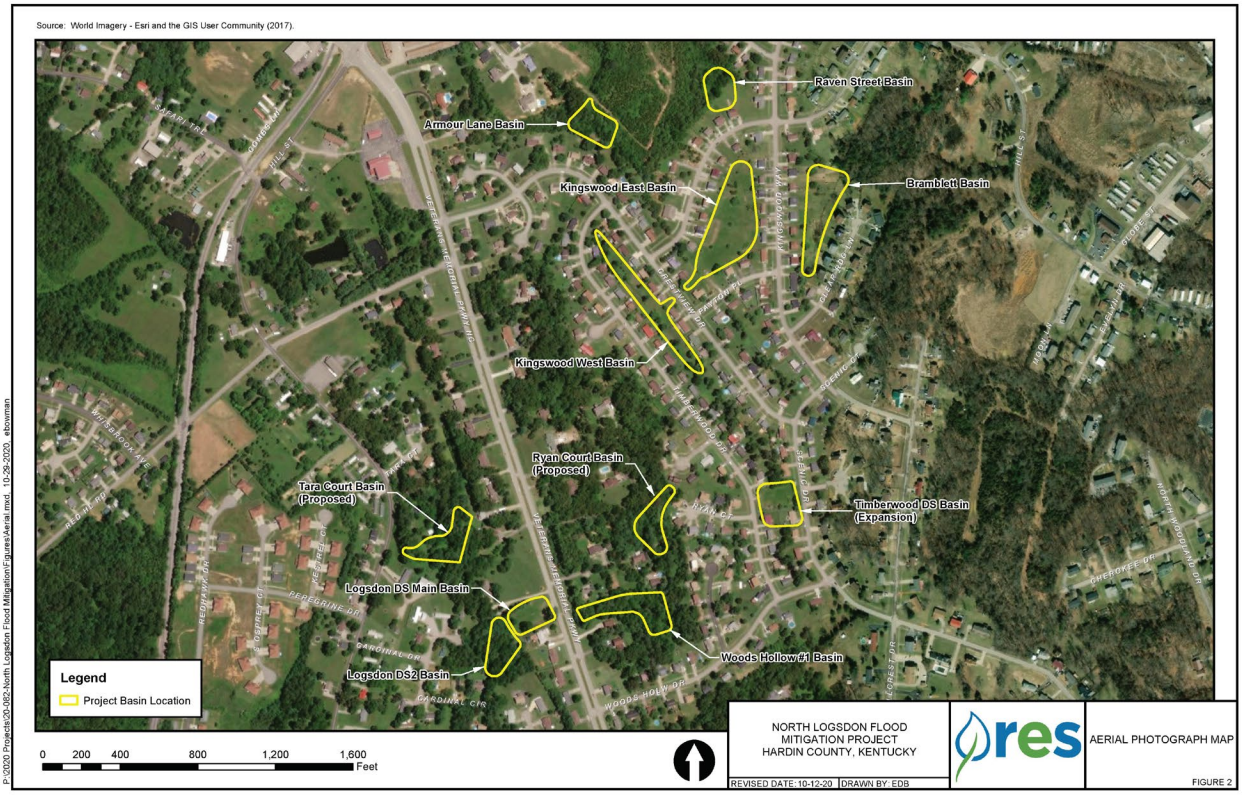

ENVIRONMENTAL ASSESSMENT

NORTH LOGSDON FLOOD MITIGATION PROJECT

Radcliff, Hardin County, Kentucky
August 2022

Prepared by:
RES Kentucky, LLC dba Redwing Ecological Services, Inc.
Louisville, Kentucky

