities by the presence of specific community processes, plans, and other documents (*Appendix F*).

III. Key Findings from Community Characterization And Asset Inventory

As part of the process to develop the SCRP, the Studio planning team conducted a Community Characterization and Asset Inventory. The Community Characterization report created an informational profile of Secaucus by employing Census data, the Secaucus town website, and other available sources. This profile was broken down into functional areas including: analyses of community demographics, land use and zoning, infrastructure systems, environmental assets, and civil services, in order to better gauge the resources that exist within Secaucus and could be employed in the case of emergency or disaster. The following are key findings from the Community Characterization and Assets Inventory Report, which can be found in Appendix A.

a. Demographic Analysis

An analysis of population demographics in a target area can help a community to understand and plan for the range of people that live and work within its borders. Also, local population demographics understood in the context of and compared to the larger regional area provides a unique opportunity to understand larger geographic implications of present conditions and future local and regional opportunities. In this case, Secaucus was compared to Hudson County and New Jersey as a whole in the areas of age, race, language, educational attainment, home ownership, household size, poverty, population density, and income.

Looking at the age of the population, compared to the population characteristics of Hudson County, Secaucus has a higher concentration of older people; this is an important feature to focus on in disaster preparation, because these populations are at a higher risk, owing to possible limited mobility and reliance on a fixed income. Racially, the biggest difference is that the Asian population percentage in Secaucus is much higher than New Jersey overall, at 20%, compared to 8%. The African-American population is also considerably different between the two; the population of Secaucus is only 4% African-American, compared to 14% for New Jersey, though there is a disproportionate effect for this community in terms of potential flood impact. A focus

on language and foreign born populations found that Secaucus has a significant presence of Spanish-speaking residents, approximately 18% of all residents. Of these residents, only 74% identified as being able to speak English well. The majority of Spanish-speaking residents are under the age of 64 and predominantly concentrated in the over 18 age group. All of these demographic identifiers and findings have important implications for preparedness planning, and should be considered when planning for higher risk groups in the community.

b. Land Use and Community Planning

Table 6 helps to summarize the land use patterns in Secaucus, with the highlighted percentages depicting the major types of the land use (*Appendix D, Table 6*). There are 21 different zoning designations used in Secaucus. The largest zoning designation is Light Industrial A (LIA), this takes up 26% of the land area and 149 parcels. The second largest zone by land area is area zoned as Environmental Conservation, this takes up 21.2% of the total area, which should be noted as a strength in terms of resiliency to coastal storm threats, flooding and sea level rise. These areas are located on the North, South and Western edges of the town of Secaucus.

Table 6: Land Use in Secaucus	
Existing Land Use	% of Total Area
Residential	13.0%
Residential - Rural	0.0%
Residential - Low Density	0.0%
Residential - Medium Density	1.2%
Residential - High Density	11.8%
Built-Up	8.4%
Commercial/Services	10.2%
Industrial	20.1%
Infrastructure	11.3%
Vacant	2.4%
Recreational	2.3%
Forest	6.1%
Wetlands	10.0%
Water	16.2%
TOTAL	100%

Related to this zone is the Water zone, which comprises 16.2% of the town’s area.

The Transportation Center zone makes up 1.02% of the land area and seven parcels. This includes New Jersey Transit’s Secaucus Junction Station, located at the southeastern edge of the town. Road, Rail and Right of Ways make up 4.9% of the land area and are the locations of the numerous roads and railroad tracks that intersect the town. Transportation is important sector in Secaucus, as the train station is a key transfer hub, connecting many train lines, and is especially popular due to frequent service and close proximity to New York City. Due to the many large warehouses and industrial uses in Secaucus, transportation via trucks and other vehicles is also very important.

c. Infrastructure Systems

Economic Profile

According to the County Business Patterns of the United States Census, there are 944 businesses in Secaucus with 33,556 total paid employees as of 2012. The dominant industries in Secaucus are Wholesale Trade, Retail Trade, and Transportation and Warehousing, which make up 371 of the total businesses. This is due to the presence of the food warehouses and distribution centers, outlet mall, and Secaucus train station. Additionally, given the proximity of Secaucus to New York City and many major highways, it serves as a hub for freight traffic.

More specifically, Secaucus, is home to many food wholesale and distribution companies. Secaucus' role as a transit hub and its proximity to several major roads and highways make these warehouses and distribution centers critical in providing the state and country with food supplies; for example, Maurice A. Auerbach Inc. is the largest distributor of garlic in the northeastern United States, and Goya Foods is an internationally-recognized brand and the largest Hispanic-owned food company in America. As stated previously, the food systems in Secaucus are largely tied to the significant size of the warehousing and wholesale trade sectors of the local economy. There are 17 businesses solely dedicated to wholesale food distribution and warehousing in Secaucus.

Civic Assets

Overall, throughout Secaucus, there are 4 Fire Stations, 1 Police Station, 2 Elementary Schools, 1 High School, 1 Hospital, 5 Places of Worship, 1 Library, as well as other assets such as parks and recreation, grocery stores, and gas stations. By mapping these resources, it became clear that there is a wealth of resources concentrated in the northern portion of Secaucus. In the case of emergency, a concentration of resources may serve only a portion of the population, and so a greater spread of assets could be a meaningful goal for Secaucus moving forward.

Housing Stock, Value, and Density

Based on the 2012 American Community Survey (*Appendix D, Table 4*), the town of Secaucus has 6,750 housing units. The town has a high occupancy rate of 92.1% (6,214 units), with vacant housing units totaling 536. The homeowner vacancy rate is 1.2% and the

Year Structure Built	# Units	Percent
Total housing units	6,750	100%
Built 2010 or later	39	0.6%
Built 2000 to 2009	680	10.1%
Built 1990 to 1999	208	3.1%
Built 1980 to 1989	1,273	18.9%
Built 1970 to 1979	1,193	17.7%
Built 1960 to 1969	998	14.8%
Built 1950 to 1959	963	14.3%
Built 1940 to 1949	330	4.9%
Built 1939 or earlier	1,066	15.8%

rental vacancy rate is 5.4%. In the event of a disaster where homes are impacted or destroyed, these factors would not mean a large surplus of housing stock to temporarily shelter residents of the town. Between 1960 and 1989 51.4% of the housing stock was built, which should be noted for purposes of inventorying aging infrastructure stock and understanding possible costs of repair and rebuilding in the event of a disaster.

Transportation

Secaucus serves as a transportation hub for many commuters; the Secaucus Junction Train Station connects all New Jersey Transit commuter rail lines except for the Atlantic City line, as well as Metro North's Port Jervis line. Additionally, adjacent to the station is a private "Park and Ride" lot, so commuters outside of the Secaucus town limits have the option of using the Secaucus station. The average trip time to New York City by train is only ten minutes.



Picture 2: Secaucus Junction Train Station (photo: Jaime Broderick)

Utilities, Wastewater Treatment, and Storm Water Management

United Water is responsible for providing water to Secaucus, NJ. The Secaucus Municipal Utilities Authority is responsible for processing and treating the wastewater generated in Secaucus. There is a single wastewater treatment facility in Secaucus which processes about 3,100,000 gallons of water a day, located at 1100 Koelle Boulevard. During Superstorm Sandy, the facility almost flooded, if it had it could have had deleterious effects on the health and well-being of residents.

d. Environmental and Natural Systems

Assessment of Environmental Characteristics: Wetlands, Wildlife, and Open Space

The Hackensack River runs along six miles of the western and southern edge of Secaucus. The waterfront area along the river was once extensive wetlands that provided beneficial flood controls, pollutant filtration, and natural habitat to flora and fauna. Some of these wetland areas have been reclaimed and rehabilitated with some invasive species removal. These water bodies provide Secaucus residents with natural hydrologic controls, breeding, wintering and migratory habitats for waterfowl and

shorebirds and recreation opportunities. The waterfront is also a recreation asset and is preserved as parks and open space. Laurel Hill County Park and Riverbend Wetland Preserve are located at the south end of Secaucus, while Mill Creek Marsh and Mill Creek Point Park are located at the north end.



Picture 3: Secaucus Riverwalk (photo: Jaime Broderick)

All of these represent environmental assets for Secaucus, but Known Contaminated Sites (KCS) represent environmental liabilities. KCS are defined by the New Jersey Department of Environmental Protection (NJDEP) as sites where contamination of soil or ground water is confirmed, at levels greater than applicable clean up criteria or environmental standards. Secaucus contains 169 KCS, are broken down as: “50 Active Sites with Confirmed Contamination;” “6 Pending Sites with Confirmed Contamination;” and “113 Closed Sites with Remediation Contamination.”

e. Health and Social Services

Health Services

Secaucus offers a myriad of health and social services, including the Meadowlands Hospital Medical Center and Bilingual Mental Health Services that aim to “provide affordable culturally congruent mental wellness services for children and caregivers in Early Childcare & Preschool settings”¹. Youth Consultation Services serves children who have been separated from their loved ones because of trauma or cognitive disabilities that prevent them from living at home. The Public Health Department addresses issues and concerns related to ensuring the overall public health of the town. This includes property maintenance, animal control, and licensing and inspection of public food and hair, nail, tanning, tattoo, massage, and pool establishments and facilities.

Social Services

The township has a robust array of social services: the Social Service Department serves Emergency Family Services, the Emergency Food Pantry, Application/Form Assistance, Medical Screenings, and a Low-Income Holiday Program; the Secaucus Senior Center

¹ Bilingual and Mental Health Services Corporation, <http://www.bmhscorp.com/>

provides “social interaction for seniors, recreation, educational programs, speakers, games...and arts & crafts...” along with a “bus service that provides transportation around town, to supermarkets and other local stores and malls and also planned trips to attractions”². Meals on Wheels is also run at the Senior Center. The Secaucus Community center offers daily youth and teen activities. Finally, the Aftercare Program serves school children from kindergarten to 6th grade from school dismissal until 6:00 pm.

As part of a “Citizen’s Corps” through FEMA, the Office of Emergency Management has a council that provides public education and training activities, support for volunteer programs, like a Community Emergency Response Team (CERT), and other trainings for emergency response. This group organizes all volunteer and community Public Safety/Emergency Preparedness efforts.

IV. Key Findings from Community Risks and Vulnerabilities

Assessing risks and vulnerabilities within Secaucus is a major component of creating specific recommendations and formal risk management strategies for the community. The purpose of the Community Risks and Vulnerabilities assessment was to identify the strengths and weaknesses Secaucus’ current emergency preparedness procedures and the town’s ability to respond to, recovery quickly from and adapt to a range of threats. The assessment included hazard identification as well as consideration of risk exposure, vulnerability and the potential consequences from an event occurring. The assessment considered both man-made and natural disasters, with an emphasis on vulnerabilities related to flooding, storm-surge and sea level rise were examined. The studio identified the major risks and vulnerabilities through a range of methods, including: mapping of hazards and impacts conceptually and geospatially, storm surge analysis, a community discovery questionnaire, as well as engagement with public stakeholders through a risk assessment index and in-person discussion.

a. Part 1: Identifying Risks through Disaster Pathway Diagramming

Disaster pathway diagramming is a tool used to identify hazard events that can occur during various emergencies. Applying this tool, the studio mapped four separate pathways categories: Terrorism, Hazardous Materials, Coastal Storm/Flooding, and Winter Storm (*Appendix D, Figure 11*). The Town of Secaucus identified these hazards as the most relevant and concerning to the town. The pathways break down hazards into a

² Secaucus Township Website, <http://www.secaucusnj.org/departments/senior-services/>

manageable and a comparative format, which is used to address the various events that occur during an isolated emergency as well as events that occur across emergencies.

Several potentially negative impacts and consequences appeared multiple times across the various pathway diagrams. These included business and government continuity, structural damage to residences and other buildings, power disruption, and serious impacts to infrastructure systems such as public transportation, storm water management, sewer systems, access to food and potable water, and accessible shelters during an emergency.

b. Part 2: Inundation Analysis

In order to evaluate the interaction of flooding with key characteristics of the community, the Studio planning team analyzed storm surge data in five significant areas: real estate, civic assets, transportation, environment, and select demographics. For the purpose of this analysis, the studio used storm surge data at the four, five, six, seven, and eight foot levels. The surface and real estate analysis focused on parcels, buildings, and important resources associated with infrastructure including tide gates and water treatment facilities. The environmental analysis focused on park and recreational land, areas of environmental conservation, wetlands, and contaminated site locations to evaluate the impact of flooding on the preservation of these areas as well as potential safety concerns. The civic asset analysis identified areas such as fire stations, hospitals, and municipal facilities, as well as civic and recreation centers, hotels, churches, libraries, etc. As discussed earlier in the report, civic assets were selected based on the resources they provide to the community and their feasibility of use as emergency centers. The transportation analysis focused on multimodal routes and the impact of flooding on their ability to be used for emergency services and evacuation. Finally, the demographic analysis evaluated potential population impacts based on socio-economic characteristics.

Methodology

These analyses use storm inundation data at the four, five, six, seven, and eight foot levels because of the likelihood of storm inundation occurring at these levels in future storm events. The four foot storm inundation height represents a typical high tide in Secaucus. In addition, the five foot storm inundation height is the height at which residents receive emergency alerts. The eight foot storm inundation height represents what was experienced by during Superstorm Sandy in 2012. Analyzing at these three heights is important because residents and municipal leaders will have the ability to associate the storm inundation heights with common events and experiences. Each of

the five analyses were performed using publicly available data from the New Jersey Geographic Information Network and the Meadowlands Environmental Research Institute. To conduct the analyses, the studio looked at the interaction of the storm inundation data with data from each of the five categories. The interaction was evaluated at each of the storm inundation levels in order to create a comprehensive picture of the strengths and weaknesses of the site with regard to flood vulnerability. The studio acknowledges that the analyses conducted and the characteristics chosen for analysis may not encompass the full range of vulnerable areas or areas for consideration, but they have been determined to be the most significant.

Table 8: Baseline Figures for Surface and Real Estate Analysis		
Total Acreage (by parcels)	Total Land Value	Total Building Value
3,185 acres	\$996,892,250	\$1,814,505,780

In conducting the topography and real estate analysis for Secaucus, the studio evaluated the amount of land surface impacted (LSI), the amount and land value of parcels affected, and the amount and value of buildings affected on impacted parcels. Using the baseline figures above (*Appendix D, Table 8*), the studio group determined that across all the storm inundation levels, the average number of parcels affected is approximately 880, with a low point (4-foot inundation) of 446 parcels and a high point (8-foot inundation) of 1,382 parcels. The result of this analysis is that even a mild storm with a four foot storm inundation could cost as much as \$793 million in structural damages and \$490 million in property in a worst-case scenario of damages.

The environmental analysis focused on the following characteristics of the site: parks and recreational land, environmental conservation areas, wetlands, and known contaminated sites. One valuable part of this analysis was the evaluation of the known contaminated sites (KCS) in Secaucus. Of the 61 KCS, the studio found that an average of 6 sites would be impacted in a storm event, with a low-point (4-foot inundation) of 1 site and a high-point (8-foot inundation) of 12 sites (approximately 20% of the total). Admittedly, the definition of a contaminated site for the purpose of this analysis was fairly broad and included sites such as gas stations with subterranean storage tanks. A more thorough determination of each of these vulnerable contaminated sites would need to be conducted to determine their health and safety risk. In addition to the evaluation of KCS, the study group evaluated the acres of undeveloped wetlands that would be covered at each inundation heights and found a range of 505-634 acres. This is

an important observation because had this land not been preserved or restored wetlands and instead been developed, this entire area would have been flooded.

Table 12: Results of Civic Asset Inundation Analysis					
Categories of Affected Civic Assets	Inundation Levels				
	4-foot	5-foot	6-foot	7-foot	8-foot
<i>Lodging</i>	2	2	3	5	5
<i>Food</i>			1	1	4
<i>Gas Stations</i>			1	4	4
<i>Schools</i>			1	1	1
<i>Civic and Recreation Centers</i>				2	2
<i>Churches</i>		1	1	1	1
<i>Medical Centers</i>		1	2	2	2
<i>Fire Stations</i>				1	1
TOTALS*	2	4	9	17	20

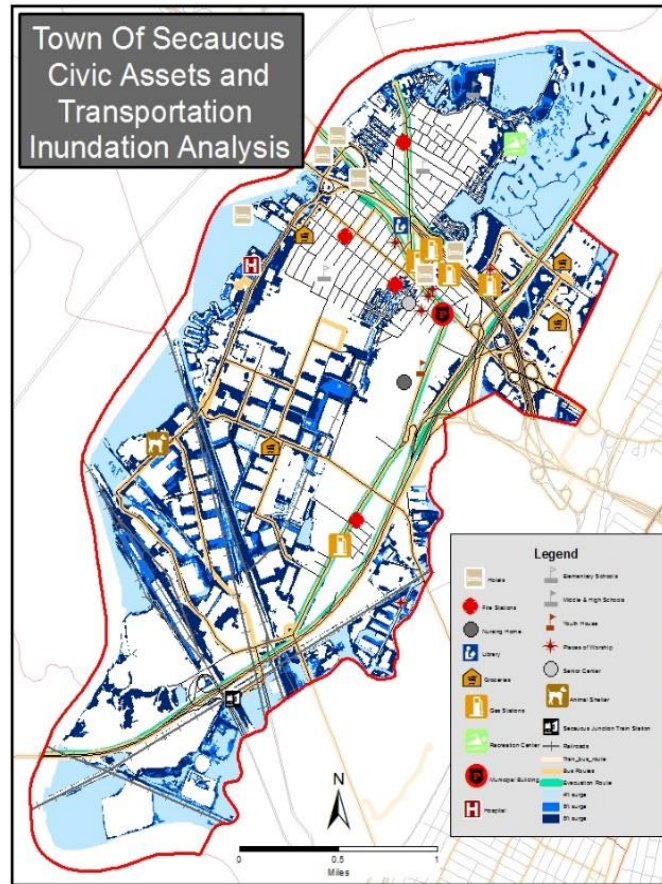
*Please note that all counts are cumulative across the inundation levels

As demonstrated by the table above (*Appendix D, Table 12*), the Studio planning team found that the number and type of civic asset significantly increased across the different inundation height levels. It is important to note that the category of civic assets list in this table is not the complete list used elsewhere in this document. It reflects only the categories of assets that were impacted by flooding. Of most concern are the types of facilities that are of particular importance during a storm or emergency including churches, medical centers, fire stations, and food retailers. Because many of these facilities are located in close proximity to each other as well as located in areas vulnerable to flooding, it would be beneficial for civic assets to be relocated to areas that are less prone to flooding as well as dispersed more evenly over the site rather than clustered.

In the transportation analysis the studio group evaluated the number and types of routes that would be affected at each of the five inundation heights; all routes and inundation information be found in the map below (*Appendix C, Figure 1*). Most importantly, at even the lower level inundation heights the routes to both the Secaucus Junction Train Station and the local hospital – The Meadowlands Hospital Medical Center – could be impacted. While it is difficult to easily or cost-effectively address issues of mass transportation infrastructure, there are more simple strategies the town can take to address these impacts. Although it may not be possible to completely

eliminate the exposure of the evacuation route to flood zones, it may be possible to limit the exposure.

For the demographic analysis the studio focused on racial and economic composition of the town. Specifically, the distribution of per capita income and the distribution of White, Blacks, and Asian residents was considered. For evaluation of income, data from the 2012 American Community Survey was used. Of particular importance is that the majority of this wealth is concentrated along the Hackensack River. This area is also vulnerable to storm surge. In the event of an 8-foot or greater storm surge, this could result in a significant economic impact, especially if the town's berm system fails.



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Data Sources: NJGIN, MERI

The age of the Secaucus population at the block level was gathered and grouped into three categories: Under 19 years of age, 20 through 59 years of age, and 60 years and older. This information was mapped so that the spatial spread could be understood and how many people in each age group might be affected by flooding. At 4 feet of inundation approximately 49% of the older population of Secaucus are to be affected. If inundation levels reach 8 feet it is estimated that 62.4% of residents over 60 years old will be affected.

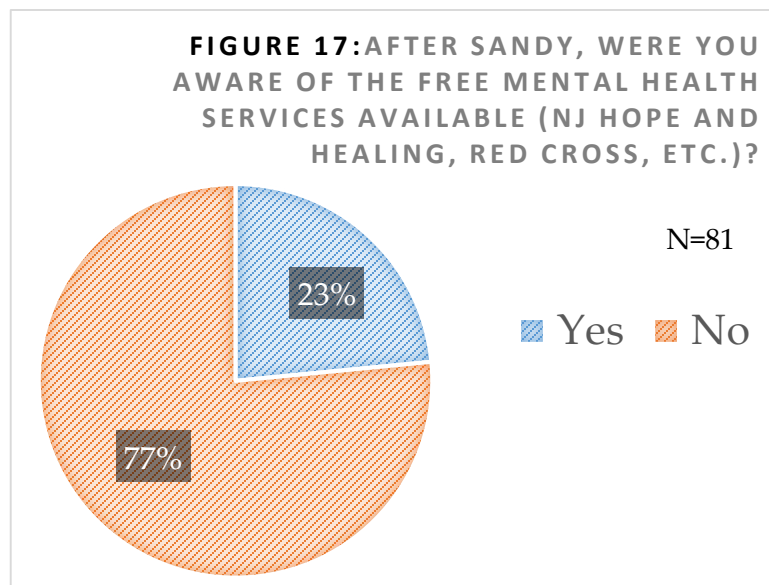
Other demographic elements that were analyzed in relation to inundation were the housing units that would be affected at each inundation height. In total, 45% of units will be affected by flooding at the 4 foot level, this figure climbs to 58.8% at the 8 foot level. Of Units owned with a Mortgage, 52% will be affected at 4 feet and 66% will be affected at 6 feet. In the event of a major damage to these units, it is possible that many

homeowners would be faced with deciding between making repairs or paying their mortgage. It could result in a financial issue for the residents and the town as a whole.

c. Part 3: Analysis of the Community Discovery Questionnaire

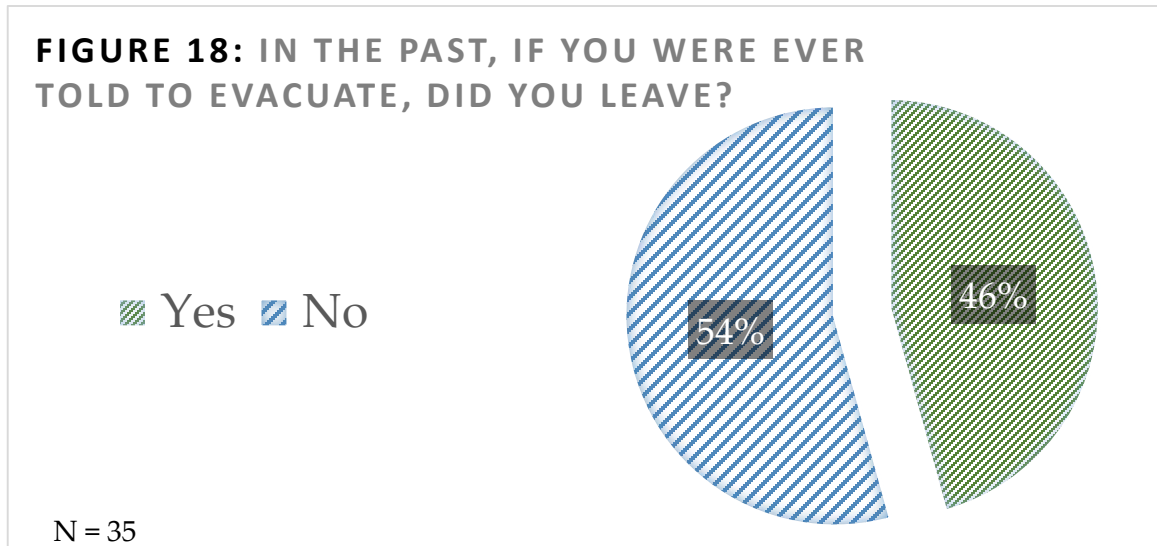
In order to better develop recommendations for Secaucus, a community questionnaire gauging resident knowledge of and experience with disasters was produced. The responses were analyzed with regard to three topic areas: household preparedness, feelings towards Secaucus and safety, and disaster experience. In addition, statistical analysis was utilized to determine if there was a correlation between any of the topic areas and demographic information of respondents.

The results of the questionnaire indicated that Secaucus residents are generally well prepared with their own emergency supplies and were somewhat aware that the town offers various emergency and medical services during disasters. However, the majority of the residents indicated they have not taken advantage of town emergency services during past disasters, as seen in the figure to the right



(Appendix D, Figure 17). The biggest concerns of residents in an emergency were loss of power, flooding, and the ability to evacuate; the disaster impact identified as most frequently experienced was wind followed by flooding and electrical damage. In contrast, only 34% of residents indicated that they themselves or their landlord have flood insurance policies. When asked to rank the perceived riskiness of eleven hazards, the majority of residents (53%) indicated that flooding was a high-risk event in Secaucus. Responses also indicated that the majority of residents are not well informed about the use of berms and wetlands to mitigate flooding. In addition to these findings, 54 percent of respondents indicated that when asked to evacuate during an emergency they chose not to, as seen in the graph below (Appendix D, Figure 18). Only a few respondents chose to answer the open-ended question of why they did not evacuate, but those that did respond indicated that they did not believe there was a significant risk, they did not want to or were afraid to leave their home, or they could not leave their home because they had nowhere to go.

The questionnaire also revealed that the majority of respondents receive information during an emergency best through social media, word of mouth, and the town website. Others indicated that they relied on the town television channel for their information. It appears that before or during an emergency, the town has a multitude of avenues to contact residents through and residents are responsive to this. Overall, residents indicated that they generally felt either somewhat or very protected during emergency situations.



When the Studio planning team analyzed correlations between questionnaire responses and demographic information (i.e. age, income, race, and language), the team found that most results did not indicate any correlation. This is important to note because it indicates that outreach and interventions should be applied uniformly across the resident population. It also suggests that feelings and concerns about resiliency and emergency preparedness are even across different populations. However, correlations were noted between race and language when tested against emergency concerns and access to insurance. Statistical analysis indicated that non-White residents are more concerned about their ability to evacuate/leave Secaucus during an emergency, and their access to clean water or medical services than White residents. Upon further analysis, the results indicated there was also a correlation between language (English or language other than English) and biggest concern during an emergency. These correlations could have implications in terms of the town’s community outreach strategies and suggest that a more concerted effort should be made to reach non-English speaking and minority residents. In addition, a correlation was found when race and language were cross-evaluated with the respondent’s knowledge of insurance held by either themselves or their landlord. This suggests that non-English speaking residents and minority residents may have more restricted access to insurance. This could be due to several factors,

including their ability to obtain information about insurance options. Finally, it is noteworthy that responses to the questionnaire suggest a correlation between income and willingness to evacuate. Although the correlation did not meet the threshold for statistical significance in our small dataset, it is possible that the correlation may be more prominent in a larger statistical sample.

d. Part 4: Resiliency Scorecard and Meeting with Stakeholders

When meeting with officials from the Town of Secaucus, the Studio planning team was able to speak with the Business Administrator, Deputy Police Commissioner, representatives from the Department of Public Works and IT department and the town's CFO. The first subject that the city officials brought up was that the Mayor took a big leadership role during Hurricane Sandy, as he was the former Director of Public Works. The Mayor led his staff in preparation for the storm. Under his guidance the town set up a trauma center in one of the schools, had ambulances ready, and ensured that the police were ready to handle any disorder in the area. One of the most substantial roles the police took on was ensuring that the gas stations were kept in order, given the subsequent gas shortage issues after the storm.

City officials noticed a disconnect between the residential population and the public officials in terms of planning. They felt that resident perception was disconnected from the procedures and roles of the Meadowlands Commission and the city's own procedures. To resolve this, City officials would like to see more participation from residents. Additionally, there were some unresolved issues regarding the roles and responsibilities of the Meadowlands Commission and the city itself in terms of governance and policy. Many of the procedures implemented in times of emergency come from the past experiences of current city officials and are not yet fully recorded in writing.

The Resiliency Index covered four sections: planning, response, recovery, and mitigation. When going over the Planning section, the studio group learned what current written protocols are in place. Officials noted that there was no Continuity of Operations Plan, but they did have scattered elements of a Continuity of Government plan. Secaucus has an Emergency Operations Plan done in collaboration with other departments, but does not have a formal Local Emergency Planning Council or formal emergency planning body. Additionally, there is an opportunity to provide information for employees in the area on how to prepare themselves and families for emergencies, and better plan with non-governmental organizations. Secaucus uses local resources when emergency food supplies are needed; the town has its own food pantries, uses

local nonprofits, local delis and Goya have provided food in the past. In terms of infrastructure, Secaucus has shelter capacity in excess of 500 by using the high school, 2 elementary schools, and library, and buses are used for mass evacuations. They do not utilize citizen groups for help except for a CERT team. Officials also stated that many of the local businesses shelter and take care of their own workers in times of emergency. The township uses a reverse-911 system to notify all registered residents when an emergency occurs or if there is a threat.

The Fire Department, Police Department, Senior Deputy of Public Works, and Office of Emergency Management are ICS trained, but there is an opportunity to train other departments in ICS and utilize them in emergencies. The town has some formal mutual aid agreements with other towns, and Secaucus was instrumental in providing surrounding townships with food and emergency services during Hurricane Sandy. The town's volunteer management program is managed on the fly, but they do have financial management protocols for tracking expenses and reimbursement in times of emergency.

When asked about recovery, the township officials stated that they had an informal recovery task force post-Sandy but could formalize the process for future events. When evaluating the effectiveness of recovery initiatives, they have a working group of municipal officials that decides what did work and what did not work. Secaucus uses the school-aged population to hand out flyers that provide information about recovery programs. This information is also available on the township website. After Hurricane Sandy, Secaucus held a forum at the library for small businesses.

When discussing mitigation tactics the town encourages, but does not require, green building techniques or LEED certification; Secaucus has an environmental coordinator who speaks with the community about these issues. Most buildings have backup treatment and power plants in times of emergencies, and the Office of Emergency Management and library are both in the process of getting them. There are no standardized procedures for fuel shortages, but during Sandy the Town produced procedure ad-hoc. When managing stormwater runoff, the township uses pump stations to keep basins and lines clear, and is currently working on a rain barrel outreach program with Coca-Cola. While the town has not adopted any regulations to decrease stormwater runoff, and it has stated that some buildings need to put in retention barriers to collect water.

Some of the shortcomings noted by the studio included a small I.T. staff, business continuity, and the lack of a formal, written emergency procedures for fuel operations

and recovery programs. The city only has one I.T. person, but also has contracts with vendors for I.T. backup if needed. Additionally, many of the procedures the city officials spoke about were not formally written down; they were procedures that city officials who worked through Hurricane Sandy happened to know and remember.

V. **Conclusions and Recommendations**

Overall, research showed that Secaucus has a breadth of valuable resources including: an interconnected transportation system of roadways and rail; a strong presence of the food distribution and storage industries; environmental strength in a large cover of effective and remediated wetlands; and a number of civic assets including strong leadership and capable staff. With a wealth of existing resources and available partners, Secaucus is in a good position to address resiliency. Communication, education, and simple information gathering into a database are potentially simple strategies that Secaucus as a whole could employ to improve resiliency. By engaging the community, through civic services and organizations, Secaucus can work together to make some of these recommendations a reality.

I. **Infrastructure**

1. **Ensure that trees beside power lines are trimmed and the power lines are well-maintained.**

The most common overlap between multiple disaster consequences is loss of power. According to the Community Discovery Questionnaire, power outages also represent the biggest concern for Secaucus residents regarding disasters. One short-term, ongoing step to help prevent power outages in the event of a disaster is to ensure that trees and branches beside and surrounding power lines are trimmed. Many, if not the majority, of power outages are the result of downed trees and tree limbs. Performing routine maintenance on Secaucus' power lines is important step in preventing power outages during emergency situations.

2. **Maintain auxiliary power supplies (generators) for crucial services (gas stations, hospitals, grocery stores).**

Secaucus should acquire and maintain a cache of fixed and portable auxiliary power generators and supplies to ensure essential community functions and services can be maintained in the event of disaster. This should include installation of permanent generators and/or "quick-connect" capability at key facilities. It is imperative that this equipment is functioning optimally in the event of an emergency, both for power output and endurance. For example, depending on the nature of the disaster, Secaucus may need to rely on their generators for an indeterminate period of time. Emergency managers and public works personnel should ensure that an adequate

stock of fuel is maintained to to run the generators for as long as necessary until they are reconnected to a fully-operational grid.

3. Improve storm water management and road infrastructure.

Secaucus should work with the Meadowlands Commission to develop and enforce ordinances, zoning amendments, or other regulatory provisions to improve stormwater management and reduce flooding. If possible, elevation of low-lying road sections should be done to stop repetitive flooding of vital pieces of the transportation network. Green infrastructure such as bioswales, green roofs and other plantings along rivers and in flood-prone areas could reduce the amount of runoff, erosion, and disperse polluted water.

In general there should be a reduction of impervious surfaces within the town. Promoting more permeable surfaces would increase the town's resilience toward flooding, sea-level rise, and snow melting as well as help preserve water quality, fish and wildlife habitat. Impervious surface limitations and restrictions would apply to construction, reconstruction, expansion, replacement, or relocation of impervious surfaces within the town.

- As a part of Wisconsin's Shoreline Protection Program, they developed a guidebook on recently adopted rules and regulations, which includes a chapter on impervious surface limits. A copy of the guidebook can be found here: http://www.ncwrpc.org/county_ftp/NR115/Chapter2.pdf
- Language from the Town of Hillsborough, NJ zoning code addresses impervious surface restrictions can be viewed here: <http://ecode360.com/10256042>
- The city of Somerville, MA adopted an ordinance to amend their zoning code to address the issue of impervious surfaces. A copy of the ordinance can be found here: <http://www.somervillema.gov/sites/default/files/pervious%20zoning%20ordinance%20ordinance%204-9-12.pdf>

4. Complete Secaucus' system of berms to mitigate flooding from the Hackensack River and surrounding marshlands.

Secaucus has invested significant resources to install a system of berms, flood barriers and pump stations along flood prone areas of town. The berm system and pumps appear to be reasonably successfully as a mitigation approach, but the system is not complete. In addition, the berms have been installed at a flood elevation of approximately eight feet. Secaucus should continue its efforts to complete the berm system and continue to ensure that its pump stations are well maintained. It is important to note however, that over time,

sea-level rise may make the berm and pump system less effective. Consequently, Secaucus should also consider what enhancement to the system (e.g., raising the elevation of the berms over time) may be necessary to ensure the system continues to provide flood protection for Secaucus residents and businesses.

II. Planning and Zoning

5. **Establish parking restrictions near sensitive areas (flood-prone areas, hazardous materials routes, emergency response access zones) and restrict new housing in flood-prone areas.**

Secaucus should review and revise (as needed) its local ordinances and codes to restrict new construction in flood prone areas and parking in flood-prone areas, along hazardous materials routes, evacuation routes and in or near emergency-response access zones. The purpose of such restrictions on vehicles and housing is two-fold: to minimize risk of damage to human property and human life and to maximize access to affected areas in the event of a disaster. For example, if a flooded area is overrun with vehicles and dense housing, it will be that much more difficult to access people in need of medical attention and emergency needs. During storm events vehicles that cannot be moved off the street or are vulnerable to damage could be moved to municipal parking lots or large retail lots, contingent on approval by owner. If no such lot is available, then perhaps one side of the street can be designated for parking, while the other is kept clear. The following day the alternate side is used for parking while the other is kept clear. This can be especially helpful when removing debris or snow from roads and preventing damage.

In the mapping and analysis regarding civic assets it was noticed that most of the town's important assets are located in the northern portion of the town. In the future, zoning and land use guidelines, perhaps part of a master plan, could steer future building of important town buildings and facilities to other parts of town. If during a disaster event the northern part of town were heavily affected then all critical assets would be damaged, if more spread out the harm would be lessened and recovery quickened. The new, potential locations of these buildings should be chosen based on areas with low likelihood for flooding or future sea level rise.

6. **Mandate appropriate flood-mitigation building techniques.**

Secaucus should review and revise its ordinances and codes to mandate flood protection best practices are utilized for all new construction and major

renovations. Given Secaucus' low elevation, proximity to water and potential impacts from sea-level rise, it is important to ensure that all new housing is built in a way that minimizes risk to human life and damage to property. Secaucus has already taken steps in this direction by mandating that no new housing can have a basement or a sunken driveway if it is in a flood-prone area. Secaucus should continue to work with the Meadowlands Commission to ensure that the town is using all appropriate flood-mitigation building techniques available.

7. Reconstitute as much functional wetlands as possible to mitigate flooding, storm surge and sea-level rise.

Reconstituting wetlands as means of mitigating flooding, storm-surge and sea-level rise is of vital importance. Wetlands are an important natural resource in the area and should be maximized to ensure resident safety and environmental protection. First, Secaucus should continue working with the Meadowlands Commission to determine the level of risk, target the appropriate areas, and decide how to best use wetlands as a tool in mitigating inundation levels, storm surge, and sea-level rise. This should include continued protection of existing wetlands and maximizing restoration of currently degraded wetlands.

8. Prepare for sea-level rise.

Sea-level rise is a consequence of global climate change. As ocean levels rise, more land area is subject to permanent and temporary inundation and the impacts of flooding and storm surge worsen. Given its location, Secaucus is potentially vulnerable to the effects of sea-level rise. It is recommended that the town use existing mapping and visualization tools like those available on the NJADAPT website to understand better the areas of town most vulnerable to sea-level rise and begin to plan for adapting to this potential threat.

Planning and zoning are effective tools to mitigate against deleterious effects of sea level rise and adapt to a changing climate. Identifying the areas that are most flood prone and what might become flood prone as sea level rises, is the first step. After these areas are identified, there are two approaches that can be taken to zone and plan for sea level rise. There are two strategies that can be implemented to enhance regulations. The first strategy is a conservation approach that seeks to protect natural resources and relocate development from highly vulnerable areas. The second is to allow continued development but requiring all structures be sited and built to be resilient to impacts, by increasing set back standards, or requiring structures to be built a certain height from the ground.

Model regulation language can be found in a document, “Zoning for Sea-Level Rise” from the Georgetown Climate Center.

(<http://www.georgetownclimate.org/sites/www.georgetownclimate.org/files/Zoning%20for%20Sea-Level%20Rise%20Executive%20Summary%20Final.pdf>)

9. Consider a buy-out program

Properties that have continual flooding or storm damage are a drain on resources. A buy-out program to retire vulnerable properties from active use, remove structures and return the land to a natural state, or as close as possible, could help to limit future damage and continued investment in repairs. To accomplish this, Secaucus should identify and prioritize areas where repetitive flooding occurs (or may occur due to rising sea levels). The Meadowlands Commission, Hudson County or the State may be of assistance in identifying areas that may be susceptible to future sea level rise. As a part of a larger hazard mitigation plan, there could be a voluntary buy-out program, through the State’s Blue Acres Program. After identification, Secaucus should reach out to affected landowners to explain potential benefits of the buy-out. If/when properties are acquired then buildings, roads and all non-natural elements should be removed and the site returned to its natural state.

Morris County, NJ has a successful buy-out program, for more details please consult <http://www.morrisplanning.org/flood/info.asp>

III. Emergency Management

10. Enhance the Secaucus’ emergency operations plan by creating formalized written Standard Operating Procedures (SOPs) for key functions and activities.

Currently, the performance of key emergency management functions and activities appear to rely on individual expertise and experience. While the city of Secaucus responded well to Hurricane Sandy, most of the procedures discussed with municipal officials were informal and known primarily by memory. In the event key personnel are incapacitate or not available, performance of key functions might be hampered by lack of written procedures. Town officials should consider preparing a set of more formal written Standard Operating Procedures and appending them to Secaucus’ existing Emergency Operations Plan (EOP). This will ensure that as municipal positions change hands, the right procedures will be in place.

11. Prepare a responsibility chart to make emergency response plans and actions more clear and transparent.

In order to ensure coordination between private organizations, the Secaucus municipal government, nonprofit organizations, and volunteers should create a chart that delineates which responsibilities belong to which organizations. For example, many of the workplaces in Secaucus are responsible for sheltering their own workers in times of emergency, which is important to know in terms of determining capacity for public shelters as well as providing these businesses with resources and guidelines for emergency procedures. Outreach should be done with Meadowlands Commission representatives, transit officials, municipal employees, school employees, and volunteers.

Once Secaucus has finished reaching out to all relevant organizations, municipal officials can delegate responsibilities so that they will know which organizations cover which responsibilities during an emergency situation. Understanding how many people will be housed by their places of employment during an emergency will give the city of Secaucus a better idea of how many beds they will need in shelters and where most citizens are located. Additionally, delegating responsibility will help determine the resource distribution network in Secaucus during emergencies.

12. Formalize and expand the number of mutual-aid agreements Secaucus has with other jurisdictions and organizations.

Secaucus should review its existing mutual aid agreements and establish new and enhanced agreements with other jurisdictions. To the maximum extent possible the agreements should be written rather than informal. Mutual-aid agreement give participating jurisdictions and organizations the ability to share emergency response personnel, equipment, supplies and other resources when needed. While Secaucus' EOP indicates that mutual aid agreements exist, the number and type are limited. They primarily address public safety and many are informal, verbal agreements. Secaucus officials also mentioned successful arrangements that were put in place during Sandy and other emergencies for providing food and some emergency services to surrounding municipalities. Establishing written formal agreements for the following types of functions should be a priority for Secaucus:

- Sheltering agreements
- Mass care and feeding agreements
- Police agreements
- Firefighting agreements
- Emergency medical services agreements

- Hazardous material clean-up agreements

The following are examples of mutual-aid agreements:

- Contra Costa County Community Awareness & Emergency Response (http://www.cococaer.org/about_groups_pmao.html)
- Southwest Louisiana Mutual Aid Association (<http://www.slma.us/>)
- Southern California Industrial Mutual Aid Organization (<http://www.scimo.org/go/site/637/>)
- Twin State Mutual Aid Fire Association (<http://www.littletonfirerescue.org/stations.htm>)
- Federal Emergency Management Agency (FEMA) Model State-County Mutual Aid Deployment Contract (<http://www.emacweb.org/?123>)
- FEMA Model Intrastate Mutual Aid Legislation (<http://www.emacweb.org/?150>)
- FEMA Mutual Aid Agreements for Public Assistance & Fire Management Assistance (<https://www.fema.gov/9500-series-policy-publications/95236-mutual-aid-agreements-public-assistance-fire-management>)

13. Create a Continuity of Operations Plan (COOP), a Continuity of Governance (COG) Plan, and prioritize reinstatement of essential services.

