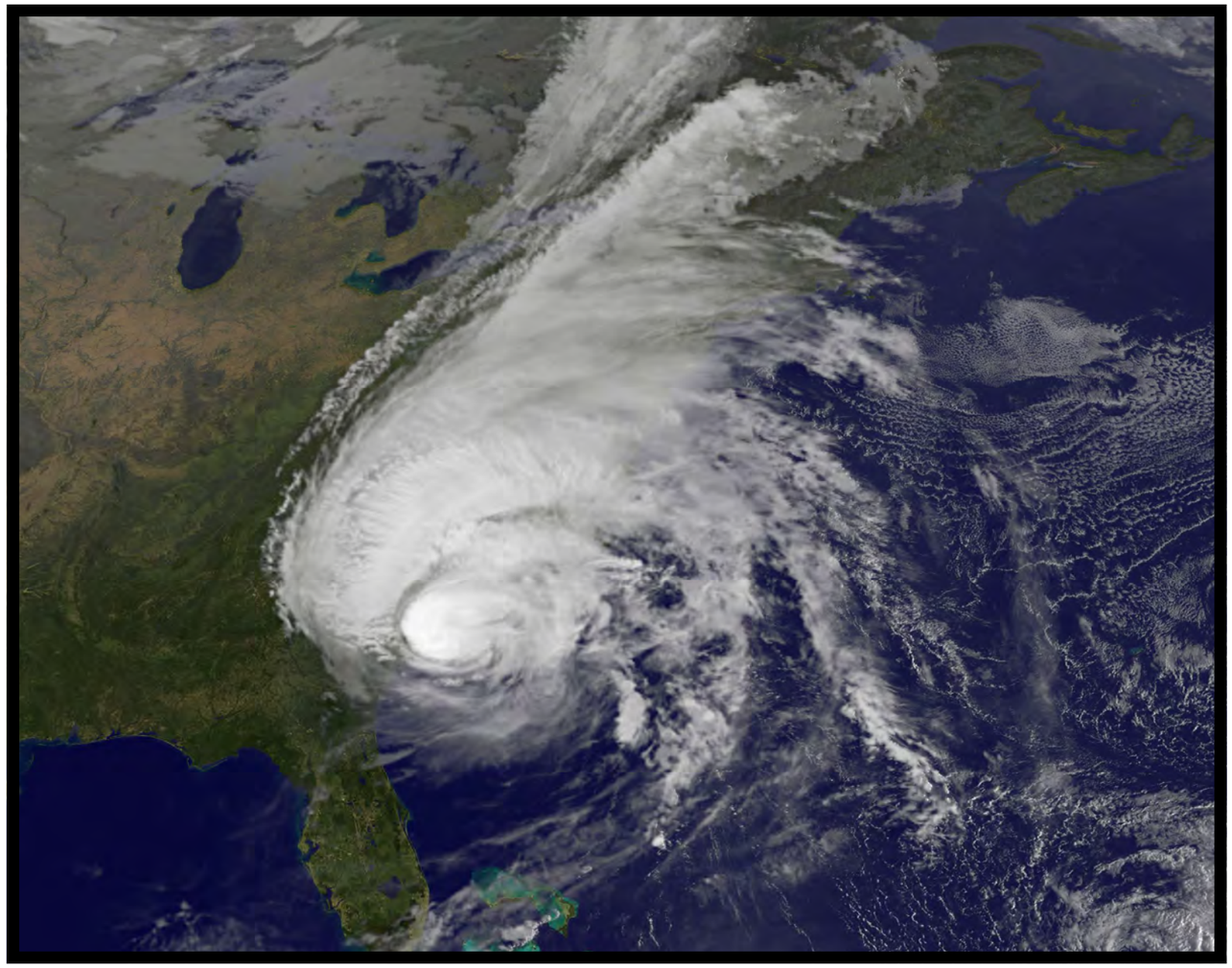


Natural Hazards

Economy

Social Equity

CITY OF FAYETTEVILLE RESILIENCY ELEMENT

RESILIENCY ELEMENT

Purpose and Introduction

The City of Fayetteville is vulnerable to a wide range of natural hazards that are inherent to its geographic location in Eastern North Carolina and its established development and infrastructure patterns. In addition to these natural hazards, an over-reliance on the influence of the military to support the City's economy has the potential to create significant negative economic impacts during deployments or cutbacks to military budgets. Finally, many of our neighborhoods and citizens have suffered from social neglect over a long period of time, leading to conditions of blight and entrenched poverty.

Consequently, it is extremely important for Fayetteville to plan for resiliency in natural hazard mitigation, economic development security, and social equity in order to maintain and enhance its physical development and economic and social structures.

There are a number of opportunities for communities to incorporate resiliency into their planning efforts. A partial list is provided below.

Comprehensive Plans
Sustainability Plans
Climate Adaptation/Resiliency Plans
Hazard Mitigation Plans/Continuity of Operations Plans
Development Standards/Community Design
Private Governance (educating citizens to pursue resiliency through personal action)
Infrastructure Projects
Economic Resiliency Plans

This Element addresses resiliency in the Comprehensive Plan Update. Previously, we have included measures to mitigate natural hazards and climate change impacts in the Cumberland/Hoke County Hazard Mitigation Plan adopted by City Council in 2016. The City was a participant in the development of the Cumberland County Climate Resiliency Plan by Sustainable Sandhills which is incorporated in this Element by reference. Our Person Street "green street" retrofit project is an example of resilient infrastructure.

The City has a Sustainability Plan that was adopted in 2009 and is now ready to be updated because many of the goals, objectives, and strategies included in the Sustainability Plan have been achieved and new challenges are evident. City development regulations, such as the Stormwater Ordinance and the Unified Development Ordinance (UDO), promote resilient development practices.

Cover Photo Credits clockwise starting from left:

Hurricane Matthew NASA/NOAA GOES Project
Special Operations Training at Ft. Bragg: DOD
Habitat for Humanity Neighborhood Damage: COF

As noted above, the City of Fayetteville has pursued community resilience across a range of planning and capital improvement initiatives. Due to the extent of our community's vulnerability, it is imperative to adopt a resiliency-mindset so that every possible opportunity to reduce risks faced by our community is explored.

The purpose of the Resiliency Element is to:

- Communicate and promote the benefits of resilience to the public.
- Integrate resilience into all planning and natural area conservation efforts.
- Protect future water quality and quantity.
- Promote social equity and provide assistance and support for vulnerable populations and areas.
- Shift development patterns to sustainable community design, green buildings, and renewable energy supplies.
- Establish and maintain economic development resiliency.
- Pursue partnerships with federal and state agencies, NGOs, and nonprofit organizations to enhance local and regional resiliency.
- Establish and maintain public confidence in our government and institutions in times of physical, economic, and social stress.
- Establish and maintain monitoring, evaluation, and adaptive management capacity for addressing communitywide resilience on a continuing basis.

What is Resiliency?

Resiliency is often defined as a physical or an emotional property, as the following two citations from *The Free Dictionary illustrate.*

- The physical property of a material that can return to its original shape or position after deformation that does not exceed its elastic limit.
- The ability to recover quickly from depression or discouragement.

By combining these definitions, resiliency could readily be defined as *the ability of a community to recover quickly from an external challenge such as a natural disaster or an impact on the local economy*.

Such a definition would be consistent with traditional hazards management practice where response to an external threat is complemented with pre-event and post-event actions intended to mitigate the impact of the realized threat.

However, the above definition of resiliency fails to reflect a key societal element that must be incorporated into resiliency planning. For resiliency to be a truly effective community planning strategy, it must also be perceived by all citizens as being applied fairly and successfully. The most socially-vulnerable populations (e.g., lower income, minority, elderly, or immigrant populations) are often located in areas where natural hazards and economic disruptions are more likely to occur. Additionally, these populations may experience institutionalized bias, blighted neighborhoods, and public disinvestment; the threats they perceive may therefore be internal as well as external.

Consequently, there may be an understandable skepticism on the part of these populations with regard to the ability of any planning process to positively affect their lives, protect their property, or ensure their safety. Resiliency planning must account for this skepticism in both response and mitigation actions. Tactics for achieving this may include enlisting people trusted in the community to speak in favor of the planning objectives, engaging the target population in activities that produce tangible, beneficial results, establishing advisory networks of existing neighborhood organizations, and utilizing participatory data collection and analysis to fully understand and address neighborhood or community needs in an open and transparent fashion.

To do all this, community resilience must address physical, economic, and social states. Consequently, for the purposes of this Element, "resiliency" is defined as:

The ability of a community to recover quickly, fairly and transparently from an internal or external challenge affecting public safety, economic well-being or social equity.

Resilience as a Design Mindset

Peter David Cavaluzzi , a principal at Perkins Eastman, says, "There is a tendency for people to look for the magic bullet, like building big walls or berms to control flooding or sea-level rise. It's almost like building infrastructure based on fear, as opposed to integrating these elements into a new public realm so that they almost disappear – 'hidden in plain sight. ' The key is to repurpose and adapt the design criteria so that [the design] results in environment that is safe and inviting for people. If you design buildings and public spaces so that they provide resilience while at the same time become promenades, boulevards, and terraces, you'll invite more people to enjoy them. But if you build more walls and berms, you'll cut people off from the wonderful environments that exist. . . . It's better to integrate resilience strategies into the fabric of new mixed-use development and into the public spaces rather than to block views and pedestrian access." (*Urban Land; May/June 2016)*

The Person Street "green street" project is an example of incorporating resiliency design thinking into a capital improvement project. This project adds parking and landscaping to a roadway that can now effectively function as an extension of downtown infrastructure. At the same time, 85% of the stormwater falling on this street segment will be absorbed into the ground and not released into the stormwater sewer system.

Natural Hazards Resilience

The City of Fayetteville was a participant in the development of the Cumberland County Climate Resiliency Plan which is incorporated into this Element by reference. The Climate Resiliency Plan identified four critical natural hazards that require acknowledgment and mitigation in planning and action. These four areas are:

- Increasing temperature and frequency of heat waves
- Increasing strength and frequency of severe weather
- Increasing frequency of heavy precipitation events
- Increasing frequency of prolonged droughts

The Cumberland County Resiliency Plan's list of hazards is reinforced by other scientific studies such as the Third National Climate Assessment.

