

BIG CREEK NATIONAL DISASTER RESILIENCE DESIGN PROJECT

FINAL ENVIRONMENTAL ASSESSMENT

SHELBY COUNTY, TENNESSEE

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Executive Summary

Shelby County, Tennessee, experienced a series of three powerful storms in April 2011, resulting in Presidential disaster declarations: Federal Emergency Management Agency (FEMA) 1974-DR, 1978-DR, and 1979-DR. The historic flooding resulted in \$2 billion in damages, with many of Shelby County's most vulnerable communities experiencing severe flooding. Due to the damage and characteristics of the most impacted and distressed, the U.S. Department of Housing and Urban Development (HUD) pre-qualified Shelby County as an eligible applicant for the Community Development Block Grant - National Disaster Resilience Competition (CDBG-NDRC), which is funding dedicated to the purpose of promoting innovative resilience projects to better prepare communities for future storms and other events.

Through a two-phase competition process, Shelby County was selected to receive funds for resilient housing and infrastructure projects. The first phase of the NDRC application identified unmet recovery needs (URN) while the second phase focused on developing resilient activities to address documented URN within the county.

The proposed Big Creek Activity has been identified as an action Shelby County could take to alleviate and prevent future flooding in the Millington area. In recent years, the Millington area has experienced flooding on multiple occasions when Big Creek water levels have exceeded the height of the protective levee. The proposed project seeks to improve Millington's resilience to future flooding and alleviate current flooding conditions of surrounding communities by establishing a large floodway between the existing levee north of Big Creek and Paul Barrett Parkway (State Route 385). Flood storage is accomplished and controlled through strategic placement of the lowered bank areas, excavation of primarily upland land to provide additional flood storage, and berms to control the flow and duration of storage. This would allow flood waters to bypass the community and provide flood protection for nearby neighborhoods and the Naval Support Activity Mid-South. The Big Creek Activity would also provide broader community benefits through connectivity of greenway trails, walking paths, multipurpose fields, and other recreational amenities.

As a recipient of CDBG-NDRC funding, Shelby County is responsible for conducting an environmental review pursuant to the National Environmental Policy Act (NEPA). Specific to this Environmental Assessment (EA), two alternatives have been evaluated: The No Action Alternative and the Proposed Action Alternative. As discussed within the EA, several other concepts were considered during early planning but were eliminated for varying reasons prior to funds being received through the NDRC. These concepts were determined not to be feasible and were not advanced to the NEPA review.

Shelby County evaluated the potential effects of proposed actions with respect to environmental resources, including the following: land use, water resources, geological resources, farmlands, cultural resources, visual resources, noise, air quality, floodplains, biological resources. With the implementation of appropriate Best Management Practices (BMPs) and mitigation measures, no significant impacts to these resources were identified.

CHAPTER 1

1.0 INTRODUCTION

The Government of Shelby County, Tennessee, has received funding from the U.S. Department of Housing and Urban Development (HUD) to assist with resiliency planning and recovery needs resulting from May 2011 flooding. The grant is designed to address flooding issues by improving the community's resilience to future flooding and alleviating current flooding conditions of adjacent communities.

Specific to this Environmental Assessment (EA), the Big Creek Activity would provide more room for a swelling stream during extreme storm events resulting in resilient, environmentally compatible solutions in the same space as recreational amenities for residents to use when the area is not flooded. The activity would provide for sustainable wildlife areas with native vegetation, wetlands, and other natural features. The area would also provide broader community benefits through connectivity of greenway trails, walking paths, multipurpose fields, and other recreational amenities.

1.1 BACKGROUND

Shelby County experienced a series of three powerful storms in April 2011, resulting in Presidential disaster declarations: Federal Emergency Management Agency (FEMA) 1974-DR, 1978-DR, and 1979-DR. The historic flooding resulted in \$2 billion in damages, with many of Shelby County's most vulnerable communities experiencing severe flooding. Due to the damage and characteristics of the most impacted and distressed, HUD pre-qualified Shelby County as an eligible applicant for the Community Development Block Grant - National Disaster Resilience Competition (CDBG-NDRC), which is funding dedicated to the purpose of promoting innovative resilience projects to better prepare communities for future storms and other events. Through a two-phase competition process, Shelby County was selected to receive funds for resilient housing and infrastructure projects. The first phase of the NDRC application identified unmet recovery needs (URN) while the second phase focused on developing resilient activities to address documented URN within the county.

Repetitive flooding over the past 30 years has resulted in damages in excess of \$200 million to public and private infrastructure in the Millington area. The three most significant events occurred in 1987, 2010, and 2011. The 2010 event alone resulted in an estimated \$233 million in damages to the area. During the 2010 flood, approximately 900 Millington residents were displaced, and between 200 and 300 homes associated with the Naval Support Activity Mid-South were flooded. The Naval Support Activity Mid-South, a major employer and economic driver in the Millington area, estimated the flood resulted in a cost of \$154,000,000 to the Navy, including \$54,000,000 in facility repairs. The 2011 flood produced some of the worst flooding in recent years in Millington and the surrounding area. Stormwater runoff caused streams and rivers to overflow their banks and caused major damage to infrastructure as well as residential, commercial, and industrial properties. The qualifying event resulted in damages of approximately \$5,000,000 in the Millington area (Shelby 2015a).

As part of the program, the CDBG-NDRC targets impacted communities with significant low- and moderate-income (LMI) populations. For CDBG funding, a person qualifying under the Section 8 Housing Assistance Payments program is considered to be "very low income". The Section 8 requirement is typically based on 50 percent of area median. CDBG moderate income relies on

Section 8 "lower income" limits, which are generally tied to 80 percent of area median income. The City of Millington was determined to be eligible for CDBG funding as it is made up of more than 50 percent LMI households (HUD 1984).

The flood damage not only displaced the LMI population but also disrupted livelihoods stemming from displacement, loss of income, and recovery needs still unmet today. The effects have been worsened by recent storm events in this area measuring well over the 1,000-year rainfall occurrence. The major cause of disaster in these events was significant flooding from Shelby County's main tributaries. Part of this flooding was exacerbated by continued environmental degradation along the river banks from agricultural runoff upstream. Resilient interventions such as flood protection infrastructure, improved wetlands, and retention and detention ponds could vastly decrease the impact of future flood events on infrastructure and residents.

In November 2011, Shelby County Government was awarded a \$2,619,999 Sustainable Communities Regional Planning Grant from HUD to prepare the Mid-South Regional Greenprint and Sustainability Plan. The 25-year plan is designed to enhance regional sustainability by establishing a unified vision for a region-wide network of green space areas, or Greenprint, which serves to address long-term housing and land use, resource conservation and environmental protection, community health and wellness, transportation alternatives, economic development, neighborhood engagement, and social equity in the Greater Memphis Area.

Had the extensive flood protection interventions proposed in the Greenprint for resilience improvements been in place at the time of the 2011 storms, the impact of the flood events would have likely been greatly reduced in the region. During the CDBG-NDRC grant application and selection process, a Benefit Cost Analysis was prepared and concluded that had the proposed improvements to the Big Creek floodplain been constructed prior to the 2011 flood, most flooding in Millington would not have occurred, reducing approximately \$4.5 million of losses to residential property damage, facilities, and lost jobs. In addition to economic benefits of flood prevention and reduction, flood intervention activities, most importantly, help prevent loss of life due to flooding (Shelby 2015a).

Despite a substantial recovery, Shelby County still faces URN for housing, infrastructure, and environmental degradation caused by the 2011 storm events. During the 2011 storms, 198 homes in Shelby County flooded. Since these flood events, there has been no allocation of CDBG-NDRC funds for home repair. In February 2015, Shelby County representatives completed a windshield survey of homes with remaining damage from the declared disaster. The survey found 80 homes with unmet repair needs due to the 2011 storms and 37 vacant lots adjacent to these damaged properties that regularly experience flooding. Further, county staff collected 26 homeowner signatures certifying they were unable to repair storm-related damage to their homes.

In September 2014 the City of Millington published the Millington Greenways Plan. This was prepared through a subplanning award of the 2011 Sustainable Communities Regional Planning Grant. The Millington Greenways Plan serves as a guide to develop an integrated, connected system of greenways, paths, and sidewalks to connect the existing park system, open spaces, and major destination points located throughout Millington (Millington 2014). In addition to floodplain improvements proposed to facilitate disaster resilience and preparedness, multiple elements of the proposed project were identified as priorities in the City of Millington Greenways Plan.

1.2 PURPOSE AND NEED FOR ACTION

In recent years, the Millington area has experienced flooding on multiple occasions when Big Creek water levels have exceeded the height of the protective levee. The proposed project seeks to improve Millington's resilience to future flooding and alleviate current flooding conditions of surrounding communities by establishing a large floodway between the existing levee north of Big Creek and Paul Barrett Parkway (SR 385), the elevated highway to the south. Flood storage is accomplished and controlled through strategic placement of the lowered bank areas, excavation of primarily upland land to provide additional flood storage, and berms to control the flow and duration of storage. This would allow flood waters to bypass the community and provide flood protection for nearby neighborhoods and the Naval Support Activity Mid-South. The Big Creek Activity would also provide broader community benefits through connectivity of greenway trails, walking paths, multipurpose fields, and other recreational amenities.

1.3 EXISTING CONDITIONS

The project area, located roughly between Big Creek to the north and Paul Barrett Parkway to the south, is bounded by US 51 to the west and Sledge Road to the east, with Raleigh Millington Road and Singleton Avenue (Highway 204) transecting the project area north to south. In addition to roadway infrastructure, just west of Raleigh Millington Road, roughly 700 linear feet (lf) of railroad travels north-south through the project area, before crossing over Big Creek and under Paul Barrett Parkway. Over time, the project area has transitioned from an active naturally forested floodplain to cultivated pastures to its current condition of wooded wetland, shrubs, and pasture mix. Over several decades, Big Creek has become a severely incised and over-widened channel that does not adequately convey the discharge it receives from large storm events. As the impairment of the stream continues, channel degradation exacerbates downstream water quality and threatens the recovery of "connected" natural aquatic systems. In recent years, the project area and surrounding community has experienced flooding when Big Creek water levels have exceeded the height of the protective levee. The project area is largely undeveloped with limited agricultural activity currently occurring within some areas. There is no public activity occurring within the project area. An active Tennessee Department of Transportation (TDOT) wetland mitigation bank, located along the eastern portion of the project site, makes up approximately 400 acres of the project area.

1.4 DESIRED FUTURE CONDITIONS

Although the primary purpose of the project is to alleviate current flooding conditions of adjacent communities, this project also intends to restore and enhance the existing floodplain and natural aquatic systems by reconnecting them with Big Creek's 5-year and bank full stages. Flood storage is accomplished and controlled through strategic placement of the lowered bank areas, excavation of primarily upland land to provide additional flood storage, and berms to control the flow and duration of storage. Grade controls, where appropriate, will be installed. These controls will lead to enhanced stabilization of the stream channels, reducing upgradient erosion and downstream sediment loading. Restoration and enhancement of the adjacent floodplain's natural conditions will include transitioning some of the currently drained (previously converted) wetland soils into native herbaceous wetlands. In addition to flood alleviation measures, trails and recreational amenities that are resilient to flooding are planned for development within the project area. The surrounding community would benefit from access to greenway trails, walking paths, multipurpose fields, and other recreational amenities.

1.5 SCOPE OF THIS ENVIRONMENTAL ASSESSMENT

The National Environmental Policy Act (NEPA) (42 United States Code [U.S.C.] §§ 4321-4347) and its implementing regulations promulgated by the Council on Environmental Quality ([CEQ], 40 Code of Federal Regulations [CFR] §§ 1500–1508), requires federal agencies to evaluate the potential environmental impacts of their proposed actions. To meet these requirements, an EA has been prepared in accordance with NEPA, CEQ’s regulations, and HUD’s procedures for implementing NEPA at 24 CFR 50.4, 58.5, and 58.6. As a recipient of funds through the CDBG-NDRC, Shelby County serves as the Responsible Entity for the environmental review, with the Mayor serving as the Certifying Officer, in accordance with 24 CFR Part 58.

The proposed project is designed to address flooding issues by improving the community’s resilience to future flooding and alleviating current flooding conditions of adjacent communities. The proposed actions will include grading, filling, and earth moving to lower land elevations and provide additional floodwater conveyance and storage. In addition to flood alleviation measures, trails and recreational amenities that are resilient to flooding are planned for development within the project area. The following chapters describe the existing environment in the project area, analyze potential environmental impacts associated with the Proposed Action Alternative and the No Action Alternative, and identify and characterize cumulative impacts resulting from the proposed project in relation to other ongoing or reasonably foreseeable proposed activities within the surrounding area of the project site.

Potentially affected areas within and beyond the project site help define the project area. Chapter 3 discusses the extent of the project area and any variances in the project area specific to certain environmental resources, e.g., impacts to archaeological resources are limited to areas of physical disturbance while impacts to historic architectural resources include structures within proposed project’s viewshed.

1.6 REQUIRED PERMITS AND LICENSES

Based on the scope of the proposed construction activities, as described in Chapter 2, the project would require a National Pollutant Discharge Elimination System (NPDES) construction general permit issued by the Tennessee Department of Environment and Conservation (TDEC). A NPDES permit would require the development of a stormwater pollution plan (SWPPP) and implementation of approved pollution prevention measures (TDEC 2016). Appropriate building permits will be obtained through Shelby County Planning & Development and City of Millington Building Department. Access for entrance improvements at US 51/SR 3 will be obtained through appropriate TDOT channels and permitting, including a driveway permit for an entrance off of US 51 and any slope and construction easements that may be needed from TDOT right-of-way (ROW).

The Clean Water Act (CWA) establishes the basic structure for regulating discharges of pollutants into the waters of the U.S. and regulating standards for surface waters. The CWA stems from the Federal Water Pollution Control Act which was enacted in 1948 but was significantly reorganized and expanded in 1972. These amendments, which focused on water protection, led to the CWA.

Section 401 of the CWA allows TDEC to take a more active role in decisions impacting aquatic resources. In most cases, Section 401 certification review is conducted at the same time as the federal agency review. This review allows for better consideration of state-specific concerns in the federal permitting process. Based on the preliminary plans, an Individual Permit will be necessary from TDEC due to the proposed impacts to stream and wetland features.

Section 404 of the CWA regulates the placement of dredged or fill material into wetlands, lakes, streams, river, estuaries, and certain other types of waters. The goal of Section 404 is to avoid and minimize losses to wetlands and other waters and to compensate for unavoidable loss through mitigation and restoration. It is also expected that an Individual Permit will be necessary from the U.S. Army Corps of Engineers (USACE) due to the proposed impacts to stream and wetland features.

In addition to CWA permitting, the proposed project will require a Section 408 permit from the USACE. 33 U.S.C 408 prevents the alteration or taking of any structure or work built or controlled by the USACE. Improvements to the existing levee will require permission through a Section 408 permit which allows the alteration of a public works project so long as that alteration is not injurious to the public interest and will not impair the usefulness of the work. The work, which will be limited to construction activities and will further progress the levee's purpose of flood protection, meets the intent and requirements of a Section 408 permit.

Construction activities within the floodplain and floodway are proposed to improve the community's resilience to future flooding and alleviate current flooding conditions of adjacent communities. As later discussed, a change in flood elevations, requiring a Letter of Map Revision (LOMR) through FEMA, is anticipated. While alterations to the floodplains would result in changes to elevations, heightened elevations are limited to storage in Area 3. Residential and commercial areas would be protected by berms and would not experience a change in elevations related to the proposed project. The LOMR revision will be submitted to FEMA for acceptance into formal FEMA flood mapping.

CHAPTER 2

2.0 DESCRIPTION OF THE ALTERNATIVES

When considering the environmental impacts associated with a proposed project, alternatives should be considered. The following discussion identifies the alternatives to be evaluated, describes each alternative, provides a comparison of alternatives with respect to their potential environmental impacts, and identifies the Preferred Alternative.

This EA evaluates two alternatives: The No Action Alternative and the Proposed Action Alternative. As later discussed, several other concepts were considered during early planning but were eliminated for varying reasons prior to funds being received through the NDRC. These concepts were determined not to be feasible and were not advanced to the NEPA review. A full environmental review has not been conducted for the eliminated concepts.

2.1 No Action Alternative

The No Action Alternative provides for a baseline of conditions against which the impacts of the Proposed Action Alternative can be measured. Under this alternative, no flood alleviation measures or trails and recreational amenities would be constructed within the project area. Under the No Action Alternative, environmental conditions in the project area would remain unchanged in the immediate future. The identified land would not be developed into the proposed Big Creek Activity and flooding would continue to be an issue for the surrounding community.

2.2 PROPOSED ACTION ALTERNATIVE

The Government of Shelby County has received funding from HUD to assist with resiliency planning and recovery needs resulting from May 2011 flooding. The grant is designed to address flooding issues by improving the community's resilience to future flooding and alleviating current flooding conditions of adjacent communities. The proposed actions will include grading, filling, and earth moving to lower land elevations and provide additional floodwater conveyance and storage. These activities are proposed along Big Creek (35.334482, -89.917250) in Millington, Tennessee, on the north side of Paul Barrett Parkway between US 51 (35.332391, -89.919611) and Sledge Road (35.308930, -89.835597). As discussed later in this section, the main project area proposed for the Big Creek Activity is divided into three areas covering approximately 1,600 acres.

Approximately one-third of this property is currently owned by the City of Millington, the State of Tennessee, or the Henderson Revocable Trust. The remainder of the property would be acquired from individual property owners and is currently undeveloped. Within Area 3, Shelby County is in the process of acquiring an easement for the use of land from the Naval Support Activity Mid-South. This will allow trails to pass through the Navy land as well as construction activities focused on flood alleviation surrounding the Naval Support Activity Mid-South. During the application process, the Navy provided a formal letter of support for the project. Throughout the grant implementation, Shelby County has continued to work with the Navy to establish an easement agreement.

Additional county-owned land has been identified west of US 51 (35.335411, -89.924699) for potential mitigation sites if needed. No activity or improvements have currently been planned for

these areas. South of the project, at Raleigh Millington Road and Duncan Road (35.285666, -89.920633), a location has been identified for excess fill material to be taken for an unrelated Shelby County project. Figure 1 identifies the project location and proposed area of impact. The current concept, included in the attachments, identifies three sections with varying activities as discussed below.

Area 1

Area 1 focuses on multipurpose recreational areas, including four 240' x 360' multipurpose fields, three parking areas, one amphitheater stage, three shelters, one playground and one disc golf course. A pedestrian bridge crossing Big Creek with a trail connector to neighborhoods north of Big Creek is also included within Area 1.

As currently proposed, a new curb cut would be required along US 51 to create an entrance into Area 1, allowing vehicular access into the project area for parking. The entrance would be right-in, right-out only, approximately 650 lf northeast of the northbound lane of the US 51/ Paul Barrett Parkway interchange. From the entrance, a minimum 24-foot wide road would bend southeast for approximately 900 lf until running roughly parallel with Paul Barrett Parkway, following along TDOT ROW. The roadway would then continue for approximately 2,350 lf before ending in a roundabout, allowing cars to easily turnaround.