A COOP is essential for a municipality in order to best prepare for how to keep essential services running or reinstate them as quickly as possible. This component is two-fold: the first step is to prioritize which services will be targeted for these efforts, and should include hospitals, shelters, emergency response facilities, grocery stores, gas stations, and any purveyor of goods or services that Secaucus deems a priority; the second step is to establish how these prioritized goods and/or services will remain functional or be reinstated as quickly as possible.

This involves: having both hard and electronic copies of necessary documents accessible to multiple people, in multiple locations, and are easily-transportable in case of hasty evacuation (having multiple access is imperative in case one person is incapacitated for whatever reason); establishing the physical infrastructure to ensure continuity of operations (e.g. generators have been installed at key gas stations); secondary routes and means of transportation to and from key facilities have been cited; other necessary elements to keeping priority facilities functioning.

Creating a COG is equally important, for keeping goods and services operating works in tandem with keeping government operating. Secaucus officials told

the studio group that they have scattered elements of a COG plan, but putting them together in a cohesive document will ensure timely operations during an emergency situation. Maintaining government operations will greatly aid in keeping other goods and services operating in Secaucus. Additionally, government operations are necessary for coordinating disaster response efforts, medical attention and maintaining order; without an operational government, the social balance may devolve into chaos, looting and violence.

14. Expand emergency response training to include town personnel outside traditional emergency response fields.

Training and maintaining a force of emergency response personnel is of fundamental importance for disaster-preparedness; relying on existing emergency response personnel (police, firefighters, EMS, etc.) may be sufficient within normal response operations but may not be effective under catastrophic circumstances. Currently, Secaucus' fire department, police force, Senior Deputy of Public Works, and Office of Emergency Management are trained in Incident Command Service (ICS). Secaucus should consider training personnel from other departments in ICS. Having as robust a network of trained personnel as possible can help to ensure effective emergency-response actions. There are many actions that such a trained group can do, such as meeting food, water and transportation needs, without requiring professional expertise. This group can emulate a corps of volunteer firefighters, in structure and organization, and should work in collaboration with existing emergency-response personnel, not in competition. Secaucus officials may want to collaborate with food warehouses and companies like Goya, as well as with businesses that opt to shelter and take care of their own employees during times of emergency.

15. Create volunteer management plan for emergencies.

Volunteers can play a critical role in disaster response and recovery, especially when municipal officials are overwhelmed with widespread damage. Secaucus should consider partnering with organizations like the Red Cross and Meals on Wheels, faith-based organizations and other non-profit organizations to recruit volunteers to provide emergency medical care, help staff emergency shelters, and other vital programs used in emergency situations. Additionally, volunteers can help with post-disaster recovery, such as packing up materials in shelter locations and helping residents return to their homes. To be most effective, Secaucus should consider creating a position for volunteer manager who can register to help in pre- and post-disaster work based on their skill sets. The volunteer manager could also maintain a database of interested volunteers and

ensure it is kept up-to-date with names, contact information, skills, and availability. Outreach to other organizations would be beneficial so that gaps in services and resources can be filled and these new organizations and the town can forge a mutually beneficial agreement

16. Create a database of previous disasters to document the type of disaster, the areas of Secaucus that were affected (geographic areas, structures, services), the actions that were taken and the results.

Creating a database of previous disasters in Secaucus will enable the town to learn from past experiences and refine their emergency-response techniques. The database should include the following elements: the type of disaster, when it occurred, the part(s) of Secaucus affected, the structures, services and/or infrastructure that was impacted, the nature of human casualties, the actions that Secaucus took, and the results of these actions. While generic documents exist that catalogue disaster types and suggested preparation and recovery protocol, which will be helpful, this living document will be specific to Secaucus. Because of that, it will be most relevant to how best to prepare for, manage, and recover from different disasters, working within the unique physical, demographic, social, socio-economic and cultural parameters of Secaucus.

A “Disaster Database” is not something that many municipalities create, and is therefore difficult to provide examples. However, a disaster databases do exist on the national and international scale. These database list the types of disasters reported, the areas that experience the bulk of these disasters and the years they occurred. An international example is produced by Global Risk Information Platform (GRIP) and can be accessed here: <http://www.gripweb.org/gripweb/?q=disaster-database>. Categorical information on disaster-response strategies and those strategies’ effectiveness is not available, but this is something that Secaucus should include in their database. Another advantage to putting this information onto a website, instead of an Excel document, for example, is that it can be accessed by any authorized individual from anywhere, which is important in emergency situations.

17. Create hazardous materials routes and establish communication between Secaucus, materials shipper and transportation firm regarding the timeline of the shipment and the contents.

The transport of hazardous materials (hazmat) represents another type of potential disaster: a transportation malfunction and the release of the materials. Transporting hazardous materials cannot be eliminated, but threats can be minimized by: establishing hazmat routes and enacting appropriate land-use codes adjacent to these routes; establishing clear communications between Secaucus, the material's shipper and the transportation firm regarding when a material will be shipped and what the material is; gathering adequate information about the materials being shipped and the best practices for response in the event of hazardous material release.

18. Enhance Secaucus' emergency notification procedures by including pre-scripted messages.

Secaucus already has a notification plan in place to relay information to residents before (if the disaster is predictable), during and after a disaster. However, to be most effective, this notification plan should include pre-scripted message that can be tailored to different hazards and events. An example of this can be seen on the Center for Disease Control's (CDC) website: <http://www.bt.cdc.gov/radiation/>. There are many advantages to this type of notification plan: it saves time because an individual does not have to create the messages in real time; any authorized individual can send one of these messages at any time, from anywhere, which is imperative in emergency scenarios; pre-scripted messages are generally more easily understood, as language is clear and uniform; pre-scripted messages can be translated into multiple languages. This last point is important, because in order to relay urgent information to all residents, especially in a diverse place like Secaucus, multiple languages are necessary. The additional language(s) chosen for the pre-scripted message should be based on US Census data for whatever language after English is most commonly spoken in Secaucus.

Secaucus should determine the best means of communicating to residents and execute these notifications in myriad forms, as different residents will prefer different means of communication; many residents will not have access to certain forms of communication. For example, seniors may not have mobile phones or internet access. In addition, Secaucus should establish a tradition of utilizing this system. For example, if the notification system is never used and then relays a message, residents may not respond appropriately if they are not accustomed to the notification system.

19. Create a network of shelters, both inside and outside of Secaucus, with neighboring jurisdictions and ensure sufficient food, water, provisions and medical supplies are available to support each shelter.

Secaucus already has either designated shelters or sites that can serve as shelters in the event of an emergency. However, numerous challenges exist to optimizing this shelter network. The following list of recommendations could improve Secaucus' sheltering capabilities:

- 1) The town should establish a Reception Center for evacuations. Please see what Matagorda County, Texas does with their Reception Center: http://www.co.matagorda.tx.us/default.aspx?Matagorda_County/Evacuation. Reception Centers have the advantage that, because people are gathering in a central location, it is much more efficient to evacuate them en masse, using public transit vehicles.
- 2) The shelter network should extend to contiguous municipalities as part of the mutual-aid agreements with these municipalities; depending on where the disaster is centered, or where residents live, it may be easier for them to access shelters in neighboring municipalities.
- 3) These shelters should be stocked with sufficient food, water, provisions and medical supplies *in advance*. Depending on the nature of the disaster, Secaucus will have advanced warning and a window in which to stock the shelters; however, other disasters will not be predictable (for example, a hazmat spill/release) and the shelters may not function properly if they are not already stocked. But, depending on the shelter type, if it is a dedicated shelter or is a secondary shelter, it may not be possible to fully stock it in advance.
- 4) Secaucus should make arrangements to transport people to and from shelters, as not everyone is fully mobile. The Community Discovery Questionnaire revealed that some residents did not use shelters in the past because they lived with a disabled individual and could not access a shelter. Therefore, when drafting this transportation plan, Secaucus should make accommodations for the disabled and those in wheelchairs.

20. Establish evacuation routes with different scenarios of mass transit functionality. Include a plan to transport people via mass transit and the elderly and disabled.

Secaucus can create evacuation routes based on different scenarios, such as if only the train is operational, only buses are operational, both train and buses

are operational. It is important to recognize these three scenarios because the train and buses act as means of evacuation for many residents. Secaucus should take seniors and the disabled into account for these evacuation plans, as they may have elevated mobility challenges.

Another aspect of creating comprehensive evacuation routes involves drafting routes for those on foot and/or bicycle. These walking and/or biking routes will not be designed to lead outside of Secaucus, but will lead to transportation centers where individuals can board some form of mass transit to complete their evacuation. Walking or biking may represent a fraction of the population, but the Community Discovery Questionnaire indicated that least one or more individuals tried to evacuate on foot.

It is also important to have evacuation routes and information available to the public, via the web, flyers, newspapers, television, etc. and in multiple languages. This will help make the process smoother, assuage fears during an emergency, and give residents power to make informed decisions.

IV. Community Outreach and Engagement

21. Create a public awareness campaign to help residents understand Secaucus' flood mitigation strategies what they can do to protect themselves.

While the town has many of its flood concerns covered by the Meadowlands Commission, the Community Discovery Questionnaire showed that most residents are unaware of flood mitigation strategies the town adopts and what they can do to protect themselves. In order to ensure proper resident preparation, it is important to inform them of the resources available to them and how they can prepare in advance for frequent mishaps and larger-scale disasters. Secaucus may want to bring officials from FEMA or other resiliency organizations for training and demonstrations as necessary.

In order to better inform the public about flood protection and mitigation strategies, Secaucus municipal officials or representatives from the Meadowlands Commission should hold regularly-scheduled community educational events that highlight the risks of flooding and how residents can prepare themselves. A flood map delineating "at risk" zones will allow residents to see where their homes are relative to "at risk" areas. Additionally, these events should also include distribution of informational materials that residents can take home as a reference guide. This kind of event would also

give residents the opportunity to ask questions about flood mitigation and prevention.

22. Engage with Secaucus' business community to ensure business continuity after disaster and to help business plan for recovery before disasters occur.

Municipal officials noted that there were no staff members who could work with the small business community. Secaucus should consider sponsoring events where local business owners could collaborate and share ideas, or bring in outside resource networks to ensure that small businesses in Secaucus can continue to thrive after any damage or destruction. The city should consider reaching out to well-established businesses or community leaders to determine if they are willing to provide guidance, or contact the spokespersons of larger companies headquartered in Secaucus, such as Goya. For examples of structure and context, please see the sample plans currently in use across the United States below:

- Business Continuity and Disaster Preparedness Plan, Anchorage, Alaska. <http://www.muni.org/Departments/OEM/Plans/Documents/BusinessContinuityDisasterPreparednessPlan.pdf>
- Business Continuity and Disaster Preparedness Planning Patterns and Findings From Current Research; Citizen Preparedness Review-Community Resilience Through Civic Responsibility and Self-Reliance. FEMA Citizen Corps. <http://www.fema.gov/media-library-data/20130726-1854-25045-6573/businesscpr.pdf>
- Preparing Your Business for a Disaster: A Basic Guide for Business Continuity Planning. Nashville, Tennessee Chamber of Commerce. http://www.nashvillechamber.com/docs/default-source/disaster-preparedness-pdfs/a_basic_guide_for_business_continuity_planning.pdf?sfvrsn=2

23. Partner with the Meadowlands Commission to educate Secaucus residents about the value of wetlands.

Secaucus should also work to educate its residents about the value of wetlands and how they mitigate inundation levels and storm surge. The Community Discovery Questionnaire indicated that many residents (perhaps the majority) do not understand the role that functional wetlands play in mitigating inundation levels, or believe they have a deleterious effect and worsen flooding. Educating residents about the benefits of wetlands represents mustering the political will to carry out wetland reconstitution.

Wetlands are a powerful and valuable land use feature in Secaucus. According to the Community Discovery Questionnaire results, not many residents understand the value of wetlands and their benefits in flood events. In order to promote community buy-in, support, and perhaps community led wetland protection, residents should be educated on wetlands, the flora and fauna in wetlands, and their benefits. Informational radio or TV spots, social media, editorials in the newspaper, and integrating wetlands information into the school's science curriculum would reach most residents of Secaucus.

24. Educate residents of emergency planning strategies.

To serve the residents as best as possible during an emergency event, Secaucus should develop a pre-disaster plan that engages the public and publicizes information most pertinent to preparing for events. To do this the town could, publish evacuation route maps, shelter locations and services, provide flood maps, encourage residents to create an emergency supply kit of water, food, and medical supplies and disperse to residents and business owners, via flyers, radio, TV, and social media. Before events the town should re-energize efforts to get all residents on their emergency phone call list.

25. Include residents in the planning process.

In addition to resident education, input from residents is useful in determining specific planning processes such as hazard mitigation planning. Residents may have faced incidents specific to the nature of Secaucus, but do not have a proper forum or outlet to express these concerns. After a disaster occurs, the town should hold a forum where residents can speak with and provide input to the municipal officials involved in the emergency planning process. Residents should also be encouraged to provide feedback if there were any gaps in emergency management and preparedness on the town's behalf.

26. Create a "preparedness and mitigation tool kit".

The "tool kit" would be a list of practices and ideas to teach residents about disaster preparedness and outline steps to take to be more resilient and disaster-proof. The practices in the tool kit will help homeowners, landlords, and all residents take precautions around their properties' to lessen the chance of damage to their property and possessions before a disaster or emergency event. The kit will have shelter in place instructions for less severe events and in the event of a severe event, evacuation routes, shelter and other related emergency resource information. To help recover from an emergency event, the tool kit will also have instructions for residents to help with common repairs,

best practices for dealing with mold, important phone numbers for town departments if damage to properties is too great, and any other information deemed important. This will make residents active and informed before events, safe and prepared during events, and involved and cautious post event.

Some good examples of “tool kit” materials can be found below:

- City of Bay Village, Ohio: provides Emergency Information Manual and other important information for residents.
<http://www.cityofbayvillage.com/safety-services/emergency-preparedness.aspx>
- City of Bellevue, Washington: provides residents with Citizen Corps resources to train volunteers and provides Community Emergency Response Team (CERT) training classes.
<http://www.ci.bellevue.wa.us/11068.htm>
- Nassau County, Long Island, New York: provides residents with a checklist of items in various emergencies.
<http://www.nassaucountyny.gov/1629/Disaster-Checklists>

VI. Appendices

Appendix A: Community Characterization And Asset Inventory Full Report

THE POPULATION OF SECAUCUS

Population Demographics

Analysis of population demographics in a target area can help depict the type of people that live and work in that place. They can be set in the context of and compared to the larger regional area to see how the composition of populations differs across places. Here, we set out to compare Secaucus to both Hudson County and New Jersey as a whole in the demographic areas of age, race, language, educational attainment, home ownership, household size, poverty, household income, and housing density. We found, overall, that while Secaucus is very similar to the state as a whole, there are some key differences that set it apart and warrant attention.

Age

Historic population counts of Secaucus from 1990-2010 Census data show that the aging population 65 years and older has grown in recent years. While the population has likewise seen a steady increase, the numbers in *Table 1* indicate that between 200 and 2010, the town saw a 1.5 % increase in the 65+ populations (*Appendix D, Table 1*).

Compared to the population characteristics of Hudson County, Secaucus has a higher concentration of older people – which is an important feature to focus on in disaster

preparation, because these populations are at a higher risk. Likewise, comparing the median age of both Hudson County with Secaucus, the higher and steadily rising median age in Secaucus is indicative of an at-risk population that is increasing and should have resources available in the case of a disaster or wide-spread emergency. Finally, a series of Age-Cohort diagrams from 1990-2010 in *Appendix D (Figure 1)* helps to further visualize the chunk of the population that the 65+ cohorts make up, and how they have changed over time.

Table 1. Comparing 65+ Population in Secaucus and Hudson County						
Year	Secaucus, NJ			Hudson County, NJ		
	Population Total	65+	% of Population	Population Total	65+	% of Population
1990	14,061	2,275	16.2%	553,099	70,401	12.7%
2000	15,001	2,396	16.0%	608,975	69,271	11.4%
2010	16,008	2,797	17.5%	634,266	66,066	10.4%

Race

Comparing the racial composition of Secaucus to the State of New Jersey, the data shows that Secaucus is more racially diverse. The most basic metric of this is that the largest racial group, Caucasians, still comprise a majority, but less than the overall percentage of New Jersey as a whole; 56% of Secaucus' population compared to 59% of New Jersey's population (*Appendix D, Figure 2*). However, examining the racial composition of Secaucus compared to New Jersey as a whole by other metrics does not reveal much difference in overall diversity for the most part. The biggest difference is that the Asian population percentage in Secaucus is much higher than New Jersey overall, at 20%, compared to 8%. The African-American population is also considerably different between the two; the population of Secaucus is only 4% African-American, compared to 14% for New Jersey. The Hispanic population is nearly equal between Secaucus and New Jersey.

Language

At approximately 18% of all residents, Secaucus has a significant presence of Spanish-speaking residents. Of these residents, only 74% identified as being able to speak English well. The majority of Spanish-speaking residents are under the age of 64 and predominantly concentrated in the over 18 age group, as seen in *Figure 3* to the right (*Appendix D, Figure 3*). However, it is important to note that a significant proportion of residents ages 5-17 identified as Spanish-speakers. More than half of all Secaucus

residents identified as speaking a language other than English, including languages other than Spanish.

Approximately 31% of Secaucus residents are considered foreign-born, of which over 40% are not considered United States citizens (*Appendix D, Figure 4*). This foreign-born population is predominantly from Asia or 'the Americas'--defined for these purposes as Latin, Central, South and North (Canada).

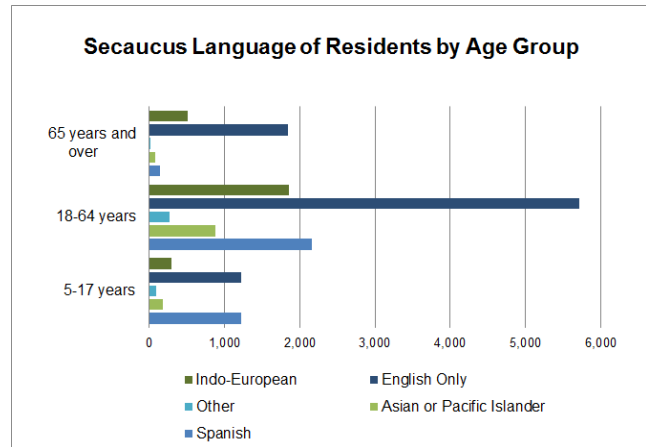


Figure 3: Language in Secaucus by Age (*Appendix 1c*)

Education

When comparing the educational attainment of Secaucus to the state of New Jersey, the data does not reveal consistent findings indicating a distinct difference between the two population groups. For example, at 30%, New Jersey has a higher percentage of residents with a high school diploma, than does Secaucus, at 26%, but Secaucus has a

greater proportion of residents with bachelors and graduate or professional degrees (*Appendix D, Figure 5*). For example, 24.5% of Secaucus residents hold a bachelor's degree and 16.5% of them hold a graduate or professional degree, compared to 22% and 13% for New Jersey, respectively. When comparing whether Secaucus is more or less educated than New Jersey residents overall, certain metrics may be misleading. For example, Secaucus has a smaller percentage of residents with a high school diploma than does New Jersey, at 26% and 29.5%, respectively, but it is impossible to know if the 3.5% gap is made up with individuals who are more or less educated than high school graduates.

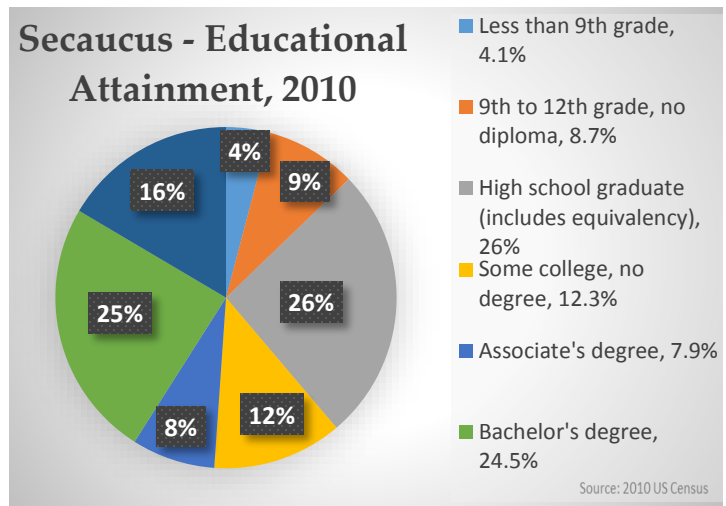


Figure 5: Educational attainment in Secaucus

Home ownership

This data (*Appendix D, Figure 6*) is not sophisticated enough and does not warrant a detailed examination. More Secaucus residents own homes compared to the rest of New Jersey. But the percentages are close and do not have deep implications. Home

ownership rates are important when considering emergencies, residents' investments, their insurance plans and potential losses incurred.

Persons per Household

Compared to New Jersey (*Appendix D, Figure 7*), Secaucus has less persons per household, at 2.58, compared to 2.7. The implications of this are not readily visible, nor are the numbers so different as to warrant significant findings.

Poverty

Secaucus has a smaller percentage of its population living below the poverty line, compared to New Jersey and the United States (*Appendix D, Figure 8*). At first glance, 7.6% compared to 9.9% does not seem significant, but a 2.25 % difference is meaningful, especially regarding poverty. For example, for the population of Secaucus, the total population estimate for 2013 is 18,311, which means that $(18,311 * .076)$ 1,392 of Secaucus residents live below the poverty line. But, if 9.9% of Secaucus residents lived below the poverty line, that would equal 1,813 people living in poverty. That is a difference of 421 people. Considering the hardships and disadvantages that the impoverished face, this difference may be considered significant, especially considering that nearly 15% of Americans live below the poverty line.

Population Density

Relative to New Jersey, the densest state in the United States, Secaucus is more than twice as densely populated. This is significant for many reasons, but especially for emergency planning. Emergency planning is directly linked to how many people are living in a particular area, and the more people living in a defined area, the greater the potential for death, injury or other dangerous conditions. Population density needs to be factored in when charting evacuation routes, planning for shelters, anticipating power outages, preparing medical supplies and the numerous human needs that must be met in the event of an emergency. When drafting a resiliency plan, Secaucus should emulate regions with comparable population densities and scale them to their needs, with New York City being a tangible and potential example.

A map (*Appendix C, Figure 5*) shows the average population density of each of the ten block groups in Secaucus (statistical divisions of census tracts, are generally defined to contain between 600 and 3,000 people³) represented in a map. The least dense area of Secaucus is the block group at the southern portion of the town where 359 or less people live per square mile; the most dense block group, in approximately the middle

³ https://www.census.gov/geo/reference/gtc/gtc_bg.html

of town, is settled at a density of more than 16,000 people per square mile. This is potentially misleading, given that the population of Secaucus is approximately 18,000 people, but it is important to recognize that the block group in question is much smaller than one square mile.

Household Income

Household income shown in *Figure 10* below depicts Secaucus as a fairly affluent community (*Appendix D, Figure 10*). However, this graph is misleading because the income cohorts are not of equal intervals; they are separated into \$5,000 cohorts, then a \$10,000 cohort, \$15,000, three \$25,000 cohorts and a \$50,000 cohort. This is done because displaying \$5,000 cohorts from \$10,000 to \$200,000 would consume too much space and because the number of households in upper income categories usually decline, which makes grouping them logical. But this graph shows fairly large numbers of households in the \$75,000 to \$125,000 cohorts. Whether or not this seems like a middle class household or higher is relative, especially because the \$25,000 spread of each cohort is large and can be significant for many households. Secaucus had 6,015 households in 2010, and 9% of them (548/6,015) earned more than \$200,000 in one year. This represents an affluent community, especially because this is the fourth largest cohort out of sixteen total cohorts, and larger than all cohorts below the \$75,000 - \$99,999 cohort.

The map of this shows where Secaucus residents live based on the median household income of each of the ten block groups (*Appendix C, Figure 4*). Graphically it can only map the median income, which is distorted by areas characterized by industry rather than residences – however, it is still telling that the most affluent area is in the Southeastern half, while the center of the city has more income diversity.

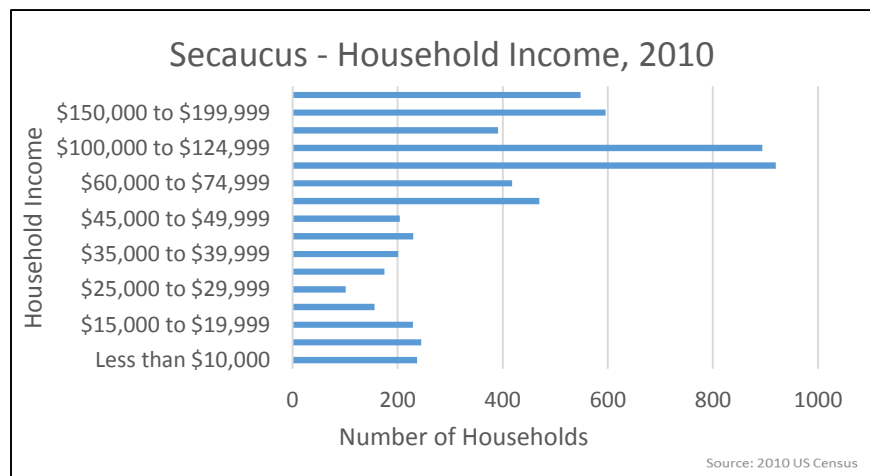


Figure 10: Household Income

b. Land Use and Community Planning

Existing Land Use Profile

Table 6 helps to summarize the land use patterns that exist in Secaucus, with the highlighted percentages depicting the major types of the land use (*Appendix D, Table 6*). Although the NJDEP provides Land Use/Land Cover for the area as delineated below,

regulation of the area falls within the purview of the NJMC. The relationship for control of zoning between the town and the commission is complex, but can best be summarized in that Secaucus only has zoning authority over 12% of its land area. For this reason, the official regulation of these areas by NJMC may differ from the land uses listed below. Within this regulatory context, the role of NJMC is to promote comprehensive planning within the region and to preserve and protect critical wetland areas from future development. Due to both area constraints as well as established land use and environmental regulations, future development in Secaucus will need to rely on redevelopment opportunities.

Zoning

There are 21 different zoning designations used in Secaucus. The largest zoning designation is Light Industrial A (LIA), this takes up 26%

of the land area and 149 parcels. There are other light industrial zoned areas, Light Industrial B and Light Industrial Zone 1, these zones make up 2.27% (35 parcels) and 2.11% (13 parcels) of land area, respectively. In total Light Industrial zoned areas comprise 30.4% of the total area of Secaucus, or 197 parcels. All areas zoned for Light Industrial uses are located in the center of the town and spanning almost the entire width of the town. Heavy Industrial takes of .86% of the area (16 parcels). This zone is located in a small section of the town along the eastern edge next to the Light Industrial B zone. **The second largest zone by land area is area zoned as Environmental Conservation, this takes up 21.2% of the total area, which should be noted as a strength in terms of resiliency to coastal storm threats, flooding and sea level rise (40 parcels).** As noted, Secaucus is part of the Meadowlands area of New Jersey and therefore contains a large amount of wetland areas. These areas are located on the North, South and Western edges of the town of Secaucus. Related to this zone is the Water zone, which comprises .03% of the town’s area.

Table 6: Land Use in Secaucus	
Existing Land Use	% of Total Area
Residential	13.0%
Residential - Rural	0.0%
Residential - Low Density	0.0%
Residential - Medium Density	1.2%
Residential - High Density	11.8%
Built-Up	8.4%
Commercial/Services	10.2%
Industrial	20.1%
Infrastructure	11.3%
Vacant	2.4%
Recreational	2.3%
Forest	6.1%
Wetlands	10.0%
Water	16.2%
TOTAL	100%

The next largest zone by land area is Residential Zone A, at 7.8% of total land area. This is significantly smaller than the previous land uses but comprises 1,344 parcels, as residential parcels are significantly smaller than parcels zoned for industrial uses. In total, residential-zoning comprises 17.78% of the total land area and 2,879 parcels of the

total parcels. The residential areas are generally located in the northwest portion of the town but there are also clusters of residences in central-east section, next to the industrial area and Planned Residential zone is located on the central-western edge of town, on the opposite side of the industrial area. Regional Commercial is 7.2% of land area and 50 parcels. This area is located in the north-east portion of town. There are four other commercially-zoned areas in Secaucus. The Commercial Park zone makes up 1.77% of land area and 30 parcels; this area is located along the western border of the town. Neighborhood Commercial makes up 1.53% of area (96 parcels) and is located within the residential area. Highway Commercial is .36% of the area and 22 parcels; it is also located near the residential area. Commercial Zone (CZC) makes up .15% of the area and 38 parcels. This zone is located adjacent to the Neighborhood Commercial and Residential Areas. In total, 11% (236 parcels) of Secaucus is zoned for commercial uses.

The remaining zoning areas in Secaucus make up smaller portions of the town but are no less important. The Redevelopment Area zone is 6.55% of the total land area (31 parcels). These area are clustered in the southern portion of the town. As this is an area that could see some future development, careful planning will be needed so that any development will be designed with resiliency in mind. One parcel, located in the Light Industrial area, is zoned as Multiple Zones and makes up .2% of the land area. The Public Utility zone is .29% of the land area between two parcels of Secaucus.

Parks and Recreation zoned areas are located throughout the town. In total, they comprise 6.2% of land area, spread across 19 areas of varying sizes. Some of the recreationally-zoned areas in Secaucus take advantage of the river and wetland areas within the town, and the unique habitats and views they provide.

The Transportation Center zone makes up 1.02% of the land area and seven parcels. This includes New Jersey Transit's Secaucus Junction Station, located at the southeastern edge of the town. Road, Rail and Right of Ways make up 4.9% of the land area and are the locations of the numerous roads and railroad tracks that intersect the town. Transportation is important sector in Secaucus, as the train station is a key transfer hub, connecting many train lines, and is especially popular due to frequent service and close proximity to New York City. Due to the many large warehouses and industrial zones, transportation via trucks and other vehicles is also very important.

In summary, the town can generally described as primarily having three major zoning designations: Light Industrial, Environmental Conservation and Residential. *Appendix D, Table 7* lists each zoning designation, acreage, and the percent of the total land area taken up by each zone and the zoning map is housed in *Appendix C, Figure 7* for reference.

c. Infrastructure Systems

Economic Profile

According to the County Business Patterns of the United States Census, there are 944 businesses in Secaucus with 33,556 total paid employees as of 2012. Total annual payroll for 2012 was 1,977,128,000. Almost half of the businesses in Secaucus only employ 1-4 people at 440, and 807 businesses have under 50 employees. The dominant industries in Secaucus are Wholesale Trade, Retail Trade, and Transportation and Warehousing, which make up 371 of the total businesses. This is likely due to the presence of the food warehouse and distribution centers, outlet mall, and Secaucus train station.

Additionally, given the proximity of Secaucus to New York City and many major highways, it serves as a hub for freight traffic. Professional and management jobs are significantly lower, at a total of only 119 businesses.

Due to its proximity to the Ports of New York and New Jersey and New York City, Secaucus houses some of the largest corporations, warehouses and company headquarters in the country. The Census reflected that there was approximately \$6.9 million dollars of manufacturing business that was accumulated in the town. One of the largest corporate residents is the headquarters of Goya Foods. Goya Foods is the largest Hispanic-owned food companies in the United States. It produces foods sold primarily in the United States and other Hispanic countries. Their headquarters occupy a 240,000 square foot building on Seaview Drive in the industrial section of Secaucus and has been there since the mid-1970s. In 2007, Forbes ranked Goya 355 amongst the best privately owned companies in the United States. In 2012, it was reported that Goya had officially cumulated over \$1 billion dollars in revenue.

Other prominent corporations with facilities located in Secaucus include: Gucci, Hartz Mountain Industries, MLB network and WWOR Channel 9 television. There many other businesses located in the Secaucus industrial and commercial districts.

Food Systems

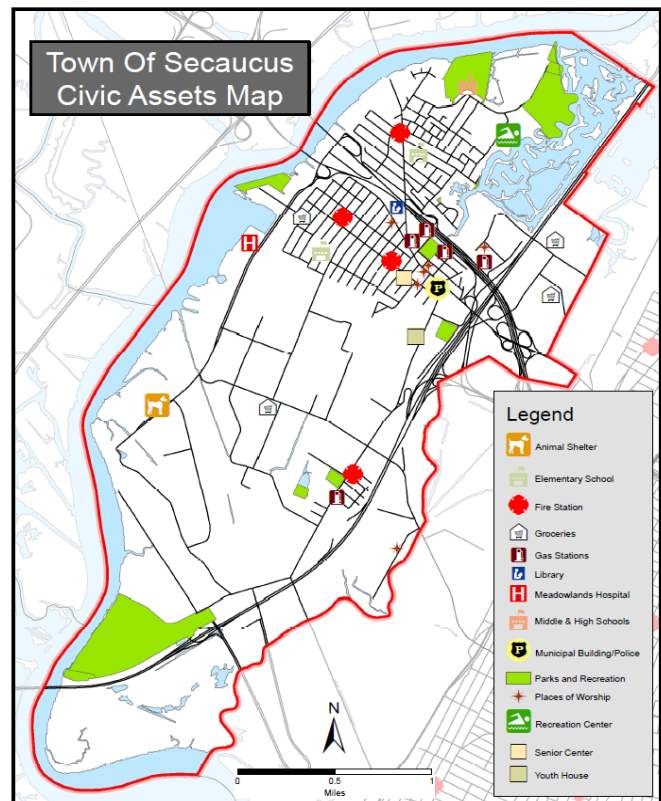
Secaucus, is home to many food wholesale and distribution companies. Some of these companies provide a significant amount of food items to New Jersey residents and even across the country; for example, Maurice A. Auerbach Inc. is the largest distributor of garlic in the northeastern United States, and Goya Foods is an internationally-recognized brand and the largest Hispanic-owned food company in America. Secaucus' role as a transit hub and its proximity to several major roads and highways make these warehouses and distribution centers critical in providing the state and country with food supplies. As stated previously, the food systems in Secaucus are large tied to the significant size of the warehousing and wholesale trade sectors of the local economy.

There are 17 businesses solely dedicated to wholesale food distribution and warehousing in Secaucus.

Secaucus only has one supermarket, a Wal-Mart. There are major supermarket chains in surrounding towns, but most of the large lots in Secaucus are dedicated to other retail shopping or warehouse space. Secaucus also houses “Secaucus Food Pantry”, an emergency food pantry at 10 Center Avenue. As of 2011, almost 2 dozen families used the Secaucus Pantry every month. Additionally, as of 2011, Hartz Mountain Industries donated a 3,000 square foot facility to be used as an emergency food pantry for the next five years, free of charge. The facility is located at 210 Meadowlands Parkway.

Community Facilities and Civic Assets

A geo-referenced map of places in Secaucus to the right (*Appendix C, Figure 16*) which labels assets to the community, helps to identify the inventory of resources that the township and community have in the event of an emergency. Overall, throughout Secaucus, there are 4 Fire Stations, 1 Police Station, 2 Elementary Schools, 1 High School, 1 Hospital, 5 Places of Worship, 1 Library, as well as other assets such as parks and recreation, grocery stores, and gas stations. Looking at the map, there is a wealth of resources concentrated in the northern portion of Secaucus. In the case of emergency, a concentration of resources may serve only a portion of the population, and so a greater spread of assets could be a meaningful goal for Secaucus moving forward.



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An Overview of Housing in Secaucus

Based on 2012 American Community Survey (*Appendix D, Table 3*), the town of Secaucus has 6,750 housing units. The town has a high occupancy rate of 92.1% (6,214 units), with vacant housing units totaling 536. The homeowner vacancy rate is 1.2% and the rental vacancy rate is 5.4%. These high occupancy rates, in conjunction with fairly

low vacancy rates are important to note – in the event of a disaster where homes are impacted or destroyed, there would not be a large surplus of stock to temporarily house residents of the town. Of the occupied units (6,214), 64.1% are owner-occupied and 35.9% are renter-occupied. The average household size of an owner-occupied unit is 2.64 persons. The average household size of a renter-occupied unit is slightly smaller at 2.48 persons. Since the household size is fairly small (either 2.64 or 2.48) it follows that the occupants per room figures are low; 97% of units have 1.00 occupants or less per room, 2.1% of units have occupants per room figures of 1.01-1.50 and .9% of units have occupant per room figures of 1.51 or above.

The largest portion of the units in Secaucus are one unit detached structures representing 30.3% of the housing stock (2,043 units). The next most common residential structure type is two unit buildings with 23.1% or 1,558 units. The third most common structure type is buildings with 20 or more units, 16.7% or 1,128 units.

Housing Stock and Value

The age of the housing stock is varied as there is no one time frame dominates. As seen in *Table 4*, of all the units in Secaucus, 13.8% were built between 1990 and 2012. Between 1960 and 1989 51.4% of the housing stock was built. From 1980 and 1989, 18.9% of the structures in town were built, the largest portion of units constructed per year range. Structures built before 1960 comprise 35% of the units in Secaucus (*Appendix D, Table 4*).

Table 4: Age of Housing Structures		
Year Structure Built	# Units	Percent
Total housing units	6,750	100%
Built 2010 or later	39	0.6%
Built 2000 to 2009	680	10.1%
Built 1990 to 1999	208	3.1%
Built 1980 to 1989	1,273	18.9%
Built 1970 to 1979	1,193	17.7%
Built 1960 to 1969	998	14.8%
Built 1950 to 1959	963	14.3%
Built 1940 to 1949	330	4.9%
Built 1939 or earlier	1,066	15.8%

Nearly three quarters of occupied units use utility gas to heat their homes (73.6% or 4,575 units). Almost 20% uses electricity (19.4% or 1,208 units), 4.8% (or 297 units) use fuel oil or kerosene and 1.9% (116 units) use bottled, tank, or LP gas to heat their homes.

Housing value in Secaucus is fairly high, the majority (52.9%) of owner occupied units (3,984) are valued between \$300,000 and \$499,999. The more expensive housing units (between \$500,000 and \$999,999) make up 27.7% of owner occupied units. Million dollar or above homes number 88 in Secaucus. Less expensive units (under \$200,000) make up 17.2% of units. The median owner occupied unit value is \$418,200. Three quarters of the owner occupied units have a mortgage, 75.9%. Of those with a mortgage, the median

monthly owner cost is \$2,612. Occupied units paying rent total 2,169. The median gross rent payment is \$1,391.

Housing Density

Appendix C, Figure 9 shows average housing units per square mile in Secaucus' ten Census block groups. The map does not reveal drastically different insights than the population density map; the most population dense and least population dense block groups in Secaucus correspond to the housing density block groups. However, there are differences between the housing and population density maps, which may be accounted for based on the data breaks. Or there may be differences based on the household size of families in certain block groups. Regardless of these nuances, this map shows the areas that may require the most attention in the event of an emergency, as those areas are where the highest number of housing units exist in a certain area.

Transportation

Secaucus serves as a transportation hub for many commuters; the Secaucus Junction Train Station connects all New Jersey Transit commuter rail lines except for the Atlantic City line, as well as Metro North's Port Jervis line.

Additionally, adjacent to the station is a private "Park and Ride" lot, so commuters outside of the Secaucus town limits have the option of using the Secaucus station as their transit stop of choice.

The average trip time to New York City by train is only ten minutes.



Picture 2: Secaucus Junction Train Station (photo: Jaime Broderick)

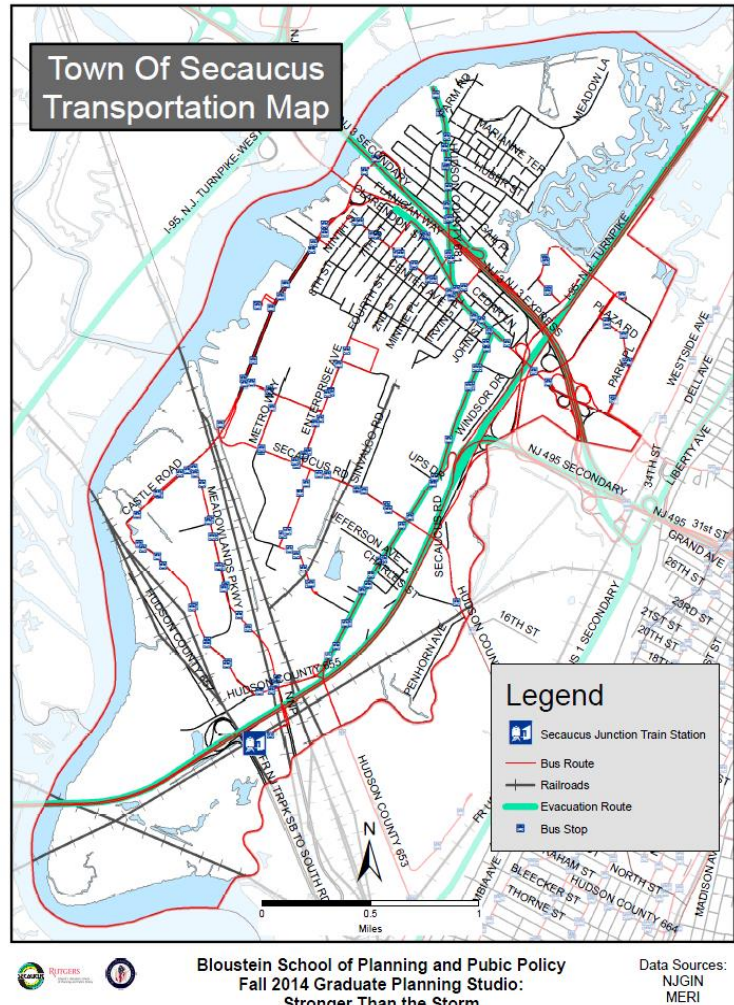
Secaucus is also well-connected via roadways, as seen in the map on the following page (*Appendix D, Figure 15*). The New Jersey Turnpike's Eastern Spur passes through the town, with Exit 15X next to the train station. New Jersey State Highway 3 crosses through the town, providing connections to U.S. 46, Interstate 80 and Interstate 495. Interstate Highway 495 is especially critical as it leads to the Lincoln Tunnel and takes commuters through New York City and Long Island. Newark Airport is only ten miles south of Secaucus. Both Enterprise Rent-A-Car and Zipcar have locations in Secaucus.