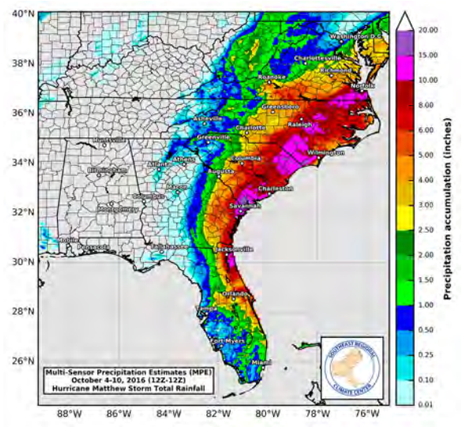
A team of more than 300 experts guided by a 60-member Federal Advisory Committee produced the Assessment in 2014 which, prior to publication, was extensively reviewed by the public and experts, including federal agencies and a panel of the National Academy of Sciences. The Third National Climate Assessment identified three primary climate change impacts affecting the Southeastern United States, a region of the country that includes North Carolina.

These impacts are:

- **Decreased water availability**, exacerbated by population growth and land use change, will continue to increase competition for water and affect the region's economy and unique ecosystems.
- **Increasing temperatures** and the associated increase in frequency, intensity, and duration of extreme heat events will affect public health, natural and built environments, energy, agriculture, and forestry.
- **Sea level rise** poses widespread and continuing threats to both natural and built environments and to the region's economy.

Citation: Melillo, Jerry M., Terese (T.C.) Richmond, and Gary W. Yohe, Eds., 2014: Highlights of Climate Change Impacts in the United States: The Third National Climate Assessment. U.S. Global Change Research Program, p 71.

Of course, even current extreme weather events create risks to the state and our region as Hurricane Matthew has amply and recently demonstrated.



Hurricane Matthew Precipitation Totals
Source: NOAA's SERCC

Lessons from Matthew

Hurricane Matthew produced the single highest 24-hour rainfall total ever recorded in Fayetteville, resulting in widespread flooding and property damage. This extreme weather event showcased the inadequacy of the Fayetteville stormwater management system to prevent property damage and to protect public safety as numerous streets were washed out and homes and residences flooded.

Four other lessons were learned. First, the Fayetteville emergency services team proved to be highly capable of dealing with an event like Hurricane Matthew. Nearly 600 people were served by water rescue teams during and immediately after the hurricane. Shelters proved adequate to handle the displaced population, including many from outside our region. Engineering and Infrastructure Department staff anticipated the potential damage and they were ready with barricades and post-disaster assistance, despite having their major operations facility underwater during the storm. For a natural disaster of this magnitude, the emergency response was truly superior.

Second, local recovery capabilities are proving to be on par with emergency response. Faith-based organizations and other nonprofits have partnered well with government resources to provide aid and assistance to those in need and to start the rebuilding process in areas damaged by the storm.

Third, some flood insurance rate maps do not appear to accurately reflect current risk levels. In one example, this is the second time in 27 years that the Traffic Engineering facility located on Alexander Street has been significantly damaged by floodwater. This facility is located in the 500-year floodplain where there is just a 0.2% chance of such flooding in any given year.

Fourth, several neighborhoods with single access points were cut off when those access points were damaged by flood waters. The largest of these neighborhoods, Kings Grant, located off Ramsey Street in North Fayetteville contains over 600 homes. Road damage in another single access subdivision, Rayconda, stranded over 200 residences.

In summary, Hurricane Matthew allowed us to experience an extreme weather event during the preparation of the Resiliency Element. This event demonstrated the inadequacy of City stormwater infrastructure to handle large volumes of rainfall, the potential for prior subdivision design to create significant public safety and neighborhood inconvenience situations when the access to these subdivisions becomes impassable due to storm damage, and the apparent inadequacy of FIRM maps to predict actual flooding potential. On a positive note, Matthew also demonstrated a superior response capability on the part of all departments involved in event response, as well as a robust recovery capacity on the part of faith-based communities, nonprofits, and government.

Critical Local Vulnerabilities

Water Supply – Fayetteville is served by surface water sources, primarily the Cape Fear River. Upstream communities also utilizing the Cape Fear River water source include fast-growing cities in the Triangle which can result in competition. The Town of Cary, for instance, seeks to divert millions of gallons of water per day from the Cape Fear River as part of an interbasin transfer. The City, through its utility provider, the Public Works Commission, is seeking to block this transfer in order to protect its future water supply.

Additionally, surface water sources are vulnerable to the effects of drought and pollution. An effort to explore groundwater options, including injected storage where surface water is treated in times of abundance and stored in an aquifer for use when the surface water supply is compromised by drought or pollution, should be considered.

Heat Vulnerability – The Sandhills area of North Carolina is traditionally the hottest part of the state. Climate change impacts are projected to significantly increase temperatures in the region, with some scenarios indicating the potential for daily high temperatures above 90°F for 120 days of the year. Such high temperatures have impacts on public health, military training, infrastructure, agriculture, and the economy.

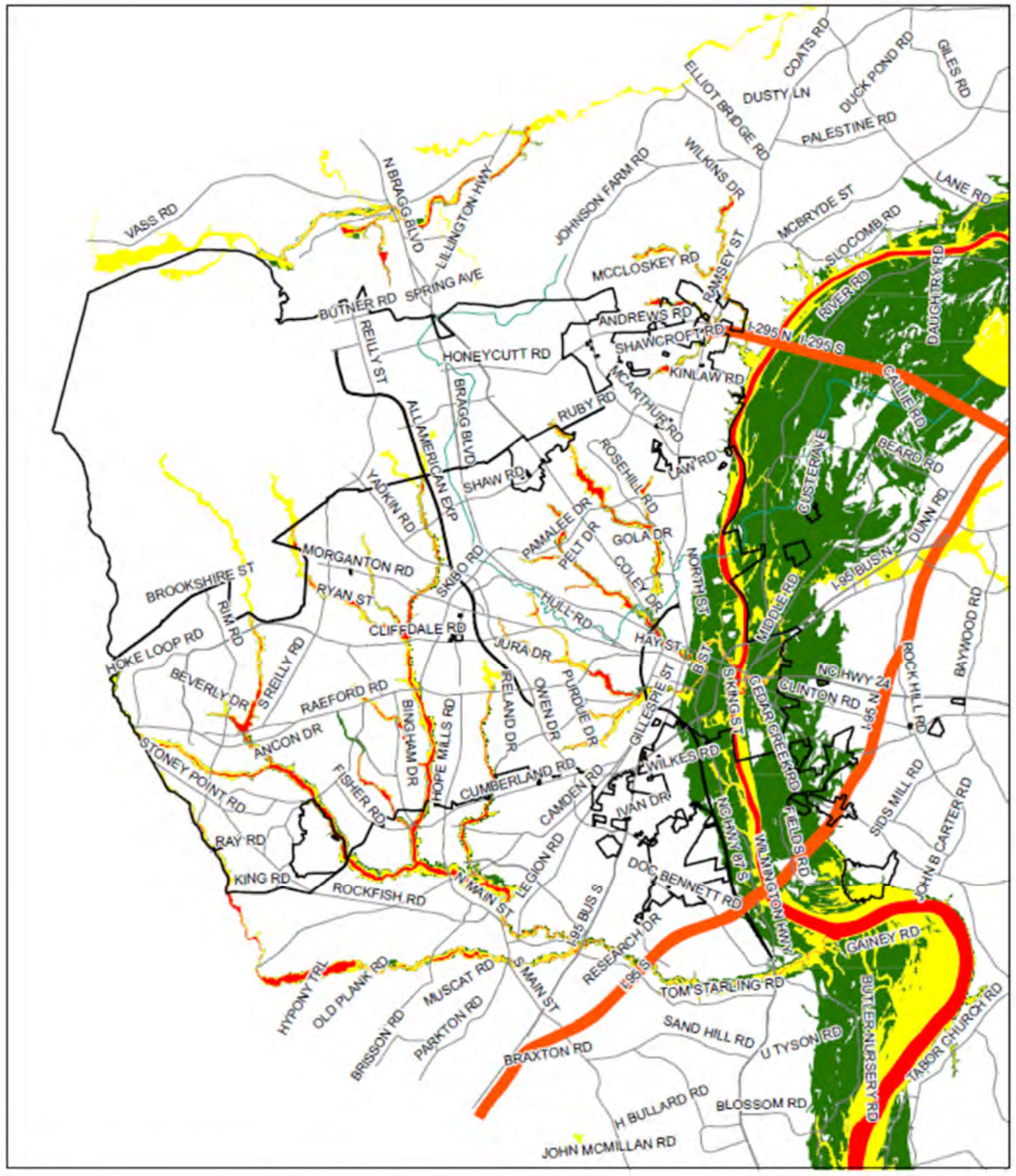
Two examples of potential vulnerability are provided below. First, airplane engine efficiency and aerodynamic lift are reduced in high temperature situations which could require lengthening of runways to allow more room for takeoffs. Second, while higher temperatures may extend the growing season for agricultural purposes, employees who work outside may have limits imposed on when and how long they can work because of health concerns. Additionally, current energy and building codes are state-mandated and do not take advantage of more efficient construction techniques and technology that can reduce energy demand.

Stormwater Management – Recent extreme rainfall events, including Hurricane Matthew, have clearly illustrated the inadequacy of the Fayetteville stormwater infrastructure. Additionally, a lack of strategically-placed open space, urban forests and green infrastructure limits our capacity to attenuate stormwater flow and volume.

While it would be impossible to design a cost-feasible stormwater management system to fully handle floodwaters from unprecedented events like Matthew, it is still evident that Fayetteville is vulnerable to flooding in significantly smaller storm events. The impacts of flooding are concentrated in lower income areas in the eastern part of the City, areas which grew rapidly under County development requirements in the western part of the City, and areas downstream of major commercial development in the general vicinity of Cross Creek Mall. There are a number of public and private dams that are rated as "high hazard" by the state of North Carolina.

