

Hurricane Matthew Resilient Redevelopment Plan Cumberland County



May 2017

Version 1.2

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Change Log

Version	Date	Summary of Changes
1.1	6/16/17	Minor Revisions
1.2	8/25/17	Labor and unemployment data updated

Executive Summary

In October 2016, Hurricane Matthew caused widespread destruction in the Caribbean and up the Eastern Seaboard of the United States. In North Carolina, at least 26 people lost their lives, and 100,000 homes, businesses, and government buildings sustained damage estimated at \$4.8 billion.¹ At the storm's peak, 3,744 individuals fled to 109 shelters across the region. More than 800,000 households lost power and 635 roads were closed, including the major east-west and north-south corridors.

In December 2016, the North Carolina General Assembly established the North Carolina Resilient Redevelopment Planning (NCRRP) program as part of the 2016 Disaster Recovery Act (*Session Law 2016-124*). The purpose of the program is to provide a roadmap for community rebuilding and revitalization assistance for the communities that were damaged by the hurricane. The program empowers communities to prepare locally driven recovery plans to identify redevelopment strategies, innovative reconstruction projects, and other needed actions to allow each community not only to survive but also to thrive in an era when natural hazards are increasing in severity and frequency.

The NCRRP consists of planning and implementation phases and is managed through North Carolina Emergency Management.

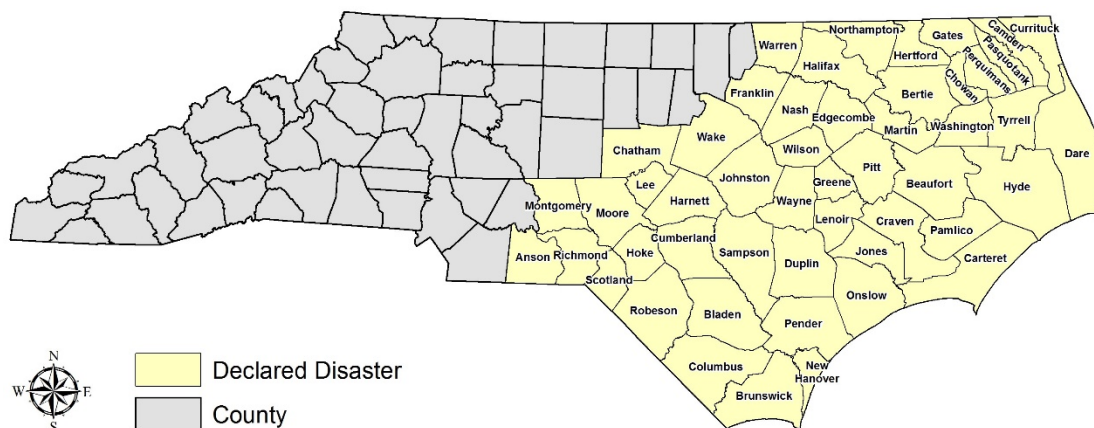


Figure 1: NCRRP Counties

This document is a snapshot of the current needs of the County regarding holistic recovery and redevelopment. The plan will evolve as the county analyzes the risk to its assets, identifies needs and opportunities, determines the potential costs and benefits of projects, and prioritizes projects. As projects are more fully defined, the potential impact on neighboring communities and the region may lead to modifications.

Implementation of the proposed projects and actions described in this plan is subject to applicable federal, state, and local laws and regulations. Proposed projects or actions may be eligible for state or federal funding, or could be accomplished with municipal, nonprofit, or private investments. However, inclusion of a project or action in this plan does not guarantee that it will be eligible for recovery funding.

¹ State of North Carolina Supplemental Request for Federal Assistance Hurricane Matthew Recovery, <https://governor-new.s3.amazonaws.com/s3fs-public/documents/files/Hurricane%20Matthew%20Relief--2017%20Federal%20Request%20%28002%29.pdf>.

After multiple public meetings, Cumberland County has identified 18 projects in four pillars: Housing, Infrastructure, Economic Development, and Environmental. Details of these projects can be found in Section IV of this plan.

Pillar	Project/Action Count
Housing	3
Economic Development	3
Infrastructure	8
Environment	4
Grand Total	18

Table 1. Cumberland County Summary of Projects by Pillar



1. Background

1. Background

Summary of Hurricane Matthew Storm Damage

Hurricane Matthew was an extraordinarily severe and sustained event that brought record-level flooding to many areas in eastern North Carolina’s coastal plain, sound, and coastal communities. Hurricane Matthew hit North Carolina on October 8, 2016, as a Category 1 storm. Communities were devastated by this slow-moving storm primarily by widespread rainfall. During a 36-hour period, up to 18 inches of heavy rainfall inundated areas in central and eastern North Carolina.

Riverine flooding began several days after Hurricane Matthew passed and lasted for more than 2 weeks. New rainfall records were set in 17 counties in the Tar, Cape Fear, Cashie, Lumber, and Neuse River watersheds. Entire towns were flooded as water levels throughout eastern North Carolina crested well beyond previously seen stages.

During the peak of the hurricane, 800,000 households lost power and 635 roads were closed, including a section of I-40 West in Johnston County that was closed for 7 days, and sections of I-95 North and South in Robeson and Cumberland Counties that were closed for 10 days.

Approximately 88,000 homes were damaged and 4,424 were completely destroyed. Losses totaled more than \$967 million, representing an economic loss as high as 68% of the damages, or \$659 million, not expected to be covered by insurance or FEMA assistance.

North Carolina Governor McCrory requested FEMA assistance on October 9, 2016, and FEMA subsequently declared a major disaster (DR-4285) for North Carolina on October 10, 2016, for 48 counties encompassing approximately 325 cities, towns, townships, and villages.

Preliminary estimates indicate more than 30,000 businesses suffered physical or economic damage, and 400,000 employees were affected as a result. Hurricane Matthew also had a significant impact on the agriculture and agribusiness economy in eastern North Carolina. The nearly 33,000 agricultural workers and 5,000 agricultural-support workers hit by the storm account for more than half of the state’s agriculture and agriculture-support workforce.

Initial economic analysis of the impacts of crop and livestock losses caused by Hurricane Matthew estimated the loss of more than 1,200 jobs and roughly \$10 million in state and local income and sales tax revenue. ²

State / Legislative Response

North Carolina’s response to Hurricane Matthew included 2,300 swift-water rescues using 79 boats and more than 90 air rescues. North Carolina also deployed over 1,000 National Guard and State Highway Patrol to assist with rescue and sheltering missions. There were 3,744 individuals transported to 109 shelters across central and eastern North Carolina during the storm’s peak.

FEMA’s disaster declaration made 50 counties eligible for FEMA assistance, 45 of which are eligible for Individual Assistance and Public Assistance and 5 of which are eligible for Public Assistance only.

² *Governors McCrory’s Request for Federal Assistance for Hurricane Matthew Recovery, November 14, 2016*

- There were 81,832 individuals registered for FEMA/state assistance.
- Federal/state financial assistance in the amount of \$92.5 million was approved to help flood survivors recover.
- Small Business Administration (SBA) loans approved for individuals after Hurricane Matthew totaled \$65.6 million.
- SBA loans approved for businesses after Hurricane Matthew totaled \$23.2 million.

After the immediate response period, North Carolina Governor McCrory and the North Carolina General Assembly took the steps summarized below to obtain and allocate long-term funding for Hurricane Matthew.

November 1: The Hurricane Matthew Recovery Committee is established. Preliminary damage assessments are completed, and the State Emergency Response Task Force continues to administer programs and identify needs unmet by existing federal programs.

November 14: Governor McCrory formally submits North Carolina’s request for supplemental federal disaster assistance to the delegation as Congress returns to work.

Late November/Early December: Congress appropriates supplemental disaster assistance for North Carolina. After the supplemental federal disaster recovery assistance package is received, Governor McCrory submits a supplemental state disaster assistance package (House Bill 2) recommendations to the General Assembly and calls a special session. Governor McCrory then signs the Hurricane Matthew Recovery Act to fund disaster recovery efforts.

This supplemental federal assistance was to focus on housing, infrastructure, economic development, and the environment. These four pillars were to be funded through the following programs and agencies: The U.S. Department of Housing and Urban Development’s Community Development Block Grant–Disaster Recovery (CDBG-DR) program, Army Corps of Engineers Operations and Maintenance, the FEMA National Dam Safety Program, the Federal Highway Administration’s Emergency Highway Funding, and the U.S. Department of Agriculture’s Emergency Conservation and Watershed Protection programs.

Resilient Redevelopment Planning

The purpose of the NCRRP program is to provide a roadmap for communities in eastern North Carolina to rebuild and revitalize after being damaged by Hurricane Matthew. The program empowers communities to prepare locally driven, resilient redevelopment plans to identify redevelopment strategies, innovative reconstruction projects, and other actions to allow each community not only to survive, but also to thrive in an era when natural hazards are increasing in severity and frequency.

The NCRRP process employs a holistic approach to planning that includes four pillars: housing, infrastructure, economic development, and the environment. Redevelopment strategies and reconstruction projects for each of the four pillars is included in each plan.

The NCRRP process consists of planning and implementation phases and is managed through North Carolina Emergency Management (NCEM).

Scope of the Plan

This document is a snapshot of the County's current needs for achieving holistic recovery and redevelopment. The plan will evolve as the County analyzes the risk to its assets, identifies needs and opportunities, determines the potential costs and benefits of projects, and prioritizes the projects. As projects are more fully defined, the potential impact on neighboring communities and the region may lead to modifications.

Planning objectives are to (1) develop strategic, resilient redevelopment plans and actions, and (2) to define any unmet funding needed to implement such actions after taking into account other funding sources.

The resulting resilient redevelopment plans will be the foundation for any supplemental funding received through Congress, the North Carolina General Assembly, and other funding sources. These plans will also be the basis for the state's Recovery Action Plan, which is required by the U.S. Department of Housing and Urban Development before the state can expend funds received from the CDBG-DR program.

Local Participation and Public Engagement

Stakeholder engagement and public involvement was an essential component of the NCRRP initiative. Three robust rounds of discovery, analysis, collaboration, and interaction were held with each affected county. Each meeting had two components: an in-depth working session with county officials, subject matter experts, and planners from the affected counties and municipalities; and a public open house. The purpose of each meeting was as follows:

Meeting 1 – Initiated the planning process and validated the existing data pertaining to damage and impacts.

Meeting 2 – NCEM presented draft documentation of resilient redevelopment strategies and received feedback from community leaders and the public.

Meeting 3 – NCEM presented refined resilient redevelopment strategies based on feedback from Meeting 2 and received additional feedback for finalization of the plan.

Each of the 50 counties that were declared a major disaster by the President of the United States as a result of Hurricane Matthew under the Stafford Act (P.L. 93-288) participated in the resilience redevelopment planning process. Each municipality in those counties, as well as the five economic development regions that sustained damage from Hurricane Matthew, were also invited to participate. The counties impacted by the storm cover the eastern half of North Carolina and occupy parts of the piedmont, sand hills, and coastal areas of the state. A map depicting Cumberland County and surrounding counties is shown on the following page.

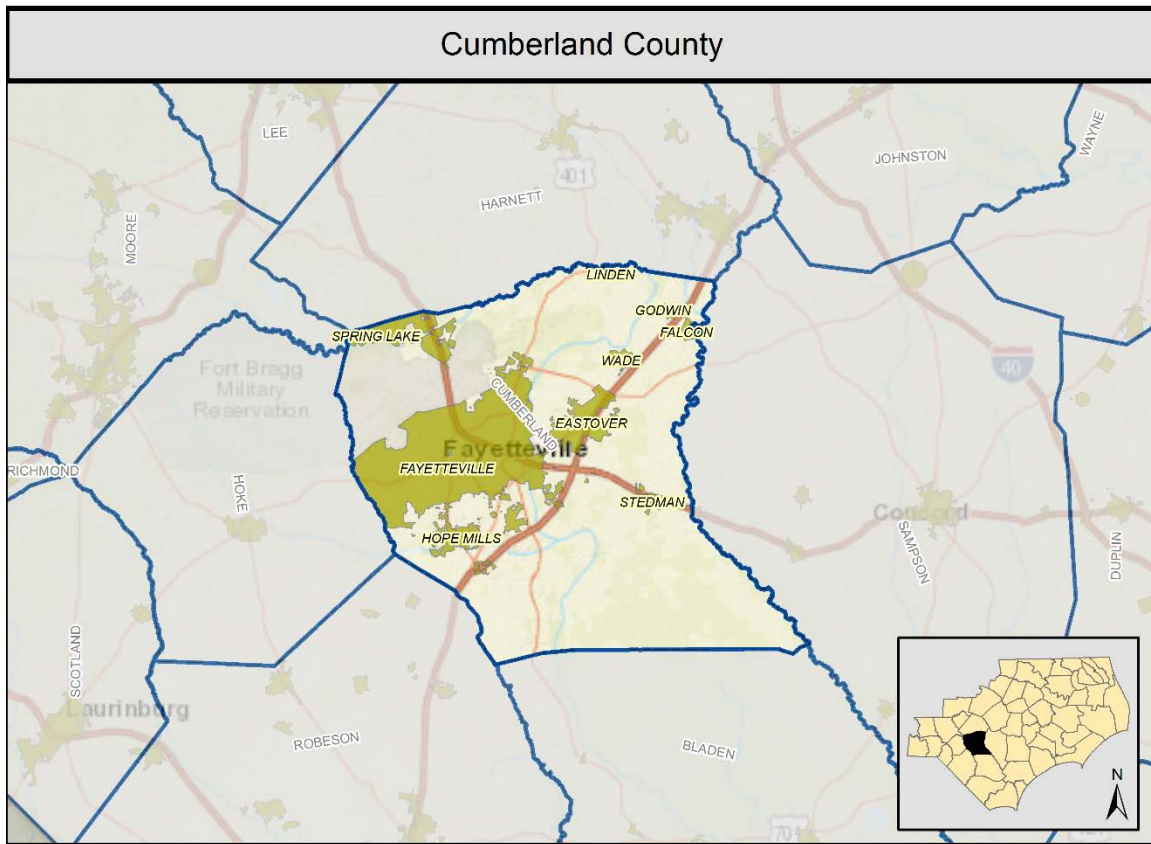


Figure 2: Cumberland County and Neighboring Counties

Data, Assumptions, and Methodologies

NCEM has assembled a wealth of data, resources, and technical expertise from state agencies, the private sector, and the University of North Carolina system to support the development of innovative best practice strategies.

Implementation of the proposed projects and actions described in this plan is subject to applicable federal, state, and local laws and regulations. Inclusion of a project or action in this plan does not guarantee that it will be eligible for recovery funding. However, proposed projects or actions may be eligible for state or federal funding or could be accomplished with municipal, nonprofit, or private investment.

An aerial photograph showing a residential neighborhood severely affected by flooding. The water is murky brown and has inundated the yards and streets between several houses. The houses are mostly two-story structures with light-colored siding and dark roofs. Some trees are partially submerged, with only their tops visible above the water. The foreground is dominated by a dense forest of green trees, while the background shows more flooded areas and distant trees. The text "2. County Profile" is overlaid in a large, blue, serif font in the upper right quadrant of the image.

2. County Profile

2. County Profile

Cumberland County is located in eastern North Carolina, on the boundary of the Sandhills and the Coastal Plain, between the cities of Raleigh and Wilmington. It is comprised of nine incorporated municipalities and one census-designated place (CDP): City of Fayetteville, Town of Hope Mills, Town of Eastover, Town of Falcon, Town of Godwin, Town of Linden, Town of Spring Lake, Town of Stedman, Vander CDP, and Town of Wade. Its current population is 324,603. This section provides a profile of housing, economics, infrastructure, environment, and administration within Cumberland County.

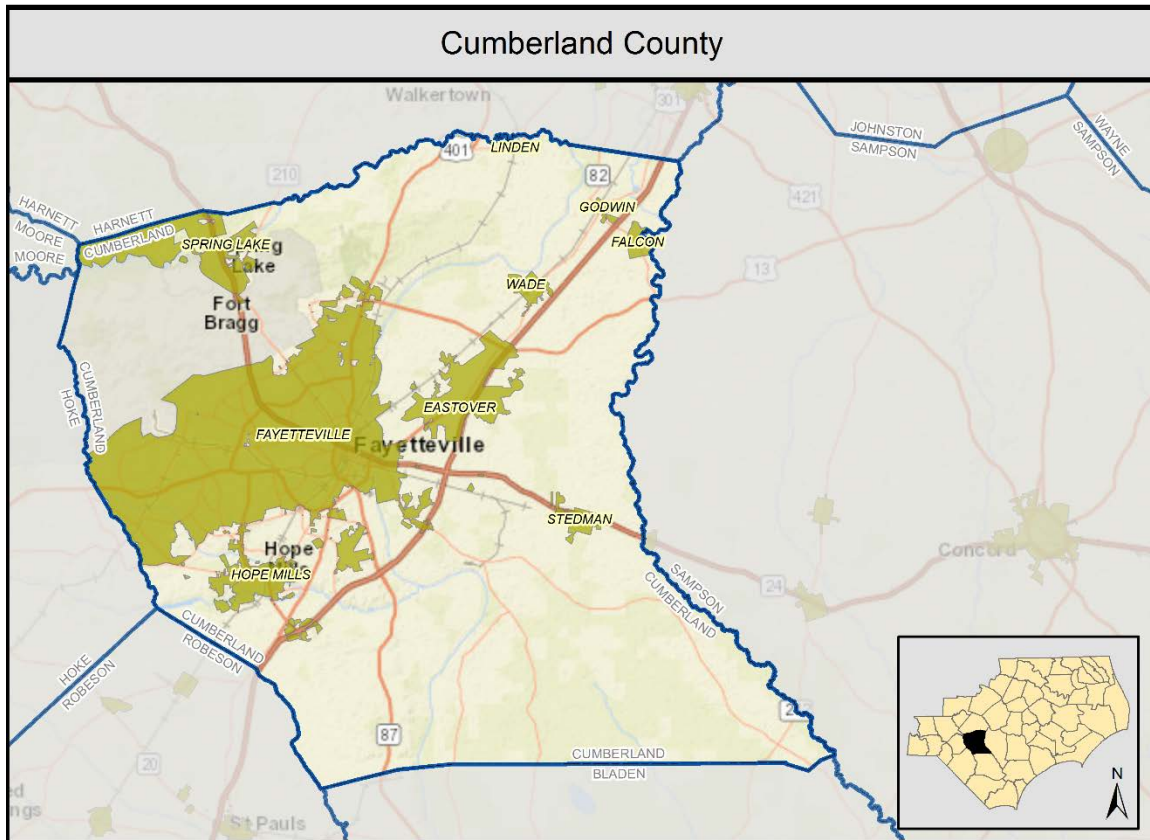


Figure 3: Cumberland Base Map

Demographic Profile

Demographics for Cumberland County and its incorporated municipalities and census-designated place are summarized and compared to statewide averages in this profile. The demographic data are from the 2000 Census, 2010 Census, and 2011-2015 American Community Survey five-year estimates.

Population

Cumberland County has a population of 324,603. Fayetteville is the most populous place within Cumberland County, with a population of 202,521. Godwin is the least populous place in the county, with a population of 140.³

³ Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (2011-2015), Table B01001, "Sex by Age."

Population Change (2000 to 2010)

The Cumberland County population grew moderately in the decade between the 2000 Census and the 2010 Census. In 2000, the population was 302,963 and in 2010 it was 319,431. The population increased by 16,468 people, or about 5 percent. In comparison, North Carolina grew by 19 percent from 8,049,313 people in 2000 to 9,535,483 in 2010.⁴

Age

The median age in Cumberland County is 31 years old, which is less than the North Carolina median age of 42 years old. Within Cumberland County, Godwin has the oldest median age at 53 years old, and Fayetteville has the youngest median age at 31 years old.⁵

⁴ Source: Minnesota Population Center. *National Historical Geographic Information System: Version 11.0 [Database]*. Minneapolis: University of Minnesota. 2016. <http://doi.org/10.18128/D050.V11.0>. *Census 2000/Census 2010 Time Series Tables Geographically Standardized*

⁵ Source: U.S. Census Bureau, *American Community Survey 5-Year Estimates (2011-2015)*, Table B01001, "Sex by Age."

Race and Ethnicity

Cumberland County is mostly White (52 percent) and African American (36 percent), with other races constituting the remaining 12 percent. In comparison, North Carolina is 70 percent White, 22 percent African American, 3 percent Asian, 1 percent American Indian and Alaska Native, and less than 1 percent Native Hawaiian/Pacific Islander. The remaining population is 3 percent Some Other Race, and 2 percent Two or More Races. Refer to the table below.⁶

Within Cumberland County, all of the communities are predominantly White with the exception of Fayetteville and Spring Lake, which have no clear majority racial distinction. In Spring Lake, 8 percent of the population identifies as Two or More Races.

The Latino population in Cumberland County is 11 percent compared to 9 percent for North Carolina. Spring Lake has the largest Latino population (17 percent), while Wade does not have any Latino population according to the census data. Fayetteville also has a notable Latino population at 11 percent.

Geography	White	Black or African American	American Indian and Alaska Native	Asian	Native Hawaiian/ Pacific Islander	Some Other Race	Two or More Races	Total Non-White
Eastover town	80.6%	14.4%	1.0%	1.6%	0.0%	0.0%	2.3%	19.4%
Falcon town	85.0%	2.7%	0.0%	10.6%	0.0%	1.8%	0.0%	15.0%
Fayetteville city	46.6%	41.4%	0.9%	2.9%	0.3%	2.5%	5.4%	53.4%
Godwin town	55.7%	38.6%	0.0%	0.7%	0.0%	0.0%	5.0%	44.3%
Hope Mills town	61.8%	26.2%	2.1%	2.3%	0.1%	0.5%	7.0%	38.2%
Linden town	75.1%	20.7%	3.0%	0.0%	0.0%	0.0%	1.2%	24.9%
Spring Lake town	45.8%	34.5%	0.7%	3.2%	0.4%	7.1%	8.2%	54.2%
Stedman town	76.4%	17.1%	2.4%	1.1%	0.0%	0.0%	2.9%	23.6%
Vander CDP	76.2%	17.5%	0.0%	0.8%	0.0%	0.0%	5.5%	23.8%
Wade town	84.7%	11.4%	1.2%	0.2%	0.0%	0.0%	2.5%	15.3%
Cumberland County	51.9%	36.2%	1.5%	2.4%	0.3%	2.3%	5.4%	48.1%
North Carolina	69.5%	21.5%	1.2%	2.5%	0.1%	3.0%	2.4%	30.5%

Table 2: Cumberland County Race and Ethnicity

Limited English Proficiency

Limited English Proficiency (LEP) is defined as populations 18 years of age or older that speak English less than very well. In Cumberland County, most of the individuals identified as LEP speak Spanish, while very few people speak primarily other languages. Similarly, the primary language group for LEP individuals in North Carolina is Spanish. Within Cumberland County, Fayetteville has the largest LEP population and the primary language group for LEP populations there is Spanish. Most of the communities in the county do not have significant LEP populations according to census data.⁷

⁶ Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (2011-2015), Table B02001, "Race" and Table B03002, "Hispanic or Latino Origin by Race."

⁷ Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (2011-2015), Table B16004, "Age by Language Spoken at Home by Ability to Speak English for the Population 5 Years and Over."

Poverty

In Cumberland County, 18 percent of the population lives below the poverty level compared to 17 percent of the North Carolina population. There are no Cumberland County communities with more than 50 percent of the population below the poverty level. In two communities, Godwin and Spring Lake, more than 20 percent of residents live below the poverty level. In Fayetteville, 18 percent of residents live below the poverty level.⁸

Low- and Moderate-Income Individuals

In Cumberland County, 38 percent of the population is classified as low- and moderate-income (LMI) individuals based on the U.S. Department of Housing and Urban Development's definition. In comparison, 39 percent of the North Carolina population is classified as LMI.⁹

Median Household Income

The median household income of the population aged 25 years old to 64 years old is \$48,779 in Cumberland County, slightly lower than the median household income in North Carolina of \$53,097. Median household income statistics were available in most communities; Fayetteville's median income for this age group is \$47,552.¹⁰

Zero Car Households

In Cumberland County, 7 percent of households do not have a vehicle, which is the same percentage as North Carolina households without a vehicle. Within Cumberland County, Godwin and Wade have the highest percentage of households without access to a vehicle at 10 percent, while Falcon has the lowest percentage at 0 percent.¹¹

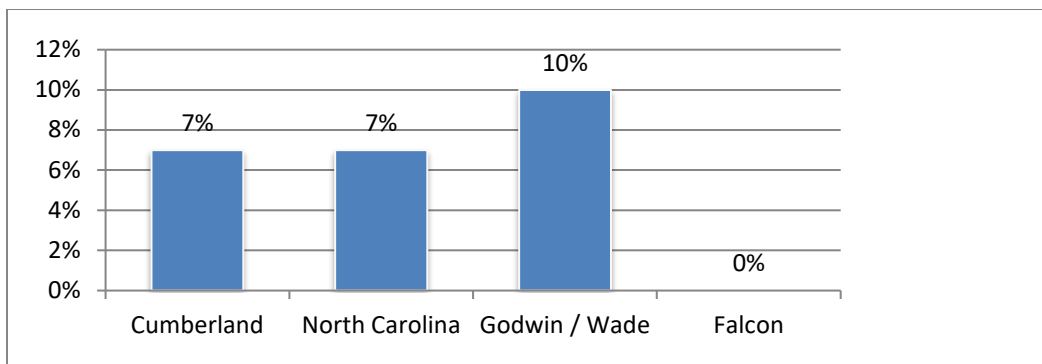


Figure 4. Zero Car Households by Percentage

⁸ Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (2011-2015), Table C17002, "Ratio of Income to Poverty Level in the Past 12 Months."

