Draft Environmental Assessment

Charlotte-Mecklenburg Storm Water Services
Proposed Kings Branch Floodplain & Stream Restoration
HMGP 4393-0093-R
Charlotte, Mecklenburg County, North Carolina

September 2024

FEMA

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Acronyms and Abbreviations

APE	Area of Potential Effect
ASCE	American Society of Civil Engineers
BFE	Base Flood Elevation
BGEPA	Bald and Golden Eagle Protection Act
BMP	Best Management Practice
CAA	Clean Air Act
CEQ	Council on Environmental Quality CFR Code of Federal Regulations
CFR	Code of Federal Regulations
CMSWS	Charlotte-Mecklenburg Storm Water Services
CWA	Clean Water Act
EA	Environmental Assessment
EIS	Environmental Impact Statement
EO	Executive Order
EO 11988	Floodplain
EO 11990	Wetlands
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FONSI	Finding of No Significant Impact
GHG	Greenhouse Gas
HEC-RAS	[USACE] Hydrologic Engineering Center River Analysis System
HMGP	Hazard Mitigation Grant Program
IPaC	[USFWS} Information for Planning and Consultation
MBTA	Migratory Bird Act
MLS	Major League Soccer
NAAQS	National Ambient Air Quality Standards
NASCAR	National Association for Stock Car Auto Racing, LLC
NBA	National Basketball Association
NCDEQ	North Carolina Department of Environmental Quality
NCDNCR	North Carolina Department of Natural and Cultural Resources
NCDOT	North Carolina Department of Transportation
NCDPS	North Carolina Department of Public Safety

NCDWR	[NCDEQ] Division of Water Resources
NCEM	North Carolina Emergency Management
NC-SHPO	North Carolina State Historic Preservation Office
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NFL	National Football League
NHPA	National Historic Preservation Act
NLEB	Northern Long-eared Bat
NMFS	National Marine Fisheries Service
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
OSH Act	Occupational Safety and Health Act
OSHA	Occupational Safety and Health Administration
RS	River Station
Section 106	[NHPA] Historic Preservation Consultation
SHPO	State Historic Preservation Officer
SRRS	Stream Restoration Ranking System
THPO	Tribal Historic Preservation Officer
TSS	Total Suspended Solids
USACE	United States (U.S.) Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service

2. Introduction

The North Carolina Department of Public Safety (NCDPS) submitted a Hazard Mitigation Grant Program (HMGP) grant application to the Federal Emergency Management Agency (FEMA) on behalf of Charlotte-Mecklenburg Storm Water Services (CMSWS). Under the HMGP, FEMA may provide funding to state, local, tribal and territorial governments so they can develop hazard mitigation plans and rebuild in a way that reduces, or mitigates, future disaster losses in their communities. In September 2018, Hurricane Florence produced disastrous weather conditions which had a devastating impact upon parts of North Carolina and the severity of the damage loss resulted in the declaration of a disaster by the Governor of North Carolina. The President of the United States concurred and subsequently declared a major disaster (DR-4393-NC). FEMA, as a result of the Presidential Declaration, made available federal funds for hazard mitigation grants and the North Carolina Emergency Management Act, N.C.G.S. §166A-19 et. seq. and N.C.G.S. §§ 143B-1000 and 166A-19.12(10) and (13) authorizes CMSWS to undertake the proposed HMGP project.

This Environmental Assessment (EA) has been conducted in accordance with the National Environmental Policy Act (NEPA), the President's Council on Environmental Quality (CEQ) regulations for implementing NEPA (40 Code of Federal Regulations [CFR] 1500-1508) and regulations adopted pursuant to the Department of Homeland Security Directive 023-01, Rev 01, and FEMA Directive 108-1. FEMA is required to consider potential environmental and cultural resource impacts before funding and approving actions and projects. FEMA will use the findings in this EA to determine if a FONSI or Environmental Impact Statement (EIS) is required for the proposed action. FEMA is required to consider potential environmental impacts before funding or approving actions and projects.[1]

In December 2020, FEMA approved a HMGP grant to design and construct the Kings Branch Floodplain & Stream Restoration project generally between Archdale Drive and East Arrowood Road in the City of Charlotte, North Carolina, as shown in Figure 1 (Appendix A). Kings Branch is a floodplain with an effective Special Flood Hazard Area and floodway. The project has dual goals of reducing flood risk and improving water quality within the project area. The project consists of bank stabilization and vertical realignment of the channel centerline, aquatic habitat improvement, and planting of native vegetation.

3. Purpose and Need

The Kings Branch Floodplain & Stream Restoration project would restore approximately 6,419 linear feet of stream. The project also includes 1,650 linear feet of sanitary sewer relocation.

The Kings Branch Watershed, covering 2.66 square miles, is located in southern Mecklenburg County and includes part of the City of Charlotte, as shown in Figure 2 (Appendix A). Kings Branch flows into Sugar Creek, which subsequently drains into the Catawba River below the project area. The watershed is currently a developing urban area. According to the U.S. Census Bureau, Charlotte's population increased from 540,828 in 2000 to 874,579 in 2020. Based on historical aerials, most development in the watershed occurred before 1985.

- [1] Consistent with E.O. 14154, CEQ has rescinded the NEPA regulations, effective April 11, 2025, and is working with Federal agencies to revise or establish their own NEPA implementing procedures. Per CEQ Guidance, while revisions are ongoing, agencies should continue to follow their existing practices and procedures implementing NEPA and can voluntary rely on the regulation in 40 CFR 1500-1508 in completing ongoing NEPA reviews (Implementation of the National Environmental Policy Act, February 19, 2025).

The purpose of the proposed project is to reduce flood risk and improve water quality within the project area through use of bank stabilization and vertical realignment of the channel centerline, aquatic habitat improvement, and planting of native vegetation. The proposed project would also reduce base flood elevations by as much as 4.6 feet at the Lexington Green Apartments, where six apartment buildings and one office/shop building are located within the FEMA Special Flood Hazard Area, as shown in Figure 3 (Appendix A).
The need for the proposed project is to reduce the Community Base Flood Elevation to one-foot below the finished floor elevations of the at-risk buildings, bringing all six apartment buildings and one office/shop building into compliance with the floodplain regulations. The Community Base Flood Elevation is the water surface elevation resulting from the flood event having a one percent chance of being equaled or exceeded in any given year. This is determined using future land use conditions (the local flood protection elevation is the Community Base Flood Elevation plus one foot of freeboard).

In addition to reduced flood damages, the project would improve water quality and aquatic habitat by stabilizing stream banks and adjusting the channel profile. An assessment of existing conditions prepared by CMSWS confirms sections of entrenched channel with steep banks and extensive woody debris blockages. All construction would comply with the State of North Carolina and local building code requirements and specifications, specifically American Society of Civil Engineers (ASCE) 24-14.

This project is regulated and coordinated by FEMA.

4. Background

The technical feasibility of the Kings Branch Floodplain & Stream Restoration project was evaluated in the Kings Branch Flood Mitigation Final Stream Feasibility Study (Appendix B) prepared in March 2018. The basis of the feasibility determination is a hydraulic analysis of the proposed channel cross sections using the one-dimensional, steady state USACE Hydrologic Engineering Center River Analysis System (HEC-RAS) model that is the basis of the effective flood insurance study for Kings Branch. The design goal is to reduce the one-percent chance future condition water surface elevation to one-foot below the building lowest floor elevation. The one-percent chance future condition plus one-foot freeboard is the local Design Flood Elevation or as it is referred to in Mecklenburg County ordinance, the Flood Protection Elevation. This decrease in water surface elevation would provide protection in excess of the 500-year storm (0.2 percent-chance event).

5. Project Location and Existing Facility

The proposed modifications to Kings Branch would be constructed from just below Archdale Drive (River Station 20,050) to just above East Arrowood Road (RS 13,750) in the City of Charlotte, North Carolina. The project area is located approximately 5.7 miles southwest of center city, 3.7 miles north of the North Carolina/South Carolina state line and 0.2 miles east of Interstate 77, as shown in Figure 1 (Appendix A).

Kings Branch was historically straightened for agriculture and timber purposes. Later, it was altered again when the sewer and water lines were installed on both streambanks to support the newly constructed neighboring residential communities. Historic aerials of the area show a large amount of development happening between 1950 and 1977.

Currently, the stream is approximately 5-10 feet lower than the corresponding floodplain. This occurrence is known as down-cutting and disconnects the stream from its active floodplain. The active floodplain provides flood volume storage, flood velocity dissipation, habitat diversity, and improved

water quality. In a flood event, sediment from the stream would typically deposit in the floodplain or be routed through the system, but currently remains in the system because of the disconnection and unstable geomorphology.

Kings Branch is also experiencing active bank erosion and bank failures as it evolves from a Gc→F→Bc stream type in the Rosgen Stream Classification System (NC State 2023) succession scenario. The bank heights are at five-plus feet in many places above the streambed, indicating extreme instability (bank height ratios of 1.5-3 feet). Overall, there is a lack of bedform diversity in most reaches and active erosion is consistent throughout the project reaches. Bank erosion, which provides increased sediment input to the system, causes a degradation of water quality due to lack of dissolved oxygen, increased turbidity, and a lack of in-stream habitat diversity encouraged by deep pools and defined riffles. Lack of bedform diversity and erosion are evident by the visual observation and geomorphic data indicating that the system lacks a riffle-pool sequence. An additional cause of bank erosion is debris from collapsed vegetation/trees, which cause severe localized bank erosion.

6. Alternatives

This section describes the alternatives considered during the planning process. Alternative 1: No Action and Alternative 2: Proposed Action are carried forward for detailed analysis in this EA. No other alternatives were considered. The rationale for alternatives considered but dismissed are included in this section.

6.1. Alternative 1: No Action Alternative

Under the No Action Alternative, no improvements would be made within the project area. The stream would remain approximately 5-10 feet lower than the corresponding floodplain. In a flood event, sediment from the stream would remain in the system because of the disconnection to the floodplain and unstable geomorphology. The base flood elevations at the Lexington Green Apartments, which include six apartment buildings and one office/shop building would not be reduced, and the potential for flood damages would remain. The stream banks would remain steep and would not stabilize and the water quality and aquatic habitat in the project area would not improve.

6.2. Alternative 2: Proposed Action

The Kings Branch Floodplain & Stream Restoration project proposes to realign Kings Branch and implement natural channel design techniques for stream rehabilitation. This would result in net increases in aquatic resource functions and services within an approximately 17-acre portion of Kings Branch. A sanitary sewer realignment would also be constructed alongside the stream restoration activities. The project will restore approximately 6,419 linear feet of stream and reduce the Community Base Flood Elevation to one foot below the finished floor elevations of at-risk buildings, bringing all six apartment buildings and one office/shop building into compliance with floodplain regulations.

A channel rehabilitation approach would be used to create hydraulic and geomorphic functional uplift of the project area and help the stream evolve more stabilize. A combined rehabilitation approach – that includes restoring profile and dimension at existing bed elevation – would be used for all reaches with very minor relocation and pattern adjustment. Rehabilitation activities primarily would focus on the creation of improved hydraulic geometry and improved bank angles. A widened floodplain at the bank's full elevation would be created where constraints occur to alleviate the confinement of the water at flood levels.

Stable bank slopes (4:1 or 3:1), riffle-pool sequences (depth variability), and buffers would be enhanced or restored. Improved hydraulic geometry (low flow channels and inner berms) combined with an active

flood-prone bench would help reduce total suspended solids (TSS) within the channel by eliminating the onsite source and providing a sediment sink. Bank slopes (4:1) would also be constructed for sediment deposition and to improve sediment competency. The cross-sectional area also helps dissipate stream velocities during more frequent, smaller storms, which is especially important in an urban setting where storm events are erratic and unpredictable. The designed size of a floodplain bench balances ideal hydraulic geometry and constraints (e.g., mature trees, sewer lines, power easements, and grading costs). The floodplain bench with new sloped banks lowers shear stress to reduce future bank erosion to natural levels (Bank Erosion Hazard Index of low-to-moderate). The stream profile would be modified to create more local slope variability, with steeper riffles and flatter pools. A sanitary sewer realignment would be constructed to the east of the stream in tandem with the stream restoration activities.