As the road straightens to run parallel with Paul Barrett Parkway, a 29-space parking lot would provide visitors with the westernmost parking option before reaching the multipurpose fields. An existing tree line will be maintained as a buffer between US 51 and the planned park area. The eastern edge of the tree line lies between 400 and 1,200 lf from US 51, running north to southeast. A 296-space parking lot is included along the roadway, just beyond the existing tree line. The parking lot, which is roughly 800 lf long, is located just north of the roadway with an entrance/exit on each end and one approximately 300 lf from the eastern edge of the parking lot. East of this parking lot, the road continues with a 15-spot parking area on the north side of the road before dead-ending into a roundabout.

In addition to vehicular access, the parking lot connects to the trail system, allowing patrons to easily access all multipurpose fields and trails continuing into other areas of the park. Within the multipurpose field area, three locations for picnic tables have been included. East of the multipurpose fields and north of the parking lot, a stage with an observation mound, constructed from relocated site fill material, is proposed. A permanent restroom facility is planned for Area 1 near the athletic fields that will serve the park.

East of the multipurpose fields, a 10-foot wide asphalt trail will travel northeast for roughly 400 lf before turning east to travel along the south side of Big Creek atop the levee for approximately 2,000 lf with another running along the south side of the roadway. The southern trail would begin from the parking lot and continue along Paul Barrett Parkway for approximately 2,400 lf until turning north, traveling on the west side of an existing railroad for approximately 500 lf. The trail system will also meander through forested area before joining the other two trails. All trails west of the railroad merge to create one singular path before crossing east of the railroad. This path is accomplished through a trail crossing beneath the railroad. The railroad bridge above the trail will be widened to prevent potential falling items from landing on or near the trail. The trail continues east of the railroad before crossing under Raleigh Millington Road and entering Area 2. The trail under Raleigh Millington Road bridge is to be constructed as part of the Shelby Raleigh Millington Road, Bridge Over Big Creek Project (TDOT PIN 122544.00).

In addition to the floodplain and recreational improvements to the project area, levee improvements are planned north of Big Creek. The project proposes to increase the height of the existing levee by 4 feet for approximately 1 mile, north of Big Creek from US 51 to the rail line west of Raleigh Millington Road. A gate structure at Newport Ditch would also be replaced. A trail would run along the top of the western portion of the levee to improve connectivity between neighborhoods in the areas north of Big Creek. The net result will be filling approximately 120,000 cubic yards in raising the area for multipurpose fields, parking, and access roads. Other activities planned for Area 1, including trails and disc golf course, will remain at existing grades. Work associated with the development of Area 1 would impact approximately 25.98 acres within the floodplain and would not result in impacts to wetlands.

Area 2

Continuing from Area 1, the 10-foot wide trail would continue into Area 2, crossing under Raleigh Millington Road and continuing east just south of Big Creek. The trail would continue to meander through Area 2, splitting into two trails occasionally to offer differing paths for trail users.

Throughout much of Area 2, a trail is also planned to travel along Paul Barrett Parkway. The north and south trails within Area 2 would be connected to create a loop around the large pond and wetland area. From the eastern edge of the loop, a trail would continue along the south side of Big Creek to Singleton Avenue where the trail would lead into Area 3. Additional amenities and observation and picnic areas are included within Area 2 of the proposed project. Near the eastern trailhead, three camp sites are planned along high ground. A 47-spot parking lot and two small, 10-spot trailhead parking areas off of Jones Boyd Road are planned south of the wetland area and would provide access to Area 2. Just off of the 47-spot parking lot, permanent restroom facilities would be available to guests.

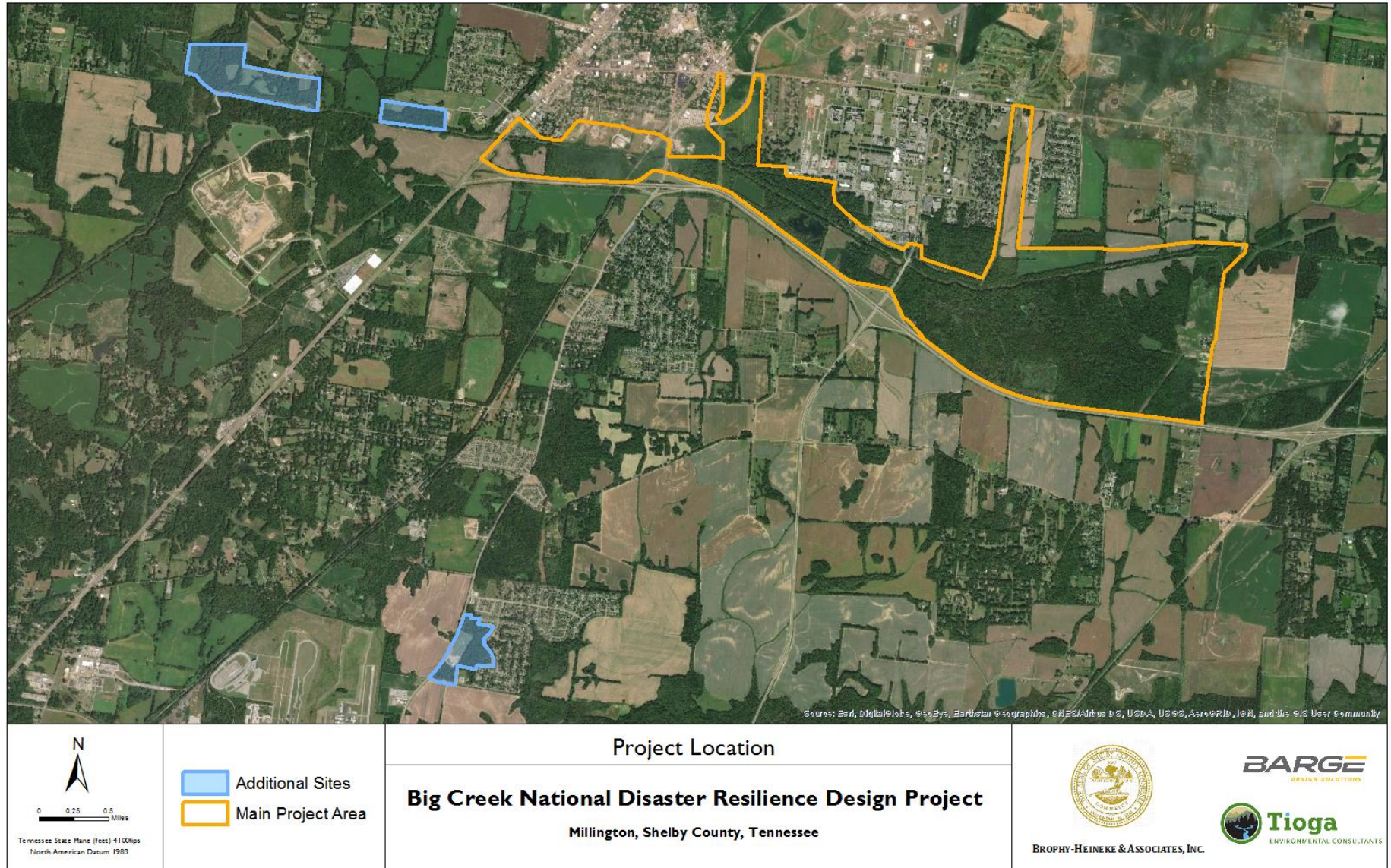
Within Area 2, Shelby County and the Chickasaw Basin Authority plan to work with local community organizations to program activities focused on the education and stewardship of ecological resources. This would likely include the use of pavilions as outdoor classrooms and guided tours through the natural trail areas.

The construction of a pump station and supporting flood control elements, such as a floodwall to tie in to the existing levee, is also planned along North Fork Creek near Pitts Street and Brinkley Street. The floodwall, planned northeast of the existing levee improvements, would begin at Veterans Parkway and cover approximately 1,500 lf on the west side of North Fork Creek. The structure would be constructed to an average height of 6 feet and protect a flood-risk neighborhood not previously protected from flooding. The net result will be excavation of approximately 120,000 cubic yards. Most of this material would come from the western edge of Area 2 (approximately 14 acres) and would be used as fill material in Area 1. The remainder of Area 2 will contain trails, boardwalks, and other site amenities that will remain at or near existing grades. Approximately 0.08 acre of wetland and 18.96 acres of floodplains will be impacted by development within Area 2.

Area 3

Due to an existing TDOT wetland mitigation site, work will be limited within Area 3. TDOT has been involved in discussions and planning for Area 3. For most of Area 3, the land will be kept in a natural state with a meandering trail. While activity and programming through Area 3 will focus on the natural environment and flood control, the Proposed Action Alternative includes a paved

trail traveling along Big Creek with a primitive trail to the south following roughly along the Old Big Creek Channel. Sections of boardwalks are proposed to be built up throughout Area 3 to cross over wetland areas. A portion of existing unpaved trail will remain. This begins in the southeastern corner of Area 3 and continues along the proposed high flow channel before traveling south and connecting to proposed boardwalks. Observation areas are planned throughout the accessible portions of Area 3. A 24-spot parking area is proposed east of Singleton Avenue, near the western edge of Area 3, and two 10-spot trailhead parking areas are planned near the project's eastern terminus along Sledge Road. A berm and Big Creek diversion channel are planned within Area 3 to provide additional flood storage. A section of Sledge Road will be raised to connect to an existing berm, providing flood protection to a nearby residential area. The net result will be fill of approximately 530,000 cubic yards used for the 70-acre berm outlining the majority of Area 3. This material will come from the excavation of the 15-acre diversion channel. The remainder of Area 3 will contain primitive trails, boardwalks and three trail heads that will remain at or near existing grades. Approximately 2.88 acres of wetlands and 76.57 acres of floodplain will be impacted by project development within Area 3.



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Date: 08 October 2019

Figure 1. Project Location Map

2.3 ALTERNATIVES ELIMINATED FROM FURTHER CONSIDERATION

In August 2015, a Big Creek Basin-Wide Drainage Study was conducted to evaluate the effects of potential improvement projects focused on eliminating or reducing flooding in Millington and surrounding areas (Shelby 2015b). The study was not designed to identify and develop specific construction projects but rather to investigate several broad, conceptual approaches. These approaches focused on reducing flooding levels and improving water quality and included preparing preliminary, planning-level opinions of probable construction costs for the studied alternatives. The results of this study provided local officials with data to assess each concept, determine funding needs, and consider potential methods for providing resiliency against future flood damages. The study considered four conceptual alternatives:

- 1) Floodwater Detention Sites
- 2) Enhanced Structural Protection (Levee)
- 3) High Flow Diversion
- 4) Increased Channel/Overbank Flow Capacity

Temporary Floodwater Detention Sites

One of the most commonly-used methods of reducing flood flows in a reach is to construct detention structures upstream of the reach where the reduction in floodwater elevation is desired. Detention structures serve to reduce flood flows downstream by temporarily storing a portion of the high flows and releasing it slowly over a longer period of time to the downstream reach. The most critical reach of Big Creek in terms of potential flood damages is from US 51 upstream to Sledge Road since this is the most highly developed portion of the basin. Consequently, areas were investigated for potential detention sites along Big Creek upstream of Sledge Road. The study evaluated four unique sites upstream of Millington including combinations of multiple detention structures. It was determined that the detention structures would be effective in mitigating flood flows in Millington; however, permitting challenges and land acquisition would have made constructing such structures challenging. Additionally, funding for impoundment structures is not readily available.

Enhanced Structural Protection (Levee)

Standard levee improvements were considered for the second alternative. These would include raising and extending the Millington and Naval Support Activity Mid-South levees. This alternative was developed to be a focused approach to provide a low-cost alternative to specifically address Naval Support Activity Mid-South flooding during the May 2010 event.

It involved examining the location and extent of the overtopping and evaluating the effects to adjacent areas of modifying the existing levee to mitigate the potential of overtopping from a similar flood event. This alternative would increase flood protection for the immediate areas around Millington by increasing the heights of existing levees and constructing new levees between areas that are not protected. Levees are effective at mitigating flooding for areas immediately “land side” or behind but can increase peak flows downstream by cutting off flood waters that would otherwise be stored in the floodplain. To avoid potential increases to peak flows downstream, limiting the project to levee improvements was eliminated from further consideration.

High Flow Diversion

The third alternative evaluated proposed constructing a high flow diversion upstream of the Naval Support Activity Mid-South along a major tributary to Big Creek called Crooked Creek. This alternative was developed as a non-traditional approach to reducing water surface elevations, which typically involves acquiring land rights for large areas associated with regional detention facilities. Using this approach, the flow from Crooked Creek would be diverted about 15 miles to the south where it would enter the Loosahatchie River during major flood events. With a drainage area of 18.4 square miles at the confluence, Crooked Creek represents about 36 percent of the total drainage area (51.4 square miles) after the two streams join. Significantly reducing the contribution from Crooked Creek would have a major effect on the peak flows in the area of primary concern downstream.

This could potentially increase Loosahatchie River flows downstream of the diversion entry point; however, it is believed that diverted Crooked Creek flow (from a drainage area of 18.4 square miles) will peak well ahead of the main flow in the Loosahatchie River which has a 520 square miles drainage area at that point, resulting in insignificant impacts to the composite hydrograph. The alignment of the excavated diversion channel could be set to roughly follow existing drainage ways to minimize the amount of cut, and consequently the amount of land acquisition required, but there would still be a maximum cut on the order of 50 feet in depth at the crest of the intervening ridge and new drainage structures would be required where the channel crossed Paul Barrett Parkway and Pleasant Ridge Road. Additional consideration of this alternative was not further considered as community buy-in would be challenging given that floodwaters would be displaced onto another basin that may already have flooding concerns.

Increased Channel/Overbank Flow Capacity – Advanced Concept

The final alternative evaluated in the drainage study consisted of providing additional flow area in the left overbank along the critical reach of Big Creek from US 51 to Sledge Road. Several different scenarios within this alternative were evaluated, consisting primarily of various combinations of: increasing flow by reducing the Manning's friction factor, providing additional flow area by excavating in the south overbank, and increasing existing bridge waterway openings to reduce bridge backwater effects.

This alternative proved effective in reducing the water surface profile along Big Creek during extreme flooding events impacting the City of Millington, the Naval Support Activity Mid-South, and the surrounding areas. Following the drainage study, the concept of increased channel/overbank flow capacity was selected to use as the basis for grant applications and funding requests. Specifically, excavation within the overbank and floodplain restoration activities were advanced in planning efforts. In addition to floodplain restoration and adding floodwater conveyance, the increased channel/overbank flow capacity concept was developed to include recreational amenities such as trails and multipurpose fields. This concept was termed "Making Room for the River" and received grant funding from HUD.

During the preliminary design phase of the project it was determined that this this alternative resulted in an increase of the peak water surface profile downstream of US 51 as result of the increase in conveyance. It proved challenging to provide a design that would incorporate the elements of the "Making Room for the River" concept without increasing flood elevations downstream of US 51. Additionally, the project relied upon excavating hundreds of acres several feet, resulting in millions of cubic yards of soil to be hauled off-site. Finding an economical place

to dispose of this large amount of material would be challenging. During the initial phase of the project coordination, meetings were held with multiple regulatory agencies including USACE and TDEC. During these coordination meetings, it was discovered that an active TDOT wetland mitigation site is located along the eastern portion of the project. It was determined early in the process that the previously established TDOT mitigation site presented challenges for any construction activities or development within Area 3. Beyond the mitigation site, excavation across nearly 1,600 acres could lead to substantial environmental challenges including additional impacts to streams and wetlands. After further consideration, lowering the floodplain through excavation of the entire project area was eliminated as an option. By excluding approximately 400 acres of excavated storage the “Making Room for the River” alternative would not provide the adequate reduction in flood elevations along Millington or Naval Support Activity Mid-South.

Given the importance flood storage in the eastern portion of the area has on mitigating flooding along Millington and the Naval Support Activity Mid-South, another alternative was developed, and the proposed project evolved into the activities as described in the Proposed Action Alternative. This alternative consisted of constructing a high flow diversion channel downstream of Sledge Road with the intent of “Reconnecting the Floodplain”. This concept would divert flow from Big Creek into the area between Sledge Road and Singleton Avenue during extreme flood events. The additional flood waters would be stored and detained in the area by constructing a small berm along Big Creek. Stored flood water would be slowly released over time after the peak of the flood event. This concept minimizes impacts to the TDOT wetland mitigation site and lowers peak flood elevations along Big Creek. Hydraulic modeling determined additional excavation in other areas of the project between US 51 and Singleton Avenue resulted in minimal flood reduction and are not worth the significant environmental and financial cost. The additional modeling also confirmed that any additional increase in flood capacity at the US 51 bridge resulted in an increase in flooding downstream. Therefore it was determined that high flow diversion culverts at US 51 are not worth the additional cost. An added measure of flood mitigation protection is proposed by increasing the height of the existing Millington Levee by 4 feet. This would provide adequate freeboard for future extreme events.

2.4 HYDROLOGIC AND HYDRAULIC MODELING

The 2015 Big Creek Basin-wide Drainage Study presented alternatives for flood mitigation within the City of Millington. This EA presents two alternatives, the No Action Alternative and the Proposed Action Alternative. To arrive at the Proposed Action Alternative, potential alternatives for the Big Creek Watershed were simulated in the hydraulic model, HEC-RAS, to minimize impacts to potential stream and wetlands and maximize flood reduction. The selected alternative was refined with additional survey data and modeling, as well as preliminary design analysis.

A hydrologic model of the Big Creek Watershed was developed in HEC-HMS and calibrated to provide input for the HEC-RAS analysis. For the development and calibration of the HEC-HMS model, two stream gage locations within the 153 square-mile watershed and observed radar-based precipitation estimates were utilized to iteratively adjust sub-basin runoff potentials. Resulting sub-basin runoff hydrographs were distributed and applied to the HEC-RAS hydraulic model to produce water surface elevation and discharge hydrographs for comparison to the two gaged locations. Sub-basin runoff potentials were adjusted to provide the best fit for three historic events. The detailed HEC-RAS model was used to refine the selected design to try and minimize the excavation required for the proposed work while still meeting the floodwater surface elevation reduction requirements for the project.

The significance of the reductions in water surface elevations, due to the alternatives evaluated within the watershed are presented herein. As previously discussed, the alternatives evaluated are classified as detention, levee enhancement, high flow diversion, and increased channel capacity. The following conclusions provide an explanation of the alternatives specific to the hydrologic and hydraulic modeling and the development of the recommended alternative.

The first alternative evaluated construction of detention structures. Detention structures are one of the most commonly-used methods for reduction of flood flows, as they temporarily store a portion of the high flows and release it slowly to the downstream reach. Construction of varying combinations of detention structures at four unique sites was evaluated upstream of Millington, where the reduction in floodwater elevation is desired. HEC-RAS simulation results show that the detention structures are effective in mitigating flood flows in Millington; however, permitting challenges and land acquisition are impediments to implementation. Further, grant funding for impoundment structures is not readily available.