⁹ Source: U.S. Department of Housing and Urban Development, Estimate of Low and Moderate Income Individuals, <https://www.hudexchange.info/programs/acs-low-mod-summary-data/acs-low-mod-summary-data-block-groups-places/>

¹⁰ Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (2011-2015), Table B19094, "Median Household Income in the Past 12 Months."

¹¹ Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (2011-2015), Table B25044, "Tenure by Vehicles Available."

Commuting: Travel Time to Work, Means of Transportation

The majority of Cumberland County residents, 83 percent, commute alone to work by vehicle, which is similar to the North Carolina average of 81 percent. Within Cumberland County, Wade has the largest percentage of commuters traveling alone, 98 percent, while Fayetteville and Spring Lake have the smallest percentage at 81 percent.

Almost 1 percent of commuters in Cumberland County use public transportation for their commute, which is comparable to the percentage of North Carolina commuters who use public transportation. A greater percentage of Falcon, Fayetteville, Hope Mills, and Spring Lake residents commute by walking, bicycle, or motorcycle than the North Carolina percentage of 2 percent.

The mean commute time to work for Cumberland County residents is 21.1 minutes. In comparison, the North Carolina mean commute time is slightly longer at 24.7 minutes. Within Cumberland County, Spring Lake has the shortest mean commute time at 19.7 minutes, while Linden has the longest at 30.4 minutes.¹²

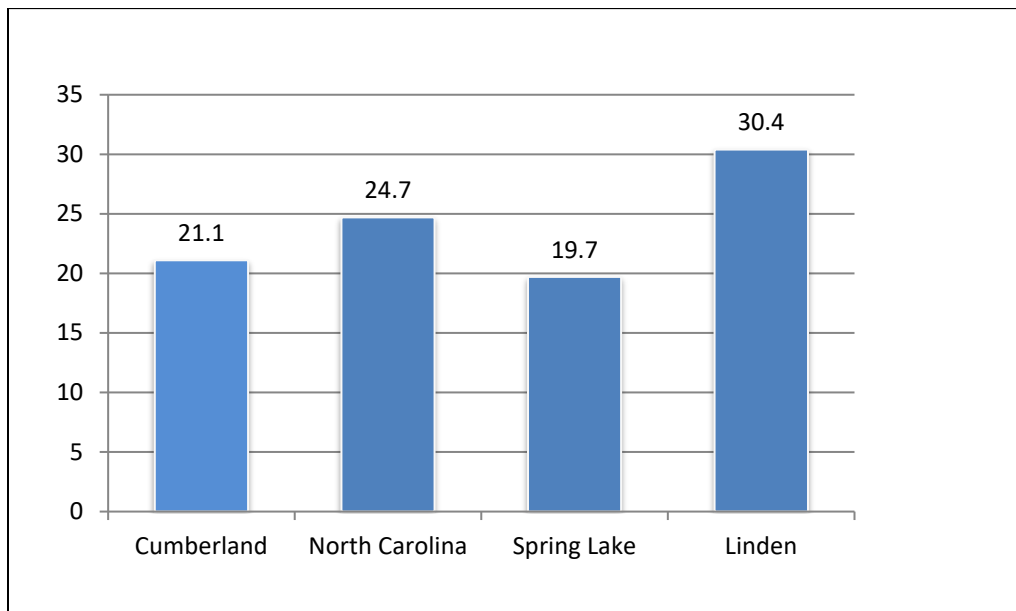


Figure 5. Mean Commute Time to Work in Minutes

¹² Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (2011-2015), Table B08301, "Means of Transportation to Work" and Table GCT0801, "Mean Travel Time to Work of Workers 16 Years and Over Who Did Not Work at Home (Minutes)."

Housing Profile

Cumberland County has more than 142,119 housing units, 64 percent of which are single-family homes, 26 percent are multi-family units, and 10 percent of housing stock is manufactured housing.

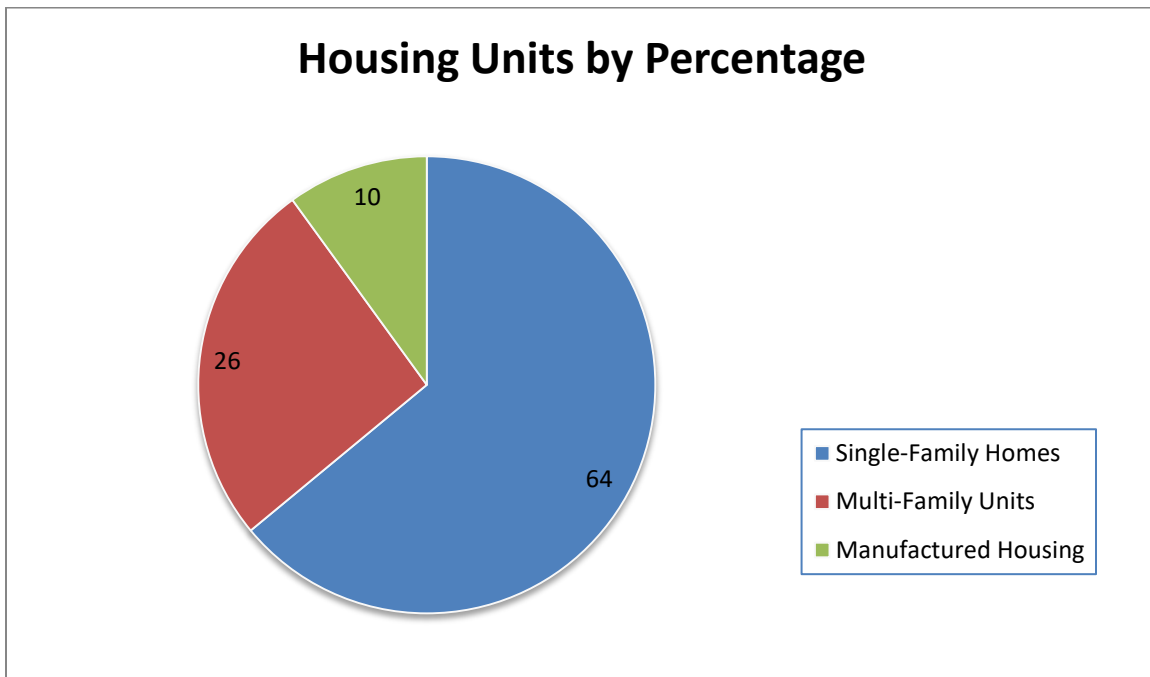


Figure 6. Housing Units by Percentage

In Cumberland County, 14 percent of housing units are vacant, which is almost the same as the vacancy rate of North Carolina at 15 percent. Within Cumberland County, Linden has the largest percentage of vacant housing units at 24 percent. Vander CDP has the smallest, with only 3 percent vacancies.

Of the occupied housing units, 53 percent are owner-occupied compared to 65 percent in North Carolina; 47 percent are renter-occupied compared to 35 percent in North Carolina.

The median housing value in Cumberland County is \$129,300. In comparison, the median housing value in North Carolina is \$140,000. Within Cumberland County, Eastover has the highest median housing value at \$157,700. Spring Lake has the lowest median housing value at \$90,900.

According to the National Housing Preservation Database, Cumberland County has 6,016 affordable housing units. Although most of the affordable housing is located within the City of Fayetteville, 16 percent of the units are in Hope Mills, and 2 percent in Spring Lake.¹³

Economic / Business Profile

The economy of Cumberland County is strongly focused on Public Administration from federal, county, and city sources. Education and Health Services, Trade, and Transportation and Utilities also are well represented. According to the U.S. Census Bureau's Longitudinal-Employer Household Dynamics Program, jobs are

¹³ Sources: U.S. Census Bureau, American Community Survey 5-Year Estimates (2011-2015), Table B25002, "Occupancy Status," Table B25003, "Tenure," Table B25024 "Units in Structure," Table B25077, "Median Value (Dollars)." National Housing Preservation Database

concentrated on the west side of the county, within and west of the City of Fayetteville, along the U.S. Highway 301 (US 301)/U.S. Highway 401 (US 401) corridor, and at Fort Bragg U.S. Army Military Installation.¹⁴

Labor Force

According to the local area unemployment statistics (LAUS) from the Labor and Economic Analysis Division (LEAD) for the unadjusted data for all periods in 2016, the civilian labor force population of Cumberland County is 127,861.¹⁵ Within Cumberland County, Spring Lake has the largest percentage of residents 16 years or older in the labor force at 72 percent, while Godwin has the smallest percentage at 46 percent.

The civilian unemployment rate in Cumberland County is 6.3 percent. In comparison, the North Carolina civilian unemployment rate is lower at 5.1 percent.¹⁵ Within Cumberland County, Godwin has the lowest civilian unemployment rate at 0 percent, while Spring Lake has the highest rate at 17 percent.¹⁶

Major Employers

The county is well-known for its economic connection to Fort Bragg U.S. Army Military Installation, the U.S. Department of Defense (DoD), and associated federal agencies. Education and health care also are top industries within the county.¹⁷

¹⁴ Source: U.S. Census Bureau Longitudinal-Employer Household Dynamics Program

¹⁵ Source: Civilian Population and Unemployment Rate - Labor and Economic Division (LEAD) of North Carolina Department of Commerce – Local Area Unemployment Statistics <http://d4.nccommerce.com/LausSelection.aspx>

¹⁶ Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (2011-2015), Table B23025, "Employment Status for the Population 16 Years and Over."

¹⁷ Sources: NC Department of Commerce

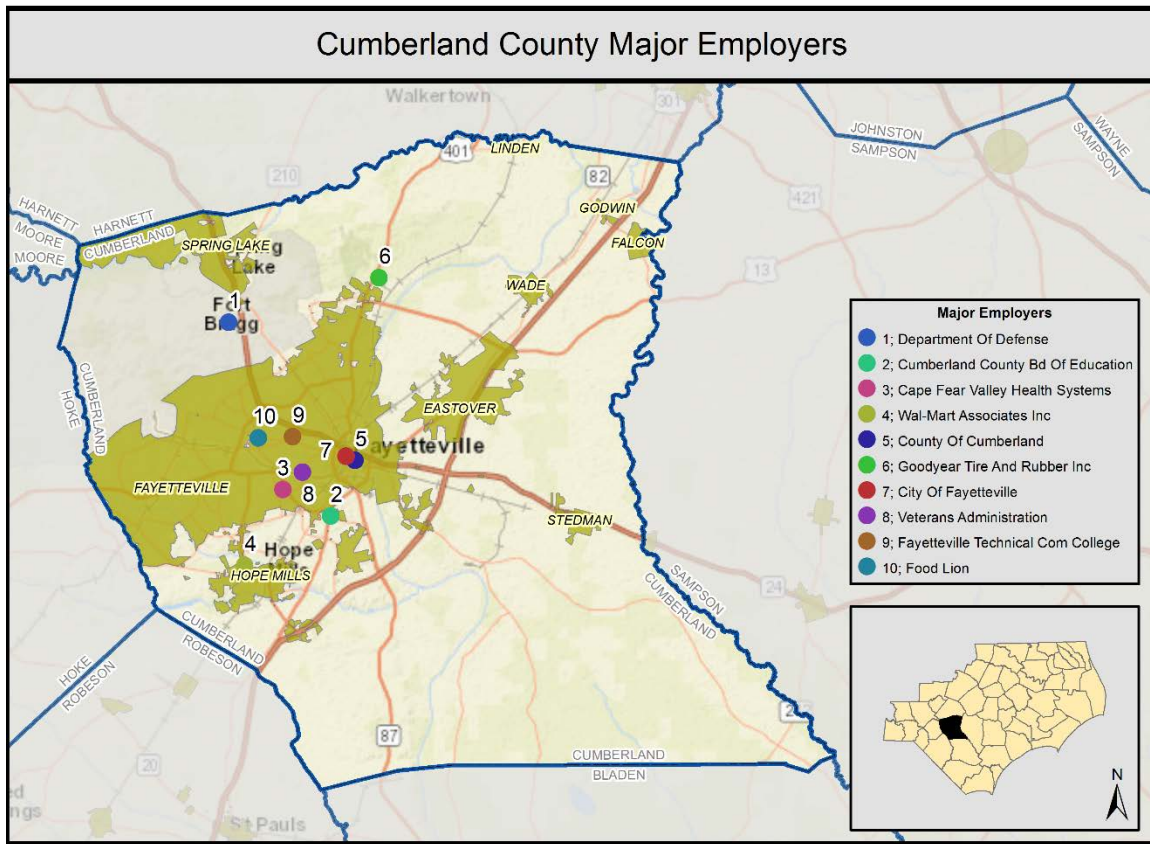


Figure 7: Major Employers by Number of Employees

Economic Development

New and expanded business and industry have brought better-paying jobs to the county, particularly in healthcare, information services, professional technical services, and military support markets. Defense spending in Cumberland County in Fiscal Year 2015 totaled \$3.7 billion associated with the 46,428 military personnel at Fort Bragg.¹⁸

Fayetteville's Economic and Business Development Strategic Action Plan set the city on a path to stemming a rise in their industrial market vacancy rate of 13.7 percent. Target industries include Aerospace, Military, Textiles, Distribution, Agro-Econ, Biotech, and Metal Science. Four distinct pathways to recovery are suggested in this plan:

- **Quality Education/Schools:** This is the most important draw.
- **Recreation:** Large-scale, high-quality active recreational spaces that enhance residential values are crucial.
- **Downtown Revival:** Urban spaces offer the most promise for demonstrating a new, more family/pedestrian friendly Fayetteville.
- **Marketing & Branding:** Lack of public spending to brand community attributes misses an opportunity to retain and attract the creative class.

¹⁸ Sources: Cumberland County, Greater Fayetteville Chamber of Commerce, Office of Economic Adjustment's Defense Spending by State in 2015, Economic and Business Development Strategic Action Plan of November 6, 2016.

Infrastructure Profile

Transportation, health, education, water, and power infrastructure are summarized for Cumberland County in the sections that follow.

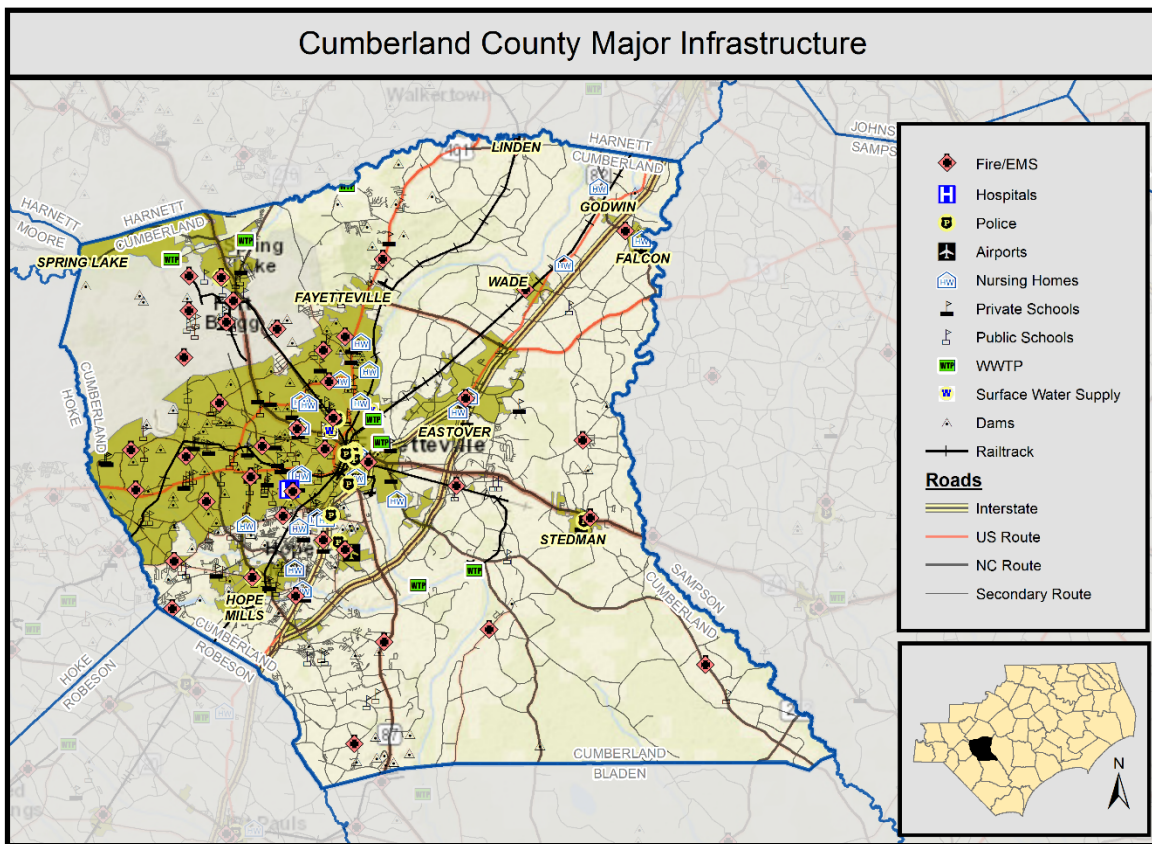


Figure 8: Cumberland County Major Infrastructure

Transportation

Cumberland County maintains a well-developed transportation network. Interstate 95 (I-95) runs through the county, which places Cumberland within one of the major eastern U.S. transportation corridors. Major routes from I-95 access Fayetteville and points beyond, including US 301/US 401 to the north and west, NC Highway 24 (NC 24) to the east and north to Fort Bragg, and NC Highways 87 (NC 87) and 53 (NC 53) to the south.

The Fayetteville Regional Airport (Grannis Field) is a commercial airport that serves three airlines: Delta, American, and United. There is a recognized passenger air travel deficiency due to Grannis Field's non-hub status.

Two rail lines traverse the county and intersect at the City of Fayetteville. A third spur connects Fayetteville to Fort Bragg.

Health

The major hospitals in Cumberland County are:

- Cape Fear Valley Behavioral Health Care, with 85 beds
- Cape Fear Valley Medical Center, with 600 beds

- Highsmith-Rainey Specialty Hospital, with 66 beds
- Womack Army Medical Center on Fort Bragg with 138 beds for servicemen
- Cape Fear Valley Rehabilitation Center, bed information is not available
- Fayetteville VA Medical Center, bed information is not available

Education

The Cumberland County School District is the fifth largest in North Carolina, with 51,480 students enrolled. There are 52 elementary, 18 middle, and 17 high schools within the Cumberland County School District.

Higher education is offered from three institutions. Fayetteville Technical Community College is a two-year public college serving more than 42,000 students annually. It provides more than 200 occupational, general, technical, and continuing education programs.

Fayetteville State University (FSU) is a public regional university located in Fayetteville. Part of the University of North Carolina System, FSU offers degrees at the baccalaureate, master's, and doctoral levels.

Methodist University is a private university and founded as a senior, coeducational liberal arts college. Methodist College opened to students in the fall of 1960. In the Fall of 2006, in conjunction with the institution's 50th anniversary celebration, Methodist College officially became Methodist University. The University today serves approximately 2,400 students—1,750 in the day program, 500 in Methodist University at Night, and 150 in graduate programs. Today the University offers bachelor's degrees in over 80 fields of study (majors and concentrations) including communications, justice studies, business administration, education, and social work.¹⁹

Water

Cumberland County is located in the Cape Fear River Basin. The county's water distribution system encompasses 1,374 miles of distribution lines, and the system's finished water storage capacity is 36.10 million gallons. Surface water sources are Big Cross Creek, Cape Fear River, and Little Cross Creek. Total available water supply is 90 million gallons per day (MGD), and total demand is 29 MGD, which is just 32 percent of supply.

The Glenville Lake Water Treatment Facility (WTF) is permitted for 10 MGD and the P.O. Hoffer WTF is permitted for 39.5 MGD. The first phase of expansion for the P.O. Hoffer WTF is underway. The expected project completion date is 2022. Initial Cape Fear River withdrawals are expected to increase by 2.50 MGD.

The permitted capacities of Fayetteville's wastewater treatment facilities are 21 MGD and 25 MGD. Average annual discharges are 12 MGD and 15 MGD, respectively.²⁰

Power

Within Cumberland County, there is one natural gas power plant located adjacent to the rail line north of Fayetteville. One petroleum product terminal is located along the NC Highway 210 (NC 210) access to Fort Bragg.

There are four solar installations located along the I-95 corridor, east and north of Fayetteville.²¹

¹⁹ Sources: Cumberland County Public Schools, Fayetteville State University, Fayetteville Technical Community College, Methodist University

²⁰ Sources: NC Division of Water Resources, Local Water Supply Plans

²¹ Source: U.S. Department of Energy, U.S. Energy Mapping System

Environmental Profile

Water resources, natural areas, managed areas, biodiversity, wildlife habitat, and recreation are summarized for Cumberland County in the sections that follow.

Water Resources

Aquatic environments are found along the Cape Fear Basin, as well as in 45 named streams, 24 named swamps, and multiple lakes (i.e., Lomond Lake, Rhodes Pond). Known basins and flats include: Bear Path Bay, Big Pond Swamp, Bucks Bay, Galiberry Swamp, Reedy Marsh, and Vineyard Swamp.

Three major rivers flow through Cumberland County. The Cape Fear River winds through the center of the county. The South River creates the border on Cumberland’s east side with Sampson County. The Little River serves as Cumberland’s northern border with Harnett County. Rockfish Creek, Little Rockfish Creek, Cross Creek, Little Cross Creek, and their tributaries also are significant to the hydrology of the county.

Wetlands are distributed throughout the county; however, the most sizeable acreages of wetlands are located on the east side of the county between the Cape Fear River and the South River.²²

Natural and Managed Areas

The largest managed area within the county is Fort Bragg, managed by the U.S. Department of Defense, in the northern portion of Cumberland County. Much of the land area on Fort Bragg is considered Exceptional natural area. Contiguous to the east side of the military installation, Carvers Creek State Park also is considered Exceptional.

Additional notable natural areas in the southeastern section of the county, east of the Cape Fear River, include Bushy Lake State Natural Area, Big White Bay, and Simmons Mill Pond. Areas along Rockfish Creek also are considered Exceptional.²³

Biodiversity and Wildlife Habitat

The North Carolina Natural Heritage Program produces a biodiversity and wildlife habitat assessment for the state. According to this assessment, areas with the highest rating for biodiversity and wildlife habitat are on or contiguous to Fort Bragg Military Installation, the natural areas in the southeast portion of the county, and stretches of the Cape Fear River, the Little River, and Rockfish Creek. These areas rank between a 7 and 10, with 10 being the highest possible score. Other areas of the county rank 5 to 6. Most of the county is unrated.²⁴

Parks and Recreation

The county has a considerable number of municipal-level recreational and park facilities, including 12 recreation centers, 10 parks, the Cape Fear River Trail, and the Cape Fear Mountain Bike Trail. These and all of the aforementioned environmental assets are especially critical to Cumberland County as they drive many of the recreational activities of the residents and enhance the local economy.²⁵

²² Source: NC Natural Heritage Program

²³ Source: NC Natural Heritage Program

²⁴ Source: NC Natural Heritage Program

²⁵ Sources: Fayetteville-Cumberland Parks and Recreation Department,

Administrative Profile

The administrative capabilities of Cumberland County and the municipalities within the County are discussed in great detail within Section 7 of the Cumberland-Hoke Regional Hazard Mitigation Plan (2016). The assessment evaluates the capabilities of the County and municipalities to implement mitigation actions across the areas of planning and regulatory capabilities, administrative and technical capabilities, fiscal capabilities, and political capabilities. Many more details about the capabilities of Cumberland County and the municipalities can be found in that document.

In terms of administrative capabilities, the County has some of the staff and the necessary plans, policies and procedures in place that are found in communities with “high” capabilities. Cumberland County has Emergency Management and Planning departments with the capacities to assist in implementing the resilience strategies proposed in this plan. Some of the other indicators of capability for the County include the following: Comprehensive Plan, Floodplain Management Plan, Zoning Ordinance, Subdivision Ordinance, BCEGS Rating, Building Code, Capital Improvements Plan, and Floodplain Management Ordinance. These plans, policies and procedures help ensure that new development in the County will be managed in a responsible manner and will take place in non-hazardous areas.

As one of the larger cities in the state, the City of Fayetteville also has indicators of “high” capability with most of the same ordinances and plans as Cumberland County. It also has a Stormwater Management Plan. The Towns of Hope Mills, and Spring Lake have the indicators of “moderate” capability like the presence of a Capital Improvements Plan. They have some administrative resources that would likely be able to assist with implementing the strategies in this plan. The Towns of Eastover, Falcon, Godwin, Linden, Stedman, and Wade also have some of the indicators of “moderate” capability but may need assistance from other agencies to implement the strategies in this plan as a result of more limited administrative resources.

Cumberland County, Fayetteville, and several of the other municipalities sustained significant damage from Hurricane Matthew. Engagement in on-going recovery work may limit their capacity to take on additional recovery duties like hazard mitigation and resiliency work.

An aerial photograph showing a residential neighborhood severely impacted by flooding. The houses, which are mostly two-story structures with grey roofs, are surrounded by deep, brown floodwater. The water has inundated the yards and streets, leaving only the roofs and some trees visible. The background shows a dense forest of green trees, also partially submerged. The text "3. Storm Impact" is overlaid in the center of the image.