6.3. Alternative Elements Analyzed and Dismissed

The technical feasibility of the Kings Branch Floodplain & Stream Restoration project was evaluated in the Kings Branch Flood Mitigation Final Stream Feasibility Study (Appendix B) prepared in March 2018. The study evaluated if restoration could result in flood reduction at the Lexington Green Apartments, where six apartment buildings and one office/shop building are located within the FEMA Special Flood Hazard Area, as shown in Figure 3 (Appendix A). The study determined the proposed design resulted in a flood reduction; no other design alternatives were analyzed. If the study had concluded the design resulted in no flood reduction, then the No Action Alternative would have been selected. The No Action alternative is included to describe potential future conditions if no action is taken to provide flood mitigation. Under this alternative, no FEMA-funded flood mitigation work would be conducted in the project area. Due to the economic position of the county, it is unlikely funds would be readily available to implement the flood reduction actions that would otherwise be completed under the Proposed Action with FEMA funding. Additional minor flood risk reduction elements proposed in the Kings Branch Restoration, such as individual structure acquisitions and elevations, would be implemented under separate funding sources over time. However, these projects would not substantially mitigate flooding within the project area. Under the No Action alternative, the community's resilience would not be improved.

7. Affected Environment and Potential Impacts

This section describes the environment potentially affected by the alternatives, evaluates the potential consequences under the No Action and Proposed Action Alternatives, and recommends measures to avoid or reduce those effects. The impacts were evaluated based on impact intensity and duration. Table 1 provides impact determination terms and definitions.

7.1. Preliminary Screening of Assessment Categories

A preliminary screening was used to narrow the list of resources for which detailed assessments must be performed. The screening was based on available information within the project area, No Action, and Proposed Action Alternative locations. The resources eliminated from further assessment were sole source aquifers, coastal zone resources, essential fish habitat, areas with special designation, and land use and zoning.

The project area is not over a sole source aquifer (U.S. Environmental Protection Agency [USEPA] 2023a). Therefore, the No Action and Proposed Action Alternatives would not affect sole source aquifers and review under Section 1424(e) of the Safe Drinking Water Act governing sole source aquifers is not required.

According to the North Carolina Department of Environmental Quality (NCDEQ), Mecklenburg County is not within the coastal zone (NCDEQ 2023a). The project is not within or near a Coastal Barrier Resource Unit based on the U.S. Fish and Wildlife Service (USFWS) Coastal Barrier Resources System mapper (USFWS 2023a). Thus, the No Action and Proposed Action Alternatives would not affect coastal resources and there will be no further discussion of coastal zone management or coastal barrier resources.

Table 1: Impact Intensity Thresholds and Impact Duration Definitions

Impact Scale	Criteria
Intensity	**Description**
Negligible	Changes or benefits would be either nondetectable or have effects that would be slight and local. Impacts would be well below regulatory standards, as applicable.
Minor	Changes to the resource would be measurable, although the changes would be small and localized. Impacts or benefits would be within or below regulatory standards, as applicable. Mitigation measures would reduce any potential adverse effects.
Moderate	Changes to the resource would be measurable and have either localized or regional-scale impacts/benefits. Impacts would be within or below regulatory standards, but historical conditions would be altered on a short-term basis. Mitigation measures would be necessary, and the measures would reduce any potential adverse effects.
Major	Changes would be readily measurable and would have substantial consequences on a local or regional level. Impacts would exceed regulatory standards. Mitigation measures to offset the adverse effects would be required to reduce impacts, though long-term changes to the resources would be expected.
Duration	**Description**
Short-term Impact	Recovers in less than three years and does not contribute to a beneficial effect.
Long-term Impact	Takes three or more years to recover and does not contribute to the long-term beneficial effect.
Long-term Benefit	Takes three or more years to recover and contributes to the long-term beneficial effect.

A search of National Marine Fisheries Service (NMFS) Essential Fish Habitat mapping tool did not reveal any designated essential fish habitat in or around the project area (NMFS 2023). Further, in the Nationwide Permit 27 issued for the Proposed Action under Section 404 of the CWA (SAW-2022-01948) dated December 19, 2022, the USACE indicates "…there is no essential fish habitat in this district's area of responsibility". The No Action and Proposed Action alternatives would not have any impact on essential fish habitat in accordance with the Magnuson-Stevens Fishery Conservation and Management Act and review under this law is not required. Permits obtained for the project are included in Appendix E.

Areas with special designation include conservation areas, wildlife refuges, parklands, and/or other ecologically critical or threatened areas. There are no areas with special designation within the vicinity of the project area; therefore, there would be no impact on areas with special designation as a result of either the No Action Alternative or the Proposed Action.

The project area is comprised of undeveloped forested land and several utility easements. The project area is bound by multi- and single-family residential development. The No Action and Proposed Action

Alternatives would not change existing land use and would be consistent with the current zoning; therefore, no further discussion of land use and zoning is required.

7.2. Physical Resources

7.2.1. Geology, Seismicity, and Soils

According to the Natural Resources Conservation Service (NRCS) Web Soil Survey, the predominant soil types in the project area are Cecil sandy clay loam (≈1 percent), Cecil-Urban land complex (≈3.1 percent), Monacan loam (≈95.8 percent, frequently flooded), and Wilkes Loam (≈0.2 percent), as shown in Figure 4 (Appendix A). All soils have a moderate to high susceptibility to erosion by water and flooding (NRCS 2023).

The Farmland Protection Policy Act requires federal agencies to minimize the unnecessary conversion of farmland into nonagricultural uses. According to NRCS, the Cecil-Urban land complex and Wilkes Loam are not designated as prime farmland; however, the Cecil sandy clay loam, which comprises approximately one percent of the project area, is designated as farmland of state importance. Additionally, the Monacan loam, which comprise approximately 95.8 percent of the project area, is designated as prime farmland if drained and either protected from flooding or not frequently flooded during the growing season (NRCS 2023).

Alternative 1: No Action

Under the No Action Alternative, there would be no construction-related short-term impacts on geology, seismicity, and soils within the project area. The No Action Alternative would not alter existing baseline conditions, so there would be no long-term impacts on geology, seismicity, and soils.

The No Action Alternative would not convert prime farmland soils to another use, nor would it prevent the future use of the soils for farmland purposes. Thus, there would be no impact on prime farmland soils.

Alternative 2: Proposed Action

The Proposed Action would have negligible short-term impacts on geology, seismicity, and prime farmland soils from earth-disturbing activities, such as excavation and grading, restoring the stream, and realigning the sanitary sewer line. In keeping with the overall water quality goals of CMSWS, a channel rehabilitation approach would be used to create hydraulic and geomorphic functional uplift of the project area and help the stream evolve into a more stable form.

Rehabilitation activities primarily would focus on the creation of improved hydraulic geometry and improved bank angles. An active floodplain at the bank full elevation would be created where constraints allow. In addition, stable bank slopes (4h:1v or 3h:1v), riffle-pool sequences (i.e., depth variability), and buffers would be enhanced or restored. Improved hydraulic geometry (low flow channels and inner berms) combined with an “active” flood prone bench (where feasible) would help reduce total suspended solids (TSS) within the channel by eliminating the onsite source and providing a sediment sink. Bank Slopes (i.e., 4:1) would also be constructed for sediment deposition and to improve sediment competency.

The cross-sectional area also would serve to dissipate stream velocities during the more frequent, smaller storms, which is especially important in an urban setting where the storm events can result in flash flood events.

The designed size of a floodplain bench balances of the ideal hydraulic geometry and constraints (i.e., mature trees, sewer lines, Duke power easements, and grading costs). The floodplain bench with the new sloped banks lowers shear stress with the intent to reduce future bank erosion to natural levels (Bank Erosion Hazard Index of low-to-moderate).

The stream profile would be modified to create more local slope variability (i.e., steeper riffles and flatter pools). Currently, the stream is dominated by long, steep areas and flat water (i.e., no depth variability).

The Proposed Action would have beneficial short-term impacts on geology, seismicity, and prime farmland soils during construction; however, the best management practices (BMPs) outlined in Section 10 would be utilized during construction to minimize or avoid any short-term impacts. No long-term impacts would occur.

7.2.2. Air Quality

The Clean Air Act (CAA) of 1970 (42 U.S. Code 7401–7661 [2009]) is a comprehensive federal law that regulates air emissions from area, stationary, and mobile sources. The CAA authorized USEPA to establish National Ambient Air Quality Standards (NAAQS) to protect public health and the environment. The NAAQS include standards for six criteria air pollutants: lead, nitrogen dioxide, ozone, carbon monoxide, sulfur dioxide, and particulate matter. Particulate matter includes both particulates less than ten micrometers in diameter and fine particulates less than 2.5 micrometers in diameter. Areas where the monitored concentration of a criteria pollutant exceeds the applicable NAAQS are designated as being in nonattainment of the standards, while areas where the monitored concentration of a criteria pollutant is below the standards are classified as being in attainment. Maintenance areas are those where air quality has exceeded the standards in the past but that are currently in compliance with the NAAQS.

Federally funded actions in nonattainment and maintenance areas are subject to USEPA conformity regulations (40 CFR Parts 51 and 93), which ensure that emissions of air pollutants from planned federally funded activities would not affect the state's ability to meet the NAAQS. Section 176(c) of the CAA requires that federally funded projects conform to the purpose of the state implementation plan, meaning that federally funded activities would not cause any violations of the NAAQS, increase the frequency or severity of NAAQS violations, or delay timely attainment of the NAAQS or any interim milestone.

Under the general conformity regulations, a general conformity determination for federal actions is required for each criteria pollutant or precursor in nonattainment or maintenance areas. Specifically, areas where the Proposed Action's direct and indirect emissions have the potential to emit one or more of the six criteria pollutants at rates equal to or exceeding the prescribed de minimis rates for that pollutant would require a conformity determination.

USEPA maintains detailed information about area NAAQS designations, classifications, and nonattainment status, called the Green Book. According to USEPA's Green Book, Mecklenburg County, North Carolina is in nonattainment for 8-hour ozone (USEPA 2023a).

Alternative 1: No Action

Under the No Action Alternative, there would be no construction-related short-term impacts on air quality within the project area. There would be no long-term effect on air quality because there would be no new permanent air emissions source.

Alternative 2: Proposed Action

The Proposed Action would have minor short-term impacts on air quality from equipment and vehicle use. Emissions from on-site construction equipment, on-road construction-related vehicles, and dust-generating activities have the potential to affect air quality. Use of heavy equipment and earth-moving machinery could temporarily increase the levels of some pollutants, including carbon monoxide, volatile organic compounds, nitrogen dioxide, ozone, and particulate matter. Dust generated by construction activities is a source of particulate matter. The Proposed Action would take approximately 280 working days to construct; thus, vehicle and equipment use in the project area would be short-term and localized. To reduce the short-term impacts on air quality, vehicles and equipment will run for short durations and areas of exposed soils would be covered or sprayed to reduce fugitive dust. Thus, air emissions would not increase to the extent that a general conformity analysis would be required for the Proposed Action. The Proposed Action would have no long-term impacts on air quality as it would not include a source of long-term permanent emissions.

Alternative 1: No Action

Effects of weather patterns, such as increasingly heavy rainstorms and more intense tropical storms and hurricanes could impact the project area. The No Action Alternative would not result in any increase in GHG emissions and would not increase the effects of flooding in the project area. However, under the No Action Alternative, the current risk factors affecting the project area, including erosion and the potential flooding of the six apartment buildings and one office/shop building at risk, would continue or worsen. It is likely that heavy rainstorms and more intense tropical storm and hurricane events under the No Action Alternative would produce more severe erosion and flooding in the future. It is expected that potential flooding of the six apartment buildings and one office/shop building would continue to occur and possibly increase after heavy rainstorms and more intense tropical storm and hurricane events. Therefore, the No Action Alternative would result in a continuation of (and perhaps increased intensity of) existing adverse impacts on the project area related to weather patterns.

