Document Type: EA-Administrative Record
Index Field: Final Environmental Document
Project Name: First Creek Drainage Improvements
Project Number: 2009-26

ENVIRONMENTAL ASSESSMENT

FIRST CREEK DRAINAGE IMPROVEMENTS

Knox County, Tennessee

PREPARED BY:
TENNESSEE VALLEY AUTHORITY

JUNE 2009

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FINAL ENVIRONMENTAL ASSESSMENT

FIRST CREEK DRAINAGE IMPROVEMENTS
KNOX COUNTY, TENNESSEE

TENNESSEE VALLEY AUTHORITY

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The Proposed Decision and Need

Tennessee Valley Authority (TVA) must decide whether to issue approval under Section 26a of the *TVA Act* for 0.36 mile of drainage improvements to First Creek in Knoxville, Knox County, Tennessee. The purpose of these drainage improvements is to improve First Creek's ability to carry storm water runoff without flooding streets and structures.

The First Creek watershed is highly urbanized. Rainfall that runs off rooftops, roadways, and parking lots in urban areas travels much more quickly to receiving streams than the same amount of runoff from grassy or forested areas. This makes First Creek prone to flooding. The City of Knoxville (City) submitted a joint permit application to TVA and the U.S. Army Corps of Engineers (USACE) on August 13, 2008, for drainage improvements along First Creek (Attachment A). In the application, the City proposes to improve a 0.36-mile stretch of First Creek between Chickamauga Avenue and 132 feet north of Emoriland Boulevard along North Broadway (Figure 1). Table 1 presents the scope of the City's proposal and the portions of scope that fall under TVA's Section 26a jurisdiction.

Table 1. Scope of Work Proposed and Scope Within TVA Section 26a Jurisdiction

Scope of Work to be Performed	Scope Within Section 26a Jurisdiction
Construction of a high-flow bench (floodplain) above the normal flow channel, at First Creek Mile 4.16	Yes
Construction of a precast concrete I-beam bridge at Fairmont Boulevard (bridge replacement) and Emoriland Boulevard (new bridge for high-flow channel)	Yes
Construction of approximately 367 feet of high-flow channel north of, south of, and under Emoriland Boulevard	Yes
Construction of sediment control structures	Yes
Detours and road closures	No
Construction of sanitary sewers, manholes, storm drains and catch basins	No
Construction of asphalt pavement, concrete curb, concrete curb and gutter, and sidewalk	No
Construction of private drives and business entrances	No
Removal of existing structures, the sodding of ditches, topsoiling, seeding, and landscaping (for revegetation)	No

Figure 1. Location of Drainage Improvements Along First Creek, Knoxville, Knox County, Tennessee

The channel of First Creek has been altered in the past. The cross section of the stream channel in the proposed project area is V-shaped. The proposed high-flow bench and channel would create broad, gently sloped areas adjacent to First Creek to accommodate storm water flows in First Creek. The bench and channel would not only slow the velocity of water through the creek, but also provide a place for temporary storm water storage, lessening the likelihood of floodwaters reaching North Broadway.

Other Environmental Reviews and Documentation

The USACE deemed the City's proposal eligible for Section 404 Nationwide Permit No. 14 on September 4, 2008, and thus categorically excluded it from the preparation of an environmental assessment (EA) or environmental impact statement. The nationwide permit letter is shown in Attachment B.

The City improved another section of First Creek in 2005-2006, and TVA adopted an EA prepared by USACE for those improvements (USACE 2005). TVA reached a finding of no significant impact based upon information provided in the USACE EA.

The City held public meetings on the proposed project on April 9, 2007; September 4, 2007; January 8, 2008; and April 15, 2008.

The City has obtained its Aquatic Resource Alteration Permit (ARAP) for this proposed project, and it is presented in Attachment C.

Section 401 Water Quality Certification is required for this project. The City obtained the necessary certification, which is presented in Attachment D.

Alternatives

TVA considered two alternatives: the No Action Alternative and the Action Alternative. Under the No Action Alternative, TVA would not issue Section 26a approval for the drainage improvements. Flooding of North Broadway and low-lying structures in the project area would likely continue.

Under the Action Alternative, TVA would issue Section 26a approval for the components of the City's proposed project that would result in obstructions to the stream and floodplain. The City would make the drainage improvements listed above to the 0.36-mile stretch of First Creek between Chickamauga Avenue and just north of Emoriland Boulevard along North Broadway.

No practicable alternatives to the First Creek drainage improvements were proposed in the joint permit application (Attachment A).