Development Pattern – Fayetteville's development pattern contributes to its vulnerability to natural hazards. The City has a significant oversupply of commercially-zoned property; commercial development is characterized by large amounts of impervious surface for buildings and parking, and, for more-recently developed properties, on-site retention ponds. This decentralized method of managing large amounts of stormwater contributes to flooding problems throughout the community. In addition, many single-family subdivisions are served by single points of access, leading to potential for isolation if the access points are damaged by flooding.

CITY OF FAYETTEVILLE FLOOD ZONES



City of Fayetteville North Carolina PLANNING

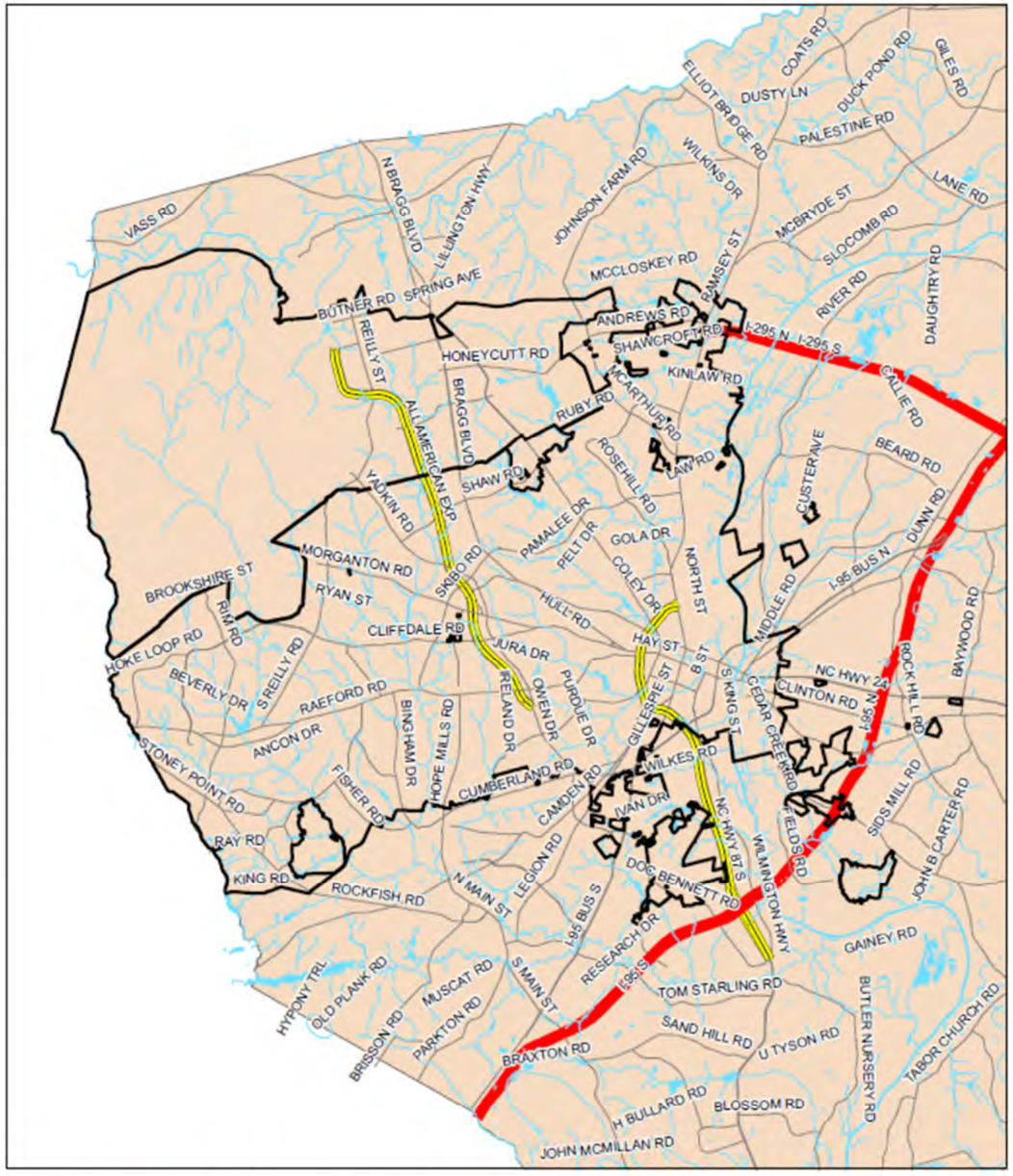
Fayetteville City Limits

Streets
- EXPRESSWAY
- INTERSTATE
- MAJOR
- Watersupply Watershed

Flood Zone
- Floodway
- 100 Year Floodzone
- 500 Year Floodzone

0 0.75 1.5 3 Miles

CITY OF FAYETTEVILLE HYDROLOGY



City of Fayetteville North Carolina PLANNING

Fayetteville City Limits

Hydrology Line

Hydrology Polygon

Streets
- EXPRESSWAY
- INTERSTATE
- MAJOR

Cumberland County

0 1.5 3 6 Miles

Strategies for Enhancing Natural Hazards Resilience

- Update the City of Fayetteville Sustainability Plan.
- Evaluate future interbasin water transfer requests by upstream municipalities to ensure the reliability of Fayetteville's water supply.
- Establish a dam management policy and develop a capital improvement program to reduce risks posed by public and private dams.
- Include an assessment of climate change impacts in all future JLUS studies and FEMA hazard mitigation plans.
- Identify repetitive-loss properties in advance of the next extreme weather event and develop a program to elevate, relocate or remove damaged structures with federal and state assistance.
- Plan for storm water management at the stream basin level rather than at the individual property level; fund the implementation of these plans by charging developers fees-in-lieu of providing storm water retention on their individual properties or by providing incentives for them to retain more water than generally required; obtain local statutory approval for such a program if it is precluded by state law or regulatory procedures.
- Encourage the updating and revision of flood insurance rate (FIRM) maps using the most current historical flooding information.
- Identify single access subdivisions, develop plans to fortify or increase access points in the largest and/or most vulnerable subdivisions, and include these plans in future capital improvement programs.
- Updates to the Parks and Recreation Master Plan should address conversion of flood prone properties to recreational uses, such as parks and trails.
- Develop a plan to incentivize the flood-proofing of historic structures located in flood prone areas.
- Work with emergency services providers and law enforcement personnel to increase understanding about the vulnerability of certain populations and certain areas of the City to flood damage and extreme heat events.
- Implement the Cape Fear River Plan (adopted 2016) to develop the River area in a resilient manner.
- Develop a plan to relocate fuel distributors, gas stations, and other uses that store hazardous materials on-site to locations outside the floodplain.
- Support efforts on the part of Ft. Bragg and the Fayetteville Regional Airport to extend runways to enhance operational effectiveness in the face of longer periods of higher temperatures.
- Utilize FEMA Advisory Base Flood Elevation Maps to better communicate flooding risks to citizens in addition to standard Flood Insurance Rate Maps.

STORM DEBRIS FROM HURRICANE MATTHEW AT NC VETERANS PARK

The Creative Economy

According to the 2010 Americans for the Arts' *Arts and Economic Prosperity IV report which documents the economic impact of the nonprofit arts and culture sector in a variety of jurisdictions across the country, nonprofit arts and culture are a $53.7 million industry in Cumberland County, supporting 1,769 full-time equivalent jobs and generating $5.4 million in local and state government revenue. These figures are higher than the national median for communities studied in the report, representing a strong demand by the population of Cumberland County for arts and culture.*

The City of Fayetteville is beginning to exploit arts and entertainment as a major local industry. Existing venues include theaters for live performances (Cape Fear Regional Theater and the Gilbert Theater), the Crown Coliseum, an art-house theater (the Cameo Art House), several history-based museums and parks (ASOM, the Arts Council Museum, the Museum of the Cape Fear, NC State Veterans Park, and the Transportation Museum), as well as fine arts and performing arts venues at Methodist University and Fayetteville State University. In addition, three other major arts and entertainment venues are being constructed or seriously considered: a minor-league baseball park located in the downtown, a new Performing Arts Center, and the NC Civil War History Center.

An Arts and Entertainment Master Plan has been developed and some of its findings inform land use planning efforts in Downtown Fayetteville and Haymount as part of this Comprehensive Plan Update.

Economic Development Resilience

For a variety of reasons, the City of Fayetteville's economy is lagging behind most other large metropolitan areas in North Carolina. One reason is a significant influence of the military operation of Ft. Bragg on our local economy. This influence tends to flatten out the highs and lows of economic development fluctuations, keeping us from both recessionary influences and high levels of short-term economic growth. Another reason is a failure to focus on other regional strengths such as serving as a center for food processing for surrounding counties with significant agricultural production. The failure to "land" the Sanderson Farms chicken processing facility is an example of this failure.