Alternative 2: Proposed Action

Implementation of the Proposed Action would result in a short-term increase in GHG emissions during construction activities, but it would not contribute to an increase in GHG in the long-term. The Proposed Action would result in improved resiliency of the project area from erosion and the potential flooding resulting from heavy rainstorms and more intense tropical storm and hurricane events.

Because Kings Branch would be less vulnerable to severe damage from such events, the potential flooding of the six apartment buildings and one office/shop building at risk, would improve when compared to the existing conditions. Overall, the Proposed Action would result in beneficial impacts by improving the resiliency of Kings Branch from the effects of flooding.

The use of gas-powered construction equipment and tools during the development of the King's Branch Project would produce GHGs for all components of the project. GHGs enter the atmosphere through the burning of fossil fuels (coal, natural gas, and oil) and some are removed from the atmosphere (or sequestered) when absorbed by plants as part of the biological carbon cycle. The construction activities that are anticipated for the Proposed Action would only generate GHGs for a short period of time. Additionally, the Proposed Action would include the benefit of carbon sequestration from the proposed stream and wetland restoration and plantings.

The Proposed Action would result in temporary GHG emissions from construction activities. The construction equipment emissions from diesel and gasoline engines would be temporary and would not increase GHGs to the extent that the Proposed Action would contribute to regional weather patterns. Thus, the Proposed Action would have short-term negligible impacts on the levels of GHG. No long-

term impacts on the levels of GHG are anticipated because the Proposed Action would not be a source of long-term GHG emissions. The Proposed Action would increase Mecklenburg County's resilience to impacts of flooding, particularly increased precipitation events, by creating wetlands and riparian areas that provide increased flood storage and area where stormwater may infiltrate into the ground. Thus, the Proposed Action would result in minor, long-term beneficial effects by increasing the city's resilience to flooding impacts.

7.3. Water Resources and Water Quality

7.3.1. Wetlands (Executive Order 11990)

Executive Order (EO) 11990 Protection of Wetlands requires federal agencies to avoid, to the extent possible, the long- and short-term adverse impacts associated with the destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative. The NEPA compliance process requires federal agencies to consider direct and indirect impacts to wetlands, which may result from federally funded actions. Each federal agency shall take action to minimize the destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands in carrying out the agency's responsibilities. FEMA uses the eight-step decision-making process to evaluate potential impacts on and mitigate impacts on wetlands, in compliance with EO 11990 and 44 CFR Part 9. U.S. Army Corps of Engineers (USACE) and the North Carolina Division of Water Resources (NCDWR) regulate activities within wetlands in the state of North Carolina. Section 404 of the Clean Water Act (CWA) regulates the discharge of fill into Waters of the United States, including wetlands.

Alternative 1: No Action

The No Action Alternative would not include any construction and would therefore not fill or alter existing wetlands thus, there would be no short-term impacts on wetlands. The No Action Alternative would not alter existing baseline conditions, so there would be no long-term impacts on wetlands.

Alternative 2: Proposed Action

According to the General Permit (Permit: SAW-2022-01948), the proposed project involves the permanent alteration of waters and a no loss of waters determination along the 6,419 linear feet of stream to facilitate restoration activities necessary to improve stream functions and reduce bank erosion. In addition, the proposed project would result in the permanent, loss of waters, of 0.002-acre of open water wetland (i.e., the existing stormwater management pond) due to the grading needed to facilitate construction activities necessary to conduct sanitary sewer improvements. Thus, the Proposed Action would have permanent impacts on up to 0.002 acres of existing wetlands within the project area.

This verification is valid until the Nationwide Permit is modified, reissued, or revoked. If a new permit is required, CMSWS is required to coordinate with USACE to determine the required permit authorization needed. The Proposed Action would comply with the conditions of the CWA Section 404 permit, which among other conditions, would require that dredged material from the stormwater management basin would not be placed in any jurisdictional stream or wetland. The Proposed Action would result in a negligible long-term impact to wetlands.

The FEMA Floodplain Management and Wetland Protection 8-step Hydrologic and Hydraulic Analysis is included in Appendix C. Permits obtained for the project are included in Appendix E.

7.3.2. Water Quality

The CWA of 1977, as amended, regulates discharge of pollutants into water with sections falling under the jurisdiction of the USACE and USEPA. Section 404 of the CWA establishes USACE permit

requirements for discharging dredged or fill materials into waters of the United States and traditional navigable waterways. Under the National Pollutant Discharge Elimination System (NPDES), USEPA regulates both point and nonpoint pollutant sources including stormwater and stormwater runoff. A NPDES permit is required to implement activities that involve one acre or less of ground disturbance.

CWA Section 303(d) requires states to identify waters that do not or are not expected to meet applicable water quality standards with current pollution control technologies alone. Under Section 303(d), states must develop Total Maximum Daily Loads (TMDL) for impaired waterbodies. A TMDL establishes the maximum amount of a pollutant or contaminant allowed in a waterbody and serves as a planning tool for restoring water quality. In North Carolina, the NCDWR is responsible for compliance with Section 303(d) of the CWA.

To comply with CWA Section 303(d), the direct effects of the proposed activity in waters would include the loss of jurisdictional waters and their associated aquatic resource functions. The proposed activity also has the potential to result in indirect effects to waters including excess sedimentation in downstream waters, disruption and/or killing of aquatic life in the direct vicinity of the project area, increase of downstream flows, and blocking/restricting aquatic life passage transiting in and through the project area. These indirect effects are expected to be minimal due to design criteria and BMPs required by Nationwide Permit General and Regional Conditions. Additionally, indirect effects would be further reduced through the implementation of BMPs required by state, local, and Federal ordinances and regulations.

Alternative 1: No Action

The No Action Alternative would not require construction or alter existing baseline conditions, so there would be no short or long term impacts on water resources or water quality.

Alternative 2: Proposed Action

On December 19, 2022, USACE issued a verification of Nationwide Permit 27 for the Proposed Action under Section 404 of the CWA (SAW-2022-01948). According to the General Permit, the proposed project involves the permanent, no loss of waters, of 6,419 linear feet of stream to facilitate restoration activities necessary to improve stream functions and reduce bank erosion. In addition, the proposed project would result in the permanent, loss of waters, of 0.002-acre of wetlands due to the grading to facilitate construction activities necessary to conduct sanitary sewer improvements. The permit regulates construction and establishes conditions for the protection of water quality.

The Proposed Action would comply with the conditions of the CWA Section 404 permit issued by USACE throughout all phases of the project. This verification is valid until the nationwide permit is modified, reissued, or revoked. If a new permit is required, CMSWS is required to coordinate with USACE to determine the required permit authorization needed. The 404 permit specifies that the terms and conditions of the general permit are sufficient to ensure no more than minimal adverse effects, and no conditions are needed for compliance with other laws or to protect the public interest.

NCDEQ also issued an Individual 401 Water Quality Certification (Certification No. WQC005231) on February 7, 2023. Permits obtained for the project are included in Appendix E. The Proposed Action would have minor short-term impacts on water quality from construction-related activities, which could result in the discharge of pollutants and sediments into surface waters. Construction activities would be short-term, and CMSWS would implement erosion and sediment control BMPs and BMPs related to the use of fill, as discussed in Section 10.

The Proposed Action would include construction of permanent in-stream structures to stabilize the stream banks and channel grade for the proposed stream restoration. For example, constructed riffles would be constructed of a gradation of rip-rap to prevent down-cutting of the stream, and rock cross-vanes would be constructed of boulders that extend across the channel and are anchored in the streambanks to protect the stream bed and streambanks from failure. The cross vanes also maintain the vertical grade during high flows. Pools are located immediately downstream of the rock cross-vanes and are utilized as a plunge pool to dissipate erosive energy within the stream channel. In addition, in keeping with the overall water quality goals of CMSWS, a channel rehabilitation approach would be used to create hydraulic and geomorphic functional uplift of the project area and help the stream evolve into a more stable form. The Proposed Action would have major long-term benefits on water resources and water quality.

7.3.3. Floodplain Management (EO 11988)

EO 11988 Floodplain Management, requires federal agencies to avoid, to the extent possible, the short- and long-term impacts associated with the occupancy and modification of floodplains and avoid direct or indirect support of development within the floodplain whenever there is a practicable alternative. Each federal agency must take action to reduce the risk of flood loss; minimize the impact of floods on human safety, health, and welfare; and restore and preserve the natural and beneficial values served by floodplains in carrying out its responsibilities. FEMA uses an eight-step decision-making process to evaluate potential impacts on and mitigate impacts to floodplains in compliance with EO 11988 and 44 Code of Federal Regulations (CFR) Part 9 (Appendix C).

FEMA maintains a list of communities that participate in the National Flood Insurance Program (NFIP) called the Community Status Book. According to the Community Status Book, Mecklenburg County participates in the NFIP (FEMA 2023). Most of the project area is within an area where a floodway has been defined as indicated on FEMA Flood Insurance Rate Map Panel 3710453100K, effective September 2, 2015. According to this map, the project area is within a FEMA defined floodway, specifically Zone AE, which has a one-percent probability of flooding every year and where Base Flood Elevations (BFEs) have not been established (Appendix C).

Alternative 1: No Action

The No Action Alternative would have a moderate long-term impact on the project area and surrounding communities. Under the No Action Alternative, the floodplain in which Kings Branch currently exists, is at a high risk for flooding and has a low community base flood elevation, which threatens the integrity of the existing floodway and would threaten and damage infrastructure and property within the project area.

Alternative 2: Proposed Action

The Proposed Action would have minor short-term impacts on the floodway because of construction, including excavation and fill activities. Construction activities could cause an accidental release of hazardous waste during the construction period from minor leaks from construction equipment, and ground-disturbing activities could cause sediment to enter the stream and wetland, and therefore impact natural floodplain functions and values. Activities would be short-term, and CMSWS would implement erosion and sediment control BMPs and BMPs related to the use of fill. Specifically, excess fill, construction material, salvaged materials, and debris would be placed in a location and manner that does not adversely impact water flow or the floodway; fill, material, and debris would not be stored in the floodway. The work area would remain dewatered during construction, and any streamflow would be routed around the work area as needed. Temporarily impacted areas would be restored following construction of the Proposed Action.

CMSWS issued an Individual Floodplain Development Permit (Permit No: 2526) for the project on March 6, 2023. The Proposed Action would also comply with the USACE General Permit for Construction Activity, CWA Section 404 authorization. Permits obtained for the project are included in Appendix E.

The Proposed Action would result in a minor short-term impact on the floodway because of the proposed fill and excavation and slope grade improvements in the floodplain that would alter the path of stormwater during high-water events. Under the Proposed Action, stormwater storage in the project area would be slightly reduced as compared to existing conditions. However, this reduction in storage would not result in changes to the flood velocities or depths during the 100-year storm event. The impacts of the 100-year flood event would remain approximately the same as compared to existing conditions.

The Proposed Action would not change the designation of the area as Flood Zone AE, the one percent annual chance floodplain, or the associated overall flood risk in the project area vicinity. Additionally, the Proposed Action would restore and support the natural and beneficial values served by floodplains and wetlands by restoring natural stream features, stream slopes and stream channel improvements. By restoring floodplain and stream features and reducing flood risk, the Proposed Action would have moderate and beneficial long-term benefits on floodplains.

The FEMA Floodplain Management and Wetland Protection 8-step Hydrologic and Hydraulic Analysis is included in Appendix C.

7.4. Biological Resources

7.4.1. Fish and Wildlife

FEMA assessed the effects of the proposed project to determine whether the project may affect any federally threatened, endangered, proposed, or candidate species. A Biological Analysis, dated April 29, 2024, was prepared using the USFWS Information for Planning and Consultation (IPaC) online tool for all federally designated threatened, endangered, candidate, and otherwise protected species. The wetland and riverine habitats in the project area have the potential to support several species and may provide a corridor for movement between larger intact terrestrial and aquatic habitats.