Prepared for:
FEMA Region IV
3004 Chamblee Tucker Road
Atlanta, Georgia 30341

FEMA

TABLE OF CONTENTS

LIST OF ACRONYMS

AAI	All Appropriate Inquires
AHPA	Archaeological and Historic Preservation Act
APE	Area of Potential Effect
AMSL	Above Mean Sea Level
ASTM	American Society for Testing and Materials
AST	Above Ground Storage Tank
BMPs	Best Management Practices
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CO	Carbon Monoxide
CRA	Cultural Resource Analysts, Inc.
CWA	Clean Water Act
CY	Cubic Yard
dB	Decibels
dbh	Diameter at Breast Height
EA	Environmental Assessment
EHP	Environmental and Historic Preservation
EIS	Environmental Impact Statement
EO	Executive Order
EPA	U.S. Environmental Protection Agency
EPSC	Erosion Prevention and Sediment Control
ESA	Endangered Species Act
FAC	Facultative
FACU	Facultative Upland
FACW	Facultative Wetland
FEMA	Federal Emergency Management Agency
FPPA	Farmland Protection Policy Act
FONSI	Finding of No Significant Impact
HMGP	Hazard Mitigation Grant Program
IBCF	Imperiled Bat Conservation Fund
IPaC	Information for Planning and Conservation
JD	Jurisdictional Determination
KDEP	Kentucky Department for Environmental Protection
KDFWR	Kentucky Department of Fish & Wildlife Resources
KDOW	Kentucky Division of Water
KHC	Kentucky Heritage Council
KPDES	Kentucky Pollution Discharge Elimination System
KSNPC	Kentucky State Nature Preserves Commission
LFI	Linebach Funkhouser, Inc.
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NHPA	National Historic Preservation Act
NO_2	Nitrogen Dioxide
NPDES	National Pollutant Discharge Elimination System

NOI	Notice of Intent
NRCS	Natural Resource Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetland Inventory
NWPL	National Wetland Plant List
NWPR	Navigable Waters Protection Rule
O_3	Ozone
OSA	Office of State Archaeology
OSHA	Occupational Safety and Health Act
Pb	Lead
PL	Public Law
PM	Particulate Matter
REC	Recognized Environmental Condition
Sec	Section
SFHA	Special Flood Hazard Area
SHPO	State Historic Preservation Officer
SO_2	Sulfur Dioxide
SWPPP	Storm Water Pollution Prevention Plan
THPO	Tribal Historic Preservation Officer
UPL	Upland
USC	United States Code
USACE	U.S. Census Bureau
USCB	U.S. Census Bureau
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UST	Underground Storage Tank
VOC	Volatile Organic Compound

1.0 INTRODUCTION

1.1 BACKGROUND

On March 8, 2018, Governor Matthew G. Bevin requested a major disaster declaration due to severe storms, flooding, landslides, and mudslides during the incident period of February 9-14, 2018. The Governor requested a declaration for Public Assistance for 22 counties and Hazard Mitigation for the entire commonwealth. On April 12, 2018, the President approved the major disaster declaration (DR-4358) under the authority of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, 42 U.S.C. 5121 et seq. (the "Stafford Act") making Public Assistance available to all eligible local counties, and certain private nonprofit organizations on a cost-sharing basis. Funds allocated to Hazard Mitigation Assistance (HMA) totaled $1,325,844.80 and total public assistance grants dollars obligated totaled $32,290.229.60. FEMA's Hazard Mitigation Assistance Program (HMGP) provides funding to state, local, tribal, and territorial governments to rebuild structures and facilities in a way that reduce or eliminates long term risk to people and property from future disaster loss.

An Environmental Assessment (EA) was drafted to evaluate the environmental consequences anticipated for the North Logsdon Flood Mitigation Project in Hardin County, Kentucky. This assessment is based on correspondence with state and federal resource agencies, in-house research, and field investigations of the proposed project areas. This document has been prepared according to the guidelines developed by the U. S. Department of Homeland Security's Federal Emergency Management Agency (FEMA) – Region 4 and in accordance with the National Environmental Policy Act of 1969, the Council on Environmental Quality (CEQ) regulations implementing NEPA (40 Code of Federal Regulations [CFR] Parts 1500 through 1508), and FEMA regulations for NEPA compliance (44 CFR Part 10). An environmental assessment is completed when FEMA must fully understand and consider the environmental consequences of actions proposed for federal funding. This EA was prepared in accordance with FEMA's regulations, federal laws and executive orders as required under NEPA. It also addresses an evaluation of alternatives and a discussion of the potential environmental impacts for the proposed federal action.