Vehicles available per housing unit is another key statistic to understand, especially for our purposes to understand town and resident resiliency, as having a car alludes to

family income. The presence of a vehicle can be considered a liability, as vehicles do get damaged in disasters. However, vehicle availability also allows for easier evacuations and those with vehicles are often less reliant on government support during a disaster.

Of the occupied units in Secaucus, 43.2% (2,685 units) have one vehicle available, 32.7% (2,030 units) have two vehicles available, 15.1% (936 units) have three vehicles available and 9.1% (563 units) have no vehicles available.

Secaucus is served by both its own bus network, as well as by outside bus lines. The internal bus network provides various transit links within Secaucus as well as to neighboring municipalities. Many New Jersey Transit buses stop at the Harmon Cove Outlets, the central business district and Harmon Cove Towers. At the present time, the bus stop at the Secaucus Junction Station is being expanded to provide additional bus capacity to meet demand. There is also express bus service from Secaucus to Port Authority of New York City, which is just a 20 minute trip. Additional bus routes provide service to Newark, Hoboken, Paterson and New Milford. A full list of bus schedules and routes can be found in the accompanying maps and bus schedules in *Appendix G*.



Utility Services and Wastewater Treatment Water Supply

According to the United States Environmental Protection Agency (USEPA) Annual Drinking Water Quality Report for New Jersey, United Water is responsible for providing water to Secaucus, NJ. The water supply in Bergen and Hudson counties is sourced from four reservoirs: Oradell, Woodcliff Lake and Lake Tappan Reservoirs in

Bergen County and Lake DeForest Reservoir in Rockland County, NY.⁴ The water supply is primarily derived from surface water which is treated at the Haworth Water Treatment Plant located in Haworth, NJ.⁵

Wastewater Treatment

The Secaucus Municipal Utilities Authority is responsible for processing and treating the wastewater generated in Secaucus and operations in conjunction with the Department of Public Works. There is a single wastewater treatment facility in Secaucus which processes about 3,100,000 gallons of water a day, located at 1100 Koelle Boulevard. The final discharge for all wastewater treated at the plant goes into Mill Creek. It is compliance with all environmental standards set by NJDEP.⁶

Electric Power and Telecommunications

Hudson County and adjacent municipalities are serviced by PSE&G. Other electric utility service providers in the northern part of New Jersey are Jersey Central Power and Light and Rockland Electric Company.⁷

d. Environmental and Natural Systems

Assessment of Environmental Characteristics: Wetlands, Wildlife, and Open Space

Secaucus is bounded by the Hackensack River which travels for six miles along western and southern borders of the town. The waterfront area along the river was once extensive wetlands, an interface between the land and the brackish and tidally inundated water of the Hackensack. These wetlands provided natural benefits that were lost as Secaucus became developed; these benefits included storm-water run-off and flood control and pollutant filtration. The wetlands also provided a home for numerous fauna and flora that require the specialized habitat provided by wetlands⁸.



Picture 3: Secaucus Riverwalk (photo: Jaime Broderick)

Some of these wetland areas have been reclaimed from the industrial past of Secaucus and have experienced a high degree of mitigation and rehabilitation. **Rather than focus**

⁴ <https://www.unitedwater.com/nj-water.aspx?terms=water+quality+report+New+Jersey>

⁵ <http://cfpub.epa.gov/safewater/ccr/index.cfm?action=ccrsearchresults&view=keywordsearch>

⁶ <http://www.secaucusmua.org/mission/>

⁷ <http://www.njcleanenergy.com/main/public-reports-and-library/links/electric-utilities-territory-map>

⁸ <http://www.njmeadowlands.gov/njmc/about/natural-resources.html>

on restoration of a particular point in the past, these projects enhance the ecological value of a site. This includes the removal of previous fill and creation of meanders and tidal channels, to promote increased tidal flow. Shallow pools have been excavated, creating open water habitat. Much of the rehabilitation work has also included the removal of invasive species, such as common reed (phragmites), that prohibit the growth of native and beneficial wetland plants. A variety of native emergent wetland plants have been introduced and have begun to colonize these sites, including Big Cordgrass and Virginia Glasswort.

These wetland enhancements emulate low marsh and lowland scrub-shrub habitats. While providing the residents of Secaucus with natural hydrologic controls, access to the Hackensack and its recreation opportunities, these landscapes have also resulted in the creation of breeding, wintering and migratory habitats for waterfowl and shorebirds. During a 2000 study, some 55 species of birds were observed at these sites; recent studies have observed 76 species, including 14 breeding species.

Much of the waterfront area is today preserved as parks and open space, including Laurel Hill County Park and Riverbend Wetland Preserve, located at the south end of the Secaucus, and Mill Creek Marsh and Mill Creek Point Park located at the north end. These areas are open to the public and offer various recreational activities, including kayaking, fishing, bird watching and nature walks.

Known Contaminated Sites

The number of contaminated sites is another key part of the environmental makeup of Secaucus, given the industrial history of the town, and continuing efforts to remediate the land. Known Contaminated Sites (KCS) are defined by the New Jersey Department of Environmental Protection (NJDEP) as sites where contamination of soil or ground water is confirmed, at levels greater than applicable clean up criteria or environmental standards. The eventual remediation of these sites are of a wide variety, ranging from simple “cut and scrape” cleanups to more complex processes; these sites can have several sources of contamination, affecting both ground water and soil simultaneously.

The NJDEP has broken down KCS into three categories: “Active Sites with Confirmed Contamination;” “Pending Sites with Confirmed Contamination;” and “Closed Sites with Remediated Contamination.” Secaucus contains 169 KCS, are broken down as: “50 Active Sites with Confirmed Contamination;” “6 Pending Sites with Confirmed Contamination;” and “113 Closed Sites with Remediation Contamination.”⁹

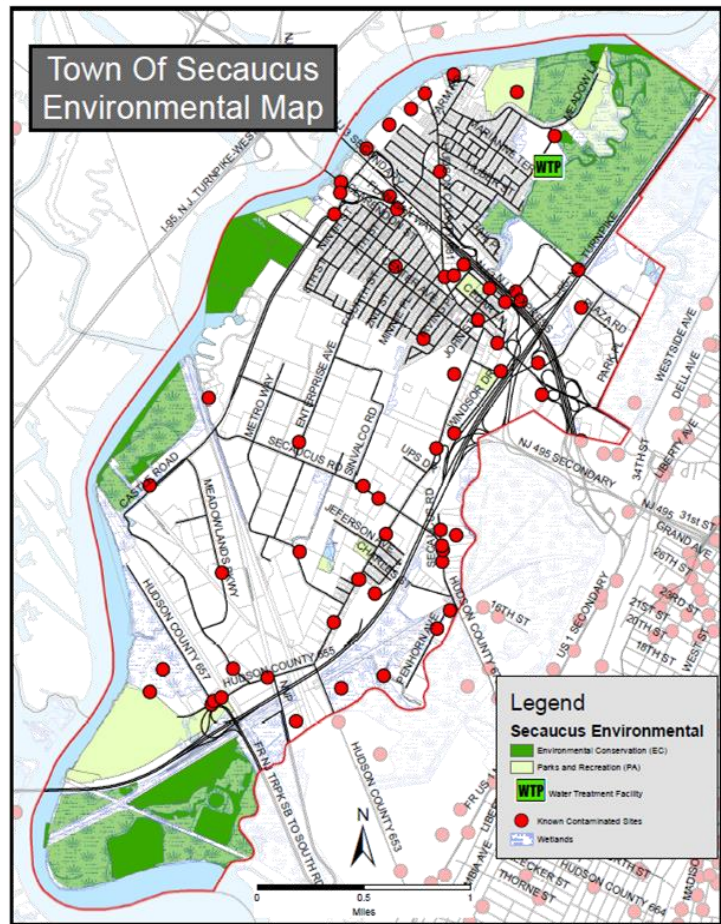
⁹ Source: New Jersey Department of Environmental Protection

Environmental Map Analysis

The environmental map of Secaucus below (Appendix C, Figure 17), points out that the town has a wealth of wetland areas, mostly on its outskirts closer to the rivers. Greenspaces, parks and conservation areas, are likewise prevalent on the map, and are also more concentrated on the outer portions of Secaucus. The water treatment facility in Secaucus is in the northeastern tip, bordered by wetlands that buffer it from the Hackensack River.

e. Health and Social Services

The *Community Facilities and Civic Assets* section described some of the healthcare, public safety and emergency preparedness, educational, and information services within Secaucus. In addition to these facilities and assets, Secaucus also has many other health and social service resources that serve the town.



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Fall 2014 Graduate Planning Studio:
Stronger Than the Storm

Data Sources:
NJGIN
MERI

Health Services

Secaucus is home to the Meadowlands Hospital Medical Center, which offers an array of clinical services. Likewise, the township has a Bilingual Mental Health Services that aims to “provide affordable culturally congruent mental wellness services for children and caregivers in Early Childcare & Preschool settings”¹⁰ and a Youth Consultation Services that can provide either residential care or in-community and in-home services for children who have been separated from their loved ones because of trauma or intellectual/developmental disabilities that prevent them from living at home.

Aside from these private healthcare businesses, the township itself employs a Health Department which: “addresses public health issues; records and responds to all

¹⁰ Bilingual Mental Health Services Corporation, <http://www.bmhscorp.com/>

complaints and concerns regarding public health, property maintenance, and animals; licenses and completes sanitary inspections on all retail food, seasonal food, hair, nail, tanning, tattoo, massage , pool, & mobile truck establishments”¹¹. Overall, the department is meant to promote health and well-being in Secaucus on a normal basis.

Social Services

The township has a robust variety of social services that include a Social Service department, Senior Services, Community Services, and an after-school Aftercare Program. The Social Service department’s duties are to assist with Emergency family services, the Emergency Food Pantry, Application/Form Assistance, Medical Screenings, and a Low-Income Holiday Program. The Secaucus Senior Center provides “social interaction for seniors, recreation, educational programs, speakers, games, movies, billiards, cards, bingo and arts & crafts for seniors 55 and older” along with a “bus service that provides transportation around town, to supermarkets and other local stores and malls and also planned trips to attractions”. Likewise, the Meals on Wheels is run at the Senior Center, and either delivers hot meals to the homebound Monday through Friday, or congregate meals at the center. The Secaucus Community center is a multi-floor building that serves as a place for youth and teen activities daily. Finally, the after-school Aftercare Program serves school children from grades K-6 from school dismissal until 6pm.

As part of a “citizens corps” through FEMA, the Office of Emergency Management has a council that is dedicated to providing public education and training activities, support for volunteer programs like a Community Emergency Response Team (CERT), and other trainings for emergency response¹². Overall, this group aims to organize all volunteer and community Public Safety/Emergency Preparedness efforts.

¹¹ <http://www.secaucusnj.org/departments/health/>

¹² <http://www.citizen corps.fema.gov/cc/showCouncil.do?id=44957>

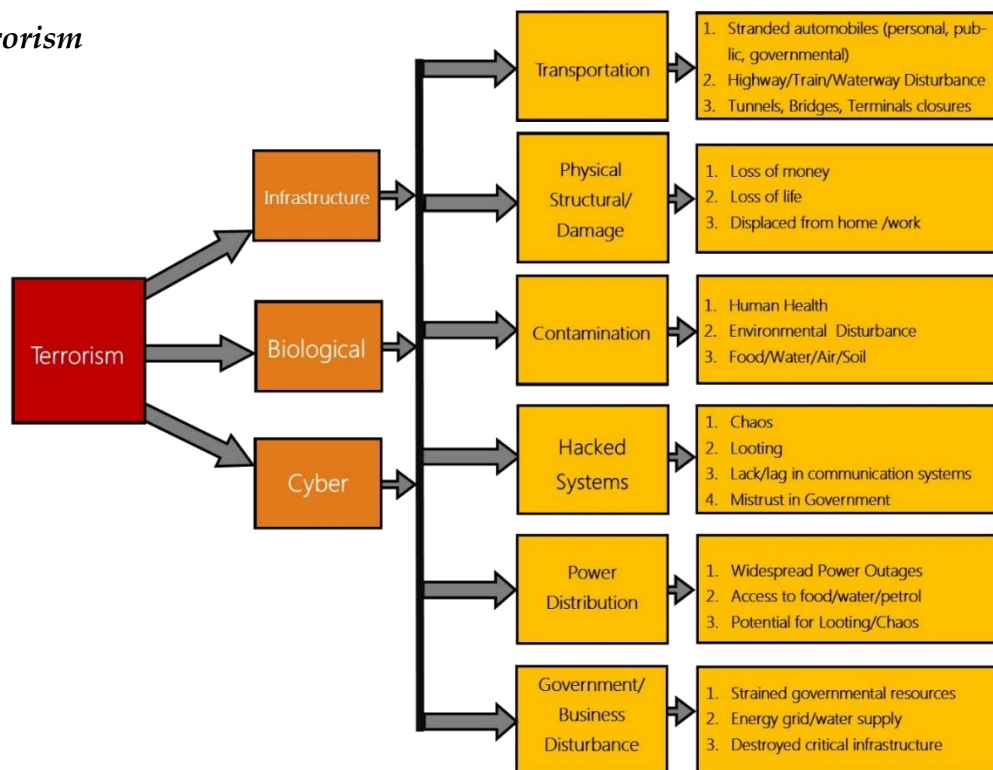
Appendix B: Community Risks and Vulnerabilities Full Report

Assessing risks and vulnerabilities within Secaucus is a major part of being able to make more specific recommendations and offer formal risk management strategies for the community. The purpose of this assessment is to identify the strengths and weaknesses of the current emergency preparedness procedures in Secaucus in the context of the identified vision, goals, and threats across the functional areas of: hazards, exposure, vulnerability, and consequence considering both man-made and natural disasters, with an emphasis on vulnerabilities related to flooding, storm-surge and sea level rise. The studio group identified the major risks and vulnerabilities through a range of methods, including: reviewing of exiting plans, mapping of hazards and impacts conceptually and geospatially, storm surge analysis, a community discovery questionnaire, as well as engagement with public stakeholders through a risk assessment index and in-person discussion.

Part 1: Identifying Risks and Hazards through Disaster Pathway Diagramming

Conceptual mapping through disaster impact pathways allows stakeholders and community members to break down the cascade of events and potential results of an emergency event. The studio group mapped four separate pathways in the categories of: Terrorism, Hazardous Materials, Coastal Storm/Flooding, and Winter Storm events. Potential risks in Secaucus are not limited to these events, but disaster pathways are easily adaptable and offer many benefits as a planning tool for emergency operations managers and services, township officials, and the community as a whole.

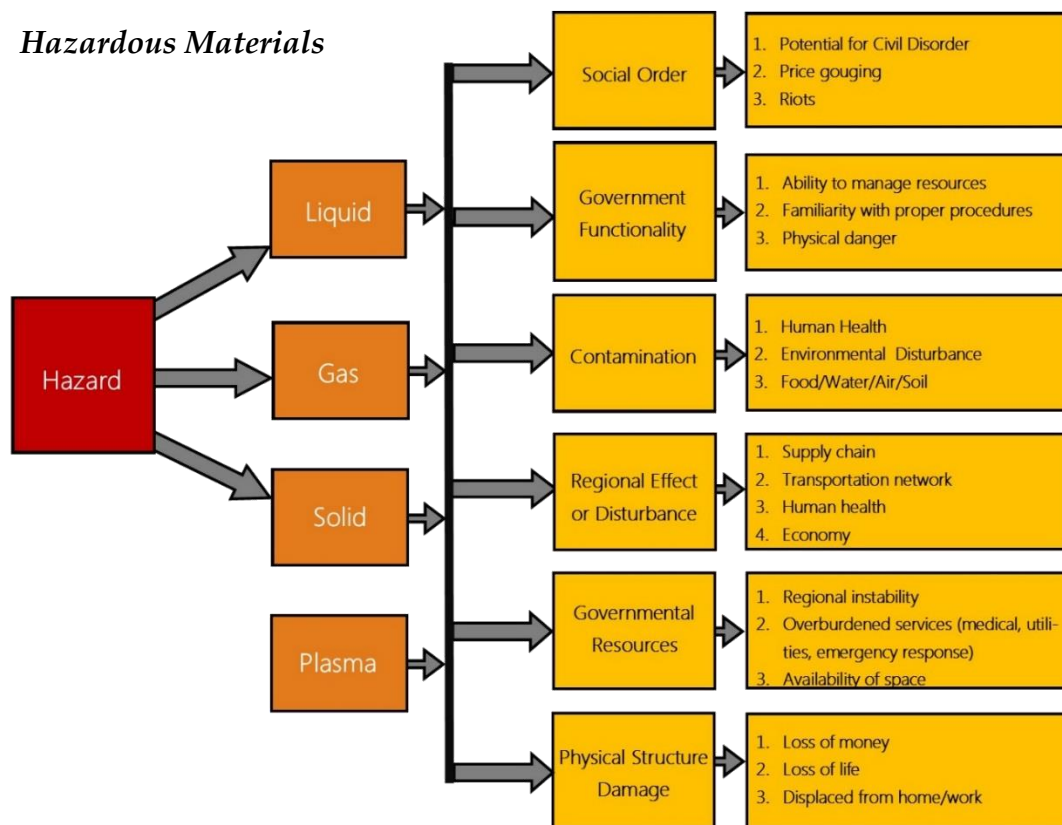
A. Terrorism



The studio group mapped three potential types of terrorism: cyber terrorism, bio-terrorism and physical terrorism. Cyber terrorism can take the form of hacking into computer systems, which may result in civil disorder, a lack or lag in communications systems and a mistrust in government, regarding the government’s ability to manage the cyber-attack and its fallout. Cyber terrorism can also aim to disrupt power distribution centers, which may result in widespread power outages, compromised access to food, water, petrol and chaos and looting. Cyber terrorism can also disrupt governmental and business functions, which may result in a temporary cessation of governmental resources and operations, a temporary discontinuance of the energy grid and water supply and a crippled critical infrastructure network.

Bio-terrorism threatens is the spread of contaminants, which may result in degraded human health, loss of life, a damaged natural environment and tainted food, water, air and soil supplies. Finally, physical terrorism would seek to incapacitate the transportation network or other physical infrastructure. An impaired transportation network may result in stranded automobiles (personal, public and governmental), cessation of rail services, waterway transportation and road, highway, tunnel, bridge and terminal operations. Damage to other physical infrastructure may result in a loss of money, resources and life, injury or threat of injury and the displacement of people from home and work.

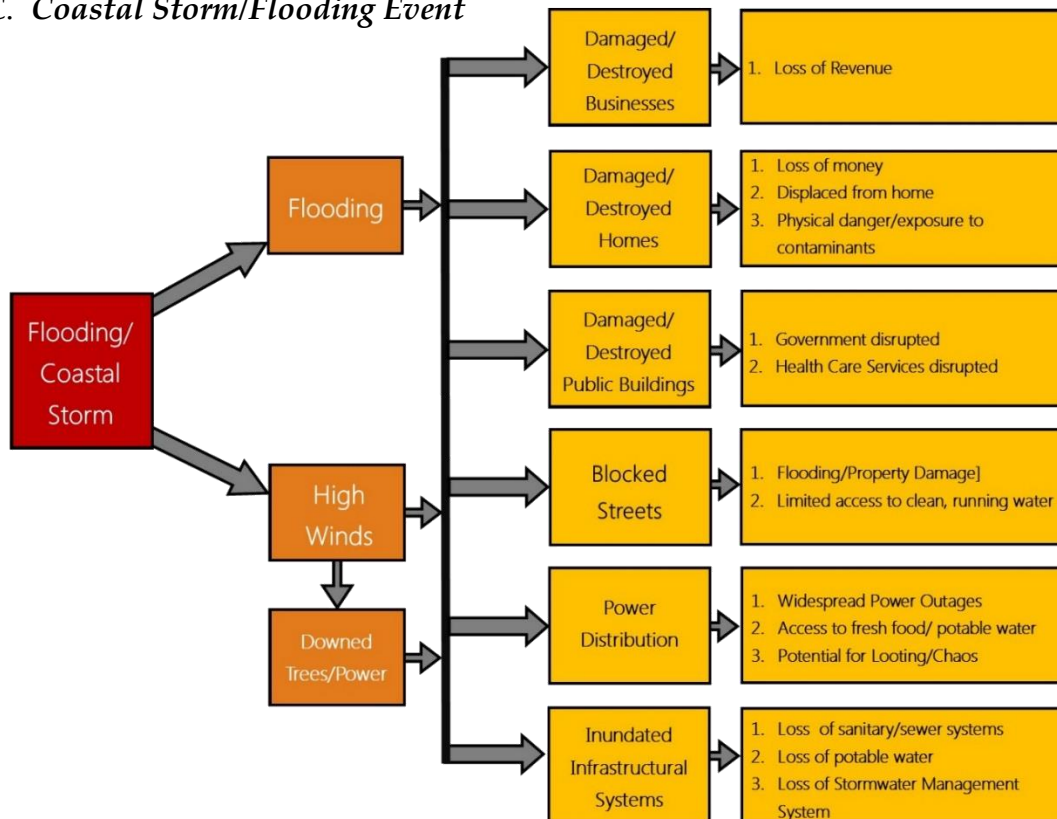
B. Hazardous Materials



A hazardous materials accident may adversely affect all areas equally, instead of particular threats that affected specific services, functions or infrastructure. All types of hazardous materials may adversely affect: social order, government functionality, the natural (and human) environment, regional stability, governmental resources and physical infrastructure.

A compromised social order may result in chaos, looting and price gouging; an impaired government may affect its ability to manage resources, may hinder familiarity with proper procedures, may result in health and safety concerns; general contamination to the natural (and human) environment may result in degraded human health, a damaged environment, tainted food, water, air and soil supplies; a regional disturbance may result in a disrupted supply chain, transportation network, economy and may adversely affect human health; a disruption to governmental resources may result in regional instability, an overburden on medical and emergency response services, and petrol, utilities and spatial availability; finally, harm to physical infrastructure may result in a loss of money, resources and life, injury or threat of injury and the displacement of people from home and work.

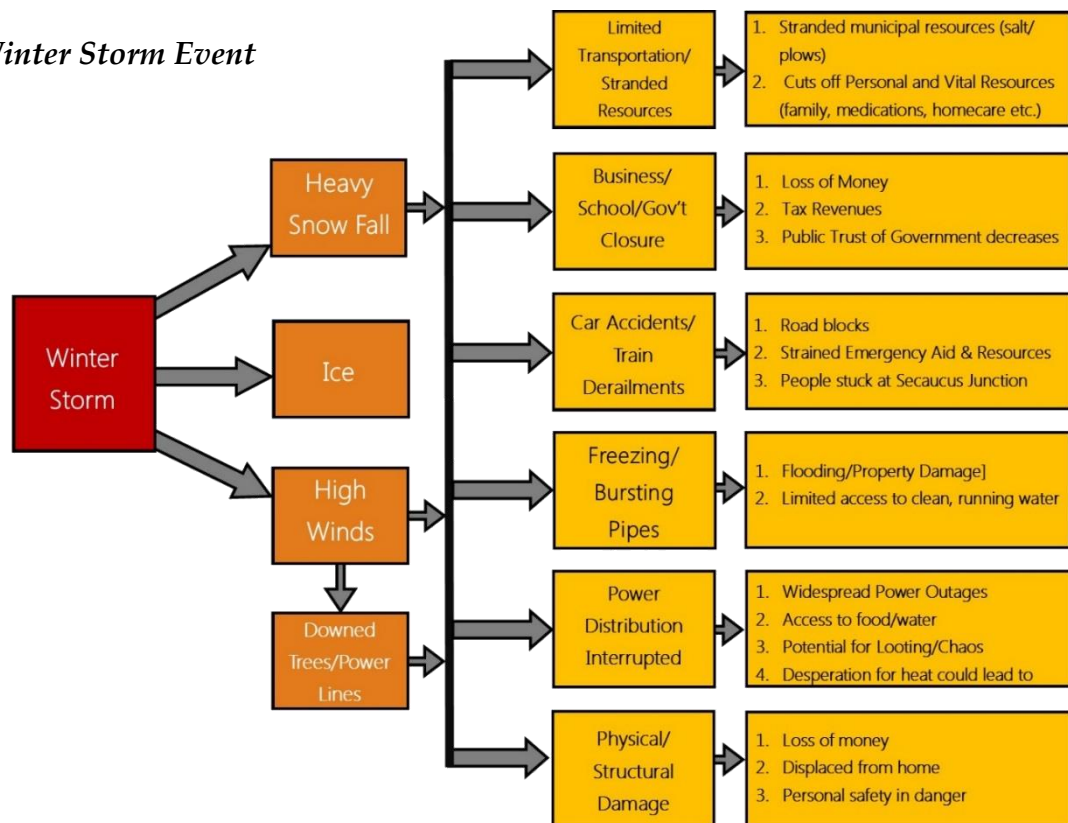
C. Coastal Storm/Flooding Event



Flooding and coastal storms are one of the biggest concerns when looking at potential hazards. Given the large portion of Secaucus located in the floodplain, it is important to be prepared for coastal storms that are inevitable and will occur regularly. Flooding has the potential to shut down homes, businesses, roads, and power systems. Since there is such a large number of people that commute to Secaucus for work, damaged roads and businesses result in a big loss of revenue for businesses and for the local economy. Since the warehouse industry in Secaucus is northeast hub for many goods, it is important to ensure roads are back up and functional as soon as possible. Additionally, residents who have to deal with flooding in their homes will have to replace damaged property and possibly seek alternate shelter or relocate if the damage is severe enough. This places a large financial burden on individuals and families alike.

Additionally, high winds often present in coastal storms can result in major infrastructure damage, including downed trees which will disrupt roads and power lines. Widespread power outages combined with bad weather make it challenging to restore power, so it is important to have standard protocols in place. Power outages are especially relevant in Secaucus because the large food warehouse industry relies heavily on a constant source of power to prevent spoilage. Aside from power, there is the potential for contaminated drinking water, damaged sewer systems, and breakdown of the storm water management system. Access to clean water and preventing water contamination are essential in ensuring resident health.

D. Winter Storm Event



Winter storms are an inevitable threat in the northeastern United States. Heavy snowfall and ice can make roads unusable and thus isolates residents from resources; the potential for residents to be cut off from health and emergency medical services is of particular concern. In the aftermath of heavy snow, roads can freeze over and become icy, which can continue resident isolation if not dealt with appropriately.

There are many similarities between the impact of winter storms and coastal storms. Both result in unusable roads, property damage, and widespread power outages. However, while the above description of coastal storms showed infrastructure damage, winter storms can place a different burden on infrastructure through frozen and ruptured pipes, once again leading to a lack of access to clean, running water. Additionally, while residents are isolated from essential resources, there is a chance that municipal agencies may be unable to access resources like snow plows and salt that would help clear roads and restore order. Another important issue to note in both winter storms and coastal storms is the damage and repair of transportation infrastructure. Secaucus has a bus network as well as a heavily-traveled NJ Transit train station, both of which bring a great deal of workers and revenue in to and through the city. Secaucus officials should also be prepared to work with and provide shelter for those who are stranded at transit stops during such storms.

Part 2: Storm Surge Analysis

In order to evaluate the interaction of flooding with key characteristics of the community, the studio group analyzed storm surge data in five significant areas: real estate, civic assets, transportation, environment, and select demographics. For the purpose of this analysis, the studio group used storm surge data at the four, five, six, seven, and eight foot levels. The surface and real estate analysis focused on parcels, buildings, and important resources associated with infrastructure including tide gates and water treatment facilities. Similarly, the environmental analysis focuses on park and recreational land, areas of environmental conservation, wetlands, and contaminated site locations to evaluate the impact of flooding on the preservation of these areas as well as potential safety concerns. The civic asset analysis identified areas such as fire stations, hospitals, and municipal facilities, as well as civic and recreation centers, hotels, churches, libraries, etc. As discussed earlier in the report, civic assets were selected based on the perceived resources they provide to the community and their feasibility of use as emergency centers. Whether they serve as a location for an emergency shelter or provide a necessary resource such as food, a greater spread of and accessibility to these assets is essential. The transportation analysis focused on multimodal routes and the impact of flooding on their ability to be used for emergency service delivery and evacuation. The central point of analysis was the Secaucus Junction

Train Station. Finally, the demographic analysis evaluated the racial and economic composition of potentially impacted area, specifically looking at White, Black, and Asian populations as well as income distributions.

Methodology

These analyses use storm inundation data at the four, five, six, seven, and eight foot levels due to the likelihood of storm inundation occurring at these levels in future storm events. The four foot storm inundation height represents a typical high tide in Secaucus and as such is relatable for residents. In addition, the five foot storm inundation height is the height at which residents receive emergency alerts. The eight foot storm inundation height represents what was experienced by residents during Hurricane Sandy in 2012. Analyzing inundation data at these three heights is important because residents and municipal leaders will have the ability to associate the storm inundation heights with common events and experiences. Each of the five analyses were performed using Geographic Information Systems (GIS) software using publicly available data from the New Jersey Geographic Information Network (NJGIN) and the Meadowlands Environmental Research Institute. To conduct the analyses, the studio group looked at the interaction of the storm inundation data with data from each of the five categories. Interactions were computed and exported from GIS to create the tables used later in this report. The interaction was evaluated at each of the storm inundation levels in order to create a comprehensive picture of the strengths and weaknesses of the site with regard to flood vulnerability. The studio group acknowledges that the analyses conducted and the characteristics chosen for analysis may not encompass the full range of vulnerable areas or areas for consideration, but they have been determined to be the most significant.

Results of Surface and Real Estate Analysis

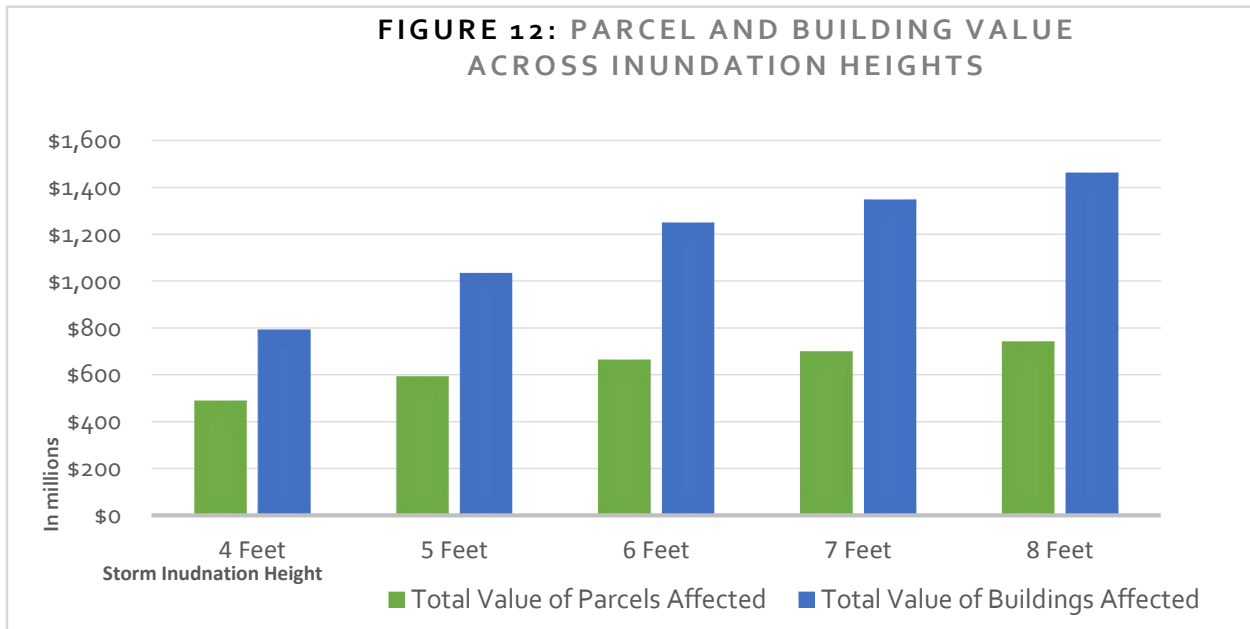
In conducting the topography and real estate analysis for the site, the studio group evaluated the amount of land surface impacted (LSI), the amount and value of parcels affected, and the amount and value of buildings affected. The baselines used to conduct this analysis are depicted in the table below and were computed using data from NJGIN. A map visually displaying this analysis is located in *Appendix A*.

Table 8: Baseline Figures for Surface and Real Estate Analysis		
Total Acreage (by parcels)	Total Land Value	Total Building Value
3,185 acres	\$996,892,250	\$1,814,505,780

Using the baseline figures above, the studio group determined that across all the storm inundation levels, the average number of parcels potentially impacted by inundation is approximately 880, with a low of 446 parcels with four feet of inundation to a high of 1,382 parcels under an eight foot inundation scenario. The average number of buildings potentially impacted is approximately 641 across all scenarios, with a low of 100 buildings and a high of 1,221 buildings. The average value of potentially impacted buildings was determined to be approximately \$1.2 billion and the average value of potentially impacted parcels was approximately \$639 million. The total percent of land surface impacted at an eight foot inundation scenario was as high as 49 percent. The lowest LSI was calculated at the four foot inundation level and was approximately 24 percent. The total number of residences that were found to be within a storm inundation area was approximately 966, which is roughly 22 percent of all residences in Secaucus (4,416). These calculations are depicted in the figure below (*Appendix D, Table 9*).

Table 9: Results of Surface and Real Estate Analysis

Inundation Level	Total LSI (acres)	Total LSI	Total Number of Parcels Affected	Total Value of Parcels Affected	Total Number of Buildings Potentially Impacted Residential vs Non-residential)	Total Number of Buildings Affected	Total Value of Buildings Potentially Impacted
4 Feet	750	23.5%	446	\$490,250,800	100 (50/50)	100	\$793,225,500
5 Feet	930	29.2%	630	\$594,073,100	295 (178/117)	298	\$1,034,642,000
6 Feet	568	35.4%	869	\$664,649,300	561 (353/208)	568	\$1,249,015,100
7 Feet	1351	42.4%	1075	\$700,679,100	1010 (721/289)	1019	\$1,347,562,400
8 Feet	1575	49.4%	1382	\$743,201,100	1221 (966/396)	1221	\$1,461,526,900



The conclusion that a mild storm with a four foot storm inundation could cost as much as \$793 million in structural damages and \$490 million in property in a worst-case scenario of damages is alarming. More alarming, is that during a storm with an inundation of eight feet (similar to the height experienced during Hurricane Sandy in 2012), the structural damages could be as much as \$1.5 billion and property damages around \$743 million. However, these damage price tags are a worst-case scenario where all affected buildings are completely destroyed. This is very rare and only happens in tsunami-type events, not as a result of storm inundations.

Results of Environmental Analysis

In the studio group’s environmental analysis, the studio group focused on the following community characteristics of the site: parks and recreational land, environmental conservation areas, wetlands, and known contaminated sites. The purpose of this analysis was to determine which of these areas would be impacted by flooding at each of the inundation heights. A map that delineates these details can be found in *Appendix B*. One valuable part of this analysis was the evaluation of the known contaminated sites (KCS) in Secaucus. Of the 61 KCS, the studio group found that an average of 6 sites would be impacted in a storm event, with a low-point (4-foot inundation) of 1 site and a high-point (8-foot inundation) of 12 sites (approximately 20% of the total). It is important to note that the source of the data used for this analysis is NJDEP. NJDEP uses a broad definition for contaminated sites that includes sites such as gas stations and could include underground storage tanks on residential properties. A more thorough determination of each of these vulnerable contaminated sites would need to be conducted to determine their true health and safety risk. However, there are no

known superfund sites in either Secaucus or Hudson County. The table below depicts the number of sites affected at each of the five inundation heights as well as an inventory of the specific KCS locations that are vulnerable to flooding. Additionally, a map of this analysis is located in *Appendix C, Figure 2*.

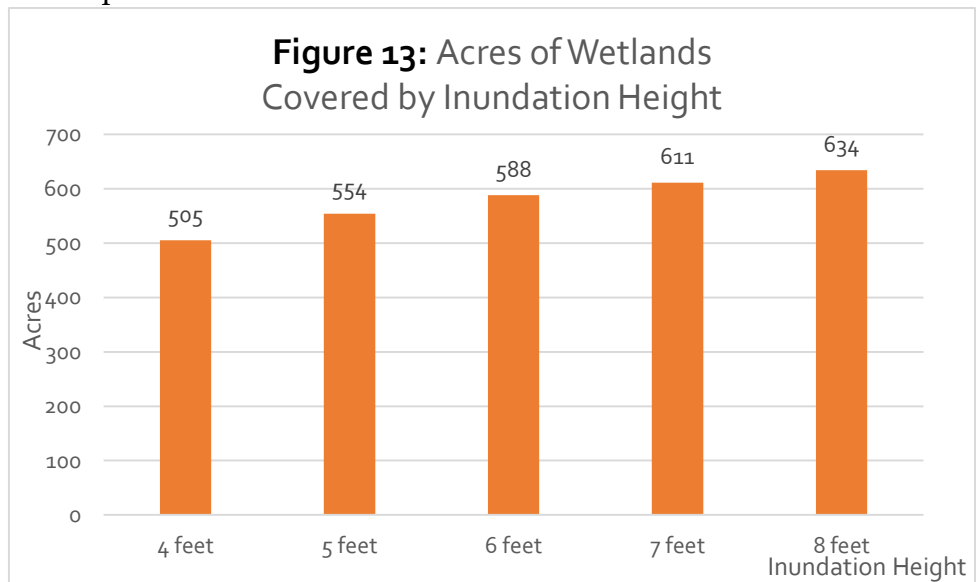
Inundation Level	Number of Contaminated Sites Potentially Impacted*
4 Feet	1
5 Feet	3
6 Feet	3
7 Feet	9
8 Feet	12

Amerada Hess Garage	Bidermann Industries
Viacom Data Center	Unknown 1
Unknown 2	NJ DOT
One Hour Martinizing	Mac Kays Landfill
Secaucus High School	Bank of America
Apex Trucking Co Inc	Abuhadba Inc

*Please note that all counts are cumulative across the inundation levels

In addition to the evaluation of KCS, the study group evaluated the acres of undeveloped wetlands that would be covered at each inundation heights and found a range of 505-634 acres. This is an important observation because had this land not been preserved or restored wetlands and instead been developed, this entire area would have been flooded. Under the assumption that the majority of the wetlands (due to remediation) is absorbing water that would otherwise have higher dispersion across the Secaucus landscape, this area of wetlands is preventing flood inundation as well. As depicted in the graph below, the acres of wetlands covered by inundation height increases at a rate of about 32 acres per additional foot of inundation height. However, it is important to note that the pace with which additional acres are covered slows

down significantly as additional feet of storm inundation are added. Currently, of the 4,061 acres of land in Secaucus, approximately 20 percent is preserved or restored wetlands.



Results of Civic Asset Analysis

To conduct the civic asset analysis, the study group used ArcGIS mapping software to run intersections with the previously determined civic asset locations and the storm inundation data. (A full map can be

found in *Appendix C, Figure 1*) There were a total of 36 previously geocoded civic assets used earlier in the report that were reused for this analysis. All categories of these assets can be found in the legend of the ‘Town of Secaucus Civic Assets Inundation Analysis’ map. The intent of this analysis was to determine the vulnerability of each of these locations to flooding at each of the inundation levels.

Categories of Potentially Impacted Civic Assets	Inundation Levels				
	4-foot	5-foot	6-foot	7-foot	8-foot
<i>Lodging</i>	2	2	3	5	5
<i>Food</i>			1	1	4
<i>Gas Stations</i>			1	4	4
<i>Schools</i>			1	1	1
<i>Civic and Recreation Centers</i>				2	2
<i>Churches</i>		1	1	1	1
<i>Medical Centers</i>		1	2	2	2
<i>Fire Stations</i>				1	1
TOTALS*	2	4	9	17	20

*Please note that all counts are cumulative across the inundation levels

As demonstrated by the table above, the studio group found that the number and type of civic asset significantly increased across the different inundation height levels. It is important to note that the category of civic assets list in this table is not the complete list used elsewhere in this document. It reflects only the categories of assets that were impacted by flooding. Of most concern are the types of facilities that are of particular importance during a storm or emergency including churches, medical centers, fire stations, and food retailers. Because many of these category facilities are located in close proximity to each other as well as located in areas vulnerable to flooding, it would be beneficial for civic assets to be relocated to areas that are less prone to flooding as well as dispersed more evenly over the site rather than clustered.