It has been determined that no essential fish habitat currently exists within the project area, as defined by the Magnuson-Stevens Fishery Conservation and Management Act, Essential Fish Habitat.

Alternative 1: No Action

No construction would occur under the No Action Alternative; therefore, no short-term impacts on the terrestrial or aquatic environment would occur. This alternative would not alter existing baseline conditions, so there would be no long-term impacts on the fish and wildlife in the project area.

Alternative 2: Proposed Action

Under the Proposed Action and upon completion of construction, the project area would be restored to its existing condition through restoration of native trees, wetland and riparian vegetation, turfgrass, and upland meadow, depending on the planting zone within the project area. Construction and excavation activities associated with the Proposed Action would temporarily disturb soils and vegetation, which could create suitable conditions for the growth and spread of invasive plant species. Thus, the Proposed Action would have minor short-term impacts on the terrestrial environment from herbaceous vegetation removal and the creation of conditions suitable for invasive species growth. This short-term degradation of habitats would have a negligible adverse effect on fish and wildlife.

To promote long-term success of the planted trees and other vegetation restoration activities, CMSWS would hire a qualified professional to inspect the plantings at the beginning and end of the growing season each year. CMSWS would be responsible for performing all tasks necessary to maintain and protect the plantings for five years after planting is complete, including but not limited to watering, fertilizing, replacing dead or damaged vegetation, and controlling invasive species. CMSWS would adhere to all conditions described in the CWA Section 404 permit related to restoration and terrestrial and aquatic habitat improvements of the riparian area, such as tree survival rate and density (Appendix E). Thus, the Proposed Action's creation of native plant habitat and control of invasive plant species would have minor long-term benefits on the terrestrial environment.

Throughout the duration of construction, the work area would be dewatered, and any stream flow would be pumped around the work area as needed, which could affect the movement of any fish or other aquatic wildlife that may be present. However, this impact would be short-term (280 working days) and localized to the project area. Thus, the Proposed Action would have minor short-term impacts on the aquatic environment from construction-related activities.

Implementation of the Proposed Action would align with the water quality goals of CMSWS and implement create hydraulic and geomorphic functional uplift of the project area and help the stream evolve into a more stable form. The new stream alignment would more closely mimic the physical structure of a natural stream and create more habitat variability within the aquatic environment. Thus, the Proposed Action would have a minor long-term benefit on the aquatic environment and the species it supports.

7.4.2. Threatened and Endangered Species

The Endangered Species Act (ESA) provides for the conservation of threatened and endangered plants and animals and the habitats in which they are found. USFWS is the lead federal agency for implementing the ESA. The law requires federal agencies to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of designated critical habitat of such species.

The law also prohibits any action that causes a taking of any listed species of endangered fish or wildlife. "Take" under the ESA is defined as "to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or any attempt to carry out these activities (50 CFR 10.12). Because the ESA defines an action area as "all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action" (50 CFR 402.02), the action area where impacts on listed species must be evaluated may be larger than the project area where project activities would occur.

Critical habitat, as defined in the ESA, is a specific geographic area(s) that contains features essential for the conservation of a threatened or endangered species and that may require special management and protection.

The Biological Analysis, listed the following five listed, proposed, and candidate species within the project area: Michaux's Sumac (*Phus michauxii*), Monarch Butterfly (*Danaus plexippus*), Schweinitz's Sunflower (*Helianthus schweinitzii*), Smooth Coneflower (*Echinacea laevigata*), and Tricolored Bat (Perimyotis subflavus). A copy of the Biological Analysis is included in Appendix D. There is no critical habitat in the project area.

Mecklenburg County also hosts a variety of wildlife and plant species. Specifically, within the project area, the rare state species Tall Larkspur *(Delphinium exaltatum)* is the only state species which has been identified and/or critical habitat for the species has been identified for as of July 19, 2022.

Alternative 1: No Action

No construction would occur under the No Action Alternative; therefore, no short-term effects on the five threatened, endangered, or candidate species within the project area would occur. Because existing baseline conditions would remain the same and the habitat for the five threatened, endangered, or candidate species within the project area would remain intact, there would be no long-term effect on ESA-listed species as a result of the No Action Alternative.

Alternative 2: Proposed Action

The project area comprises mature deciduous woodlands, wetlands, and streams. The project area is located in a residential community within large contiguous tract of forest that extends north and south along the riparian zone of Kings Branch. The removal of trees associated with the Proposed Action is unknown at this time; however, trees which have the potential to provide suitable seasonal roosting and foraging habitat for the NLEB are present within the project area.

The Biological Analysis describes, species by species, the effects of the proposed action on the five listed, proposed, and candidate species, and the habitat on which they depend. In addition, effects are broken down as direct interactions (something happening directly to the species) or indirect interactions (something happening to the environment on which a species depends that could then result in effects to the species). These interactions encompass effects that occur both during project construction and those which could be ongoing after the project is finished.

As outlined in the Biological Analysis, the following four species have been excluded from analysis in this environmental review document:

1. Michaux's Sumac (Phus michauxii)
   This species has been excluded from analysis in this environmental review document as the botanical survey results determined the lack of presence within the project area.

   Justification for Exclusion: Fire or some other suitable form of disturbance, such as mowing or careful clearing, appears to be essential for maintaining the open habitat preferred by Rhus michauxii. Without such periodic disturbance, this type of habitat is gradually overtaken and eliminated by the shrubs and trees of the adjacent woodlands. As the woody species increase in height and density, they overtop the Rhus michauxii, which is shade- intolerant.

   While there are areas of clearing that are maintained by mowing, it is not carefully done so with Michaux's Sumac conservation in mind. The clearing is done for powerline rights of ways and sewer line maintenance. Other areas along the project are fully shaded and not suitable for the species.

2. Monarch Butterfly (Danaus plexippus)
   This species has been excluded from analysis in this environmental review document.

   Justification for Exclusion: Due to this species status it is candidate status it is exempt from review. However, the project includes rehabilitation of stream areas and planting of native plant species that would improve overall habitat quality.

   Section 7 consultation is not required for candidate species such as the monarch butterfly; however, voluntary conservation measures were recommended, which can be found listed in Section 6 under Project Conditions.

3. Smooth Coneflower (Echinacea laevigata)
   This species has been excluded from analysis in this environmental review document as the botanical survey results determined the lack of presence within the project area.

   Justification for Exclusion: The habitat occurring within the project area does not meet all off the criteria associated with the Smooth Coneflower. The soils in the project area are sandy loams, highly sloped and erroded, and frequently flooded. These characteristics are not conducive for the presence of Smooth Coneflower. This species prefers, more dry open woodlands best managed with fire.

4. Tricolored Bat (Perimyotis subflavus)
   This species has been excluded from analysis in this environmental review document.

   Justification for Exclusion: This action will not jeopardize the existence of this species. The habitat is not present for this species and there will be no large trees removed from the area to complete the restoration of the stream.

   Section 7 consultation is not required for proposed species such as the monarch butterfly; however, voluntary conservation measures were recommended, which can be found listed in Section 6 under Project Conditions.

As outlined in the Biological Analysis, the effects of the proposed action on the Schweinitz's Sunflower (*Helianthus schweinitzii*) and the habitat on which it depends is summarized below:

1. Schweinitz's Sunflower (Helianthus schweinitzii)
   The Schweinitz's Sunflower is federally listed as 'Endangered' and is a perennial species of the sunflower genus Helianthus Linnaeus, a large genus of the aster family Asteraceae, which is one of the largest and most familiar families of flowering plants. Schweinitz's sunflower is generally 2 meters in height however, young, stressed, or injured plants can be substantially shorter, for example, mowed plants can flower at less than 0.5 meters. Alternatively, plants in ideal conditions can reach 3 meters in height. Compared to most sunflowers in eastern North America, Schweinitz's sunflower has relatively small heads measuring 6 to 15 millimeters across with a vibrant yellow color. Other Helianthus species are readily distinguished by larger heads often measuring more than 1.5cm wide.

   Conservation Needs: Little is understood about the complete life cycle of this species. It is known that the mature individuals of this species needs full sunlight, in a habitat of frequent disturbance. The greatest threats include Loss of habitat due to suppression of periodic fire regime and discontinued grazing by native herbivores, residential and industrial development,

mining, encroachment by invasive exotic species such as privet, highway construction and improvement, and roadside and utility right- of-way maintenance during the growing season or with herbicide.

Species Presence and Use: Some aspects of the habitat within the action area are conducive to the Scheweinitz Sunflower. According to the Journal of the SC Academy of science; "Although habitats are fragmented, current populations of Schweinitz's sunflower seem to thrive in power line rights-of-way and along roadsides (Fig. 2). This is likely due to the periodic disturbance of such microsites by mowing, the effects of which would be similar to the effects of grazing." There are some of these types of habitat however, they will not be removed or changed from this current habitat type by this project. Once this project is complete with restoration and greenway construction, the habitat Scheweinitz Sunflower may increase.

Species Conservation Needs within the Action Area: The areas within the action area that may have suitable habitats should be maintained with frequent disturbances, excluding herbicide use or late-season mowing, to improve the potential germination rate.

Habitat Condition (General): Soils may be either shallow, sandy with high gravel content, or a clayey hardpan. The sunflower may prefer soils derived from basic material.

Scheweinitz Sunflower generally occurs on upland flats and gentle slopes where plants are in full to partial sun. This species prefers soils which are typically shallow and claye with increase quantities of slaty rock fragments from weathered metasedimentary rocks. Helianthus Schweinitzii can be found in a variety of soil types to include Iredell, Enon, Badin, Cecil, Misenheimer, Gaston and Zion. The main unifying factors in all the soils is location on upland interstream flats or gentle slopes, textures are clayey and thin with substantial rock fragments making them poor for agricultural use. It is believed that this species once occurred in natural forest openings or grasslands. Many of the remaining populations occur along roadsides. Schweinitz's sunflowers has a preference for soils known to be poor for agricultural use. The preferred soil types for Schweinitz's sunflower tend to contain increased rock fragments. Over the past two centuries, the general conversion of the landscape surrounding the Carolina Piedmont to agricultural uses has avoided the preferred soil of Schweinitz's Sunflower, aiding the survival of this species.

Influences: There are no recent accounts of the species within the action area, only the potential of suitable habitat.

Additional Baseline Information: The area has potential for this species to occur, the best-case scenario would be to improve the area and increase the suitability for this species to inhabit the action area.

Cumulative Effects: The effects of this habitat should be an overall positive influence on the action area, creating an overall more suitable habitat.

The Proposed Action will not affect most species. The Schweinitz's Sunflower has potential habitat in the area but will not likely be adversely affected as a species by the restoration of the floodplain. Overall, the final restoration should benefit the species by providing more potential habitat. As a result, the Schweinitz's Sunflower will not likely be affected by the Proposed Action. The Proposed Action should be an overall positive influence on the action area, creating an overall more suitable habitat.

The project area was surveyed for Michaux's sumac, Schweinitz's sunflower, and smooth coneflower on August 27, 2024. The results of this survey were emailed to the USFWS Asheville Field Office on September 3, 2024.

On September 3, 2024, the USFWS Asheville Field Office responded via email with the following comments/concurrence pursuant to Section 7 of the Endangered Species Act (ESA):

"The information provided indicates that suitable habitat is present within the proposed action area for the federally endangered Schweinitz's sunflower (Helianthus schweintizii), Michaux's sumac (Rhus michauxii), and the federally threatened smooth coneflower (Echinacea laevigata). Targeted botanical surveys were conducted August 27, 2024, and no evidence for those species was detected at that time. Therefore, we believe the probability for project-meditated loss of these plants would be insignificant and/or discountable and would concur with "may affect, not likely to adversely affect" determinations from the action agency for these species. Botanical survey results for this species is valid for two years for the purposes of ESA consultation: https://www.fws.gov/story/2022-03/north-carolinas-federally-threatened-endangered-and-risk-plant-species.