1.2 PROJECT LOCATION

The City of Radcliff in Hardin County is approximately 14 miles north of Elizabethtown (Figure 1). According to the U.S Census Bureau, the population of Radcliff was 21,688 in 2010 and estimated to be 22,914 by 2019 (USCB 2019). The North Logsdon Flood Mitigation Project (4358-0021) is situated in northern Radcliff. The project will focus on improving the North Logsdon Stormwater Drainage System by increasing the capacity of nine existing basins and the construction of two new basins. The basins are in the Timberwood and Kingswood watershed drainage systems and are bound by roads and residential construction or forested lots.

Large storm events occurred within the study area in 1997 and 2008 resulting in flooding of the residential neighborhoods adjacent to the existing basins, as evidenced by the flooding photographs in the Master Plan (Appendix E). Information collected from these events was used to determine downstream sinkhole outflows and calibrate the hydrologic model created in the *North Logsdon Storm Water Master Plan* (Master

Plan) (Qk4 2019) (Appendix E). The Master Plan was prepared for the City of Radcliff to evaluate alternatives to provide effective stormwater control measures utilizing existing and proposed basins within the Timberwood and Kingswood watersheds to control flooding and remove residences from the limits of a theoretical 100-year flooding area. The Master Plan evaluated 13 basins spread across ten sub-watersheds within the Timberwood and Kingswood watershed drainage systems. Four sub-watersheds are located within the Timberwood watershed, which include the Logsdon, Woods Hollow #1, Woods Hollow #2, and the Timberwood sub-watersheds. Six sub-watersheds are in the Kingswood watershed, which include the Red Hill Road, Darlene Court, Armour Lane, Raven Street, Bramblett, and the Kingswood sub-watersheds. Seven of the ten sub-watersheds contain sinkholes connected through a network of sub-surface caverns that carry rainfall runoff into surface streams. The sinkholes provide outlets for the runoff in certain basins; however, drainage through the sinkholes can be restricted by debris or sediment, collapse, or excess volume of flow in the cavern structures.

As part of the Master Plan evaluation, detailed information was collected on each existing basin, sinkhole and watershed. The collected data was verified and used to produce an accurate Hydraflow model. Results from the model showed: 1) the existing drainage systems in the Timberwood and Kingswood watersheds are undersized for existing conditions, and 2) multiple basins overflow during large storm events. The model also identified that during a theoretical 100-year flood event, approximately 97 residences within the two watersheds would incur property damage, and flooding conditions could also result in safety and accessibility issues for the community (Qk4 2019).

Of the 13 basins assessed, Red Hill Road, Darlene Court, and Woods Hollow #2 were determined to be of appropriate size and functioning efficiently. The Master Plan identified nine existing basins and two proposed basins for the North Logsdon Flood Mitigation Project (Appendix E). The basins total approximately 12.8 acres and are shown on Figure 1 (Appendix A). The City of Radcliff approached FEMA regarding a grant for the project. FEMA determined that an EA would be required for the project under NEPA. The coordinates for each basin are presented in the table below.

Basin	Latitude (decimal degrees)	Longitude (decimal degrees)
Armour Lane	37.853681	-85.963590
Raven Street	37.854189	-85.961340
Kingswood East	37.852270	-85.961172
Kingswood West	38.851138	-85.962577
Bramblett Basin	37.852490	-85.595480
Logsdon DS Main	37.846743	-85.964696
Logsdon DS 2	37.846285	-85.965237
Timberwood DS Expansion	37.848317	-85.960256
Woods Hollow #1	37.846825	-85.962850
Proposed Tara Court	37.847781	-85.966236
Proposed Ryan Court	37.848059	-85.962494

1.3 PURPOSE AND NEED

Through the Hazard Mitigation Grant Program (HMGP), FEMA provides grants to states and local governments to implement long-term hazard mitigation measures. The purpose of HMGP is to reduce the loss of life and property due to natural disasters and to enable mitigation measures to be implemented during the immediate recovery from a disaster. HMGP is authorized under Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act.