The second alternative evaluated raising and extending the Millington and Naval Support Activity Mid-South levees. Levees are effective at mitigating flooding for areas immediately land side, or behind, but can increase peak flows downstream by cutting off flood waters that would otherwise be stored in the floodplain. The potential for downstream impacts is a concern for this alternative.

The third alternative evaluated a high flow diversion upstream of Naval Support Activity Mid-South along Crooked Creek, a major tributary to Big Creek. This alternative is a non-traditional approach to reducing water surface elevations while eliminating the necessity of acquiring land rights for the large areas associated with regional detention facilities. During major flood events the flow from Crooked Creek would be diverted about 15 miles to the south where it would enter the Loosahatchie River. With an upstream drainage area of 18.4 square miles, Crooked Creek represents approximately 36 percent of the total drainage area (51.4 square miles) downstream of the confluence with the Loosahatchie River. The reduction in the contribution from Crooked Creek would significantly reduce the peak flows in the area of primary concern downstream. However, Loosahatchie River flows downstream of the diversion entry point could increase depending on the storm event. Additionally, the alignment of the excavated diversion channel would require a channel cut of approximately 50 feet in depth at the crest of the intervening ridge and new drainage structures would be required where the channel crossed Paul Barrett Parkway and Pleasant Ridge Road. Public perception for this project would be challenging given the displacement of floodwaters onto another basin that may already have flooding concerns.

The final alternative evaluated in the drainage study provides additional flow area in the left overbank along the critical reach of Big Creek from US 51 to Sledge Road. Different scenarios within this alternative were evaluated, consisting primarily of various combinations of: increasing flow by reducing the Manning's friction factor, providing additional flow area by excavating in the south overbank and increasing existing bridge waterway openings to reduce bridge backwater effects. This alternative proved effective in reducing the water surface profile along Big Creek during extreme flooding events along the City of Millington and Naval Support Activity Mid-South. Additionally, recreational amenities such as parks, trails, and multipurpose fields could be constructed in the excavated areas. This concept was termed "Making Room for the River" and received grant funding from HUD. This alternative will henceforth be referred to as the grant alternative.

During the preliminary design phase of the project it was determined that the grant alternative resulted in an increase of the peak water surface profile downstream of US 51 due to the increase in conveyance. It proved challenging to provide a design that would incorporate the elements of the grant alternative concept without increasing flood elevations downstream of US 51. Additionally, the grant alternative relied upon excavation of several feet of soil across hundreds of acres. This would result in millions of cubic yards of soil to be hauled off-site. Finding an economical place to dispose of this large amount of material would be challenging.

Coordination meetings took place during the initial phase of the project with multiple regulatory agencies, including USACE and TDEC. During these coordination meetings, it was made known that an active TDOT wetland mitigation bank is located along the eastern portion of the project site. After multiple coordination meetings with TDOT and TDEC, the regulatory authorities decided that excavation in the mitigation bank would be prohibited. By excluding approximately 400 acres of excavated storage, the grant alternative would not provide the adequate reduction in flood elevations along Millington or the Naval Support Activity Mid-South.

The revised constraints on flood mitigation precipitated evaluation of additional alternatives. Generally, these alternatives included various combinations of cut and fill, potential updates to adjacent roadways (Sledge Road, Raleigh Millington, and US 51), and comparison of outlet structure types for the detention areas.

Flood storage in the eastern portion of the project site for mitigation of flooding along Millington and the Naval Support Activity Mid-South is paramount to the success of this project. A new alternative was developed through multiple iterations in HEC-RAS. The Proposed Action Alternative consists of constructing a high flow diversion channel downstream of Sledge Road with the intent of reconnecting the floodplain. This concept diverts flow from Big Creek into the area between Sledge Road and Singleton Avenue during extreme flood events. A section of Sledge Road will be raised to connect to an existing berm, providing flood protection to a nearby residential area. The construction of the small berm along Big Creek will detain the additional flood waters. This stored flood water will be slowly released over time after the peak of the flood event. Detaining the water until the peak has passed eliminates the criticality of outlet structure type.

The Proposed Action Alternative minimizes impacts to the TDOT wetland mitigation site and lowers peak flood elevations along Big Creek. Further hydraulic modeling determined that additional excavation in other areas of the project between US 51 and Singleton Avenue resulted in minimal flood reduction and are not worth the significant environmental and financial cost. The additional modeling also confirmed that any additional increase in flood capacity at the US 51 bridge resulted in an increase in flooding downstream, diminishing the benefit of high flow diversion culverts at US 51 given the additional cost. The Proposed Action Alternative includes an added measure of flood mitigation protection by increasing the height of the existing Millington Levee by 4 feet. An increase in the levee height would provide adequate freeboard for future extreme events.

Figure 2 shows a comparison of the water surface profiles for multiple storm recurrences intervals with the existing conditions and the Proposed Action Alternative. As shown, the Proposed Action Alternative reduces the water surface elevation.

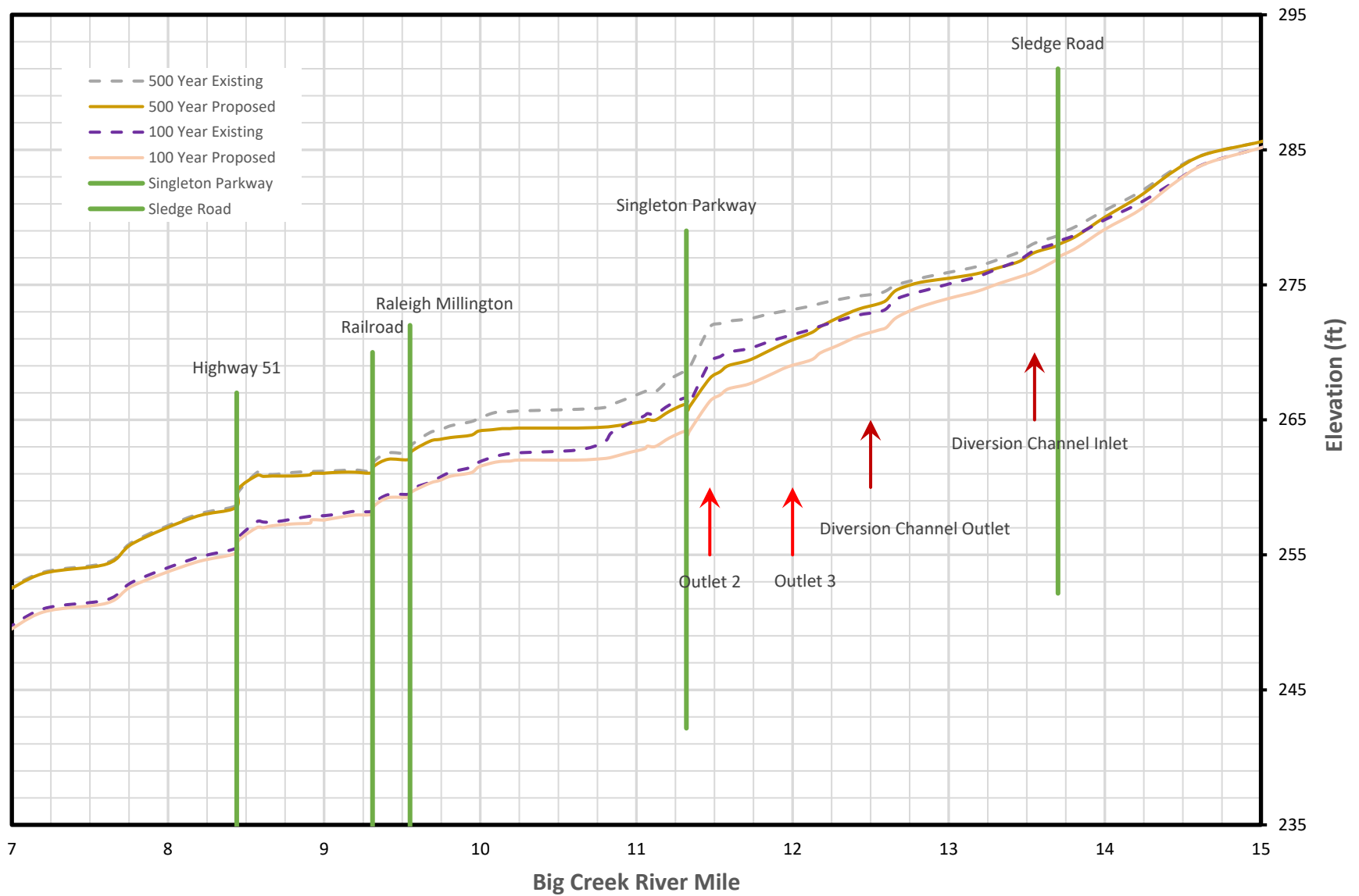


Figure 2. Big Creek Water Surface Profile for existing conditions and the Proposed Action Alternative

2.5 COMPARISON OF ALTERNATIVES

This EA evaluates the potential environmental effects that could result from implementing the No Action Alternative or the Proposed Action Alternative of floodplain restoration and recreational amenity improvements. The analysis of impacts in this EA is based on current and potential future conditions on the property and within the surrounding region. The summary and comparison of impacts by alternative for each resource area evaluated is provided in Table 1.

Table 1. Summary and Comparison of Alternatives by Resource Area

Resource Area	Impacts from No Action Alternative	Impacts from Proposed Action Alternative
Planning, Land Use, and Zoning	No impacts anticipated	No indirect impacts are anticipated from the development of the Proposed Action Alternative. Minimal direct impacts would occur to land within the immediate project area.
Geology, Soils, and Prime Farmland	No impacts anticipated	Potential for minor direct impacts to geology and soil resources are anticipated. Long-term impacts to prime farmlands and soil productivity on much of the site would be insignificant. Based on the limited site disturbance, there would be minimal direct and indirect effects on prime farmland under the Proposed Action Alternative.
Water Resources	No impacts anticipated	Minor, temporary indirect impacts to water resources could occur from stormwater runoff during construction. Direct adverse impacts to streams and wetlands would occur. These impacts would be mitigated through onsite stream restoration and the creation of new wetland areas.
Floodplains	No impacts anticipated	Minor direct adverse impacts to the floodplain are anticipated. While alterations to the floodplains would result in changes to elevations, heightened elevations are limited to storage in Area 3. Minor beneficial indirect impacts are anticipated for surrounding area through berm protection and additional water storage.
Biological Resources	No impacts anticipated	Potential indirect impacts to the federally listed Indiana bat and the northern long-eared bat may occur due to loss of potential summer roosting habitat. Additional minor impacts would result from the loss of bird habitat; however, this would be minimal.
Visual Resources	No impacts anticipated	Minor direct and indirect impacts are anticipated from the development of the Proposed Action Alternative. The floodplain alleviation efforts and development of the recreational facilities will not change the overall character of the land or have significant adverse visual impacts to the surrounding properties.
Noise	No impacts anticipated	Minor, temporary direct impacts would occur during construction.
Air Quality and Greenhouse Gas Emissions	No impacts anticipated	Minor, temporary direct impacts would occur during construction.
Cultural Resources	No impacts anticipated	No direct or indirect impacts are anticipated from the development of the Proposed Action Alternative.
Solid and Hazardous Wastes	No impacts anticipated	Minor direct and indirect adverse impacts anticipated from the development of the Proposed Action Alternative are anticipated. Construction waste generated during construction activities would be directed to local landfills.
Socioeconomics and Environmental Justice	No impacts anticipated	Minor, temporary beneficial impacts related to employment are anticipated. The surrounding LMI community would benefit from the long term flood protection efforts. The Proposed Action Alternative would not have significant adverse impacts to the local economy or result in adverse impacts to low-income or minority populations.
Recreational Facilities	No impacts anticipated	Direct beneficial impacts are anticipated from the development of the Proposed Action Alternative. No indirect impacts to existing recreational facilities would result from the construction of the Proposed Action Alternative.
Airport Hazards	No impacts anticipated	No direct or indirect impacts are anticipated from the development of the Proposed Action Alternative.
Public Safety	No impacts anticipated	No direct or indirect impacts are anticipated from the development of the Proposed Action Alternative.
Utilities	No impacts anticipated	Minor direct impacts are anticipated from the development of the Proposed Action Alternative.

2.6 MITIGATION MEASURES

Shelby County will implement appropriate Best Management Practices (BMPs), including those specified by permits, the SWPPP, and other mitigation agreements. Mitigation related to impacts to streams and wetlands and tree removal will be mitigated as described in the following.

As discussed in the permitting section, the Proposed Action Alternative would result in impacts to jurisdictional streams and wetlands that would require permitting through the USACE. Direct fill impacts to streams will be mitigated onsite. The restoration and enhancement of other onsite resources would ensure that no net losses would occur.

Streams that would be impacted have been field evaluated for mitigation suitability. Mitigation activities are proposed for a highly channelized stream, with slight erosion along the reach and regions of small bankfull benches occasionally connected to adjacent wetlands. Currently, man-made berms separate large portions of likely floodplain to the potential stream restoration area. With the removal or trimming of the berm height, flood waters from the streams can be dissipated into the adjacent wetlands that could act as large floodplains, minimalizing erosional issues. These activities will provide functional lift to the stream to offset the minimal functional losses anticipated to other onsite streams due to the proposed direct impacts from installation of pipes and culverts.

Similarly, where grade control structures are installed or streams are realigned, instream functions are expected to be lifted, through the provision of increased morphological stream stability and increased water quality due to decreased sediment loading.

No significant resource loss for wetlands is expected for this project. Less than 1 percent of the total onsite wetlands are expected to be directly impacted by the project, and no wetland conversion due to the proposed flood storage is anticipated. The proposed uplands excavation for flood storage will create new wetland areas, compensating for this minimal loss. No additional mitigation is proposed for wetland impacts.

As discussed in the grant application, Shelby County committed to tree planting to mitigate for tree removal associated with the Big Creek Activity. The Proposed Action Alternative would result in the removal of 20 acres of trees in Area 1, 23 acres in Area 2, and 113 acres in Area 3 for a total of 156 acres of trees to be removed. While tree removal is necessary to meet the need and purpose of the project, Shelby County has identified areas for tree planting to mitigate for Big Creek Activity tree loss. These plantings will occur as part of two other NRDC funded projects: South Cypress Creek Watershed and West Junction Neighborhood Redevelopment and the Wolf River Wetland Restoration and Greenway projects. Tree planting associated with these projects will balance the Proposed Action Alternative's tree removal and will ensure no net loss to the regional tree canopy.

2.7 THE PREFERRED ALTERNATIVE

The Proposed Action Alternative has been identified as the Preferred Alternative. Under this alternative, Shelby County would construct recreational amenities and floodplain alleviation measures along Big Creek in Millington.

2.8 PUBLIC INVOLVEMENT

As previously discussed, the Greenprint is a 25-year plan focused on enhancing regional sustainability through a unified vision for a region-wide network of green space areas while

addressing long-term housing and land use, resource conservation and environmental protection, community health and wellness, transportation alternatives, economic development, neighborhood engagement, and social equity. In addition to resilience efforts and goals identified throughout the region, Millington was specifically identified as an area in need of resilience planning and improvements. Millington and the surrounding communities were particularly open to the idea of combining resilience planning efforts with recreational amenities. As part of the planning efforts for the Greenprint, the City of Millington oversaw the preparation of the Millington Greenways Plan, which provides a vision and strategy for the development of an integrated, connected system of greenways, paths, and sidewalks to connect the existing park system, open spaces, and other destinations throughout the City. The concept of the proposed project is included in the Millington Greenways Plan and Greenprint (Millington 2014; Greenprint 2015).

Throughout the development of the Greenprint, Shelby County was consistently involved in outreach and stakeholder engagement. Beginning in 2012, the Memphis and Shelby County Office of Sustainability (MSCOS) led the planning process for the Greenprint, involving a consortium of 82 organizations represented by over 300 individuals and public outreach across nearly 100 events in the tri-state region, engaging over 4,000 individual residents. To guide outreach for the NDRC, the Shelby County Resilience Council created the Shelby County Outreach and Engagement Plan, a continuation of the approach that began during the Greenprint and has continued during both phases of the NDRC. For Phase 2 of the NDRC, Shelby County and partnering organizations led an extensive community engagement plan. Wide-ranging engagement efforts were a hallmark of the Phase 2 development process, including four public charrettes focused on URN and resilience strategies, outreach to local community and professional groups, stakeholder meetings, and the development of a community resilience portal, ResilientShelby.com, with information about the NDRC application and a survey. A complete list of all stakeholders engaged can be found in the attachments. In order to reach LMI populations directly, Shelby County also utilized “The Mobile Porch”, a traveling citizen engagement experience used at five community events, including the Goat Days Festival in Millington.

Livable Memphis and the MSCOS made wide use of online networks, with a combined reach of over 10,000 email contacts, over 5,000 followers on Facebook and Twitter, and over 40,000 users on NextDoor. Additionally, Livable Memphis and MSCOS used NextDoor and Facebook to reach a broader segment of Shelby County. Facebook posts were targeted countywide and to URN areas (using ZIP codes), reaching a total of 32,953 users, with 2,959 clicks, shares, or other post engagements.

Information regarding public meetings and the survey were distributed via media advisory, and received coverage in several Memphis area news outlets, including the Memphis Commercial Appeal, with the largest print circulation in the Mid-South and a significant online presence.

Input at the four public meetings confirmed the need to address flooding and provide community amenities that contribute to quality of life and neighborhood and regional connections to green space. Acknowledgement of the link between resilience projects and the Greenprint were also prominent, as was the need to minimize damage from future events and provide for quicker recovery after disasters.

In Millington, participants embraced the possibility of preventing severe flooding from Big Creek while creating recreational amenities that increase quality of life. The Resilient Shelby survey was administered online and through the Mobile Porch. Over 1,500 surveys were completed.

Participants were asked to respond to questions about threats, risks and vulnerabilities, URN, needs in a natural or other disaster, and household demographics. Approximately 26 percent of respondents were from LMI households. Nearly 60 percent of respondents said that natural disasters – severe storms, extreme weather, earthquakes and other disasters – are the greatest threat to Shelby County communities. Respondents also indicated that people (because of age, social isolation, ability) and infrastructure were the most vulnerable to risks. Housing and infrastructure ranked among the top three priorities, with emergency planning indicated as the single greatest need still remaining from the April 2011 storm events.

Considering regional planning initiatives and feedback received through the Greenprint and NDRC processes, the Proposed Action Alternative has been developed to address resilience planning needs while increasing recreational and community amenities available to residents of Millington and the surrounding areas, particularly LMI neighborhoods.

Shelby County held a public meeting on August 14, 2019, to update project stakeholders and surrounding communities on the Big Creek Activity. A public notice announcing the meeting ran in the Memphis Flyer and Tri-State Defender on July 25, 2019, Memphis Daily News on July 26, 2019, and La Prensa Latina on July 28, 2019.

Prior to the meeting, one comment was received via email. The comment expressed concern about government spending on recreational facilities rather than funding efforts to address Shelby County's crime rate. During the meeting, most interest was related to land acquisition. No environmental concerns or opposition was brought up at the meeting. Record of public notice publication and the meeting agenda and sign-in sheet are included in the EA attachments.