Please be aware that obligations under section 7 of the ESA must be reconsidered if: (1) new information reveals impacts of the identified action may affect listed species or critical habitat in a manner not previously considered, (2) the identified action is subsequently modified in a manner that was not considered in this review, or (3) a new species is listed or critical habitat is determined that may be affected by the identified action."

Prior to this site survey and coordination with USFWS, CMSWS also submitted a Section 7 consultation letter to the USFWS Asheville Field Office on July 19, 2022 for a review of the Proposed Action. In this consultation letter, CMSWS determined that the Proposed Action is likely to have the following impacts on the five threatened, endangered, or candidate species[2] within the project area within the project area. Correspondence with USFWS is included in Appendix E.

- NLEB – May affect, not likely to adversely affect;
- Schweinitz's Sunflower – May affect, not likely to adversely affect;
- Michaux's Sumac – May affect, not likely to adversely affect;
- Smooth Coneflower – May affect, not likely to adversely affect;

On December 19, 2022, USACE issued a verification of Nationwide Permit 27 for the Proposed Action under Section 404 of the CWA (SAW-2022-01948). Under Section 4.0 (Compliance with Other Laws, Policies and Requirements), USACE states:

"Based on the latest version of the Natural Heritage Program's NHEO data, there are no protected species located within or in the vicinity of the action area. The Corps has determined the proposed activity will not directly or indirectly affect any species subject to the ESA. In addition, on December 16, 2022, the Corps consulted the North Carolina Natural Heritage Program database for the presence/absence of federally-listed species; therefore, the proposed project would have no effect on any of the federally-listed species in Mecklenburg County."

[2] *The monarch butterfly is a candidate species and not yet listed or proposed for listing. Consultation with USFWS under Section 7 of the ESA is not required for candidate species, like the monarch butterfly. However, USFWS encourages agencies to take advantage of any opportunity they may have to conserve the species (USFWS 2023b).*

Permits obtained for the project are included in Appendix E.

Voluntary conservation measures for the Monarch butterfly:

1. Planting (recommended) or seeding of native milkweed and native nectar plants (organically and locally grown sourced plants are best) with an aim for diversity of species and bloom timing,
2. Conservation mowing (i.e., mowing only November – March) to enhance native floral resource habitat.
3. Targeted herbicide treatments (outside the growing season of native milkweeds) to restore suitable habitat.
4. Invasive species management.

7.4.3. Migratory Birds

The Migratory Bird Treaty Act (MBTA) of 1918, as amended, provides protection for migratory birds and their nests, eggs, and body parts from harm, sale, or other injurious actions except under the terms of a valid permit issued pursuant to federal regulations. All native birds are protected by the MBTA. In total, 1,106 bird species are protected by the MBTA (USFWS 2023c). A migratory bird is any species or family of birds that live, reproduce, or migrate within or across international borders at some point during their annual life cycle. The Bald and Golden Eagle Protection Act (BGEPA) of 1940 prohibits the take, possession, sale, or other harmful action of any golden or bald eagle, alive or dead, including any part, nest, or egg (16 U.S.C. § 668(a)).

Bald eagles are known to occur within Mecklenburg County, and the project area; they nest in trees near large bodies of water, such as lakes, rivers, and coasts (IPaC 2022, Appendix E). Thus, bald eagles may occur in the project area; however, because of the nature of the residential land uses surrounding the project area, eagles would be unlikely to forage or roost in the project area. Golden eagles are not likely to occur regionally or in the project area as they prefer mountainous habitats and nesting in rocky cliffs. They do not occur commonly in eastern United States (Audubon 2023).

In addition to Bald Eagles, the following migratory bird species were identified within the project area; Black-bulled Cuckoo (*Coccyzus erythropthalmus*), Eastern Whip-poor-will (*Antrostomus vociferus*), Prairie Warbler (*Dendroica discolor*), Prothonotary Warbler (*Protonotaria citrea*), Red-headed Woodpecker (*Melanerpes erthrocephalus*), Rusty Blackbird (*Euphagus carolinus*), and Wood Thrush (*Hylocichla mustelina*) (IPaC 2022, Appendix E).

Alternative 1: No Action

Under the No Action Alternative there would be no construction and no removal of vegetation during the breeding season. Therefore, there would be no short-term construction-related impacts on migratory birds. The No Action Alternative would not alter existing baseline conditions, so there would be no long-term impacts on migratory birds and golden or bald eagles.

Alternative 2: Proposed Action

If vegetation removal associated with the Proposed Action were to occur during the migratory bird nesting season, CMSWS would coordinate with USFWS to obtain any required authorization and provide documentation of coordination with USFWS to FEMA. Therefore, there would be a minor short-term impact on migratory birds if vegetation removal occurs during the breeding season. Bald eagles nest in large trees close to waterbodies and are sensitive to disturbances within 660 feet of a nest during the breeding season. If a bald eagle nest is discovered close to the project area, tree removal may have minor impacts on bald eagles if construction occurs during the nesting season; therefore,

CMSWS would coordinate with USFWS to determine an appropriate avoidance buffer and implement other relevant BMPs in the event a bald eagle nest is discovered before or during construction. Documentation of that coordination would be provided to FEMA.

The Proposed Action would restore native vegetation and restore the stream channel and wetlands, potentially providing more suitable habitat for native bird species in the long term. The stream and habitat restoration would provide additional forage and shelter for a variety of migratory birds. The rehabilitation of the stream bed and pools may provide shelter and aquatic habitat for migrating birds. Thus, the Proposed Action would have minor long-term benefits on migratory birds and golden or bald eagles.

7.5. Hazardous Materials

Hazardous materials and wastes are regulated under several federal laws, including 40 CFR 260, the Resource Conservation and Recovery Act of 1976, the Solid Waste Act, the Toxic Substances Control Act, the Comprehensive Environmental Response, Compensation, and Liability Act as amended by the Superfund Amendments and Reauthorization Act, and the CAA of 1970. Occupational Safety and Health Administration (OSHA) standards under the Occupational Safety and Health Act (OSH Act) seek to minimize adverse impacts on worker health and safety (29 CFR 1926). Evaluating hazardous substances and wastes includes consideration of whether any hazardous material would be generated by the proposed activity and/or already exists at or in the general vicinity of the site (40 CFR 312.10).

A Phase I Environmental Site Assessment was not performed as part of the planning for the project. It is not expected that contaminated soils or hazardous materials exist within the project footprint where ground disturbance or excavation would occur. There are no sites identified as an USEPA hazardous waste generator, water discharger, and Toxic Substances Control Act site within a ten-mile radius of the project area (USEPA 2023b). Additionally, a review of the North Carolina Department of Environmental Quality (DEQ) Hazardous Waste Site Map did not identify any a state-listed hazardous waste site (NCDEQ 2023b). No Superfund sites are located within half a mile of the project area (USEPA 2023b).

Alternative 1: No Action

No construction would occur under the No Action Alternative; therefore, no impacts related to hazardous materials would occur as a result of construction equipment use or the exposure of contaminated materials through ground-disturbing activities. Thus, the No Action Alternative would have no short-term impacts related to hazardous materials. Because this alternative would not alter existing baseline conditions, there would be no long-term impacts on related to hazardous materials.

Alternative 2: Proposed Action

The Proposed Action would include the use of mechanical equipment, such as excavators and trucks, which could release fuels, oils, and lubricants through inadvertent leaks and spills. However, construction activities would be short-term, lasting for an expected 280 working days. The use of equipment in good condition and compliance with BMPs and conditions specified in the USACE General Permit for Construction Activity (Permit Number SAW-2022-01948), which would be obtained prior to construction, would reduce the impact of leaks and spills. Although subsurface hazardous materials are not anticipated to be present, excavation activities could expose or otherwise affect previously undetected subsurface hazardous wastes or materials. Any hazardous materials discovered, generated, or used during implementation of the Proposed Action would be disposed of and handled in accordance with applicable local, state, and federal regulations. Therefore, there would be a negligible short-term impact from the use of vehicles and equipment or from the potential for inadvertent exposure

of previously unknown hazardous materials. The Proposed Action would have no long-term permanent impacts on hazardous materials.

7.6. Socioeconomic Resources

7.6.1. Socioeconomic Issues

The City of Charlotte is one of the 25 largest cities in the U.S. and the largest city in North Carolina. Located in the southwestern region of North Carolina, the city has a total area of nearly 308 square miles and a population of approximately 885,663 individuals. The city's focus areas are housing and neighborhood development, community safety, transportation, economic development, and the environment.

The City of Charlotte consistently ranks as one of the top growing cities and is home to more than ten Fortune 1000 companies, including household names such as Bank of America, Lowe's, and Duke Energy. The city is also home to the National Football League (NFL) Carolina Panthers, the National Basketball Association (NBA) Charlotte Hornets, Major League Soccer (MLS) Charlotte FC, the National Association for Stock Car Auto Racing, LLC (NASCAR) Hall of Fame, and the U.S. National Whitewater Center. The city is located within Mecklenburg County which has a total area of nearly 546 square miles and a population of approximately 1,145,392 (2022).

Mecklenburg County grew 19.4 percent from 2010 to 2022, moving the County from the 49th to 41st most populous county in the country. In North Carolina, Mecklenburg County ranks behind Cabarrus County, a suburban neighboring county in population growth rate, but outpaces Union County, another suburban county that has grown faster in prior decades. Mecklenburg County now ranks second in North Carolina for largest total population, falling just short of Wake County.
All racial and ethnic groups (except American Indian and Alaska Native (alone)) grew in number along with the population growth from 2010 to 2022. However, there was a shift in the proportions of these groups as shown in Table 2. The proportion of White (alone) population declined, while the proportion of Hispanic/Latino, Black or African American (alone), and Asian (alone) grew at faster paces.

During the period from 2010 to 2022, Mecklenburg County saw an increase in median household income. This percent increase (35.1 percent) was slightly lower than the increase in median household income across North Carolina (35.8 percent) but was higher than the increase in median household income throughout the country (33.1 percent). The percentage of the population below the poverty level in Mecklenburg County dropped substantially (-50.0 percent) between 2010 and 2022, outpacing the reduction in the population below the poverty level in North Carolina (-36.7 percent) and the United States (-21.4 percent).

Though Mecklenburg County is still relatively young demographically, the senior population is steadily rising. In 2010, residents aged 65+ accounted for about 9 percent of the population. In 2022, that number increased to about 12 percent. The disproportionate increase in older adults can be seen through the increase in the County median age. The median age of residents in 2010 was 33.8, compared to 35.5 in 2022. This population trend can be explained in part through the influx of retirees from across the nation. Overall, the City of Charlotte ranks 6th in the nation for net migration (the total people moving into Mecklenburg County minus the people moving out of Mecklenburg County) of people age 60 and over.

Alternative 1: No Action

No construction or restoration work would occur under the No Action Alternative; therefore, there would be impacts on socioeconomic resources within the project area, including a flood risk to the residents of

the six apartment buildings. In addition, the surrounding residential communities would continue to be impacted by flash flooding events. Because the No Action Alternative would not alter existing baseline conditions, there would be the potential for short- and long-term impacts on socioeconomic resources.

Alternative 2: Proposed Action
Under the Proposed Action, the stream channel would be realigned utilizing natural stream channel design techniques and align a sanitary sewer consistent with the stream realignment. The Proposed Action would reduce the Community Base Flood Elevation to one-foot below the finished floor elevations of the at-risk buildings, bringing all six apartment buildings and one office/shop building into compliance with the floodplain regulations. In addition to reduced flood damages, the project would improve water quality and aquatic habitat by stabilizing stream banks and adjusting the channel profile which would benefit the surrounding residential communities. Thus, the Proposed Action would provide short- and long-term benefits to the project area.

7.6.2. Visual Resources

The analysis of visual resource quality is qualitative and considers the visual context of the project area and the potential for changes in character and contrast. The assessment evaluates whether the project area includes any places or features designated for protection, the number of people who can view the site and their activities, and the extent to which those activities are related to aesthetic qualities of the area.