The purpose of the project is to address current flooding issues in the Timberwood and Kingswood watersheds by providing mitigation measures to remove as many homes as possible from an established theoretical 100-year flooding area and reduce safety risks, accessibility constraints, physical and socioeconomic burdens for the public and emergency services (police, fire department and ambulance services). There is an identified need for flood mitigation measures in the Timberwood and Kingswood watersheds.

The need of the project, as identified in the Master Plan, include implementing economical and efficient flood mitigation measures to control stormwater in the Timberwood and Kingswood watersheds to remove 97 residences from a Hydraflow computer modeled theoretical 100-year floodplain and improve the safety conditions and accessibility for the public. Achieving these goals will require lowering the maximum flood elevation below the critical elevation, which is defined as the level at which no residences remain within the limits of the theoretical 100-year flood event. The critical elevation is approximately 705 feet above mean sea level (AMSL) in the Timberwood watershed and 704 feet AMSL in the Kingswood watershed. To remediate the negative impacts of flooding and lessen the amount of runoff reaching the Kingswood Basin and Timberwood DS Basin, flood mitigation measures will be implemented to retain as much water as possible upstream during major rain events, including enlarging upstream basins to hold more storm water runoff prior to overtopping and flowing into the Timberwood and Kingswood sub-watersheds. The flood mitigation measures proposed for this project include the expansion of nine existing basins, including eight basins within their existing footprints (Armour Lane, Raven Street, Bramblett, Kingswood West, Kingswood East, Logsdon DS Main, Logsdon DS 2, and Woods Hollow #1) and the expansion of the Timberwood DS Basin, and the construction of two new basins, Ryan Court and Tara Court Basins (Figure 2, Appendix A).

In accordance with federal laws and FEMA regulations, the EA process for a proposed federal action must include an evaluation of alternatives and a discussion of the potential environmental impacts. This EA was prepared in accordance with FEMA's regulations, federal laws and executive orders as required under NEPA. It also addresses an evaluation of alternatives and a discussion of the potential environmental impacts for the proposed federal action."

2.0 ALTERNATIVES

The NEPA of 1969 requires that federal agencies consider the potential environmental consequences of a proposed project, including an analysis of alternatives that meet the purpose and need of the action. Federal agencies are not required to consider every potential alternative, but they must consider a full range of reasonable alternatives including those that are "practical or feasible from the technical and economic standpoint and using common sense" per the Council of Environmental Quality.

2.1 NO ACTION ALTERNATIVES

The No Action Alternative provides a baseline for comparison in determining potential environmental effects to the Proposed Action. Under the No Action Alternative, no flood mitigation measures would be implemented in the Timberwood and Kingswood watersheds. Therefore, approximately 97 homes would remain in the theoretical 100-year flood area based on the hydrologic model, and the potential for property damage or loss, safety risks, and accessibility for the public would not be reduced.

2.2 PROPOSED ACTION ALTERNATIVES

The Master Plan assessed a Baseline Solution and six different Alternatives to decrease drainage issues, reduce downstream flooding and remove residences from the theoretical 100-year flood area based on the hydrologic model (Appendix E). From this analysis, the Proposed Action Alternative was identified and included a Baseline Solution and Alternatives 1, 2 and 5. These alternatives, and the ones that were rejected, are discussed in the following sections.