3. Storm Impact

3. Storm Impact

Rainfall Summary

Hurricane Matthew officially made landfall as a Category 1 storm southeast of McClellanville, South Carolina, early on October 8, 2016. The track and speed of the storm resulted in heavy precipitation over the eastern parts of North Carolina for almost two days. A number of locations across North Carolina received all-time record, one-day rainfall amounts. Many locations in the Coastal Plain of North Carolina, including Cumberland County, already had received above-normal rainfall in the month of September leading to wet antecedent conditions prior to Hurricane Matthew. Cumberland County received as much as 15 inches to 16 inches of rain in small, concentrated areas of the southern part of the county, with lower rainfall of seven inches to eight inches in the northern part. Total rainfall depth for Cumberland County is highlighted graphically in the figure below.

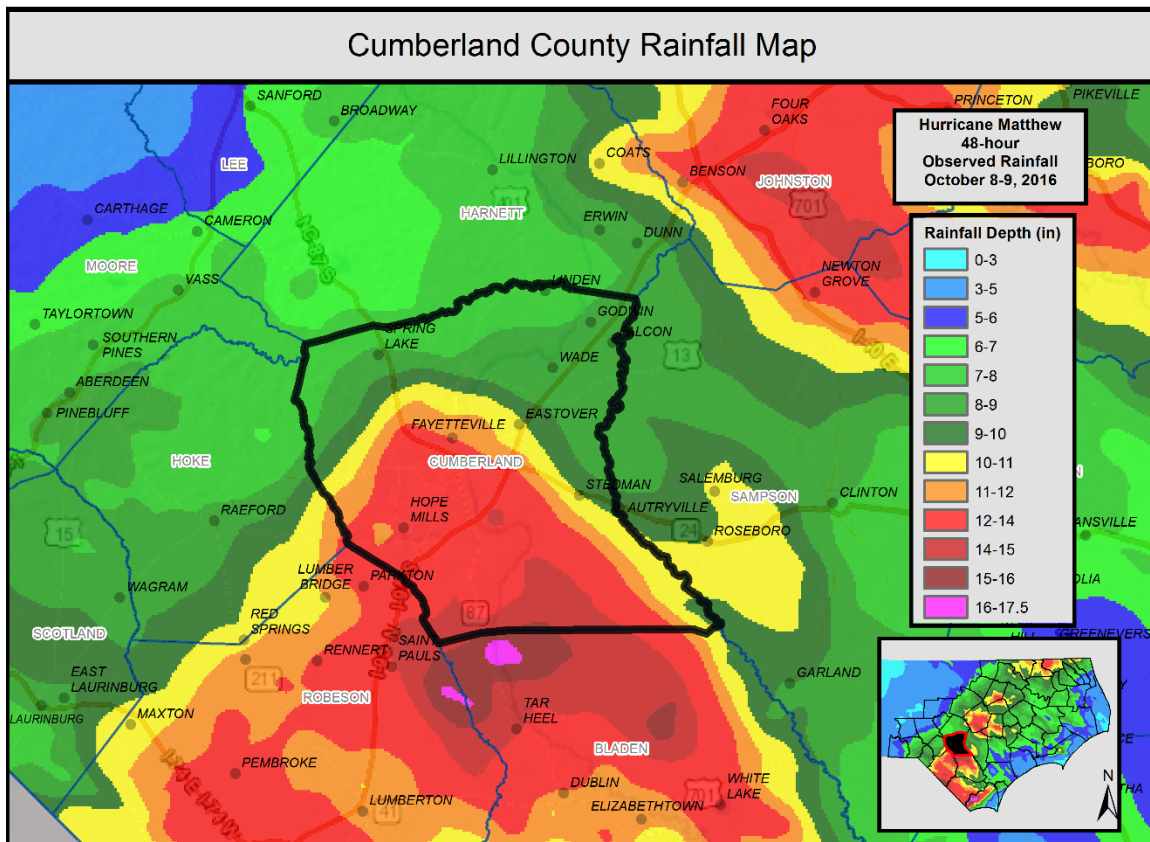


Figure 9: 48-hour Observed Rainfall Depth (October 8-9, 2016)

Riverine Flooding Summary

Hurricane Matthew had a number of significant impacts on Cumberland County. Flooding in this area was reminiscent of the flooding that occurred in the hardest-hit areas from Hurricane Floyd in 1999, which makes this a particular hot spot zone for flooding. The National Weather Service reported that an observer affiliated with the Community Collaborative Rain, Hail, and Snow (CoCoRaHS) network reported 17.00 inches of rain on October 7 to October 9 near Hope Mills in Cumberland County, North Carolina.

The U.S. Geological Survey (USGS) documented stream gauge data in the report, *Preliminary Peak Stage and Streamflow Data at Selected Streamgaging Stations in North Carolina and South Carolina for Flooding Following*

Hurricane Matthew, October 2016. Stream gauge data from the USGS report for the one gauge located in Cumberland County is summarized below.

USGS Gauge	County	River Name and Location	Drainage Area (sq. mi)	Peak Matthew Elevation (ft.)	Previous Record (ft.)
02104000	Cumberland	Cape Fear River at Fayetteville, NC	4,395.0	58.94	46.17

Table 3: Cumberland County USGS Stream Gage Data

Cumberland County was in the heart of counties that experienced major impacts from Hurricane Matthew and which were under the federal disaster declaration that resulted from the storm. The county includes several waterways that flooded during the storm, including streams like Rockfish Creek that flow into the Cape Fear River.

Residents across the county lost their homes and personal belongings due to the storm, and local infrastructure was heavily damaged in many areas. Dam breaks exacerbated the flooding, and many property owners outside mapped flood zones were affected. Roads washed out and were blocked by downed trees. Critical facilities and shelters were inundated with flood water and/or inaccessible due to impassible roads. Power outages ranged from three days to eight days in parts of Fayetteville and isolated locations across Cumberland County, impacting homes, businesses, and critical facilities.

As one of the most heavily impacted counties in the state, Cumberland County experienced a wide array of effects from Hurricane Matthew that are detailed below.

Housing Impacts

According to Federal Emergency Management Agency (FEMA) Individual Assistance claims as of March 17, 2017, there were 13,588 registrations for Individual Assistance in Cumberland County as a result of Hurricane Matthew. It should be noted that additional claims from Hurricane Matthew still may be pending, so this number may not reflect the final claims data from the event.

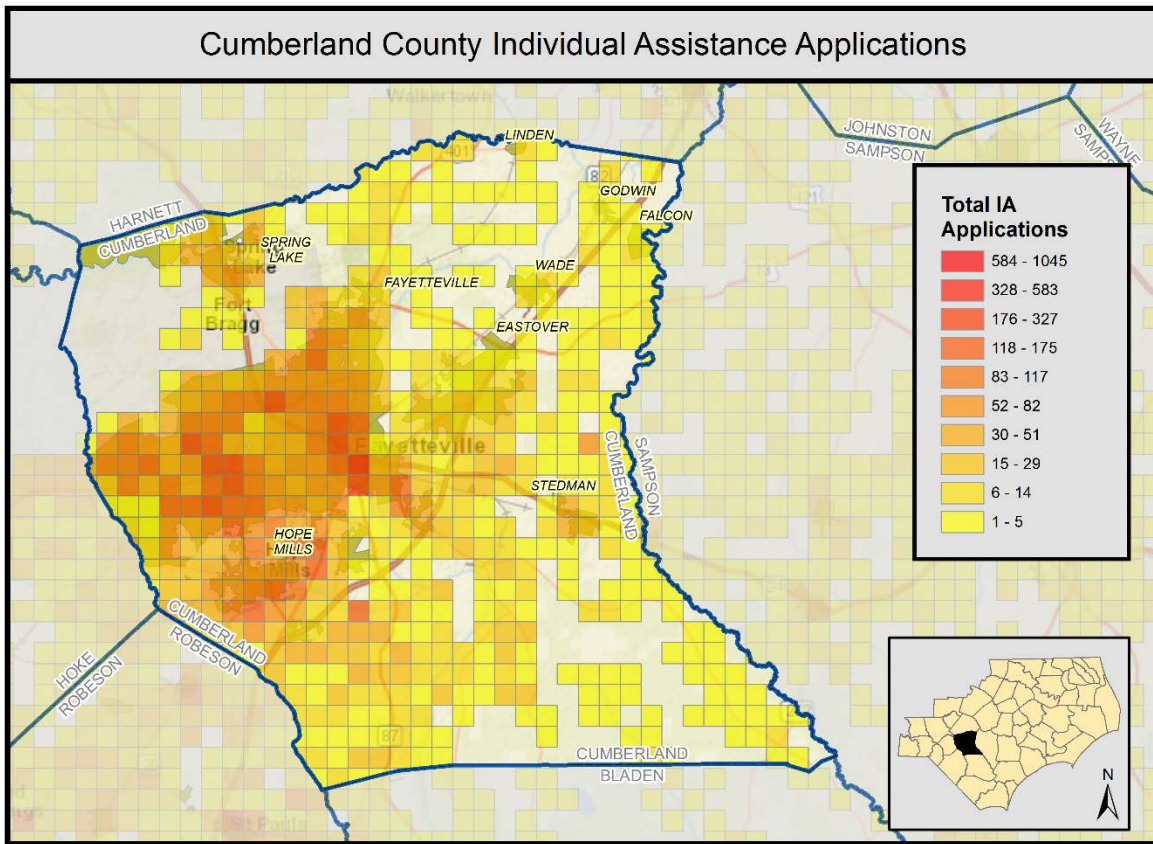


Figure 10: Cumberland County IA Applications by Area

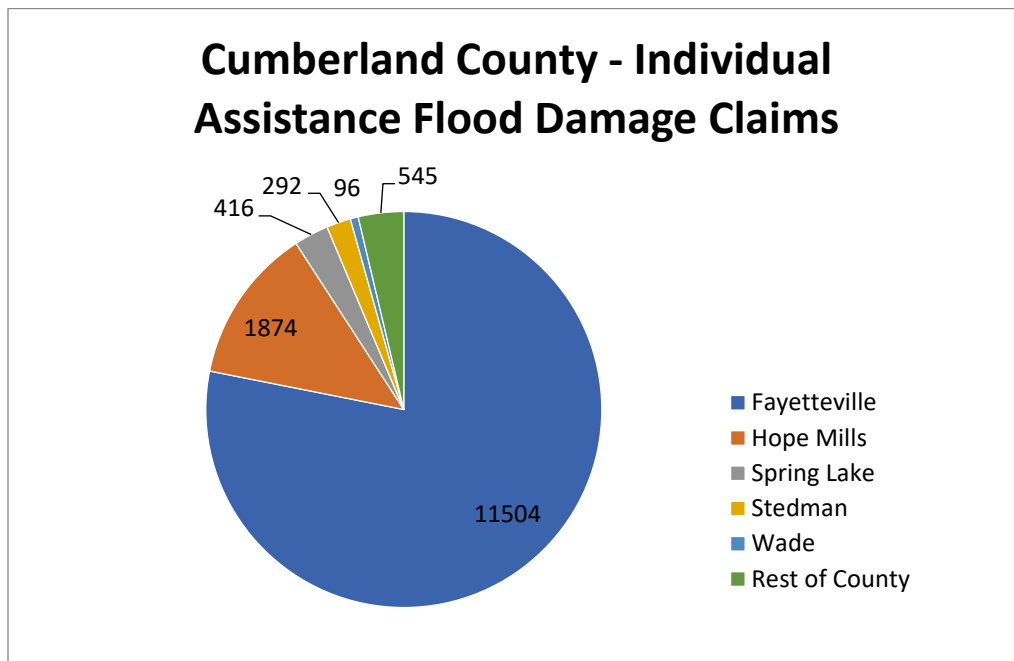


Figure 11: Number of IA Flood Damage Claims by Area

The *Fayetteville Observer* reported that 800 homes were damaged in the city of Fayetteville. The paper also reported on March 11, 2017, that 14,794 people from Cumberland County registered for FEMA assistance by

January 23, 2017. Much of the damage occurred in areas that were outside of the FEMA-designated Special Flood Hazard Areas (SFHAs) but located adjacent to the SFHAs.

- In the Rockfish Creek area, houses were inundated with up to 20 feet of water. These homes were located adjacent to but not within the floodplain designated area.
- Water was trapped under the new bridge at Parkton Road and N.C. Highway 59 (NC 59), which eventually overtopped and caused surrounding subdivisions to flood.
- In Eastover, canals overflowed and caused homes to flood.
- Nursing homes and assisted living facilities were flooded, creating a need for mass transportation and relocation.
- Residents along Brown Creek Road and Country Club Road routinely sustain flooding with rainfall greater than two inches.

Low-Income Housing

Many low- and moderate-income housing units were damaged due to flooding.

- Homes were flooded at the intersection of Old Wilmington Road and Monroe Road. This is an area of low-income ownership within the SFHA.
- Mobile homes were destroyed in the trailer park located where Beaver Creek, Rockfish Creek, and Buckhead Creek come together, at NC 59.
- Affordable housing was difficult to find in the aftermath of the storm due to a reduced housing stock.

Economics / Businesses / Jobs Impacts

Several buildings in historic downtown Fayetteville (i.e., Greene Street area) were flooded and road closures cut off business access (see complete list in the Appendix). Power outages ruined products and brought business operations to a halt. Power outages at farms in the rural parts of the county shut down water pumps that led to livestock mortality. Urban water supply was contaminated by low pressure, which also affected business and hospital operations.

The Cumberland County economic engine is robust. Fayetteville's economic rebound was strong, but the smaller municipalities are still in recovery. Hurricane Matthew proved that electrical power is the greatest economic threat to business and industry in Cumberland County.

Major Employers

Employment in Cumberland County is mainly concentrated at the Fort Bragg U.S. Army Military Installation, associated federal agencies, education and health care. The impacts from the Hurricane Matthew to the top 10 employers in Cumberland County include:

Employer	Impacts from Hurricane Matthew (if any)
Department of Defense	Fort Bragg experienced flooding which caused extensive road and bridge damage. Some of the dams breached (Smith Lake). Traffic was re-routed.
Cumberland County Board of Education	Water damage in warehouse facility. Schools closed for several days due to road impacts. People out of work. Some damage to a generator at a school serving as a generator having to do with transfer switch
Cape Fear Valley Health Systems	Lost water for several days; almost had to evacuate due to sanitary reasons including the inability to flush toilets.

Employer	Impacts from Hurricane Matthew (if any)
Wal-Mart	Struggle to get bottled water at several stores. Distribution of water at Wal-Mart. Road issues made it difficult for employees to get to work as well as getting supplies.
County of Cumberland	Flooding of Main Branch Library. Damage to the Crown Complex (washout on embankments and retaining wall breaches, two retention pond breaches). The Sherriff's Training Center and EM portable equipment set behind training center were also damaged.
Good Year Tire and Rubber	Road damage created many challenges with employees getting to work.
City of Fayetteville	Numerous streets washed out downtown along Cross Creek. Nature area had facilities damaged along Cape Fear river. Flooding downtown included the Police Department.
Veterans Administration	Road damage created many challenges with employees getting to work.
Fayetteville Technical Community College	Road damage created many challenges with employees getting to work.
Food Lion	Could not get things in or out of major distribution center. Road damage created many challenges with employees getting to work.

Table 4: Hurricane Matthew Impacts to Top 10 Employers.

Infrastructure Impacts

According to Public Assistance information (the applicant's Task Force Lead's Progress Tracker and EMMIE), which often are tied closely to infrastructure damage, as of April 20, 2017, there were 145 identified Project Worksheets in Cumberland County as a result of Hurricane Matthew. The 100 percent value of these 145 Project Worksheets is approximately \$31,000,000. 27 of these Project Worksheets have been obligated in the amount of \$708,938 Federal Share. It should be noted that additional claims from Hurricane Matthew still may be pending, so this number probably does not reflect the final claims data from the event. Hurricane Matthew caused both power outages, which disrupted infrastructure and facility operations, and direct damage to infrastructure.

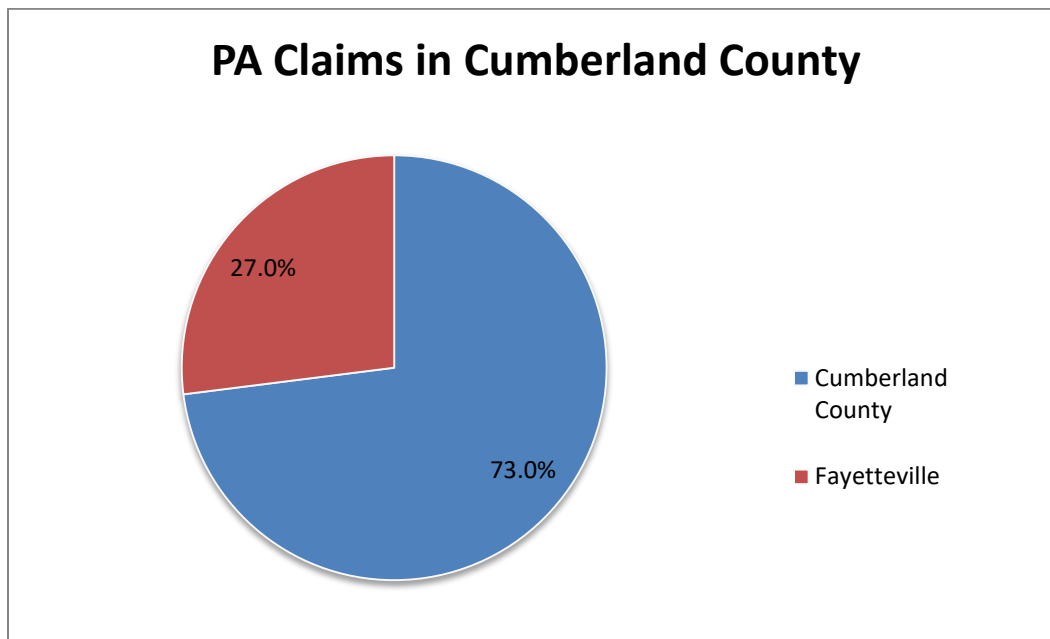


Figure 12. Cumberland County PA Claims by Area and Percentage

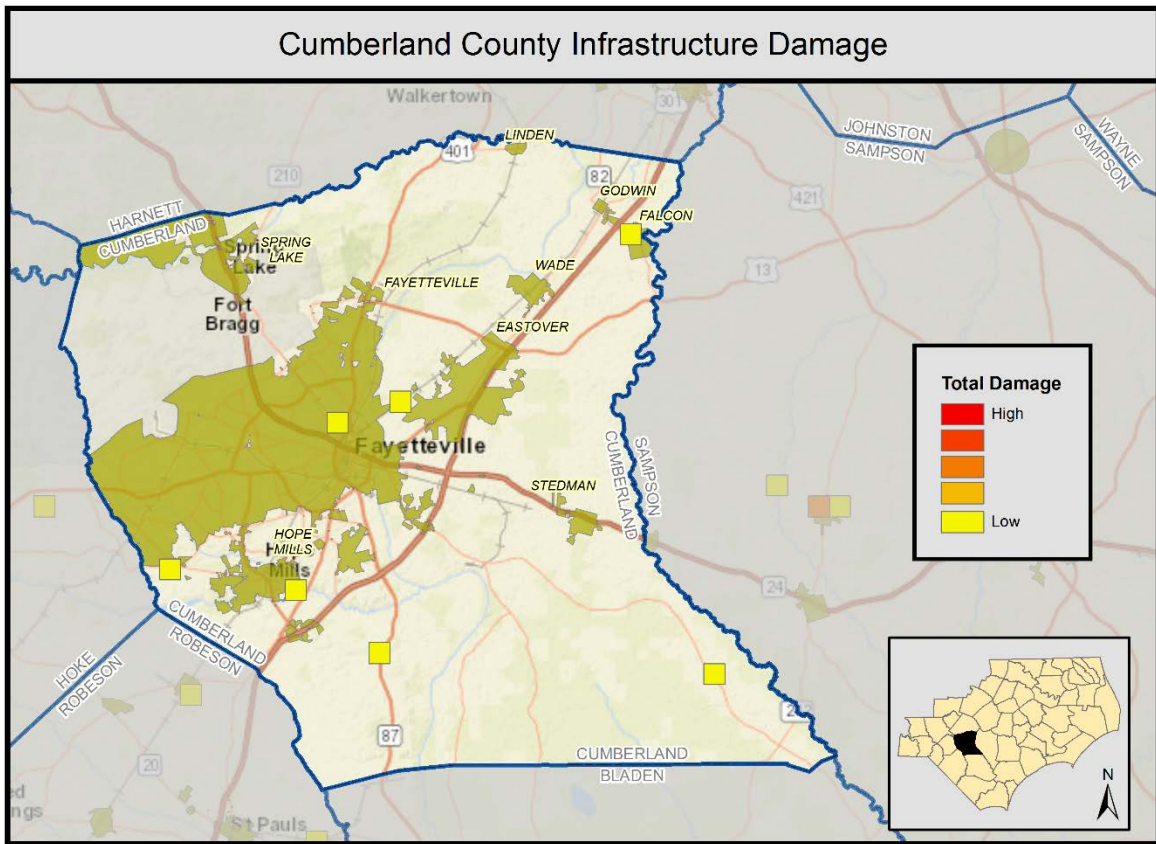


Figure 13: Cumberland County Infrastructure Damage

Flooded and Damaged Roads

Information released by the City and County Joint Information Center at the height of the storm indicated that these interchanges on Interstate 95 (I-95) had been flooded and closed:

- Greenock Avenue/Paisley Road
- Old Bunce Road/Baden Lake Road
- Morganton Road/Cliffdale Road
- Murchison Road/Washington Road

Traffic was rerouted away from these areas and major delays ensued.

The *Fayetteville Observer* reported on March 11, 2017, that Cumberland County incurred \$9 million worth of damage to infrastructure on a half-dozen roads alone in the city. Main roads were cleared of debris quickly, but many residential streets were impassable or washed out, which caused some rerouting. Challenges remain around who will rebuild roads.

The CSX rail line was washed out at one primary line location and several spurs.

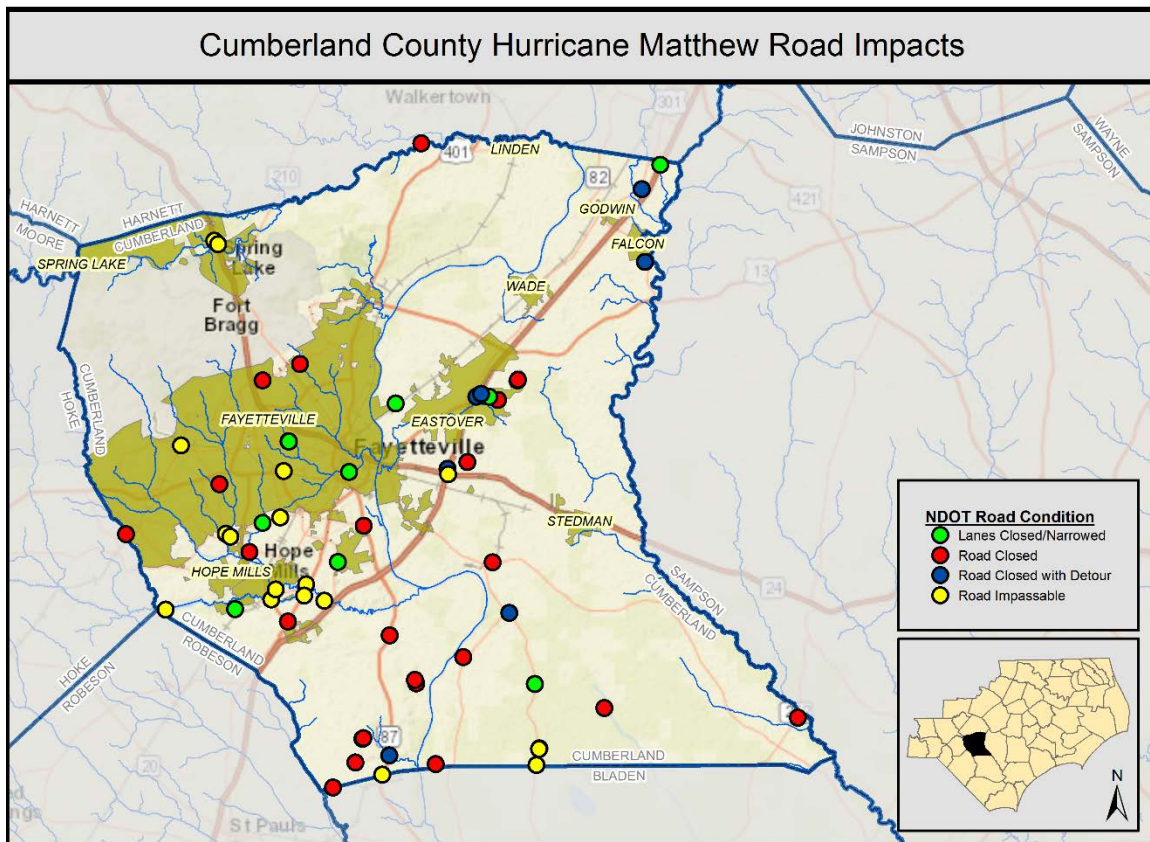


Figure 14: Impacted NCDOT Structures in Cumberland County

Critical Facilities

Flooding and downed trees caused many critical facilities to be inaccessible and delayed restoration of power and water services. Some of these facilities flood historically.

- Twelve critical facilities in Downtown Fayetteville near Greene Street, which sit in a topographic depression, were flooded with waist-deep water.

- Flooding almost reached the downtown Emergency Operations Center (EOC).
- The fire station was flooded, as well as a section of fire department road.
- The homeless shelter at Old Wilmington Road/Monroe Road was flooded.
- Many shelters do not have back up power.
- The hospital was impacted by the low water pressure, which led to water supply contamination. The hospital resorted to bottled water and supplemental sources for flushing sanitary waste. The hospital was hours away from having to be evacuated before this situation was remedied.
- The Cumberland-Hoke Regional Hazard Mitigation Plan of January 2016 noted the lack of accurate and comprehensive understanding of the condition of critical facilities. Of greatest concern are the facilities needed to provide water, electricity, transportation, and waste management.