TVA's preferred alternative is the Action Alternative, issuance of Section 26a approval for the proposed drainage improvements along First Creek.

Affected Environment and Evaluation of Impacts

Site Description

The proposed First Creek drainage improvements area extends from North Broadway at Chickamauga Avenue to 132 feet north of Emoriland Boulevard on First Creek at approximate Creek Miles 4.16 to 4.70 (Figure 1). This section of First Creek meanders underneath North Broadway, in a section of Knoxville that has supported residential neighborhoods since the late 1800s. The main environmental concern regarding the City's proposal is the impact the proposed stream improvements would have on the many historic homes within the viewshed of First Creek.

In this section of First Creek, North Broadway is a four-lane or five-lane road. Much of the ground surface is impervious, resulting in brief intense pulses of runoff whenever heavy rain falls.

Impacts Evaluated

TVA staff first documented the potential impacts of the proposed action in a categorical exclusion checklist (Attachment E). Based on this evaluation, TVA determined that no wetlands, archaeological resources, or threatened and endangered species were present and the City's proposal would have no effects on these resources. The evaluations and their findings satisfy the requirements of both Executive Order 11990 (Protection of Wetlands) and Section 7 of the *Endangered Species Act.* TVA also determined that there were no unusual or

unique wildlife, plant, or aquatic communities in the project area; therefore, no impacts would occur to these resources. Impacts to wildlife, vegetation, and air quality would be insignificant. There would be no adverse socioeconomic impacts or disproportionate effects to minority or low-income populations.

This EA further evaluates the following resource areas for potential impacts: historic structures; visual resources; floodplains; surface water, water flow, and water quality; noise; and transportation.

Historic Structures

Affected Environment

According to a Phase I historic structures report survey (Sparkman 2009), this segment of North Broadway is a mixed-use commercial and residential area that was developed in the late 1800s. The area retained a primarily rural character until the development of the automobile and the resulting housing development it brought in the 1920s. This growth steadily continued into the 1950s with little development since that time. Today, this area contains a number of fast food restaurants, car lots, service establishments, condominiums, and single-family subdivisions. Like many inner city neighborhoods of this period, residential properties adjoin a commercial corridor, and nonresidential properties within the residential areas are limited to churches, schools, and other civic buildings. Although the commercial development along this section of North Broadway has declined in recent years, the residential areas have been well maintained and have experienced stable property values.

While there are no cohesive commercial districts along this section of North Broadway, several buildings were identified as having potential for historic significance. A small studio at 3553 North Broadway was used as an early location for local television station WATE in the mid-1950s. A two-story Art Moderne building at 3415 North Broadway provides a unique example of pre-World War ll commercial architecture. Two early 1930s apartment buildings at 3228 North Broadway are intact examples of pre-World War ll multifamily housing that retain their original architectural character. The Home Federal Building at 3101 North Broadway is an intact example of midcentury modern architecture. The Emory/Sherfick house at 1517 Emoriland Boulevard is the only building in the project area listed in the National Register of Historic Places (Sparkman 2009).

Environmental Consequences

Under the No Action Alternative, TVA would not issue Section 26a approval, and the proposed improvements to First Creek would not occur. Problems with flooding in the area, including the potential flooding of historic structures, would continue.

Under the Action Alternative, effects on historic structures as a result of implementation of the proposed First Creek drainage improvements would likely not be adverse. During construction, the removal of some mature trees and standing structures would result in a change in the landscape character for historic structures. Immediate short-term visual benefits would include flood control and storm water management. Upon completion of construction and cleanup, there would be a slow but noticeable enhancement of aesthetic character through the implementation of proposed landscape improvements.

In addition, the City has incorporated a number of measures into its proposal to reduce the long-term effects to historic structures. These include railings on the proposed new bridges

on Fairmont Boulevard and Emoriland Boulevard similar in character to the railings on the bridges on North Broadway, which would help minimize the effects of new construction. The landscape improvements following construction would minimize the effects of grading and visible drainage structures in the landscape. Installation of the proposed landscape materials would replace vegetation that would be lost during construction. As a result, no long-term negative visual effects are expected with respect to historic structures.

The City also purchased and demolished a restaurant at 3428 North Broadway. The restaurant was out of character with the nearby neighborhood. The City removed the restaurant building as part of its mitigation to reduce potential impacts of the First Creek improvements on historic structures. The purchase and demolition of the restaurant was completed prior to TVA involvement in the project. However, TVA agrees that this effort has helped to restore the visual character and setting of the historical neighborhood.