2.2.1 Baseline Solution

A Baseline Solution was developed that would allow the North Logsdon Storm Water Drainage System to function more efficiently and remove 85% of single-family residences (82 homes out of 97 homes) in the surrounding residential neighborhoods within the watersheds from the theoretical 100-year flood area as detailed in the Master Plan (Appendix E). To ensure the Baseline Solution would be economical, the focus was placed on increasing basin capacity through excavation in eight existing basins within their current footprints and altering or adding controlled outlets where necessary. These modifications would drastically reduce drainage issues in both the Timberwood and Kingswood watersheds, and 82 residences would no longer fall within the theoretical 100-year flood zone. The Baseline Solution would reduce the maximum flood elevation from 707.65 feet to 703.15 feet in the Kingswood watershed and from 711.61 feet to 709.90 feet in the Timberwood watershed. This would bring the maximum flood elevation near, but not below the Timberwood watershed's critical elevation of 705 feet, thereby leaving some residences within or partially within the theoretical 100-year flood area. The Baseline Solution will include utilizing excavators, bulldozers, and dump trucks for construction and staging equipment in the open, upland areas surrounding the basins. Work will commence with the installation of erosion protection and sediment control (EPSC) measures. Next, the existing and proposed basins will be stripped of vegetation and topsoil, and then excavated to provide the additional storage capacity. Construction activities will require a total of 103,605 cubic yards (CY) to be cut or excavated from the basins and 3,375 CY of soil fill or compaction in the basins, as depicted on the table in Section 3.1.1. The depth of ground disturbance ranges from three to eight feet to increase

basin capacity, depicted on the table shown in Section 3.1.1. The basins with sinkhole outfalls will involve the installation of protection structures to avoid further erosion. Following construction, the basins will be seeded utilizing a native plant mix.

The Baseline Solution increases basin capacity by excavating existing basins and altering or adding controlled outlets. This action is one of the most efficient and cost-effective ways to combat drainage issues. Each sub-watershed was assessed for the Baseline Solution in the Master Plan and recommendations were provided (Appendix E). These sub-watersheds include:

- **Logsdon:** This sub-watershed contains three basins: the Logsdon US, Logsdon DS 2, and Logsdon DS Main. The Logsdon US Basin is the furthest north in the Logsdon sub-watershed and excavation of this basin would provide very little change to flooding. No changes to this basin were recommended. Logsdon DS Main Basin and Logsdon DS 2 Basin are undersized and not capable of handling existing runoff volumes without over topping. The Baseline Solution includes the excavation of both basins resulting in storage capacity improvements from 2.78 acre-feet to 5.20 acre-feet in Logsdon DS 2 Basin and 0.97 acre-feet to 4.66 acre-feet in Logsdon DS Main Basin.

- **Woods Hollow #2:** This sub-watershed contains the Woods Hollow #2 Basin, which flows into the Woods Hollow #1 and contributes to the Timberwood sub-watershed. The Woods Hollow #2 Basin is sufficient to control all runoff and no changes were recommended to this basin.

- **Woods Hollow #1:** The Woods Hollow #1 Basin flows to the Timberwood sub-watershed. The Baseline Solution includes excavating Woods Hollow #1 Basin, and the spillway will be relocated and raised to add capacity. With these improvements, the storage capacity in the Woods Hollow #1 Basin would increase from 10.70 acre-feet to 13.39 acre-feet.

- **Timberwood:** This sub-watershed contains two basins –Timberwood US Basin and Timberwood DS Basin, the furthest downstream basin in the Timberwood watershed. Excavation of the Timberwood US Basin is not feasible since it would cause negative effects to two residences and add less than 0.5 acre-feet of storage to the basin. No changes were recommended for this basin. As part of the Baseline Solution, the Timberwood DS Basin would be excavated to increase storage capacity from 4.13 acre-feet to 5.38 acre-feet.

- **Red Hill Road:** This sub-watershed contains the Red Hill Road Basin, which has a sufficient capacity to hold all runoff from Red Hill Road and no changes to this basin were recommended.

- **Darlene Court:** This sub-watershed contains the Darlene Court Basin, which overflows into the Kingswood sub-watershed. The capacity of the Darlene Court Basin is not sufficient, but the outflow does not appear to negatively impact any residences. No changes to this basin were recommended.

- **Armour Lane:** This sub-watershed contains the Armour Court Basin, which directly overflows into the Kingswood sub-watershed. Under the Baseline Solution, the excavation of the Armour Lane Basin was recommended to increase storage capacity from 2.00 acre-feet to 4.03 acre-feet and a

12-inch outlet pipe would be added to control outflow and divert the flow path away from nearby homes.