CHAPTER 3

3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

Within the chapter, the nature, extent, and importance of environmental resources in their existing setting are discussed. Discussion of the Affected Environment provides a baseline for the assessment of potential effects of the alternatives described in Chapter 2, while the Environmental Consequences provide details on the analysis and identified impacts to the environment. In addition to individual resources, cumulative impacts are also addressed in this chapter.

Cumulative impacts are defined by the CEQ as the impact on the environment resulting from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions. Cumulative impacts can result from individually insignificant but collectively significant actions taking place over a period of time (40 CFR 1508.7). The cumulative impacts analysis recognizes the effects of the proposed alternatives on the various resources. It also recognizes the effects of other past, present, and reasonably foreseeable future actions and describes the additive or cumulative effects that might result. Although some cumulative effects, however minimal, could be identified for virtually any resource or condition, the effects described in this document are believed to be the most pertinent and most representative of those associated with the proposed action.

3.1 PLANNING, LAND USE, AND ZONING

This section provides an overview of existing land use at and surrounding the project site and potential impacts to land use associated with the No Action and Proposed Action Alternatives. The project area is located in Millington, Tennessee, located in Shelby County.

Affected Environment

As part Greenprint planning efforts, the City of Millington oversaw the preparation of the Millington Greenways Plan, which provides a vision and strategy for the development of an integrated, connected system of greenways, paths, and sidewalks to connect the existing park system, open spaces, and other destinations throughout the City. The concept of the proposed project is included in the Millington Greenways Plan and Greenprint.

The project area is split between land within the Millington city limits and unincorporated Shelby County. Land within unincorporated Shelby County is zoned for Conservation Agriculture (CA). As described in the Memphis and Shelby County Unified Development Code (UDC), the CA District is intended to conserve agricultural land and undeveloped natural amenities while preventing the encroachment of incompatible land uses. In addition to the CA District, this land also falls within a Floodplain Overlay (Shelby 2010). Land within the Millington city limits is a mixture of zoning, including residential, commercial, and agriculture. A portion of the land has been acquired from the Naval Support Activity Mid-South and is within the military zone (Millington 2019).

While the project's focus is on floodplain improvements, multiple elements of the proposed project recreational amenities were identified as priorities in the City of Millington Greenways Plan, which was published in September 2014 and serves as a guide to develop an integrated, connected system of greenways, paths, and sidewalks to connect the existing park system, open spaces, and major destination points located throughout Millington.

Environmental Consequences

Under the No Action Alternative, no improvements to the floodplain would be made to increase resilience to future flooding and alleviate current flooding conditions. No recreational amenities would be added to the project area and land uses within the site would not change.

Under the Proposed Action Alternative, undeveloped, open, and agricultural lands would be converted to a large recreational area with focus on multipurpose fields and trails. The elements and activities of the proposed project are compatible with plans, zoning, and surrounding land uses. The proposed project is in alignment with allowed development, as discussed in the UDC, within the Floodplain Overlay. Project information was sent to the Memphis and Shelby County Division of Planning and Department. Documented in the Local Expert Coordination available in the attachments, the Division of Planning and Department has provided no comment specific to impacts at this time. No indirect impacts are anticipated from the development of the Proposed Action Alternative. Direct impacts to existing land use are minimal.

3.2 GEOLOGY, SOILS, AND PRIME FARMLAND

Existing geological resources within the project area and potential impacts on these geological resources that could result from the No Action and Proposed Action Alternatives are discussed in this section.

Affected Environment

Geology

The site is located in the Gulf Coastal Plain physiographic province, which extends from the Florida Panhandle to eastern Texas and from Kentucky to the Yucatan Peninsula in Mexico. The project is located in Shelby County, which is within the East Gulf Coastal Plain section that dates to the Quaternary Period. The landscape varies greatly in topography from rolling hills near the Appalachian Mountains to the flat sandy coastal regions near the Gulf of Mexico (National Park Service [NPS] 2019).

Paleontology

During the Cenozoic era, western Tennessee was a shallow, tropical sea. The most prevalent paleontological formations within Tennessee are Paleozoic era and located in the central portion of the state. Cenozoic era fossils are known to be found in a small portion of West Tennessee (approximately 75 miles east of Shelby County) and in East Tennessee. Shelby County is not known to have significant paleontological formations (PaleoPortal 2019). It is unlikely that any significant fossil remains are present within the project boundary as the area is not typically associated with paleontological finds.

Geological Hazards

Potentially hazardous geological conditions can include the following: landslides, volcanoes, earthquakes/seismic activity, and subsidence/sinkholes. Conditions for a majority of these types of hazards are not found within the project area, which is located on relatively stable ground and does not have significant slopes present within several miles, virtually eliminating any potential of landslides. No volcanoes are present within several hundred miles of the project site. The predominant geologic unit on the west side of Shelby County is Quaternary-aged loess. The project site lacks the carbonate bedrock geology and karst landforms associated with sinkholes.

Seismic activity at the site could cause surface faulting, ground motion, ground deformation, and conditions including liquefaction and subsidence. The Modified Mercalli Scale is used within the U.S. to measure the intensity of an earthquake. The scale arbitrarily quantifies the effects of an earthquake based on observed impacts on people and the natural and built environments. Mercalli intensities are measured on a scale of I through XII, with I denoting the weakest intensity and XII denoting the strongest. Lower degrees of the scale typically represent earthquakes felt by people. Higher numbers of the scale are based on observed structural damage. This value is translated into a peak ground acceleration (PGA) value to measure the maximum force experienced. The PGA is the maximum acceleration experienced by a building or object at ground level during an earthquake on uniform, firm-rock site conditions. The PGA is measured in terms of percentage of “g”, the acceleration due to gravity. The U.S. Geological Survey (USGS) Earthquake Hazards Program publishes a seismic hazard map (Figure 3) that display the PGA with 10 percent (1 in 500-year event) probability of exceedance in 50 years. The potential ground motion for the proposed project area is 0.65 g, for a PGA with a 2 percent probability of exceedance within 50 years (USGS 2014).

Soils and Prime Farmland

The Farmland Protection Policy Act ([FPPA]; 7 U.S.C. 4201 et seq.) requires federal agencies to minimize the impact federal programs have on the unnecessary and irreversible conversion of farmland to nonagricultural uses. Prime farmland is land that is the most suitable for economically producing sustained high yields of food, feed, fiber, forage, and oilseed crops.

The entire project area contains 15 known soil types. Of these soils, 13 are found within the main project area proposed for the Big Creek Activity. The predominant soils within this area are Falaya silt loam and Waverly silt loam, comprising approximately 33 and 41 percent of the onsite soil, respectively. Figure 4 below shows the approximate distribution area of each soil type while Table 2 provides a list of soils identified within the main project area. In addition to the main area targeted for flood reduction measures and recreational amenities, there are approximately 230 acres proposed for potential fill material or mitigation activities. Falaya silt loam is the predominate soil in these areas, reported at nearly 53 percent of the land. Table 3 provides a breakdown of soil types within the proposed fill and mitigation areas.

Table 2. Site Soils – Main Project Area

Big Creek - Main Project Area Site Areas				
Soil Type	Farmland Classification	Acres in AOI	Percent of AOI	Hydric Rating
Calloway silt loam, 0 to 2 percent slopes (Ca)	All areas prime farmland	95.2	4.9%	No
Collins silt loam, 0 to 2 percent slopes, occasionally flooded, brief duration (Co)	All areas prime farmland	188.0	9.6%	No
Falaya silt loam (Fm)	All areas prime farmland	640.8	32.7%	Yes
Filled land, silty (udorthent, silty) (Fs)	Not prime farmland	39.3	2.0%	No
Grenada silt loam, 0 to 2 percent slopes (GaA)	All areas prime farmland	2.3	0.1%	No
Grenada silt loam, 2 to 5 percent slopes (GaB)	All areas prime farmland	2.6	0.1%	No
Grenada silt loam, 2 to 5 percent slopes, eroded (GaB2)	All areas prime farmland	4.4	0.2%	No
Graded land, silty materials(udorthent, silty) (Gr)	Not prime farmland	21.2	1.1%	No
Henry silt loam (He)	Not prime farmland	84.6	4.3%	Yes
Loring silt loam, 2 to 5 percent slopes (LoB)	All areas prime farmland	1.3	0.1%	No
Memphis silt loam, 2 to 5 percent slopes (MeB)	All areas prime farmland	1.4	0.1%	No
Memphis silt loam, 8 to 12 percent slopes, eroded (MeD2)	Not prime farmland	1.5	0.1%	No
Water (W)	Not prime farmland	68.6	3.5%	-
Waverly silt loam, 0 to 2 percent slopes, occasionally flooded, long duration (Wv)	Not prime farmland	811.3	41.3%	Yes
Totals for Area of Interest (AOI)		1,962.4	100.0%	

Source: <https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx>

Table 3. Site Soils – Potential Fill Areas and Mitigation

Big Creek - Potential Fill Areas				
Soil Type	Farmland Classification	Aces in AOI	Percent of AOI	Hydric Rating
Calloway silt loam, 0 to 2 percent slopes (Ca)	All areas prime farmland	28.3	12.4%	No
Falaya silt loam (Fm)	All areas prime farmland	120.9	52.9%	Yes
Grenada silt loam, 2 to 5 percent slopes (GaB)	All areas prime farmland	25.4	11.1%	No
Grenada silt loam, 5 to 8 percent slopes (GaC)	Not prime farmland	2.1	0.9%	No
Grenada silt loam, 5 to 8 percent slopes, severely eroded (GaC3)	Not prime farmland	4.3	1.9%	No
Graded land, silty materials (udorthent, silty) (Gr)	Not prime farmland	18.3	8.0%	No
Henry silt loam (He)	Not prime farmland	12.8	5.6%	Yes
Water (W)	Not prime farmland	16.4	7.2%	-
Totals for Area of Interest (AOI)		228.5	100.0%	

Source: <https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx>

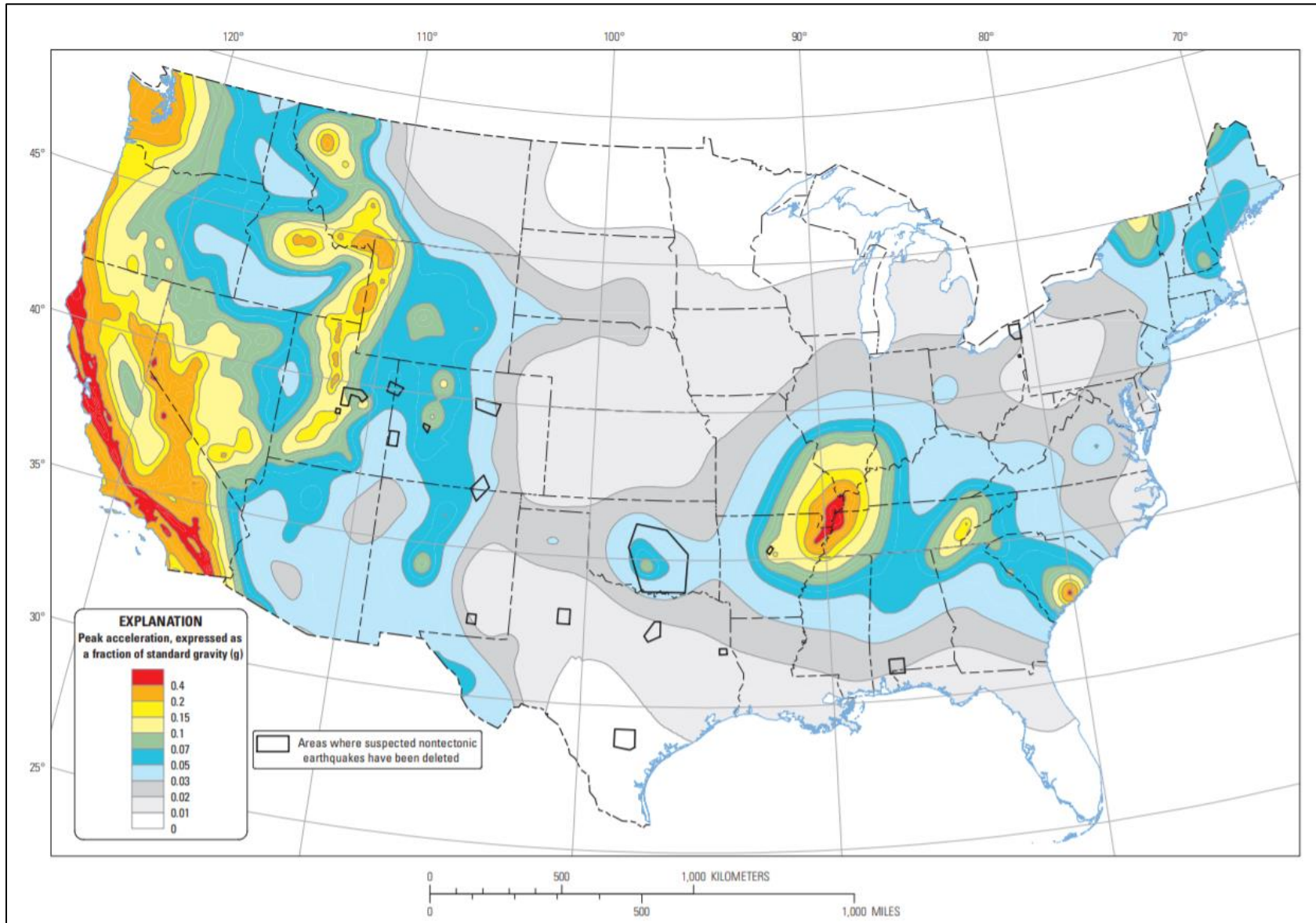


Figure 3. Ten-percent Probability of Exceedance in 50 Years Map of Peak Ground Acceleration

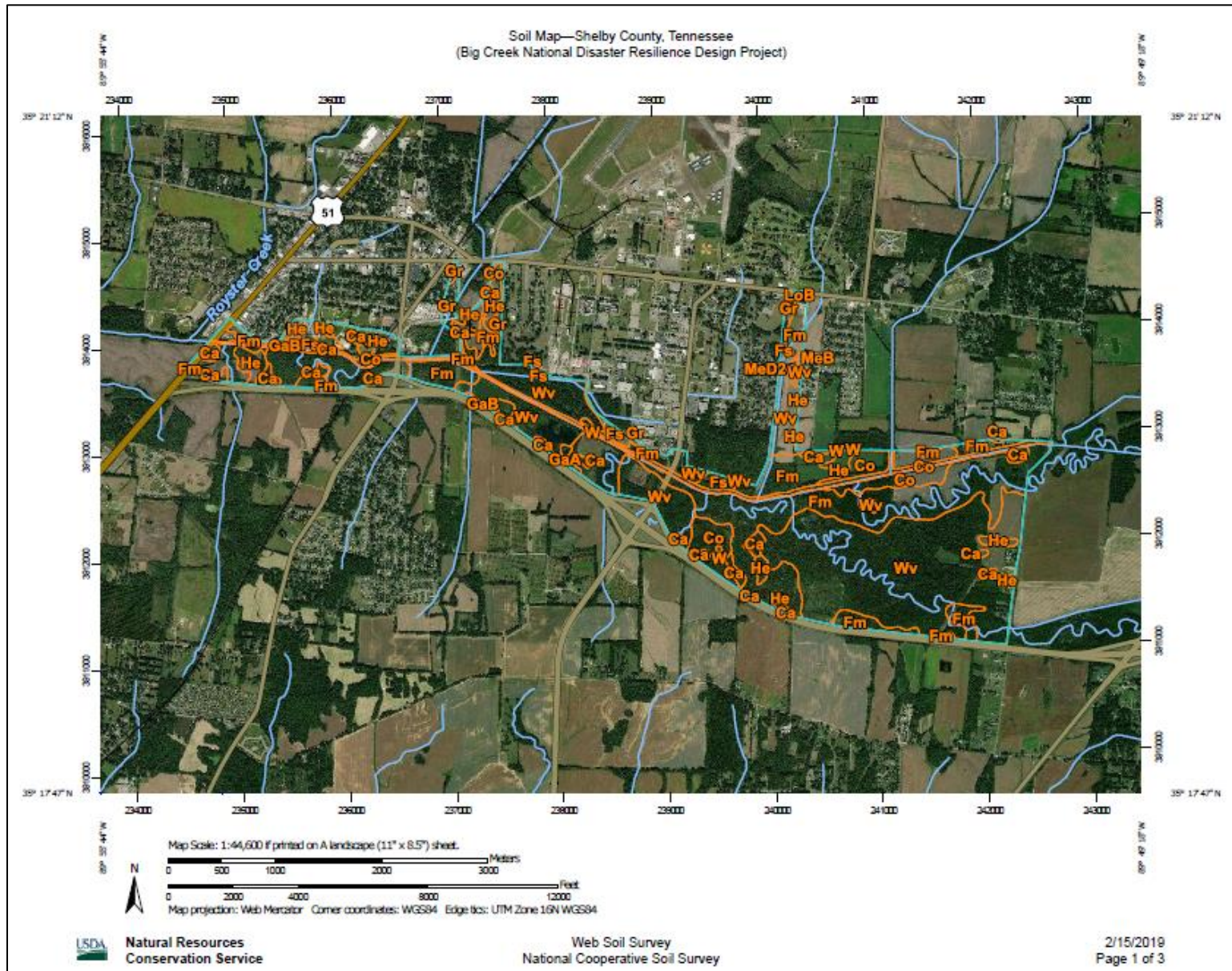


Figure 4. Site Soil Map – Main Project Area

Based on data available from the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS), just over 930 acres within the main project area are considered prime farmland. Within the additional auxiliary areas, approximately 175 acres are identified as prime farmland. In total, the activities associated with the Big Creek National Disaster Resilience Design Project would involve over 1,100 acres of prime farmland. This is comprised of Ca, Co, Fm, GaA, GaB, GaB2, LoB, and MeB soils. The remaining soils appear for Shelby County on the Soil Data Access (SDA) Prime and other Important Farmlands listing but are not considered prime farmland (USDA NRCS 2019b). Table 4 provides a breakdown of soil types within the proposed fill and mitigation areas.

Table 4. Prime Farmland

Big Creek - All Prime Farmland Soil		
Soil Type	Acres in AOI	Percent of Prime Farmland
Calloway silt loam, 0 to 2 percent slopes (Ca)	123.5	11.1%
Collins silt loam, 0 to 2 percent slopes, occasionally flooded, brief duration (Co)	188.0	16.9%
Falaya silt loam (Fm)	761.7	68.6%
Grenada silt loam, 0 to 2 percent slopes (GaA)	2.3	0.2%
Grenada silt loam, 2 to 5 percent slopes (GaB)	28.0	2.5%
Grenada silt loam, 2 to 5 percent slopes, eroded (GaB2)	4.4	0.4%
Loring silt loam, 2 to 5 percent slopes (LoB)	1.3	0.1%
Memphis silt loam, 2 to 5 percent slopes (MeB)	1.4	0.1%
Prime Farmland Totals	1,110.6	100.0%

Source: <https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx>

The Calloway silt loam (Co) has 0 to 2 percent slopes and is classified as somewhat poorly drained. Depth to the water table in Co soils is about 7 to 21 inches. Falaya silt loam (Fm) is classified as somewhat poorly drained and is typically found in floodplains. The Grenada silt loam (GaB) has 2 to 5 percent slopes and is moderately well drained soil that has formed in thick loess. Grenada silt loam (GaC) has 5 to 8 percent slopes and is typically found on loess hills. The Grenada silt loam (GaC3) has slopes of 5 to 8 percent, is severely eroded, and is typically found on backslopes/footslopes. Henry silt loam (He) is poorly drained and is considered a hydric soil (USDA NRCS 2019a).