TVA began consultation with the Tennessee State Historic Preservation Officer (SHPO) in January 2009 as required under Section 106 of the *National Historic Preservation Act*. During consultation, TVA personnel conveyed to the SHPO the measures proposed by the City to reduce effects to historic structures. In a letter dated April 8, 2009, the SHPO concurred that as a result of the proposed measures, there would be no adverse effects to historic properties (see Attachment F).

Visual Resources

Affected Environment

The physical, biological, and cultural features of an area combine to make the visual landscape character both identifiable and unique. Scenic integrity indicates the degree of unity or wholeness of the visual character. Scenic attractiveness is the evaluation of outstanding or unique natural features, scenic variety, seasonal change, and strategic location. Where and how the landscape is viewed will affect the more subjective perceptions of its aesthetic quality and sense of place. Views of a landscape are described in terms of what is seen in foreground, middleground, and background distances. In the foreground—an area within 0.5 mile of the observer—details of objects are easily distinguished in the landscape. In the middleground, normally between 1 and 4 miles from the observer, objects may be distinguishable but their details are weak, and they tend to merge into larger patterns. Details and colors of objects in the background, the distant part of the landscape, are not normally discernible unless they are especially large and standing alone. The impressions of an area's visual character can have a significant influence on how it is appreciated, protected, and used.

Although the commercial development along North Broadway has declined in recent years, the residential areas have been well maintained. There are numerous mature hardwoods interspersed with shrubs and groundcovers around the residences and open green space to complement stone walls and other period infrastructure. First Creek has steep side banks and is heavily vegetated with woody scrub vegetation ranging in height from 3 to 6 feet. The creek cannot be seen from North Broadway and does not provide visual contrast. The resulting landscape possesses a harmonious urban character.

Environmental Consequences

Visual consequences are examined in terms of visual changes between the existing landscape and proposed actions, sensitivity of viewing points available to the general

public, their viewing distances, and visibility of proposed changes. Scenic integrity indicates the degree of intactness or wholeness of the landscape character. These measures help identify changes in visual character based on commonly held perceptions of landscape beauty and the aesthetic sense of place.

Under the No Action Alternative, TVA would not issue Section 26a approval, and the improvements to First Creek would not occur. No impacts to visual resources would result from implementing the No Action Alternative.

Under the Action Alternative, drainage improvements to this section of North Broadway would have short-term insignificant negative visual impacts and long-term minor beneficial impacts. During construction, the removal of some mature trees ranging in height from 20 to 40 feet and standing structures would result in a decline in scenic integrity. The introduction of construction equipment, personnel, and rerouting of automobiles along construction routes would contribute to this decline. Immediate short-term visual benefits would include flood control and storm water management. Upon completion of construction and cleanup, there would be a slow but noticeable enhancement of aesthetic character through the implementation of proposed landscape improvements.

Floodplains

Affected Environment

The 100-year floodplain on First Creek is the area that would be inundated by the 100-year flood. Based on Knox County, Tennessee, Flood Insurance Rate Map Panel 143, published on May 2, 2007, the 100-year flood elevation at First Creek Mile 4.16 is 948 feet above mean sea level. The City participates in the National Flood Insurance Program, and any development must be consistent with these regulations.

Environmental Consequences

Under the No Action Alternative, TVA would not issue Section 26a approval, and the City would not implement any of the proposed improvements to First Creek. Few changes to the First Creek floodplain would be expected, and some of the flooding problems would continue.

The proposed project considered under the Action Alternative involves the construction of a high-flow channel and other associated improvements to lower flood elevations in the area and upstream of the project. The City proposes to remove earth from the existing channel banks and deposit it at a spoil site about 1 mile away. Topsoil would be stripped and stockpiled. The channel would then be reconfigured to accommodate a high-flow bench consisting of a broad, nearly flat bottom just above the existing banks of the creek and extending outward for a combined total of between 40 and 50 feet. The bank would then slope upward from the channel bottom to the original ground surface at a slope of 2:1. The high-flow bench and stream bank would be seeded. The 2:1 slope of the stream bank would be seeded as well and interspersed with boulders, trees, shrubs, and other plantings. The excavation would change the cross section of the creek channel from a V-shape to a trapezoidal shape. Attachment G shows typical cross sections of First Creek upon completion of the drainage improvements.