The project area is located on approximately 17 acres of land around Kings Branch between Archdale Drive and East Arrowood Road. The visual character of the project area contains wooded forest area along the banks of Kings branch as well as some an open grassy area that could be affected by the Proposed Action. Typical viewers of the project area include residents who live nearby.

Alternative 1: No Action
No construction or restoration work would occur under the No Action Alternative; therefore, there would be no short-term impact on visual resources within the project area. The No Action Alternative would not alter existing baseline conditions, there would be no long-term impact on visual resources.

Alternative 2: Proposed Action
Under the Proposed Action, the stream channel would be realigned utilizing natural stream channel design techniques and a sanitary sewer line that would be realigned as well. The construction of these components would require equipment such as excavators and trucks to be used and staged within the project area, potentially causing visual disruptions to nearby residents and to the existing visual character of the project area. However, these visual elements would be present for a short period of time (280 working days) and would likely be observed by a relatively small number of people; thus, the Proposed Action would have minor short-term impacts on the visual resources within the project area.

The Proposed Action would likely result in the project area appearing to be more consistent with the visual character of the surrounding project area and more natural to residents of nearby properties. The Proposed Action would also be consistent with CMSWS goals to improve water quality, stream buffers, and in-stream habitat. Thus, the Proposed Action would have minor long-term benefits on the project area.

Table 2: Comparison of Population Demographics

	MC	MC	MC	NC	NC	NC	US	US	US
Demographic Category	**2010**	**2022**	**Change**	**2010**	**2022**	**Change**	**2010**	**2022**	**Change**
Population	**923,427**	**1,145,392**	**19.4%**	**9,561,558**	**10,698,973**	**10.6%**	**309,349,689**	**333,287,562**	**7.2%**
White (alone)	466,551	506,058	7.8%	6,229,927	6,497,519	4.1%	196,929,412	192,153,076	-2.5%
Hispanic/Latino	112,890	165,220	31.7%	804,826	1,114,799	27.8%	50,740,089	63,553,639	20.2%
Black or African American (alone)	278,877	352,223	20.8%	2,023,810	2,155,650	6.1%	37,897,524	39,582,961	4.3%
American Indian and Alaska Native (alone)	3,065	2,114	-45.0%	102,730	91,758	-12.0%	2,074,523	1,750,489	-18.5%
Asian (alone)	42,407	73,147	42.0%	208,695	341,052	38.8%	14,566,264	19,415,251	25.0%
Native Hawaiian and Other Pacific Islander (alone)	152	398	61.8%	4,117	9,954	58.6%	474,799	590,339	19.6%
Some other race (alone)	1,739	3,747	53.6%	14,354	50,180	71.4%	558,211	1,912,680	70.8%
Median Household Income	**$52,188**	**$80,365**	**35.1%**	**$43,326**	**$67,481**	**35.8%**	**$50,046**	**$74,755**	**33.1%**
Population Below Poverty Level	**15.3%**	**10.2%**	**-50.0%**	**17.5%**	**12.8%**	**-36.7%**	**15.3%**	**12.6%**	**-21.4%**
Median Age	**33.8**	**35.5**	**4.8%**	**37.3**	**39.2**	**4.8%**	**36.9**	**39**	**5.4%**

MC = Mecklenburg County, NC = North Carolina, US = United States
Source: U.S. Census Bureau. American Community Survey. 2010 and 2022.

7.6.3. Noise

The Noise Control Act of 1972 required USEPA to create a set of noise criteria. In response, USEPA published Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety in 1974, which explains the impact of noise on humans. The USEPA report found that keeping the maximum 24-hour day-night average sound level below 70 A-weighted decibels (dBA) would protect most people from hearing loss. USEPA recommends an outdoor average sound level of 55 dBA to prevent interference with daily human activities such as sleeping, working, and recreation. The Federal Highway Administration (FHWA) has identified noise levels and ranges for construction equipment that typically would not need noise attenuation measures (FHWA 2006), and OSHA has adopted a standard of 140 dBA for maximum impulse noise exposure for workers in noisy environments. Chapter 15 Article III (Acceptable Noise Levels) of the City of Charlotte (Mecklenburg County) Code specifies that during daytime hours (8:00 AM to 9:00 PM) construction or demolition activities may not exceed 85 dBA. Furthermore, operation of construction machinery is not allowed at night between the hours of 9:00 PM and 7:00 AM.

Assessment of noise impacts includes the proximity of the Proposed Action to sensitive receptors, which are defined as areas of frequent human use that would benefit from a lowered noise level. Typical sensitive receptors include residences, schools, churches, hospitals, nursing homes, libraries, and parks. There are multiple residences located directly adjacent to the project area and the project area is in the passive use area where lower noise levels are present. The closest residence is approximately 50 feet away from the project boundary. Typical noises in the project area are associated with vehicular traffic, recreational activities, and natural sounds.

Alternative 1: No Action

No construction or restoration work would occur under the No Action Alternative. Therefore, this alternative would have no short-term adverse noise impacts. There would be no long-term effect related to noise because there would be no new permanent source of noise.

Alternative 2: Proposed Action

Under the Proposed Action, construction activities would temporarily increase noise levels in the project vicinity. Heavy machinery and equipment that would be used for the Proposed Action would be well maintained, have sound-control devices no less effective than those provided on the original equipment, and have muffled exhaust. Construction on private land would conform with City of Charlotte, North Carolina Noise Ordinance (Ordinance No. 9585-X), Chapter 15, Article II (Acceptable Noise Levels) of the City Code, Section 15-63(a)(2) (Charlotte 1991), which restricts construction work to daytime hours (8:00 AM to 9:00 PM). Furthermore, in the project design plans, CMSWS states that construction within the entire project area, including public land, would occur during the day. With the implementation of the above BMPs and mitigation measures, the Proposed Action would have minor short-term noise impacts in the project area.

The Proposed Action would not result in long-term noise impacts because it would not include a permanent source for noise.

7.6.4. Public Services and Utilities

Charlotte Water is the municipal water and sewer services provider for Charlotte, North Carolina and the surrounding region (Charlotte Water 2023). Duke Energy provides electricity for Charlotte, North Carolina and approximately 7.5 million customers located in six states in the Southeast and Midwest (Duke 2023), and Piedmont Natural Gas, a business unit of Duke Energy, is the natural gas provider for residential and business customers in North Carolina, South Carolina, and Tennessee (Piedmont 2023). Existing Charlotte Water sewer lines and Duke Energy electrical lines, as well as associated easements, are located within the project area.

Alternative 1: No Action
No construction or restoration activities would occur under the No Action Alternative; therefore, this alternative would not disrupt or increase demand on public services or utilities in the project area in the short-term. Because the No Action Alternative would not alter existing baseline conditions, there would be no long-term impact on public services and recreation.

Alternative 2: Proposed Action
Under the Proposed Action, approximately 1,650 linear feet of sanitary sewer would be relocated. Any impacts during construction would be localized and would not disrupt or increase demand on public services or utilities in the project area in the short-term. The contractor would take all necessary precautions to support and protect the existing sewer infrastructure and would repair or replace any damaged facilities at their own expense. No other utilities or public services would be disrupted or relocated during construction. Following construction, the impacted areas would be restored to their existing uses, conditions, and level of accessibility. Thus, the Proposed Action would have negligible short-term impacts on public services and utilities in the project area.

7.6.5. Traffic and Circulation

Regional access to the project area is provided by U.S. Route 21. The segment of U.S. Route 21 nearest the project area has an average annual daily traffic count (AADT) of 23,701 vehicles (North Carolina Department of Transportation [NCDOT] 2023). Local roadways in the project vicinity used for immediate access to the project area include Archdale Drive and East Arrowood Drive.

Alternative 1: No Action
Under the No Action Alternative, there would be no construction equipment or personnel accessing the project area. Thus, there would be no short-term impact on traffic on surrounding roads.

Alternative 2: Proposed Action
Under the Proposed Action, local roads would be used to access the site. Property owned by Mecklenburg County, existing City of Charlotte sewer easements, and Duke Energy rights of way located within the project corridor would also provide site access. Haul roads were selected to limit the sewer line to heavy construction traffic. The work site would be accessed from the following roads: Archdale Drive, Rabbits Foot Lane, and East Arrowood Road. Therefore, the Proposed Action is expected to have negligible short-term impacts on transportation.

Alternative 1: No Action
Under the No Action alternative, no FEMA-funded construction of flood mitigation measures would occur; thus, there would be no impacts related to construction, such as increased noise or temporary reductions in air quality. Therefore, the No Action alternative would have no short-term impacts on the community's population. However, the populations present throughout the study areas would continue to be at risk from floods. Periodic flooding could result in the disruption of utilities, the damage or loss of homes and properties, or the need for evacuation, all of which would place high burdens on local populations that are unlikely to have the same capacity to protect themselves or recover from flood events as compared to other populations. Therefore, the No Action alternative could result in minor to moderate adverse effects on the local population in the long-term, depending on the frequency and intensity of flooding.

Alternative 2: Proposed Action
There is a population present in or near the project area, the Proposed Action would have the potential to impact the local community. While FEMA recognizes that there are citizens of the community present in or near the project area the population would receive benefits from the Proposed Action with improved stormwater drainage and reduced flooding within the project area. In addition, it is important to note that there would be no relocation or displacements associated with the Proposed Action;

therefore, FEMA believes that there would be no short- or long-term high or adverse impacts on the community's population as a result of the Proposed Action.

7.6.6. Cultural Resources

As a federal agency, FEMA must consider the potential effects of its actions upon cultural resources prior to engaging in any project. Cultural resources are defined as prehistoric and historic sites, structures, districts, buildings, objects, artifacts, or any other physical evidence of human activity considered important to a culture, subculture, or community for scientific, traditional, religious, or other reasons. There are several laws a federal agency must consider when working with and identifying cultural resources. For the Kings Branch Stream Restoration Project, FEMA will meet this obligation through its Section 106 of the National Historic Preservation Act of 1966 (NHPA) consultation. Section 106 of the NHPA, as amended and implemented by 36 CFR Part 800, outlines the required process for federal agencies to consider a project's effects to historic properties. The NHPA defines a historic property as "any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion on the National Register." Eligibility criteria for listing a property on the National Register of Historic Places (NRHP) are found at 36 C.F.R. Part 60. While the definition of a cultural resource under NEPA can be broader, FEMA regularly uses Section 106 to meet its obligations to consider effects to cultural resources.

Cultural resources determined to be potentially significant under the NHPA are subject to a higher level of review and federal agencies must consider the potential effects of their projects on those resources and consider steps to avoid, minimize, or mitigate those effects. To be considered significant, a cultural resource must meet one or more of the criteria established by the National Park Service that would make that resource eligible for inclusion in the NRHP. The term "eligible for inclusion in the NRHP" includes all properties that meet the NRHP listing criteria, which are specified in the Department of Interior regulations Title 36, Part 60.4 and NRHP Bulletin 15. Properties and sites that have not been evaluated at the time of the undertaking may be considered potentially eligible for inclusion in the NRHP and, as such, are afforded the same regulatory consideration as nominated properties. The North Carolina Office of State Archaeology (NCOSA) maintains a database of North Carolina's historic properties, the North Carolina Archaeological Record Program. FEMA uses this database, along with the NRHP National Resources Information Service (NRIS), as part of its efforts to identify significant cultural resources that may be impacted by a project.

Pursuant to 36 CFR Part 800.16(d), the Area of Potential Effect (APE), "is the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if such properties exist." Within the APE, impacts to cultural resources are evaluated prior to the undertaking for both Standing Structures (above ground resources) and Archaeology (below ground resources). The APE for this undertaking consists of the footprint of ground disturbance for the bank stabilization, vertical realignment of the channel centerline, utility relocation, aquatic habitat improvement, and planting of native vegetation of Kings Branch. This work will consist of realigning the existing stream centerline and excavating it deeper; regarding and sloping embankments; installing rock and log riffles with check dams and pools along entire project area; installing rip rap along stream embankments and toes; installing erosion control matting; installing chain link fencing; relocating and removing an existing sanitary sewer; and removing other utilities along the stream embankment. One section of the stream will be filled in and converted to wetland to redirect water flow. Visual impacts for the stream restoration will be minimal as work is occurring within the stream, below ground level and the banks are surrounded by trees.