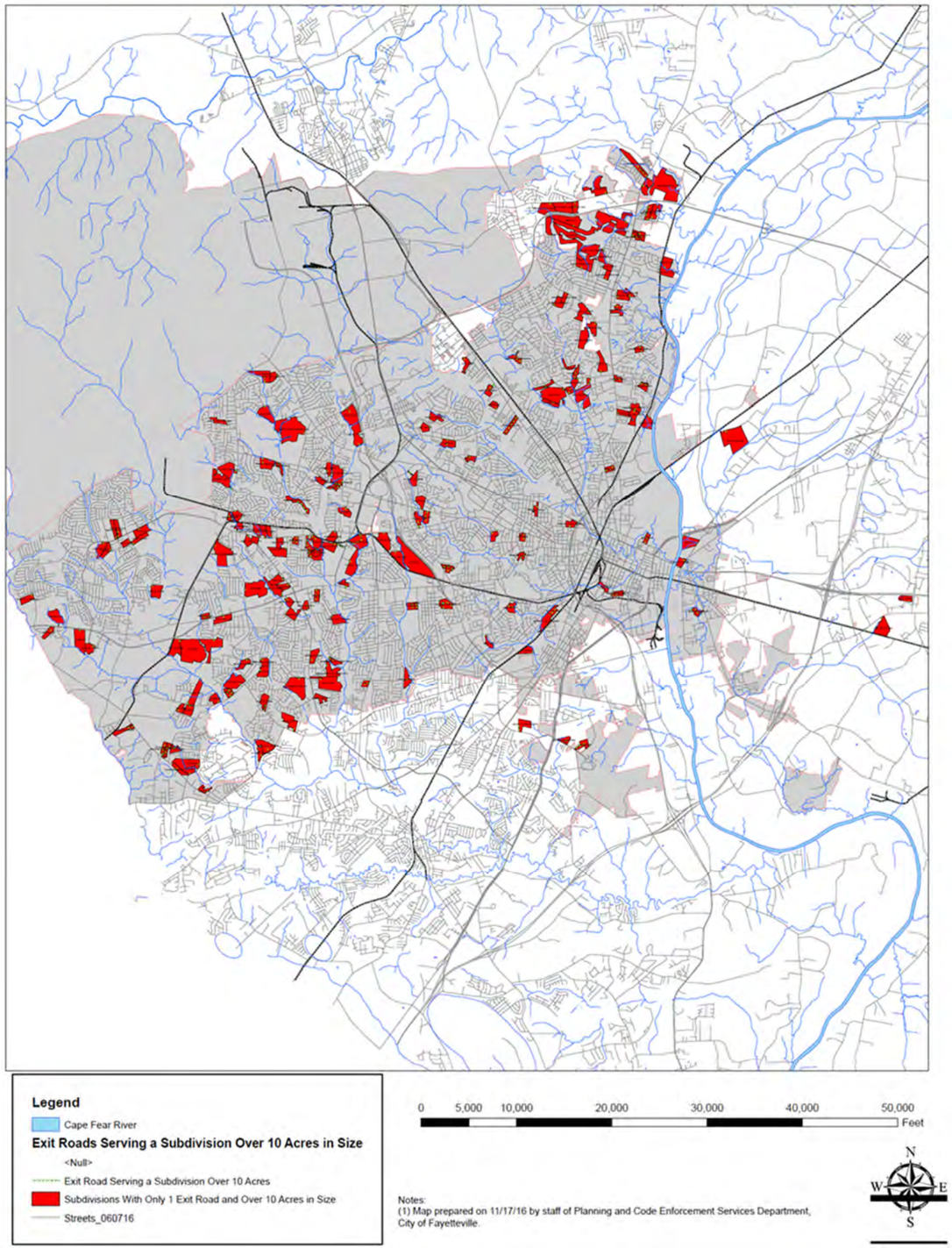
An additional reason that Fayetteville does not seem to attain its economic development potential is both a real and a perceived low level of quality of life in the area. The anticipated population boom from the transfer of FORSCOM to Ft. Bragg did not pan out because much of the growth went to Moore, Harnett, and Lee counties because of quality of life issues, perceptions about school quality, availability of recreational amenities, and personal safety.

Fayetteville has undertaken a significant number of steps to improve community quality of life in recent years. Such steps include the adoption of the Unified Development Ordinance (UDO) to raise the bar for higher development standards, voter approval of a Parks and Recreation bond program to enhance recreational facilities throughout the City, support for a mixed-use development project that includes a multiuse downtown baseball stadium, the development of an Arts and Entertainment Master Plan to guide public and private investment in this growing local economic sector and City Council support for the proposed Civil War History Center, a state historical education project that focuses on the implications of the Civil War and the Reconstruction period of American history.

Despite these significant steps, a number of critical economic development vulnerabilities remain, most of which can be attributable to the influence of the military.

COLLAPSED DAM FROM HURRICANE MATTHEW

Subdivisions in City of Fayetteville Over 10 Acres in Size and Served by Only 1 Exit Road



This photograph taken by the Fayetteville Engineering and Infrastructure Department illustrates damage to Shawcroft Road in north Fayetteville. This road serves over 600 residences which are using an emergency access for several months until repairs can be effected.

Critical Vulnerabilities

Planning for a resilient economy starts with identifying critical vulnerabilities that could affect City and regional economic prosperity. As is generally well-known, Fayetteville has a number of structural vulnerabilities that must be confronted in order to improve resilience. These vulnerabilities include:

- Over-reliance on the influence of Ft. Bragg – An OEA-funded report presented to City Council and other regional local governments in February 2017 by Fayetteville State University and Creative Economic Development Consulting highlighted the devastating effect that even a relatively-minor reduction in troop strength at Ft. Bragg might have on the local economy.
- Failure to recognize the need for balanced economic development across all income ranges – The failure to "land" the Sanderson Farms processing plant is indicative of this structural problem; economic development must extend to all income levels.
- Past failure to recognize and capitalize on the importance of quality of life in economic development – In recent years, Fayetteville has made great strides in overcoming this problem, with progress being made on many projects included in the Parks and Recreation bond program, the downtown baseball stadium complex and the Civil War History Center. It must be recognized, however, that while we are making exceptional progress, we are starting from behind many of our peer communities in this critical economic development movement.
- A failure to recognize the value of natural systems to the economy of the region, including the role forests play in reducing water pollution, the urban heat island effect, and stormwater.
- Army efforts to make Ft. Bragg more self-contained with regard to commercial, entertainment and recreational opportunities for those living on base – Ft. Bragg is housing more and more military contractors on-base and adding additional retail, restaurants and entertainment facilities. Each one of these on-base additions represents a lost economic development opportunity and lost tax base for the surrounding communities.
- Army efforts to create self-contained military residential communities in off-base locations – Even though these communities are provided in off-base locations and result in some surrounding commercial development, these communities provide no increase in tax base by themselves and result in the need for the hosting county to provide expensive educational services, resulting in a net loss of revenue.
- A failure to capitalize on the training and expertise of service members leaving the military by "capturing" them in post-military employment in Fayetteville – Some of the quality of life efforts underway currently will make Fayetteville more attractive to military veterans as additions to the local workforce or as retirees, but a broader range of post-military training and business recruitment needs to occur (see the example in the box).

Opportunities for engaging the spouses of active-duty soldiers and post-military veterans might include engagement in the arts and entertainment industry, military contracting, and general entrepreneurship. Such efforts would support the creative economy concept and build on the strengths of our area and its highly trained military population.

Additional ways to support and enhance the local "creative economy" that includes arts and entertainment, strategic entrepreneurship, and the proposed Culinary Incubator are through encouraging private sector provision of co-working and maker spaces, continued support of the Arts Council and the arts and entertainment district concept, and supporting the construction of a downtown Performing Arts Center.

Recreational businesses would also appear to be a potential target industry for our area. For example, Moore County has made golf a focal point of its economic development for decades.

Fayetteville Observer Editorial
Our View: Numbers tell a tale of Fort Bragg economic value. Aug 21, 2016

Elected leaders and economic developers around Fayetteville talk often about the need to build new industries and bulk up the economy, so we're not so dependent on Fort Bragg. Lofty ideal, one we've long supported. But it definitely fits into the wishful thinking file folder. We remember that every time we see a presentation on the size and scope of Fort Bragg.

We heard the numbers again last week, at a meeting of the Regional Land Use Advisory Committee, which got its annual Bragg update from post officials.

Some of the figures:
53,228 military personnel, including students and Reservists.
14,663 civilian employees.
5,552 contract employees.
71,259 family members.
144,702 total Fort Bragg population.

In addition, there are the billions in local spending, especially from payroll. And there is more than another billion in construction, either ongoing or planned, between now and 2020. And more than a quarter of a million people are supported by the post, including the large numbers of military retirees in the region around Bragg.

* * * * *

So if we add up all those numbers, we have a behemoth. We sometimes bemoan the good fortune of a place like Greenville, South Carolina, which enticed BMW to set up an assembly plant. Oh, what we'd give for all those jobs and all those paychecks flowing into our economy. We would welcome them, of course. But that plant has about 7,000 employees. With nearly 75,000 military, civilian and contract jobs, Fort Bragg is the equivalent of seven BMW plants.

With Cumberland County's unemployment rate still substantially higher than the state average, we need to redouble our efforts to create new opportunities here. But let's not kid ourselves: We will never come close to building an alternative economy that rivals what Fort Bragg provides. Let's continue to take good care of the post and its employees. They are our gold.

Fayetteville can do the same with different collection of recreational amenities geared towards its younger demographics. Existing businesses in this area include climbing walls, zip line courses, and specialized exercise venues offering unique approaches to health and fitness.

In addition to these quality-of-life approaches, the City has a number of plans and reports that identify a variety of target industries that should be pursued to diversify our economy, including:

⇒ Logistics and Warehousing
⇒ Defense and Security
⇒ Advanced Manufacturing
⇒ Business Services
⇒ Healthcare/Life Services
⇒ Local food production and processing

Targeting these industries takes advantage of our existing transportation infrastructure, the proximity of Ft. Bragg, the demographics of our population, and our location in the center of North Carolina's most significant agricultural region.

Strategies for Enhancing Economic Resiliency

- Support diversification of the local economy using economic development strategies to recruit and/or support target industries identified in various plans and reports.
- Continue to pursue placemaking and the creative economy as a critical economic development strategy.
- Encourage the military to minimize on-base commercial development that competes with local businesses.
- Encourage the military to minimize off-base military-only residential development that competes with local homebuilding businesses.

Social Equity Resilience

Hurricane Matthew taught us that African-American and lower-income populations are subject to more severe natural hazards risk than the Fayetteville population in general. The following maps overlay the hurricane damaged homes by race and by income. While the overall damage was widespread, Appendix A shows the extent to which the severely damaged properties (red dots on the Race and Income maps) were confined to African American populations. As to income, the mean value of the severely-damaged homes was $50,788; the median value was $48,117; these values indicate that these structures were primarily owned and/or occupied by lower income persons. Appendix B illustrates this information graphically.