Results of Transportation Analysis

In the transportation analysis the studio group evaluated the number and types of routes that would be affected at each of the five inundation heights; all routes and inundation information can be found in the map in *Appendix C, Figures 10a-10e*. The table below depicts the total counts that resulted from this analysis. Most importantly, at even the lower level inundation heights the routes to both the Secaucus Junction Train Station and the local hospital — The Meadowlands Hospital Medical Center —

could be impacted. In addition, a large portion of the evacuation route, including Routes 3, 95 (NJ Turnpike), 653 (County Avenue) and 681 (Patterson Plank Road), could be impacted at various storm inundation heights. This could make it more difficult for residents to vacate the town in a case of emergency or more likely for residents to be stranded in a flood zone if they were to follow the evacuation route. Similarly, a large portion of the bus routes in the town would be impacted at various inundation heights. While it is likely that in the event of an extreme storm service on the bus lines would be temporarily suspended, there is the possibility that vulnerable populations who rely on public transportation would have more difficulty evacuating their homes or reaching a shelter location. In particular, it is significant that Secaucus has a high volume of commuters and the town size dramatically increases during the work week. If a storm were to occur while these individuals were in Secaucus, the town would have a much higher population of individuals to plan and account for. If the majority of these individuals are stranded at the train station and difficult to reach by transportation routes, this could be problematic.

Table 13: Results of Transportation Inundation Analysis	
Inundation Level	Number of Routes Potentially Impacted*
4 Feet	20
5 Feet	36
6 Feet	56
7 Feet	66
8 Feet	74

*Please note that all counts are cumulative across the inundation heights

While it is difficult to easily or cost-effectively address issues of mass transportation infrastructure, the town should consider revising their evacuation route to account for the areas where flooding would impact or compromise the ability of residents to travel. Although it may not be possible to completely eliminate the exposure of the evacuation route to flood zones, it may be possible to limit the exposure.

Results of Demographic Analysis

Race

For the demographic analysis, the studio group focused on racial and economic composition of the Town. Specifically, the distribution of per capita income and the distribution of White, Blacks, and Asian residents was examined. For the evaluation of income, data from the 2012 American Community Survey, 5-year estimates at the census block group level was used. Since Secaucus has a fairly small geography and only three census tracts, block group level data is necessary to present a comprehensive

and detailed picture of the community composition. It was found that the income ranges from \$18,000 to \$63,000 per capita. Of particular importance is that the majority of this wealth is concentrated along the Hackensack River. This area is also extremely vulnerable to storm surge. In the event of an 8-foot storm surge, this could result in a significant economic impact. It is also noteworthy that these areas are predominately industrial as opposed to residential. Due to the extreme vulnerability and high risk of these areas, it will be important to enforce non-residential use of these areas through proper planning and zoning regulations.

The vulnerability of Secaucus during a storm surge should include an analysis of the vulnerable populations in the town. There are 243 census blocks in Secaucus with a total population of 16, 264 people as of the 2010 Census. A census block is the lowest geographic level of analysis used by the United Census Bureau and is the most detailed mapping level available for population¹³.

First, the Studio group created an overlay of population by race and census block level data and ran a GIS process that would select all of the census blocks that were impacted by water inundation at each designated level. The table below summarizes the results. At 4 feet of inundation, the level of flooding

Level of Inundation (feet)	Census Blocks Potentially Impacted by Inundation (by level)
4 feet	106
5 feet	132
6 feet	144
7 feet	150
8 feet	155
TOTAL Blocks in Secaucus	243

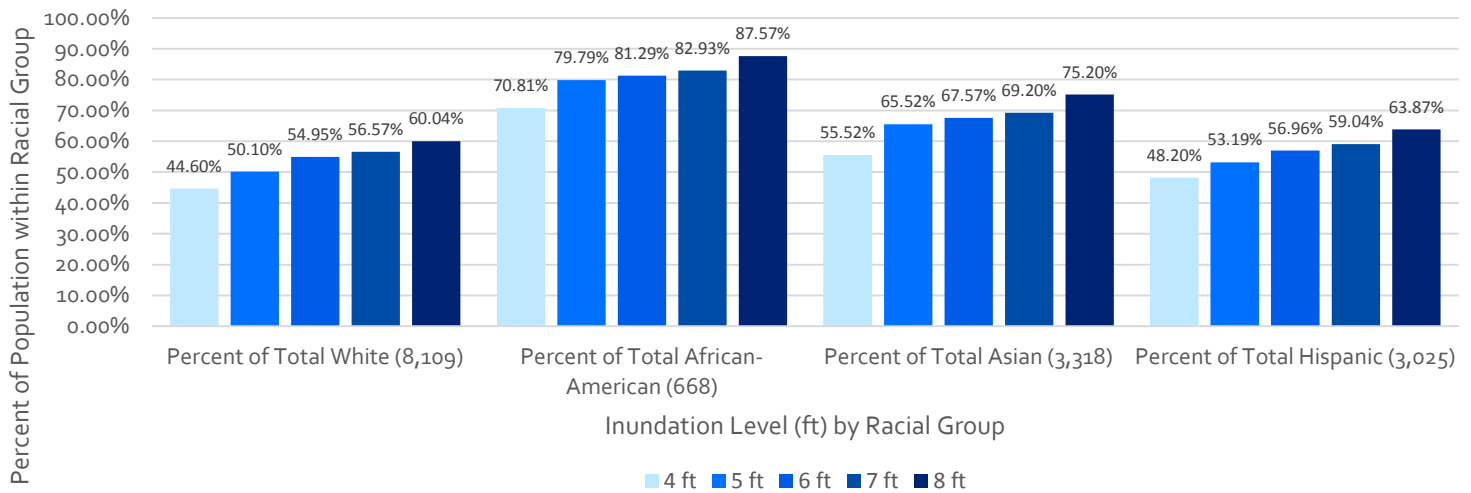
experienced during a normal rain event, about 44% of the town (by census block) is vulnerable to some flooding. As the inundation level rises, the risk to the town also increases. At 8 feet of inundation, the level flooding experienced during Superstorm Sandy, about 64% of the town is vulnerable.

Within these areas of vulnerability, studio group identified the impact each level of flooding could have on the population of Secaucus (in total and by the racial group breakdown). The table and graph below summarize the results. At 4 feet of inundation about 45% of the population is vulnerable to flooding. At 8 feet of inundation about 60%

¹³ NHGIS Data Finder: Census 2010 block level summary file on the population by race (White, African-American/Black, Asian, and Hispanic); NHGIS Data Finder: Census 2010 block level shapefile

of the population is vulnerable to flooding. The graph visually shows how each racial group is affected by the inundation of water during a storm surge with the most affected racial group being the African-American/Black population in Secaucus.

Figure 14: Population by Race Potentially Impacted by Inundation



The effect on African American/Black residents of Secaucus is troublesome because of the damage and health risks associated with flooding, especially repetitive flooding, affects this minority population disproportionately. This could be seen as an environmental justice issue, which violates Executive Order 12898¹⁴. The Order calls for the creation of equitable, healthy, sustainable communities for all people, regardless of race, ethnicity, or income. Low income and minority populations are more likely to live in unhealthy environments. Creating equitable and healthy communities should be part of any resilient town’s goals.

Table 15: Population by Race Affected by Inundation (ft)

Level of Inundation	White	% of Total White (8,109)	African-American	% of Total African-American (668)	Asian	% of Total Asian (3,318)	Hispanic	% of Total Hispanic (3,025)	Total	% of Total Pop. Affected
4 feet	3,617	44.60%	473	70.81%	1,842	55.52%	1,458	48.20%	7,390	45.44%
5 feet	4,063	50.10%	533	79.79%	2,174	65.52%	1,609	53.19%	8,379	51.52%
6 feet	4,456	54.95%	543	81.29%	2,242	67.57%	1,723	56.96%	8,964	55.12%
7 feet	4,587	56.57%	554	82.93%	2,296	69.20%	1,786	59.04%	9,223	56.71%
8 feet	4,869	60.04%	585	87.57%	2,495	75.20%	1,932	63.87%	9,881	60.75%

¹⁴ http://www.epa.gov/environmentaljustice/resources/policy/exec_order_12898.pdf

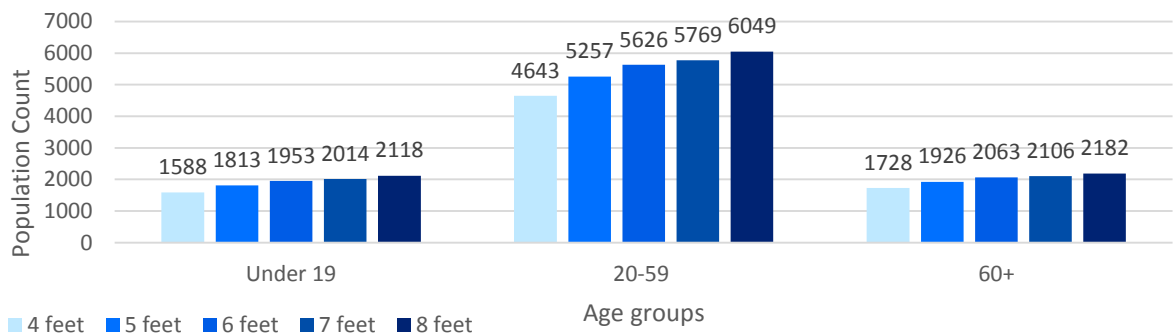
Age

The age of the Secaucus population at the block level was gathered and grouped into three categories: Under 19 years of age, 20 through 59 years of age, and 60 years and older. This information was mapped so that the spatial spread of these demographic cohorts could be understood and how many people in each age group might be affected by flooding. The population was grouped into these three cohorts because households with children or older adults may have a more difficult time evacuating or may be reluctant to evacuate at all.

The same general methodology as when race was analyzed (in the previous section). The census blocks that were impacted by each level of inundation were selected. Then the census information on age was extracted to determine the age breakdown of people affected by inundation at each height. The table below summarizes the results. At 4 feet of inundation approximately 49% of the older population of Secaucus will be affected. If inundation levels reach 8 feet it is estimated that 62.4% of residents over 60 years old will be affected. Over 60% of residents under 19 will be affected at 4 feet of flooding, this figure will reach 85% if inundation levels reach 85%. Overall inundation levels residents under 19 years of age are disproportionately impacted by flooding.

Level of Inundation	19 and Under	Percent of Cohort	20-59	Percent of Cohort	60+	Percent of Cohort	Total	Percent of Total Population Affected
4 feet	1588	63.80%	4643	50.04%	1728	49.43%	7959	48.94%
5 feet	1813	72.84%	5257	56.65%	1926	55.09%	8996	55.31%
6 feet	1953	78.47%	5626	60.63%	2063	59.01%	9642	59.28%
7 feet	2014	80.92%	5769	62.17%	2106	60.24%	9889	60.80%
8 feet	2118	85.09%	6049	65.19%	2182	62.41%	10349	63.63%

Figure 15: Population by Age Potentially Impacted by Inundation



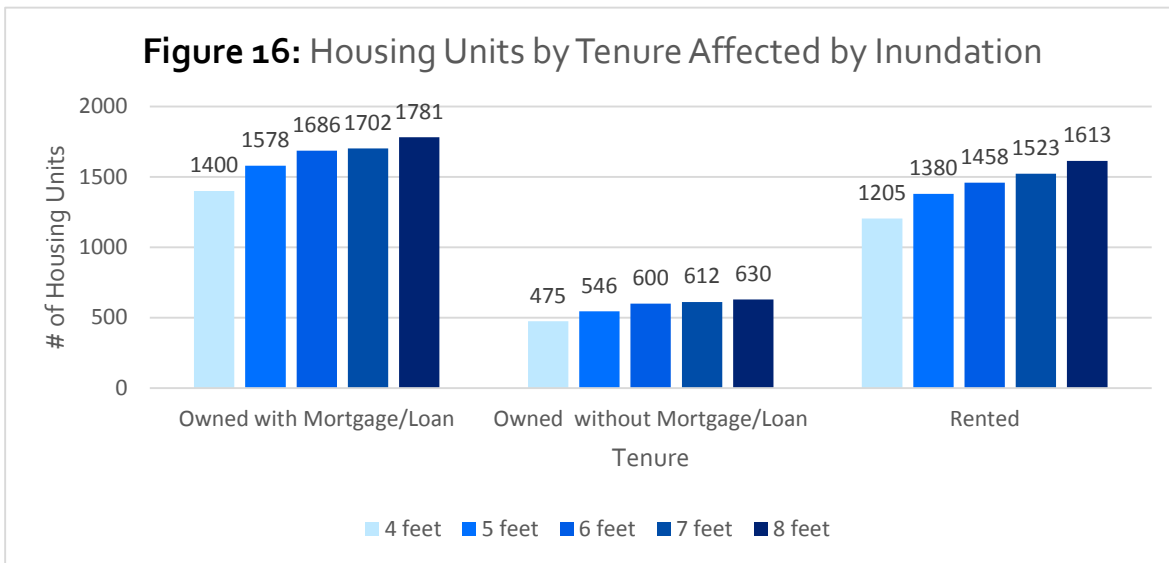
Housing Tenure and Occupancy

The other demographic element that was analyzed in relation to inundation was the housing units by tenure type that would be affected at each inundation height. Using the aforementioned methodology, three types of housing tenure were examined: Owned with a Mortgage or Loan, Owned without a Mortgage or Loan and Rented. Of the housing units, 40% are owned with a mortgage, 16% are owned free and clear (without mortgage), and 36% are rented. The percentages of the unit types that are affected by flooding will reflect the distribution of tenure type. In total, 45% of units will be affected by flooding at the 4 foot level, this figure climbs to 58.8% at the 8 foot level. Of Units owned with a Mortgage, 52% will be affected at 4 feet and 66% will be affected at 6 feet. Of rental units, 48% will be affected at 4 feet and 64% will be affected at 8 feet. Please also see *Appendix C, Figure 3* for a map of the spatial distribution of units by tenure and flood analysis.

This information is important to understand because housing tenure can be related to income and stability. A higher percentage of units owned with a mortgage are affected by flooding than other tenure types. This could present a potential problem if flood damage created a substantial economic burden on homeowners, they could default on their mortgages and go into foreclosure. Such a situation would very undesirable for the Town, so mitigating flooding effects would be beneficial. Rental units are also susceptible to flooding, while renters are not responsible for making flooding repairs they are less tied to their housing units than those who own. This could mean population loss if renters choose to leave in favor of units in towns with less proclivity to flooding and damage.

Table 17: Housing Units by Tenure Affected by Inundation (ft)

Level of Inundation	Owned with Mortgage/ Loan	Percent of Units with Mortgage	Owned without Mortgage/ Loan	Percent of Units without Mortgage	Rented	Percent of Rented Units	Total	Percent of Total Units
4 feet	1400	51.83	475	43.18	1205	48.28	3080	44.99
5 feet	1578	58.42	546	49.64	1380	55.29	3504	51.18
6 feet	1686	62.42	600	54.55	1458	58.41	3744	54.69
7 feet	1702	63.01	612	55.64	1523	61.02	3837	56.05
8 feet	1781	65.94	630	57.27	1613	64.62	4024	58.78



Further FEMA Data and Map Analysis

The Special Flood Hazard Area (SFHA) is the regulatory floodplain, where homes are required to have flood insurance coverage if there is a federally-backed mortgage for the property, coverage that is available through FEMA’s National Flood Insurance Program (NFIP). This area is also known as the 1% annual flood zone, which is occasionally referred to as the “100 year flood zone”. In Secaucus, this area is entirely in FEMA’s AE zone, which means that minimal to no wave action is expected during a 1% annual flood event; however, that does not necessarily mean there will not be some degree of wave action along the river in a more extreme storm. For new substantially improved construction, these properties must be built to at least the Base Flood Elevation (BFE), the elevation above mean sea level (MSL) the water is expected to reach during a 1% annual event. An additional foot of freeboard, or factor of safety, above the BFE is required per the State of New Jersey. The Shaded X zone, also referred to as the .2% or 500 year flood zone, is not technically part of the SFHA. However, critical facilities, such as hospitals, nursing homes, fire stations and other emergency services buildings should be located outside of the .2% flood level, per Presidential Executive Order 11988.

As the Meadowlands Commission is responsible for NFIP compliance for the area under its jurisdiction, most of Secaucus is included in the Bergen County FIRM maps. The two sections of Secaucus that are not part of the Meadowlands Commission jurisdiction are included in the Hudson County maps.

Prior to Hurricane Sandy, FEMA, through its contractors, had largely completed the analysis process of revising the Flood Insurance Rate Maps (FIRMs) for the coastal counties of New York and New Jersey. Since Sandy, FEMA has released drafts of these

new maps, including the new Preliminary Flood Insurance Rate Maps that were issued for Bergen and Hudson Counties in early 2014. The State of New Jersey has adopted the new maps for its purposes. However, when zone and/or BFE is higher in the old maps than the new maps, the current effective map must be followed, as the current effective FIRMs still remain the regulatory maps for NFIP compliance. The formal adoption process for the new maps is expected to be completed in 2015, at which times the new maps will become the new regulatory maps.

The new Preliminary FIRM map that includes all of Secaucus is shown in *Appendix C, Figure 11*, while the new base flood elevation map is shown in *Appendix C, Figure 12*. The changes of zone and BFE between the current effective FIRMs and the new Preliminary FIRM maps are shown in *Appendix C, Figure 14* and *Appendix C, Figure 13*, respectively.

The surge analysis maps are based on surge levels above mean sea level (the average of the daily tidal cycles). The area impacted at an eight foot surge above MSL is approximately the same area that is in FEMA's mapped SFHA. This is based strictly on the flooding caused by the Hackensack River overflowing- any lower-lying areas that experience flooding just due to rain runoff are not included in these maps.

At the four foot and five foot surge levels, the wetlands are completely underwater. A few roadways are underwater, including along some stretches of the Meadowlands Parkway, and some limited areas around buildings are flooding, making building access difficult in some cases during times of high tide. This is the fairly common, nuisance-type flooding that is common during nor'easters in New Jersey.

At the eight foot surge levels, the impacts become much greater. At this level, access to the hospital would be difficult if not impossible, which is the greatest concern. Many more roadways will be flooded and many buildings will be surrounded by flooding, if not physically flooded. At this point, much of the town will be cut off, and most of the roadways to other towns will be flooded. With the exception of the fire station located by the center of town, the other fire stations will remain accessible. The recreation center will be inaccessible and some hotels will also be inaccessible.

At the eight foot level, some pump stations will be impacted, making it difficult for any runoff to enter the river, and the water treatment center will be surrounded by flooding. The high school complex and animal shelter will also be surrounded by flooding.

It should also be noted that no map, whether a FIRM or a storm inundation map, is likely to be 100% in a real-world situation- each storm is unique and the flooded area

may exceed predications. The areas on the fringes of such maps, in particular, may be impacted as well. Another note of caution is that FIRM and storm inundation maps were developed based on the current and past conditions. Any future sea level rise or land changes would not be captured in these maps.

Looking at the sea level rise maps, the main impact at the one foot level is that most of the wetlands areas would be under water. At the two foot level, some of the area around Farm Road would be under water, but for the most part, the town would be fine. At the three foot level, access to both the hospital and animal shelter starts becoming an issue, meaning any rain event would be cause for concern. At the four foot level, additional areas would be inundated, including areas adjacent to some of the warehouses. Access to the high school starts becoming a major concern at this point. At five foot, much more of the town would be under water, including most of the warehouse areas of Secaucus. More residential areas would also be under water, and roadway access to other towns, aside from the NJ Turnpike, is of great concern. Finally, at the six foot level, many of the same inundation impacts from the previous eight foot surge maps are seen. At this level, much of Secaucus would be underwater, including one fire station.

An important note here is that any sea level rise would mean that a less severe storm than Hurricane Sandy could potentially flood the same, if not greater, area than Sandy did, as the starting mean sea level would be higher than the present day. So the concern is not just what would be under water on a daily basis; drainage would also become an issue as there it would be tough for runoff to enter the river, so additional areas would likely see temporary flooding during heavy rain events. Any tidal flooding event on top of any sea level rise would mean that some areas that do not experience nuisance flooding today would do so in the future. Finally, any major storm event, such as another Hurricane Sandy, would be even more devastating than in 2012, both for Secaucus and for the region at large¹⁵.

Part 3: Outreach and Analysis of the Community Discovery Questionnaire

While the survey sample for our Community Questionnaire was fairly small (91 with 78 fully completed), this information will help guide the interventions and strategies for town resiliency. A larger sample size may increase the accuracy of the results or alter the overall analysis. We analyzed responses with regard to three topic areas: household preparedness, feelings towards Secaucus and safety, and disaster experience. In addition,

¹⁵ Sources: FEMA (fema.gov), FEMA Region II Coastal Mapping and Analysis website (region2coastal.com)

we ran chi-squared test to determine if there was a correlation between any of the topic areas and demographic information of respondents.

We found that overall, the results of the sample indicated that Secaucus residents are well prepared with their own emergency supplies and were somewhat aware that the town offered various emergency and medical services during disasters. However, the majority of the

residents indicated they have not taken advantage of town emergency services during past disasters (Figure 17). The biggest concerns of residents in an emergency were loss of power, flooding, and the ability to evacuate, and the disaster impact identified as most frequently experienced was wind followed by flooding and electrical damage. In contrast, only 34 percent of residents indicated that they themselves or their landlord have flood insurance policies. When asked to rank the perceived riskiness of eleven hazards, the majority of residents (53%) indicated that flooding was a high-risk event in Secaucus. In contrast, only 30 percent of residents indicated that utility outages were a high-risk event. Responses also indicated that the majority of residents are uninformed or misinformed about the use of berms and wetlands to evade flooding. The mismatch between information and concern around the area of flood risk may be cause for some concern. In addition to these responses, an alarming 54 percent of respondents indicated that when asked to evacuate during an emergency they chose not to (Figure 18). Only a few respondents chose to answer the open-ended question of why they did not evacuate but those that did respond indicated that they did not believe there was a significant risk, they did not want to or were afraid to leave their home, or they could not leave their home because they had nowhere to go.

The questionnaire also revealed that the majority of respondents receive information during an emergency best through social media, word of mouth, and the town website. Others indicated that they relied on the town television channel for their information. It appears that before or during an emergency, the town has a multitude of avenues to contact residents through and residents are responsive to this. Overall, residents indicated that they generally felt either somewhat or very protected during emergency situations.

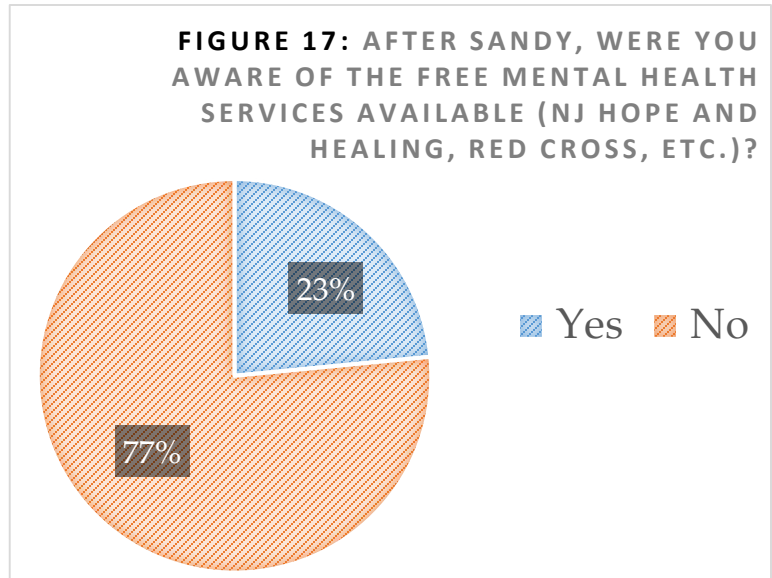
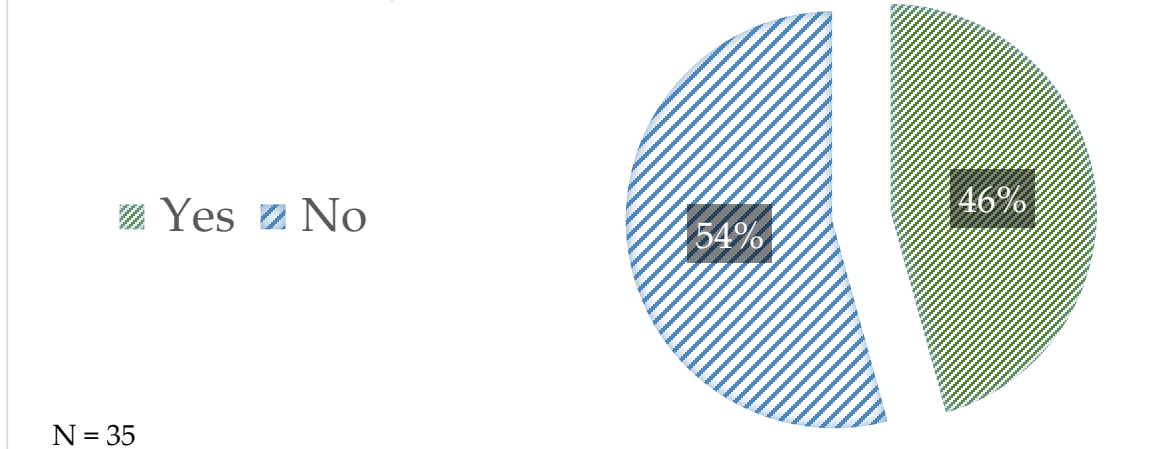


FIGURE 18: IN THE PAST, IF YOU WERE EVER TOLD TO EVACUATE, DID YOU LEAVE?



When the Studio planning team analyzed correlations between questionnaire responses and demographic information (i.e. age, income, race, and language), the team found that most results did not indicate any correlation. This is important to note because it indicates that outreach and interventions should be applied uniformly across the resident population. It also suggests that feelings and concerns about resiliency and emergency preparedness are even across different populations. However, correlations were noted between race and language when tested against emergency concerns and access to insurance. Statistical analysis indicated that non-White residents are more concerned about their ability to evacuate/leave Secaucus during an emergency, and their access to clean water or medical services than White residents. Upon further analysis, the results indicated there was also a correlation between language (English or language other than English) and biggest concern during an emergency. These correlations could have implications in terms of the town's community outreach strategies and suggest that a more concerted effort should be made to reach non-English speaking and minority residents. In addition, a correlation was found when race and language were cross-evaluated with the respondent's knowledge of insurance held by either themselves or their landlord. This suggests that non-English speaking residents and minority residents may have more restricted access to insurance. This could be due to several factors, including their ability to obtain information about insurance options. Finally, it is noteworthy that responses to the questionnaire suggest a correlation between income and willingness to evacuate. Although the correlation did not meet the threshold for statistical significance in our small dataset, it is possible that the correlation may be more prominent in a larger statistical sample.

Part 4: Resiliency Index Questionnaire and Meeting with Stakeholders

When meeting with officials from the Town of Secaucus, the Studio planning team was able to speak with the Business Administrator, Deputy Police Commissioner, representatives from the Department of Public Works and IT department and the town's CFO. The first subject that the city officials brought up was that the Mayor took a big leadership role during Hurricane Sandy, as he was the former Director of Public Works. The Mayor led his staff in preparation for the storm. Under his guidance the town set up a trauma center in one of the schools, had ambulances ready, and ensured that the police were ready to handle any disorder in the area. One of the most substantial roles the police took on was ensuring that the gas stations were kept in order, given the subsequent gas shortage issues after the storm.

City officials noticed a disconnect between the residential population and the public officials in terms of planning. They felt that resident perception was disconnected from the procedures and roles of the Meadowlands Commission and the city's own procedures. To resolve this, City officials would like to see more participation from residents. Additionally, there were some unresolved issues regarding the roles and responsibilities of the Meadowlands Commission and the city itself in terms of governance and policy. Many of the procedures implemented in times of emergency come from the past experiences of current city officials and are not yet fully recorded in writing.

The Resiliency Index covered four sections: planning, response, recovery, and mitigation. When going over the Planning section, the studio group learned what current written protocols are in place. Officials noted that there was no Continuity of Operations Plan, but they did have scattered elements of a Continuity of Government plan. Secaucus has an Emergency Operations Plan done in collaboration with other departments, but does not have a formal Local Emergency Planning Council or formal emergency planning body. Additionally, there is an opportunity to provide information for employees in the area on how to prepare themselves and families for emergencies, and better plan with non-governmental organizations. Secaucus uses local resources when emergency food supplies are needed; the town has its own food pantries, uses local nonprofits, local delis and Goya have provided food in the past. In terms of infrastructure, Secaucus has shelter capacity in excess of 500 by using the high school, 2 elementary schools, and library, and buses are used for mass evacuations. They do not utilize citizen groups for help except for a CERT team. Officials also stated that many of the local businesses shelter and take care of their own workers in times of emergency. The township uses a reverse-911 system to notify all registered residents when an emergency occurs or if there is a threat.

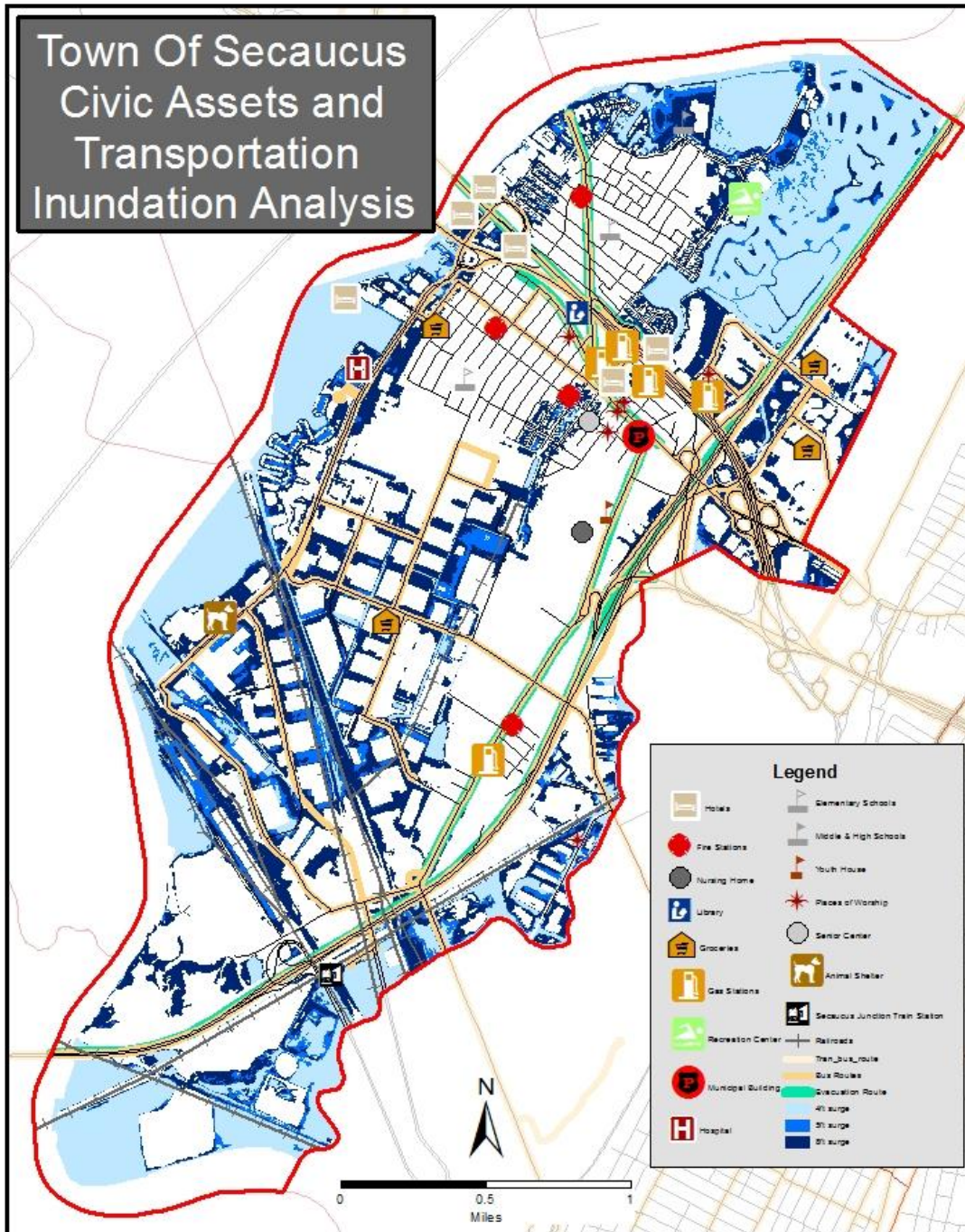
The Fire Department, Police Department, Senior Deputy of Public Works, and Office of Emergency Management are ICS trained, but there is an opportunity to train other departments in ICS and utilize them in emergencies. The town has some formal mutual aid agreements with other towns, and Secaucus was instrumental in providing surrounding townships with food and emergency services during Hurricane Sandy. The town's volunteer management program is managed on the fly, but they do have financial management protocols for tracking expenses and reimbursement in times of emergency.

When asked about recovery, the township officials stated that they had an informal recovery task force post-Sandy but could formalize the process for future events. When evaluating the effectiveness of recovery initiatives, they have a working group of municipal officials that decides what did work and what did not work. Secaucus uses the school-aged population to hand out flyers that provide information about recovery programs. This information is also available on the township website. After Hurricane Sandy, Secaucus held a forum at the library for small businesses.

When discussing mitigation tactics the town encourages, but does not require, green building techniques or LEED certification; Secaucus has an environmental coordinator who speaks with the community about these issues. Most buildings have backup treatment and power plants in times of emergencies, and the Office of Emergency Management and library are both in the process of getting them. There are no standardized procedures for fuel shortages, but during Sandy the Town produced procedure ad-hoc. When managing stormwater runoff, the township uses pump stations to keep basins and lines clear, and is currently working on a rain barrel outreach program with Coca-Cola. While the town has not adopted any regulations to decrease stormwater runoff, and it has stated that some buildings need to put in retention barriers to collect water.

Some of the shortcomings noted by the studio included a small I.T. staff, business continuity, and the lack of a formal, written emergency procedures for fuel operations and recovery programs. The city only has one I.T. person, but also has contracts with vendors for I.T. backup if needed. Additionally, many of the procedures the city officials spoke about were not formally written down; they were procedures that city officials who worked through Hurricane Sandy happened to know and remember.

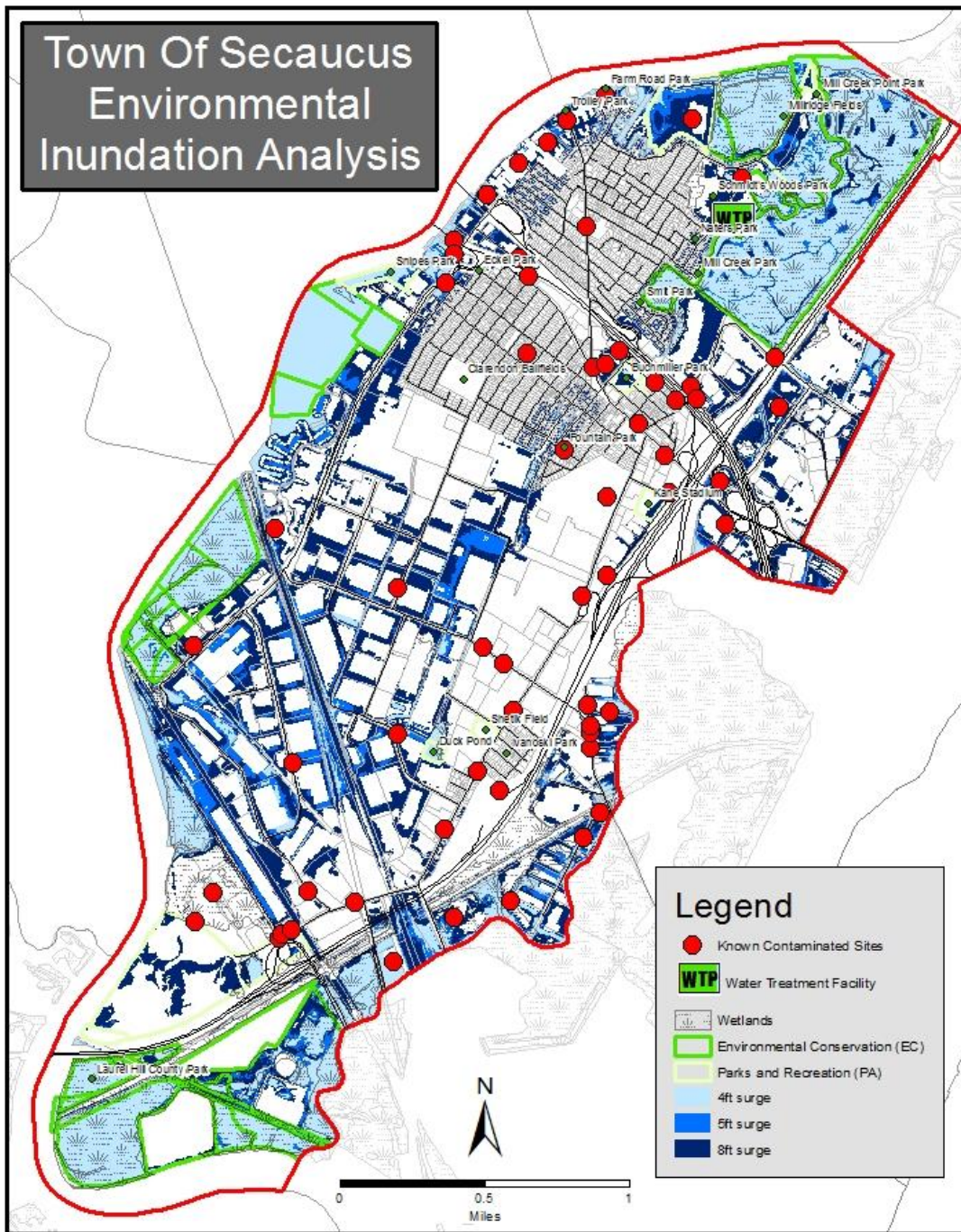
Figure 1



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Data Sources:
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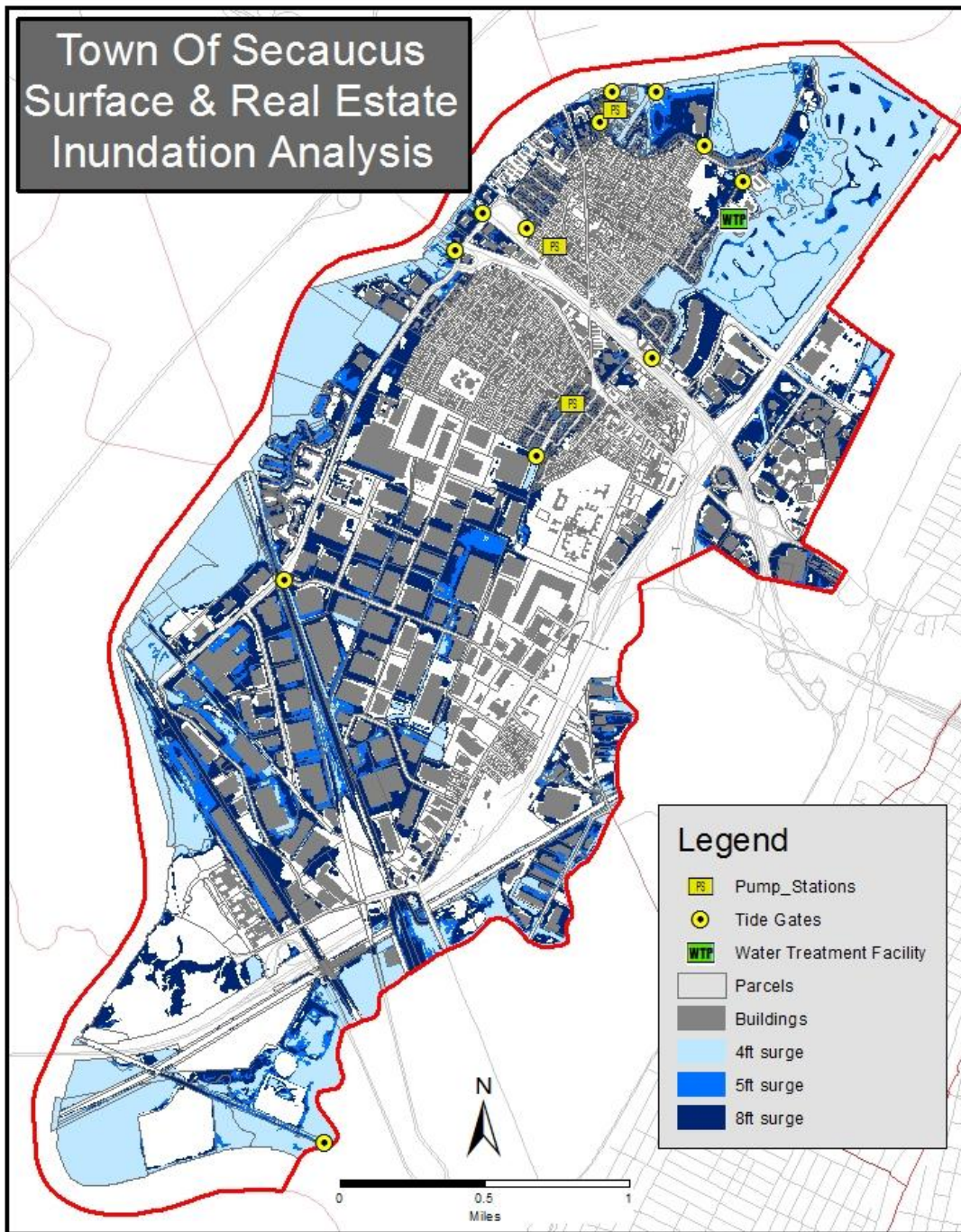
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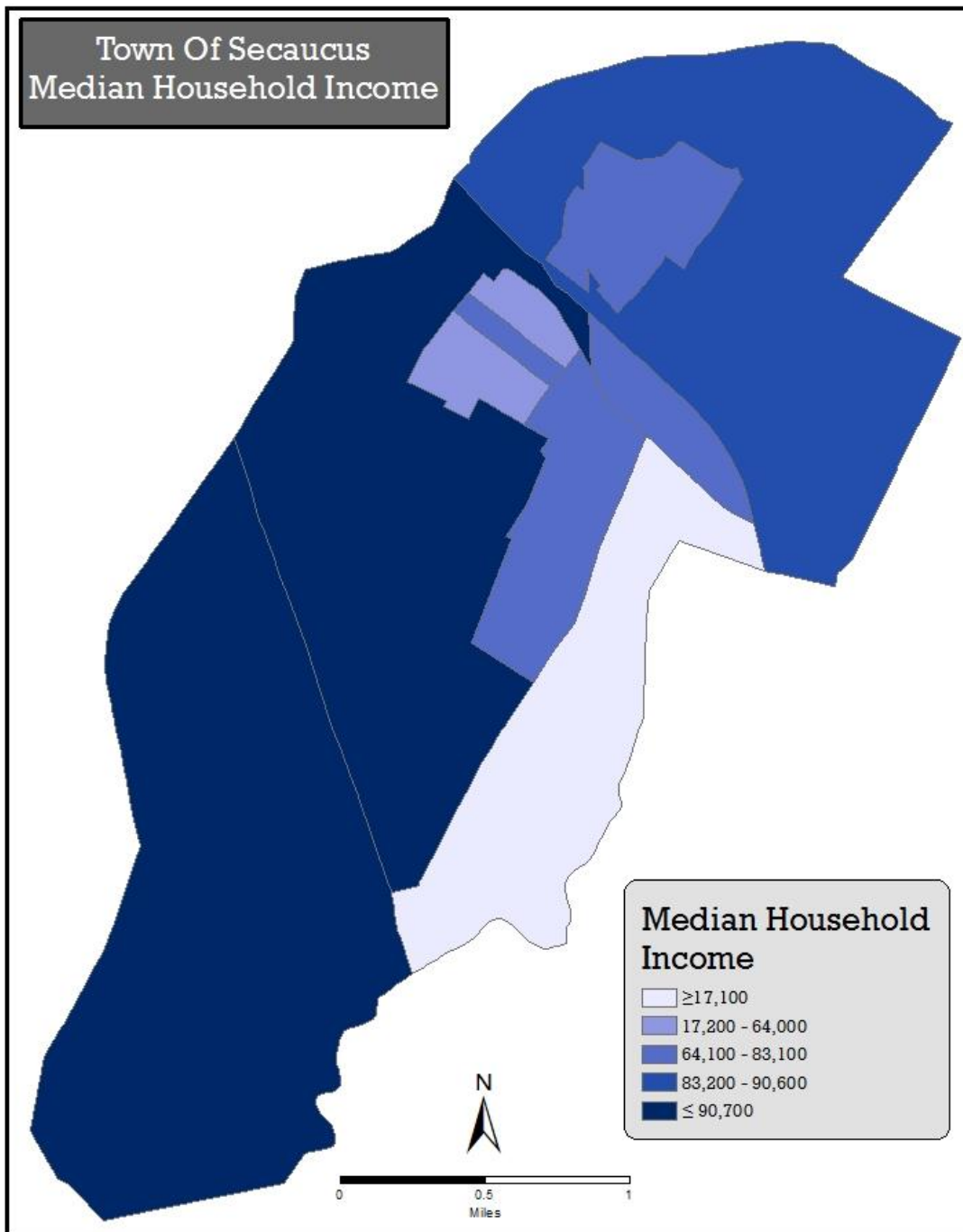
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Figure 4