Environmental Consequences

Under the No Action Alternative, the floodplain restoration and recreational amenities would not be constructed; therefore, no direct or indirect project-related impacts on geological, paleontological, soil resources, or prime farmlands would result. Existing land use would be expected to remain a mix of farmland and forested areas.

Under the Proposed Action Alternative, minor direct impacts to geology and soil resources would be anticipated due to construction and operation of the project. In addition to the floodplain and recreational areas, site grading and clearing for fill material areas would cause minor impacts to geology and soils including minor, localized increases in erosion and sedimentation.

Geology and Paleontology

Under the Proposed Action Alternative, minor impacts to geology could occur.

Geologic Hazards

Hazards resulting from geological conditions would be minor because the project site is in a relatively stable geologic setting. There is a moderate potential for small to moderate intensity seismic activity. The facility would be designed to comply with applicable seismic standards according to state and local building codes. A seismic event would likely only cause minor impacts to the project site. Geologic hazard impacts on the site would be unlikely to impact off-site resources.

Soils and Prime Farmland

Use of BMPs such as soil erosion and sediment control measures would minimize the potential for increased soil erosion and runoff. Due to the project disturbance area being at least 1 acre, a NPDES permit for discharges of stormwater associated with construction activities would be required. Application for the permit would require submission of a SWPPP describing the management practices that would be utilized during construction to prevent erosion and runoff and those to reduce pollutants in stormwater discharges from the site. Following construction, implementation of soil stabilization and vegetation management measures would reduce the potential for erosion impacts during site operations.

A land evaluation and site assessment system is used by the USDA NRCS to establish a farmland conversion impact rating score. When considering the impact rating score, project stakeholders must consider alternative sites if the potential adverse impacts on the farmland exceed the recommended allowable level (USDA 2014). The construction and operation of the Proposed Action Alternative would potentially impact/convert prime farmland. There are approximately 270,000 acres of prime farmland in Shelby County, accounting for roughly 54 percent of the total land area in the county. Nearly 51 percent, over 1,100 acres, of the project site soil is considered prime farmland. The proposed project would impact a minimal portion of the total available farmland in the county; however, much of the improvements proposed for the project would not result in the permanent or irreversible conversion of farmland. While agricultural production would not occur on the project site, long-term impacts to prime farmlands and soil productivity on much of the site would be insignificant. Based on the limited site disturbance, there would be minimal direct and indirect effects on prime farmland under the Proposed Action Alternative.

3.3 WATER RESOURCES

This section describes an overview of existing water resources within and near the proposed project area and the potential impacts on these water resources resulting from the No Action and Proposed Action Alternatives.

Affected Environment

This project area is located in Shelby County and drains to water ways within the (8-digit HUC 08010209) Loosahatchie River Watershed and more directly to the Big Creek Middle Watershed. The primary project area lies mostly within the Big Creek Middle 12-digit HUC (080102090302), although the eastern edge of the area is within the Big Creek Lower HUC (080102090303). The ancillary parcels west of the primary area are within the Loosahatchie River-Outlet HUC (080102090406). Over several decades, Big Creek has become a severely incised and over-widened channel that does not adequately convey the discharge it receives from large storm events. As the impairment of the stream continues, channel degradation exacerbates downstream water quality and threatens the recovery of “connected” natural aquatic systems.

The majority of the approximately 1,600-acre project area lies within the floodplain of Big Creek and is undeveloped. Wetlands and other jurisdictional water features were identified within the project area through the use of available USGS Topographical maps, the National Wetlands Inventory (NWI) database, NRCS Soils Maps, and an onsite delineation.

Prior to visiting the project study area, a resource review of available background site information was conducted using the U.S. Fish and Wildlife Service (USFWS) NWI database, USDA soils maps, topographic maps, and USGS National Hydrography Dataset (NHD) to determine if jurisdictional features could be found within the area. Major landscapes and vegetation units were identified using aerial imagery before surveying the project study area. This provided a base understanding of expected conditions within the study area prior to the site visit.

During the months of July 2017, April 2018, and June 2018 Barge Design Solutions, Tioga Environmental Consultants, and Brophy-Heineke & Associates biologists performed a field survey within and directly adjacent to the limits of investigation to determine the presence or absence of jurisdictional waters. Wetland determinations were conducted by Barge Design Solutions, Tioga Environmental Consultants, and Brophy-Heineke & Associates biologists through the observation of hydrophytic vegetation, hydric soils, and wetland hydrology according to the U.S. Army Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region, Version 2.0 (USACE 2010). The methodologies as set forth in the Manual were employed to determine presence or absence of vegetation, hydrology, and hydric soil field indicators. Sample points were chosen based upon representative portions of the study area to confirm visual estimates of field indicators. The Atlantic and Gulf Coastal Plain Data Forms were completed at wetland and upland sample points according to the Manual to confirm boundaries of each ecosystem. The boundaries of the wetland were then marked in the field with pink flagging and coordinates were obtained with a GPS unit.

Hydrologic determinations were conducted by Tennessee Qualified Hydrologic Professionals. Streams were field verified as waters of the state/waters of the U.S. based on the existence of biology, geomorphology [i.e. defined bed and bank, ordinary highwater mark (OHWM)] and hydrology. Streams that were identified by the USGS NHD and/or topographic maps were targeted for confirmation. Potential streams that were encountered and not identified by NHD or topographic maps were also noted. The coordinates of the centerline of all streams located within the project area were obtained with a GPS unit. On features that were not easily identifiable as streams, hydrologic determinations were performed based on observing hydrological, geomorphological, and biological features according to the TDEC Guidance for Making Hydrologic Determinations Version 1.4.

Additionally, as these determinations were completed during multiple visits, a calculation of normal weather conditions was conducted for each trip. During each of the site visits, the conditions were considered normal for precipitation.

Within the project limits, 56 wetlands (WTLs), totaling 288.03 acres, were identified (“WTL-1 – WTL-56”). This does not include the TDOT mitigation bank site within Area 3 which is comprised of approximately 400 acres of wetlands. The identified wetlands range from less than 0.01 acres up to 131 acres in size and generally are a complex of emergent and forested types. Most of the features are identified as temporarily flooded or as “floodplain” wetlands, indicating frequent or persistent inundation.

Additionally, 25 streams (STRs) (STR-1 – STR-25) and 34 wet weather conveyances (WWCs) (WWC-1 – WWC-34) were also found within the limits of investigation. The USACE and TDEC provided concurrence for the delineation of these features. Figure 5 shows the approximate locations of the identified aquatic features.

Big Creek, which is designated for fish and aquatic life and recreation is listed on the 303(d) list for physical substrate habitat alterations, sedimentation/siltation, phosphate, Escherichia coli, and dissolved oxygen (TDEC, 2013 and 2018). Sections of Big Creek in the project area are listed on Tennessee’s 2018 Section 303(d) list of impaired waters as shown on Table 5.

Table 5. Big Creek 303(d) List

Big Creek - Tennessee’s 2018 Section 303(d) list of impaired waters		
Pollutant	Cause	TMDL Priority
Oxygen, Dissolved	Municipal (Urbanized High Density Area)	Low
Phosphate	Municipal (Urbanized High Density Area)	Low
Physical substrate habitat alterations	Channelization	Low
Sedimentation/Siltation	Channelization	Low
Sedimentation/Siltation	Municipal (Urbanized High Density Area)	Low
Escherichia coli	Municipal (Urbanized High Density Area)	N/A

Source: 2018 Final List of Impaired Waters

Portions of the project area were historically excavated for use as wastewater treatment ponds by the north adjoining Naval Support Activity Mid-South. These ponds are no longer in use but remain as open waters / wetlands. No work is proposed to occur within the former wastewater treatment ponds. Portions of Area 3 are used as a TDOT wetland mitigation bank. This approximate 425-acre tract is not counted in the total wetland acreage listed above, but for purposes of the “affected environment” is considered part of the project area.

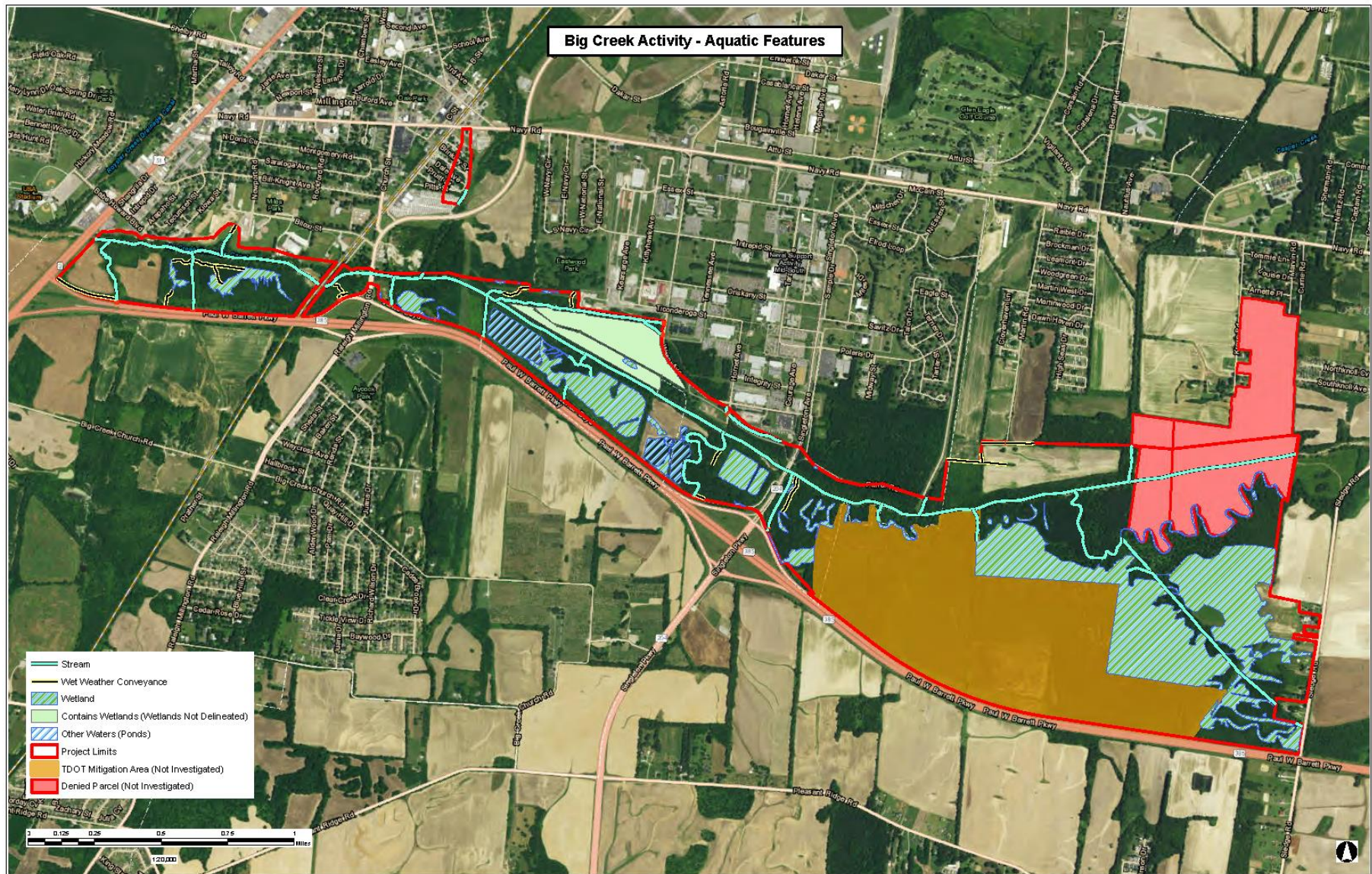


Figure 5. Aquatic Features Map

Environmental Consequences

Under the No Action Alternative, the floodplain restoration and recreational amenities would not be constructed; therefore, no direct or indirect project-related impacts to water resources would occur.

The Proposed Action Alternative includes construction activities, which would result in permanent direct impacts to streams and wetlands and have the potential to temporarily affect surface water via stormwater runoff.

Although the primary purpose of the project is to alleviate current flooding conditions of adjacent communities, the project also intends to restore and enhance the existing floodplain and natural aquatic systems. This includes installing grade controls where appropriate. These controls will lead to enhanced stabilization of the stream channels, reducing upgradient erosion and downstream sediment loading.

Wetlands

Direct Impact - Fill

Seventeen areas of direct impact by fill totaling approximately 1.66 acres (0.6 percent of total onsite wetlands) to ten of the fifty-six onsite wetlands are proposed. These fill areas are for placement of the proposed flood control berms and are generally located on the outer margins of the wetland communities near property boundaries or physical barriers (Big Creek, roadways, etc.) where placement of the berms was limited or would have caused greater impacts to other resources. The largest single fill impact to a wetland is 0.436 acre (0.243 direct fill + 0.193 acres hydrologic isolation due to fill) to Wetland 18, a 4.37 acre forested and emergent wetland complex adjoining the TDOT mitigation bank in Area 3. Wetland 18 lies between the highway and the mitigation bank. The proposed berm protects the mitigation bank from inundation created by the project and due to the location of Wetland 18, cannot be installed without these direct impacts. Twelve of the seventeen impacts are 1/10th of an acre or less each.

Direct Impact - Excavation

Only one section of a wetland, 0.04 acres of Wetland 8, will be directly impacted by excavation for flood storage. Wetland 8 is located immediately adjacent to Big Creek in Area 2, with its eastern edge within the footprint of one of the bank layback areas. This area was chosen for excavation based on the immediate area being most suitable due to already being a low area where several wetland and stream systems converge before flowing into Big Creek. The portion of the wetland impacted is its discharge area to Stream 11, discussed above. The adjoining uplands will be excavated for flood storage, likely causing future ponding of this small portion of Wetland 8 and Stream 11.

Indirect Impacts

The site wetlands are anticipated to be impacted by the potential increase in frequency and duration of inundation resulting from the flood controls proposed for Big Creek. Increases in inundation depth are minimal in the wetland areas and inundation times are typically expected to be less than a few days difference over the existing regime. Figures representing the predicted hydrological deltas, in both inundation depths and durations, are included in the attachments. Table 6 below presents an approximation of the changes in the larger wetland systems, presented by project area.

Table 6. Projected Inundation Changes – Depth and Duration

Flood Event	Delta Type (Depth/Duration)	Area of Study		
		Area 1	Area 2	Area 3
5 Year	Depth	-5 ft	0 ft	0 to 5 ft
	Duration	0 hr.	48 hrs.	24 to 72 hrs.
10 Year	Depth	0 ft	0 ft	0 to 5 ft
	Duration	24 hrs.	60 hrs.	-24 to 96 hrs.
25 Year	Depth	0 ft	0 ft	0 to 5 ft
	Duration	24 hrs.	60 hrs.	-24 to 48 hrs.
100 Year	Depth	0 ft	0 ft	0 to 5 ft
	Duration	24 hrs.	96 hrs.	-70 to 120 hrs.

* Due to the size of this area, there is significant variability. For the proposed action, the western side of Area 3 generally tends to hold water longer at a slightly deeper depth, while the eastern portion holds water for a shorter duration but at unchanged depth as compared to the existing conditions.

No significant alteration to the wetlands’ function or conversion of wetland types are anticipated because:

- Most of the flood storage is in excavated uplands,
- Changes in inundation are designed to occur beginning at the 5-year storm event, not during the 1-year (annual) storm event,
- Increases in inundation depth are minimal in the wetland areas and inundation times are typically expected to be less than a few days difference over the existing regime,
- The existing wetlands are primarily classified as temporarily flooded / “floodplain” wetlands, indicating they are already frequently or permanently inundated.

Restoration and enhancement of the floodplain’s natural communities will include transitioning some of the currently drained (previously converted) wetland soils into native herbaceous wetlands.

Streams

The majority of impacts to onsite streams are associated with installation of pipes and culverts for placement of stream crossings and drainage relative to the proposed floodwater control berms, roadways, and trails. Additional impacts will result from installation of grade controls and ponding and channel realignments associated with site grading for flood storage and control.

Direct Impacts - Fill

Direct impacts, totaling 2,412 lf due to fill and 1,997 lf of upstream pooling, are proposed, as follows:

- Placement of three pipes / culverts for new roadways accessing the recreational facilities, totaling 1,779 lf of fill impacts. Impacts will occur on Streams 1, 10, and 13.
- Placement of four pipes / box culverts for flood control activities, totaling 579 lf of impact. Impacts will occur on Stream 2, two locations on Stream 12, and Stream 15.
- Placement of three sheet piles as a grade control structures with subsequent pooling, on Stream 4 (398 feet pooled), Stream 7 (584 lf pooled), and Stream 13 (1,015 lf pooled). Grade control structures are considered fill impacts although they are designed to provide upstream channel stability as a benefit. These impacts should not result in significant net

loss of resource value for these channels, particularly given the existing incision and channelization of the channels.

Direct Impacts – Excavation / Realignment

Two streams (17 and 18, which are in actuality one stream system upstream / downstream of a wetland channel convergence) will be intercepted by the new high flow diversion channel in Area 3, which will create a realignment of the channel. Total length of stream realigned is 3,462 lf.

Wet Weather Conveyances

Direct Impacts - Fill

Direct impacts to wet weather conveyances are as follows:

- Placement of fill and / or piping into EPH-1 and EPH-2 for construction of roadways and recreational facilities, totaling 352 lf.
- Grading or placement of fill and / or culverts into EPH-3, EPH-4, EPH-5, EPH-12, and EPH-13 for flood control activities, totaling 901 lf of impact.

Other Waters

Single platforms with piling systems are proposed on three of the open water ponds within the project area. Based on the current design, six to ten pilings total are anticipated with a minimal impact acreage, approximately 0.03 acres.

As defined in Executive Order (EO) 11990, this project involves “new construction” in wetlands, in the form of fill and related activities. Multiple small areas of direct impact to wetlands by grading and fill, totaling approximately 0.20 acres, are proposed. These fill areas are primarily for placement of the proposed trail system. These direct impacts are expected to be permissible through the USACE’s and TDEC’s Division of Water Resources (DWR) permit programs under the CWA (Sections 404 and 401 respectively) and are not anticipated to affect the functional capacity of the site’s wetlands.

The stream restoration and grade control portions of the Big Creek activity would provide erosion and scour protection improvements to Big Creek and its tributaries. It would also add streambank protection and result in reduced velocities downstream of the site. These creek channel improvements will reduce the transport of sediment into Big Creek improving the quality of the water in the creek.