Ecosystems / Environment Impacts

Dams

Dam breaches caused the greatest environmental threat. The surging floodwaters from dam breaks scoured banks, destroyed downstream dams and roads, flooded homes, and backed up at the confluence of creeks and rivers, overflowing into the land around these blockages. The most severely inundated areas were:

- SW Cumberland/Hoke county line, on Beaver Creek tributary
- Rayconda and Loman Dam on Buckhead Creek
- Merge of Buckhead Creek, Rock Fish Creek, and Little Rock Fish Creek, near U.S. Highway 301 (US 301).

A full 10 percent of the 113 registered dams in Cumberland County had been breached prior to Hurricane Matthew (see the Appendix). During the kick-off meeting for this project, local officials indicated that Hurricane Matthew caused 10 additional dam breaches.

Area	Dams Breaches
Fayetteville	#52 Arran Lakes Impound Dam #25 Loch Lomond Impound Dam #32 Watson Lake Exempt Dam #32 Wilson Lake Exempt Dam
Manchester	#34 Long Valley Farm Lake Impound Dam #37 Smith Lake Exempt Dam Bragg
Cliffdale	Rayconda Upper Impound Dam
Wade	#53 Roads Lake Impound Dam
Jerome	#50 Smith Lake Exempt Dam
St. Pail	#86 Mt. Vernon Estates Impound Dam

Table 5. Cumberland County Dam Breaches

Stream Restoration and Maintenance

As a result of Hurricane Matthew, many trees and other debris now litter waterways across the county. During heavy rains, this debris will continue to dam up water and impede natural flows. These changes in the water flow put more properties at risk to future flooding.

Stormwater Management

Hurricane Matthew has demonstrated that stormwater management plans need to be re-evaluated. Even though the principles of smart environmental growth are deeply imbedded in almost every plan and policy drafted by the planners for the county, municipalities, and the city, the impact of rapid urban growth and subsequent additional impervious surface is stressing the ability of watercourses to perform their natural functions. Stormwater infrastructure was designed to handle normal flows, but it fails under extreme flooding conditions. Flooding occurred the week before Hurricane Matthew hit without the dam breaches.

Industrial farming contamination was spread across prime preservation lands and into neighborhoods.

The presence of dams and an increase of urban development over time has increased impervious cover and altered the hydrology of the county. The flood damages occurred mostly outside the SFHA.

Streambed restoration is needed to reinforce slopes that were damaged along several rivers. Slope damage included loss of natural compaction, loss of rip-rap, and creation of sink holes.

The Parks and Recreation Department had to shut down several trails due to flood conditions and downed trees.

Summary of Critical Issues and Community Assets

- Many homes were damaged by flooding, and most of the damage occurred outside the SFHA. Urbanization leading to increased flood risk needs to be analyzed to better inform homeowners.
- Early warning systems are needed to provide sufficient and timely 24-hour warning services during heavy rainfall and flood events.
- Many critical facilities were damaged or threatened during Hurricane Matthew, including an important switch station and downtown buildings.
- Downed power lines were the major disruption caused by Hurricane Matthew. Power outages led to many ancillary problems.
- Residual water from the prior week's rains prepared the way for Hurricane Matthew's force to breach dams, which caused flood waters to cascade toward urbanized areas. These floodwaters overwhelmed the stormwater management system.
- Communications, emergency services, and public education were ranked as the most important activities for communities to pursue in reducing risks.
- Economic incentives would help rebuild a positive business climate.

An aerial photograph showing a residential neighborhood severely affected by flooding. The water is murky brown and has inundated the yards and streets between several houses. The houses are mostly two-story structures with light-colored siding and dark roofs. Some trees are partially submerged, with only their tops visible above the water. The background shows a dense line of trees and more flooded areas, suggesting a larger scale of inundation.

4. Strategies for Resilient Redevelopment

4. Strategies for Resilient Redevelopment

This section provides details about the resilience and revitalization strategies and actions identified in Cumberland County. These actions were identified and refined during three public meetings with local officials and county residents held in March and April 2017. The actions are tied to impacts from Hurricane Matthew and organized by the pillars of housing, economic development, infrastructure and environment. In addition to the public meetings, frequent coordination calls with County officials and data gathered from state agencies and organizations were utilized to formulate the actions listed below.

Meeting 1 was designed to introduce the community and County points of contact to the Resilient Redevelopment Planning process and goals. This meeting allowed the planning team to capture areas within the county that were damaged during Hurricane Matthew and to hear what potential mitigation actions had already been considered. Draft resilience actions were then presented at Meeting 2 of the planning process. This was done to garner general buy-in on the draft actions from the County-level planning teams and residents. More details on the actions were collected between Meetings 2 and 3 through research and follow-up phone calls and emails with the primary points of contact. Meeting 3 provided the opportunity to collect and finalize details for the draft actions. Meeting 4, scheduled in early May 2017, allowed the county points of contact to rank the identified actions, group them into High, Medium, and Low Priorities, and to approve their inclusion in the plan.

Pillar	Strategy/Action Count
Housing	3
Economic Development	3
Infrastructure	8
Environment	4
Grand Total	18

Table 6. Cumberland County Summary of Strategies by Pillar

The following table is ordered by the rankings and priorities provided by Cumberland County during Meeting 4:

Pillar	Strategy/Action Name	Priority	Overall Ranking
Infrastructure	Critical Facilities Flood Protection (Fayetteville, Spring Lake/Hope Mills, PWC)	High	1
Infrastructure	Critical Facilities Backup Power	High	2
Housing	Fayetteville and Cumberland County Acquisition/Elevation of Damaged Homes and Mitigation Reconstruction	High	3
Housing	Fayetteville/Cumberland County Housing Rehabilitation Assistance	High	4
Housing	Fayetteville Affordable Housing Supply	High	5
Infrastructure	City/County PWC Resilient Power (Microgrid)	High	6
Infrastructure	Fayetteville/Cumberland County Dam Rehabilitation and Replacement	High	7
Environment	Cumberland County Stream Restoration	Moderate	8
Environment	Stream Gauges and Early Warning Network	Moderate	9
Infrastructure	Stormwater Management Improvements	Moderate	10
Economic Development	Cumberland County Qualified Local Contractor Program for Reconstruction	Moderate	11
Environment	Augmented Flood Mapping	Moderate	12
Economic Development	Fayetteville Downtown Revitalization	Moderate	13
Environment	Open Space and Flood/Stormwater Retention Areas	Low	14

Pillar	Strategy/Action Name	Priority	Overall Ranking
Infrastructure	Flood Protection of Roads	Low	15
Infrastructure	Flood Protection of Bridges	Low	16
Economic Development	Cumberland County Agricultural Alternative Energy Supply	Low	17
Infrastructure	Interstate-95 Multi-County Coordinated Evacuation/Rerouting Plan	Low	18

Table 7. Projects by Rank

On the following pages, we have organized the strategies and actions by pillar. Within each pillar, the projects are grouped by county priority. Please note that maps are provided for all strategies that have a specific location within the county. Projects without maps are county-wide strategies that will benefit citizens throughout the county.

Additionally, each strategy is described with more detail in the appendix. The appendix will be ordered in the same manner as below.

Housing Strategies

Cumberland County experienced significant impacts from Hurricane Matthew with respect to housing, with most of the flooding that impacted homes occurring outside the Special Flood Hazard Area (SFHA). As a result of these significant impacts, the planning team focused on resiliency, rehabilitation assistance, and boosting the affordable housing supply in developing Cumberland County's housing strategies.

High Priority Housing Strategies

Pillar	Strategy/Action Name	Priority	Overall Ranking
Housing	Fayetteville and Cumberland County Acquisition/Elevation of Damaged Homes and Mitigation Reconstruction	High	3
Housing	Fayetteville/Cumberland County Housing Rehabilitation Assistance	High	4
Housing	Fayetteville Affordable Housing Supply	High	5

Table 8. Cumberland High Priority Housing Summary

These projects represent the housing strategies that Cumberland County indicated is of a higher priority to address. Additional detail on the strategies can be found below:

- **Fayetteville and Cumberland County Acquisition/Elevation of Damaged Homes and Mitigation Reconstruction:** Develop a program in Fayetteville to assess and identify best solutions for widespread repetitive flooding of homes and continual flood risk in multiple locations. The county would like to include the options of elevation, reconstruction, and/or acquisition as a part of this study. Proposed projects include:
 - Acquisition in Fayetteville of 55 flood-prone units on Aftonshire Drive, Arran Lake Apartments, Loch Ness Court, VanStory Street, Louise Circle
 - Rockfish Creek corridor at Pennystone Road, Chevy Chase, Cameron Road, Tippit Trail, and Battery Court (between 50 to 75 units estimated as of April 2017).
 - Elevation or mitigation reconstruction in Fayetteville of 520 flood-prone units on Paisley Road, 140 Wildwood Drive, Historic District, and Robeson Street
 - Acquisition in Cumberland County of 25 mobile homes on Lena Road and Sunnydale Road—an area that was inundated with up to six feet of water

- Elevation or mitigation reconstruction in Cumberland County on Main Street (40 units), Dogwood Court (20 units), Carol Street (15 units), Point East Subdivision (87 units), Mill Bridge in Hope Mills (30 units), and Manchester at Bragg Boulevard in Spring Lake (30 units)

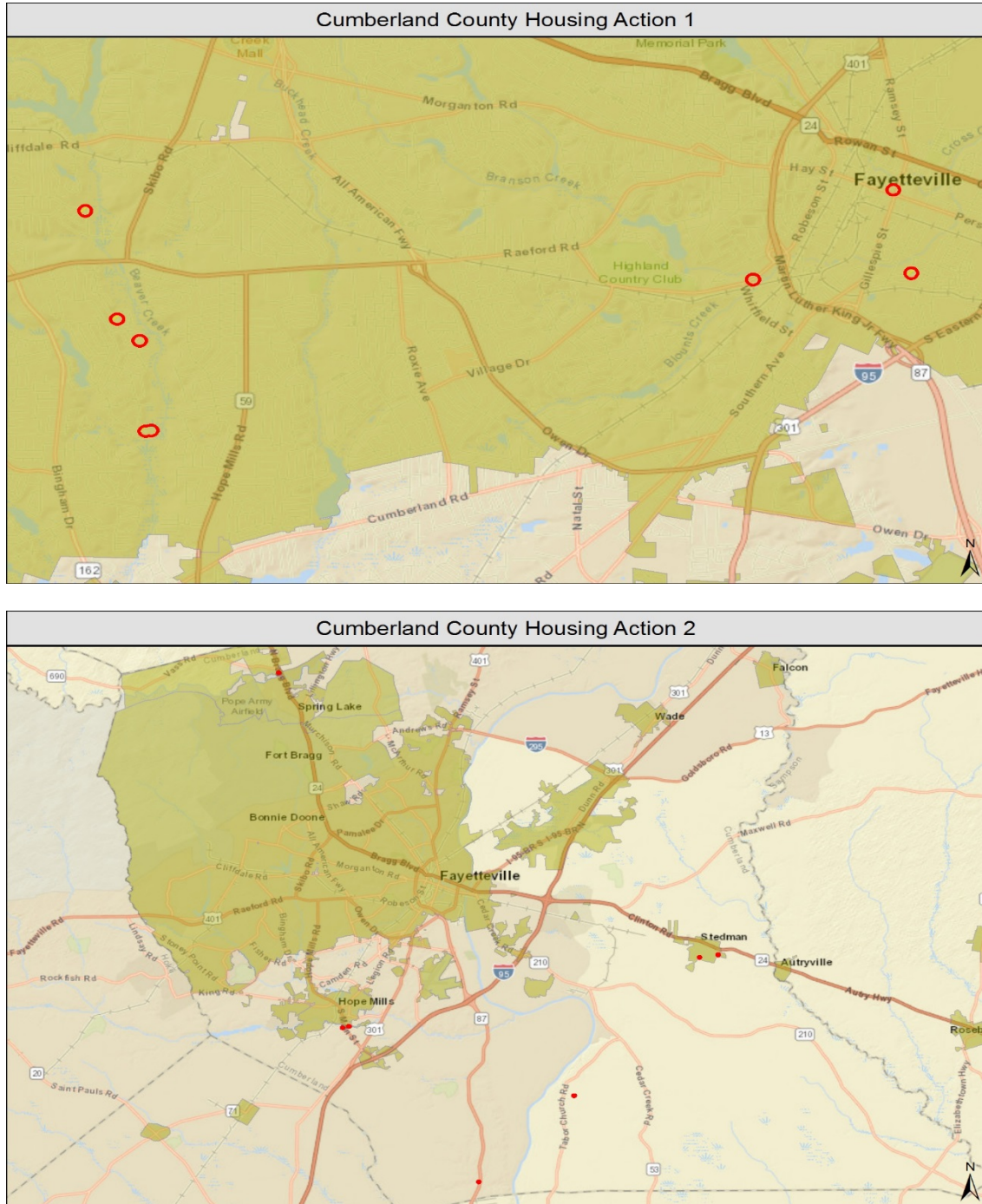


Figure 15. Housing Actions 1 - and 2 (one strategy) - Fayetteville and Cumberland County Acquisition/Elevation of Damaged Homes and Mitigation Reconstruction

H1: Fayetteville - Acquisition, Elevation, or Mitigation Reconstruction

County: Cumberland

Priority Grouping: High Priority

Priority Ranking: 3

Project Timeframe: 24-36 months

Location: Acquisition: Aftonshire Dr/Arran Lake Apt., Loch Ness Court, VanStory St., Louise Circle; Proposed Elevation or Mitigation Reconstruction - 140 Paisley Rd, 140 Wildwood Dr, 100 Historic District, 140 Robeson St.

Project Summary: Mitigation of homes that were damaged after Hurricane Matthew and at high risk from future flooding. Proposed Acquisition of 55 floodprone units - 40 Aftonshire Dr/Arran Lake Apt., 5 Loch Ness Court, 5 VanStory St., 5 Louise Circle. Proposed Elevation or Mitigation Reconstruction of 520 floodprone units - 140 Paisley Rd, 140 Wildwood Dr, 100 Historic District, 140 Robeson St.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	Hundreds to thousands of homes were impacted by Hurricane Matthew flooding in Cumberland County including many that are located in the City of Fayetteville. Many of the homes proposed in this project are the highest risk from future flooding. This project will help make the City of Fayetteville more resilient.	N/A
Consistent with existing plans (describe points of intersection/departure)	Mitigation individual housing is supported in 2016 Cumberland-Hoke Regional Hazard Mitigation Plan for all Cumberland County jurisdictions(Action # 8): Also provide incentives for making buildings safer from wind flooding more energy and water efficient and healthier to live in.	N/A
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	N/A
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	N/A
Explain any benefits or impacts to the economy of the county from this project.	Floodprone homes start to lose value and result in less tax revenue base. While acquisition will remove homes from the local tax base it will be replaced by permanent open space which could be used as parkland creating an amenity. Elevation and Mitigation Reconstruction projects will increase the value of the home.	N/A
For how long will this solution be effective?	More than 50 years	N/A
How effective is the risk reduction?	>200 year event	N/A
How many public facilities are involved in this project (buildings and infrastructure)?	0	N/A
Is coordination with other communities/counties needed to complete this project?	No	N/A
Is this project consistent with Federal Laws	Yes	N/A
To what degree does this project adversely impact local floodplain/coastal zone management?	No Impact	N/A
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	High confidence	N/A
What impact will this action have on the local economy/tax base?	Less than 25%	N/A
What impacts to the environment of the county will result from this project?	Creates more open space for water storage wildlife habitat and recreational use. There will be less flood-soaked	N/A

	contents and structural material that will need to be disposed of.	
What is the capability of the local government to administer this project?	Medium	N/A
What is the financial range of this project?	\$1M+	N/A
What is the level of public support for this project?	High	N/A
What is the technical feasibility of this project?	Higher than 75%	N/A
Who will administer this project?	Local	N/A

H2: Cumberland County Acquisition, Elevation, or Mitigation Reconstruction

County: Cumberland

Priority Grouping: High Priority

Priority Ranking: 3

Project Timeframe: 24-36 months

Location: Multiple locations: Lena Rd at Sunnydale Rd., Main St., Dogwood Court, Carol St, Point East Subdivision, Mill Bridge (Hope Mills), Manchester at Bragg Blvd (Spring Lake)

Project Summary: Mitigation of homes that were damaged after Hurricane Matthew and at high risk from future flooding. Proposed Acquisition of 25 mobile homes at Lena Rd/Sunnydale Rd.(mobile homestotal loss with 6 feet of water), Elevation or MT Reconstruction at: Main St. - 40 units, Dogwood Court - 20 units, Carol St - 15 units, Point East Subdivision - 87 units, Mill Bridge (Hope Mills) - 30 units, Manchester at Bragg Blvd (Spring Lake) - 30 units

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	Hundreds to thousands of homes were impacted by Hurricane Matthew flooding in Cumberland County. Many of the homes proposed in this project are the highest risk from future flooding. This project will help make the County more resilient.	N/A
Consistent with existing plans (describe points of intersection/departure)	Mitigation individual housing is supported in 2016 Cumberland-Hoke Regional Hazard Mitigation Plan for all Cumberland Co jurisdictions (Action # 8): Also provide incentives for making buildings safer from wind flooding more energy and water efficient and healthier to live in.	Agree
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	Agree
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	Agree
Explain any benefits or impacts to the economy of the county from this project.	Floodprone homes start to lose value and result in less tax revenue base. While acquisition will remove homes from the local tax base it will be replaced by permanent open space which could be used as parkland creating an amenity. Elevation and Mitigation Reconstruction projects will increase the value of the home.	Agree
For how long will this solution be effective?	More than 50 years	Agree
How effective is the risk reduction?	>200 year event	Agree
How many public facilities are involved in this project (buildings and infrastructure)?	0	Agree
Is coordination with other communities/counties needed to complete this project?	No	Agree
Is this project consistent with Federal Laws	Yes	Agree
To what degree does this project adversely impact local floodplain/coastal zone management?	No Impact	Agree
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	High confidence	N/A
What impact will this action have on the local economy/tax base?	Less than 25%	Agree
What impacts to the environment of the county will result from this project?	Creates more open space for water storage wildlife habitat and recreational use. There will be less flood-soaked contents and structural material that will need to be disposed of.	N/A

What is the capability of the local government to administer this project?	Medium	Agree
What is the financial range of this project?	\$1M+	Agree
What is the level of public support for this project?	High	Agree
What is the technical feasibility of this project?	Higher than 75%	Agree
Who will administer this project?	County	Agree

- Fayetteville/Cumberland County Housing Rehabilitation Assistance:** Approximately 90 percent of the damage in Cumberland County to homes occurred outside the SFHA. This situation has imperiled the ability of these homeowners to stay in and fix their homes, since most of them do not carry flood insurance and do not have financial resources to repair their homes—many of these homeowners may be facing bankruptcy. Via loan or grant, the county proposes to provide property owners with extensive damage outside the Special Flood Hazard Area (SFHA) funds equivalent to the damages incurred. Numbers and locations to be determined.

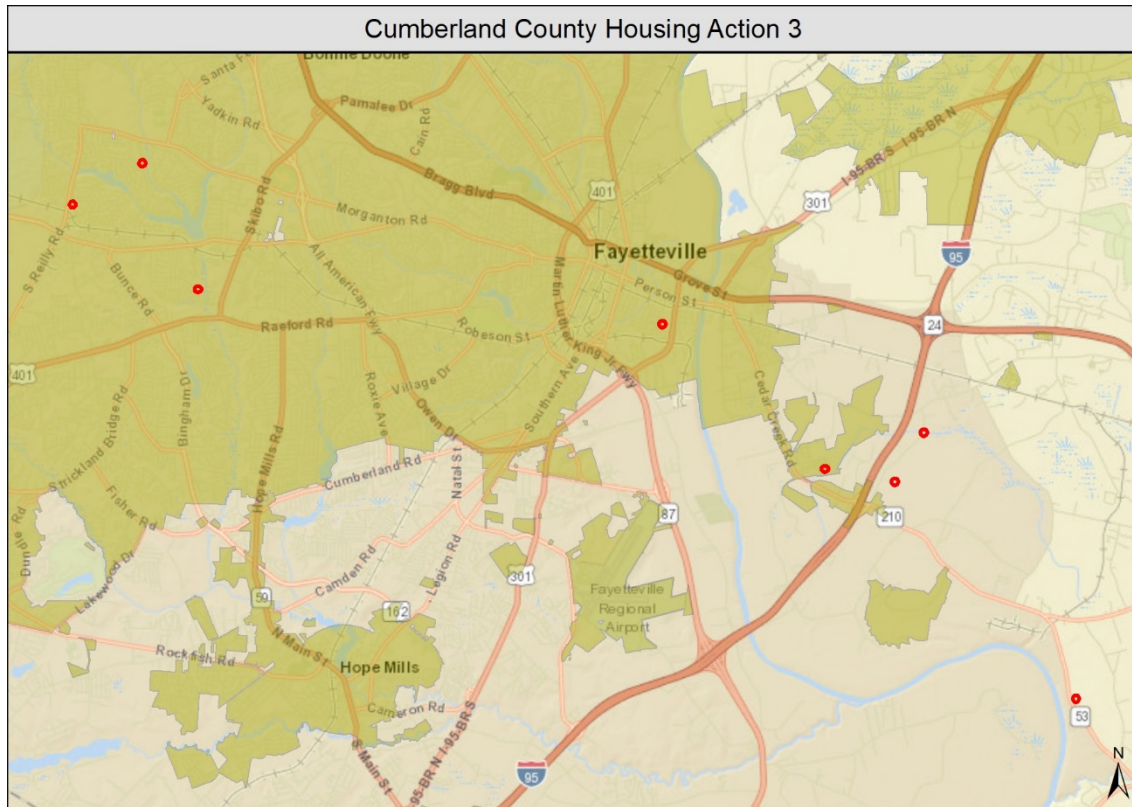


Figure 16. Housing Action 3 - Fayetteville/Cumberland County Housing Rehabilitation Assistance

H3: City of Fayetteville and Cumberland County Housing Rehab Loan Assistance

County: Cumberland

Priority Grouping: High Priority

Priority Ranking: 4

Project Timeframe: 24 months

Location: County 1. Cedar Creek neighborhood – 250 units, 2. Judson Church Rd - 8 units, 3. Jim Johnson Rd - 15 units 4. Bombay Dr. - 40 units. Fayetteville: 1. Hollywood Hts. – 18 units, 2. Old Wilmington Rd – 80 units, 3. Devonwood Neighborhood – 18 units

Project Summary: Many homeowners outside the 100-year floodplain had their homes severely damaged by Matthew. Most do not carry flood insurance and do not have financial resources to repair their homes and may be facing bankruptcy. Grants or 0% loans can help repair home and restore some financial equilibrium.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	Flooding outside the SFHA from excessive rainfall and swollen creeks and rivers caused flooding of residential properties. A lack of flood insurance because it was not mandatory has led to financial distress and inability to repair homes. Having to still pay mortgages on uninhabitable homes creates mounting debt which is the leading cause of foreclosure and loss of homes.	N/A
Consistent with existing plans (describe points of intersection/departure)	Supports Action #4 from the Cumberland part of the Cumberland-Hoke Regional Hazard Mitigation Plan about removing barriers to recovery for socially vulnerable populations. These loans are intended for low and mod income families who are on the verge of foreclosure. The stabilization of these families are central to the County and City affordable housing strategy. Reduction of vacancies reduces vandalism and fire.	N/A
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	N/A
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	N/A
Explain any benefits or impacts to the economy of the county from this project.	These loans are intended to stabilize low and mod income families thereby preserving their disposable income for spending on consumables that drive the local economy. The stabilization of the housing stock maintains the tax base. Neighborhoods filled with homes in foreclosure cannot support the local business centers. Rehab loans encourage reinvestment in the community and eliminate liability risk and health hazards.	N/A
For how long will this solution be effective?	Between 11 and 30 years	N/A
How effective is the risk reduction?	<50 year event	N/A
How many public facilities are involved in this project (buildings and infrastructure)?	0	N/A
Is coordination with other communities/counties needed to complete this project?	No	N/A
Is this project consistent with Federal Laws	Yes	N/A
To what degree does this project adversely impact local floodplain/coastal zone management?	No Impact	N/A
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Medium to high confidence	N/A

What impact will this action have on the local economy/tax base?	Between 26 and 50%	N/A
What impacts to the environment of the county will result from this project?	The positive impact will be higher occupancy in the existing environment and less sprawl.	N/A
What is the capability of the local government to administer this project?	Medium	N/A
What is the financial range of this project?	\$1M+	N/A
What is the level of public support for this project?	High	N/A
What is the technical feasibility of this project?	Higher than 75%	N/A
Who will administer this project?	County	N/A

- Fayetteville Affordable Housing Supply:** Large-scale disasters like Hurricane Matthew generally impact low-income housing the most and greatly diminish the supply of affordable housing in the area, forcing low- to moderate-income (LMI) populations to move out of the area. This type of exodus has a negative impact on businesses dependent on the LMI workforce, while also creating a hardship on people who can afford it the least. Units occupied by the LMI community will be more resilient to flooding/storms by repairing, protecting, or relocating/locating resilient housing stock. Locations include the Mt. Sinai Apartments and the North Carolina Indian Housing Authority Eagles Nest Apartments on Indian Creek Road. It is envisioned by Cumberland County that it would partner with a Voluntary Organizations Active in Disaster (VOAD) to incorporate voluntary labor to help stretch the available funding in order to rehabilitate as much housing as possible. The County would manage the project but work with the VOAD to provide labor to also help meet any non-federal match. The County would also investigate the possibility of donated materials and bulk purchasing to reduce costs.