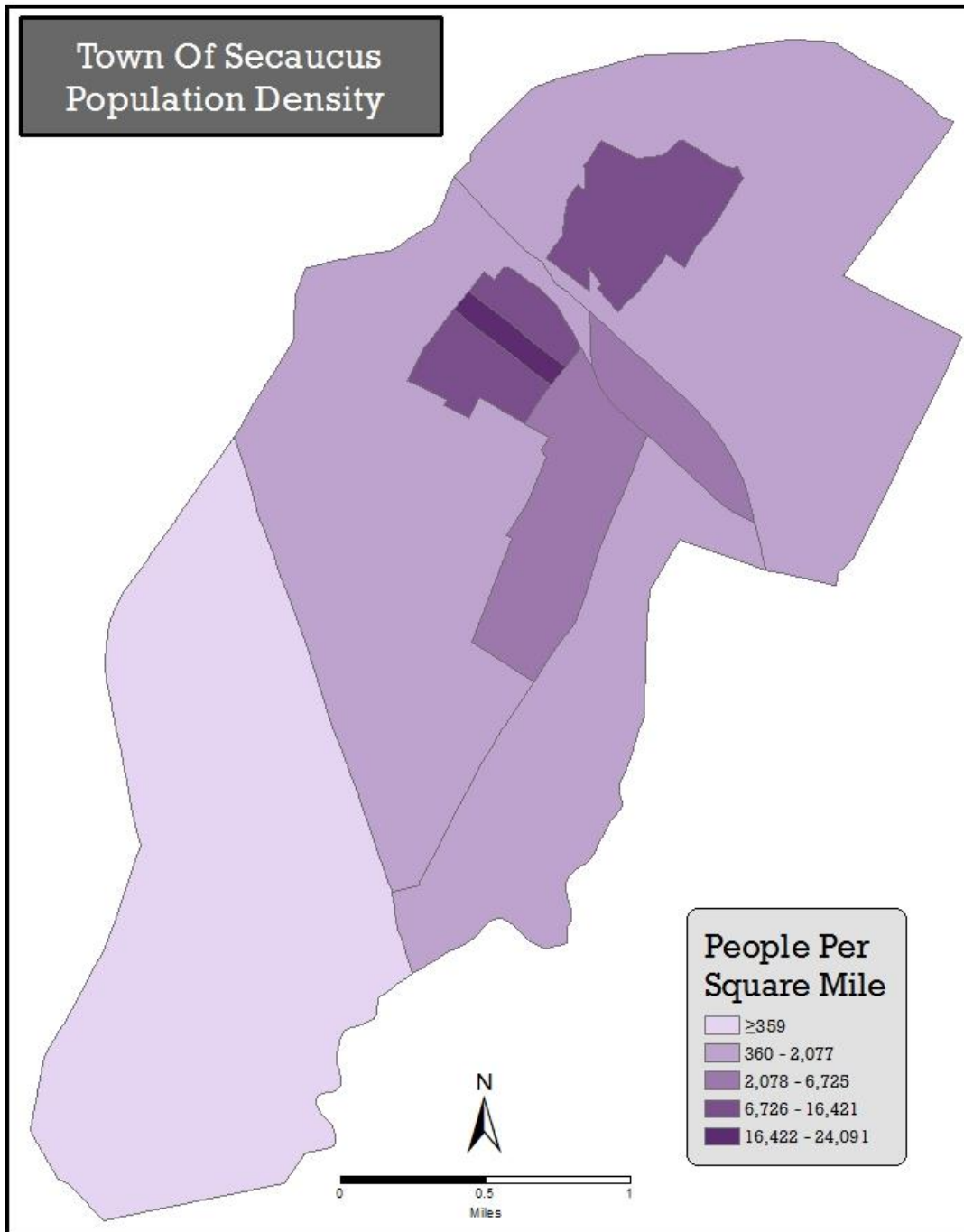


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Data Sources:
2010 US Census

Figure 5

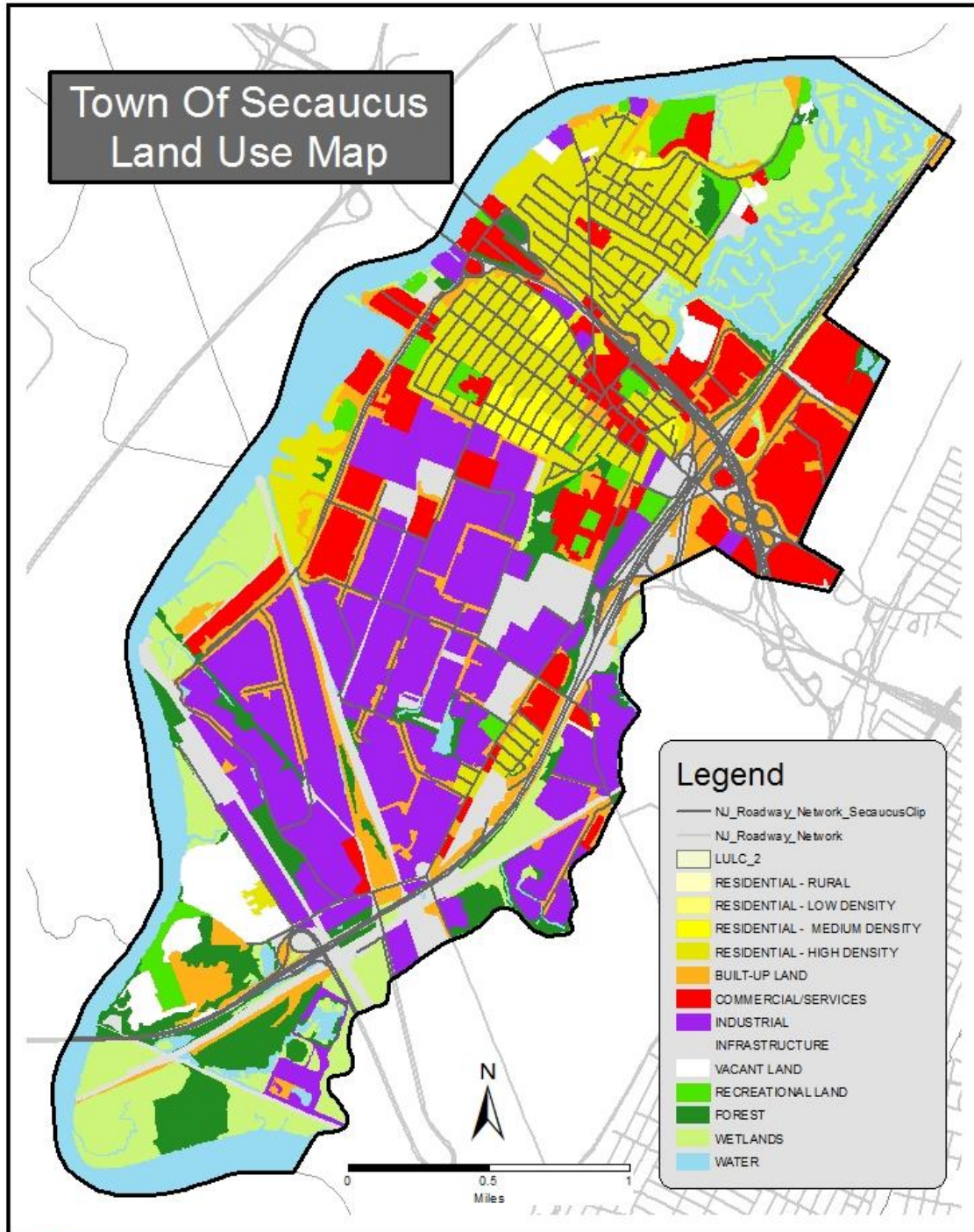


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Data Sources:
2010 US Census

Figure 6

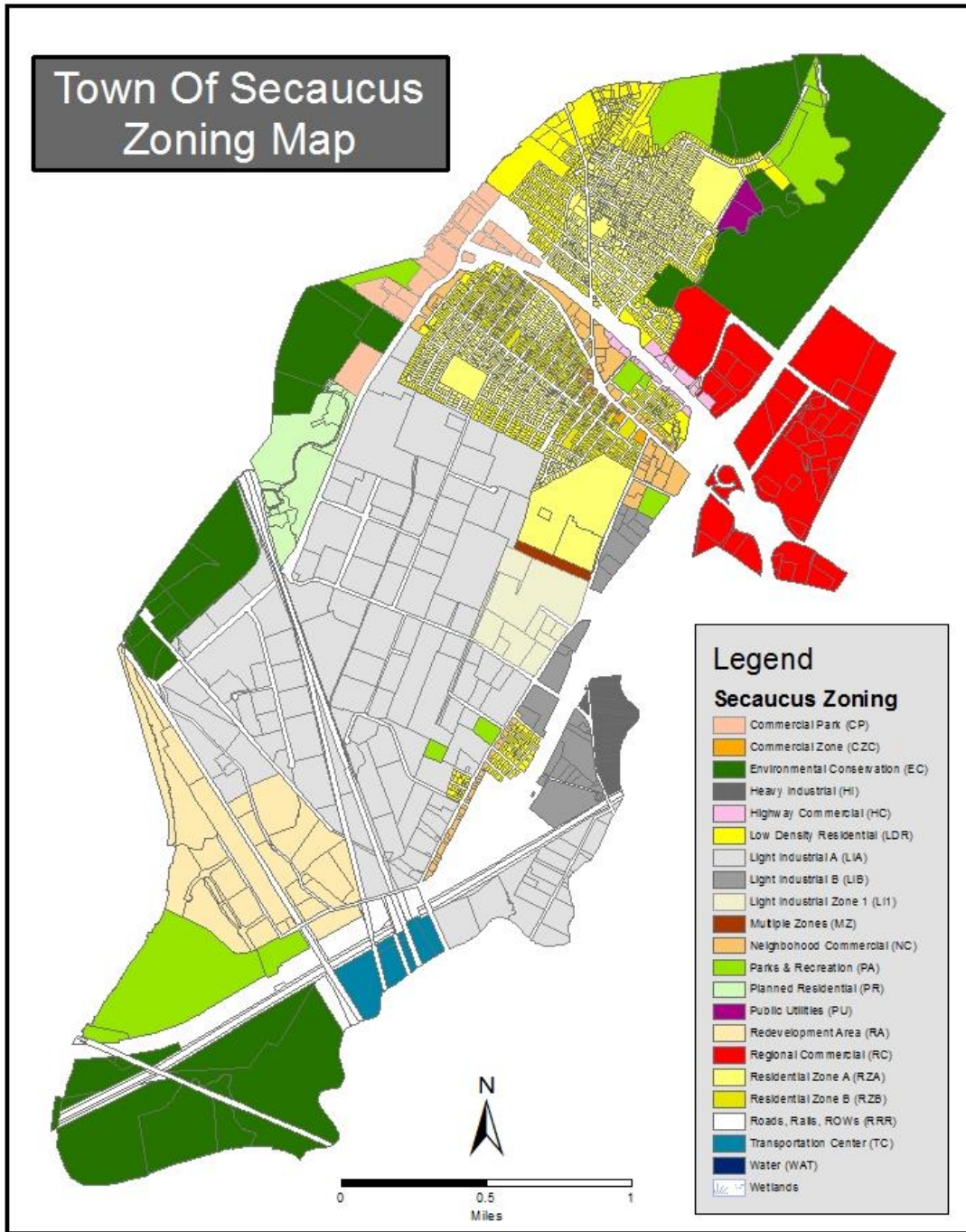


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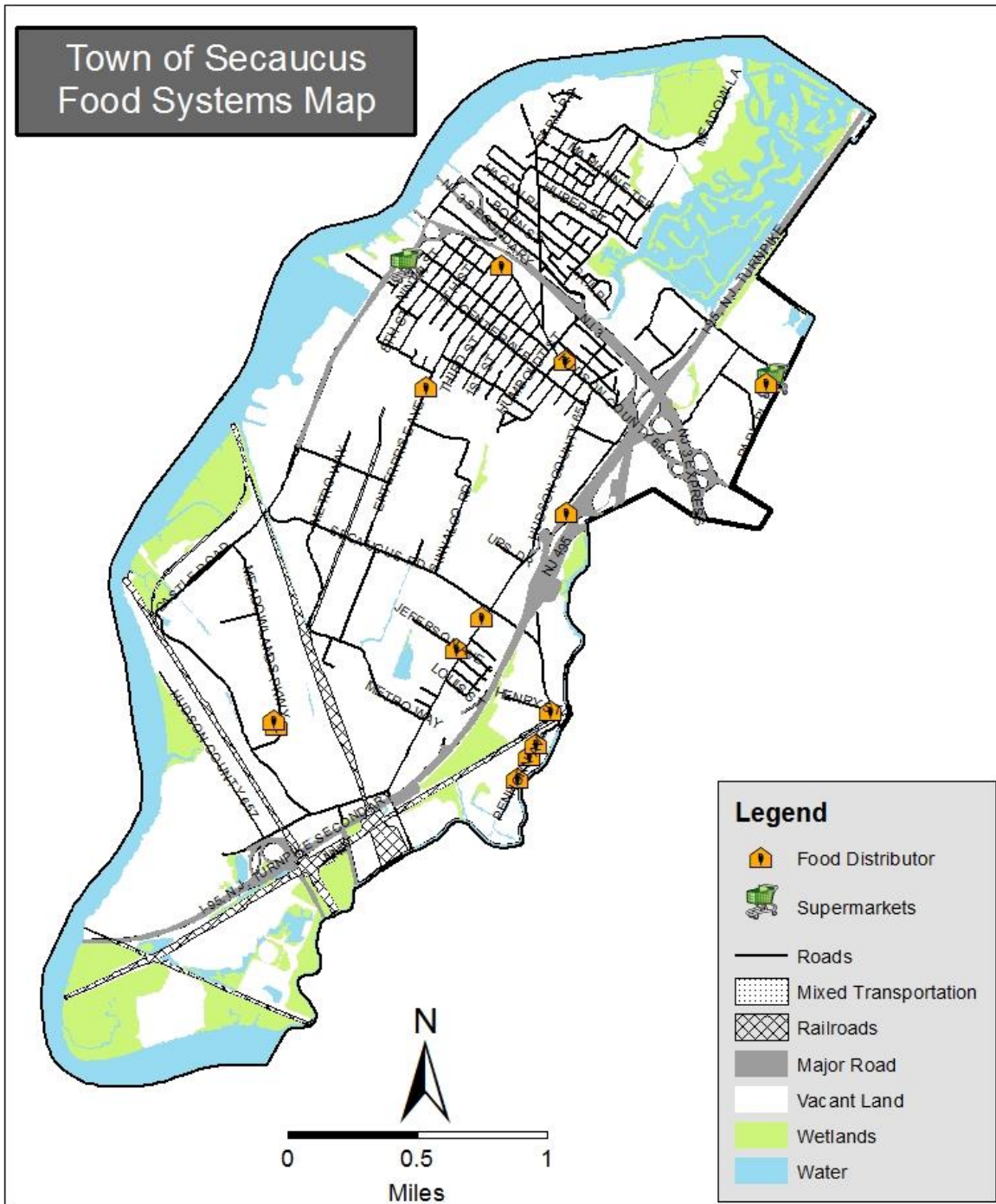
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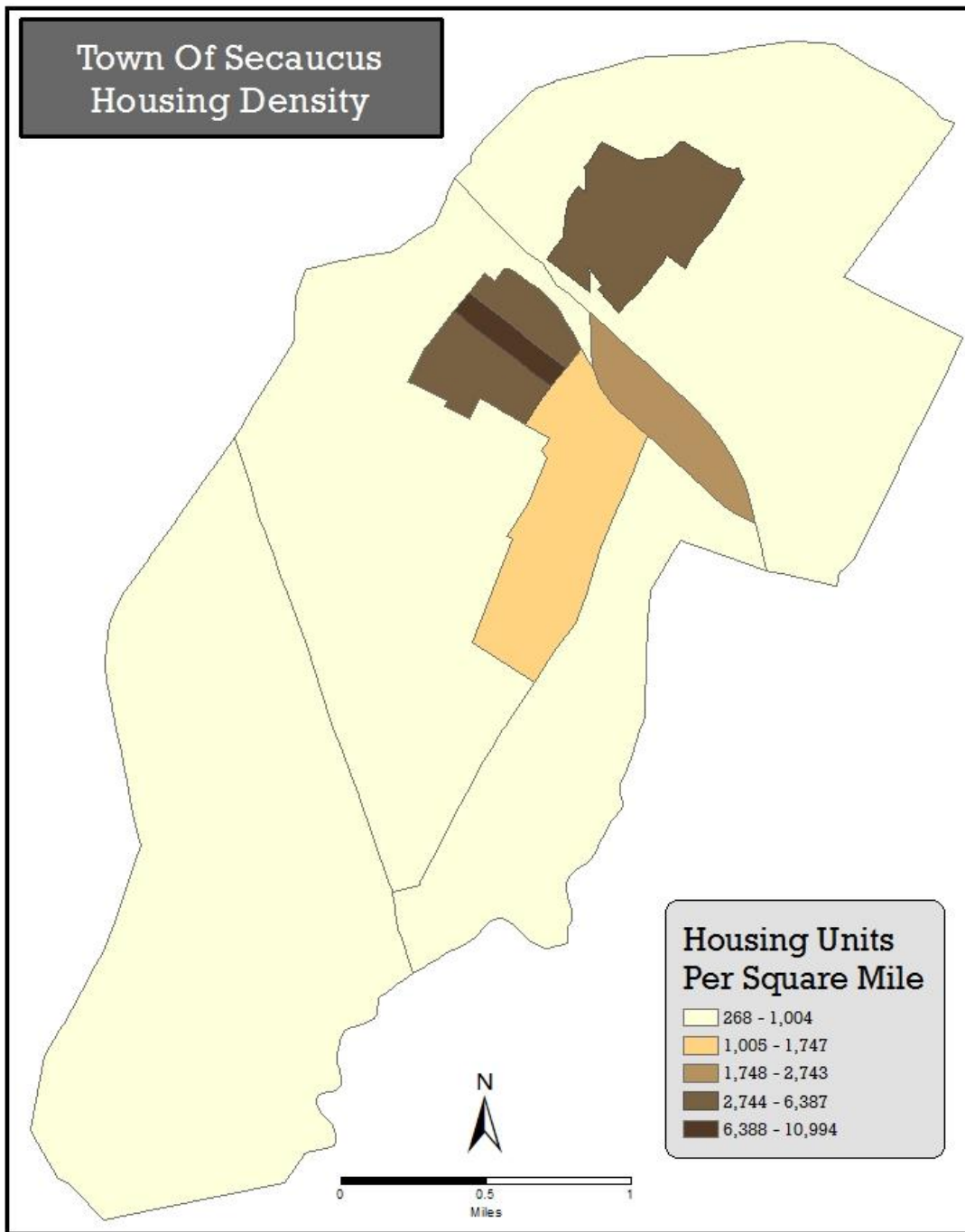
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Yellow Pages

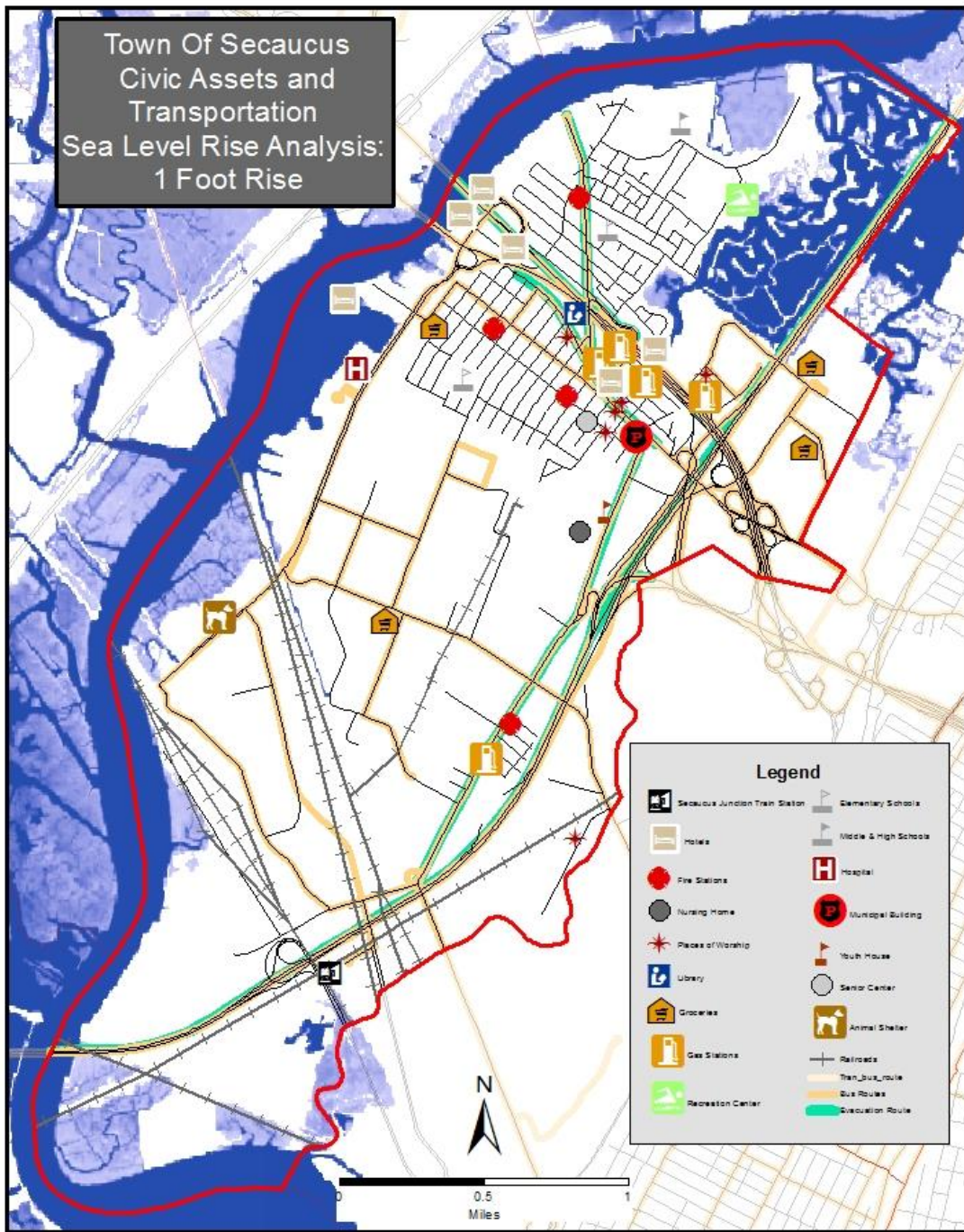
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Data Sources:
2010 US Census

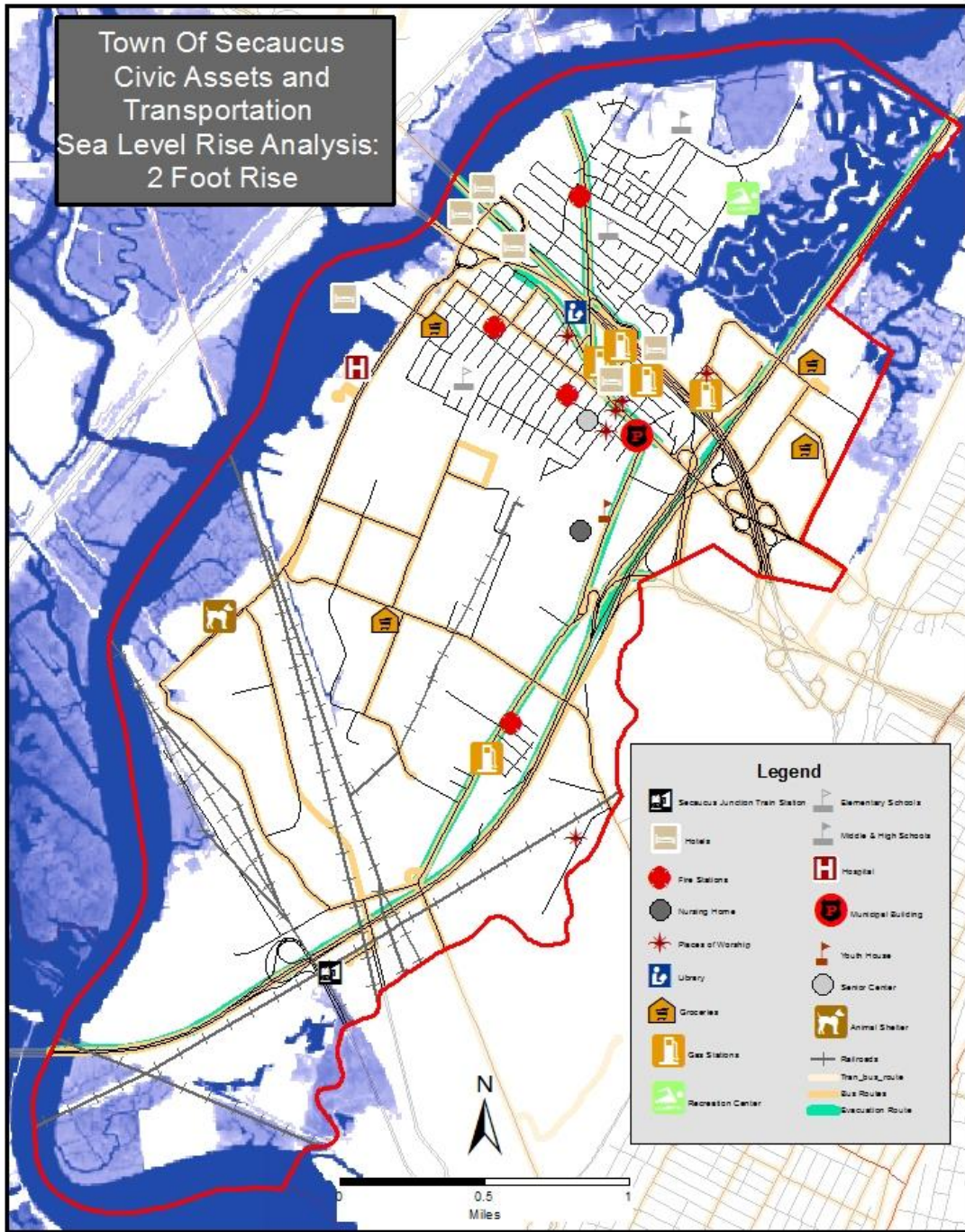
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Rutgers University