- **Raven Street:** This sub-watershed contains the Raven Street Basin, which directly overflows into the Kingswood sub-watershed. The Baseline Solution includes excavation of the Raven Street Basin to increase storage capacity from 1.58 acre-feet to 3.80 acre-feet and the outlet pipe would be altered to add capacity and control flow.

- **Bramblett:** This sub-watershed contains the Bramblett Basin, which directly overflows into the Kingswood sub-watershed. Under the Baseline Solution, it was recommended that the Bramblett Basin be excavated to increase storage capacity from 5.49 acre-feet to 12.92 acre-feet and a 15-inch outlet pipe would be added to control and protect surrounding residences from overflow.

- **Kingswood:** This sub-watershed contains one basin – Kingswood Basin (East and West). As part of the Baseline Solution, the excavation of the Kingswood Basin was recommended to increase storage capacity from 14.94 acre-feet to 26.56 acre-feet. Increasing storage capacity along with other improvements upstream, the runoff upstream could be contained before it enters the Kingswood sub-watershed. In addition, the runoff volume that overflow into the Kingswood sub-watershed could be successfully stored and managed within the Kingswood basin.

2.2.2 Additional Alternatives

Six alternatives were reviewed in addition to the Baseline Solution. Of the six alternatives reviewed, Alternatives 1, 2, and 5 combined with the Baseline Solution were chosen as the Proposed Action Alternative. Alternatives 1, 2 and 5 are discussed below.

- **Alternative 1:** This alternative involves the construction of a new basin near Ryan Court, upstream of the Timberwood DS Basin. The Ryan Court Basin project would cost approximately $226,400 and add 4.7 acre-feet of storage capacity in the Timberwood watershed. This basin would lower the 100-year flood maximum elevation to 709.24 feet, removing one residence and leaving 14 residences within or partially within the theoretical 100-year flood zone based on the model.

- **Alternative 2:** This alternative involves the construction of a new basin near Tara Court, upstream of the Logsdon DS Main Basin. The Tara Court Basin would cost approximately $192,140 and would add 6.9 acre-feet of storage to the Timberwood watershed. The construction of this basin would lower the theoretical 100-year flood zone maximum elevation to 708.66 feet, removing six residences and leaving nine residences within or partially within the theoretical 100-year flood zone.

- **Alternative 5:** This alternative includes the purchase of an adjacent property to expand the existing Timberwood DS Basin and would include the demolition of two residences. These houses are located at 878 Timberwood Drive (37.848114, -85.960440) and 1025 Scenic Drive (37.848165, -85.960001) and would be demolished for expansion. Acquiring these properties was voluntary and the owner will be paid a fair market price that is budgeted for $300,000 but will be negotiated. Demolition costs have not been determined at this time. The Timberwood DS Basin expansion would cost approximately $426,133 and would add 3.5 acre-feet of storage to the Timberwood

watershed. This basin would lower the 100-year floodplain maximum elevation to 709.53 feet, removing one residence and leaving 14 residences within or partially within the theoretical 100-year flood zone based on the model.

2.2.3 Proposed Action (Preferred)

The Proposed Action Alternative includes the Baseline Solution and Alternative 1, 2, and 5. This alternative would remove 97 residences from the theoretical 100-year flood zone and lower the maximum elevation to 704.28 feet in the Timberwood watershed and 703.15 feet in the Kingswood watershed.

The Proposed Action Alternative would include utilizing excavators, bulldozers, and dump trucks with staging areas in the open areas surrounding the basins. Work will commence with the installation of EPSC measures. Next, the existing and proposed basins will be stripped of vegetation and topsoil, and then excavated to provide additional storage capacity. The basins with sinkhole outfalls will involve the installation of protection structures and lastly, the basins will be restored utilizing a native seed mix.

2.3 OTHER ACTION ALTERNATIVES

Three additional alternatives, Alternative 3, 4 and 6, were evaluated in the Timberwood watershed, but were determined not to be feasible. These alternatives are described below.

- **Alternative 3:** This alternative included the installation of a pipe to reroute overflow from the Timberwood Basin to the Kingswood Basin. This alternative would cost an estimated $897,052 and lower the maximum elevation in the Timberwood watershed to 707.66 feet, but would raise the maximum elevation in the Kingswood watershed to 706.40 feet.