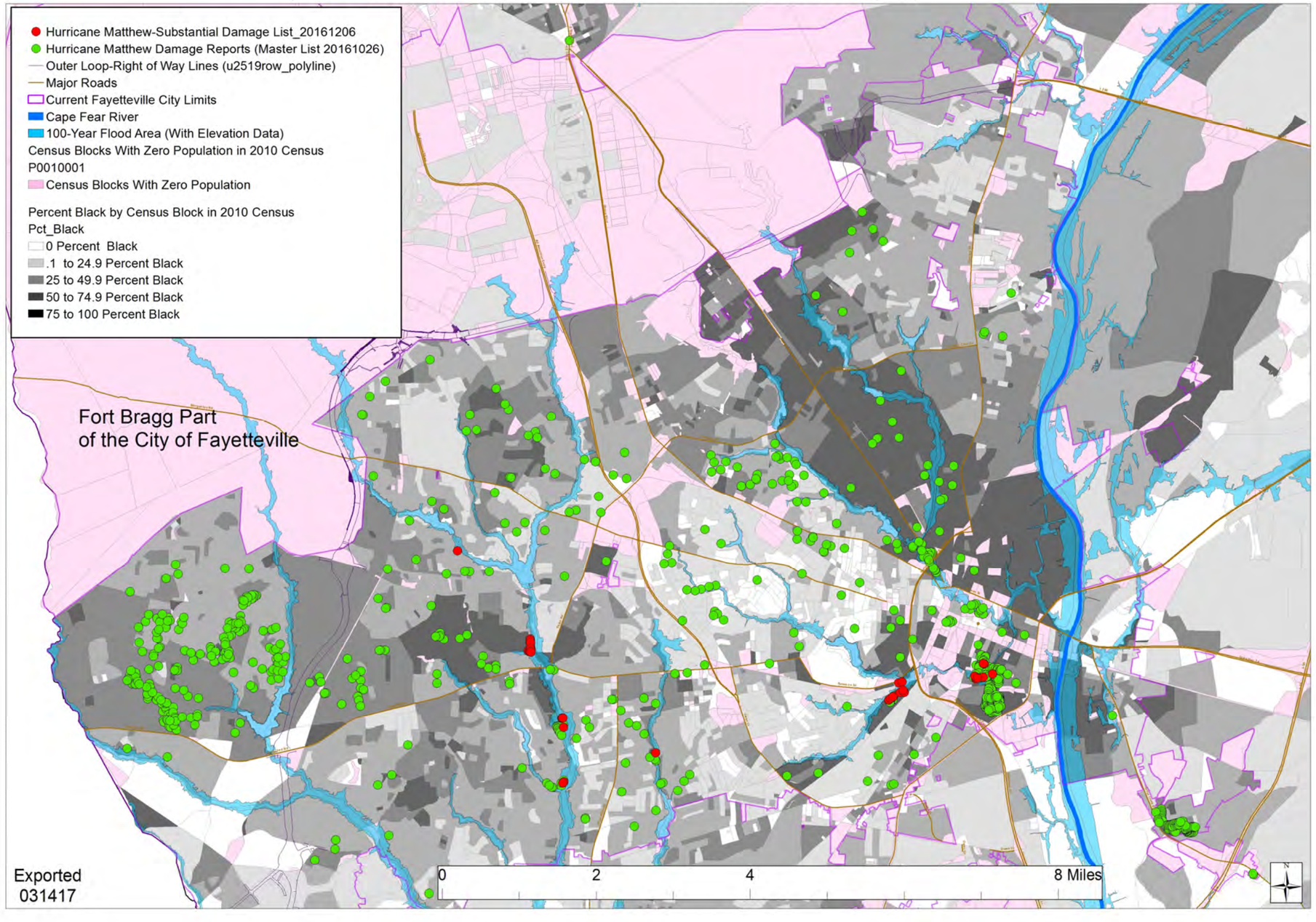
It is evident that an approach to addressing natural hazards mitigation must take social equity issues into consideration. Programs to reduce risk in these areas should be given higher priority and sufficient resources to allow these areas to "catch up" to the level of natural hazards resilience experienced by the general Fayetteville community. It is extremely important that community perceptions concerning relative risks be managed by visible results.

Strategies to Enhance Social Equity Resilience

- Develop programs to relocate populations in the 100-year floodplain or to elevate or otherwise floodproof structures in these locations. Where possible, utilize FEMA funding for relocation "buyouts" and retroactive elevation of structures.
- Provide additional housing affordable to these citizens in areas outside the 100-year floodplain.
- Develop a social vulnerability analysis to identify priority needs and opportunities for climate resilience that will benefit vulnerable populations. (From *Cumberland County Climate Resiliency Plan*.)
- Develop a multilayered approach to inclusive engagement of low-moderate income neighborhoods to encourage participation in identifying and reducing risks, defining and prioritizing capital improvement projects, and enhancing safety and livability in those neighborhoods.
- Promote the employment of low-moderate income persons.

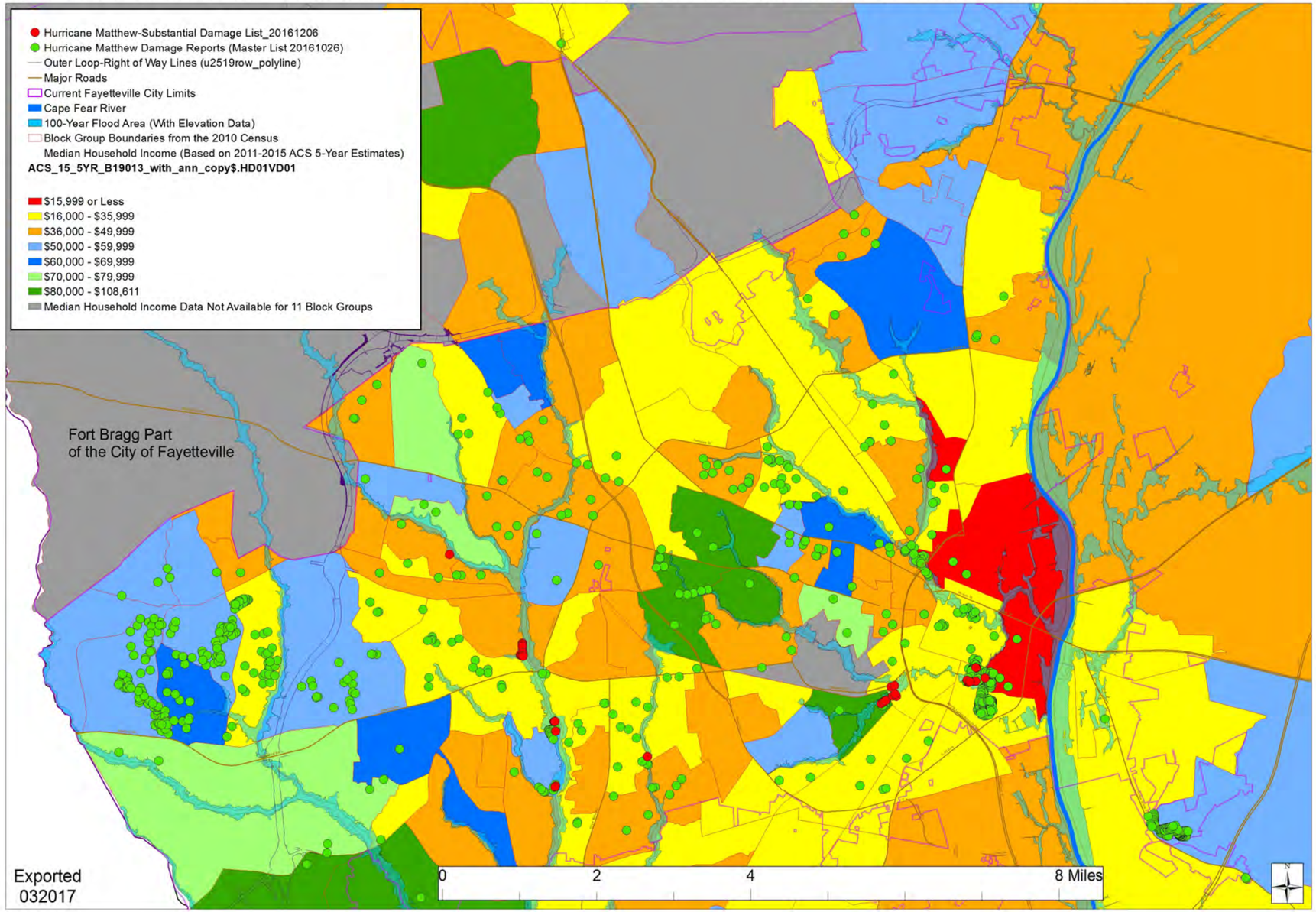
STORM DAMAGE BY RACIAL CHARACTERISTICS

Hurricane Matthew Damage Reports and 100-Year Flood Zones
Overlaid on Percent Black (by Census Blocks)
in the City of Fayetteville and Cumberland County, NC
(Percent Black Based on Block-Level Data from the 2010 Census Redistricting File)



STORM DAMAGE BY INCOME

Hurricane Matthew Damage Reports and 100-Year Flood Zones
Overlaid on Income (Median Household Income by Census Block Groups)
in the City of Fayetteville and Cumberland County, NC
(Median Household Income Based on 2011-2015 American Community Survey 5-Year Estimates from the Census Bureau-Released on December 8, 2016)



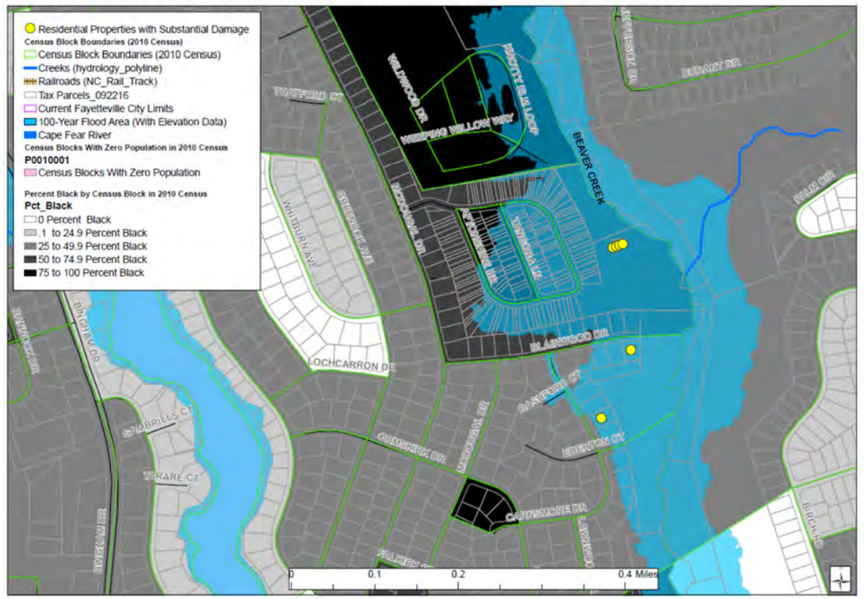
Implementation Matrix

The following matrix provides a timeline and responsible party or parties for the implementation of many of the strategies proposed in this Element to enhance natural hazards, economic and social equity resilience.