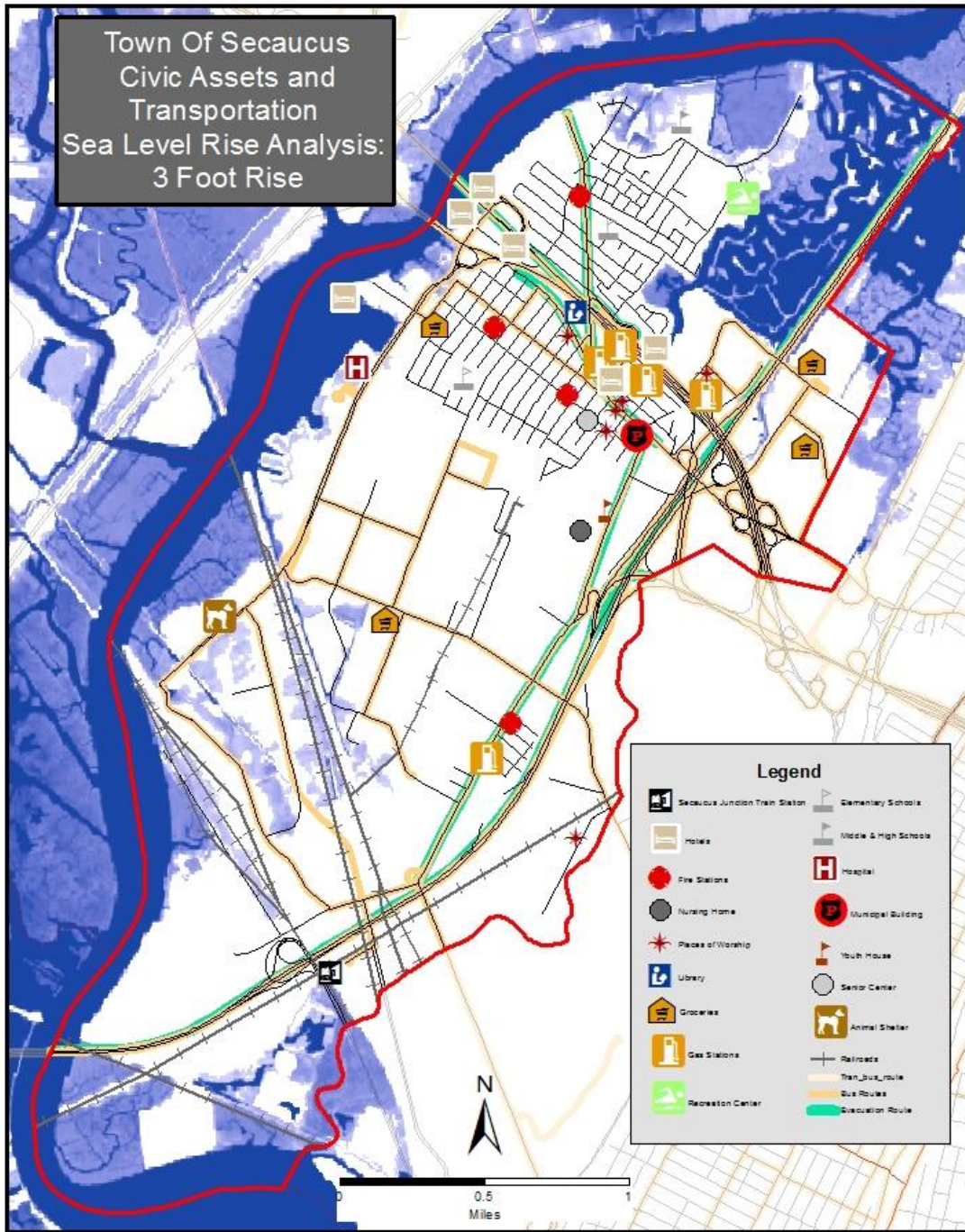
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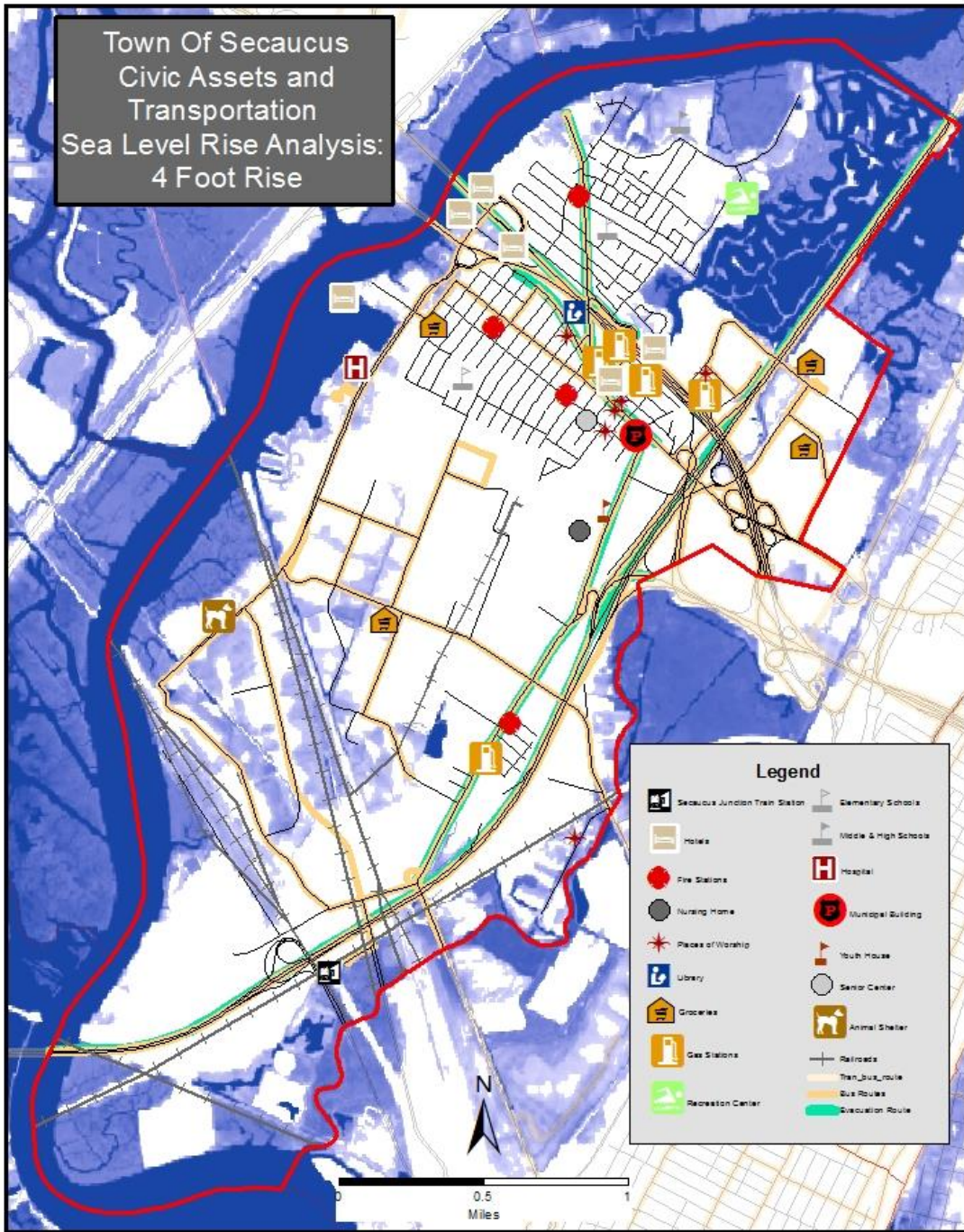
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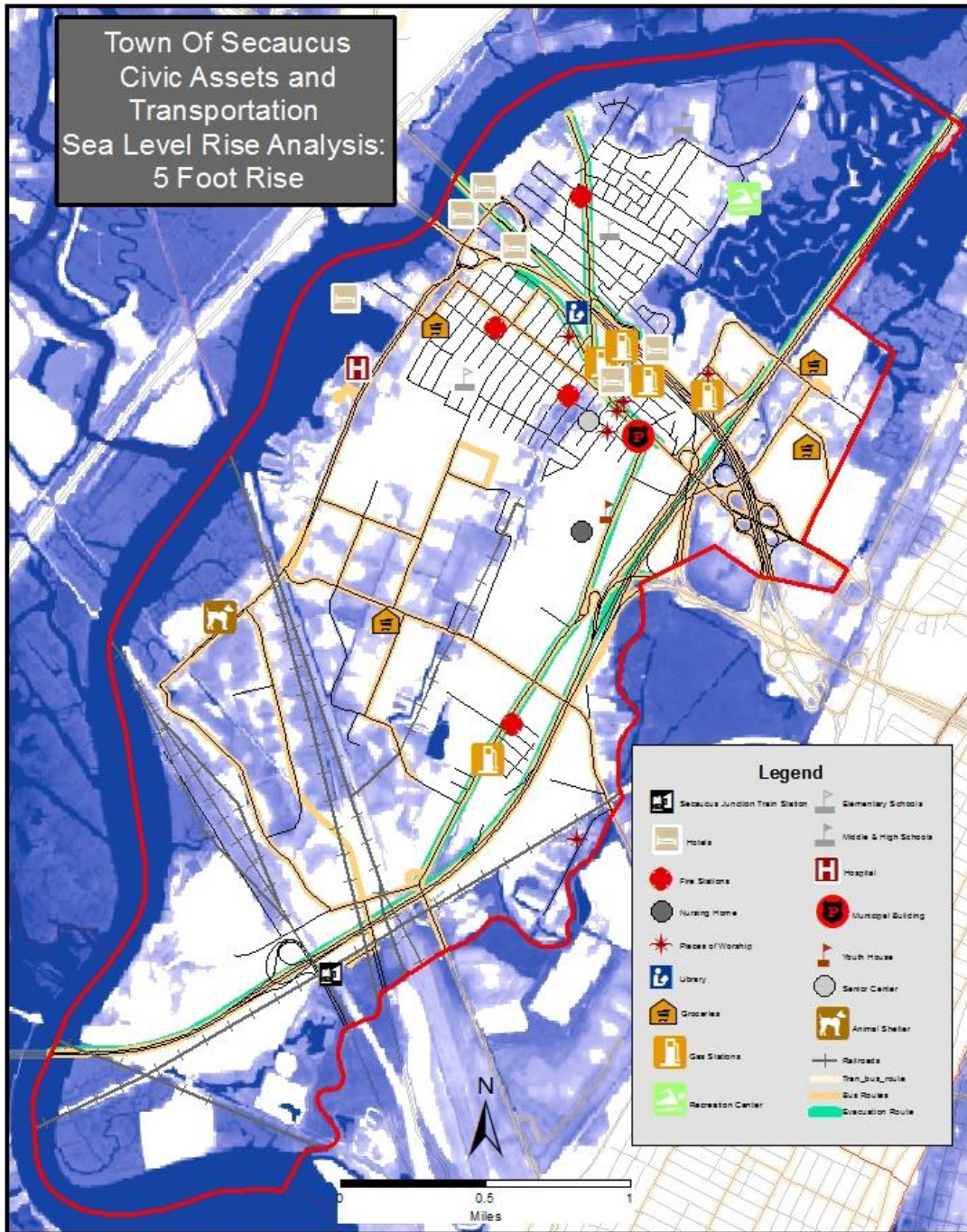
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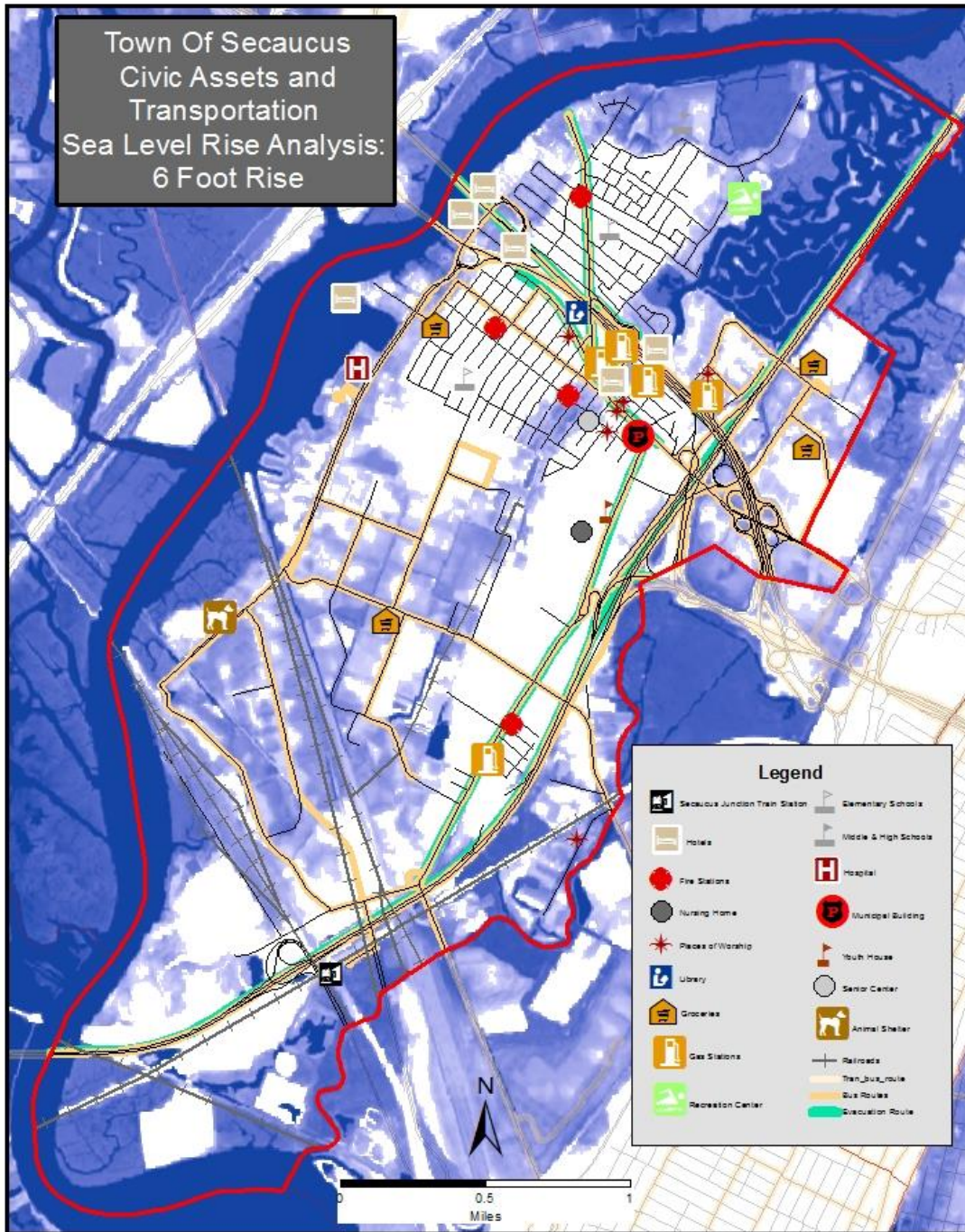
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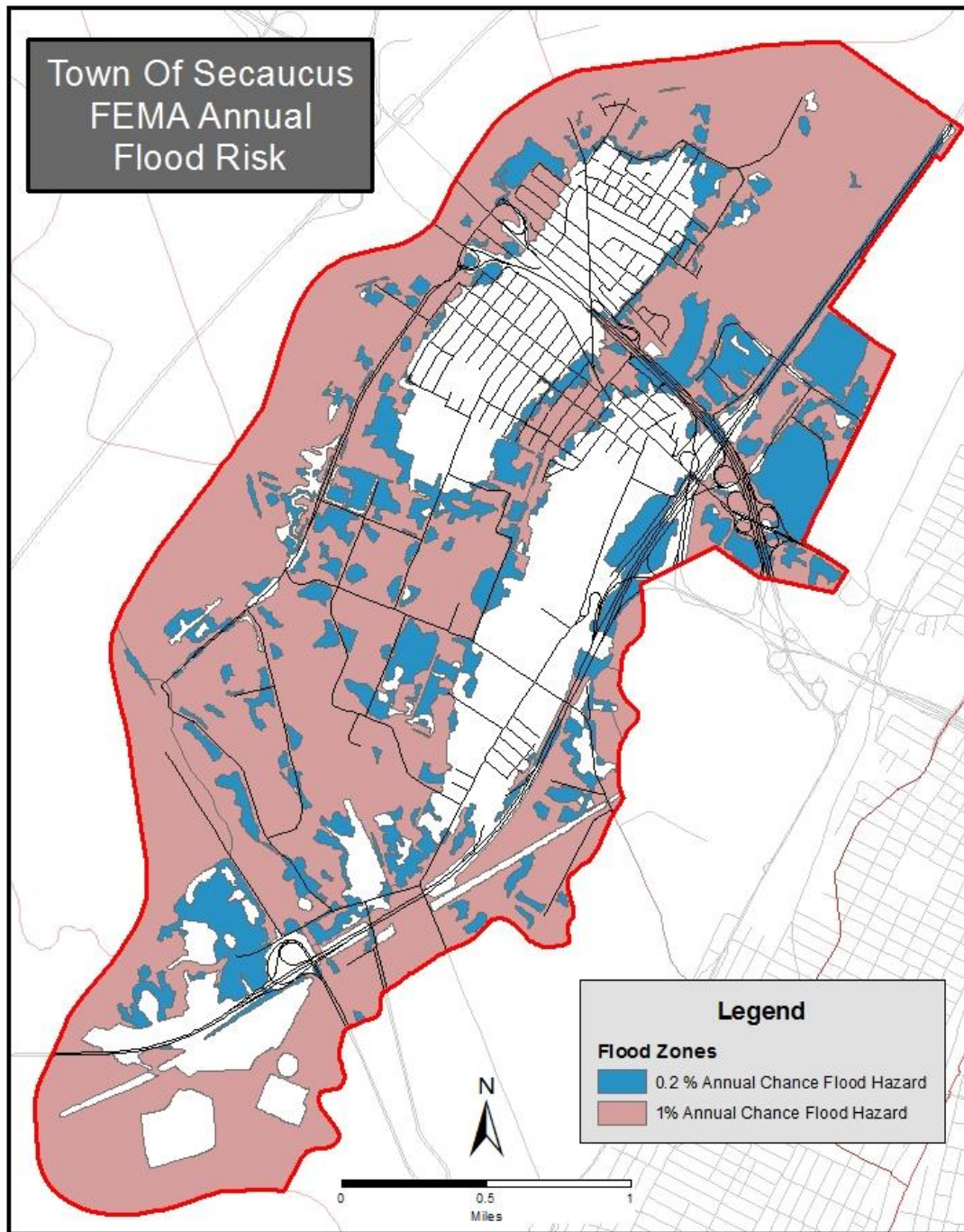
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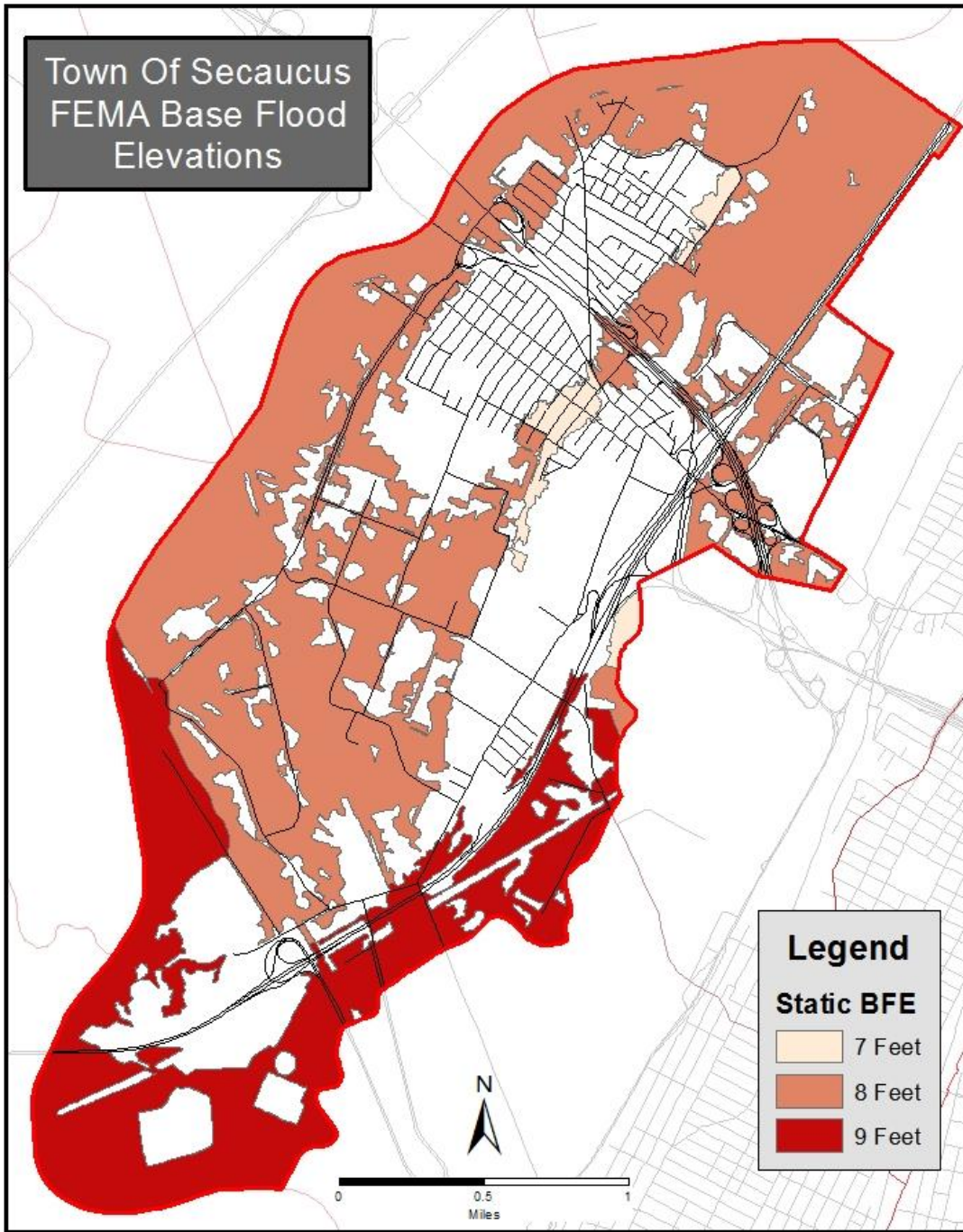
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Data Sources:
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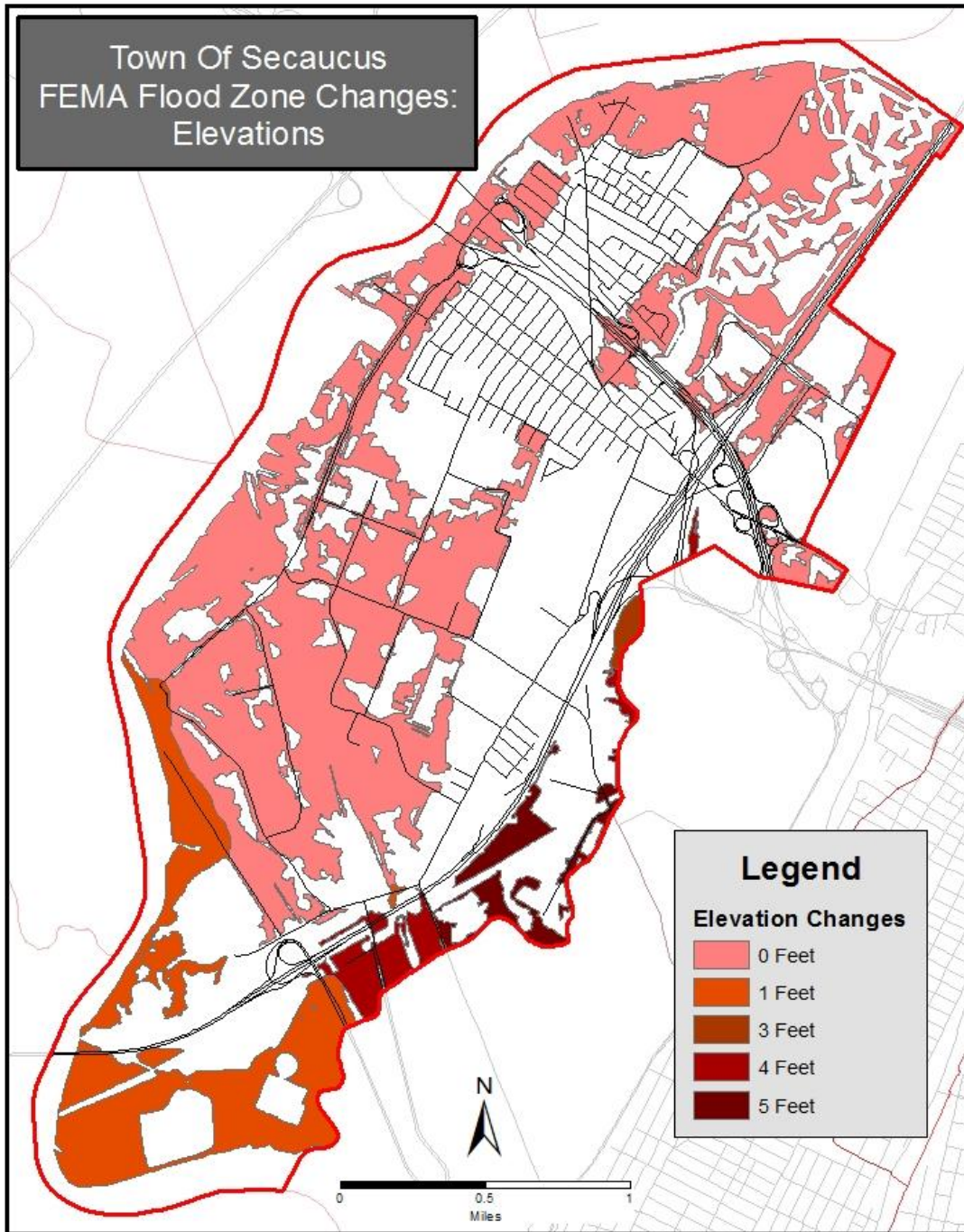
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Data Sources:
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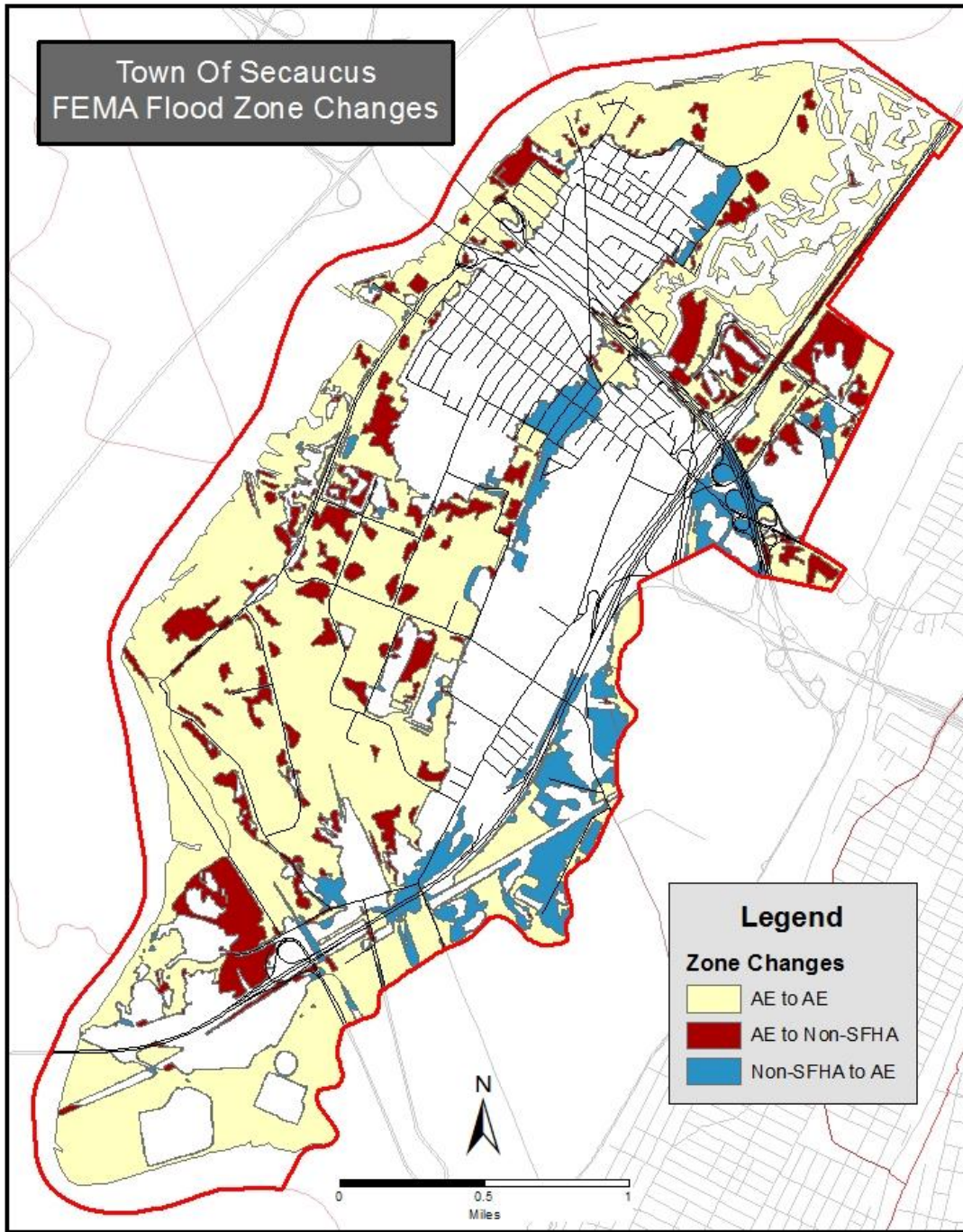
Figure 13



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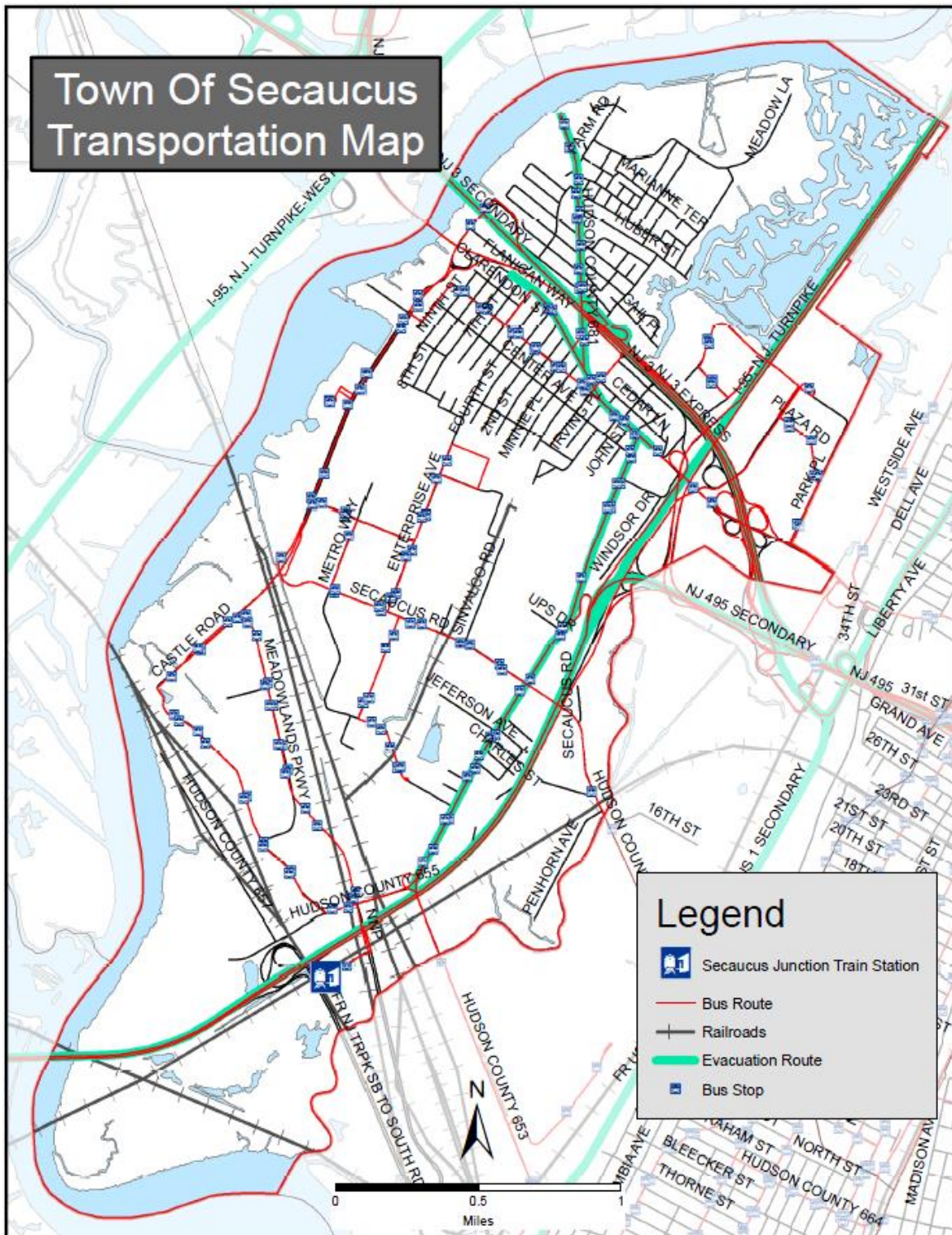
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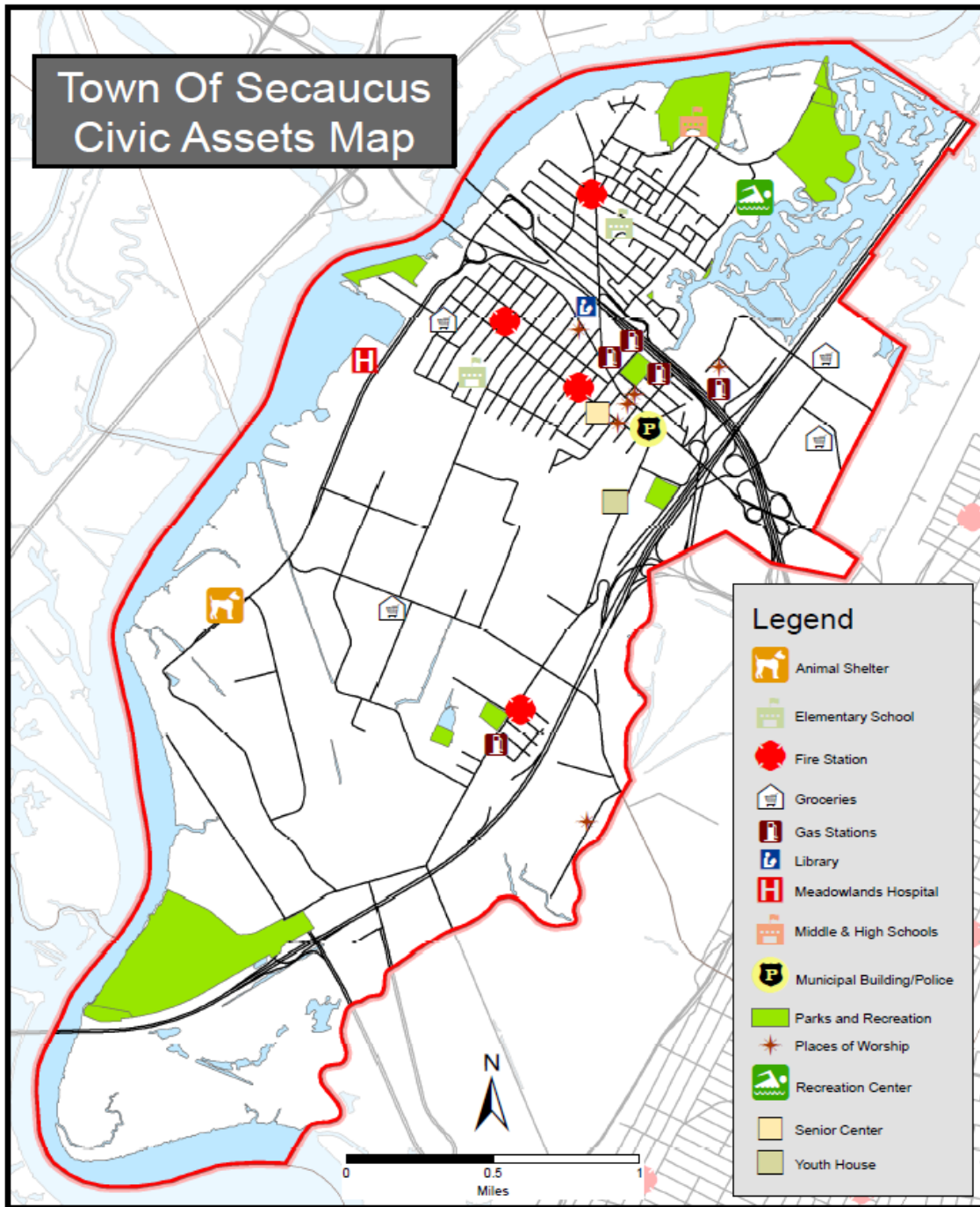
Figure 15



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Stronger Than the Storm

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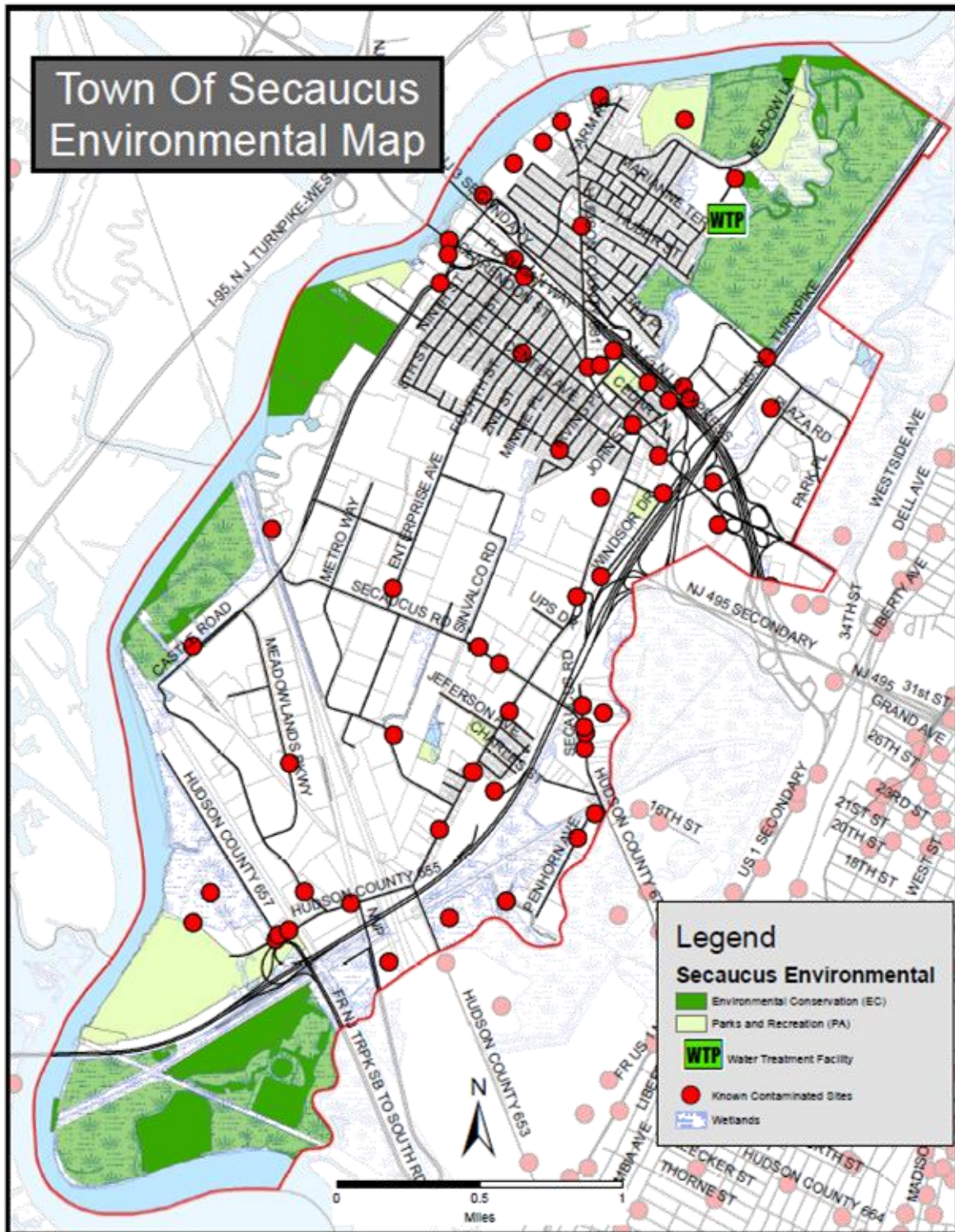
Figure 16



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Stronger Than the Storm

Data Sources:
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MERI

Figure 17



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 Stronger Than the Storm

Data Sources:
 NJGIN
 MERI

Appendix D: Tables, Graphs, and Figures

Table 1. Comparing 65+ Population in Secaucus and Hudson County						
Year	Secaucus, NJ			Hudson County, NJ		
	Population Total	65+	% of Population	Population Total	65+	% of Population
1990	14,061	2,275	16.2%	553,099	70,401	12.7%
2000	15,001	2,396	16.0%	608,975	69,271	11.4%
2010	16,008	2,797	17.5%	634,266	66,066	10.4%

Table 2. Median Age of Secaucus and Hudson County Populations 1990-2010		
Year	Secaucus	Hudson
1990	39.2	33.0
2000	39.5	33.6
2010	40.2	34.2

Figure 1: Age-Cohort Diagrams for Secaucus, NJ 1990-2010

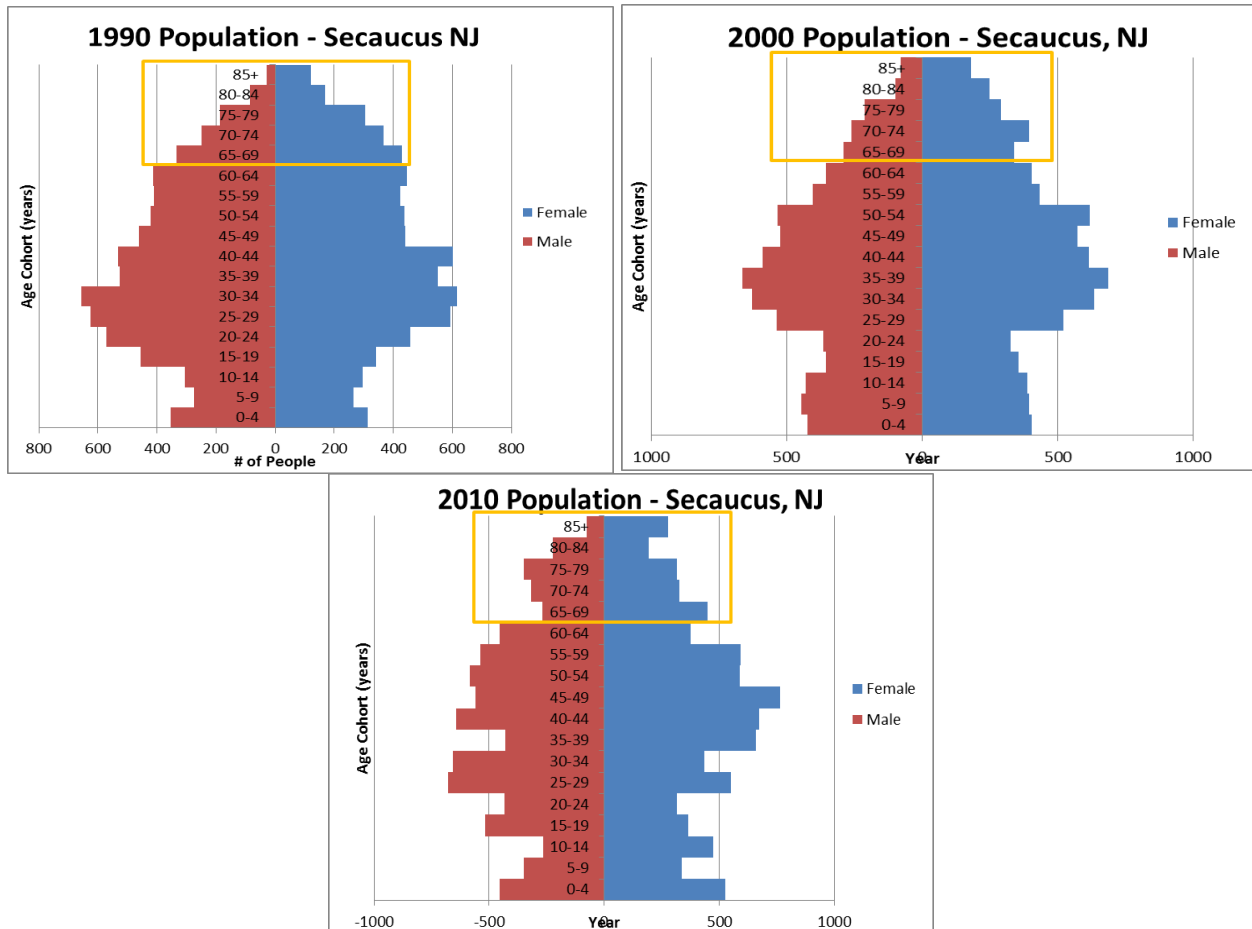


Figure 2: Comparing Racial Composition in Secaucus and NJ, 2010

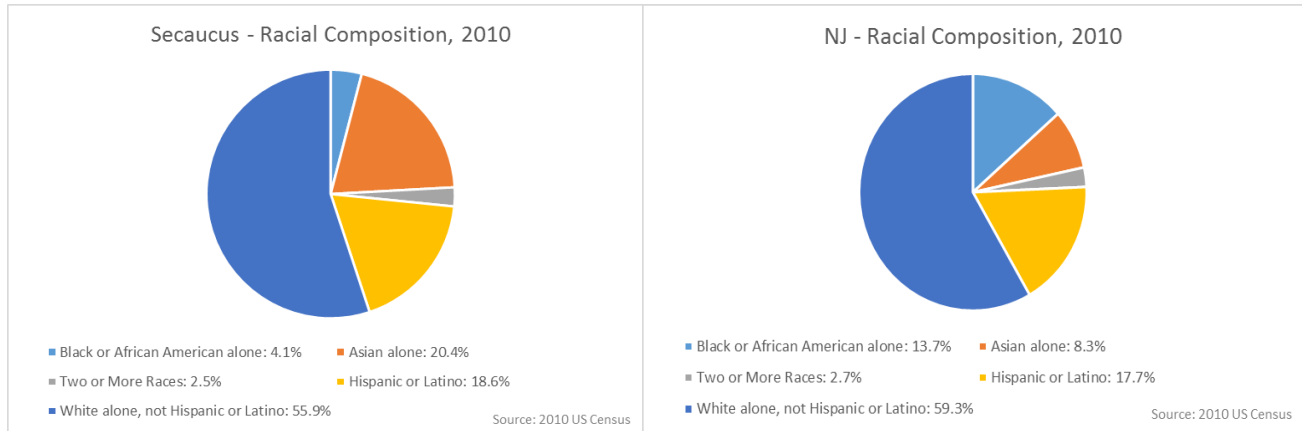


Figure 3: Languages Spoken in Secaucus

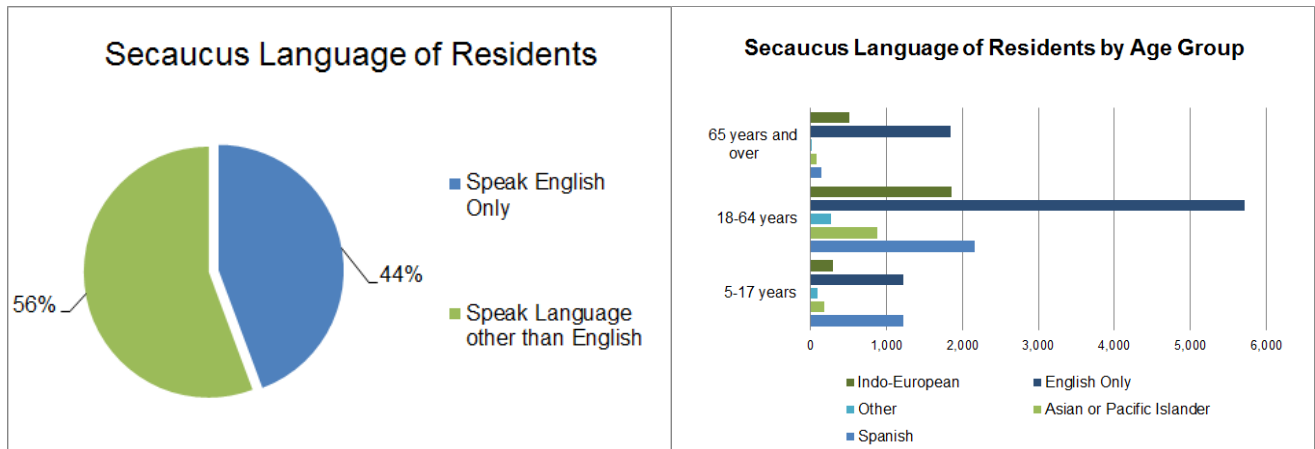


Figure 4: Foreign Born Population in Secaucus

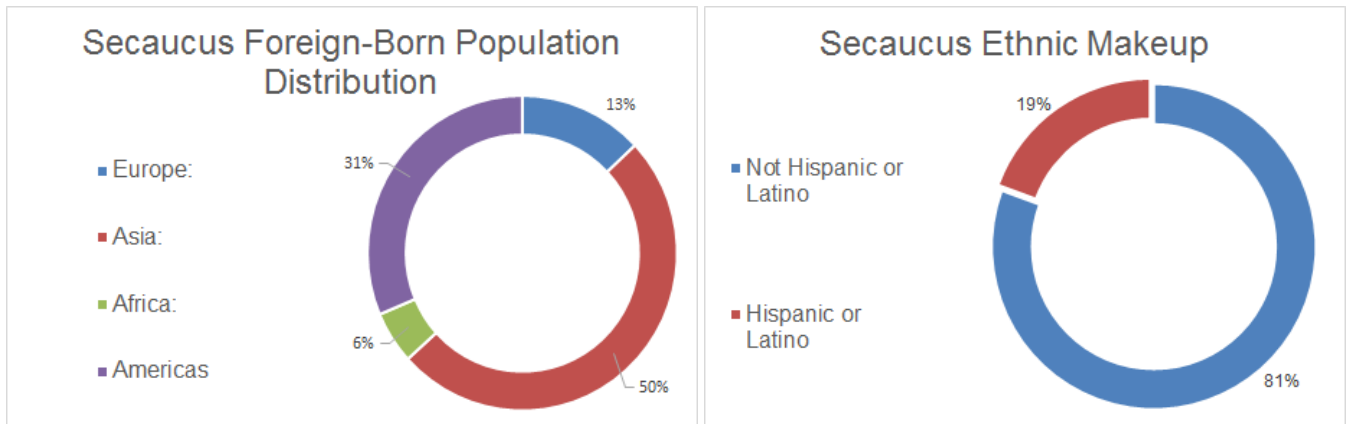


Figure 5: Comparing Educational Attainment in Secaucus and NJ Overall, 2010

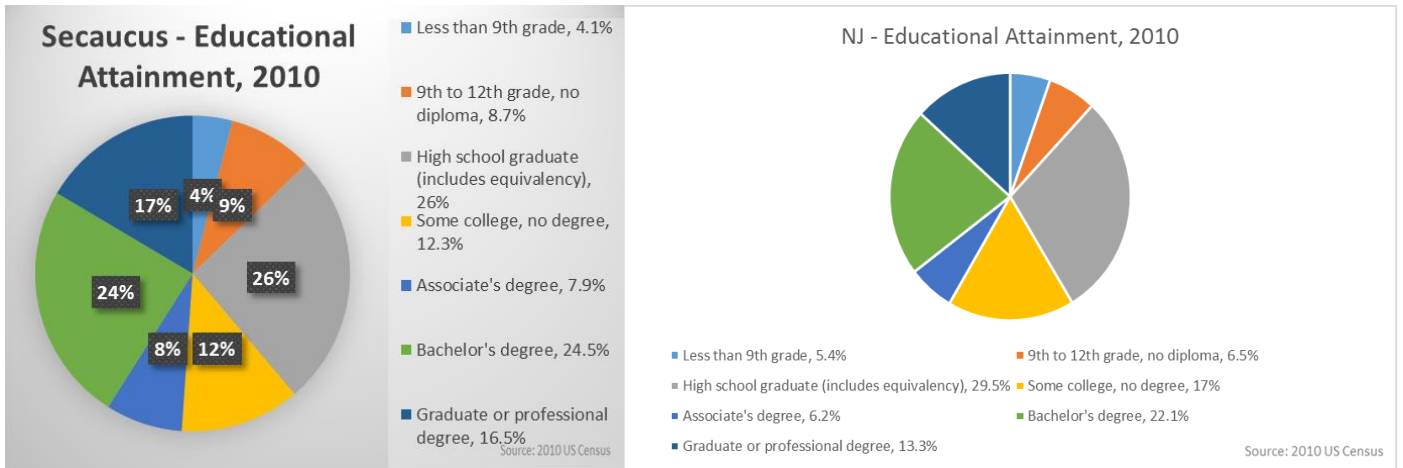


Figure 6: Comparing Homeownership in Secaucus and NJ Overall, ACS 2008-2012

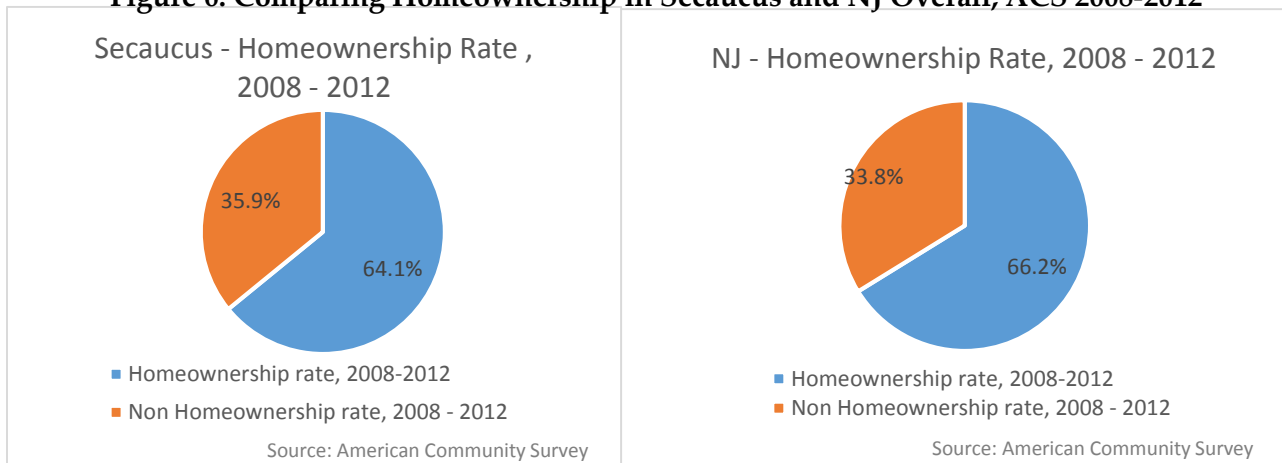


Figure 7: Average Persons Per Household in Secaucus, ACS 2008-2012

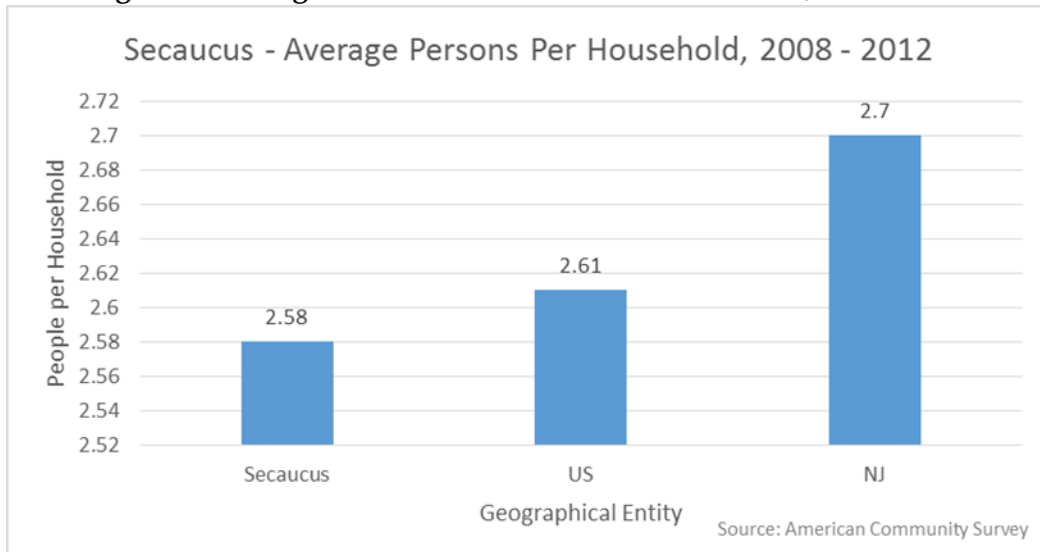


Figure 8: Comparing Persons Above/Below Poverty Level in Secaucus, NJ, and US 2008-2012