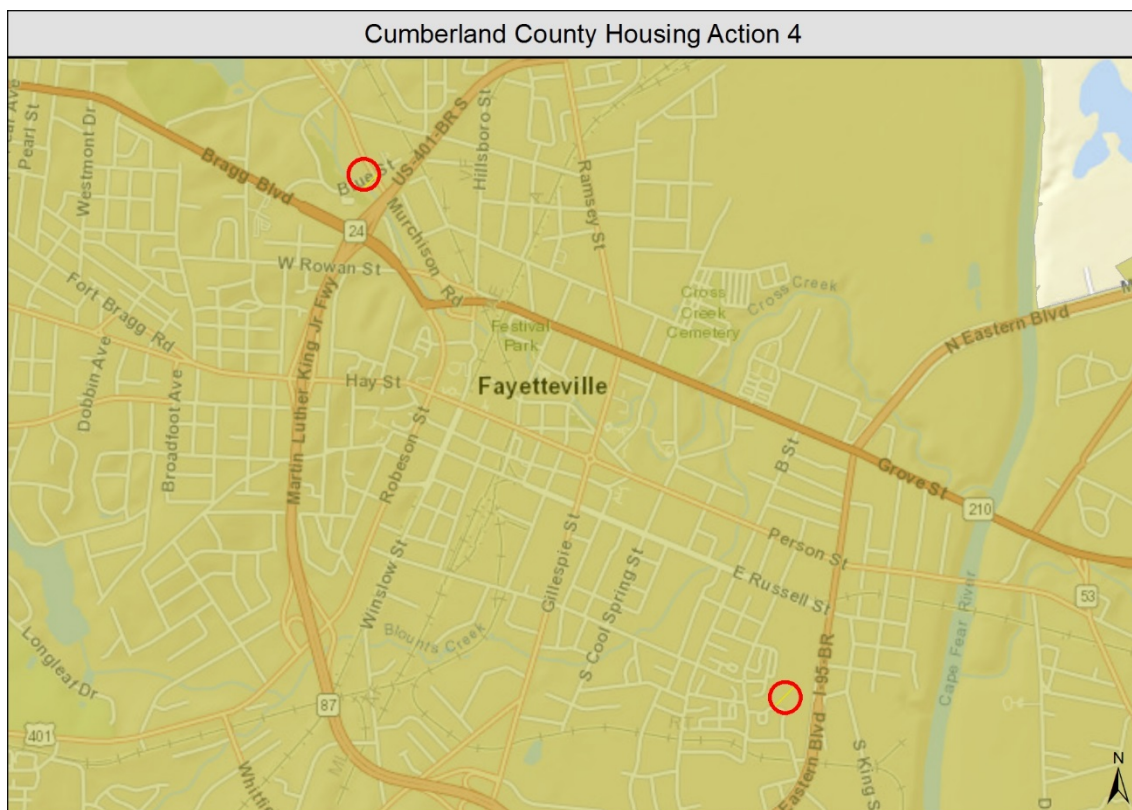


Figure 17. Housing Action 4 - Fayetteville Affordable Housing Supply

H4. Fayetteville Affordable Housing Supply

County: Cumberland

Priority Grouping: High Priority

Priority Ranking: 5

Project Timeframe: 24 months

Location: Project locations so far: Fayetteville; Old Wilmington Road and Mount Sinai Apartments at 703 Blue Street.

Project Summary: There is a need for more affordable housing in post flood situations. New and rehabilitated housing should be built in areas that fully utilize the infrastructure in-place or under construction, e.g. consistent with the growth plan.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	Large-scale disasters like Matthew generally impact low-income housing the most and greatly diminish the supply of affordable housing in the area forcing LMI populations to move out of the area. This has a negative impact on businesses dependent on LMI workforce as well as creating a hardship on people who can afford it the least. Units occupied by the LMI community will be more resilient to flooding/storms by repairing/protecting/building resilient housing stock.	N/A
Consistent with existing plans (describe points of intersection/departure)	Low income and affordable housing is a key issue in the 2030 Growth Plan for Cumberland County and the City of Fayetteville. Affordable housing needs met by smaller accessory units (garage apartments granny flats apartments over shops or small clusters of multifamily housing) rather than concentrated complexes. Also helps meet Action from Cumberland-Hoke HMP that seeks to remove impediments to recovery for socially vulnerable populations.	N/A
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	N/A
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	N/A
Explain any benefits or impacts to the economy of the county from this project.	Previously vacant commercial and residential buildings will be renovated and adapted for use as innovative housing and retrofitted by small business contractors to be energy efficient.	N/A
For how long will this solution be effective?	Between 11 and 30 years	N/A
How effective is the risk reduction?	<50 year event	N/A
How many public facilities are involved in this project (buildings and infrastructure)?	0	N/A
Is coordination with other communities/counties needed to complete this project?	No	N/A
Is this project consistent with Federal Laws	Yes	N/A
To what degree does this project adversely impact local floodplain/coastal zone management?	No Impact	N/A
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Medium to high confidence	N/A
What impact will this action have on the local economy/tax base?	Less than 25%	N/A
What impacts to the environment of the county will result from this project?	Minor clean-up on sites and potentially introduction of some alternative energy.	N/A

What is the capability of the local government to administer this project?	Medium	N/A
What is the financial range of this project?	\$501K - \$1M	N/A
What is the level of public support for this project?	Medium	N/A
What is the technical feasibility of this project?	Between 51 and 75%	N/A
Who will administer this project?	Local	N/A

There are no Cumberland County housing strategies that are a moderate or low priority.

Economic Development Strategies

In terms of economic development strategies in Cumberland County, the planning team worked with local county officials to examine several ways to increase resiliency for future storm events, build on current assets, be opportunistic, and encourage economic growth. There are no high priority economic development strategies.

Moderate Priority Economic Development Strategies

Pillar	Strategy/Action Name	Priority	Overall Ranking
Economic Development	Cumberland County Qualified Local Contractor Program for Reconstruction	Moderate	11
Economic Development	Fayetteville Downtown Revitalization	Moderate	13

Table 9. Cumberland Moderate Priority Economic Development Summary

These projects represent the economic development strategies that Cumberland County indicated is of a moderate priority to address. Additional detail on the strategies can be found below:

- Cumberland County Qualified Local Contractor Program for Reconstruction:** The City of Fayetteville and Cumberland County are applying for grants to help hundreds to thousands of homeowners with repairs and mitigation improvements post-Hurricane Matthew. This project would establish a qualified local contractor program that can provide the needed repair and mitigation services when these grants are awarded to property owners. It also can be used for PA work. This project will benefit local workers, who also may have been impacted by Hurricane Matthew, by providing a screened and qualified labor pool for homeowners to select from, reducing opportunities for fraud. It also could be used as a model for neighboring counties.

EC2. Cumberland County Qualified Local Contractor Program for Reconstruction

County: Cumberland

Priority Grouping: Medium Priority

Priority Ranking: 11

Project Timeframe: 2-6 months (it should start quickly to get ahead of the wave of improvements).

Location: Countywide - no specific locations so no maps

Project Summary: The City of Fayetteville and Cumberland County are applying for grants to help hundreds to thousands of homeowners with repairs and mitigation improvements post-Hurricane Matthew. This project is to establish a qualified local contractor program that can provide the needed repair and mitigation services once these grants are awarded to property owners. It can also be used for PA work. This will benefit local workers, who may have also been impacted by Matthew, and provides a screened and qualified labor pool for homeowners to select from, reducing opportunities for fraud. It could also be used as a model for neighboring counties like Robeson, Hoke, Harnett, Sampson and Bladen.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	As post-disaster reconstruction continues qualifying local contractors to do this work is an excellent opportunity to steer qualified local workers to help homeowners in the construction process while keeping the funding in local hands thereby boosting the local economy. The effort will support the LMI recovery and use of disadvantaged contractors. The State Legislature in 12/2016 recognized that this disaster had a disproportionate impact on the poorer people within the impacted counties.	N/A
Consistent with existing plans (describe points of intersection/departure)	Both the City and the County have economic goals for minority and disadvantaged business participation in government funded projects; this would align well with those goals while broadening it to other qualified local businesses as well.	N/A
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	N/A
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	N/A
Explain any benefits or impacts to the economy of the county from this project.	This has a huge benefit to the local economy by facilitating a process that qualifies local contractors to play a large role in post-Matthew reconstruction. It helps keep the disaster recovery construction funding in local hands as long as the contractors are qualified to do the work. These opportunities give local small business a chance to build their resume of government work.	N/A
For how long will this solution be effective?	More than 50 years	N/A
How effective is the risk reduction?	50-100 year event	N/A
How many public facilities are involved in this project (buildings and infrastructure)?	>6	N/A
Is coordination with other communities/counties needed to complete this project?	Yes	N/A
Is this project consistent with Federal Laws	Yes	N/A
To what degree does this project adversely impact local floodplain/coastal zone management?	No Impact	N/A

To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Medium to high confidence	N/A
What impact will this action have on the local economy/tax base?	Between 26 and 50%	N/A
What impacts to the environment of the county will result from this project?	Using local qualified contractors as much as possible reduces the need to bring in workers from out of the area; this cuts down on travel and need for fuel consumption resulting in cleaner air.	N/A
What is the capability of the local government to administer this project?	Low	N/A
What is the financial range of this project?	\$251K - \$500K	N/A
What is the level of public support for this project?	High	N/A
What is the technical feasibility of this project?	Higher than 75%	N/A
Who will administer this project?	Regional	N/A

- Fayetteville Downtown Revitalization:** Disasters stall and sometimes cause on-going downtown revitalization efforts to decline because small businesses that populate downtowns can quickly go out of business. By reinvesting in a pleasant, walkable, urban environment, shop owners are inspired to get back in the market. Great opportunities exist to encourage retirees and millennials to move into the affordable downtown units, bringing new life to the urban streets and making the city more economically resilient. Downtown revitalization and affordable “above the shop” housing could work well in the CBD District, Murchison Road, Center City Action Park, Williams Street Business District, River Walk/Festival Park to Botanical Gardens (eco-tourism).

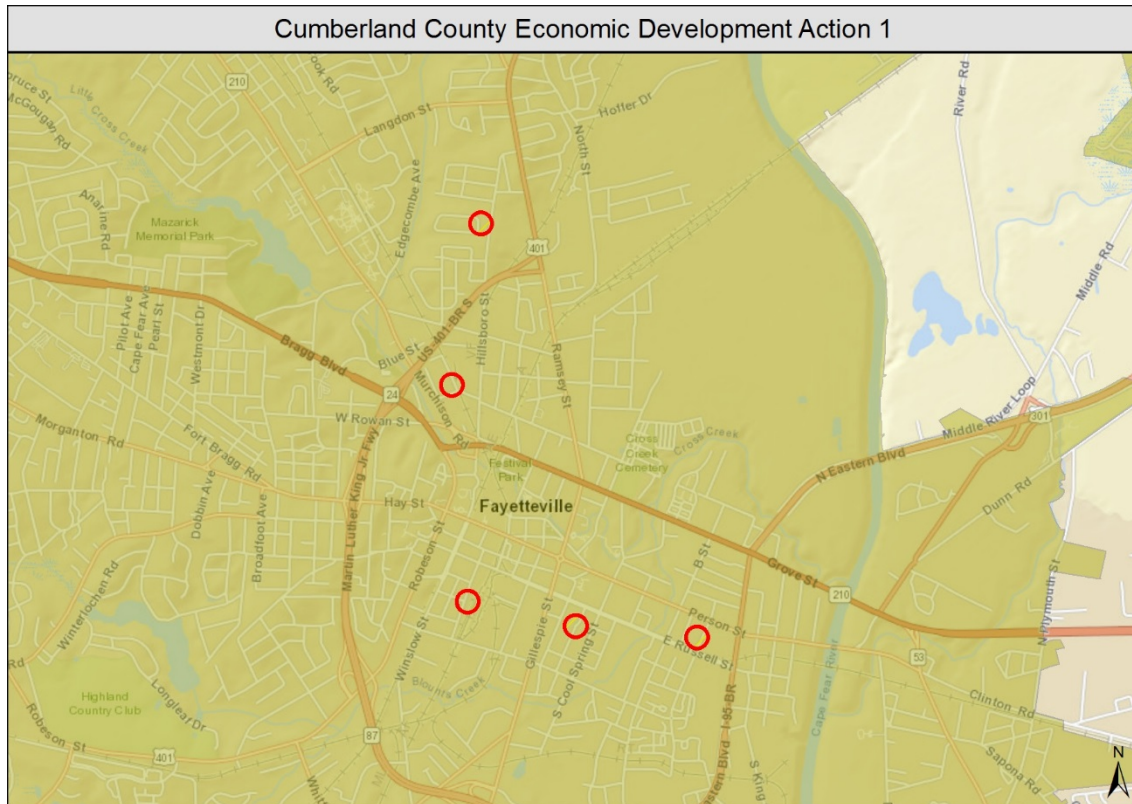


Figure 18. Economic Development Action 1 - Fayetteville Downtown Revitalization

EC1.Economic Development – Downtown Fayetteville and Corridor Revitalization

County: Cumberland

Priority Grouping: Medium Priority

Priority Ranking: 13

Project Timeframe: 12-24 months

Location: Downtown Fayetteville efforts in: 1) Downtown Historic District; 2) Market House Square; 3) Liberty Row. Corridor revitalization efforts: 1) Murchison Road; 2) Center City Action Park; 3) Williams St., 4) River Walk

Project Summary: Downtown Revitalization and Affordable 'above the shop' Housing: The CBD District, Murchison Road, Center City Action Park, Williams St. Business District, River Walk - Festival Park to Botanical Gardens (eco-tourism).

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	Disasters stall and sometimes cause on-going downtown revitalization efforts to decline because small businesses that populate downtowns can quickly go out of business. By reinvesting in a pleasant walkable urban environment the shop owners are encouraged get back in the market. There exists great opportunities to capture retirees and millennials to move into the affordable downtown units bringing new life to the urban streets and making the city more economically resilient.	N/A
Consistent with existing plans (describe points of intersection/departure)	Consistent with Southeastern NC CEDS' Goal #3: Create Revitalized and Vibrant Communities. 2030 Growth Vision Plan Policies and Actions November 2008: Create affordable housing options and make use of existing building stock. Provide residential options in walkable environments like downtown and provide amenities for residents and visitors.	Agree
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	Agree
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	Agree
Explain any benefits or impacts to the economy of the county from this project.	New investment in the Cape Fear River corridor including trails along the river has complemented downtown revitalization efforts especially east of the Market House - new residential and business development has been drawn to the area.	Agree
For how long will this solution be effective?	Between 31 and 50 years	Agree
How effective is the risk reduction?	<50 year event	Agree
How many public facilities are involved in this project (buildings and infrastructure)?	>6	Agree
Is coordination with other communities/counties needed to complete this project?	No	Agree
Is this project consistent with Federal Laws	Yes	Agree
To what degree does this project adversely impact local floodplain/coastal zone management?	No Impact	Agree
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Medium to high confidence	N/A
What impact will this action have on the local economy/tax base?	Between 26 and 50%	Agree
What impacts to the environment of the county will result from this project?	Less storm water runoff and pollution due in part to policies on low impact design tree preservation protection of	N/A

	wetlands landscaped parking areas and vegetated buffer strips adjoining stream channels and roadsides. New clustered and mixed use development strategies generate fewer land use conflicts less sprawl and less traffic congestion	
What is the capability of the local government to administer this project?	Medium	Agree
What is the financial range of this project?	\$1M+	Agree
What is the level of public support for this project?	Medium	Agree
What is the technical feasibility of this project?	Higher than 75%	Agree
Who will administer this project?	Local	Agree

Low Priority Economic Development Strategies

Pillar	Strategy/Action Name	Priority	Overall Ranking
Economic Development	Cumberland County Agricultural Alternative Energy Supply	Low	17

Table 10. Cumberland Low Priority Economic Development Summary

This project represents the economic development strategy that Cumberland County indicated is of a low priority to address. Additional detail on the strategy can be found below:

- Cumberland County Agricultural Alternative Energy Supply:** Overall, back-up, supplemental, and redundant power is needed to ensure livestock have sufficient water and food supply when the main power grid and distribution lines are shut down. Install power generators with cogeneration capacity at large-scale locations. Power supply for cogeneration can include bio materials like animal waste.

EC3. Cumberland County Agricultural Alternative Energy Supply

County: Cumberland

Priority Grouping: Low Priority

Priority Ranking: 17

Project Timeframe: 12 -24 months

Location: Cumberland County - large scale farms. Locations TBD so no maps at this point.

Project Summary: Overall, back-up, supplemental and redundant power is needed to ensure livestock have sufficient water and food supply when the main power grid and distribution lines are shut down. Install Power Generator with cogeneration capacity at large scale locations. Power supply for cogeneration can include bio materials like animal waste.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	The pumps that supplied the water to the hen houses were interrupted long enough to dehydrate the animals. Huge die-offs of poultry were reported after Hurricane Matthew.	N/A
Consistent with existing plans (describe points of intersection/departure)	This alternative energy strategy will allow SE Cumberland to remain a productive agricultural region which is a goal of the Regional Economic Development plan for the region. The City of Fayetteville supports this principle ... embrace differences found in development practices for rural versus urban areas. The use of animal waste for energy will help reduce the amount that could contaminate ambient water quality including the Cape Fear River which has been labeled as endangered.	N/A
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	N/A
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	N/A
Explain any benefits or impacts to the economy of the county from this project.	Hog farms have as many as 5000 head on one farm. This project will transform hog poultry and other agricultural animal waste into energy sources and a managed asset rather than sit idle in fields. Economic development plans call for: Directing new development away from prime agricultural areas significant open spaces and environmentally sensitive lands which is achieved through control of provision of utilities.	N/A
For how long will this solution be effective?	Between 11 and 30 years	N/A
How effective is the risk reduction?	<50 year event	N/A
How many public facilities are involved in this project (buildings and infrastructure)?	0	N/A
Is coordination with other communities/counties needed to complete this project?	No	N/A
Is this project consistent with Federal Laws	Yes	N/A
To what degree does this project adversely impact local floodplain/coastal zone management?	No Impact	N/A
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	High confidence	N/A
What impact will this action have on the local economy/tax base?	Less than 25%	N/A
What impacts to the environment of the county will result from this project?	Helps make use of animal waste that could potentially contaminate nearby protected bodies of water like the Cape	N/A

	Fear River if flooded again. It will have a positive impact on water quality by providing another use for animal waste that would otherwise remain in large concentrations vulnerable to future storms.	
What is the capability of the local government to administer this project?	Medium	N/A
What is the financial range of this project?	\$501K - \$1M	N/A
What is the level of public support for this project?	Medium	N/A
What is the technical feasibility of this project?	Between 51 and 75%	N/A
Who will administer this project?	County	N/A

Infrastructure Strategies

Protecting critical facilities and key routes needed to foster community resiliency, sustainability, and safety before, during, and after disasters is the purpose of the strategies developed for Cumberland County’s infrastructure. Dam failures, power loss, and flooded critical facilities were huge issues for Cumberland County and its municipalities. These strategies are essential in protecting citizen and community well-being, while augmenting an effective recovery from a potential future storms like Hurricane Matthew. In working with local officials, the planning team developed multiple infrastructure strategies.

High Priority Infrastructure Strategies

Pillar	Strategy/Action Name	Priority	Overall Ranking
Infrastructure	Critical Facilities Flood Protection (Fayetteville, Spring Lake/Hope Mills, PWC)	High	1
Infrastructure	Critical Facilities Backup Power	High	2
Infrastructure	City/County PWC Resilient Power (Microgrid)	High	6
Infrastructure	Fayetteville/Cumberland County Dam Rehabilitation and Replacement	High	7

Table 11. Cumberland High Priority Infrastructure Summary

These projects represent the infrastructure strategies that Cumberland County indicated is of a high priority to address. Additional detail on the strategies can be found below:

- Fayetteville, Spring Lake/Hope Mills, and PWC Critical Facilities Flood Protection:** The primary government facilities for Fayetteville and the county are located downtown in a topographically low area that floods often. During Hurricane Matthew, the water was several feet deep and the roads became impassable. This project would provide an upgrade to the existing stormwater system to help it address peak flood volumes. This strategy also includes a component to provide the Cape Fear Valley Medical Center on Owen Street with its own redundant water system composed of a well, pump system, and water tower to avoid a loss of potable water that occurred after Hurricane Matthew that almost led to a costly and traumatic evacuation.

Flooding of the Spring Lake Wastewater Treatment Plant occurs regularly after major storms and infiltration causes the system to fail. To prevent future damage and contamination, drainage improvements—including floodproofing of manhole covers, which will protect the sewer system from stormwater inundation and subsequent pollution at the Plant—are needed. The Hope Mills Cotton Volunteer Fire Department on Calico Street and its access road also are repetitively flooded; this issue will only be resolved by relocation. This project will help preserve the fire department's critical role in handling emergencies.

The PWC Operations Center site was flooded to a depth of 4.5 feet above ground level and buildings were inundated—for example, the Electric Meter Shop suffered \$600,000 in damage. Nine PWC Fleet Vehicles were lost due to flooding. At the two Water Reclamation Facilities, effluent outfall structures were undercut by erosion and washed out during flooding. The damaged outfalls leaked effluent onto adjacent properties and into streams. This project would provide flood protection at multiple PWC facilities to help maintain the critical utility services these sites provide after a storm. Exact measures are to be determined, but could include elevating electrical equipment, relocating functions of the flood zone, floodproofing, and building ring berms.

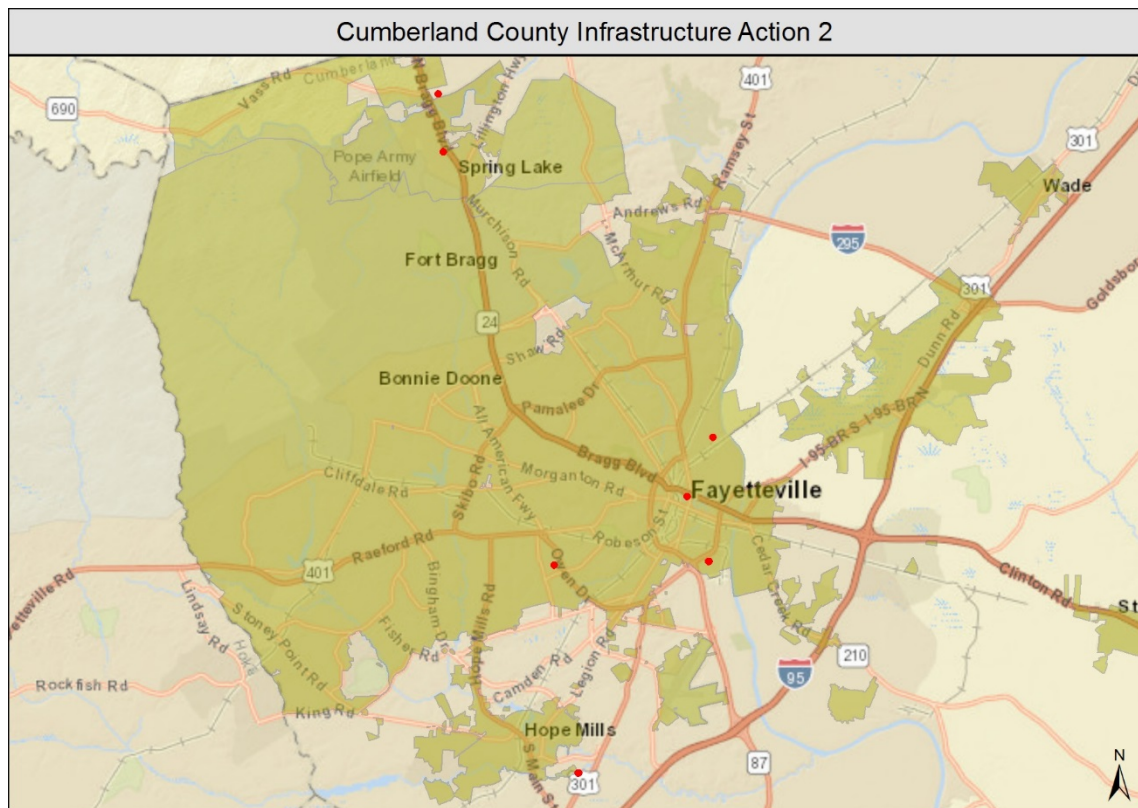


Figure 19. Infrastructure Action 2 - Fayetteville, Spring Lake/Hope Mills, and PWC Critical Facilities Flood Protection

I.2.F Fayetteville Critical facilities Flood Protection (Downtown & Cape Fear Valley Med Ctr)

County: Cumberland

Priority Grouping: High Priority

Priority Ranking: 1

Project Timeframe: 24 months

Location: Downtown centered on the Greene St. Area; the Cape Fear Valley Medical Center is at 1638 Owen Dr, Fayetteville

Project Summary: The primary government facilities for Fayetteville and the County are located downtown in a topographic low area that collects water and floods at times. A stormwater system was designed and built based on the city footprint at the time but increased urbanization has made it insufficient for current needs. With new growth the system is inadequate to handle storm conditions. The Cape Fear Valley Medical Center on Owen Street has no alternative water supply other than the municipal water and it had to rely on bottled water to function after Matthew. It nearly had to evacuate which is a costly and traumatic process. It's own redundant water system composed of a well, pump system and water tower is needed to avoid this type of impact in the future.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	Downtown Fayetteville the economic hub of the city with many critical government facilities flooded badly post-Matthew. The City has never had the resources to tackle the historic drainage problem adequately and continues to provide 'fixes-as-necessary'. The hospital almost had to evacuate because of the lack of potable water. This project will help maintain functionality of these critical facilities and operations after disasters as well as avoiding costly flood damages.	N/A
Consistent with existing plans (describe points of intersection/departure)	Consistent with the Cumberland Hoke Hazard mitigation Plan (Cumberland Action 3: Conduct a countywide infrastructure vulnerability assessment to identify priority needs for updating ill-designed or outdated critical structures) and Flood Plain management section of the Fayetteville City Code. Endorsed by City planning and PWC.	Agree
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	Agree
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	Agree
Explain any benefits or impacts to the economy of the county from this project.	Flooding in the Central Business District downtown disrupted the continuity of agencies responsibilities city-wide and regionally producing general slow-down for the economy. Flood mitigation downtown encourages more investment and private sector upgrades of historic buildings. The Hospital becomes a durable trauma center which can handle regional storm emergencies.	Agree
For how long will this solution be effective?	Between 31 and 50 years	Agree
How effective is the risk reduction?	50-100 year event	Agree
How many public facilities are involved in this project (buildings and infrastructure)?	>6	Agree
Is coordination with other communities/counties needed to complete this project?	No	Agree
Is this project consistent with Federal Laws	Yes	Agree
To what degree does this project adversely impact local floodplain/coastal zone management?	No Impact	Agree

To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Medium to high confidence	N/A
What impact will this action have on the local economy/tax base?	Between 51 and 75%	Agree
What impacts to the environment of the county will result from this project?	Agencies that protect the environment were impacted when their central city offices flooded.	N/A
What is the capability of the local government to administer this project?	Medium	Agree
What is the financial range of this project?	\$1M+	Agree
What is the level of public support for this project?	High	Agree
What is the technical feasibility of this project?	Higher than 75%	Agree
Who will administer this project?	Local	Agree

12.O Hope Mills and Spring Lake Critical Facilities Flood Protection

County: Cumberland

Priority Grouping: High Priority

Priority Ranking: 1

Project Timeframe: 24 months

Location: Hope Mills Fire Dept Building at 4618 Calico St.; and the Spring Lake Wastewater Treatment Plant off East Manchester Road.