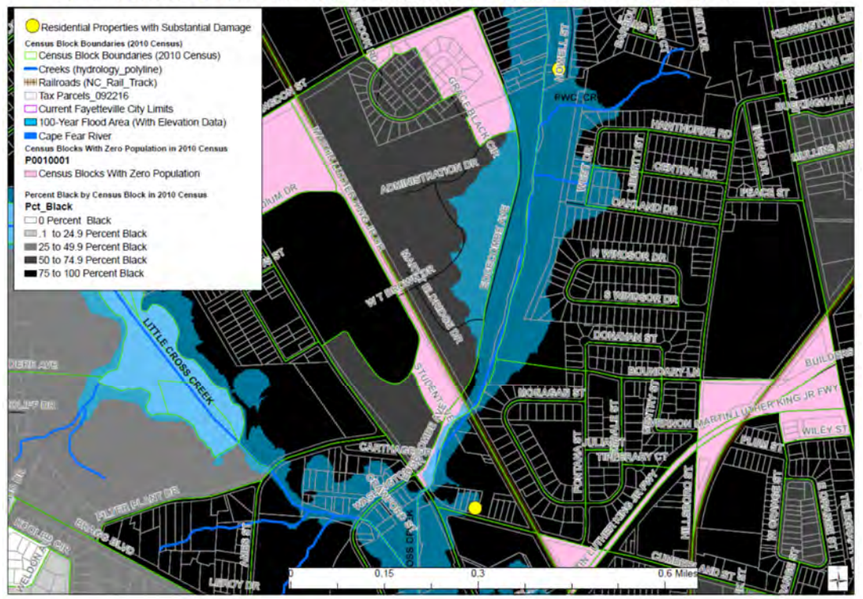
STRATEGY	TIMELINE	RESPONSIBLE PARTY OR PARTIES
Natural Hazards		
Update the City of Fayetteville Sustainability Plan	FY19	Planning & Zoning Division
Evaluate interbasin water transfers	Continuing	PWC
Use a multidisciplinary approach to develop a regional water use plan for the Cape Fear River Basin that includes future climate impacts on water supply.	FYs 19-20	PWC
Establish a dam management policy and develop a capital improvement program to reduce risks posed by public and private dams.	Continuing	Public Services Department
Include climate change impacts in future JLUS and hazard mitigation plans	Continuing	Planning & Zoning Division
Develop a program to elevate, relocate or remove structures in the 100-year floodplain	FY 18	FEMA
Develop a comprehensive stream basin approach to storm water management	Multiyear	Public Services Department
“Ground-truth” future FIRM maps with local historical information	Continuing	Planning & Zoning Division
Inventory single access subdivisions and develop plans to reduce potential vulnerabilities	Inventory - FY 18 Implementation - Continuing	Public Services Department
Utilize future Parks and Recreation Master Plans to address conversion of flood prone properties to recreational uses	Continuing	Parks & Recreation Department
Develop incentives to floodproof historic structures located in flood prone areas	FY 20	Planning & Zoning Division
Enhance the understanding of public safety personnel about the vulnerability of particular populations and areas of the city to natural hazards	Continuing	Planning & Zoning Division Human Relations Department
Implement the Cape Fear River Plan	Continuing	Planning & Zoning Division
Plan for relocation of facilities that store hazardous materials outside of the floodplain	FY 20	Planning & Zoning Division
Support runway extensions necessitated by climate change	Continuing	City Council
Utilize FEMA advisory base flood elevation maps to better communicate flooding risks	Continuing	Planning & Zoning Division
Upgrade/Improve stream gaging and flood forecasting technologies and equipment.	FY 19	Fire/Emergency Management
Economic		
Support diversification of the local economy using economic development strategies to recruit and/or support target industries	Continuing	City Council Community Development Department
Continue to pursue placemaking and growth of the creative economy as a critical economic development strategy	Continuing	City Council All City Departments
Encourage the military to minimize on-base commercial development that competes with local businesses	Continuing	City Council Community Development Department
Encourage the military to minimize off-base military-only residential development that competes with local homebuilding businesses	Continuing	City Council Community Development Department
Social Equity		
Provide additional affordable housing to accommodate citizens relocated from flood prone areas	Continuing	Community Development Department
Develop a social vulnerability analysis to prioritize resilience for vulnerable populations	FY 19	Planning & Zoning Division Human Relations Department
Develop an outreach program to effectively engage low-moderate income neighborhoods in identifying and reducing risks and enhancing safety and livability	FY 18	Human Relations Department Corporate Communications Department
Promote an economic development program that supports job growth in all income levels	Continuing	Community Development Department

APPENDIX A—SEVERELY DAMAGED PROPERTIES BY RACE

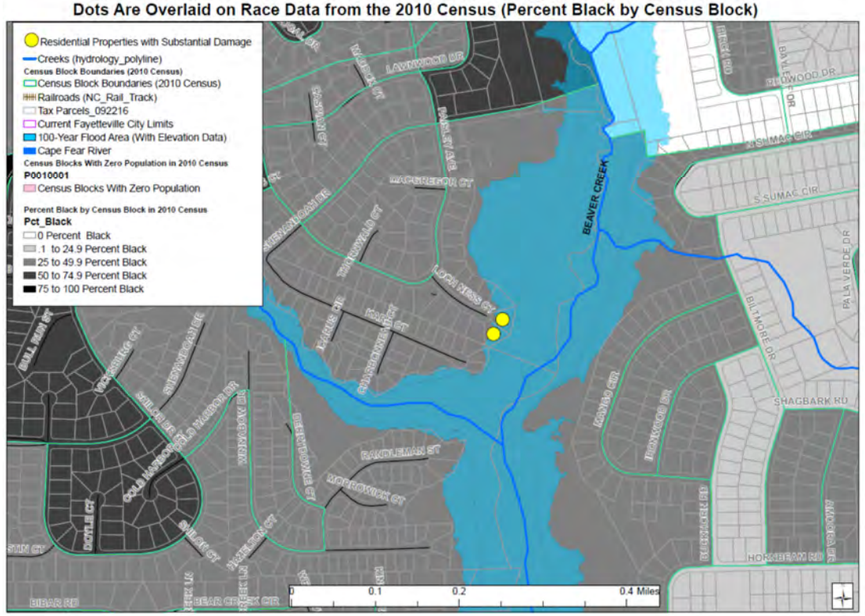
Aftonshire Drive Cluster
Dots Show Residential Properties with Substantial Damage from Hurricane Matthew
Dots Are Overlaid on Race Data from the 2010 Census (Percent Black by Census Block)



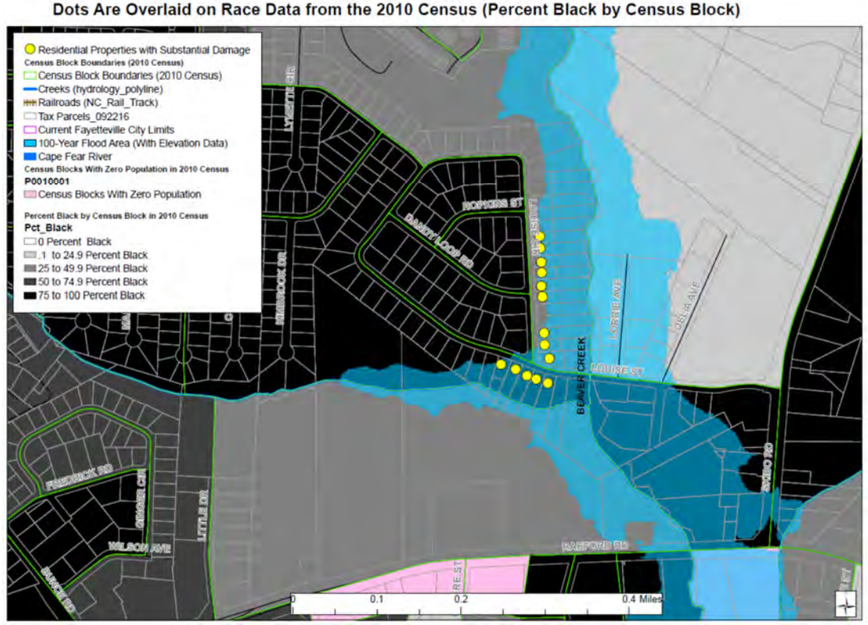
Howell Street and Cumberland Street Cluster
Dots Show Residential Properties with Substantial Damage from Hurricane Matthew
Dots Are Overlaid on Race Data from the 2010 Census (Percent Black by Census Block)



Loch Ness Courtt Cluster
Dots Show Residential Properties with Substantial Damage from Hurricane Matthew
Dots Are Overlaid on Race Data from the 2010 Census (Percent Black by Census Block)