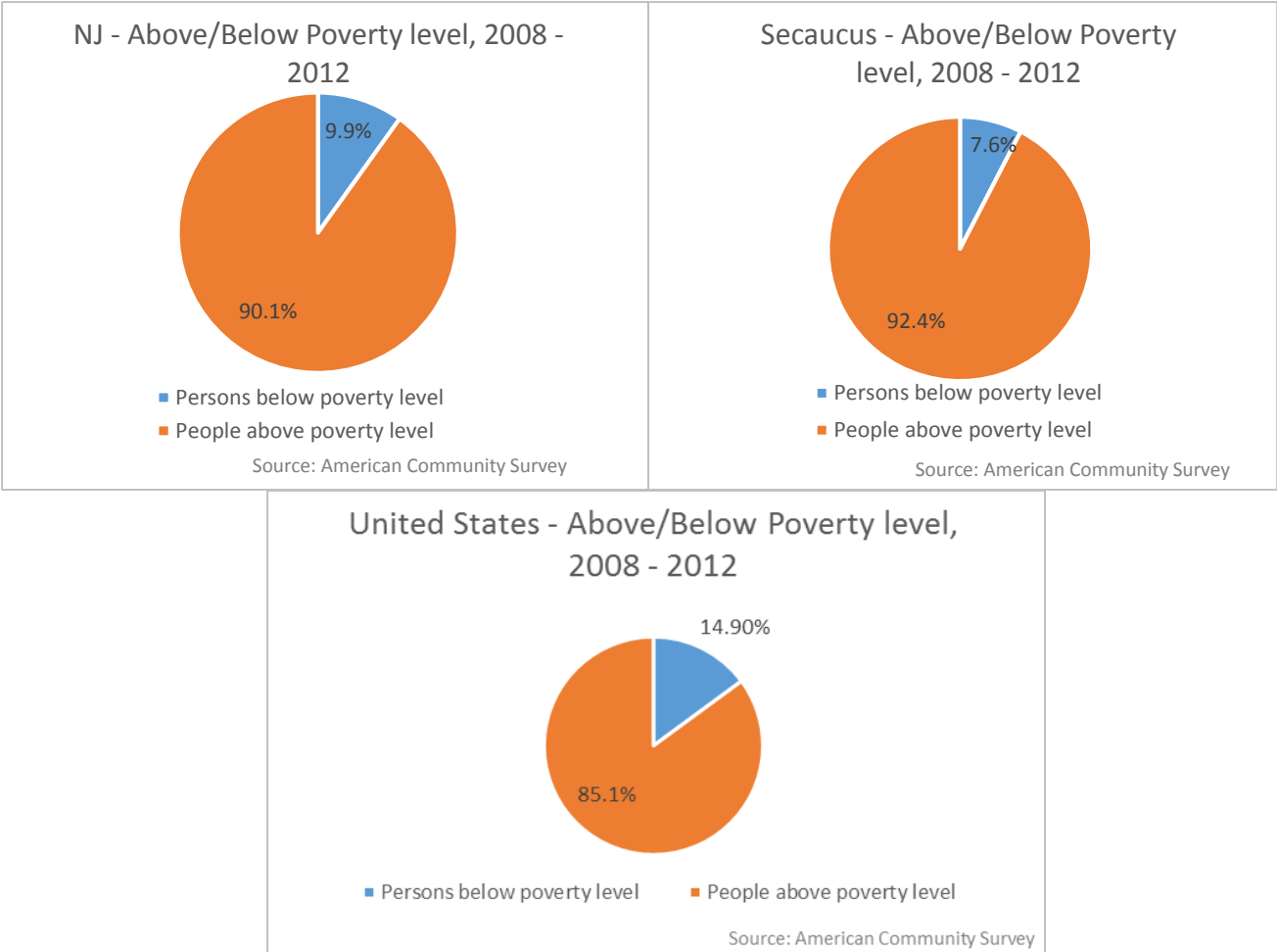


Figure 9: Population Density in Secaucus, 2010

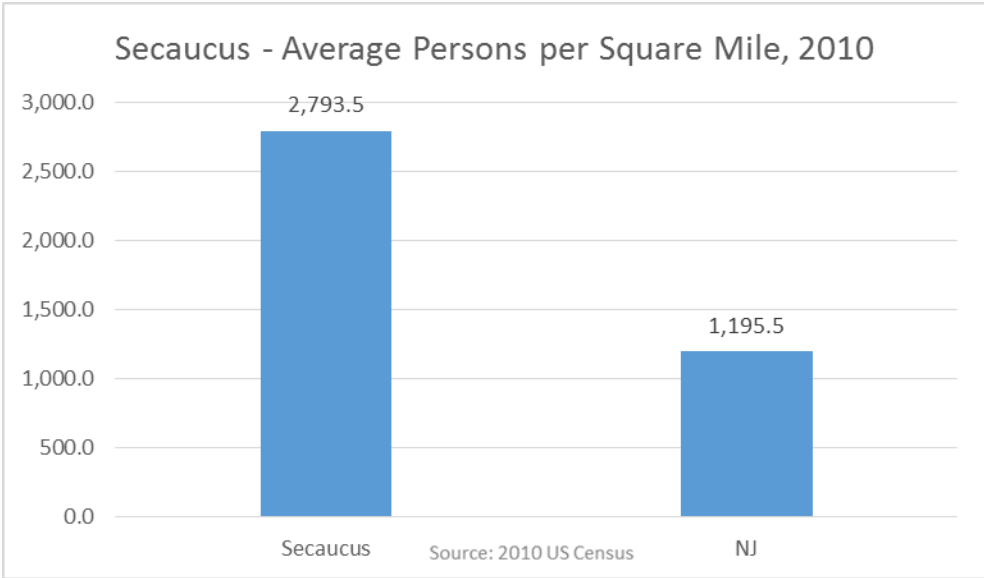
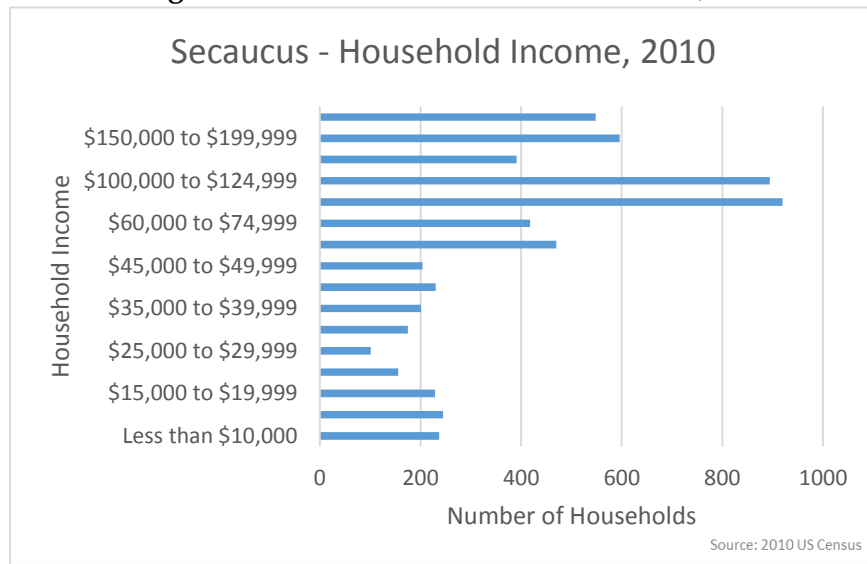


Figure 10: Household Income in Secaucus, 2010



Units in Structure	Units	Percent
Total housing units	6,750	6,750
1-unit, detached	2,043	30.3%
1-unit, attached	695	10.3%
2 units	1,558	23.1%
3 or 4 units	692	10.3%
5 to 9 units	242	3.6%
10 to 19 units	392	5.8%
20 or more units	1,128	16.7%
Mobile home	0	0.0%
Boat, RV, van, etc.	0	0.0%

Year Structure Built	# Units	Percent
Total housing units	6,750	100%
Built 2010 or later	39	0.6%
Built 2000 to 2009	680	10.1%
Built 1990 to 1999	208	3.1%
Built 1980 to 1989	1,273	18.9%
Built 1970 to 1979	1,193	17.7%
Built 1960 to 1969	998	14.8%
Built 1950 to 1959	963	14.3%
Built 1940 to 1949	330	4.9%
Built 1939 or earlier	1,066	15.8%

Value	Units	Percent
Owner-occupied units	3,984	3,984
Less than \$50,000	21	0.5%
\$50,000 to \$99,999	43	1.1%
\$100,000 to \$149,999	95	2.4%
\$150,000 to \$199,999	56	1.4%
\$200,000 to \$299,999	470	11.8%
\$300,000 to \$499,999	2,107	52.9%
\$500,000 to \$999,999	1,104	27.7%
\$1,000,000 or more	88	2.2%
Median (dollars)	418,200	

¹⁶ Source for Tables 3-5: American Community Survey, 2010

Table 6: Land Use in Secaucus	
Existing Land Use	% of Total Area
Residential	13.0%
Residential - Rural	0.0%
Residential - Low Density	0.0%
Residential - Medium Density	1.2%
Residential - High Density	11.8%
Built-Up	8.4%
Commercial/Services	10.2%
Industrial	20.1%
Infrastructure	11.3%
Vacant	2.4%
Recreational	2.3%
Forest	6.1%
Wetlands	10.0%
Water	16.2%
TOTAL	100%

Table 7: Zoning in Secaucus	
Zone	Percent of Total Area
Residential Zone A	7.78%
Residential Zone B	1.93%
Low Density Residential	5.29%
Planned Residential	2.18%
Commercial Park	1.77%
Commercial Zone C	0.16%
Highway Commercial	0.36%
Neighborhood Commercial	1.53%
Regional Commercial	7.22%
Light Industrial A	26.05%
Light Industrial B	2.27%
Light Industrial Zone 1	2.11%
Heavy Industrial	0.87%
Public Utilities	0.29%
Roads, Rails, ROWs	4.93%
Transportation Center	1.02%
Multiple Zones	0.20%
Redevelopment Area	6.55%
Unzoned	0.12%
Parks and Recreation	6.20%
Environmental Conservation	21.16%
Water	.03%

Figure 11: Conceptual Disaster Impact Pathways

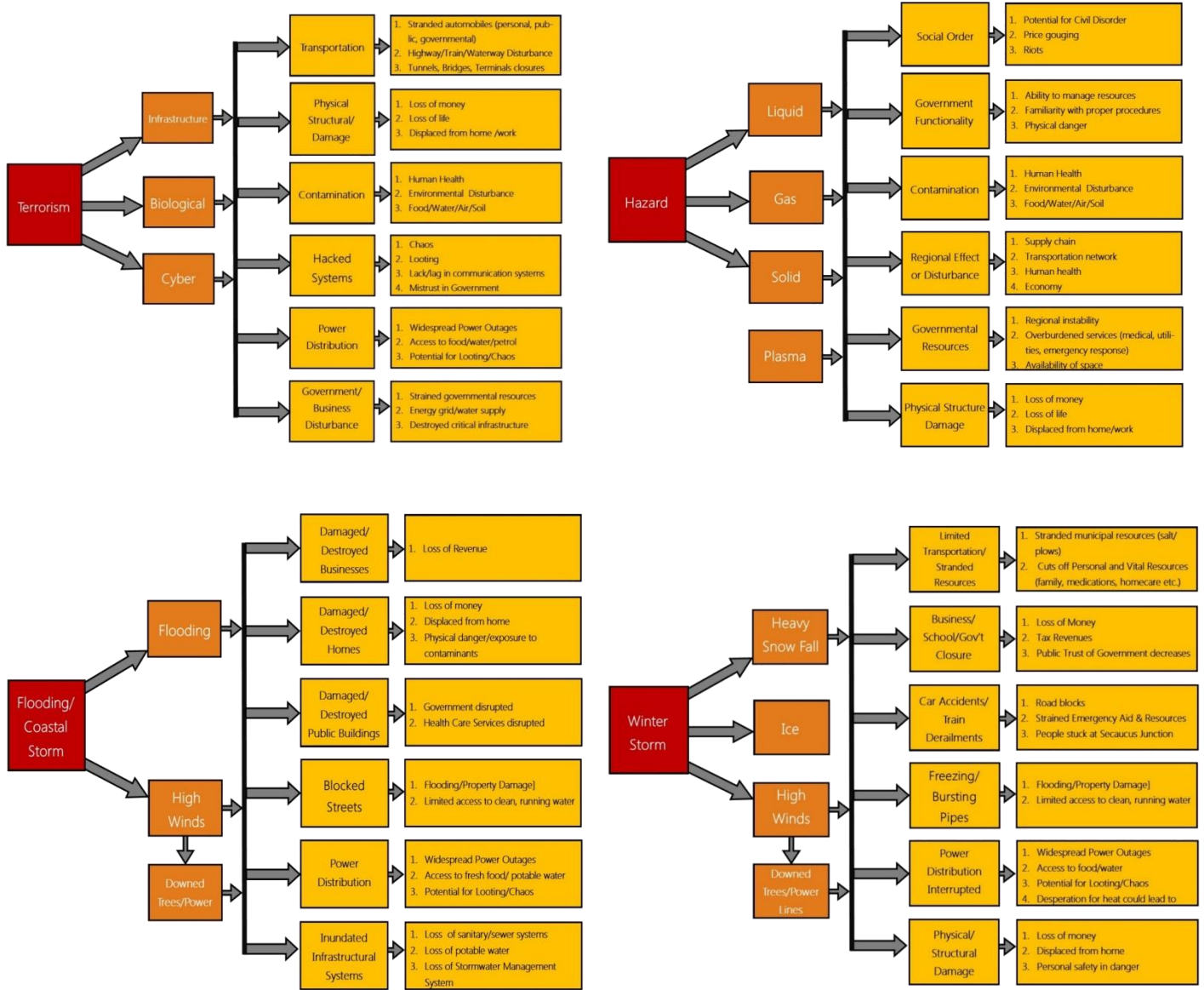


Table 8: Baseline Figures for Surface and Real Estate Analysis		
Total Acreage (by parcels)	Total Land Value	Total Building Value
3,185 acres	\$996,892,250	\$1,814,505,780

Table 9: Results of Surface and Real Estate Analysis

Inundation Level	Total LSI (acres)	Total LSI	Total Number of Parcels Affected	Total Value of Parcels Affected	Total Number of Buildings Potentially Impacted Residential vs Non-residential)	Total Number of Buildings Affected	Total Value of Buildings Potentially Impacted
4 Feet	750	23.5%	446	\$490,250,800	100 (50/50)	100	\$793,225,500
5 Feet	930	29.2%	630	\$594,073,100	295 (178/117)	298	\$1,034,642,000
6 Feet	568	35.4%	869	\$664,649,300	561 (353/208)	568	\$1,249,015,100
7 Feet	1351	42.4%	1075	\$700,679,100	1010 (721/289)	1019	\$1,347,562,400
8 Feet	1575	49.4%	1382	\$743,201,100	1221 (966/396)	1221	\$1,461,526,900

FIGURE 12: PARCEL AND BUILDING VALUE ACROSS INUNDATION HEIGHTS

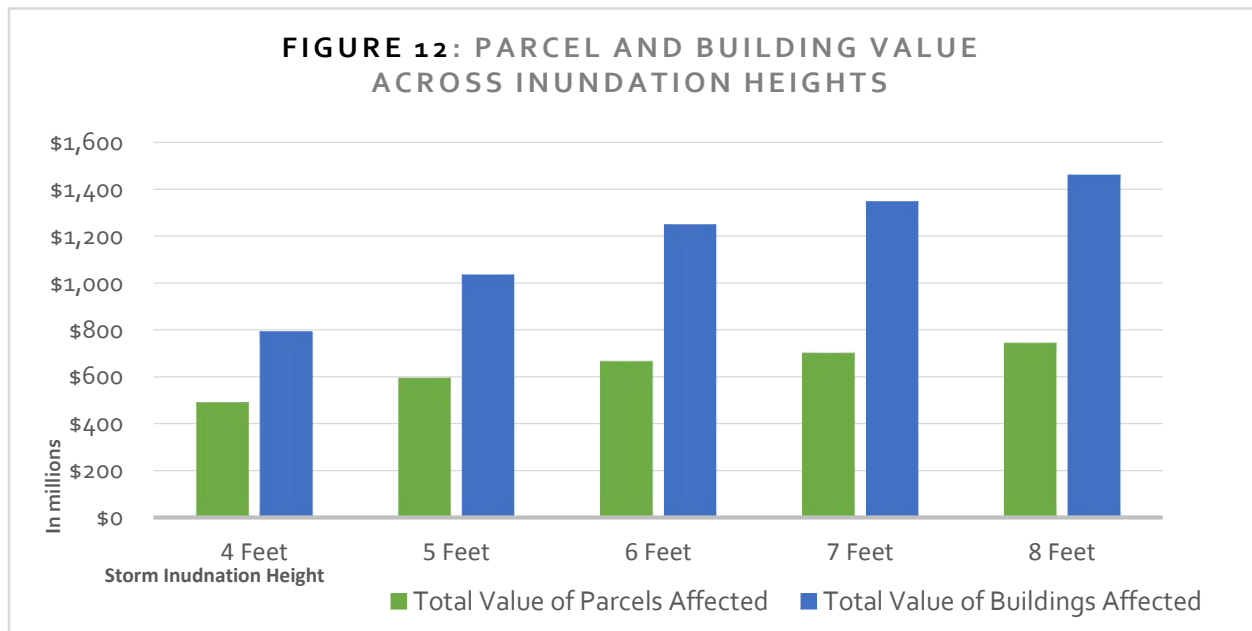


Table 10: Results of Contaminated Sites Evaluation

Inundation Level	Number of Contaminated Sites Potentially Impacted*
4 Feet	1
5 Feet	3
6 Feet	3
7 Feet	9
8 Feet	12

*Please note that all counts are cumulative across the inundation levels

Table 11: Inventory of Contaminated Sites

Amerada Hess Garage	Bidermann Industries
Viacom Data Center	Unknown 1
Unknown 2	NJ DOT
One Hour Martinizing	Mac Kays Landfill
Secaucus High School	Bank of America
Apex Trucking Co Inc	Abuhadba Inc

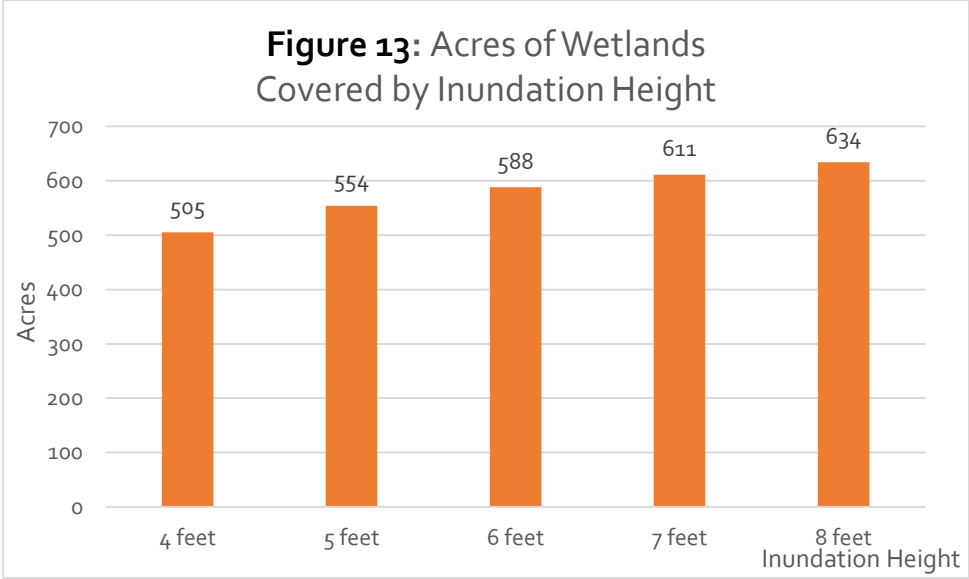


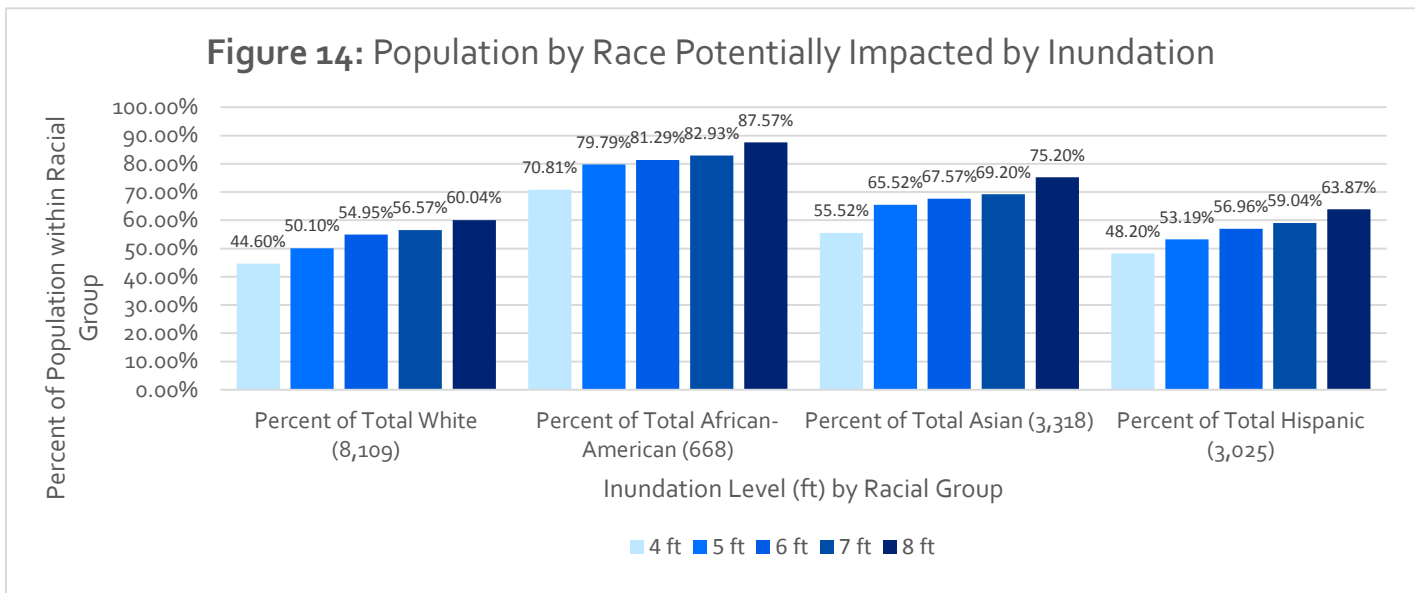
Table 12: Results of Civic Asset Inundation Analysis					
Categories of Potentially Impacted Civic Assets	Inundation Levels				
	4-foot	5-foot	6-foot	7-foot	8-foot
<i>Lodging</i>	2	2	3	5	5
<i>Food</i>			1	1	4
<i>Gas Stations</i>			1	4	4
<i>Schools</i>			1	1	1
<i>Civic and Recreation Centers</i>				2	2
<i>Churches</i>		1	1	1	1
<i>Medical Centers</i>		1	2	2	2
<i>Fire Stations</i>				1	1
TOTALS*	2	4	9	17	20

*Please note that all counts are cumulative across the inundation levels

Table 13: Results of Transportation Inundation Analysis	
Inundation Level	Number of Routes Potentially Impacted*
4 Feet	20
5 Feet	36
6 Feet	56
7 Feet	66
8 Feet	74

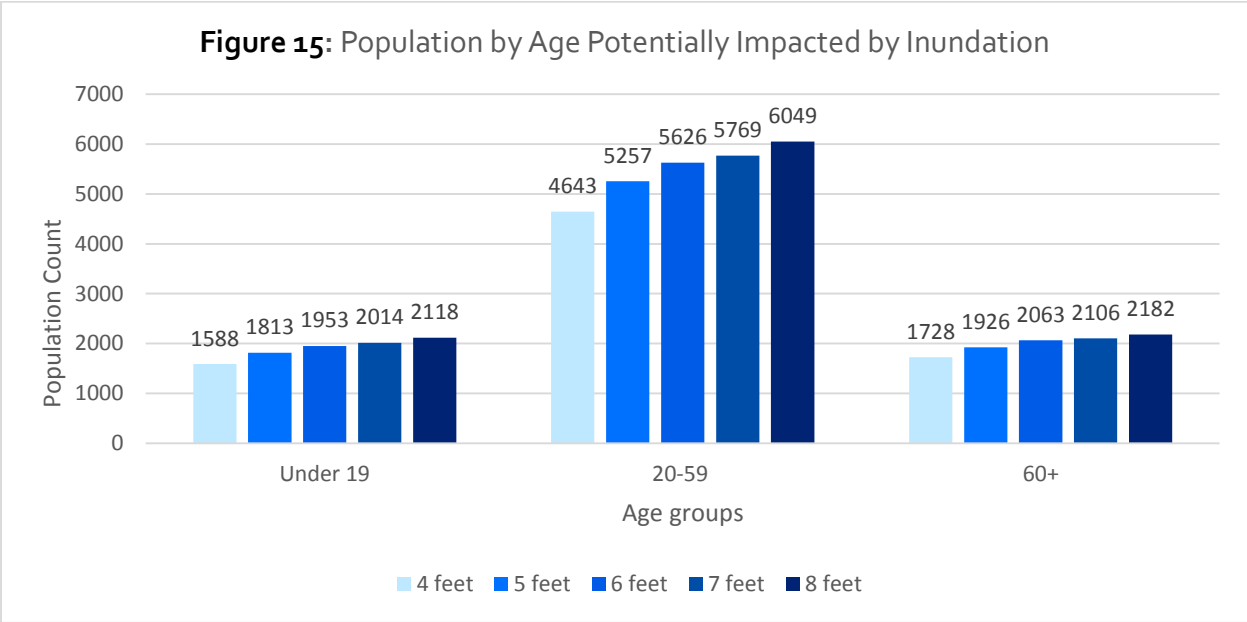
*Please note that all counts are cumulative across the inundation heights

Level of Inundation (feet)	Census Blocks Potentially Impacted by Inundation (by level)
4 feet	106
5 feet	132
6 feet	144
7 feet	150
8 feet	155
TOTAL Blocks in Secaucus	243



Level of Inundation	White	% of Total White (8,109)	African-American	% of Total African-American (668)	Asian	% of Total Asian (3,318)	Hispanic	% of Total Hispanic (3,025)	Total	% of Total Pop. Affected
4 feet	3,617	44.60%	473	70.81%	1,842	55.52%	1,458	48.20%	7,390	45.44%
5 feet	4,063	50.10%	533	79.79%	2,174	65.52%	1,609	53.19%	8,379	51.52%
6 feet	4,456	54.95%	543	81.29%	2,242	67.57%	1,723	56.96%	8,964	55.12%
7 feet	4,587	56.57%	554	82.93%	2,296	69.20%	1,786	59.04%	9,223	56.71%
8 feet	4,869	60.04%	585	87.57%	2,495	75.20%	1,932	63.87%	9,881	60.75%

Level of Inundation	19 and Under	Percent of Cohort	20-59	Percent of Cohort	60+	Percent of Cohort	Total	Percent of Total Population Affected
4 feet	1588	63.80%	4643	50.04%	1728	49.43%	7959	48.94%
5 feet	1813	72.84%	5257	56.65%	1926	55.09%	8996	55.31%
6 feet	1953	78.47%	5626	60.63%	2063	59.01%	9642	59.28%
7 feet	2014	80.92%	5769	62.17%	2106	60.24%	9889	60.80%
8 feet	2118	85.09%	6049	65.19%	2182	62.41%	10349	63.63%



Level of Inundation	Owned with Mortgage/ Loan	Percent of Units with Mortgage	Owned without Mortgage/ Loan	Percent of Units without Mortgage	Rented	Percent of Rented Units	Total	Percent of Total Units
4 feet	1400	51.83	475	43.18	1205	48.28	3080	44.99
5 feet	1578	58.42	546	49.64	1380	55.29	3504	51.18
6 feet	1686	62.42	600	54.55	1458	58.41	3744	54.69
7 feet	1702	63.01	612	55.64	1523	61.02	3837	56.05
8 feet	1781	65.94	630	57.27	1613	64.62	4024	58.78

Figure 16: Housing Units by Tenure Affected by Inundation

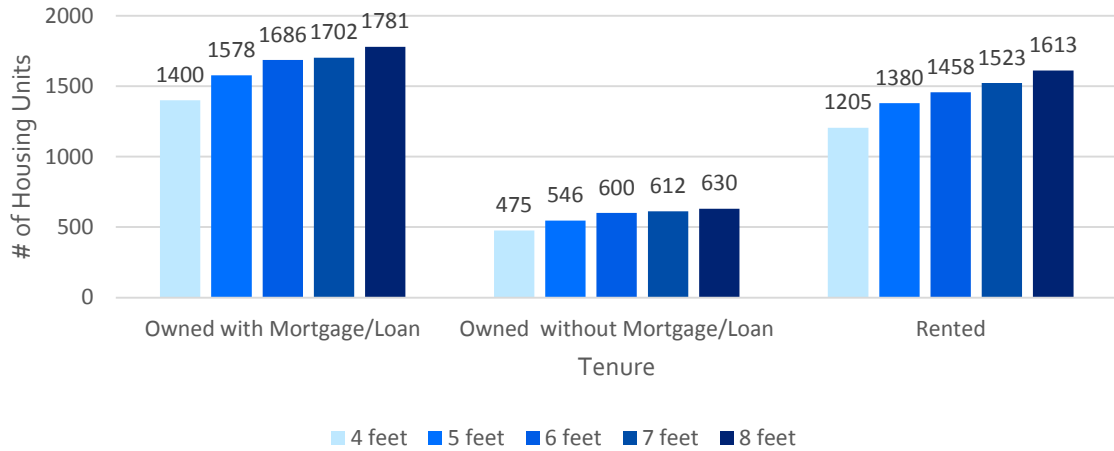


FIGURE 17: AFTER SANDY, WERE YOU AWARE OF THE FREE MENTAL HEALTH SERVICES AVAILABLE (NJ HOPE AND HEALING, RED CROSS, ETC.)?

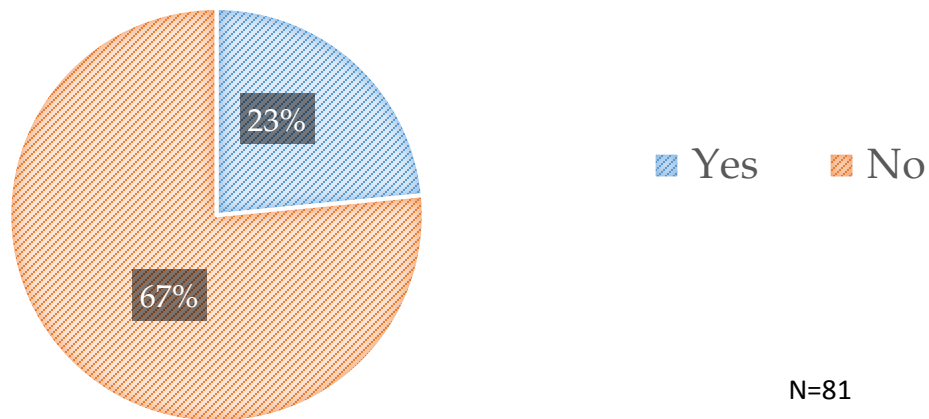
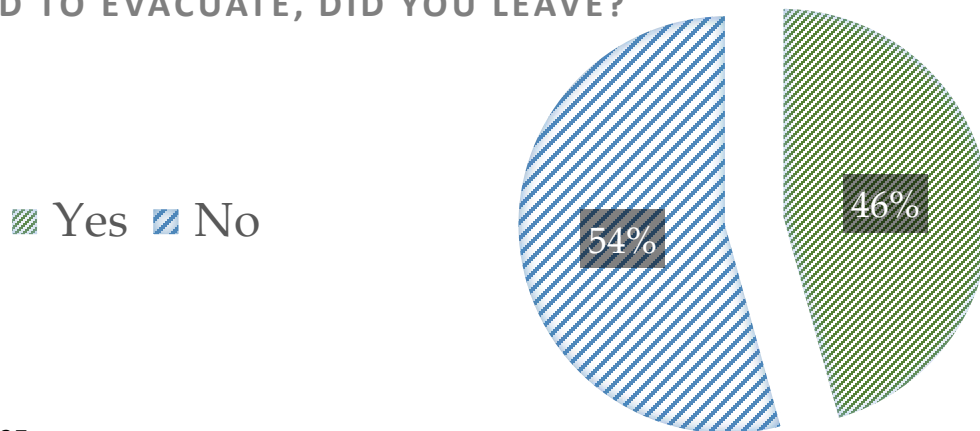
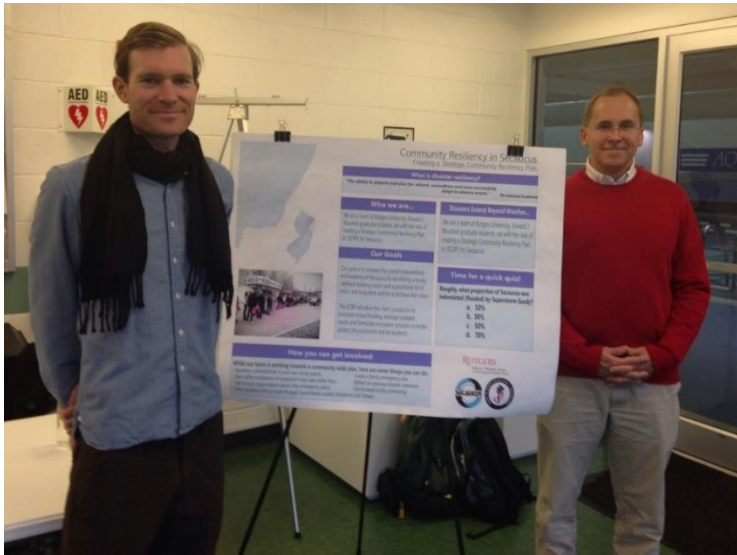


FIGURE 18: IN THE PAST, IF YOU WERE EVER TOLD TO EVACUATE, DID YOU LEAVE?

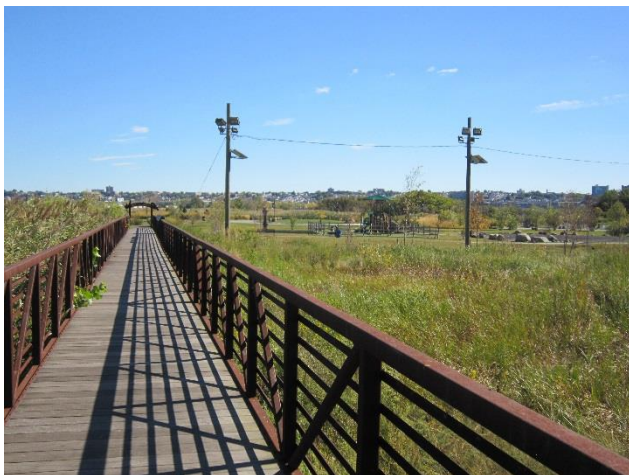




Picture 1: Public Engagement at Secaucus Recreation Center



Picture 2: Secaucus Junction Train Station (photo: Jaime Broderick)



Picture 3: Secaucus Riverwalk (photo: Jaime Broderick)

Appendix E: Community Discovery Questionnaire



You are invited to participate in a study being conducted by graduate students at the Bloustein School of Planning and Public Policy at Rutgers University, in partnership with the Town of Secaucus and the NJ Department of Homeland Security and Preparedness. The purpose of this survey is to collect information about Secaucus resident's disaster preparedness, perceptions of disaster vulnerability and their experience with past disasters like Hurricane Sandy.

This survey is anonymous. Anonymous means that no personal information about you will be recorded when you take the survey. There will be no way to link your responses back to you.

The research team and the Institutional Review Board at Rutgers University are the only parties that will be allowed to see your responses, except as may be required by law. If a report of this study is published, or the results are presented at a professional conference, only summarized results will be stated. All study data will be kept for three years.

There are no foreseeable risks if you decide to complete this survey. In addition, you will receive no direct benefit from taking the survey. The benefits of completing the survey are that you will contribute to information and data that will help inform the development of a Strategic Community Resiliency Plan for Secaucus.

The survey should take no more than 10 minutes to complete.

Participation in this study is voluntary. You may choose not to participate, and you may stop the survey at any time without any penalty to you. In addition, you may choose not to answer any questions with which you are not comfortable.

If you have any questions about the study or study procedures, you may contact Jon Carnegie at the Bloustein School for Planning and Public Policy, 33 Livingston Ave., New Brunswick, NJ, 08901, 848-932-2840, carnegie@ejb.rutgers.edu.

If you have any questions about your rights as a research subject, you may contact the IRB Administrator at Rutgers University at:

Rutgers University, the State University of New Jersey
Institutional Review Board for the Protection of Human Subjects
Office of Research and Sponsored Programs
3 Rutgers Plaza
New Brunswick, NJ 08901-8559
Tel: 848-932-0150, Email: humansubjects@orsp.rutgers.edu

1. Are you a resident of Secaucus?

Yes

No

a. Do you work in Secaucus?

Yes

No

b. Do you own or rent your home/apartment?

Own

Rent

c. How many vehicles are available to members of your household?

0

1

2

More than 2

d. What is the language most often spoken in your household?