Project Summary: The Cotton Volunteer Fire Department on Calico Street flooded and the access road washed out. There was scouring of the foundation and relocation is proposed. The Spring Lake Water Treatment Facility site was inundated with flood waters and the site is in need of a drainage improvements including floodproofing of manhole covers which will protect the sewer system from stormwater inundation and subsequent pollution.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	Flooding of the Wastewater Treatment Plant occurs regularly after major storms and infiltration causes the system to fail. The Town of Spring Lake is growing and this problem will continue into the future. To prevent future damage and contamination this project needs to be funded and implemented. The Hope Mills Fire Department flooding is also repetitive and will only really be resolved by relocation. This project will help preserve the fire department's critical role in handling emergencies	N/A
Consistent with existing plans (describe points of intersection/departure)	This project is consistent with Cumberland Action #s (all jurisdictions in the county) from the Cumberland-Hoke HMP: Conduct a countywide infrastructure vulnerability assessment to identify priority needs for updating ill-designed or outdated critical structures. The mixing of the effluent and storm water is a major health concern for Cumberland County.	N/A
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	N/A
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	N/A
Explain any benefits or impacts to the economy of the county from this project.	Flooding disrupted the continuity of agencies responsibilities city-wide producing general slow-down for the economy. The delay in emergency response could be a major economic problem in the future.	N/A
For how long will this solution be effective?	Between 31 and 50 years	N/A
How effective is the risk reduction?	50-100 year event	N/A
How many public facilities are involved in this project (buildings and infrastructure)?	1-3	N/A
Is coordination with other communities/counties needed to complete this project?	No	N/A
Is this project consistent with Federal Laws	Yes	N/A
To what degree does this project adversely impact local floodplain/coastal zone management?	No Impact	N/A
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Medium to high confidence	N/A

What impact will this action have on the local economy/tax base?	Between 26 and 50%	N/A
What impacts to the environment of the county will result from this project?	Mixing of the sewage and storm water during Hurricane was widespread due to both the site inundation and the infiltration through the sewer vents. This sewage contamination created a public health hazard.	N/A
What is the capability of the local government to administer this project?	Low	N/A
What is the financial range of this project?	\$1M+	N/A
What is the level of public support for this project?	High	N/A
What is the technical feasibility of this project?	Between 51 and 75%	N/A
Who will administer this project?	Local	N/A

12.P Public Works Commission (PWC) Critical facilities Flood Protection

County: Cumberland

Priority Grouping: High Priority

Priority Ranking: 1

Project Timeframe: 24 months

Location: Flood protection at Stormwater Control Operation Center, 955 Old Wilmington Road,; PWC Operations Center, the Rockfish Water Reclamation Facility and PO Hoffer Water Treatment Plant

Project Summary: Provide flood protection at multiple PWC facilities (PWC provides many utilities including power in much of Cumberland County) to avoid damages and keep utilities operational after a storm. Exact measures to be determined but could include elevating electrical equipment, relocating functions of the flood zone, floodproofing, and ring berms. The Ops Center site was flooded to 4.5 feet above ground level and buildings were inundated, e.g. the Electric Meter Shop suffered \$600,000 in damage. Nine PWC Fleet Vehicles were lost due to flooding. Emergency Vehicles stalled in the high water, while trying to access the facility fuel pumps. Effluent outfall structures, at the two Water Reclamation Facilities, were undercut by erosion and washout during flooding. The damaged outfalls leaked effluent onto adjacent properties and into streams. The high flood waters washed away rip rap that had been placed there to protect outfalls from erosion.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	Hurricane Matthew caused significant damage to these PWC facilities which in turn affected businesses and residents. Flood protection is needed at these facilities to make PWC more resilient and able to maintain operations that the whole community is dependent on after a disaster.	N/A
Consistent with existing plans (describe points of intersection/departure)	PWC Resilient Redevelopment Plan - Conduct a Stormwater Study of this Facility to determine ways of improving drainage possibly adding a reservoir and a master pumping station; Design/build a more robust erosion control system around the critical flood control infrastructure. Consistent with Action #1 of Cumberland-Hoke HMP: Conduct a countywide infrastructure vulnerability assessment to identify priority needs for updating ill-designed or outdated critical structures.	Agree
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	Agree
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	Agree
Explain any benefits or impacts to the economy of the county from this project.	PWC provides basic utilities that keep businesses going. The operations complex is used by both PWC and City of Fayetteville Vehicles. These Fleet Maintenance Facility provides vehicle repair for both PWC and all City Emergency Response Vehicles. City vehicles also use this facility for refueling of vehicles. When the site was flooded government to business collaboration came to a halt.	Agree
For how long will this solution be effective?	More than 50 years	Agree
How effective is the risk reduction?	50-100 year event	Agree
How many public facilities are involved in this project (buildings and infrastructure)?	4-6	Agree
Is coordination with other communities/counties needed to complete this project?	No	Agree
Is this project consistent with Federal Laws	Yes	Agree
To what degree does this project adversely impact local floodplain/coastal zone management?	No Impact	Agree

To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Medium to high confidence	N/A
What impact will this action have on the local economy/tax base?	Between 26 and 50%	Agree
What impacts to the environment of the county will result from this project?	Agencies that protect the environment from sewage contamination and other utility cascading disaster effects were impacted when the Ops Center site flooded. The redesign of the water treatment outfalls will stop effluent from mixing with storm water runoff that eventually pollutes the natural water courses.	N/A
What is the capability of the local government to administer this project?	Medium	Agree
What is the financial range of this project?	\$1M+	Agree
What is the level of public support for this project?	High	Agree
What is the technical feasibility of this project?	Between 51 and 75%	Agree
Who will administer this project?	Regional	Agree

- Critical Facilities Backup Power:** One of the primary impacts from Hurricane Matthew was widespread power loss, including to critical facilities. A loss of drinking water and/or emergency operations capability is a severe impact that can endanger public health and force evacuations or costly measures such as bringing in potable water to respond to the event. This project would provide backup power to several critical facilities in Cumberland County. Without power at the Glenville Water Plant and School Road Water Tower, pressure dropped below 20 pounds per square inch (PSI); the water source was contaminated by E. coli bacteria. Critical operation centers in Hope Mills and Spring Lake also were without power, which hindered emergency operations. This project would provide these critical facilities, upon which the whole community depends, with adequate backup power systems like generators to keep them functional during storm events and recovery periods.

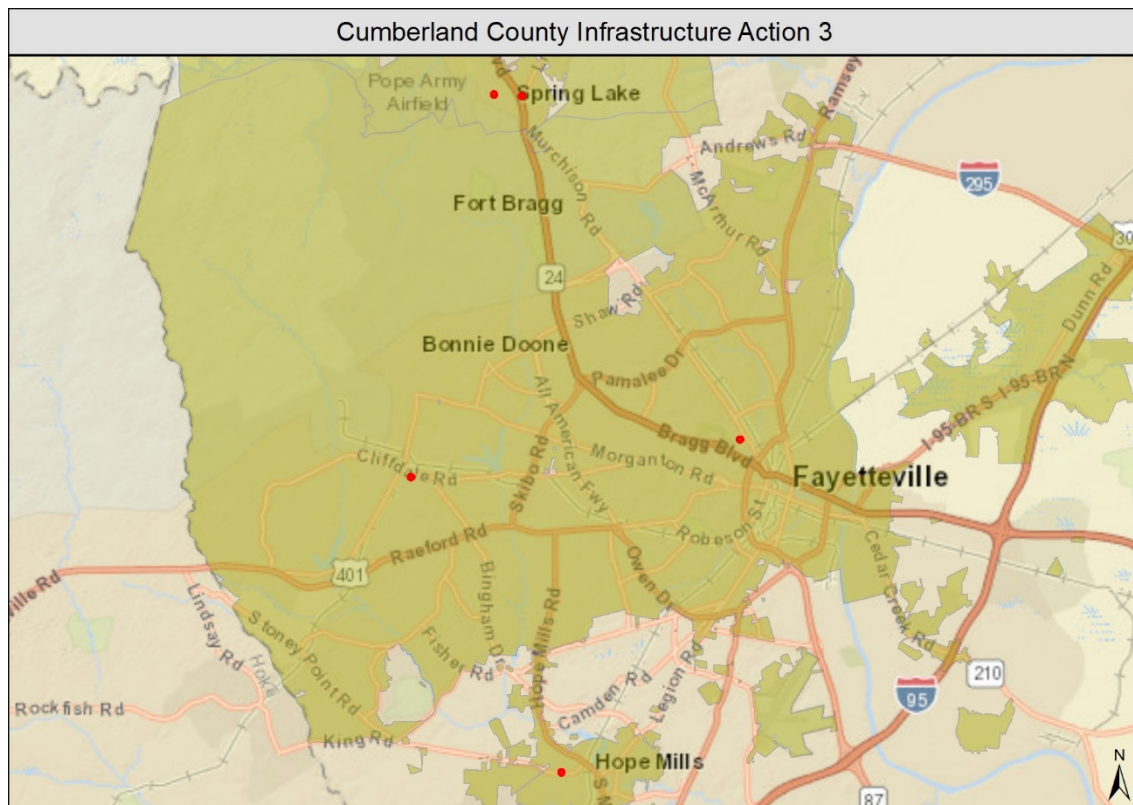


Figure 20. Infrastructure Action 3 - Critical Facilities Backup Power

I.3. Back Up Power at Critical Facilities

County: Cumberland

Priority Grouping: High Priority

Priority Ranking: 2

Project Timeframe: 6- 12 months

Location: Generators needed at Fayetteville 71st School Road Water Tower (130 KW) and Glenville Water Treatment Plant (200 KW); Hope Mills EOC/PD/Fire Center; Spring Lake Town Hall and Rec Center (shelter).

Project Summary: This project is to provide back-up power to several critical facilities in Cumberland County. Without power at the Glenville Water Plant and School Road water tower, pressure dropped below 20 PSI; the water source was contaminated by E-Coli Bacteria. A Boil Water Advisory was issued to 86,000 customers. Customers were advised to evacuate when no safe drinking water could be secured. Critical operation centers in Hope Mills and Spring Lake were also without power which hindered emergency operations.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	One of the primary impacts from Hurricane Matthew was widespread power loss including to critical facilities. A loss of drinking water and/or emergency operations capability is a severe impact that can endanger public health and force evacuations or costly measures like brining in potable water to respond to the event. These critical facilities upon which the whole community depend need adequate back-up power systems to keep them functional during storm events and recovery periods.	N/A
Consistent with existing plans (describe points of intersection/departure)	Consistent with Cumberland Action #3 from its approved Mitigation Plan: Conduct a countywide infrastructure vulnerability assessment to identify priority needs for updating ill-designed or outdated critical structures. Human safety and the provision of basic needs are the core responsibility of the local government. These responsibilities were interrupted during Hurricane Matthew and the local government is determined to minimize these in the future.	Agree
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	Agree
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	Agree
Explain any benefits or impacts to the economy of the county from this project.	Emergency services will be improved.	Agree
For how long will this solution be effective?	Between 11 and 30 years	Agree
How effective is the risk reduction?	50-100 year event	Agree
How many public facilities are involved in this project (buildings and infrastructure)?	4-6	Agree
Is coordination with other communities/counties needed to complete this project?	No	Agree
Is this project consistent with Federal Laws	Yes	Agree
To what degree does this project adversely impact local floodplain/coastal zone management?	No Impact	Agree
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Medium to high confidence	N/A
What impact will this action have on the local economy/tax base?	Between 26 and 50%	Agree

What impacts to the environment of the county will result from this project?	Some benefits in the form of reducing the chance of contamination to occur due to lack of back-up power. Emergency response capacity will be increased which will position responders to reduce cascading impacts of disasters including environmental damage.	N/A
What is the capability of the local government to administer this project?	Medium	Agree
What is the financial range of this project?	\$1M+	Agree with Modifications
What is the level of public support for this project?	High	Agree
What is the technical feasibility of this project?	Higher than 75%	Agree
Who will administer this project?	Local	Agree

- City/County Public Works Commission (PWC) Resilient Power (Microgrid):** Power outages caused by Hurricane Matthew led to significant impacts in Cumberland County. The ability to dispatch emergency services and recover more quickly was seriously hampered by the loss of power at the PWC Operations Facility. Water treatment plants nearly went off-line due to lack of remote switching. This project will address these key critical operational needs so that PWC can serve critical facilities post-disaster. One of the main components of this strategy is the installation of a microgrid network (self-contained power generation/ distribution system) downtown to connect 12 critical facilities (federal/military and local government). The microgrid also will provide energy savings in blue sky days and use sustainable power sources. Other components of the project include automated remote switching capability for Glenville Water Treatment Plant to enable it to act as redundant plant when H.O. Hoffer goes down; automated switching at the high-tension transmission transfer point; and an underground cable and auto switch at the PWC Operations Building, which includes Emergency Services, to keep these vital operations functional post-disaster.

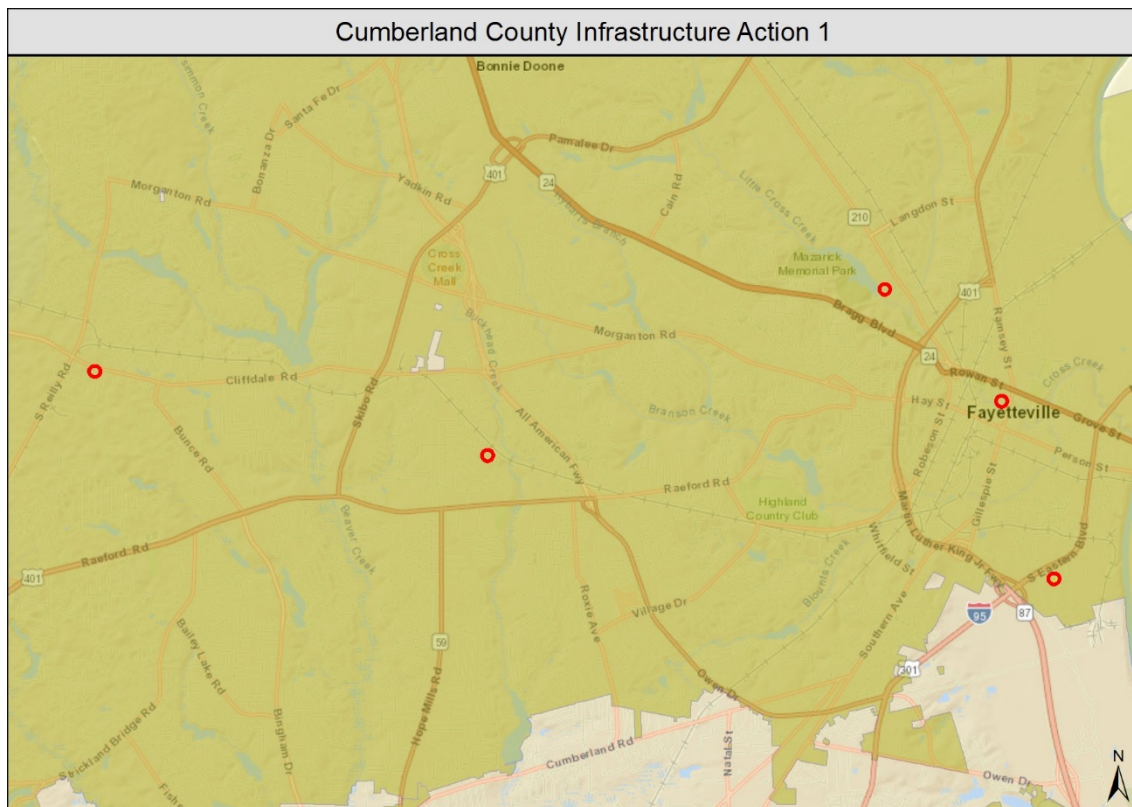


Figure 21. Infrastructure Action 1 - City/County Public Works Commission (PWC) Resilient Power (Microgrid)

I.1.P City/County Public Works Commission (PWC) Power Resiliency

County: Cumberland

Priority Grouping: High Priority

Priority Ranking: 6

Project Timeframe: 24 months

Location: Downtown Microgrid - Greene St. Area; Glenville Water Treatment Plant; Beaver Creek Rd/Lafayette Village High Tension switch; PWC OP Center at 955 Old Wilmington Rd.

Project Summary: The following are activities needed at PWC facilities to keep the power grid functional for critical operations that serve the whole community. Connect 12 critical facilities (Federal/Military and Local Gov't) in downtown to a microgrid network to provide emergency power after a disaster and energy savings in blue sky days. Install automated remote switching capability for Glenville Water Treatment Plant to enable it to act as redundant plant when HO Hoffer goes down. Install automated switching at the High Tension transmission transfer point. Install underground cable and auto switch at the PWC Operations Building which includes Emergency Services to keep these vital operations functional post-disaster. The Power Outage Management and Information Communications system prioritize resources, facilitate interagency coordination, keep detailed logs of activities during the event, and report expenditures; all of which can function while automatically provide 86,000 customer alerts via telephone switching and internet broadcast.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	Power outages caused significant immediate destruction and danger along with the most severe flooding in Cumberland County. The ability to dispatch emergency services and more quickly recover from Matthew was seriously hampered by the loss of power at the Public Works Commission Operations Facility. Water treatment plants nearly went off-line due to lack of remote switching. This project will address these key critical operational needs so that PWC can serve critical facilities post-disaster.	N/A
Consistent with existing plans (describe points of intersection/departure)	This initiative is consistent with Cumberland Action #3 of the Cumberland-Hoke Regional Hazard Mitigation Plan: Conduct a countywide infrastructure vulnerability assessment to identify priority needs for updating ill-designed or outdated critical structures. The 2030 Growth Plan for Greater Cumberland County which calls for controlling growth through limiting public utilities.	Agree
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	Agree
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	Agree
Explain any benefits or impacts to the economy of the county from this project.	The downtown businesses are vital to Fayetteville's downtown revitalization and overall economic development. Having quality utility services in this area promotes the economic climate needed to sustain and promote growth in this district. The microgrid shaves energy costs reducing overhead costs. Automatic Switching allows the School Road water systems to continuously supply potable water to businesses and industry on the west side of the County and supports the associated logistic network.	Agree
For how long will this solution be effective?	Between 31 and 50 years	Agree
How effective is the risk reduction?	100-200 year event	Agree
How many public facilities are involved in this project (buildings and infrastructure)?	>6	Agree
Is coordination with other communities/counties needed to complete this project?	No	Agree

Is this project consistent with Federal Laws	Yes	Agree
To what degree does this project adversely impact local floodplain/coastal zone management?	No Impact	Agree
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	High confidence	N/A
What impact will this action have on the local economy/tax base?	Between 51 and 75%	Agree
What impacts to the environment of the county will result from this project?	New efficiently monitored power distribution systems minimize fuel consumption which in-turn saves natural resources and reduces air pollution. During blue sky days the microgrid alternative energy system can 'shave' power demands and reload power back into the main grid.	N/A
What is the capability of the local government to administer this project?	High	Agree
What is the financial range of this project?	\$1M+	Agree
What is the level of public support for this project?	High	Agree
What is the technical feasibility of this project?	Higher than 75%	Agree
Who will administer this project?	Regional	Agree

- Fayetteville/Cumberland County Dam Rehabilitation and Replacement:** Multiple private dams, generally owned and managed by a homeowner association or a few individuals, were destroyed by the excessive rainfall and/or upstream dam failures. These dam failures led to additional damages to infrastructure and downstream homes and posed a threat to residents. The dry lake beds have caused rapid drops in property values. The loss of dams has changed the water flow in previously dammed streams. The replacement of the breached dams will help restore habitat, property values, and pre-storm water flow. This strategy would make available micro loans to the private dam owners to rebuild their dams in accordance with higher resiliency standards to avoid a similar future scenario. Implement a comprehensive dam safety program, including dam replacement, rehabilitation, and/or retrofitting, which helps address small dams generally owned by neighborhood associations, farmers, utilities, or other private owners. Locations include Rayconda Dam, Loch Lommond Dam, Arran Lake Dam, Watson Dam, Long Valley Dam, Jessups Mill Pond, Rhodes Pond Dam, and Mount Vernon Estates Dam.