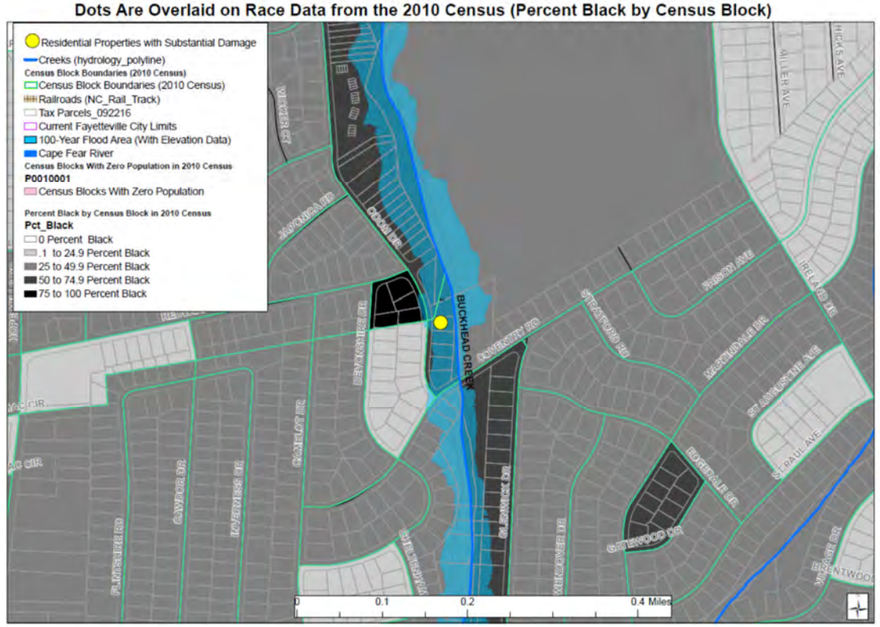


Louise Circle Cluster
Dots Show Residential Properties with Substantial Damage from Hurricane Matthew
Dots Are Overlaid on Race Data from the 2010 Census (Percent Black by Census Block)

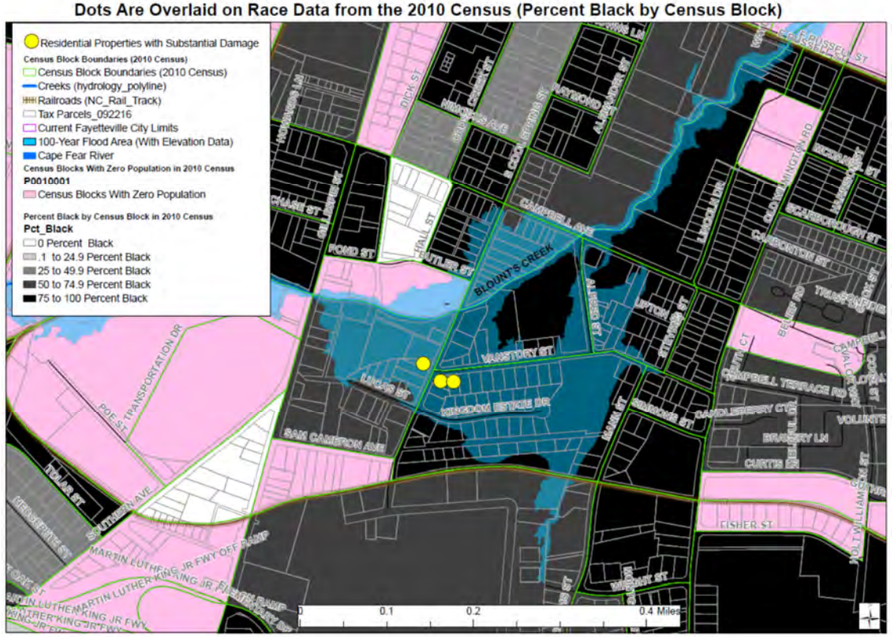


APPENDIX A (CONTINUED)—SEVERELY DAMAGED PROPERTIES BY RACE

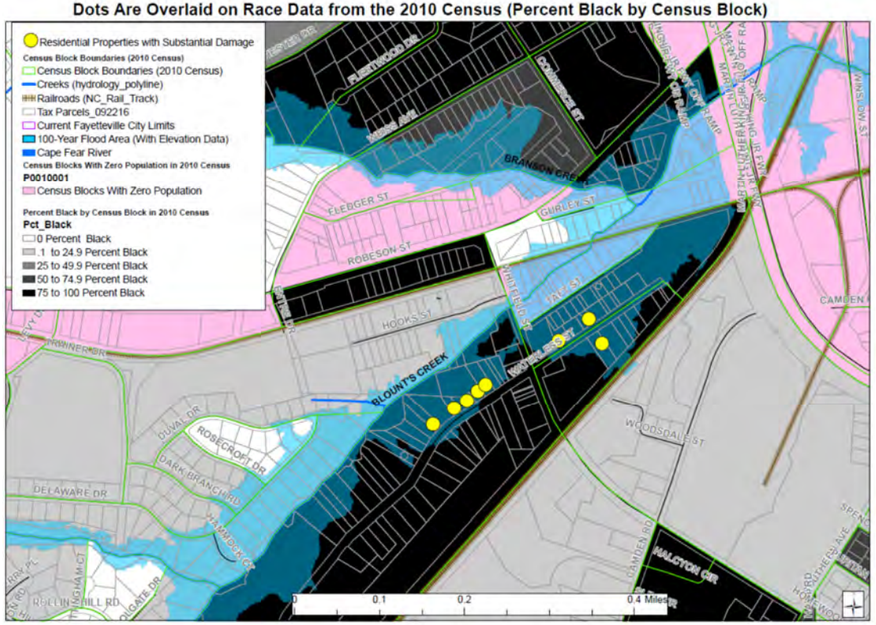
Odom Drive Property
Dots Show Residential Properties with Substantial Damage from Hurricane Matthew
Dots Are Overlaid on Race Data from the 2010 Census (Percent Black by Census Block)



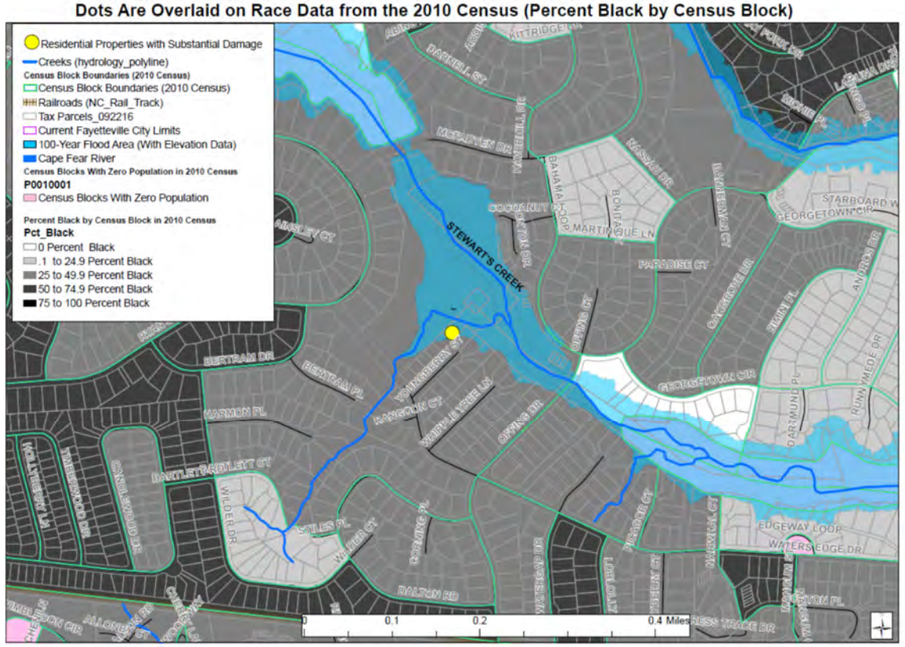
Vanstory Street and S Cool Spring Street Cluster
Dots Show Residential Properties with Substantial Damage from Hurricane Matthew
Dots Are Overlaid on Race Data from the 2010 Census (Percent Black by Census Block)



Waterless Street Cluster
Dots Show Residential Properties with Substantial Damage from Hurricane Matthew
Dots Are Overlaid on Race Data from the 2010 Census (Percent Black by Census Block)

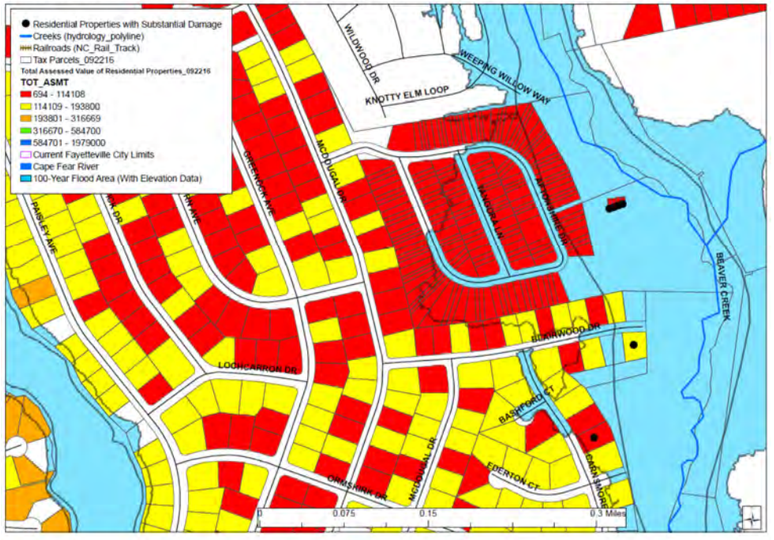


Youngberry Street Property
Dots Show Residential Properties with Substantial Damage from Hurricane Matthew
Dots Are Overlaid on Race Data from the 2010 Census (Percent Black by Census Block)