In order to fulfill its Section 106 responsibilities, in accordance with the North Carolina Statewide Historic Preservation Programmatic Agreement (2020 Statewide Agreement) executed on May 7, 2020 and amended December 07, 2021, FEMA initiated consultation for this project in order to identify historic properties that may exist in the proposed project's APE, and in consultation with the appropriate

State Historic Preservation Officer (SHPO) and interested Tribal Historic Preservation Officers (THPO), what effect, if any, the action will have on historic properties.

7.6.6.1.Historic and Archaeological Resources

FEMA evaluated potential resources in the Area of Potential Effects (APE) utilizing the National Park Service (NPS) National Register of Historic Places (NRHP) GIS resource, the North Carolina Archaeological Record Program, and previous cultural resource investigations. The project area is located within a tributary of Sugar Creek between Archdale Drive and Arrowood Road in the City of Charlotte, North Carolina. The review identified no archaeological sites within close proximity to the APE. No above ground resources will be impacted by the undertaking.

Alternative 1: No Action

If no action is taken, there would be no ground disturbance or new construction resulting in viewshed impacts. Therefore, under the no-action alternative there would be no impact to cultural resources.

Alternative 2: Proposed Action

Under the proposed action, there would be no potential to effect historic properties. In accordance with Section 106 of the NHPA, the implanting regulations, 36 CFR Part 800, and the North Carolina HP PA on February 13, 2024 FEMA consulted with the North Carolina State Historic Preservation Officer (SHPO) and federally recognized Tribes with an ancestral interest in the project area: Catawba Indian Nation, Cherokee Nation, Pamunkey Tribe of Virginia, Seminole Nation of Oklahoma, and Shawnee Tribe with a finding of No Historic Properties Affected for this undertaking in accordance with 36 CFR 800.4(d)(1). A response was received from the North Carolina State Historic Preservation Officer (SHPO) on March 18, 2024, concurring with FEMA's determination of No Historic Properties Affected. No Tribal Historic Preservation Office (THPO) responses were received.

To ensure that FEMA-funded activities will not adversely affect archaeological resources, FEMA is placing the following condition(s) on the project for the treatment of fortuitous finds or unexpected discoveries during ground disturbing activities within the project area:

- Prior to work beginning, the applicant must identify the source and location of fill material and provide this information to FEMA. If the borrow pit is privately owned, or is located on previously undisturbed land, or if the fill is obtained by the horizontal expansion of a pre-existing borrow pit, FEMA consultation with the State Historic Preservation Officer will be required. Failure to comply with this condition may jeopardize FEMA funding; verification of compliance will be required at project closeout.
- Construction vehicles and equipment will be stored onsite during the project or at existing access points within the Applicant's right-of-way and existing hard top surfaces. If new staging areas are established, they will utilize geotextile fabric and a layer of gravel, timber matting, or other such surface treatment during construction activities to prevent ground disturbance.
- If human remains or intact archaeological features or deposits (e.g. arrowheads, pottery, glass, metal, etc.) are uncovered, work in the vicinity of the discovery will stop immediately and all reasonable measures to avoid or minimize harm to the finds will be taken. The subrecipient will ensure that archaeological discoveries are secured in place, that access to the sensitive area is restricted, and that all reasonable measures are taken to avoid further disturbance of the discoveries. The subrecipient's contractor will provide immediate notice of such discoveries to the applicant. The subrecipient shall contact the ***North Carolina State Archaeologist*** and FEMA within 24 hours of the discovery. Work in the vicinity of the discovery may not resume until FEMA has completed consultation with SHPO, Tribes, and other consulting parties as necessary. In the event that unmarked human remains are encountered during permitted

activities, all work shall stop immediately, and the proper authorities notified in accordance with ***North Carolina Statutes, Section 70-29***.

- Any changes to the approved scope of work will require submission to, and evaluation and approval by, the State and FEMA, prior to initiation of any work, for compliance with Section 106.

Please see Appendix E for copies of consultation sent to the SHPO.

8. Summary

This chapter provides a summary of the No Action Alternative and the Proposed Action evaluated in the document, the resource topics, and the impacts of each alternative on the resource topic.

8.1. Alternative 1: No Action Alternative

Under the No Action Alternative, no improvements would be made within the project area. Kings Branch would remain approximately 5-10 feet lower than the corresponding floodplain. In a flood event, sediment from the stream would remain in the system because of the disconnection to the floodplain and unstable geomorphology. The base flood elevations at the Lexington Green Apartments, where six apartment buildings and one office/shop building located within the FEMA Special Flood Hazard Area would not be reduced and the potential for flood damages would remain. The stream banks would remain steep and would not be stabilized and the water quality and aquatic habitat in the project area would not be improved.

8.2. Alternative 2: Proposed Action

Under the Proposed Action, the Kings Branch Floodplain & Stream Restoration project would realign Kings Branch and implement natural channel design techniques to conduct stream rehabilitation activities that would result in net increases in aquatic resource functions and services within an approximately 17-acre portion of Kings Branch. The project would restore approximately 6,419 linear feet of stream and improve water quality, stream buffers, and in-stream habitat, as well as reduce the Community Base Flood Elevation to one foot below the finished floor elevations of the at-risk buildings, bringing all six apartment buildings and one office/shop building into compliance with the floodplain regulations. Additionally, a sanitary sewer realignment would be constructed in tandem with the stream restoration activities.

8.3. Comparison of Alternatives

Table 4 summarizes the potential impacts and BMPs analyzed for the No Action and Proposed Action alternatives.

Table 3: Summary of Environmental Impacts

Resource	Impacts of Alternative 1: No Action	Impacts of Alternative 2: Proposed Action
Geology, Seismicity, and Soils	• No impacts.	• Measures would be implemented during construction to minimize or avoid any short-term impacts; and beneficial long-term impacts would occur.
Air Quality	• No impacts.	• Measures would be implemented during construction to minimize or avoid any short-term impacts; no long-term impacts would occur.
Wetlands	• No impacts.	• Negligible (0.002-acre) short- and long-term impacts to wetlands.
Water Quality	• No impacts.	• Measures would be implemented during construction to minimize or avoid any short-term impacts;

Resource	Impacts of Alternative 1: No Action	Impacts of Alternative 2: Proposed Action
		no long-term impacts would occur.
Floodplain Management (EO 11988)	• Continuation of moderate long-term impact on the project area and surrounding communities.	• Restoration of floodplain and stream features would result in a reduced flood risk and moderate long-term benefits to floodplains.
Fish and Wildlife	• No impacts.	• Minor long-term benefit to the aquatic environment and the species it supports.
Threatened and Endangered Species	• No impacts.	• Measures would be implemented during construction to minimize or avoid any short-term impacts; no long-term impacts would occur.
Migratory Birds	• No impacts.	• Minor long-term benefits to migratory birds by providing more suitable habitat for native bird species.
Hazardous Materials	• No impacts.	• Measures would be implemented during construction to minimize or avoid any short-term impacts; no long-term impacts would occur.
Socioeconomic Issues	• Continuation of (and perhaps increased intensity of) existing adverse impacts on the project area.	• Restoration of floodplain and stream features would result in a reduced flood risk.
Visual Resources	• No impacts.	• Negligible short-term impacts during construction; no long-term impacts would occur.
Noise	• No impacts.	• Noise levels would temporarily increase during construction activities, but measures would be in place to minimize impacts; no long-term impacts would occur.
Public Services and Utilities	• No impacts.	• No impacts.
Traffic and Circulation	• No impacts.	• Negligible short-term impacts during construction; no long-term impacts would occur.
Historic and Cultural Resources	• No impacts.	• No impacts.

9. Cumulative Effects

According to NEPA, cumulative impacts are defined as “the impact on the environment which results from the incremental impact of the action when added to other past, present, or reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions” (40 CFR 1508.7). Cumulative impacts were evaluated based on general descriptions of past, present, and reasonably foreseeable projects in the vicinity of the project area. Their impacts were considered for the Proposed Action and the No Action Alternatives.

9.1. Past, Present, and Reasonably Foreseeable Projects

The City of Charlotte maintains a Citywide Project Portal (Charlotte 2023) which serves as a central location for construction projects managed by multiple departments, including General Services, Charlotte-Mecklenburg Storm Water Services, Charlotte Water, Charlotte Department of Transportation and other programs and projects made possible by the Capital Investment Plan. Based on a review of the Citywide Project Portal, two stormwater drainage improvement projects were identified that may contribute to the cumulative impacts of the project.

1. **Alanhurst/Cherrycrest Storm Drainage Improvement Project**
   The Alanhurst/Cherrycrest Storm Drainage Improvement Project would reduce street and structure flooding throughout the neighborhood. Located within a drainage area of approximately 215 acres, the project would replace and/or rehabilitate aging infrastructure and provide adequate drainage system capacity. The project area is bordered to the north by Griffith Road, to the south by Archdale Road, to the east by Old Pineville Road and to the west by Kenly Lane. Construction of the project was completed in March 2023.

2. **901 Greenhill Drive Stormwater Drainage Improvement Project**
   The 901 Greenhill Drive Stormwater Drainage Improvement project would install and/or repair drainage infrastructure. This project is currently in the design phase and an estimated construction start and completion date are not known at this time.

Alternative 1: No Action

The No Action Alternative would not result in any impacts on resources that would be affected by the past, present, and reasonably foreseeable projects discussed above; therefore, the No Action Alternative would not contribute to the cumulative impact of those projects.

Alternative 2: Proposed Action

The Alanhurst/Cherrycrest Storm Drainage Improvement Project, the 901 Greenhill Drive Stormwater Drainage Improvement Project, and the Proposed Action would contribute to the overall resiliency of Kings Branch and allow the City of Charlotte to better adapt to and recover from the effects of weather by providing improved resiliency of the project area from erosion and the potential flooding resulting from heavy rainstorms and the likelihood of more intense tropical storm and hurricane events. Overall, the Proposed Action would contribute a beneficial improvement to the cumulative impact related to improving resiliency of Kings Branch and the City of Charlotte.

10. Agency Coordination and Public Involvement

10.1. Agency Coordination

The following agencies (Appendix F) were contacted during the preparation of this EA:

- North Carolina Department of Public Safety
- North Carolina Department of Environmental Quality
- North Carolina Division of Water Resources
- North Carolina Department of Natural and Cultural Resources
- North Carolina Department of Transportation
- North Carolina State Historic Preservation Office
- U.S. Army Corps of Engineers
- U.S. Environmental Protection Agency
- National Marine Fisheries Service

10.2. Public Notice

Over the last three years, CMSWS has provided opportunities for public involvement in the planning for this project. There have been presentations about the project and grant funding discussions at Storm Water Advisory Committee (SWAC) meetings, meetings with property owners adjoining the project area, and information about the project is posted on the CMSWS website (CMSWS 2023).

The public will be notified of the availability of this EA for review and comment by posting of the public notice on FEMA's website and the CMSWS website, and a hard copy of the EA will be made available at CMSWS (2145 Suttle Avenue, Charlotte, North Carolina, 28208). The public comment period ends after 30 days from date of posting.

10.3. Coordination and Permits

The following permits (Appendix E) have been obtained for this project:

- USACE issued a verification of Nationwide Permit 27 (SAW-2022-01948) dated December 19, 2022 for the Proposed Action under Section 404 of the CWA.
- NCDEQ issued an Individual 401 Water Quality Certification (Certification No. WQC005231) Approval (Modification) dated February 7, 2023. This Certification replaced the Certification issued on October 5, 2023, with additional conditions added.
- NCDEQ issued an Approval with Modifications (MECKL-2023-031) dated March 2, 2023.
- CMSWS issued an Individual Floodplain Development Permit (Permit No. 2526) dated March 6, 2023.