The City has evaluated alternatives and provided documentation to support a no practicable alternative determination for this project. The proposed project would result in

beneficial effects in the form of flood damage reduction in the area. Therefore, the project would be consistent with Executive Order 11988 (Floodplain Management).

Surface Water, Water Flow, and Water Quality

Affected Environment

The affected environment is a section of First Creek from approximately Creek Miles 4.16 to 4.70, located in the Ridge and Valley ecoregion in Knox County, Tennessee. Small streams within this ecoregion are typically characterized by limestone rubble, bedrock riffles, and silty sand pool areas (Etnier and Starnes 1993). The creek flows through an urban setting of neighborhoods, small businesses, and busy thoroughfares. First Creek was listed in 2008 on the Tennessee Department of Environment and Conservation's 303(d) list as being impaired along its entire length due to siltation and habitat alteration.

Environmental Consequences

Under the No Action Alternative, TVA would not issue Section 26a approval, and the proposed improvements to First Creek would not occur. The stream bank would remain in its current condition, and flooding during heavy rainfall events would likely continue.

Under the Action Alternative, the City would construct the drainage improvements on First Creek in the vicinity of North Broadway, Emoriland Boulevard, and Fairmont Avenue. The expected effects of the proposed drainage improvements to water quality and surface water would be minor and beneficial, provided the facilities are designed, constructed, and maintained to prevent pollution and adverse water quality impacts, to comply with all applicable state and federal environmental laws and regulations, and to employ construction best management practices (BMPs) to prevent surface water impacts. The proposed drainage improvements would affect water flow and stream channels in only a minor way. The proposed project would create a floodplain for First Creek and would involve plantings and the use of BMPs to reduce bank erosion. The proposed slope of the improved channel would be gentler than the existing bank, further reducing the possibility of bank erosion. The City's proposed project would affect only 0.36 mile of a stream about 8 miles long. Reshaping the stream channel would have only a minor effect on the overall drainage of First Creek.

With the use of BMPs as outlined in TVA's Section 26a General and Standard Conditions, which include the condition that uncured concrete must not contact the waters of First Creek, impacts resulting from the proposed action would be insignificant. In addition, the Tennessee ARAP and Section 401 Water Quality Certification contain additional conditions for minimizing impacts to water quality and surface water resources.

Noise

Affected Environment

The area of the proposed First Creek drainage improvements is a mix of commercial, urban residential, and sensitive receptors. Saint Mary's Medical Center, Fulton High School, and Arlington Baptist Church are sensitive receptors in the project area. Arlington Baptist Church is about 0.3 mile, Fulton High School is about 0.5 mile, and Saint Mary's Medical Center is about 0.6 mile from the site of the proposed project. This section of First Creek flows near and under several busy city streets. Commercial operations are most sensitive during usual business hours; whereas, local residents are most sensitive outside normal

business hours, especially sleeping hours. For nearby Saint Mary's Medical Center, the most sensitive time is during night sleeping hours, although resting and recuperating patients could be sensitive at any time. Students and staff at Fulton High School are most sensitive during school hours, and church attendees are sensitive during scheduled worship and special activities, such as weddings.

Current environmental noise in the area comes mainly from traffic, commercial activities, and outside building air-conditioning units. Traffic and commercial noise is usually higher from about 6:30 a.m. to 7:00 p.m. due to commuting vehicles and business activities. Air-conditioning noise peaks during the warmest parts of the day, but it is usually heard most plainly during sleeping hours because of the decrease in other noise levels.

Environmental Consequences

No additional impacts to noise would result from the No Action Alternative because no construction activities would take place in the First Creek floodplain along North Broadway between Emoriland Boulevard and Chickamauga Avenue.

Under the Action Alternative, heavy equipment operations and truck hauling would be the predominant sources of noise during the construction phase of this project. Trackhoes, bulldozers, loaders, and trucks all use diesel engines that generate considerable noise. Although the daytime ambient noise is quite noticeable in the area, the construction noise would be heard in the adjacent areas. The construction noise has the potential to cause annoyance during daytime activities, disruption of sleep for the local residents, disturbance of rest and recuperation for hospital patients, and interruption of activities at schools and churches.

These annoyances, disturbances, and disruptions would be minimized by requiring all heavy equipment and trucks to have working, state-of-the-industry mufflers and by limiting construction work to normal business hours (e.g., 7:00 a.m. to 5:00 p.m.), Monday through Friday. This limitation would also eliminate potential interruptions to church activities since these activities are typically held outside of normal business hours and on weekends. Most people would likely accept the extra construction noise during business hours.