While the project area is currently vegetated, a permanent park facility would protect the area from increased urban heat-island effect in the future by preventing future urban development in the area.

Restoration and enhancement of the floodplain’s natural communities will include transitioning some of the currently drained (previously converted) wetland soils into native herbaceous wetlands. Site wetlands are anticipated to be impacted by the potential increase in frequency and duration of inundation resulting from the flood controls proposed for Big Creek, lowering its banks to the 5-year flood elevation. Because these impacts are not expected to occur annually, no significant alteration to the wetlands’ function are anticipated.

During construction, site grading and earthmoving could lead to sediment runoff to adjacent streams. A SWPPP identifying management to prevent erosion during construction will be developed and specific soil erosion and sediment control measures will be implemented and monitored throughout construction activities.

3.4 FLOODPLAINS

A floodplain is the relatively level land area along a stream or river that is subject to periodic flooding. The area subject to a 1 percent chance of flooding in any given year is normally called the 100-year floodplain. The area subject to a 0.2 percent chance of flooding in any given year is normally called the 500-year floodplain. A floodway is the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height (44 CFR 59.1).

Floodwaters are generally deepest and swiftest in the floodway, and anything in this area is in the greatest danger during a flood (FEMA 2005). Given the increased risk, development and placement of fill are not allowed without extensive hydraulic modeling to ensure upstream floodplain elevations and upstream floodway elevations and widths are not impacted. This analysis is called a “No-Rise” study. If it is determined that a change in flood elevations or floodway widths is expected by implementation of the improvements, the floodplain/floodway must be remapped through a LOMR.

It is necessary to evaluate development in the 100-year floodplain to ensure that the project is consistent with the requirements of EO 11988: Floodplain Management, which requires federal agencies to avoid to the extent possible the long and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative. This section considers the proposed project’s relationship to the floodplain and potential impacts to floodplain resources resulting from the No Action and Proposed Action Alternatives.

Affected Environment

A map showing the project area and the FEMA Flood Insurance Rate Map (FIRM) is presented in Figure 6 (FEMA 2019). Based on a review of the proposed project area found on Map Nos. 47157C0155F, 47157C0160G, 47157C0165F, 47157C0170F, 47157C0180G and 47157C0190G of the Shelby County FIRM, the vast majority of the project area falls within the existing 100-year floodplain, with areas immediately along Big Creek identified as a floodway.

Environmental Consequences

Under the No Action Alternative, the floodplain restoration and recreational amenities would not be constructed; therefore, no direct or indirect project-related impacts to the floodplain would occur.

The Proposed Action Alternative would involve work within the floodplain. To satisfy the requirements of EO 11988, the Water Resources Council developed an eight-step process that agencies should carry out as part of their decision making on projects that have potential impacts to or within a floodplain or a wetland. The eight steps reflect the decision-making process required in Section 2(a) of the EO and are reflected in FEMA regulations at 44 CFR 9.6.

Due to the Proposed Action Alternative’s location and proposed activity within the floodplain, the eight-step process will be carried out as part of the project. Shelby County is in the process of completing the steps of the process which involve early public review, identifying and evaluating

alternatives, identifying impacts, announcing the decision, and implementing the proposed action in compliance with impacts minimization plans and flood insurance requirements. As part of the process, an initial public notice ran to announce the potential activity within the floodplain and wetlands. This notice appeared in the Memphis Flyer and Tri-State Defender on August 1, 2019, Memphis Daily News on July 31, 2019, and August 2, 2019, and La Prensa Latina on August 4, 2019. A final public notice announcing the decision to proceed with the activity within the floodplain appeared in the Memphis Flyer and Tri-State Defender on September 12, 2019, Memphis Daily News on September 13, 2019, and La Prensa Latina on September 15, 2019.

Although federal agencies are typically required to avoid direct and indirect support of floodplain development, the CDBG-NDRC funds are allocated for projects dedicated to the purpose of promoting innovative resilience projects to better prepare communities for future storms and mitigate flooding. Specifically, the Proposed Action Alternative would involve the construction of a berm along the south side of Big Creek between Sledge Road and Singleton Avenue in conjunction with a high flow diversion channel and floodplain excavation. The berm along with portions of Paul Barrett Parkway will create a storage area that will store flood waters during a high flow event. While the berm will be constructed of fill placed in the floodway, the combined effect of the berm, the diversion channel, and the additional excavation will reduce flood levels downstream. On the downstream end of the project, an existing USACE levee will be extended by 4 feet to provide additional flood protection between US 51 and Raleigh Millington Road. Additionally, a portion of an existing levee around the Shady Oaks Mobile Home Park will be extended and the existing pump station will be upgraded.

These construction activities within the floodplain and floodway are proposed to improve the community's resilience to future flooding and alleviate current flooding conditions of adjacent communities. The "No-Rise" study shows that a change in flood elevations will occur if the improvements are constructed and a LOMR will be required. While alterations to the floodplains would result in changes to elevations, heightened elevations are limited to storage in Area 3. Residential and commercial areas would be protected by berms and would not experience a change in elevations related to the proposed project. Based on the results of the "No-Rise" study, minor impacts, including benefits to the surrounding communities through berm protection and additional water storage, are expected to the floodplain.

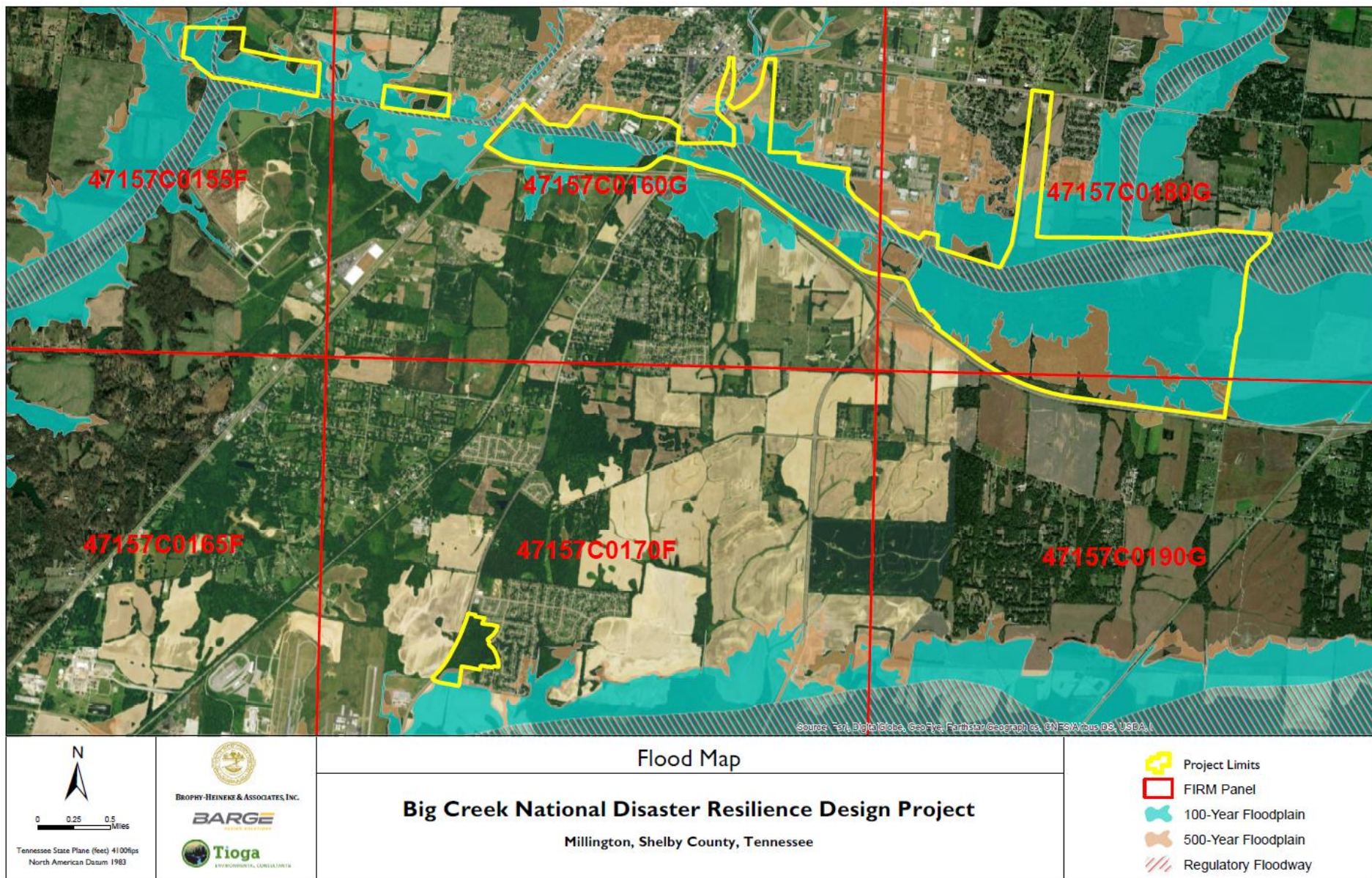


Figure 6. Site Boundary and FEMA Floodplain

3.5 BIOLOGICAL RESOURCES

Biological resources are regulated by a number of federal and state laws. The laws and rules relevant to the Proposed Action Alternative undertaken by Shelby County include:

- Endangered Species Act (ESA) (16 U.S.C. §§ 1531-1544);
- Migratory Bird Treaty Act (MBTA) of 1918 (16 U.S.C. §§ 703-712);
- EO 13186: Responsibilities of Federal Agencies to Protect Migratory Birds (2001)
- The Bald and Golden Eagle Protection Act (BGEPA); and
- Rules of the Tennessee Wildlife Resources Agency, Chapter 1660-01-32 (based on authority provided in Tennessee Code Annotated §§ 70-1-206, 70-8-104, 70-8-106 and 70-8-107).

This section describes an overview of existing biological resources within the project area and the potential impacts to biological resources that would be associated with the No Action and Proposed Action Alternatives.

Affected Environment

A desktop survey was performed prior to field investigations of the proposed project site. Wildlife, vegetation, and threatened and endangered species were researched during the desktop review and verified through field investigations. Results of desktop survey, field investigations, and list updates are described in this section.

The USFWS Information for Planning and Consultation (IPaC) Trust Resource website was evaluated for protected species that may be present within the project area. An official list of protected species with potential to be affected by activities proposed at this location may be found in the attachments. The IPaC identified two potential endangered and threatened species within the project area: The endangered Indiana bat (*myotis sodalis*) and the threatened northern long-eared bat (*myotis septentrionalis*) (USFWS 2019).

Both bats prefer winter habitats (hibernacula) that include caves, mines, and cave-like structures (NatureServe 2019; USFWS 2015, 2019c, 2019d). Both species also utilize areas near caves in the fall and spring (for swarming and staging) prior to migration back to their summer roosting habitat (NatureServe 2019). During the summer, Indiana bats roost under the exfoliating bark of dead and living trees in mature forests with an open understory often near sources of water. Indiana bats are known to change roost trees frequently throughout the season, yet still maintain site fidelity, returning to the same summer roosting areas in subsequent years. This species forages over forest canopies, along forest perimeters, tree lines, and occasionally over bodies of water (Kurta et al. 2002; USFWS 2019c).

In the summer, northern long-eared bats roost individually or in colonies beneath exfoliating bark or in crevices of both live and dead trees. While roost selection is similar to Indiana bats, northern long-eared bats are more opportunistic in roost site selection. This species has also been documented roosting in abandoned buildings and under bridges. Northern long-eared bats emerge at dusk to forage below the canopy of mature forests on hillsides and roads, and occasionally over forest clearings and along riparian areas (USFWS 2014, 2019c).

Much of the project area is comprised of mature forest that presents potential summer roosting habitat for the Indiana bat and northern long eared bat. During the winter, the northern long-eared bat and Indiana bat hibernate in caves and mines which have large entrances, constant

temperatures, and high humidity. No caves or mines are located in or around the project area. Foraging habitat for both species exists in forested areas and wetlands within the project location.

No plant or aquatic species listed under the ESA are known or likely to occur within the project area (USFWS 2019b).

In addition to the endangered and threatened bat species, the IPaC report identified the prairie warbler (*Dendroica discolor*) as a migratory bird of concern that has the potential to occur in the vicinity of the project site. This is a bird of conservation concern, which is a species not already federally listed, that represents USFWS' highest conservation priorities. The prairie warbler has a breeding season from April through July with heightened probability of presence in the project area during late April and early May. The species prefers second growth scrub and densely overgrown fields. Colonies may shift year to year as the preferred habitat is often temporary (Audobon 2019).

Environmental Consequences

Under the No Action Alternative, the floodplain restoration and recreational amenities would not be constructed; therefore, no direct or indirect project-related impacts to federal or stated threatened and endangered species would occur.

The Proposed Action Alternative would result in the removal of 20 acres of trees in Area 1, 23 acres in Area 2, and 113 acres in Area 3 for a total of 156 acres of trees to be removed. While the potential for large, old growth trees is limited to the eastern portion of Area 3, much of the project area is mature forest that could present opportunity for summer roosting habitat for the federally listed Indiana bat and northern long-eared bat; however, the USFWS has determined it cannot be reasonably certain that take of bats would occur with spring/summer tree clearing in areas with no known occurrences such as this. Specific to the Indiana bat, the USFWS currently uses the [Map of Indiana bat sites in Tennessee](#) to review a proposed project's location in relation to hibernacula and documented presence. Based on this map, the nearest recorded presence are two maternity roosts documented in southeastern McNairy County, near the Tennessee-Mississippi state line. Considering the USFWS comments, no direct effects to the federally listed bats are anticipated; however, potential indirect effects to the federally listed Indiana bat and the northern long-eared bat may occur due to loss of potential summer roosting habitat. Habitat loss is to be mitigated with tree planting efforts associated with two other NRDC funded projects: South Cypress Creek Watershed and West Junction Neighborhood Redevelopment and the Wolf River Wetland Restoration and Greenway projects. The proposed project would have no effect on winter roosting habitat as no hibernacula are located within or near the project area.

While the project is likely to have minor impacts to prairie warbler habitat, this would be minimal as much of the project area is mature forest that is not ideal for prairie warblers. In addition, there is ample habitat near the project site to which any impacted birds could move, something that is common to prairie warbler colonies as their preferred habitat is often temporary.

The Tennessee Wildlife Resources Agency (TWRA) reviewed preliminary project information to consider potential impacts to state listed species under its authority. Following review, TWRA provided comments stating, "We do not anticipate adverse impacts to state listed species under our authority due to the project; provided that best management practices to address erosion and sediment are implemented and maintained during construction activities." Considering potential impacts to state listed rare plant species, the TDEC Division of Natural Areas (DNA) reviewed

preliminary project information and determined that the project area does not appear to be suitable for any state listed rare plant species under TDEC's authority. TDEC DNA went on to state that adverse impacts to state listed plant species are not anticipated from this project.

3.6 VISUAL RESOURCES

Visual resources are the characteristics of a place, both natural and manmade, that give a particular landscape its character and aesthetic quality. An observer's experience within or near a specific location can be determined by the visual resources at and surrounding that location. A viewshed is defined as the environment that is visible from a certain vantage point. This section describes an overview of the visual resources in and surrounding the project area and the potential impacts on these visual resources that would be associated with the No Action and Proposed Action Alternatives.

Affected Environment

The project area is a mixture of wooded wetland, shrubs, and pasture. From Paul Barrett Parkway, the southern boundary, the project area is obscured from view by a vegetation buffer. Along US 51, from Paul Barrett Parkway to Big Creek, the roadway overlooks a field with a tree line setting back with its eastern edge lying between 400 and 1,200 lf from US 51, running north to southeast. The project area is bounded by Big Creek to the north with forest vegetation running along the entirety of the creek, with the exception of the utility easement east of Raleigh Millington Road. Roadway improvements planned for Sledge Road represent the project's eastern boundary. Trees, agricultural fields, single-family residential properties, and a church line Sledge Road within the project area. Wooded wetlands and forested areas make up the vast majority of land within the project boundaries. A tree-lined Jones Boyd Road runs parallel to Paul Barrett Parkway from Raleigh Millington Road to Singleton Avenue.

Environmental Consequences

Under the No Action Alternative, the floodplain restoration and recreational amenities would not be constructed; therefore, no direct or indirect project-related impacts or changes to the visual character of the area would occur.

The Proposed Action Alternative would involve the development of recreational facilities and flood alleviation measures. An existing tree line will be maintained to allow for a buffer between US 51 and the park area. Beyond the tree line, Area 1 will be cleared to allow for the development of four athletic fields and additional features such as an Amphitheatre and shelters. While this will change the existing conditions and introduce developed features into the project area, the land is surrounded by high-speed roadways, dense residential development, and military facilities. Selective tree clearing is proposed within Area 2 to increase visibility from Paul Barrett Parkway and Jones Boyd Road. In addition, trees will be strategically cleared and landscaping maintained to provide for visibility and discourage unwanted activity. More extensive clearing and tree removal would occur within Area 3. While this would result in the loss of forested tree coverage, the overall feeling of Area 3 would remain natural, focusing on the health of wetland features. The floodplain alleviation efforts and development of the recreational facilities will not change the overall character of the land or have significant adverse visual impacts to the surrounding properties.

3.7 NOISE

Noise is generally described as unwanted sound, which can be based on objective effects (hearing loss, damage to structures, etc.) or subjective judgments (such as community

annoyance). Noise pollution and sensitive areas are discussed in this section along with potential impacts related to the No Action Alternative and Proposed Action Alternative.

Affected Environment

Sound is typically measured by the decibel (dB), which is used to express the ratio of one value of a physical property to another on a logarithmic scale. An A-weighted decibel (dBA) is the expression of relative loudness as experienced by the human ear. A day-night average sound level of 55 dBA is commonly used as a threshold level for noise which could result in adverse impacts, and prolonged exposure to levels above 65 dBA is considered unsuitable for residential areas (USEPA 1974).

No specific “noise sensitive” areas have been identified within the project area.

Environment Consequences

Under the No Action Alternative, the floodplain restoration and recreational amenities would not be constructed; therefore, no noise impacts related to the construction or operation of the Big Creek Activity would occur.

The Proposed Action Alternative does not include new construction or rehabilitation for residential use (thus no increase in residential population receptors) and no development of significant public, commercial, or industrial facilities that could increase noise within the project area is proposed.

The proposed project would result in short-term noise production related to construction activities. Construction equipment typically results in a maximum noise level within the range of 80 to 85 dBA at a distance of 50 feet from the equipment (USDOT 2006). Elevated noise levels caused by construction equipment could be experienced by nearby residents, but construction noise would be of short duration and likely not exceed the 65 dBA noise level at nearby houses for prolonged periods.

Contract documents will specify that contractors must ensure that the standard noise abatement devices (such as mufflers) on all equipment are functional and in use during construction and that construction hours will be limited to no earlier than 7:00 a.m. and no work on Sundays except for emergency situations. Each day of construction will stop at dusk. All construction will be conducted to minimize the impact of construction noise and inconvenience to persons or residences adjacent to the construction areas.