- **Alternative 4:** This alternative assessed the option of using underground storage to handle the runoff volume over the critical elevation. An additional five acre-feet of storage would be needed to lower the maximum 100-year floodplain elevation in the Timberwood watershed to 705 feet, which would require approximately 11,000 linear feet of 60-inch pipe with an approximate cost of $2,000,000.

- **Alternative 6:** This alternative was considered to efficiently control runoff in the Darlene Court and Armour Lane sub-watersheds. Alternative 6 included rerouting runoff from the Darlene Court sub-watershed to the Armour Lane sub-watershed and expanding the Armour Lane Basin to increase capacity. This alternative would not remove any additional residences when paired with the Baseline Alternative from the theoretical 100-year flood zone, but would allow more runoff to be stored upstream, requiring less storage in the Kingswood Basin. Alternative 6 would require the procuring of adjacent property and the expansion of the Armour Lane Basin. The cost for the expansion is approximately $115,200 and 11 acre-feet of additional storage could be added to the Armour Lane Basin.

2.4 ALTERNATIVES CONSIDERED AND DISMISSED

Alternatives 3, 4, and 6 were eliminated due to:

- the implementation of **Alternative 3** would be costly and would leave the maximum theoretical 100-year flood elevation in both the Timberwood and Kingswood watersheds above their critical values, resulting in nine residences within the theoretical 100-year flooding area. Based on these factors, Alternative 3 was considered and dismissed.

- the implementation of **Alternative 4** would require excessive excavation and the cost of 11,000 linear feet of 60-inch pipe would not be cost effective. Based on these factors, this alternative was considered and dismissed.

- **Alternative 6** would not remove any additional residences from the theoretical 100-year flooding area model when coupled with the Baseline Solution and would not be needed. The Baseline Solution would reduce the maximum flood elevation from 707.65 feet to 703.15 feet in the Kingswood watershed and thereby eliminates the need for Alternative 6. Since the Proposed Action Alternative includes the Baseline Solution and Alternatives 1, 2, and 5, Alternative 6 is not needed as it would not contribute to the removal of any additional residences from the theoretical 100-year flood zone but would cost additional money to construct.

The City of Radcliff determined that only implementing the Baseline Solution would allow for the removal of most, but not all the residences located within the theoretical 100-year floodplain zone. Therefore, it was determined that a combination of the Baseline Solution and Alternatives 1, 2, and 5 would be utilized to maximize success of the action and the removal of majority of the residences from the theoretical 100-year flood zone.

3.0 AFFECTED ENVIRONMENT AND POTENTIAL IMPACTS

The environmental characteristic of the project areas are presented below in terms of the physical environment, water, biological, cultural, and socioeconomic resources. Each of these components is discussed in more detail below.

3.1 PHYSICAL ENVIRONMENT

The components of the physical environment – Geology, Seismicity, Soils, Water, Floodplains and Air - are discussed in more detail in the following sections.

3.1.1 Geology, Seismicity and Soils

The proposed project is in the rolling Mitchell Plain (Level IV Ecoregion) of Kentucky, which is underlain by Mississippian limestone and characterized by well-developed karst, low relief, and extensive agriculture. Sinkholes, ponds, springs, sinkhole wetlands, subterranean drainage, and dry valleys occur within this area. The U.S. Department of Agriculture (USDA) Soil Survey Geographic Database for Hardin County, Kentucky maps the project area as being underlain predominately by Crider silt loam, Nolin silt loam, Vertrees silt loam, and Vertrees silty clay loam (Figure 3, Appendix A). Nolin silt loam is listed as a hydric-by-inclusion soil in Hardin County.

The Timberwood watershed maximum flood elevations vary from 746 feet within the uppermost basin to 705 feet in the furthest downstream. The Kingswood watershed maximum flood elevations vary from 736 feet within the uppermost basin to 704 feet in the furthest downstream. The project area is not in an elevated seismic hazard area relative to the western part of the state [U.S. Geological Survey (USGS) 2014].