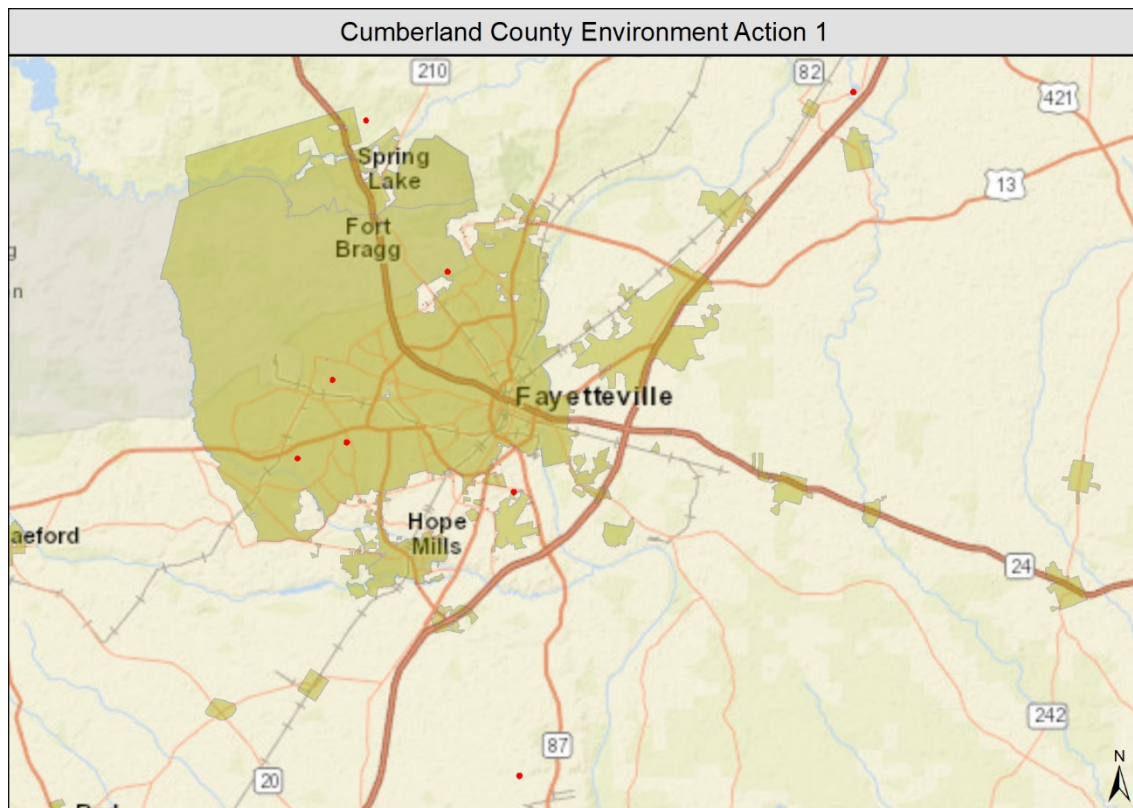


Figure 22. Infrastructure Action 8 - Fayetteville/Cumberland County Dam Rehabilitation and Replacement

I.8 Fayetteville and Cumberland County Dam Rehabilitation and Replacement

County: Cumberland

Priority Grouping: High Priority

Priority Ranking: 7

Project Timeframe: 24 months

Location: Rayconda Dam, Loch Lomond Dam, Arran Lake Dam, Watson Dam, Long Valley Dam, Jessups Mill Pond, Rhodes Pond Dam, Mount Vernon Estates Dam (see map attachments)

Project Summary: Implement a comprehensive dam safety program, including dam replacement, rehab and/or retrofit, which helps address small dams generally owned by neighborhood associations, farmers, utilities, or other private owners. Technical assistance should be made available to re-engineer dams in need of retrofit, repair and/or rebuild. The State should establish minimum standards for construction and maintenance including hardening to avoid damage from future storms and prevent dam failure. Additional funds in the form of micro loans should be made available to dam owners for the actual repair and construction. In exchange for loans and design work, dam owners will agree to comply with annual maintenance agreement and set aside funds for future maintenance.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	One of the most noticeable impacts of Hurricane Matthew in Cumberland was the destruction of dams due to high water levels and upstream dam breaches. These dam failures led to additional damages to infrastructure downstream homes and posed danger to residents. The dry lake beds have caused rapid drops in property values. The loss of dams has changed the water flow in previously dammed streams. The replacement of the breached dams will help restore habitat property values and pre-storm flow.	N/A
Consistent with existing plans (describe points of intersection/departure)	Many of these dams were built in before any standards and mostly likely without much development around it. As urbanization has occurred around these areas it is time to apply consistent standards to lower the risk of continued dam breaches. The project is consistent with Action #3 from the approved Cumberland Hoke Mitigation Plan: Conduct a countywide infrastructure vulnerability assessment to identify priority needs for updating ill-designed or outdated critical structures.	Agree
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	Agree
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	Agree
Explain any benefits or impacts to the economy of the county from this project.	The dam breaches cause immediate flood damage but also left behind dried up lake beds that have become breeding grounds for vermin (some ponds/lakes filtered storm water). The property values of homes around the dry lake beds have plummeted which reduce the level of tax revenue for the city or county.	Agree
For how long will this solution be effective?	Between 31 and 50 years	Agree
How effective is the risk reduction?	50-100 year event	Agree
How many public facilities are involved in this project (buildings and infrastructure)?	1-3	Agree
Is coordination with other communities/counties needed to complete this project?	No	Agree
Is this project consistent with Federal Laws	Yes	Agree

To what degree does this project adversely impact local floodplain/coastal zone management?	No Impact	Agree
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Medium to high confidence	N/A
What impact will this action have on the local economy/tax base?	Between 51 and 75%	Agree
What impacts to the environment of the county will result from this project?	The normalization to pre-Hurricane Matthew stream flow is the goal of this project. The project is intended to improve the environmental conditions. Sedimentation caused by drainage of empty lake beds creates downstream water quality issues. The drained lake itself with mud and sediment is an environmental hazard to people and wildlife. Lakes provide habitat for fish and waterfowl.	N/A
What is the capability of the local government to administer this project?	Low	Agree
What is the financial range of this project?	\$1M+	Agree with Modifications
What is the level of public support for this project?	High	Agree
What is the technical feasibility of this project?	Between 51 and 75%	Agree
Who will administer this project?	Unknown	Agree

Moderate Priority Infrastructure Strategies

Pillar	Strategy/Action Name	Priority	Overall Ranking
Infrastructure	Stormwater Management Improvements	Moderate	10

Table 12. Cumberland Moderate Priority Infrastructure Summary

This project represents the infrastructure strategy that Cumberland County indicated is of a moderate priority to address. Additional detail on the strategy can be found below:

- Stormwater Management Improvements:** The excessive rainfall from Hurricane Matthew overwhelmed stormwater systems and highlighted major vulnerabilities in these systems. Current assessment of stormwater systems are taking place, but this process needs to be accelerated. Upgrades are needed at particularly vulnerable locations, such as Festival Park Channel Floodway in Fayetteville and the Bounts and Cross Creek Culverts in Hope Mills. This strategy will include concrete stabilization of channels, upsizing culverts, and separating storm and sewage systems.

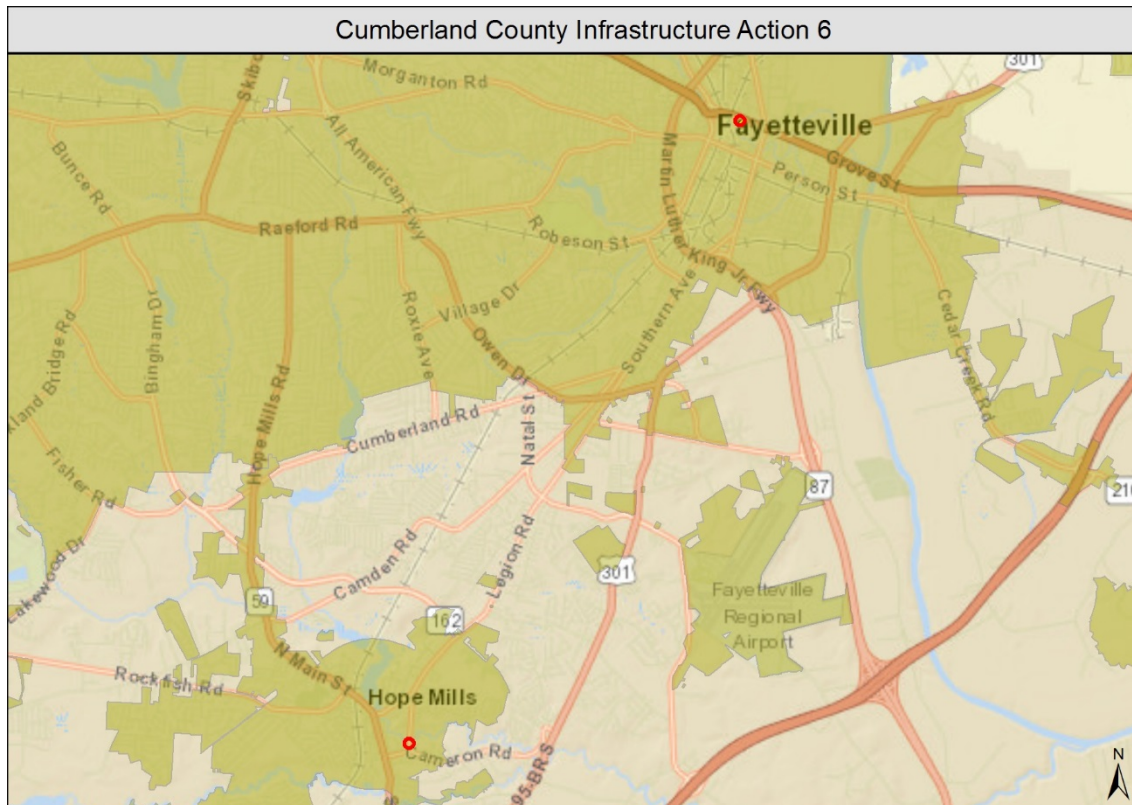


Figure 23. Infrastructure Action 6 - Stormwater Management Improvements

16. Stormwater System Upgrades

County: Cumberland

Priority Grouping: Medium Priority

Priority Ranking: 10

Project Timeframe: 24-36 months

Location: Fayetteville – Festival Park Channel Floodway, Bounts and Cross Creek Culverts; Hope Mills - Culvert on Legion Road.

Project Summary: The excess rainfall from Hurricane Matthew overwhelmed stormwater systems and highlighted major vulnerabilities in these systems. Current assessment of stormwater systems are taking place but need to be accelerated. Upgrades are needed at particularly vulnerable locations identified in "Project Location". Immediate remedies include concrete stabilization of channels, upsizing culverts and separating storm and sewage systems.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	The excess rainfall from Hurricane Matthew overwhelmed stormwater systems and highlighted major vulnerabilities in these systems. Due to the fact that most of the damage in Cumberland County occurred outside the 100-year flood zone means that inadequate stormwater drainage played a part in contributing to flooding.	N/A
Consistent with existing plans (describe points of intersection/departure)	Projects are the most obvious solutions to immediate problems and extensive study that considers future storm flows would be needed to 'masterplan' the optimal storm drainage network. This project is consistent with actions from the Cumberland-Hoke HMP including Conduct a countywide infrastructure vulnerability assessment to identify priority needs for updating ill-designed or outdated critical structures(3) and Use natural systems more open space and green surfaces to manage stormwater(9)	Agree
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	Agree
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	Agree
Explain any benefits or impacts to the economy of the county from this project.	Roads flooded due to overtopping of undersized stormwater facilities interrupts business and industry operations. Improving the network can improve access to these areas.	Agree
For how long will this solution be effective?	Between 11 and 30 years	Agree
How effective is the risk reduction?	<50 year event	Agree
How many public facilities are involved in this project (buildings and infrastructure)?	1-3	Agree
Is coordination with other communities/counties needed to complete this project?	No	Agree
Is this project consistent with Federal Laws	Yes	Agree
To what degree does this project adversely impact local floodplain/coastal zone management?	No Impact	Agree
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Medium to high confidence	N/A
What impact will this action have on the local economy/tax base?	Between 51 and 75%	Agree

What impacts to the environment of the county will result from this project?	The stormwater capacity improvements will help prevent downstream washout that can destroy wildlife habitats. Improved stormwater system can also help improve water quality by reducing the amount of sedimentation and contaminants that get into local water bodies. The stormwater system should be sized/integrated with the proposed dam and stream restoration improvements.	N/A
What is the capability of the local government to administer this project?	Medium	Agree with Modifications
What is the financial range of this project?	\$251K - \$500K	Agree
What is the level of public support for this project?	Medium	Agree
What is the technical feasibility of this project?	Between 51 and 75%	Agree
Who will administer this project?	Local	Agree

Low Priority Infrastructure Strategies

Pillar	Strategy/Action Name	Priority	Overall Ranking
Infrastructure	Flood Protection of Roads	Low	15
Infrastructure	Flood Protection of Bridges	Low	16
Infrastructure	Interstate-95 Multi-County Coordinated Evacuation/Rerouting Plan	Low	18

Table 13. Cumberland Low Priority Infrastructure Summary

These projects represent the infrastructure strategies that Cumberland County indicated is of a low priority to address. Additional detail on the strategies can be found below:

- Flood Protection of Roads:** This project would protect critical stretches of roadway from flooding via elevation or enlarged stormwater drainage under the roadways, or by adding swales to channel water away from the low sections of roadway. On Ray Avenue, pop-up barricades with quick release are needed to stop cars from using this area, which is flooded frequently. Another area needed for road improvements is Maiden Lane downtown behind the County Library.

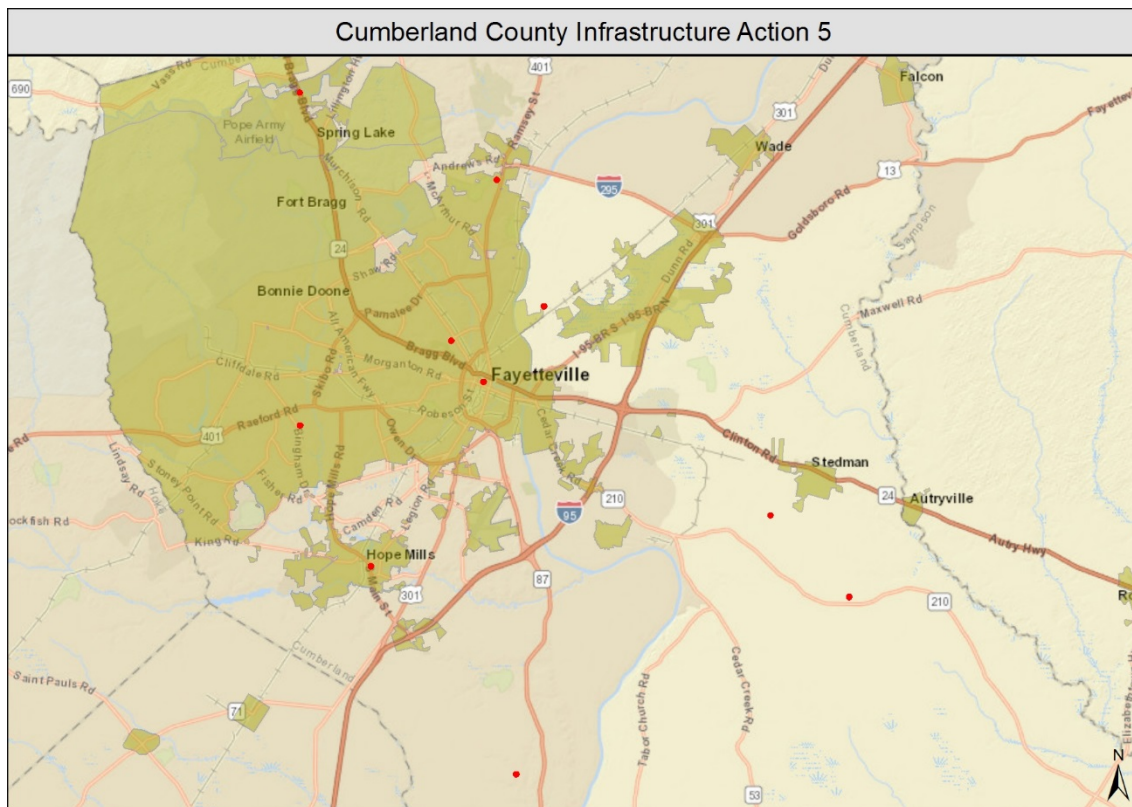


Figure 24. Infrastructure Action 5 - Flood Protection of Roads

15. Flood Protection of Roads

County: Cumberland

Priority Grouping: Low Priority

Priority Ranking: 15

Project Timeframe: 12-36 months

Location: Road flood protection locations area: River Rd, Ava Rd, Carl Freeman Rd, Stedman, Church St., Bingham Dr, Subdivision access, E. Patterson St., Yarborough Rd, Hope Mills, N. Bragg Blvd, Spring Lake, Ray Ave.,

Project Summary: Protect critical stretches of roadway from flooding via: elevation, enlarged stormwater drainage under the roadways or add swales to channel water away the low sections of roadway. Install pop-up barricade with quick release to stop cars from using Ray Avenue, where cars continuously enter and stall out when road is flooded. Behind County Library, at 300 Maiden Ln, Fayetteville, NC 28301. Electronic signage as well as roadside signage is necessary.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	Flooding caused by Hurricane Matthew damaged several roads and bridges to the point that costly detours had to be implemented. These damages also caused issues with emergency access and roads in key locations need to be made resilient to resist damage so the road network remains functional in the aftermath of future storms. These roads will be continuously repaired to the minimum standard unless the flood resiliency improvements are built into this round of repairs.	N/A
Consistent with existing plans (describe points of intersection/departure)	Supports Action 3 from the Cumberland part of the Cumberland-Hoke Regional Hazard Mitigation Plan which states: Conduct a countywide infrastructure vulnerability assessment to identify priority needs for updating ill-designed or outdated critical structures These improvements are consistent with the Fayetteville Area Metropolitan Planning Organization Transportation Improvement Program but many are on the unfunded list e.g. beyond the current years of committed funding.	N/A
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	N/A
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	N/A
Explain any benefits or impacts to the economy of the county from this project.	Maintaining functionality of roads and bridges after a storm helps avoid costly repairs and even more costly disruption of economic and government services post-disaster. Without access to commercial areas small businesses can go bankrupt without the normal flow of customers and access to supply chains.	N/A
For how long will this solution be effective?	Between 31 and 50 years	N/A
How effective is the risk reduction?	50-100 year event	N/A
How many public facilities are involved in this project (buildings and infrastructure)?	>6	N/A
Is coordination with other communities/counties needed to complete this project?	No	N/A
Is this project consistent with Federal Laws	Yes	N/A
To what degree does this project adversely impact local floodplain/coastal zone management?	No Impact	N/A

To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Medium to high confidence	N/A
What impact will this action have on the local economy/tax base?	Between 26 and 50%	N/A
What impacts to the environment of the county will result from this project?	The improvements should be designed to respect the natural watercourse and preserve useable open space for low income neighborhoods.	N/A
What is the capability of the local government to administer this project?	Medium	N/A
What is the financial range of this project?	\$1M+	N/A
What is the level of public support for this project?	Medium	N/A
What is the technical feasibility of this project?	Higher than 75%	N/A
Who will administer this project?	State	N/A

- Flood Protection of Bridges:** This project would make bridges in key locations more resilient to maintain road networks after a disaster. This strategy proposes the construction and/or elevation of both Strickland Road Bridge and Parkton Road Bridge. Locations on River Road and Skibo Road may need either new bridges or multiple segments of culvert, depending on the recent undermining of the banks during the washout.

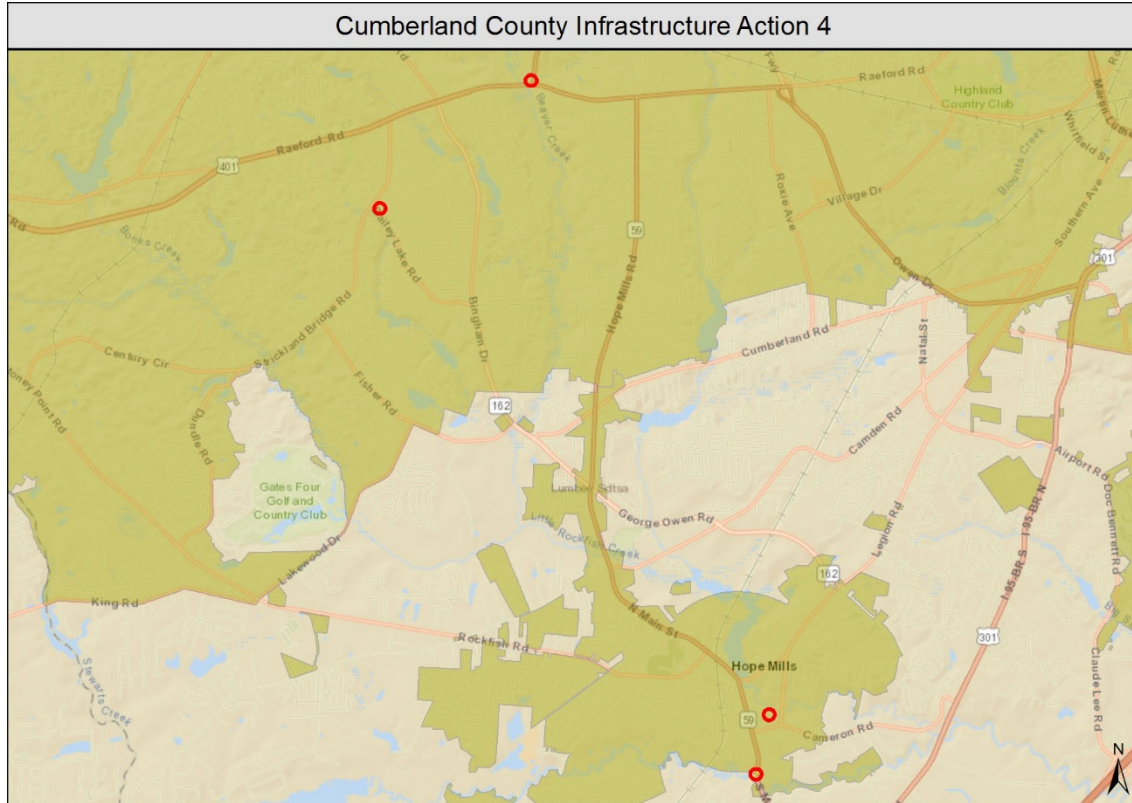


Figure 25. Infrastructure Action 4 - Flood Protection of Bridges

I.4 Flood Protection of Bridges

County: Cumberland

Priority Grouping: Low Priority

Priority Ranking: 16

Project Timeframe: 12-36 months

Location: Locations include: Fayetteville; 1) Strickland Bridge Rd (SR 1104), 2) Skibo Rd. at Raeford Rd. Hope Mills; 1) Parkton Rd/Hwy 59 and 2) River Rd.

Project Summary: Protect bridges in key locations to maintain road network after a disaster. Construct and or elevate both Strickland Road Bridge and Parkton Road Bridge, which were recently replaced at their same heights, but should have been elevated. River Road and Skibo Road may need either bridges or multiple segments of culvert; depending on the recent undermining of the banks during the washout.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	Maintaining functionality of roads and bridges after a storm helps avoid costly repairs and even more costly disruption of economic and government services post-disaster. Without access to commercial areas small businesses can go bankrupt without the normal flow of customers and access to supply chains. The need for bridge improvements was recognized by NCDOT but storm resiliency component goes beyond their current scope.	N/A
Consistent with existing plans (describe points of intersection/departure)	Supports Action 3 from the Cumberland part of the Cumberland-Hoke Regional Hazard Mitigation Plan which states: Conduct a countywide infrastructure vulnerability assessment to identify priority needs for updating ill-designed or outdated critical structures.	N/A
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	N/A
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	N/A
Explain any benefits or impacts to the economy of the county from this project.	Having a passable road network will maintain access to some of the open commercial businesses during disasters especially for the low income properties. Under non-storm conditions these bridges are vital to the Cumberland Agro-industry.	N/A
For how long will this solution be effective?	Between 31 and 50 years	N/A
How effective is the risk reduction?	50-100 year event	N/A
How many public facilities are involved in this project (buildings and infrastructure)?	4-6	N/A
Is coordination with other communities/counties needed to complete this project?	No	N/A
Is this project consistent with Federal Laws	Yes	N/A
To what degree does this project adversely impact local floodplain/coastal zone management?	No Impact	N/A
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Medium to high confidence	N/A
What impact will this action have on the local economy/tax base?	Between 26 and 50%	N/A

What impacts to the environment of the county will result from this project?	The improvements should be designed to respect the natural watercourse and preserve useable open space for low income neighborhoods.	N/A
What is the capability of the local government to administer this project?	Medium	N/A
What is the financial range of this project?	\$501K - \$1M	N/A
What is the level of public support for this project?	Medium	N/A
What is the technical feasibility of this project?	Higher than 75%	N/A
Who will administer this project?	State	N/A

- **Interstate-95 Multi-County Coordinated Evacuation/Rerouting Plan:** Both northbound and southbound lanes of Interstate 95 (I-95) were closed between Exit 13 (the U.S. Highway 74/Interstate 95 interchange) and Exit 56 (in Cumberland County) due to flooding conditions. Another evacuation route, U.S. Highway 301, also was closed to general-purpose traffic south of Fayetteville to allow emergency vehicles and residents at least one route out of town. Millions of dollars were lost due to the I-95 shut down and rerouting. Confusion resulted both for travelers passing through the area and local traffic alike. Detours were not well marked and several motorists became lost. This strategy proposes a better advisory and rerouting system to be prepared for the entire I-95 corridor in North Carolina.

I.7 Interstate-95 Multi-County Coordinated Evacuation/Rerouting Plan

County: Cumberland

Priority Grouping: Low Priority

Priority Ranking: 18

Project Timeframe: 24 months

Location: I-95 through Cumberland County in connections with other counties in NC. One area in particular is Exit 56. No maps are attached for this project since re-routing area is to be determined.

Project Summary: Both northbound and southbound lanes of Interstate 95 were closed between Exit 13 (the U.S. 74-Interstate 95 interchange) and Exit 56 (in Cumberland County) due to flooding conditions. The evacuation route, U.S. 301, was also closed to general purpose traffic south of Fayetteville, to allow emergency vehicles and local residents at least one route out of town. Furthermore, motorists are being advised not to rely on GPS to navigate. All southbound I-95 traffic was required to exit off onto business Interstate (Exit 56) and travel toward NC 162 west. Motorist then traveled along NC 162 west toward US 401 south, to US 74 east then return to I-95 South. A better advisory and rerouting system will be prepared.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	Millions of dollars were lost due to I-95 shut down and rerouting. Confusion resulted in travelers passing through and local traffic alike. Detours were not well marked and several motorists became lost. This project will mean positive benefits on the evacuation and re-routing of Cumberland County residents as well as adjacent counties during the next disaster. In the days and weeks after a future storm it will help both motorists passing through the area as well as local traffic.	N/A
Consistent with existing plans (describe points of intersection/departure)	The NCDOT information advisory system is constantly growing and evolving. This will help improve emergency communication and response so will help inform Annex A Appendix 5 Tab A (Transportation) of the NC Emergency Operations Plan.	N/A
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	N/A
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	N/A
Explain any benefits or impacts to the economy of the county from this project.	Millions of dollars were lost due to I-95 shut down and rerouting. Confusion resulted in travelers passing through and local traffic alike. Detours were not well marked and several motorists became lost. A more organized response and advisory service will reduce time related losses.	N/A
For how long will this solution be effective?	Between 31 and 50 years	N/A
How effective is the risk reduction?	<50 year event	N/A
How many public facilities are involved in this project (buildings and infrastructure)?	1-3	N/A
Is coordination with other communities/counties needed to complete this project?	Yes	N/A
Is this project consistent with Federal Laws	Yes	N/A
To what degree does this project adversely impact local floodplain/coastal zone management?	No Impact	N/A
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Low to moderate confidence	N/A
What impact will this action have on the local economy/tax base?	Less than 25%	N/A

What impacts to the environment of the county will result from this project?	Some degradation occurred to roadside ditches along the reroute established by NCDOT.	N/A
What is the capability of the local government to administer this project?	Minimum	N/A
What is the financial range of this project?	\$101K - \$250K	N/A
What is the level of public support for this project?	Medium	N/A
What is the technical feasibility of this project?	Between 51 and 75%	N/A
Who will administer this project?	State	N/A

Environmental, Ecosystem, and Agricultural Strategies

There are several opportunities for enhancing environmental resources for both resiliency and recreational purposes within Cumberland County. These strategies, paired with the need for monitoring stream levels and adding areas to be mapped for flood zones, provide opportunities for the county to become more resilient and attractive for locals and visitors. There are no high priority environmental strategies.