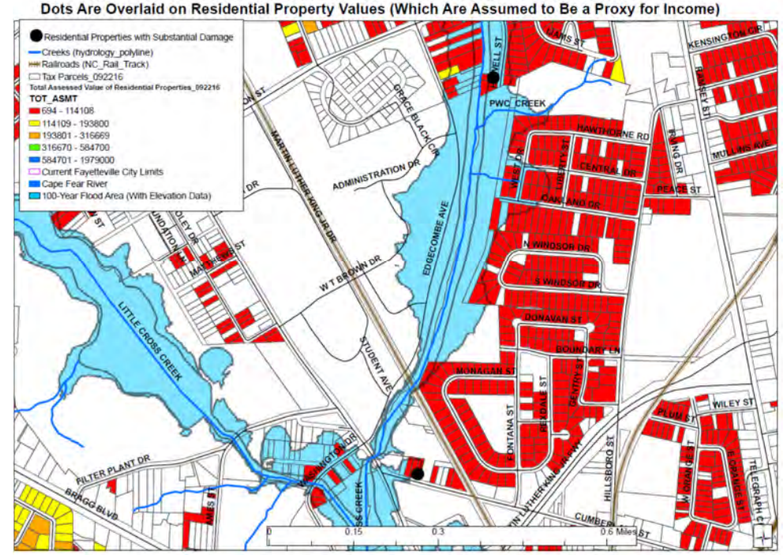


APPENDIX B—SEVERELY DAMAGED PROPERTIES BY INCOME WITH HOME VALUES SERVING AS A PROXY FOR INCOME

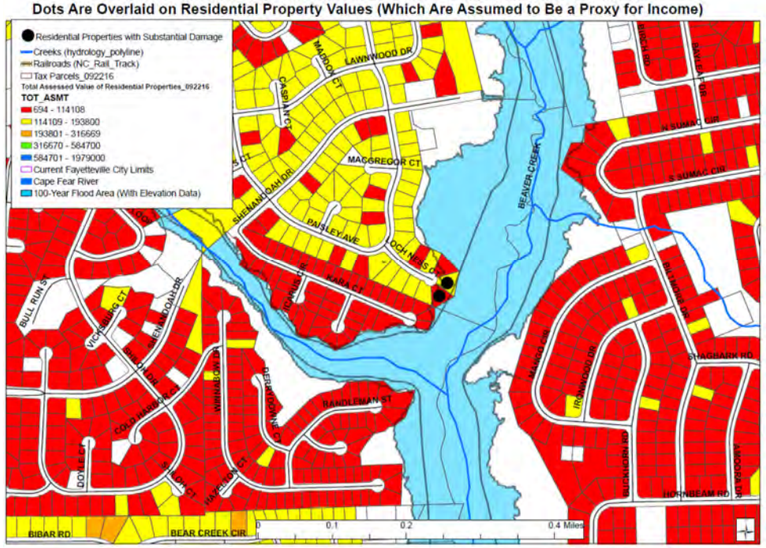
Aftonshire Drive Cluster
Dots Show Residential Properties with Substantial Damage from Hurricane Matthew
Dots Are Overlaid on Residential Property Values (Which Are Assumed to Be a Proxy for Income)



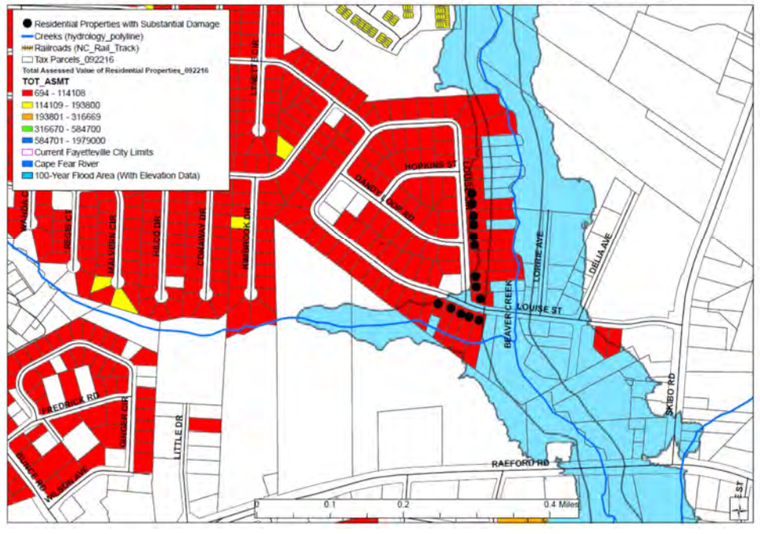
Howell Street and Cumberland Street Cluster
Dots Show Residential Properties with Substantial Damage from Hurricane Matthew
Dots Are Overlaid on Residential Property Values (Which Are Assumed to Be a Proxy for Income)



Loch Ness Court Cluster
Dots Show Residential Properties with Substantial Damage from Hurricane Matthew
Dots Are Overlaid on Residential Property Values (Which Are Assumed to Be a Proxy for Income)

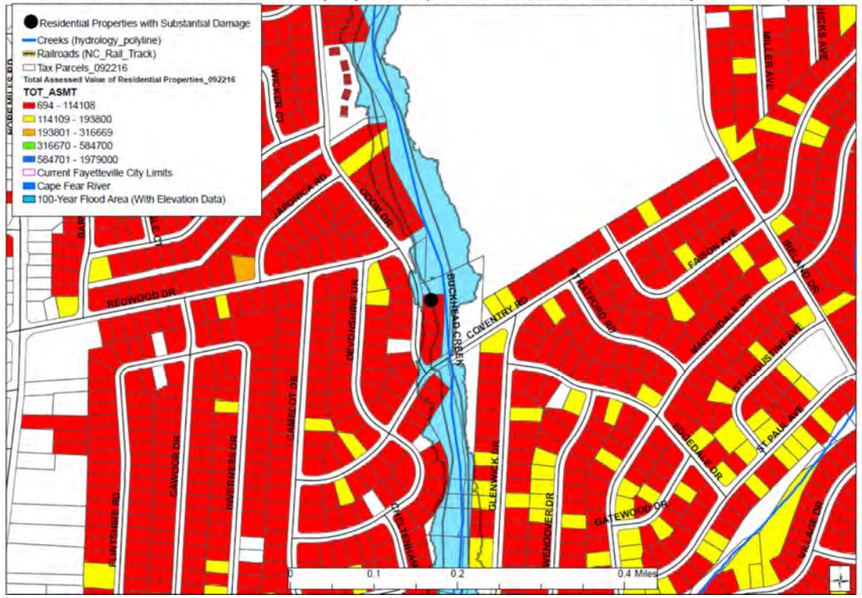


Louise Circle Cluster
Dots Show Residential Properties with Substantial Damage from Hurricane Matthew
Dots Are Overlaid on Residential Property Values (Which Are Assumed to Be a Proxy for Income)

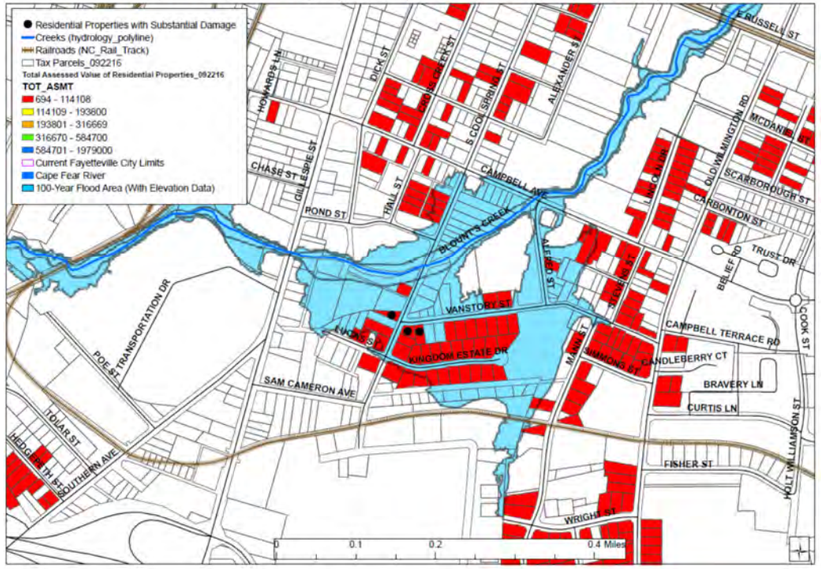


APPENDIX B—SEVERELY DAMAGED PROPERTIES BY INCOME
WITH HOME VALUES SERVING AS A PROXY FOR INCOME

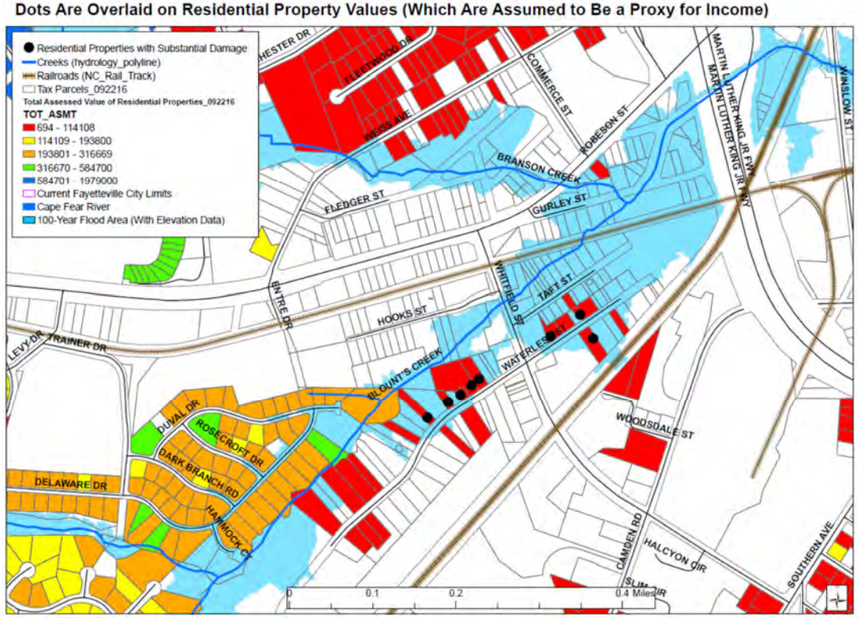
Odom Drive Property
Dots Show Residential Properties with Substantial Damage from Hurricane Matthew
Dots Are Overlaid on Residential Property Values (Which Are Assumed to Be a Proxy for Income)



Vanstory Street and S Cool Spring Street Cluster
Dots Show Residential Properties with Substantial Damage from Hurricane Matthew
Dots Are Overlaid on Residential Property Values (Which Are Assumed to Be a Proxy for Income)



Waterless Street Cluster
Dots Show Residential Properties with Substantial Damage from Hurricane Matthew
Dots Are Overlaid on Residential Property Values (Which Are Assumed to Be a Proxy for Income)



Youngberry Street Property
Dots Show Residential Properties with Substantial Damage from Hurricane Matthew
Dots Are Overlaid on Residential Property Values (Which Are Assumed to Be a Proxy for Income)