Elevated noise levels from construction equipment could be perceptible above background noise but would be of short duration, during normal daylight hours and would likely not exceed the 65 dBA noise level for prolonged periods. Maintenance activities, primarily mowing, would result in noise periodically; however, this noise would be similar to existing noises near the project site. Overall noise impacts resulting from the Proposed Action Alternative would be insignificant.

3.8 AIR QUALITY AND GREENHOUSE GAS EMISSIONS

The Clean Air Act (42 U.S.C. §7401 et seq.) mandates the protection and enhancement of our nation’s air quality resources. National Ambient Air Quality Standards (NAAQS) for the following criteria pollutants have been set to protect the public health and welfare:

- Sulfur dioxide (SO₂),
- Ozone,

- Nitrogen dioxide (NO₂),
- Particulate matter whose particles are less than or equal to 10 micrometers (PM₁₀),
- Particulate matter whose particles are less than or equal to 2.5 micrometers (PM_{2.5}),
- Carbon monoxide (CO), and
- Lead.

Affected Environment

The primary NAAQS were promulgated to protect the public health, and the secondary NAAQS were promulgated to protect the public welfare from any known or anticipated adverse effects associated with the presence of pollutants in the ambient air. Areas in violation of the NAAQS are designated as nonattainment areas. New sources to be located in or near these areas may be subject to more stringent air permitting requirements. A listing of the NAAQS is presented in Table 7 (USEPA 2019b). National standards other than annual standards are not to be exceeded more than once per year (except where noted). Based on available ambient air quality data, Shelby County is currently in maintenance status for the 8-hour Ozone (2008) and Carbon Monoxide (1971) NAAQS pollutants.

Greenhouse Gases (GHGs) are chemical compounds in the Earth's atmosphere that trap and convert sunlight into infrared heat. Gases exhibiting greenhouse properties come from both natural and man-made sources. Carbon dioxide, methane, and nitrous oxide are among the most common GHGs emitted from natural processes and human activities.

The primary GHG emitted by human activities in the U.S. is carbon dioxide, representing more than 80 percent of total GHG emissions. This occurs when carbon dioxide enters the atmosphere through the burning of fossil fuels (coal, natural gas, and oil), solid waste, trees, and wood products and chemical reactions. Carbon dioxide is removed from the atmosphere (or "sequestered") when it is absorbed by plants as part of the biological carbon cycle (USEPA 2019c).

Table 7. NAAQS Listing

Pollutant		Primary/ Secondary	Averaging Time	Level	Form
Carbon Monoxide (CO)		primary	8 hours 1 hour	9 ppm 35 ppm	Not to be exceeded more than once per year
Lead (Pb)		primary and secondary	Rolling 3 month average	0.15 µg/m ³ (¹)	Not to be exceeded
Nitrogen Dioxide (NO ₂)		primary primary and secondary	1 hour 1 year	100 ppb 53 ppb(²)	98th percentile of 1-hour daily maximum concentrations, averaged over 3 years Annual Mean
Ozone (O ₃)		primary and secondary	8 hours	0.070 ppm(³)	Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years
Particle Pollution (PM)	PM _{2.5}	primary	1 year	12.0 µg/m ³	annual mean, averaged over 3 years
		secondary	1 year	15.0 µg/m ³	annual mean, averaged over 3 years
		primary and secondary	24 hours	35 µg/m ³	98th percentile, averaged over 3 years
	PM ₁₀	primary and secondary	24 hours	150 µg/m ³	Not to be exceeded more than once per year on average over 3 years
Sulfur Dioxide (SO ₂)		primary secondary	1 hour 3 hours	75 ppb(⁴) 0.5 ppm	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years Not to be exceeded more than once per year

Source: USEPA 2018

Abbreviations: ppb = parts per billion, ppm = parts per million, µg/m³ = micrograms per cubic meter.

Notes:

(1) In areas designated nonattainment for the Pb standards prior to the promulgation of the current (2008) standards, and for which implementation plans to attain or maintain the current (2008) standards have not been submitted and approved, the previous standards (1.5 µg/m³ as a calendar quarter average) also remain in effect.

(2) The level of the annual NO₂ standard is 0.053 ppm. It is shown here in terms of ppb for the purposes of clearer comparison to the 1-hour standard level.

(3) Final rule signed October 1, 2015, and effective December 28, 2015. The previous (2008) O₃ standards additionally remain in effect in some areas. Revocation of the previous (2008) O₃ standards and transitioning to the current (2015) standards will be addressed in the implementation rule for the current standards.

(4) The previous SO₂ standards (0.14 ppm 24-hour and 0.03 ppm annual) will additionally remain in effect in certain areas: (1) any area for which it is not yet 1 year since the effective date of designation under the current (2010) standards, and (2) any area for which an implementation plan providing for attainment of the current (2010) standard has not been submitted and approved and which is designated nonattainment under the previous SO₂ standards or is not meeting the requirements of a SIP call under the previous SO₂ standards (40 CFR 50.4(3)). A SIP call is an EPA action requiring a state to resubmit all or part of its State Implementation Plan to demonstrate attainment of the required NAAQS.

Environmental Consequences

Under the No Action Alternative, no project-related impacts to air quality or climate change would occur as the floodplain restoration activities and recreational amenities would not be constructed.

Under the Proposed Action Alternative, no new construction or conversion of land use facilitating the development of significant public, commercial, or industrial facilities, or of dwelling units, is proposed for this project, limiting the potential for impacts to air quality and greenhouse gas production. Minimal greenhouse gas emissions, including carbon monoxide, are expected from heavy machinery during construction, but no significant impacts are anticipated.

The Pollution Control Section of the Shelby County Health Department reviewed the project for conformity with the NAAQS and in a letter dated August 27, 2019, determined "...there will be no direct or indirect emissions associated with the project approaching de minimus [*sic*] levels identified in 40 CFR 93 § 153 which would require a formal conformity determination. Further, it is also apparent this project does not include any stationary sources of air emissions that would need to receive a minor source permit...".

Construction activities may generate dust particulate matter that will require control. Fuel burning construction equipment should be fitted with appropriate, industry standard, emissions control devices. Contract documents will specify general BMPs such as water dampening for control of fugitive dust emissions from temporary roadways and other disturbed areas during construction activities. Any impacts to air quality are expected to be minor and temporary.

3.9 CULTURAL RESOURCES

Cultural resources are prehistoric and historic archaeological sites, districts, buildings, structures, and objects, as well as locations of historic events of importance. Cultural resources that are listed, or determined to be eligible for listing, on the National Register of Historic Places (National Register) maintained by the National Park Service are considered historic properties. This section discusses potential impacts from the No Action and Proposed Action Alternative as they relate to cultural resources.

Affected Environment

As the Responsible Entity of a HUD project, Shelby County is required by Section 106 of the National Historic Preservation Act (NHPA) to evaluate the potential effects of its actions on historic properties (36 CFR Part 800). When HUD action would adversely affect a historic property, HUD or the identified Responsible Entity must, in consultation with state historic preservation office (SHPO), federally-recognized Indian tribes, and other stakeholders, consider ways to avoid or minimize the adverse effect. If avoidance or minimization is not feasible, measures to mitigate the adverse effect must be taken.

In order to fulfill requirements of Section 106 of the NHPA and consider the proposed project's impacts on historic resources, Shelby County contracted with Panamerican Consultants, Inc. to perform a Phase I cultural resources survey of the Big Creek Activity project areas. During January and February 2019, Panamerican conducted the survey and carried out work necessary to create an inventory of cultural resources within the area of potential effect (APE) and make appropriate management recommendations for their treatment. All work was consistent with the Secretary of the Interior's Standards and Guidelines for Identification (NPS1983) and met the minimum requirements established by TDEC (2009).

The survey included the primary project location along Big Creek to the north of Paul Barrett Parkway, two mitigation sites located west of US 51, and a possible borrow site located on Raleigh Millington Road. The primary project area covers 1,584 acres, but only an approximately 225 acres portion will be disturbed by the construction. The archaeological APE is considered the 225 acres within the primary project area that will be disturbed by the construction, and the 230.7 acres associated with the off-site areas. In total, the APE is 455.7 acres (0.7120 mi.2) (Panamerican 2019).

A standard cultural resources literature and records check was conducted using Tennessee Division of Archaeology (TDOA), Tennessee Historical Commission (THC) and NHRP databases as primary sources. This research revealed that there are three previously recorded archaeological sites within the proposed Big Creek project APE: one within the Primary Project Area 1 and two within the western mitigation tract. There are no previously recorded THC above ground cultural resources or National Register listed historic properties within the Big Creek Resilience project area.

Considering previous surveys in the surrounding area, the Big Creek APE was expected to exhibit low site density, with an expected 8.3 (1.84 km²/0.22 sites per km²) sites per acre. Expected site types included Prehistoric open habitations, Historic domestic sites, and ruins associated with the Chickasaw Ordnance Works. Standing structures were not expected within the low-lying, floodplain setting.

The basic site detection method included shovel testing at 30-meter (m) intervals in areas with restricted surface visibility (< 50 percent) and surface inspection at 15 m intervals in areas with good surface visibility (>50 percent). Additionally all sites, both newly recorded and previously recorded, were shovel tested at 10 m or 15 m intervals. The survey yielded an observed overall resource density of 7, a result close to the projected 8.3.

During the course of the field work, 1,129 shovel test locations were documented across the six discrete tracts, including 16 that were positive for cultural material, 702 that were negative for cultural material, and 401 planned tests that were not dug, mainly due to standing water. The survey resulted in revisits to three previously recorded sites, and the documentation of two newly recorded Historic sites and two newly recorded Historic domestic loci not assigned trinomials by the TDOA (Locus 2 and Locus 3). One site, located within the wooded areas of the potential western mitigation site, is considered potentially eligible for the National Register under Criterion D (Information Potential), which is the criterion commonly used to nominate archaeological sites to the National Register. The site is large, and the Big Creek Activity APE covers only a fraction of the site. The other six resources identified with the Big Creek National Disaster Resilience Improvements Project APE are recommended ineligible for the National Register.

In addition to archaeological resources, an architectural resource review did not lead to the identification of any National Register listed or eligible properties within the project area. According to the National Register website, there are no listed or eligible properties within three miles of the project area. The Tennessee State Historic Preservation Office (SHPO) survey viewer at <http://tnmap.tn.gov/historicalcommission/> was also accessed to review data related to previously surveyed structures. While there are some previously surveyed properties near the project area appearing on the viewer, no surveyed properties immediately within the project area would be disturbed by the project.

Environmental Consequences

Under the No Action Alternative, no impacts to cultural resources would be disturbed as the floodplain restoration activities and recreational amenities would not be constructed.

The Proposed Action Alternative would not impact any listed or eligible National Register architectural or archaeological sites as it avoids the one site that has been determined to be potentially eligible. Avoidance is the recommended management treatment plan for the potentially eligible site. If avoidance is not possible, Phase II testing to make a formal determination on the eligibility and National Register status of the site should be conducted. Note that since all the features associated with the potential site are located within wooded sections of the western mitigation tract, potential mitigation activities within the agricultural fields would not constitute an impact to the site.

As currently planned, construction activities associated with the Big Creek Activity would avoid cultural resource sites that were identified as potentially eligible for the National Register. The SHPO reviewed the proposed project and Phase I cultural resources survey and supporting

documentation. Specific to architectural resources, the SHPO responded in a letter dated May 11, 2018, stating, "Considering the information provided, we find that no architectural resources eligible for listing in the [National Register] will be affected by this undertaking..." On April 8, 2019, the SHPO concurred with Shelby County's determination that no archaeological resources eligible for listing in the National Register would be affected by the proposed project. In the event construction activities occur within the wooded area of the potential western mitigation site, Phase II archaeological investigations would need to be conducted in this area.

In addition to the SHPO, pursuant to 36 CFR Part 800.3(f)(2), Shelby County is consulting with federally recognized Indian tribes regarding historic properties within the proposed project's APE that may be of religious and cultural significance. After review of preliminary project information, the Coushatta Tribe of Louisiana requested to serve as a consulting party. On August 9, 2019, the Phase I cultural resources survey and record of SHPO concurrence was submitted to the Coushatta Tribe of Louisiana for review. At this time no response has been received from the Tribe.

The Proposed Action Alternative would not have impacts to any listed or eligible cultural resources sites or any sites with religious or cultural significance.

3.10 SOLID WASTE AND HAZARDOUS MATERIALS

Hazardous materials include substances subject to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA), and the Toxic Substances Control Act (TSCA). Due to their quantity, concentration, physical, chemical, or infectious characteristics, hazardous materials may present danger to the public welfare or environment when released or improperly managed. Waste management and potential hazardous waste sites within and near the project area are discussed in this section along with their potential impacts on the No Action and Proposed Action Alternatives.

Affected Environment

The project area is previously undeveloped with the vast majority being forested and a small amount used for agricultural activities. A review of a list of underground storage tank (UST) facilities available through the TDEC Division of Underground Storage Tanks (DUST) did not identify any previously reported USTs within the immediate project area. As previously discussed, Big Creek is listed on the 303(d) list for physical substrate habitat alterations, sedimentation/siltation, phosphate, *Escherichia coli*, and dissolved oxygen (TDEC, 2013 and 2018). Portions of the project area were historically excavated for use as wastewater treatment ponds by the north adjoining Naval Support Activity Mid-South. These ponds are no longer in use but remain as open waters / wetlands.

A review of data available through the USEPA identified five Resource Conservation and Recovery Act (RCRA) documented sites within or near the immediate project area. No violations have previously been identified at these locations and no earthwork is anticipated within their immediate vicinity. Table 8 provides additional information on these sites.

Table 8. RCRA Sites

EPA ECHO - Detailed Facility Report								
Big Creek Activity - 1-Mile Buffer								
Facility	Street Address	City	State	Zip	Latitude	Longitude	Statute	Compliance Status
Aramark Uniform & Career Apparel Inc.	6195 Navy Road	Millington	TN	38053	35.338694	-89.857124	RCRA	No Violation Identified
51 Concrete Millington Ready	7630 Raleigh-Millington Road	Millington	TN	38053	35.33409	-89.89825	CWA RCRA	Terminated Permit No Violation Identified
Edsal Sandusky	4815 Biloxi Road	Millington	TN	38053	35.335653	-89.902953	CAA CWA RCRA	No Violation Identified No Violation Identified No Violation Identified
Sandusky Lee	4815 Jack Huffman Boulevard	Millington	TN	38053	35.334404	-89.903761	No Data Records Returned	
Collision Center Auto Body Shop	7654 US Highway 51 North	Millington	TN	38053	35.335347	-89.916327	RCRA	No Violation Identified

Source: USEPA 2019a; USEPA 2019b

In addition to these sites, the EPA’s NEPAssist tool identified 13 other RCRA locations within one mile of the project area. A NEPAssist report identifying these locations is included in the attachments.

In 1997, USGS prepared a hydrogeology and groundwater quality report for the Naval Support Facility – Mid-South. As part of this study, 67 Solid Waste Management Units (SWMUs) and one Area of Concern were documented at the facility. During the investigations, a large amount of data was collected on contaminant concentrations in the shallow ground-water system. Generally, concentrations detected were less than applicable maximum contaminant levels. However, locally elevated concentrations of several contaminants have been previously detected (USGS 1997). The Big Creek Activity avoids all SWMU locations and the Area of Concern.

Environmental Consequences

Under the No Action Alternative, no project-related impacts associated with solid and hazardous waste would occur.

The Proposed Action Alternative will generate solid waste both during facility construction and operation. Construction activities could result in waste such as oily rags, worn or broken metal and machine parts, defective or broken electrical materials, other scrap metal and plastic, empty containers, paper, glass, and other miscellaneous solid wastes. Once operational, waste would mostly be limited to trash and recyclable materials generated by visitors to the Big Creek Activity area. Occasionally, waste would be produced by maintenance activities. Waste would be disposed of by appropriate refuse collection and recycling services. All applicable regulatory requirements would be followed in the collection and disposal of waste to minimize health and safety effects.

No hazardous waste would be encountered or generated during the construction and operation of the facility. Project development and operation would not be affected by USTs or hazardous waste as no known UST or hazardous waste sites occur within the project area. During construction and operation of the facility, any materials determined to be wastes would be evaluated (e.g., waste determinations) and managed (e.g., inspections, container requirements, permitted transport, and disposal) in accordance with the Solid and Hazardous Wastes Rules and Regulations of the State of Tennessee (TDEC DSWM Rule 0400 Chapters 11 and 12, respectively).

A SWPPP will be prepared by a Certified Professional in Erosion and Sediment Control, a licensed Professional Engineer, or someone who has completed the TDEC Level 2 Tennessee Erosion Prevention and Sediment Control (EPSC) Training Program for Construction Sites Design

Course. The SWPPP establishes the overall management plan for hazardous wastes and materials. The following are some general BMPs from the SWPPP that outline these procedures.

- All hazardous waste materials will be disposed of in a manner which is compliant with local or state regulations.
- For all hazardous materials stored on site, the manufacturer's recommended methods for spill cleanup will be clearly posted.
- Any hazardous substance release occurring within a 24-hour period in an amount equal to or in excess of a reportable quantity established under either 40 CFR 117 or 40 CFR 302 will be documented as prescribed in the SWPPP.

Procedures to limit fuel spills would be implemented during construction and operation of the facility. Details regarding the handling of fluid spills and general trash will be included in the SWPPP. Nonhazardous wastes would be disposed of in an approved, operating landfill. Bulk chemicals would be stored in storage tanks or in returnable delivery containers. The transport, storage, handling, and use of all chemicals would be conducted in accordance with applicable laws, ordinances, regulations, and standards.

Excavated soil and waste materials will be managed and disposed of in accordance with applicable local, state, and federal regulations. No cut is proposed to occur within the former wastewater treatment ponds. Exposure to these areas will be limited with final treatment of the land determined by specifics of CWA permitting. If contaminated materials are discovered during construction, work will cease until the appropriate procedures and permits can be implemented. Any hazardous materials encountered during construction will be handled and disposed of in accordance with applicable local, state, and federal regulations. Impacts from hazardous wastes or the generation of solid waste during the construction and operation of the proposed facility would be insignificant.

3.11 SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

EO 12898 on Environmental Justice directs federal agencies to consider the impacts of their actions on minority and low-income populations and to avoid disproportionate impacts to those populations. As the Responsible Entity, Shelby County should address any environmental justice concerns through its NEPA analysis for the proposed HUD funded project. This section considers the proposed project and its potential impacts to minority and low-income populations within and near the project area. This includes analysis of impacts related to the No Action and Proposed Action Alternatives.

Affected Environment

The proposed project is located in Millington and unincorporated Shelby County, approximately 15 miles northeast of downtown Memphis. Based on U.S. Census data available through the U.S. Environmental Protection Agency's (USEPA) EJSCREEN, approximately 9,500 people live within one-mile of the project area, just over 1 percent of the Shelby County population of 936,990 (Census 2016). Tables 9 and 10 below provide a breakdown of relevant population, income, and poverty data.