Moderate Priority Environmental Strategies

Pillar	Strategy/Action Name	Priority	Overall Ranking
Environment	Cumberland County Stream Restoration	Moderate	8
Environment	Stream Gauges and Early Warning Network	Moderate	9
Environment	Augmented Flood Mapping	Moderate	12

Table 14. Cumberland Moderate Priority Environmental Summary

These projects represent the environmental strategies that Cumberland County indicated is of a moderate priority to address. Additional detail on the strategies can be found below:

- Cumberland County Stream Restoration:** Hurricane Matthew knocked down many trees and the resulting debris ended up in streams causing water backup and potential flooding. This project would conduct streambed cleanup and rehabilitation by removing debris and restoring channels to their proper depth and path. For dams built by beavers, explore removal/relocation strategies with the North Carolina Department of Natural Resources. Require annual inspection to ensure that restoration work continues to function properly. Consider use of the Citizen Corps in stream restoration and maintenance. Require annual inspection and maintenance to ensure that restoration work remains effective. Locations include: Eastover, Rockfish Creek, Beaver Creek, Hybarts Branch, Heritage Park, Greys Creek, and Beaver Creek leading to Hope Mill Dam.

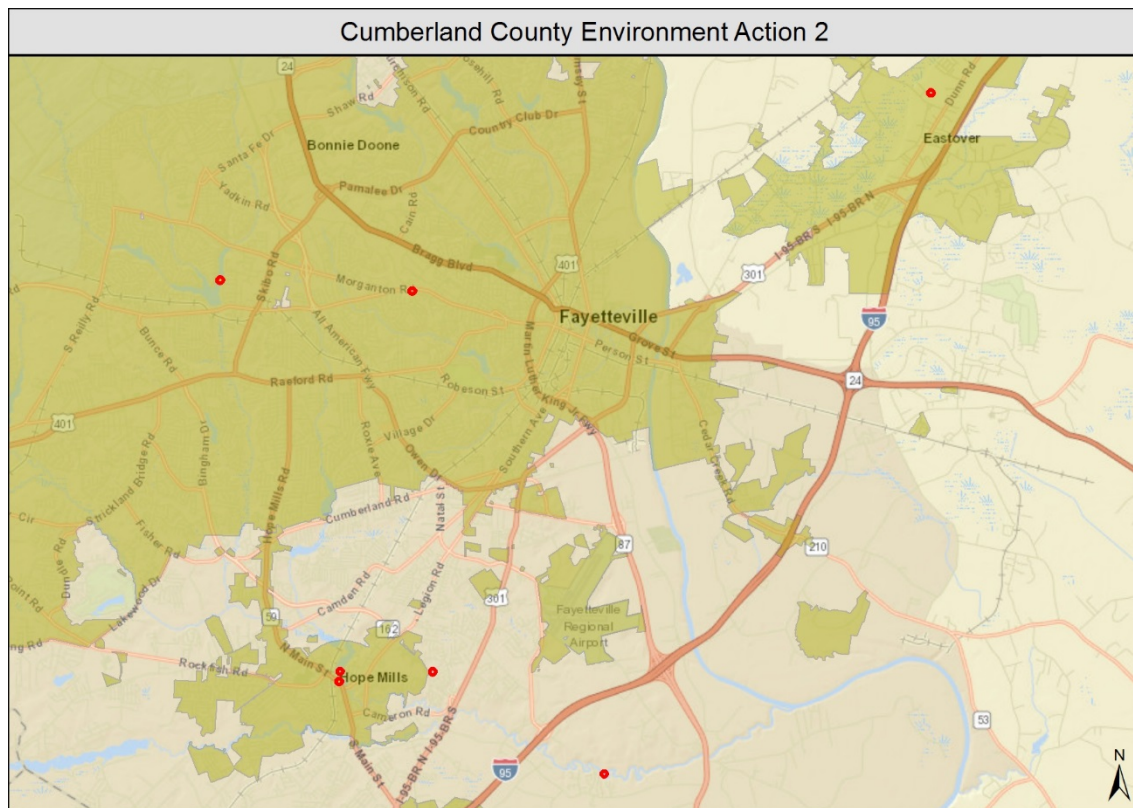


Figure 26. Environment Action 2 - Cumberland County Stream Restoration

EN2 - Cumberland County Stream Restoration

County: Cumberland

Priority Grouping: Medium Priority

Priority Ranking: 8

Project Timeframe: 12-24 months

Location: See maps. Eastover; Rockfish Creek; Beaver Creek; Hybarts Branch; Heritage Park; Greys Creek; BeaverCreek leading to Hope Mill Dam

Project Summary: Hurricane Matthew knocked down many trees and resulting debris ended up in stream beds causing water backup and potential flooding. Conduct streambed cleanup and rehabilitation by removing debris and restoring channels to their proper depth and path. For dams built by beavers - explore removal/relocation strategies with NC DNR. Require annual inspection to ensure that restoration work continues to functions properly. Consider use of the Citizen Corps in stream restoration and maintenance. Require annual inspection and maintenance to ensure that restoration work remains effective.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	Hurricane Matthew caused many impacts include a number of downed tree and debris that ended up in streams as well as exacerbating stormwater drainage issues. Due to the amount of vegetative debris in streambed the chance of another massive potential flooding situation looms. Restoration of the capacity of the streams to convey water is needed including debris removal. Approximately 90% of the residential flooding damage occurred outside of the designated floodplain.	N/A
Consistent with existing plans (describe points of intersection/departure)	Consistent with Cumberland - Hoke Regional Mitigation Plan Action Cumberland Action #9 Use natural systems more open spaces and green surfaces to manage stormwater in a more resilient fashion. This strategy is also repeated in the Cumberland County Resiliency Plan.	N/A
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	N/A
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	N/A
Explain any benefits or impacts to the economy of the county from this project.	A key discovery of the Cumberland NC Resiliency meetings was a realization of the interconnectedness of all the environmental initiatives and the City and County growth planning. The City and County are much more aware of the economic impact of not managing the environment as a natural resource.	N/A
For how long will this solution be effective?	Between 11 and 30 years	N/A
How effective is the risk reduction?	50-100 year event	N/A
How many public facilities are involved in this project (buildings and infrastructure)?	0	N/A
Is coordination with other communities/counties needed to complete this project?	Yes	N/A
Is this project consistent with Federal Laws	Yes	N/A
To what degree does this project adversely impact local floodplain/coastal zone management?	No Impact	N/A
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Medium to high confidence	N/A

What impact will this action have on the local economy/tax base?	Less than 25%	N/A
What impacts to the environment of the county will result from this project?	Stream restoration will help prevent downstream washout that can destroy wildlife habitats. It will also remove debris that is currently reducing the quality of natural aquatic habitats.	N/A
What is the capability of the local government to administer this project?	Low	N/A
What is the financial range of this project?	\$501K - \$1M	N/A
What is the level of public support for this project?	High	N/A
What is the technical feasibility of this project?	Between 51 and 75%	N/A
Who will administer this project?	County	N/A

- Stream Gauges and Early Warning Network:** Information on upstream volumes and flows in creeks, rivers, and streams often is unknown. There are also several high-hazard dams in Cumberland County and no way of monitoring whether emergency spillways have been opened or the dam itself is at risk. Private dam owners don't always communicate or are not responsive during high rain events. This project will place stream gauges in strategic locations and connect them to the emergency notification systems to be able to provide warnings during future flood events. Install gauges and build out an early-warning system to assist with management of flow from the interconnected and interdependent series of dams and water courses throughout the county, including Little Rockfish Creek and Black River in Godwin, Bones Creek, and Upchurches Pond near Lake Upchurch Drive.

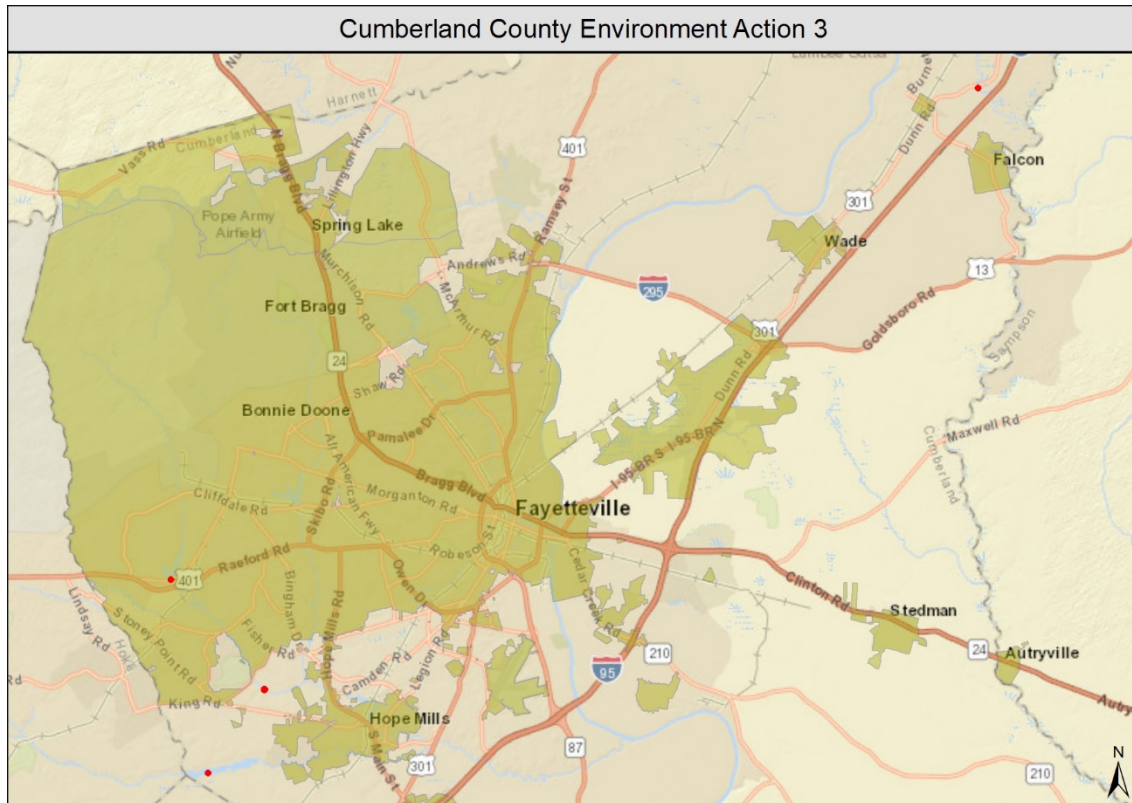


Figure 27. Environment Action 3 - Stream Gauges and Early Warning Network

EN3.Stream Gauges and Flood Warning System

County: Cumberland

Priority Grouping: Medium Priority

Priority Ranking: 9

Project Timeframe: 24-36 months

Location: Gauges - Little Rockfish Creek, Black River, in Godwin, Bones Creek, Upchurches Pond, near Lake Upchurch Dr.. NOAA staff at meeting helped select locations

Project Summary: Information on upstream volumes and flows is often unknown. There are also a number of high hazard dams in Cumberland County and no way of monitoring the opening/closing of gates. Private dam owners don't always communicate or are not responsive during high rain events. Install gauges and build out an early-warning system to assist with management of flow from interconnected and interdependent series of dams and water courses throughout the county.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	Heavy rainfall caused by Hurricane Matthew can cause rapid flooding that can surprise homeowners; during Matthew residents went to bed only to find out 3 hours later they were in a dangerous flooding situation; this was compounded by dam breaches. Dam owners on the same waterbodies don't always communicate during high rain events. During Matthew upstream dam breaches caused a cascading effect that: burst lower dams washed out culverts roads and bridges and added debris to the flood surge.	N/A
Consistent with existing plans (describe points of intersection/departure)	This water flow monitoring project will allow SE Cumberland to remain a productive agricultural region which is a key goal of the Regional Economic Development plan for the region. Economic development plans call for: Directing new development away from prime agricultural areas significant open spaces and environmentally sensitive lands which is achieved through control of provision of utilities. Avoiding leapfrog developments in the midst of productive farmland.	N/A
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	N/A
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	N/A
Explain any benefits or impacts to the economy of the county from this project.	The project is primarily to protect human lives by increasing the amount of time people have to evacuate. It has secondary benefits of allowing people to protect personal property and machinery by getting it above projected flood levels and switching over to alternative power sources.	N/A
For how long will this solution be effective?	More than 50 years	N/A
How effective is the risk reduction?	>200 year event	N/A
How many public facilities are involved in this project (buildings and infrastructure)?	0	N/A
Is coordination with other communities/counties needed to complete this project?	Yes	N/A
Is this project consistent with Federal Laws	Yes	N/A
To what degree does this project adversely impact local floodplain/coastal zone management?	No Impact	N/A
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Medium to high confidence	N/A

What impact will this action have on the local economy/tax base?	Between 26 and 50%	N/A
What impacts to the environment of the county will result from this project?	Stream flow and rainfall monitoring will help aid in protecting wildlife and their habitats.	N/A
What is the capability of the local government to administer this project?	High	N/A
What is the financial range of this project?	\$101K - \$250K	N/A
What is the level of public support for this project?	Medium	N/A
What is the technical feasibility of this project?	Higher than 75%	N/A
Who will administer this project?	County	N/A

- **Augmented Flood Mapping:** There are stream reaches identified by the state near existing flood zones where concentrations of damage to homes occurred based on Individual Assistance claims filed. Several of these areas need detailed flood mapping to accurately portray risk and guide future development to avoid risk, at least to the 100-year storm level. Local officials and property owners will be advised of the flood risk and will need to take appropriate action to mitigate the risk.

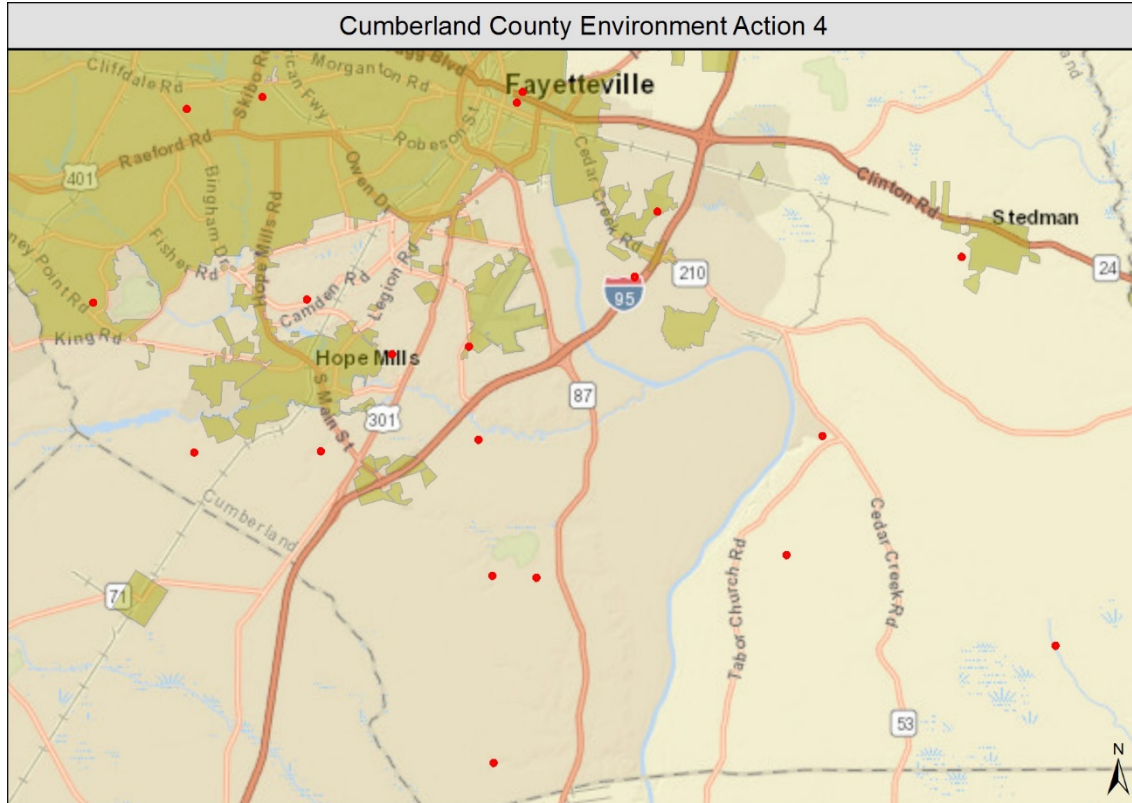


Figure 28. Environment Action 4 - Augmented Flood Mapping

EN4. Augmented Floodplain Mapping

County: Cumberland

Priority Grouping: Medium Priority

Priority Ranking: 12

Project Timeframe: 12-36 months

Location: Countywide - 12 named streams and two unnamed streams (see attached maps)

Project Summary: There are stream reaches near existing flood zones where concentrations of damage and Individual Assistance claims were noted. Several of these areas are in need for detailed flood mapping to accurately portray risk and guide future development to avoid risk, at least to the 100-year storm level. Local officials and property owners will be advised of the flood risk and will need to take appropriate action to mitigate the risk.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	Flood maps need to be periodically revised and updated. The project locations in this project were identified as an unmet need because concentrations of flood damage occurred in these areas from Matthew. In many cases property owners do not likely carry flood insurance and are not aware of the flood risk. By producing a flood map in these areas future development will be at lower risk from flooding.	N/A
Consistent with existing plans (describe points of intersection/departure)	Consistent with the most recent approved Cumberland Hoke Regional Hazard Mitigation Plan Cumberland County Action # 8 which states: Analyze and update local development ordinances to make buildings safer from wind and flooding	N/A
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	N/A
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	N/A
Explain any benefits or impacts to the economy of the county from this project.	The greatest benefit will be to ensure that development is built with respect to the studied flood risk.	N/A
For how long will this solution be effective?	More than 50 years	N/A
How effective is the risk reduction?	100-200 year event	N/A
How many public facilities are involved in this project (buildings and infrastructure)?	0	N/A
Is coordination with other communities/counties needed to complete this project?	No	N/A
Is this project consistent with Federal Laws	Yes	N/A
To what degree does this project adversely impact local floodplain/coastal zone management?	No Impact	N/A
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Medium to high confidence	N/A
What impact will this action have on the local economy/tax base?	Less than 25%	N/A
What impacts to the environment of the county will result from this project?	The mapping is complementary to: dam assessment and repair warning system and stormwater upgrades that are proposed for Cumberland County.	N/A
What is the capability of the local government to administer this project?	Medium	N/A
What is the financial range of this project?	\$501K - \$1M	N/A

What is the level of public support for this project?	Medium	N/A
What is the technical feasibility of this project?	Higher than 75%	N/A
Who will administer this project?	County	N/A

Low Priority Environmental Strategies

Pillar	Strategy/Action Name	Priority	Overall Ranking
Environment	Open Space and Flood/Stormwater Retention Areas	Low	14

Table 15. Cumberland Low Priority Environmental Summary

This project represents the environmental strategy that Cumberland County indicated is of a low priority to address. Additional detail on the strategy can be found below:

- Open Space and Flood/Stormwater Retention Areas:** Hurricane Matthew highlighted issues with stormwater drainage, including massive flooding outside the SFHA, which in part is due to widespread urbanization in many parts of Fayetteville and Cumberland County. Green infrastructure is an effective and well-received way to provide stormwater storage. This project would involve the use of land owned by private interests, like golf courses, to be modified to serve as stormwater retention basins to capture excess water during peak flows. These bioswales in landscaped areas would have infiltration and holding capacity potential, providing much needed stormwater storage during peak flows to reduce future flood impacts and make the area more resilient.

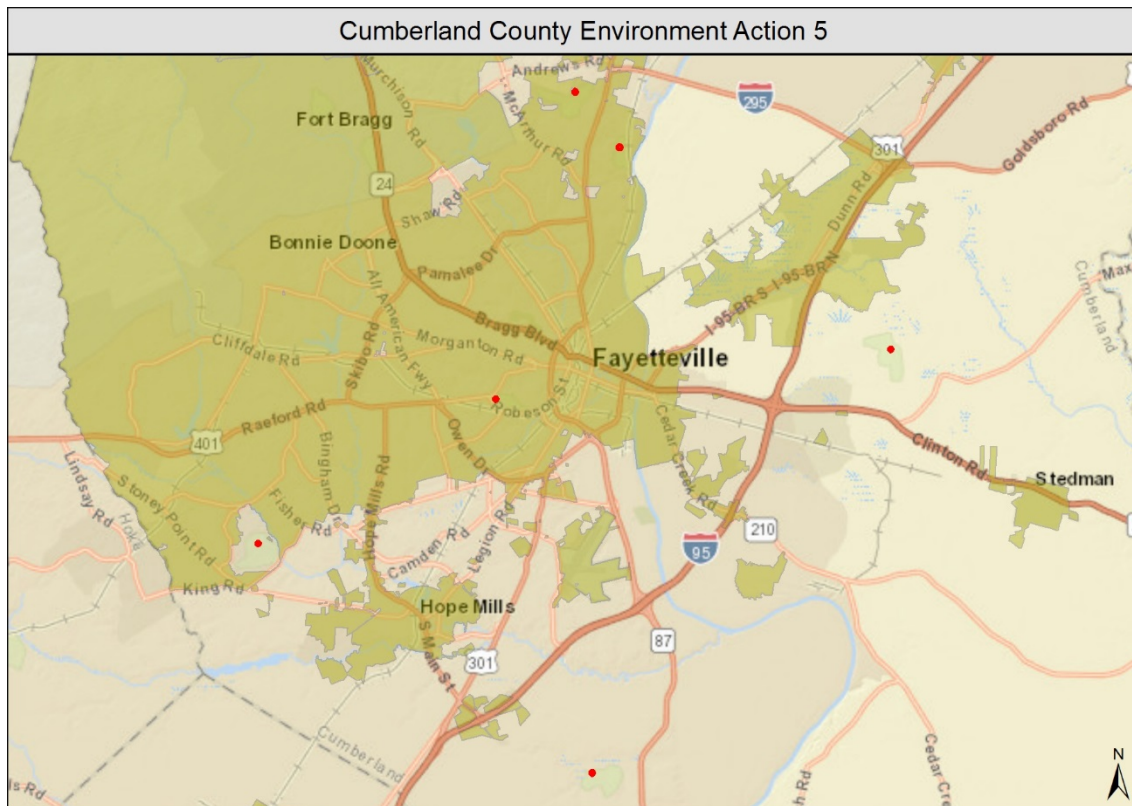


Figure 29. Environment Action 5 - Open Space and Flood/Stormwater Retention Areas

EN5. Open Space and Flood/Stormwater Retention Areas

County: Cumberland

Priority Grouping: Low Priority

Priority Ranking: 14

Project Timeframe: 12-24 months

Location: King's Grant Golf & Country, Cypress Lakes Golf Course (Hope Mills) and Methodist College Golf Course. All six project locations identified in attached maps

Project Summary: Hurricane Matthew highlighted issues with stormwater drainage and high levels of runoff due to massive urbanization in many parts of Fayetteville and Cumberland County. Green infrastructure is an effective and well-received way to provide stormwater storage. This project involves use of land owned by private interests, like golf courses, to be modified to serve as stormwater retention basins to capture excess water during peak flows. Create bioswales in landscaped areas with infiltration/holding capacity potential.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	Hurricane Matthew highlighted issues with stormwater drainage and high levels of runoff due to massive urbanization in many parts of Fayetteville and Cumberland County. Insufficient stormwater storage led to flooding which approximately 90% of it in Cumberland County occurred outside the 100-year flood zone. This project will help provide much needed stormwater storage during peak flows to reduce future flood impacts and make the area more resilient.	N/A
Consistent with existing plans (describe points of intersection/departure)	Directly consistent with Cumberland Action 9 from the Cumberland-Hoke HMP: Use natural systems more open space and green surfaces to manage stormwater in a more resilient fashion. Fayetteville supports this principle ... embrace differences found in development practices for rural versus urban areas small towns versus large city areas and historic versus “modern” areas.	N/A
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	N/A
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	N/A
Explain any benefits or impacts to the economy of the county from this project.	Tax-incentives should be considered to encourage private entities to participate in this project. Business can advertise their eco-friendly contribution.	N/A
For how long will this solution be effective?	Between 11 and 30 years	N/A
How effective is the risk reduction?	<50 year event	N/A
How many public facilities are involved in this project (buildings and infrastructure)?	0	N/A
Is coordination with other communities/counties needed to complete this project?	No	N/A
Is this project consistent with Federal Laws	Yes	N/A
To what degree does this project adversely impact local floodplain/coastal zone management?	No Impact	N/A
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Medium to high confidence	N/A
What impact will this action have on the local economy/tax base?	Between 26 and 50%	N/A

What impacts to the environment of the county will result from this project?	Open space is retained for flood water absorption. Floodwater channelization is improved by use of bioswales. More groundwater recharge occurs because water is stored in green infrastructure rather than overwhelming streams. Contaminants carried by stormwater are filtered out during absorption into groundwater.	N/A
What is the capability of the local government to administer this project?	Low	N/A
What is the financial range of this project?	\$501K - \$1M	N/A
What is the level of public support for this project?	Medium	N/A
What is the technical feasibility of this project?	Between 51 and 75%	N/A
Who will administer this project?	County	N/A

Summary

Grant applications may have already been prepared for some of these actions but for those that have not already been funded, the State of North Carolina will begin a process of prioritizing the actions and seeking to match a funding stream to each action. Those that are not matched with a funding source will be added to the State's Unmet Needs Report. Funding for Unmet Needs will be sought through additional funding from Congress and from the North Carolina General Assembly. Any action that cannot be matched to a funding source should be incorporated into the County's Hazard Mitigation Plan for consideration for future funding. It is important to seek to implement as many of these actions as feasible. Doing so will significantly contribute to helping improve the resiliency of North Carolina's communities.