Urban hospitals and schools are built to reduce noise from external sources in order to decrease the disturbance to their occupants from high-traffic streets and other city-related activities. Because of this, as well as their distance from the construction site, noise impacts on Saint Mary's Medical Center and Fulton High School are not likely to disturb their occupants. Additionally, the hospital, the church, and the school are not along the route that would convey truck traffic to and from the proposed project site.

Transportation

Affected Environment

Primary access to the proposed site is via Interstate (I-) 640. From I-640, access to the site is via Exit 6 to North Broadway/State Highway 71/U.S. Highway 441. The project area is approximately 1.25 miles south of the exit. Spoils would be hauled by dump truck to a site located at the corner of Washington Pike and Valley View Drive.

Environmental Consequences

Under the No Action Alternative, TVA would not issue Section 26a approval, and the proposed improvements to First Creek and the construction and/or modification of the two bridges would not occur. No impacts to transportation resources would result from the No Action Alternative.

Under the Action Alternative, the proposed drainage improvements would require hauling away and delivering a maximum of 150 truckloads per day of excavated materials or construction materials for approximately 15 months.

From the First Creek construction site, trucks carrying spoil material away from the site would travel north along North Broadway to I-640 East. From I-640, the trucks would take the Washington Pike exit. Trucks would then head south to the spoil site, a vacant lot, located at the corner of Washington Pike and Valley View Drive.

Besides an additional 150 trucks per day, some additional traffic would be added due to trips by the construction workers. The volume added by the construction workers would be minimal. The majority of the truck trips would be during nonpeak traffic hours (approximately 9:00 a.m. to 4:00 p.m.), which implies low traffic volume. The volume of vehicle trips added to the daily traffic from the trucks and workers would not have a significant impact on the level of service (LOS) for this road network. LOS is a transportation planning and engineering concept found in the *Highway Capacity Manual* (Transportation Research Board 2000). LOS is a qualitative measure that is described in terms of travel time, comfort, safety, and maneuvering freedom and incorporates various measurable factors associated with a particular segment of a roadway into the analysis.

Construction time is expected to last approximately 15 months. Some road closures and detours would be needed during the course of the construction. Although the road network would see an increase in vehicle trips due to the closures, detours, and added vehicular volume, the increase due to construction would be only temporary.

Cumulative Impacts

The City has undertaken several assessments and projects beginning in 1976 to improve drainage in First Creek, mainly to reduce flooding to roadways and structures along the creek. The stream modifications made in these earlier projects added runoff storage volume to the creek, increased the capacity of culverts and/or bridges, or otherwise relieved congestion in First Creek, with the goal of reducing the impacts of flooding on roadways and structures. The floodplain of First Creek is the main resource cumulatively impacted by this project, and that is by design. The slope of the modified floodplain is much gentler than the existing creek bank and is sufficiently low to reduce if not eliminate bank failure. The modifications to the creek channel extend outward from it at a maximum of 40 feet each direction (80 feet total). For these reasons, the cumulative impacts of the City's proposed improvements are expected to be minor and slightly beneficial in the vicinity immediately upstream and downstream of the proposed drainage improvements.

Land in the immediate area of the proposed project is largely developed as either residential or commercial property. Any new development would almost certainly require demolition of existing structures. The land use for redeveloped property would likely be very similar to that currently exhibited near First Creek. Although the City has other

drainage improvement projects in mind for First Creek, funding is not available for those projects at this time, and the likelihood of future funding is unknown.

Mitigation and Special Permit Conditions

The project has been designed to minimize adverse environmental impacts, and the ARAP and Water Quality Certification contain additional conditions for minimizing impacts. TVA would require the following mitigation measures in addition to the Section 26a General and Standard Conditions:

- The City would adhere to its own commitment that construction would be limited to the hours between 7:00 a.m. and 5:00 p.m., Monday through Friday, and Saturdays only when necessary due to inclement weather or other delays.

- The City would ensure that equipment and trucks have original equipment equivalent mufflers in good working condition.

These conditions and commitments are sufficient to ensure that the proposed project would not have a significant impact on the environment.

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Agencies and Others Consulted

None

References

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Attachments

A – Joint Permit Application
B – USACE Nationwide Permit Approval Letter
C – Aquatic Resource Alteration Permit
D – Tennessee Department of Environment and Conservation Water Quality Certification
E – Categorical Exclusion Checklist
F – Tennessee State Historic Preservation Office Letter
G – Typical Post-Construction Cross Sections of First Creek