English

Spanish

2 or more languages

Other _____

e. Please choose the race/ethnicity that most applies to you:

White, not Hispanic

Black, not Hispanic

White Hispanic

Black Hispanic

Asian/Pacific Islander

Native American

Other (please specify) _____

f. Please estimate your annual household income:

<\$14,999

\$15,000-\$24,999

\$25,000-\$49,999

\$50,000-\$74,999

\$75,000-\$99,999

\$100,000-\$149,999

\$150,000-\$199,999

\$200,000>

Don't Know

2. How many people are living in your household?

1 person

2 people

3 people

4 people

5 or more

a. How many people in your household are under the age of 18?

0

1

2

3 or more

b. How many people in your household are over the age of 65?

0

1

2

3 or more

c. How old are you?

18-24

25-34

35-44

45-54

55-64

65 and over

3. Do you participate in any recreation or other organizations in town (Recreation Center/Senior Services/Youth Sports etc.)?

Yes

No

4. Does your household have access to the following? (Select all that apply.)

Cell Phone

Home Phone

Internet

TV

Radio

5. How do you receive information on what to do during an emergency? (Select all that apply.)

- Social Media
- Radio
- Newspaper
- Town Website
- Neighbor/Friend/Peers
- Other _____

a. During an emergency, what is your biggest concern?

- Loss of Power
- Flooding
- Access to clean water
- Access to Medical services
- Ability to evacuate/leave Secaucus
- Other _____

6. In the past, if you were ever told to evacuate: (Circle which apply)

a. Did you leave?

Yes

No

b. How did you leave?

Drove Self
 Escorted by Gov't official
 Carpool
 Walk
 Other

c. Where did you go?

Shelter
 Relative/Friend in Secaucus
 Relative/Friend outside Secaucus
 Other _____

d. If you were told to evacuate, but did not, why did you choose not to?

7. During a disaster/emergency, does your household have:

- Generator
- Medical Supplies
- Emergency supplies
- Non-perishable food or bottled water

8. Do you have or does your landlord have (Select all that apply):

- Flood insurance
- Fire insurance
- Home owners insurance
- Renter's insurance
- Not sure/Don't Know

9. In the event of a disaster/emergency are you aware of any disaster resources (shelters, evacuation plans, emergency management sites, etc) available in Secaucus?

- Yes No
-

a. Have you ever used any of these resources?

- Yes No
-

10. On a scale from 1-5 how protected do you feel from another superstorm/hurricane (1 being not protected at all and 5 being completely protected):

	1	2	3	4	5
	Not Protected	Somewhat Protected	Neither Protected Nor Not Protected	Protected	Completely Protected
Protected From Another Major Storm	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

11. What are your feelings about wetlands?

- They help protect us from flooding
- They cause more flooding
- No opinion
- I don't know what wetlands are
- Other _____

12. What do you feel about the berms that have already been built in town?

- Will protect us from future storms
- May or may not help

- May make things worse
- I don't know what berms are

13. What emergency/disaster impacts have you experienced while living in Secaucus? (Select all that apply)

- Regular flooding during high tides or significant rain events
- Flooding during Tropical Storm Irene
- Flooding during Hurricane Sandy (if checked, please see question 13b. as a follow-up)
- Loss of power for 12 hours or more
- Stranded in home during snow/ice storm
- Other (please specify) _____

a. Did you or anyone in your family experience personal impacts during disaster or emergency? (Select all that apply)

- Serious injury
- Displaced from home for more than a couple of days
- Ran out of medication
- Lost wages/income from missing work
- Got sick
- Chronic health condition (asthma, heart conditions, blood pressure) made worse by event
- Post-traumatic stress disorder
- Mold in home
- Vehicle damaged or destroyed
- Other (please specify) _____

b. Select all ways you were affected by Hurricane Sandy (Select all that apply):

- | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Flood Damage | Wind Damage | Electric Damage | Personal injury/illness | Other _____ |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

14. After Sandy, were you aware of the free mental health services available (NJ Hope and Healing, Red Cross, etc.)?

Yes

No



a. Did you or anyone else you know take advantage of these resources?

Yes

No



15. How connected do you feel to Secaucus?

	Not At All	Not Very	Somewhat	Very
Personal Connection To Secaucus	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

16. Views on different hazards:

	No Risk	Low Risk	Medium Risk	High Risk	Don't Know/No Opinion
Coastal Storms/Hurricane	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Flooding	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Earthquake	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Thunderstorm	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tornado	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Terrorism	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Utility Outage	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Snow Storm/Blizzard	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Drought	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Land Slide	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sea Level Rise	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Appendix F: Resiliency Index

NJ Office of Homeland Security & Preparedness Resiliency Index			
Planning			
	Element	Response (Check one for each element)	Notes
1	Does your town have a Continuity of Operations Plan (COOP) for each department/facility or a Continuity of Government Plan (COG)?	Yes, all essential departments/facilities have COOP plans.	
		Yes, some essential departments/facilities have COOP plans, or we are working on them now.	
		No, no essential departments/facilities have COOP plans.	
2	Does your town have Local Emergency Planning Council (LEPC) or other emergency planning body?	Yes, we have an active LEPC that meets regularly and before events.	
		Yes, we have an LEPC but we meet infrequently.	
		No, we do not have an LEPC.	
3	Does your town have a campaign to promote individual and family preparedness (e.g. promoting the use of go-kits, family communication plan, shelter in-place supply kit, family preparedness guide)?	Yes, we have a robust campaign and regularly engage the public with preparedness education.	
		Yes, we have a campaign but we only send out public messaging infrequently.	
		No, we do not have an individual/family preparedness campaign.	
4	Does your town educate its employees about how to prepare themselves and their families for emergencies (family protection or sheltering plan for essential personnel)?	Yes, we have a robust campaign and regularly engage our employees with preparedness education.	
		Yes, we have a campaign but we only engage our employees infrequently.	
		No, we do not have an individual/family preparedness campaign.	
5	Are any non-governmental organizations involved in pre-event planning or response	Yes, several of our local NGO's are active in both planning and responding to events.	

	activities (e.g. American Red Cross, local food pantry, etc.)?	Yes, but we would like more representation from NGO's in planning and response.		
		No, we only notify NGO's when we need something or not at all.		
6	Are there any citizen groups in our town that are active in emergency preparedness, response or recovery (e.g. CERT, block captains, etc.)?	Yes, there are citizen groups engaged in preparedness, response and recovery and represent a large portion of the town.		
		Yes, there are a few groups, but they are only somewhat integrated into town operations.		
		No, there are no citizen groups that participate.		
7	Does your town engage with the local Board of Education to coordinate emergency planning?	Yes, we have an active partnership with the BOE.		
		Yes, but we could do better.		
		No, we do not engage the BOE in planning.		
8	Does your town have a shelter plan that lists identified shelter locations and assets (e.g. staffing, commodities) to support sheltering capability at these locations?	Yes, we have a list of identified shelters and are ready to support them with human and material assets.		
		Yes, we have a list of identified shelters, but we are not sure how to staff and supply them.		
		No, we have no shelter plan.		
9	Does your town have a website or use social media, a printed newsletter, or mailing list to notify residents about projects, events, public meetings, and community events?	Yes, we have a website, social media outlets or other outreach tool that is widely distributed and regularly updated for this kind of outreach.		
		Yes, but outreach is not consistent or widely distributed		
		No, we do not have a website or other methods of		
10	Does your town utilize an emergency notification system, like Nixle, to inform residents of emergency weather or other events, providing preparedness tips, evacuation routes, and information on emergency shelters, updates on when power will be restored, and	Yes, we have an emergency notification system that notifies residents via text and email that most town residents subscribe to.		
		Yes, but unsure how many residents are aware of this service and how much of an impact it has made during emergency events.		

	information on any actions residents need to take, etc.?	No, we do not have an emergency notification system in our town.		
11	Does your town’s planning process engage and consider adjacent towns, county initiatives and the regional context for emergency management, planning, land use planning and economic development?	Yes, we engage neighboring towns in our planning process and actively consider the county and region in our decisions.		
		Yes, we are aware of what other towns/county/region are doing, but we do not actively engage with them.		
		No, we do not actively engage with any of them.		
12	How active is your community in planning, including updating the town Master Plan?	There are rarely vacancies on boards, and there is competition for vacancies. There is good attendance at public meetings, and support for town initiatives.		
		There are few vacancies on boards, but it often takes effort to fill openings. Attendance is good at high-visibility meetings, but not for general sessions.		
		Board positions go vacant for months. Meetings are sparsely attended.		
13	How successful is the town at implementing the town's Master Plan recommendations?	Very successful: the town plan guides most projects and investments, and the town’s regulations align with and implement town plan.		
		Moderately successful: the town plan is used for some projects, and the regulations are somewhat consistent with the town plan policies.		
		Not successful: the town engages in planning, but then the plan sits on the shelf.		
14	Does your town's Master Plan support and reference other town plans/plan elements such as the Open Space Plan, Stormwater Management Plan or County Multi-Hazard Mitigation plan?	Yes, the Master Plan supports and references other plans/plan elements with specific strategies.		
		Yes, the Master Plan references these other plans but does not support them with specific strategies.		

		No, the plans are drafted separately and are not mutually supporting.		
15	Have you identified populations with Access & Functional Needs in your community, where they are located and what their needs may be?	Yes, we have identified AFN populations, mapped their location and are ready to respond to their needs.		
		Yes, we are aware of some AFN populations, but we are not sure where they are located or how to meet their needs.		
		No, we are not aware of any AFN populations.		
16	Does your town have an economic development plan or strategy?	Yes, we have an economic development plan that covers critical areas in the town.		
		Yes, we have an informal strategy for some areas of the town.		
		No, we have no plan or strategy.		
17	Does your economic plan or strategy identify economic vulnerabilities due to identified hazards?	Yes, it identifies vulnerabilities from multiple hazards.		
		Yes, but it only identifies a few vulnerabilities.		
		No, it does identify any vulnerabilities.		

Response				
	Element	Response (Check one for each element)		Notes
1	Are all departments responsible for providing essential services during emergencies trained in the Incident Command System (ICS)?	Yes, all departments are trained in ICS.		
		Yes, most departments are trained in ICS.		
		No, most departments are not trained in ICS.		
2	For response activities, is there an organizational chart documenting organizational structure and role definitions of each relevant agency which is updated regularly (e.g. EOP).	Yes, we have a clearly defined organizations chart and it is updated regularly.		
		Yes, but the organizational chart is confusing or is not updated regularly.		
		Yes/no, we have an organizational chart but it is never updated.		
3	Do you hold regular exercises to test role responsibilities	Yes, we hold regularly occurring exercises.		

	and training (table top, functional or full-scale)?	Yes, but our exercises only occur infrequently.		
		No, we never hold exercises.		
4	Are any of your other staff who are not usually active in response activities cross-trained to fill gaps during extreme emergencies (e.g. planning dept. trained to staff ICS planning cell, admin staff trained to work in an EOC)?	Yes, we have several departments cross trained to fill gaps.		
		Yes, but we only have a few individuals trained to fill gaps.		
		No, we have no other individuals trained.		
5	Does your town have a Public Information Officer (PIO) or official designated to communicate with the public during emergencies?	Yes, we have a PIO or similar.		
		No, but we have strategies about how to communicate with the public.		
		No, we do not have a PIO and let our department heads take care of public communication.		
6	Does your PIO or similar have a catalogue of pre-scripted messages that can be sent to the public letting them know what to do during specific events (flooding, HazMat, evacuations, etc.)	Yes, our PIO or similar has a well-developed catalogue of pre-scripted messages.		
		Yes, we have a limited amount of pre-scripted material.		
		No, we have no pre-scripted messaging.		
7	Does your town have mutual aid agreements (MAA) with other communities for emergency or other services (mass care, alternate EOC)?	Yes, we have several MAA's with other towns and they are signed and recorded in our Emergency Operations Plan.		
		Yes, have several agreements but they handshake agreements only (police and fire).		
		No, we have no such agreements.		
8	Does your town have pre-scripted event specific resolutions or declarations for use before during or after and event (e.g. evacuation orders, shelter in place)?	Yes, we have several pre-scripted resolutions/declarations and regularly update them.		
		Yes, we have a few pre-scripted resolution/declarations.		
		No, we do not have any pre-scripted.		
9	Does your town financial management protocols in place for tracking of activities	Yes, we have protocols in place and are ready to track financial and human resource activities.		

	during an event for financial reimbursement purposes (e.g. employee overtime, volunteer hours, resources dispatched to other communities)?	Yes, but we do not have any formal/written procedures, only experience from past events.		
		No, we do not have any protocols.		
10	Does your town have a volunteer management plan in place to manage an influx of volunteers after an event?	Yes, we have a plan.		
		No, we do not have a formal plan, have experience managing volunteers in past events.		
		No, we do not have a plan or any idea how we would manage volunteers.		
11	Does your town have active partnerships with any Non-Governmental Organizations or private business for the response to events?	Yes, we have active partnerships and they are documented with written agreements.		
		Yes, we have a few partnerships, but they are no documented by written agreements.		
		No, we do not partner with any NGOs or private business.		

Recovery				
	Element	Response (Check one for each element)		Notes
1	Are departmental/town officials' roles defined in pre-disaster recovery plan (PDRP) or ordinance?	Yes, we have a pre-disaster recovery plan/ordinance.		
		No, but we are working on a plan or ordinance.		
		No, and we have no plans to start work on a pre-disaster recovery plan or ordinance.		
2	Does your town have a debris management plan with prioritized locations for clearance and identified sites for dumping of material?	Yes, we have a debris removal plan with priorities, pre-identified sites and it has been approved by the county.		
		Yes, we have some idea of how we would do debris removal, but no formal plan.		
		No, we have no debris removal plan.		
3	Does your town have a system for evaluating the value of recovery projects?	Yes, we have a system and it is clearly defined and recorded in a PDRP.		

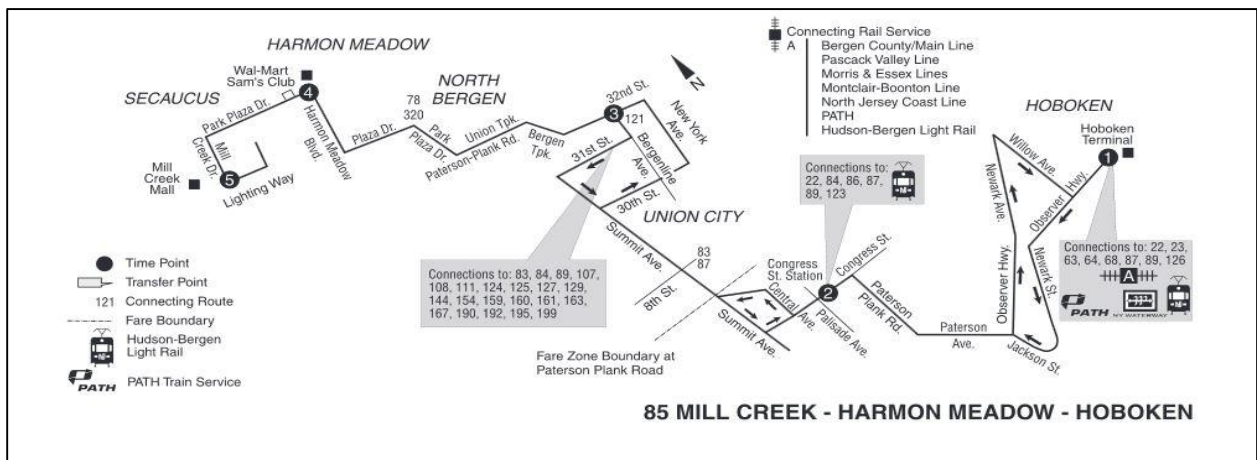
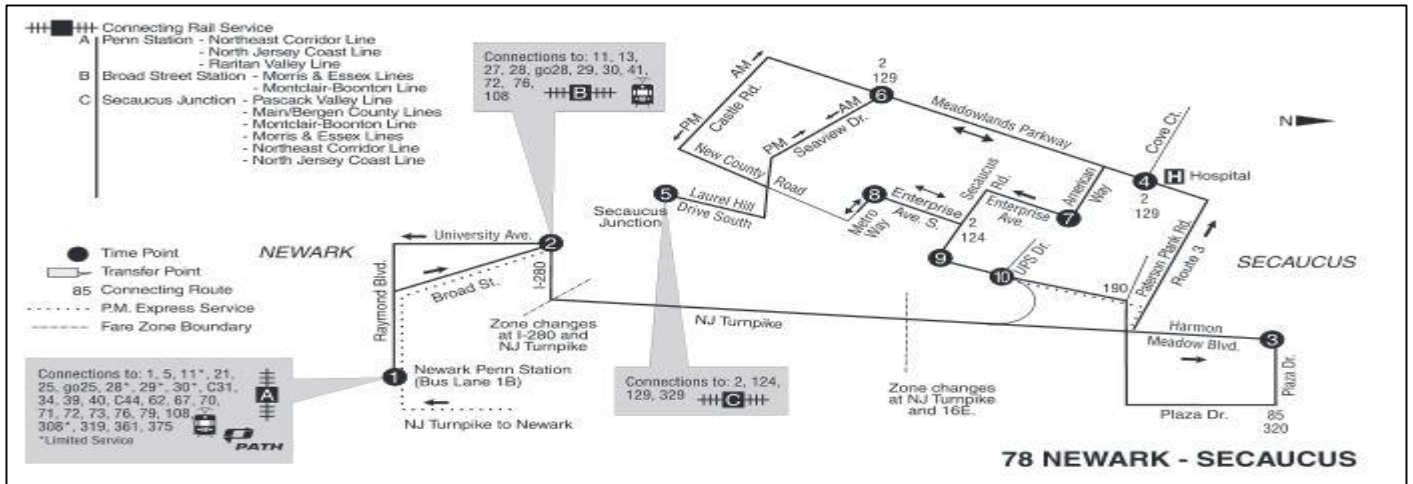
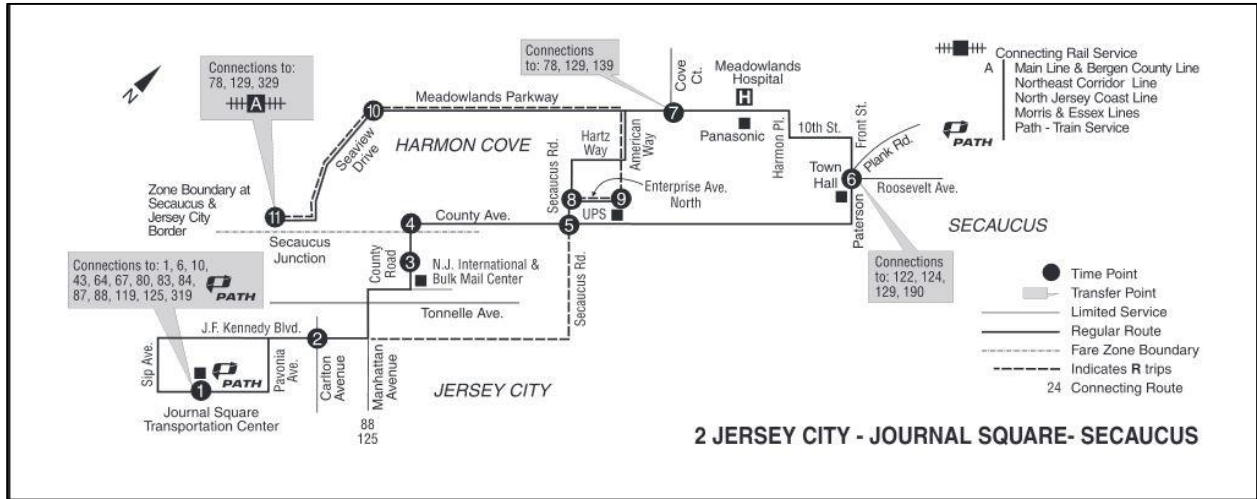
		Yes, we have a system used during past events, but we have never recorded it.		
		No, we have no system.		
4	Does your town make information about how to access state, federal and non-profit recovery programs available to the private sector (e.g. SBA loans, other recovery programs)?	Yes, we make the information available on our website, social media and we communicate it through the media.		
		Yes, we make the information available but do not update it very often.		
		No, we do not make the information available.		
5	Does your town make information about how to access state, federal and non-profit recovery programs available to the general public (e.g. Individual Assistance programs, mold remediation, basement muck outs)?	Yes, we make the information available on our website or communicate it through the media.		
		Yes, we make the information available but do not update it very often.		
		No, we do not make the information available.		
6	Does your town make information about how to access state, federal and non-profit recovery programs available to the general public? (e.g. Public Assistance programs, mold remediation, basement muck outs)?	Yes, we make the information available on our website or communicate it through the media.		
		Yes, we make the information available but do not update it very often.		
		No, we do not make the information available.		
7	Does your town have protocols in place handle a surge in building inspections and applications for permits after an event with widespread damage?	Yes, we have a protocols in place and they are on file at city hall.		
		Yes, we have some protocols but they are not written down.		
		No, we do not have any protocols.		
8	Does your town have a strategy to prioritize areas for restoration of utility services or debris removal?	Yes, we have a strategy and is recorded and updated regularly.		
		Yes, but we do not have a formal strategy or it is not written down.		
		No, we have no strategy.		

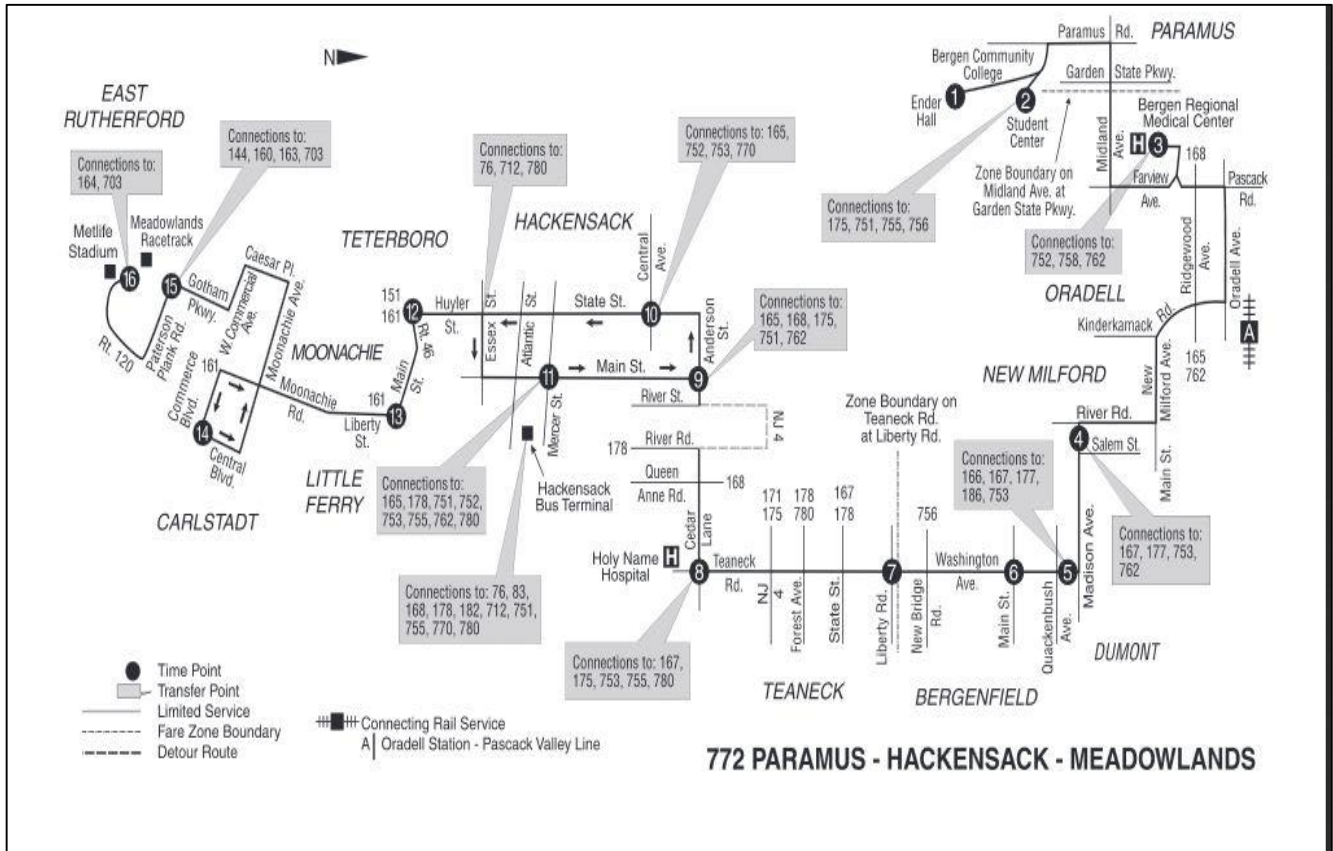
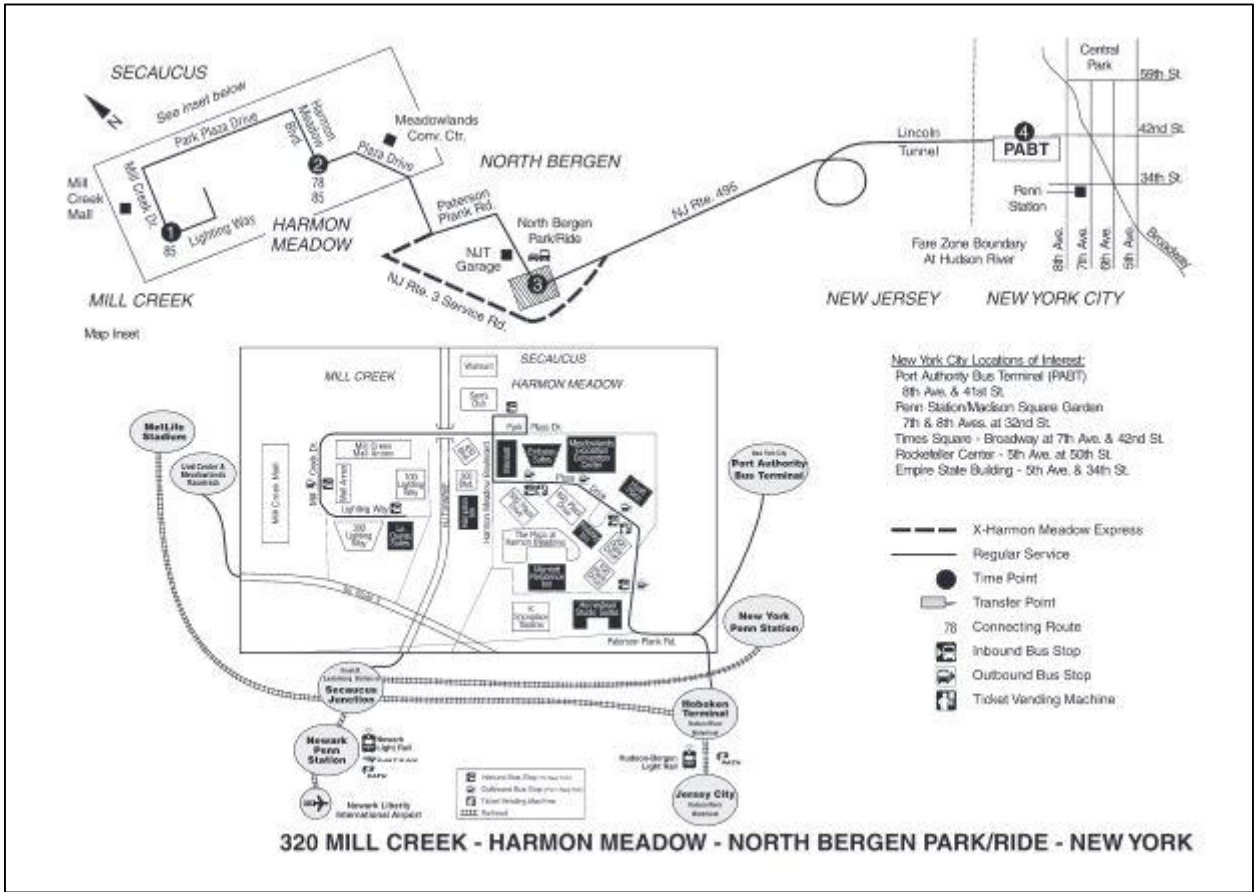
Mitigation			
	Element	Response (Check one for each element)	Notes
1	Does your town promote green building techniques, such as the use of solar panels, green roofs or LEED standard buildings?	Yes, we have town ordinances that require the use of such techniques and offer incentives to do so.	
		Yes, we have language in our ordinances/plans that encourage the use of such techniques and offer some incentives.	
		No, we have no ordinances, incentives or language to promote these techniques.	
2	Does your town have back-up power supplies for critical facilities such as police departments, fire stations and city hall?	Yes, we have back up power supplies are all our critical facilities.	
		Yes, we have back up power supplies are some of our critical facilities.	
		No, we do not have back up power on any of our critical facilities.	
3	Does your town have a strategy to address fuel shortages following a major disaster?	Yes, we have a written strategy and we consider both demand from both municipal assets as well as the general public.	
		Yes, we have an informal strategy.	
		No, we do not have a strategy.	
4	Does your town have a storm water management plan?	Yes, we have an adopted stormwater management plan.	
		Yes, we have an informal plan but nothing written or adopted.	
		No, we do not have one.	
5	How does your town manage stormwater runoff from major rain events?	We have permitting standards for stormwater that are more stringent than state permitting requirements.	

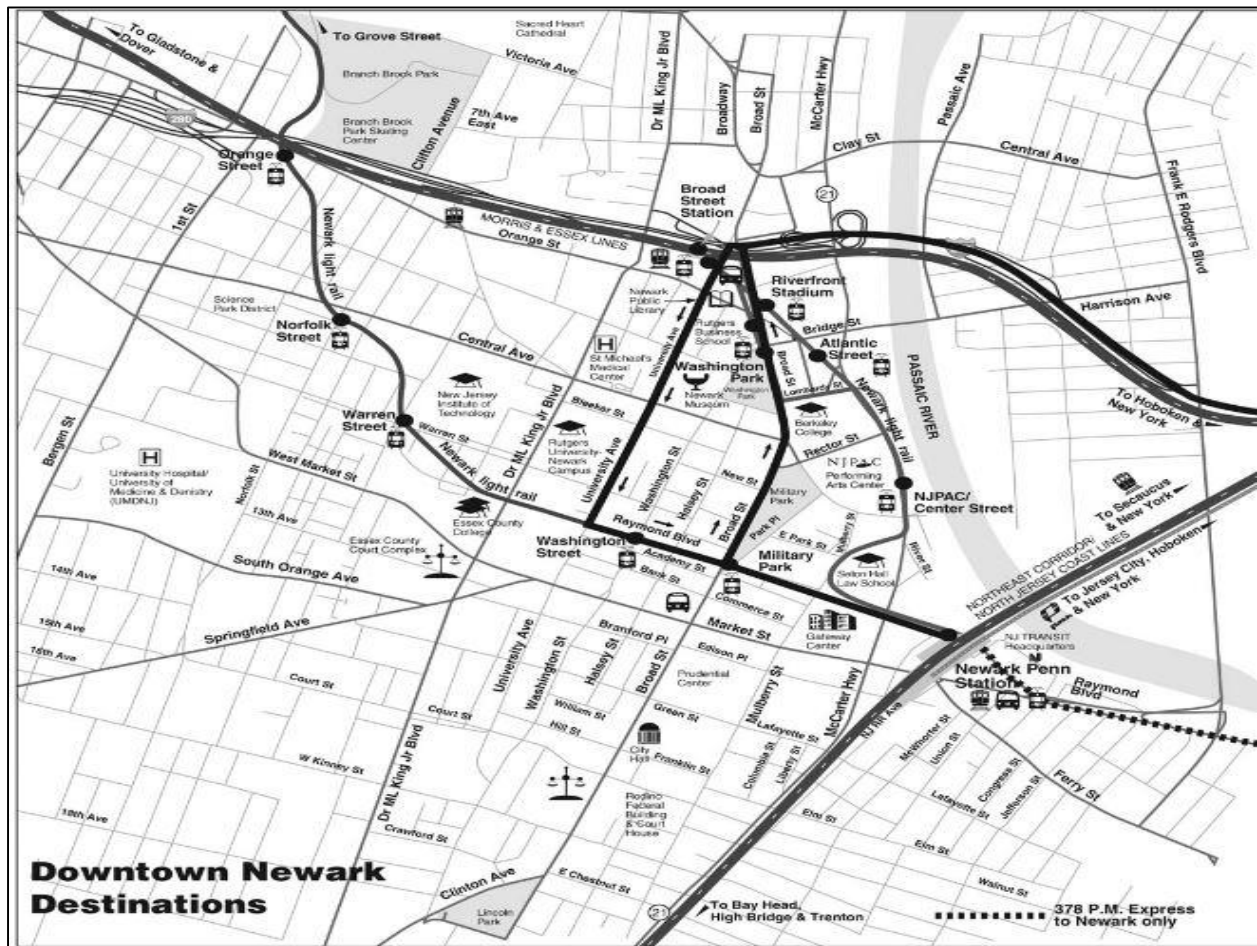
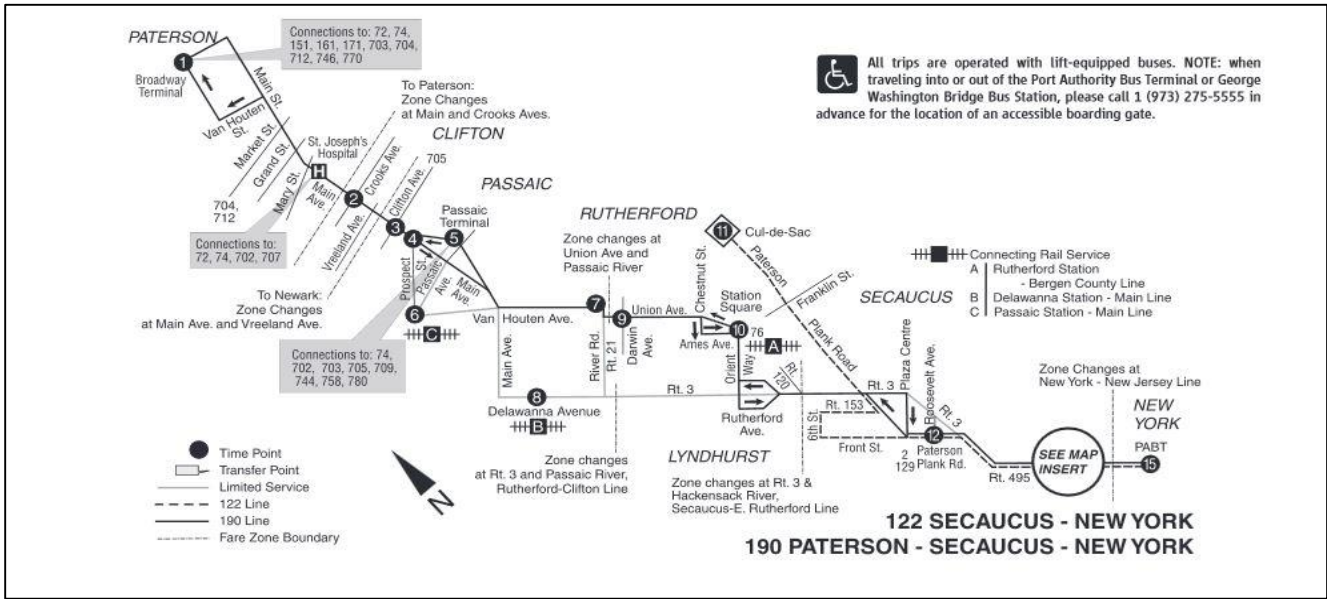
		We offer information about how property owners can maximize infiltration of stormwater (e.g., permeable pavement, rain gardens, rain barrels, vegetated buffers.		
		We have no regulations beyond state permitting requirements.		
6	Has your town adopted regulations requiring new construction to incorporate, maintain, or enhance riparian buffers for projects that are near lakes, rivers, and streams?	Yes, we require new construction to incorporate, maintain or enhance riparian buffers.		
		No, but we actively encourage and educate property owners about incorporating, maintaining, or enhancing riparian buffers		
		No, there has been little or no activity related to riparian buffer protection or enhancement.		
7	Has our town identified any low-impact regulatory options to decrease stormwater runoff, such as a tree protection ordinance, impervious cover limits, riparian buffers, vegetated drainage channels or cluster development?	Yes, we employ most of those tools.		
		Yes, we employ a few of those tools.		
		No, we do not employ any of those tools.		
8	Does your town have any programs that will help citizens decrease stormwater runoff from their own properties (i.e. rain barrel/rain garden programs, etc.)?	Yes, we have a rain barrel/rain garden program.		
		No, but we have considered a rain barrel/rain garden program, but we need more resources.		
		No, we have no plans to start such a program.		
9	Does your town promote green building techniques, such as the use of solar panels, green roofs or LEED standard buildings?	Yes, we have town ordinances that require the use of such techniques and offer incentives to do so.		
		Yes, we have language in our ordinances/plans that		

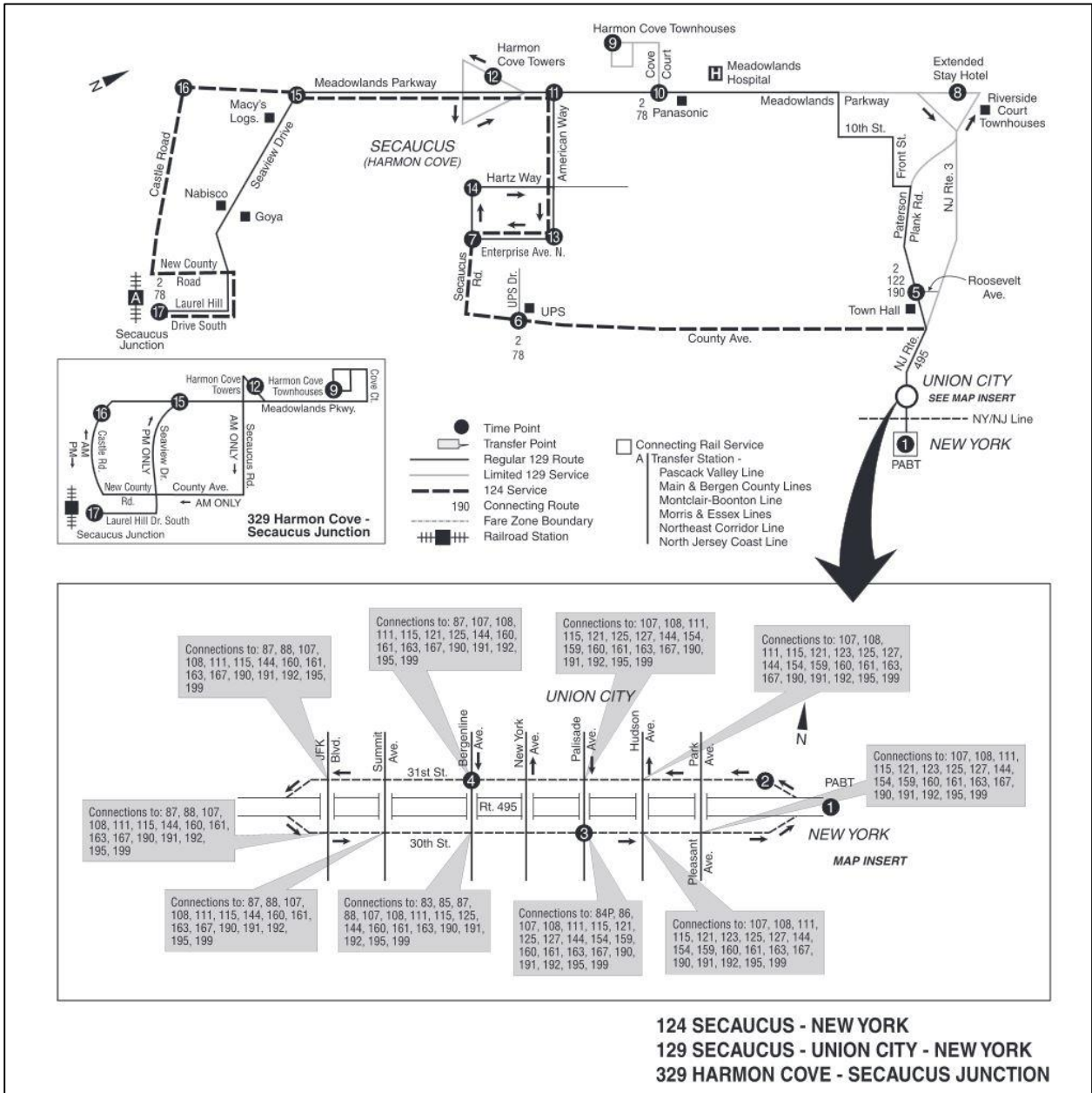
		encourage the use of such techniques and offer some incentives.		
		No, we have no ordinances, incentives or language to promote these techniques.		
10	What, if any, regulatory actions is your town taking to protect natural resources?	We have strong provisions to protect natural resources such as wetlands, riparian areas, habitat and sites for rare plant and animal species in the development review process, zoning, and/or subdivision regulations.		
		We have made provisions to protect some, but not all, natural areas in development review, zoning and/or subdivision regulations.		
		We have made no provisions to protect natural resources in our regulations.		
11	Has your town adopted more robust building codes to protect against projected hazards (e.g. require installation of flood vents, require foundation ties to protect against wind damage)?	Yes, we have several areas of are building code that are more strict than the state standards.		
		Yes, we have only adopted a few preventative codes.		
		No, we have not adopted any preventative codes.		
12	Has your town provided any resources to assist businesses with business continuity planning (e.g. workshops, how to guides)?	Yes, we have a thriving business continuity program		
		Yes, but we would like to do more.		
		No, we do not provide such resources.		

Appendix G: Transit Routes and Maps









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