Recorded population within the one-mile radius is predominantly white, with 63 percent reporting race as white and 37 percent minority (USEPA 2019a). The reported minority population within the one-mile radius is over 23 percentage points lower than the Shelby County minority population of just over 60 percent, which is over two and a half times Tennessee’s 22.2 percent minority population.

Table 9. Project Area Population

BIG CREEK NATIONAL DISASTER RESILIENCE DESIGN PROJECT					
POPULATION DATA					
Geography	Population Total	Minority Population			
		White	Percent White	Minority	Percent Minority
1-Mile Radius - Project Area	9,562	6,056	63.3%	3,506	36.7%
Millington, Tennessee	11,069	7,219	65.2%	3,850	34.8%
Shelby County, Tennessee	936,990	370,954	39.6%	566,036	60.4%
Memphis, TN-MS-AR Metro Area	1,341,339	633,397	47.2%	707,942	52.8%
Tennessee	6,548,009	5,096,733	77.8%	1,451,276	22.2%
United States	318,558,162	233,657,078	73.3%	84,901,084	26.7%

Sources:

* U.S. Census Bureau. American FactFinder; 2016 ACS 5-year estimates; B02001. Accessed February 15, 2019. <https://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml>.

*USEPA. EJSCREEN. Accessed February 15, 2019. Available at: <https://ejscreen.epa.gov/mapper/>.

While median household income is not reported at this level through EJSCREEN, the City of Millington has a reported median income of almost \$48,000, slightly higher than the Shelby County median income of \$46,854. Considering the location of housing stock and assumed population concentrations, it is likely the median income within one-mile of the project area is comparable to the City of Millington’s median income. In addition to median income, reported populations below poverty level were also considered. The City of Millington reports a higher percentage of population below poverty when compared to Shelby County, the Memphis Metropolitan Statistical Area (MSA), Tennessee, and the U.S., with the percentage decreasing as population sizes increase. While the differences only vary by a few percentage points, this supports the data identifying much of Millington as LMI households.

Table 10. Project Area Income and Poverty

BIG CREEK NATIONAL DISASTER RESILIENCE DESIGN PROJECT					
INCOME AND POVERTY DATA					
Geography	Median Income		Poverty Level		
	Total Households	Median Household Income	Population for whom poverty status is determined	Population below poverty level	Percent below poverty level
1-Mile Radius - Project Area	3,672	N/A	N/A	N/A	N/A
Millington city, Tennessee	4,260	\$47,823	10,750	2,548	23.7%
Shelby County, Tennessee	349,956	\$46,854	918,762	196,471	21.4%
Memphis, TN-MS-AR Metro Area	495,558	\$48,545	1,315,436	254,757	19.4%
Tennessee	2,522,204	\$46,574	6,386,751	1,100,169	17.2%
United States	117,716,237	\$55,322	310,629,645	46,932,225	15.1%

Sources:

*U.S. Census Bureau. American FactFinder; 2016 ACS 5-year estimates; S1701, S1901, B19301. Accessed February 15, 2019. <https://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml>.

*USEPA. EJSCREEN. Accessed February 15, 2019. Available at: <https://ejscreen.epa.gov/mapper/>.

During planning efforts and activities associated with the preparation of the Greenprint, a Fair Housing & Equity Assessment was conducted. Results indicated that flooding risks may disproportionately affect individuals with accessibility challenges due to the limited housing options. Other risks such as extreme heat-island effect, a phenomenon of concentrated, higher temperatures due to impervious development replacing open land and vegetation, may disproportionately affect LMI individuals, aging population, and persons with disabilities, resulting in negative health impacts.

Environmental Consequences

Under the No Action Alternative, no project-related or disproportionate impacts to the socioeconomics or low-income or minority populations in the project area would occur.

Under the Proposed Action Alternative, temporary workers would be employed during construction. A vast majority of these workers would be based in the local area, leading to a short-term beneficial impact on the local economy.

The proposed project would not likely result in an increase in local employment as no workers would be needed for day-to-day operation of facilities associated with the Big Creek Activity. While periodic maintenance activities, primarily mowing, would be required, City of Millington, Shelby County, and Chickasaw Basin Authority Staff will oversee these responsibilities, which are not likely to result in an increase in employment.

While long-term employment growth is not anticipated from the development of the Big Creek Activity, alleviating flooding in the area will help protect the Naval Support Facility Mid-South, a major employer and large economic driver in Millington and the surrounding communities. In addition, resilience planning can help lead to additional private development, spurring the local economy.

While the Big Creek Activity is located within a LMI community, the development of the Proposed Action Alternative would protect surrounding neighborhoods and businesses from future flooding and would not result in long-term adverse effects. Consequently, there would be no disproportionately adverse impacts to minority or low-income populations. It is worth noting that the City of Millington is made up of more than 50 percent LMI households, many of which would directly benefit from the reduction of flooding in the surrounding neighborhoods and recreational amenities. The community as a whole would benefit from the additional resources focused on improving community health and wellness, transportation alternatives, and social equity in access to the amenities, including recreational areas, multiuse trails, wetlands, boardwalks, community pavilions, blight reduction, and camping areas.

The Proposed Action Alternative would not have significant adverse impacts to the local economy or result in adverse impacts to low-income or minority populations.

3.12 RECREATIONAL FACILITIES

The project and its potential impact to recreational facilities within the project area and surrounding community are discussed in the following section. This includes impacts related to the No Action and Proposed Action Alternatives.

Affected Environment

While there are no existing recreational activities within the project area, potential impacts to public recreational facilities were considered to ensure the proposed project would not have

adverse impacts to recreational resources currently enjoyed by the community. A variety of public recreational facilities may be found in the surrounding areas. Most notably, the USA Stadium Complex is located at 4351 Babe Howard Boulevard, just north of Big Creek and approximately 900 lf from the northwestern corner of the proposed project. Since the mid-1980s, this venue has played host to a variety of events including baseball games, rodeo, rugby games, tractor pulls, festivals, and concerts. In addition to the USA Stadium Complex, the following public facilities, operated by the City of Millington, are found within one mile of the proposed project:

- Baker Community Center
- Aycock Park
- Biloxi Ball Fields/Millington South Park
- Centennial Park/Eastwood Park
- Lions Park
- Oak Park
- Millington Gym
- Millington Farmers' Market

Environmental Consequences

Under the No Action Alternative, no project-related impacts to surrounding recreational facilities would occur.

The Proposed Action Alternative would not directly impact any existing recreational resources. The recreational components and features of the Proposed Action Alternative would add to the public recreational offerings within the community while also improving connectivity of these resources across Millington and Shelby County. In addition to resilience and disaster preparedness, the Proposed Action Alternative would address some main goals of the Greenprint, which is designed to enhance regional sustainability by establishing a unified vision for a region-wide network of green space areas. Specific elements of the proposed project are also included in the Millington Greenways Plan which provides a vision and strategy for the development of an integrated, connected system of greenways, paths, and sidewalks to connect the existing park system, open spaces, and other destinations throughout the City.

Specific to recreational components of the Proposed Action Alternative, the Proposed Action Alternative would provide additional resources to improve community health and wellness, transportation alternatives, and social equity in access to the amenities. The Proposed Action Alternative would provide direct benefits to Millington and the surrounding communities by creating a regional park facility that would allow for enjoyment of trails and recreational facilities. Project information was submitted to the City of Millington Parks and Recreation Department for review. While no comments have been received directly from the City of Millington Parks and Recreation Department, the City has provided input throughout the development of the concept and master plan of the proposed project.

3.13 AIRPORT HAZARDS

This section discusses the proposed project as it relates to airports. Potential impacts and hazards to and from airport operations and the No Action and Proposed Action Alternatives are identified.

Affected Environment

The main project area is approximately 1 mile from the Millington-Memphis Airport. The airport has an 8,000-foot runway that is able to accommodate a variety of commercial, private planes,

and cargo carriers. The Millington-Memphis Airport is operated as a public airport that primarily serves private and military aircraft. The master plan is included in the attachments.

Environmental Consequences

Under the No Action Alternative, no project-related impacts to surrounding airport facilities would occur.

Based on a review of the Millington Regional Jetport Airport Master Plan, the Proposed Action Alternative does not fall within the Accident Potential Zone (APZ) or Runway Protection Zone (RPZ)/Clear Zone (CZ). Elevations of the proposed activities fall within the limits of the identified critical elevations of the area and would not cause violations of the Federal Aviation Administration Part 77 surfaces. In addition to considered elevations, the proposed activities and land use are not likely to cause any additional wildlife attractant concerns near the airport when compared to the existing conditions and undeveloped land. The Proposed Action Alternative would not result in direct or indirect impacts to the Millington-Memphis Airport or contribute to airport hazards.

3.14 PUBLIC SAFETY

Public health issues include access and emergency response and preparedness to ensure project construction and operations do not pose a threat to public health and safety. This section discussed potential impacts on public health and safety resulting from the No Action and Proposed Action Alternative.

Affected Environment

Operation and Access

The majority of the project area is undeveloped and not accessible to the public. From Paul Barrett Parkway, the southern boundary, the project area is obscured from view by forest vegetation. Much of the land north of Big Creek is located within the perimeters of the Naval Support Activity Mid-South and is not open to the public.

Canadian National Railway

Approximately one mile east of US 51, roughly 700 lf of railroad travels north-south through the project area, before crossing over Big Creek and under Paul Barrett Parkway. This is an active freight rail owned and operated by Canadian National Railway (CN). The existing rail bridge is constructed of concrete with steel piles and consists of a single track. There is also an adjacent service bridge constructed of wood including wooden piles. The existing railroad bridge, where the greenway will cross under, is currently protected from stream incision and bank erosion by a metal sheet pile grade control structure installed immediately downstream in the Big Creek channel. The sheet pile has structurally failed resulting in significant bank erosion downstream of the existing bridge. The erosion is threatening the existing Millington Levee to the north.

Environmental Consequences

Under the No Action Alternative, no project-related impacts to public safety would occur.

The Proposed Action Alternative would require facility management and oversight to ensure public safety and successful operation of the facility.

Operation and Access

In agreements that have been worked out throughout project planning, Area 1, including the main entrance off of US 51, will be owned, operated, and maintained by the City of Millington. Areas 2 and 3 of the Big Creek Activity will be owned by Shelby County, with the Chickasaw Basin

Authority taking responsibility for management. As currently proposed, the main entrance would require a new curb along US 51. As this is a state route, the entrance will require a driveway permit and approval by TDOT. The entrance would be right-in, right-out only, approximately 650 lf northeast of the northbound lane of the US 51/ Paul Barrett Parkway interchange.

The Big Creek Activity will maintain standard City of Millington Parks and Recreation hours of operation: from dawn to dusk, except for campers that have been approved to use camping areas in Area 2. Gates will be installed at the main entrance off of US 51 and the pedestrian bridge over Big Creek to prevent trespassers from accessing the area when the facility is not open.

The City of Millington Fire Department reviewed the master plan and determined fire hydrants would not be needed as the Proposed Action Alternative does not include any permanent buildings. In addition, one access drive into Area 1 will be sufficient as long as the emergency access from Paul Barrett Parkway is maintained. All parking lots will have space for fire truck access and turning around. Pedestrian trail entrances off roadways will include removable bollards to prevent park visitors from driving on trails but allow access to trails and surrounding areas for maintenance and in cases of emergency. In addition, boardwalks will be designed and constructed to handle a small utility vehicle.

Canadian National Railway

The performance metrics identified for this activity include an increase in the utilization of greenways and biking trails. A continuous multi-use trail from the western portion of the park near US 51, to the eastern area near Sledge Road is critical to meeting this key metric. This trail will be designed in accordance with the Americans with Disabilities Act and constructed with a hardscape material such as asphalt or concrete. To create a contiguous trail across the entire Proposed Action Alternative area, the greenway will intersect the CN railroad. The safest mode of crossing the railway consists of a grade separated crossing to limit pedestrian and train interaction. Grade separation will be achieved by routing the greenway under the railroad bridge crossing over Big Creek. Coordination with CN began with sharing the master plan and purpose of the overall project. The CN railway will permit the greenway to cross under the existing bridge given that it meets specific criteria and goes through their review process. The crossing will include the design of a protective barrier extending minimum of 25 feet beyond each end from the edge of the existing railroad bridge. Consistent with the rest of the project, it must not increase flooding upstream of the bridge. The crossing will likely consist of a precast box culvert or a free-standing metal structure designed such that it will allow access for maintenance and inspection of the existing bridge.

This project will repair the sheet pile that is located within CN ROW and stabilize the banks downstream to protect both existing and proposed flood mitigation structures. Repairs will consist of installing a new metal sheet pile weir and armoring the banks with turf reinforced matting and articulated concrete matting.

Preliminary design of the improvements within the CN ROW will be submitted to CN for review. Upon final approval of design, an agreement between the City of Millington and CN will need to be executed to ensure accessibility for proper maintenance.

With proper design and operation agreements, direct or indirect impacts to public safety are not anticipated from the development of the Proposed Action Alternative.

3.15 UTILITIES

This section describes an overview of existing utilities within the project area and the potential impacts on these utilities that would be associated with the No Action and Proposed Action Alternatives.

Affected Environment

Electric

Existing overhead electric lines are located along the east side of US 51 near the project site's western boundary. There is also electric along the east side of Sledge Road near the project site's eastern boundary.

Water

North of Big Creek there is an existing 12-inch (in) water main along US 51 that terminates before crossing Big Creek. There is also an existing 8-inch water main along Raleigh Millington Road that extends south of Big Creek. The 8-inch line is hung on the Raleigh Millington Road bridge and continues south of the intersection of Jones Boyd Rd.

Sewer

There is an existing 15-inch sewer line west of US 51. The outfall flows from the south to the north and crosses an existing crop field before going under Big Creek. There is an existing 24-inch sewer line that flows south under Highway 385 approximately 2,000 feet east of Raleigh Millington Road. The sewer line then turns and flows west along the north side of Jones Boyd Road for 2,000 ft before flowing into a lift station at the northwest corner of Raleigh Millington Road and Highway 385.

Environmental Consequences

Electric

In Area 1 the existing lines may need to be raised based on the amount of fill placed on the project site to provide the required vertical clearance. Power is needed on the project site for athletic field lighting. The proposed electric service into the site will follow the proposed access road. The proposed electrical work should have minimal effects on the site due to the other work required to construct the access road and site grading.

Power for Area 2 is needed on the project site in Area 2 for pavilion and parking lot lighting, and the grinder pump for the restroom. Power could be provided to the site by constructing approximately 1 mile of overhead power from Raleigh Millington Road along Jones Boyd Road. Since the amenities in Area 2 have minimal power requirements, power may be provided from on-site solar power. The option for on-site solar would have minimal impact and reduce the carbon footprint of the project area.

The flood control concept in Area 3 will require power to be extended to the proposed flood control gates. Overhead power will be extended along the proposed flood storage berm from Sledge Road.

Water

In Area 1 water service could be extended to the site by hanging a new water main on the eastern US 51 bridge and extending it south where it could connect to the park road by boring under US 51. The water main into the site will follow along the proposed access road. There should be minimal effects on the site due the other work required to construct the access road and site

grading. The bore pits required to extend water to US 51 would have minimal impact. Water is needed on the site for restrooms, athletic field irrigation, hose connections, and drinking fountains.

In Area 2 water service could be extended to the site by tying into the existing 8-inch water main along Raleigh Millington Road. The water main would extend approximately 4,000 lf along Jones Boyd Road to the proposed educational area. Water is need on the site for hose connections, drinking fountains, and restrooms.

Sewer

New sewer service in Area 1 will need to be extended.

New sewer service in Area 2 will need to be extended east approximately 1,600 lf to the proposed permanent restroom facilities. The sewer service can follow Jones Boyd Road into the park. The existing line must be surveyed to determine how much of the new service can be gravity flow. Since the park elements will be constructed at or near existing grades, a lift station may need to be installed in the park to reach the gravity sewer. In addition, a small grinder pump will be needed for the operation of the permanent restroom facilities in Area 2.

Considering the Big Creek Activity and related utility needs, the Proposed Action Alternative would result in minor direct impacts.

3.16 CUMULATIVE IMPACTS

CEQ regulations define a cumulative impact as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions” (40 CFR § 1508.7). Cumulative impacts should be considered early in the project development process, as identification of potential cumulative impacts may assist in the design and selection of alternatives and mitigation measures to minimize a project’s environmental impacts.

This Proposed Action Alternative has potential to contribute to cumulative impacts on land use, water resources, geological resources and farmlands, visual resources, noise, air quality, floodplains, biological resources, solid waste, and utilities in the area.

Planned residential development near the Big Creek Activity includes a 247-unit apartment complex and 72 single-family home development on 46 acres just south of the project area near Paul Barrett Parkway and Raleigh Millington Road (Business Journal).

Within Millington and near the project area, transportation projects are the largest contributors to cumulative impacts. The Naval Facility Connector, a 0.5 mile roadway reconstruction project, is currently under construction less than one mile north of the proposed project area. Within the Memphis Metropolitan Planning Organization’s Fiscal Year 2020-2023 Transportation Improvement Program (TIP), which was approved in September 2019 and is currently under FHWA review for final approval, the City of Millington has two capital projects listed: The Navy Streetscape and Median Project and Raleigh Millington Road at SR-385 Intersection Improvements (MPO 2019).

As shown in the TIP, the Navy Streetscape and Median Project and intersection improvements at Raleigh Millington Road are scheduled for construction in 2020. Funding for a new Raleigh Millington Road bridge over Big Creek is also identified in the TIP. This bridge is within the Big Creek Activity project area and its construction will include some trail improvements as discussed

for the Proposed Action Alternative. In addition to these projects, Millington also has funding for minor resurfacing, bicycle and pedestrians, and Intelligent Transportation System projects.

The City of Millington recently received a Multimodal Access Grant from TDOT. The grant funds are for a sidewalk project along US 51 which will tie into the planned entrance for the Big Creek Activity. The proposed project is along US 51 from just south of Big Creek to Veterans Parkway. The grant is intended to improve pedestrian access along the corridor. The project covers approximately 2.5 miles along US-51 and includes replacement of deteriorated sections of sidewalk, new accessible curb ramps, and new pedestrian traffic signal equipment. The project is currently in the preliminary engineering phase.

The largest project within the area is a segment of the future Tennessee portion of I-69. A segment is planned for Millington and is set to follow Paul Barrett Parkway near the project area (TDOT 2019). While existing highway alignments would be used for many segments of the proposed I-69, roads would need to be widened and new segments are proposed that would affect agricultural or undeveloped land. Proposed highway improvements and construction of new highway would likely affect wetlands and other water resources; however, compensatory mitigation would be required to offset unavoidable impacts. As part of the project undertaking, the Federal Highway Administration, in conjunction with TDOT, will complete a NEPA analysis to consider the impact of I-69 on these resources, as well as noise, visual resources, and air quality, among other things. Considering recent and planned development near the project area, the proposed Big Creek Activity is expected to result in minor direct impacts and would not contribute to a cumulative adverse effect on these resources.

CHAPTER 4

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CHAPTER 5

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