CMSWS has made presentations about the project and the HMGP funding application at SWAC meetings. CMSWS staff has met with and provided detailed project information to property owners adjoining the project area, as well as other stakeholders.

11. Best Management Practices, Mitigation Measures, and Permits

This chapter summarizes the best management practices that would be utilized during project implementation as well as measures to avoid, minimize, and mitigate adverse impacts on resources within the project area.

11.1. General Measures

The following general best management practices and measures to avoid, minimize, and mitigate impacts would be implemented:

- The applicant is responsible for obtaining and complying with all required local, State and Federal permits and approvals.
- If deviations from the proposed scope of work result in substantial design changes, the need for additional ground disturbance, additional removal of vegetation, or any other unanticipated changes to the physical environment, CMSWS must contact FEMA so that the revised project scope can be evaluated for compliance with NEPA and other applicable environmental laws.

11.2. Physical Resources

The following measures would be implemented to avoid, minimize, and mitigate impacts on physical resources within the project area:

- Adherence to the erosion and sedimentation control plan as referenced in the Approval with Modifications issued by the NCDEQ (MECKL-2023-031) dated March 2, 2023 (Appendix E).
- Temporary Construction Entrance: All access points from the public street into the construction site shall include a construction entrance composed of coarse stone installed according to the dimensions and specifications shown on the design plans. The rough texture of the stone helps to remove clumps of soil adhering to construction vehicle tires through the action of vibration and jarring over the rough surface and the friction of the stone matrix against soils attached to vehicle tires.
- Haul Road: The haul road indicates the location of concentrated traffic through the site. By locating appropriate erosion and sediment control measures along the specified haul path, erosion and soil migration can be minimized and contained in specific locations. Silt fence will be installed along the haul road as indicated on the design plans to reduce soil laden runoff to the stream or offsite. After construction, temporary haul roads will be planted according to the planting plan contained in the design plans. Haul roads do not require preparation other than clearing vegetation and are areas that are anticipated to have compacted earth following construction and prior to ripping.
- Temporary Stream Crossing: Temporary stream crossings will be utilized in areas where crossing the existing or proposed stream is necessary. Stream crossings are intended to minimize the damage to the existing stream channel from repeated crossings, minimize active erosion in the flowing stream channel, and to provide a location for crossing. Temporary stream crossings will be constructed and located as shown in the design plans. The temporary crossings will be constructed per the detail contained in the Design Plans.
- Temporary Silt Fencing: Silt fence is a synthetic permeable mesh fabric supported by metal stakes at intervals sufficient to support the fence, as well as the water and sediment retained by the fence. Silt fence is also available with a wire mesh backing for use in areas with significant flow.

The fence is designed to retain sediment-laden water to allow settlement of suspended soils before filtering through the mesh fabric for discharge downstream. Temporary silt fencing will be installed where the grade may allow sediment to leave the project site. Silt fence will also be installed around areas where loose soil has been placed in the staging and stockpiling areas.

- Temporary Rock Silt Check: Defined channels subject to concentrated flows in larger quantities and higher velocities may be protected with rock check dams located below the construction area. These dams impound sediment-laden water to allow settlement of suspended soils before filtering through the stone. Dams shall be placed downstream of any work areas in the stream as shown on the Design Plans. Check dams will be composed of a gradation of 5”-12” Rip Rap and #57 stone. These will be used to control sediment in Kings Branch during construction.
- Tree Protection: Tree protection consists of an orange, UV resistant, poly barricade fabric placed at or just inside the dripline of trees and a minimum of one foot outside shrubs and other plants. The dripline of trees shows the outer reaches of a tree’s root system. With tree protection at the dripline, any land disturbing activity outside of the fencing ensures the safety of a tree’s roots. Contractor will install tree protection around plants to be saved, or areas where it is necessary to deter pedestrians from entering the site, prior to any construction or grading activity as shown on the Plans.
- Coir Fiber Matting: Coir fiber is a 100% coconut fiber woven into a high strength matrix. Coir fiber matting provides a natural stabilization of a disturbed soil surface and provides seeding protection from stormwater runoff. Since coir fiber is natural, it decays after vegetation has been established and requires no removal. Coir fiber matting will be installed along all newly graded and seeded stream banks, slopes steeper than 4:1 and in additional areas shown on the plans.
- Pump-Around System: A pump around operation will be used as a passageway for stream flow around the work site for Kings Branch. Limits of the pump around system shall be incidental to the work area. Stilling basins and impervious dikes will be installed as part of the pump around system. Stilling basins will be installed before pumping operations and stream diversion begins. The quantity of special stilling basins to be installed will be affected by the actual conditions that occur during the construction of the project. Impervious dikes will be installed to isolate work from stream flow when necessary. Excavation of work areas shall be performed in or isolated sections of channel. Graded stream banks shall be stabilized, with matting, prior to predicted rain fall events, unless all rain event flow can be pumped around for predicted event. Clean water diverted around the work area will be pumped around the work area with the pump outlet dissipated by a plunge pool or rip rap apron. Turbid water from the work area (i.e. ground water intrusion) will be pumped through a stilling basin or silt sack.

11.3. Biological Resources

The following measures would be implemented to avoid, minimize, and mitigate impacts on biological resources within the project area:

- Educate all employees, contractors, and/or site visitors of relevant rules and regulations that protect wildlife.
- Provide enclosed solid waste receptacles at all project areas. Non-hazardous solid waste (trash) would be collected and deposited in the on-site receptacles. Solid waste would be collected and disposed of by a local waste disposal contractor.
- Minimize project creep by clearly delineating and maintaining project boundaries (including staging areas).

- Implement standard soil erosion and dust control measures. For example: establish vegetation cover to stabilize soil; use erosion blankets to prevent soil loss; and water bare soil to prevent wind erosion and dust issue.
- Schedule all vegetation removal, trimming, and grading of vegetated areas outside of the peak bird breeding season to the maximum extent practicable.
- When project activities cannot occur outside the bird nesting season, conduct surveys prior to scheduled activity to determine if active nests are present within the area of impact and buffer any nesting locations found during surveys.
- For temporary and permanent habitat restoration/enhancement, use only native and local (when possible) seed and plant stock.

11.4. Hazardous Materials

The following measures would be implemented to avoid, minimize, and mitigate impacts related to hazardous materials within the project area:

- Demolition debris and unusable fill will be properly disposed at a NCDEQ landfill or permitted site if not salvageable.

11.5. Socioeconomic Resources

The following measures would be implemented to avoid, minimize, and mitigate impacts related to socioeconomic resources within the project area:

- To minimize disturbance related to noise, construction activities would be limited to Monday through Sunday from 8:00 AM to 9:00 PM, which is in compliance with the City of Charlotte, North Carolina Noise Ordinance (Ordinance No. 9585-X), Chapter 15, Article II (Acceptable Noise Levels) of the City Code, Section 15-63(a)(2) (Charlotte 1991). Chapter 15 Article III (Acceptable Noise Levels) of the City of Charlotte (Mecklenburg County) Code specifies that during daytime hours (8:00 AM to 9:00 PM) construction or demolition activities may not exceed 85 dBA. Furthermore, operation of construction machinery is not allowed at night between the hours of 9:00 PM and 7:00 AM.
- Construction related to the Proposed Action would also abide by Occupational Safety and Health Administration (OSHA) regulations, as well as state and local ordinances and regulations, related to creating a safe construction zone for the public.

11.6. Historic and Cultural Resources

The following measures would be implemented to avoid, minimize, and mitigate impacts on historic and cultural resources within the project area:

If in the unlikely occurrence that any unknown archaeological resources are uncovered during ground-disturbing activities, all work in the immediate vicinity of the discovery would be halted until the resources are identified, documented, and an appropriate mitigation strategy developed, if necessary, in accordance with pertinent laws and regulations, including Section 106 of the National Historic Preservation Act. FEMA specified the following conditions to be placed on the project for the treatment of fortuitous finds or unexpected discoveries during ground disturbing activities within the project area:

- If human remains or intact archaeological features or deposits (e.g. arrowheads, pottery, glass, metal, etc.) are uncovered, work in the vicinity of the discovery will stop immediately and all reasonable measures to avoid or minimize harm to the finds will be taken.

The subrecipient will ensure that archaeological discoveries are secured in place, that access to the sensitive area is restricted, and that all reasonable measures are taken to avoid further disturbance of the discoveries. The subrecipient's contractor will provide immediate notice of such discoveries to the applicant. The subrecipient shall contact the North Carolina State Archaeologist and FEMA within 24 hours of the discovery. Work in the vicinity of the discovery may not resume until FEMA has completed consultation with SHPO, Tribes, and other consulting parties as necessary. In the event that unmarked human remains are encountered during permitted activities, all work shall stop immediately, and the proper authorities notified in accordance with North Carolina Statutes, Section 70-29.

- Any changes to the approved scope of work will require submission to, and evaluation and approval by, the State and FEMA, prior to initiation of any work, for compliance with Section 106.
- Prior to conducting repairs, applicant must identify the source and location of fill material and provide this information to North Carolina Emergency Management (NCEM) and FEMA. If the borrow pit is privately owned, or is located on previously undisturbed land, or if the fill is obtained by the horizontal expansion of a pre-existing borrow pit, FEMA Section 106 consultation will be required. Failure to comply with this condition may jeopardize FEMA funding; verification of compliance, review and follow-up consultation by FEMA Environmental Planning and Historic Preservation (FEMA-EHP) will be required at project closeout.

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FEMA is aware of the November 12, 2024 decision in Marin Audubon Society v. Federal Aviation Administration, No. 23-1067 (D.C. Cir. Nov. 12, 2024). To the extent that a court may conclude that the Council on Environmental Quality (CEQ) regulations implementing NEPA are not judicially enforceable or binding on this agency action, FEMA has nonetheless elected to follow those regulations at 40 C.F.R. Parts 1500–1508, in addition to DHS and FEMA's procedures implementing NEPA found in DHS Directive 023-01-01, DHS Instruction 023-01-001-01, FEMA Directive 108-1, and FEMA Instruction 108-1-1to meet the agency's obligations under NEPA, 42 U.S.C. §§ 4321 et seq.

13. List of Preparers

Table 5 is a list of preparers who contributed to the development of the Kings Branch Floodplain & Stream Restoration EA for FEMA. The individuals listed below had principal roles in the preparation of this document. Many others contributed, including senior managers, administrative support personnel, and technical staff, and their efforts in developing this EA are appreciated.

Table 4: List of Preparers

Preparers	Experience and Expertise	Role in Preparation
Kimley-Horn and Associates		
Doug Delaney, AICP	Senior Environmental Planner	NEPA Documentation
Hope Weaver	Environmental Planner	NEPA Documentation
Meridith Krebs	Senior Environmental Planner	Quality Control / Technical Review
Tad Hardy, P.E.	Senior Environmental Planner	Quality Control / Technical Review
Jason Diaz, P.E., CFM	Project Manager	Quality Control / Technical Review
Charlotte-Mecklenburg Storm Water Services		
Brian Sikes	Project Manager	Quality Control / Technical Review
Federal Emergency Management Agency		
Kelly Hinson	FEMA Region 4	Environmental Specialist
Evan Welker	FEMA Region 4	Environmental and Historic Preservation Specialist
Hayley Cotton	FEMA Region 4	Emergency Management Specialist
Angelika H. Phillips, DrPH	FEMA Region 4	Regional Environmental Officer

Appendices are available for review upon request to

FEMA-R4EHP@fema.dhs.gov

Appendix A
Maps and Figures

Appendix B
Kings Branch Flood Mitigation Final Stream Feasibility Study

Appendix C
FEMA Floodplain Management and Wetland Protection 8-step Hydrologic and Hydraulic Analysis

Appendix D
Biological Analysis

Appendix E
Permits Obtained for the Project

Appendix F
Agency Coordination