The Farmland Protection Policy Act (FPPA) (P.L. 97-98, Sec. 1539-1549; 7 U.S.C. 4201, et seq.), which states that federal agencies must "minimize the extent to which federal programs contribute to the unnecessary conversion of farmland to nonagricultural uses," was considered in this EA. The Web Soil Survey does not identify prime farmland within the project area (USDA 2020). In addition, a letter response from the USDA Natural Resources Conservation Service (NRCS) dated October 27, 2020, stated because the project is located in a previously developed residential area and that the sites have been previously manipulated with infrastructure, no conversion of agricultural lands (*Prime or Statewide Important Farmland*) will occur or be negatively impacted by the proposed action (Appendix C).

No Action Alternative: Under the No Action Alternative, no impacts to geology or soils would occur as a result of construction related activities.

Proposed Action Alternative: The Proposed Action Alternative will require excavation and regrading in nine existing basins to increase storage capacity and construction of two proposed basins. Additionally, the proposed action will require the acquisition and demolition of two residence for the Timberwood DS basin expansion. Construction activities will require a total of 103,605 cubic yards (CY) to be cut or excavated from the basins and the filling or compaction of 3,375 CY. Excess soils generated from the excavation will

be disposed of responsibly by the contractor. The table below depicts the cubic yards of soil movement per basin.

Basin	Cut/Excavation of Basin (CY)	Fill/Compaction of Basin (CY)	Hauling Soils (CY)
Armour Lane	9,818	53	9,765
Raven Street	5,207	80	5,127
Kingswood East and Kingswood West	32,788	32	32,756
Bramblett Basin	14,076	103	13,973
Logsdon DS Main and Logsdon DS 2	13,277	310	12,967
Timberwood DS Expansion	6,763	288	6,475
Woods Hollow #1	6,582	1,494	5,088
Proposed Tara Court	8,022	956	7,066
Proposed Ryan Court	7,072	59	7,013
Total	**103,605**	**3,375**	**100,230**

Soil disruption will be minimized to the extent possible. Soil Erosion Prevention and Sediment Controls (EPSC) will be addressed through the development and implementation of a *Construction Plan and Storm Water Pollution Prevention Plan* (SWPPP), which will be submitted to the appropriate local and state personnel for review and approval. The proposed action will result in minor impacts to soils and most of the impacts will occur in already disturbed or excavated basins. The table below depicts the depth of ground disturbance in feet for the increased capacity of basins.

Basin	Proposed Average. Depth (ft)	Existing Average Depth (ft)	Increase in Depth (ft)
Logsdon DS 2 (Timberwood)	7	4	3
Logsdon DS Main (Timberwood)	7.5	5.5	2
Woods Hollow #1 (Timberwood)	10	8	2
Timberwood DS (Timberwood)	11	8	3
Amour Lane (Kingswood)	6	3	3
Raven Street (Kingswood)	5	3	2
Bramblett (Kingswood)	9	5.5	3.5
Kingswood	10	4	6

These impacts will be localized to the project areas through the use of best management practices (BMPs). Based on the minimization of soil disruption, the use of BMPs to reduce soil migration, and the location of the soils within mostly existing basins, significant impacts to soils will not occur because of the proposed action.

3.1.2 Air Quality

The Clean Air Act requires the U.S. Environmental Protection Agency (EPA) to set National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to public health and the environment. The Clean Air Act established two types of national air quality standards: primary and secondary standards. Primary standards set limits to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly. Secondary standards set limits to protect public welfare, including protection against decreased visibility and damage to animals, crops, vegetation and buildings. Current criteria pollutants are Carbon Monoxide (CO), Nitrogen Dioxide (NO_2), Ozone (O_3), Lead (Pb), Particulate Matter ($PM_{2.5,}$ and PM_{10}), and Sulfur Dioxide (SO_2).

Areas that consistently exceed the NAAQS are designated as non-attainment areas. The non-attainment status may be issued for individual or multiple criteria pollutants. The proposed project is located in Hardin County, Kentucky, which is not listed as a non-attainment area for fine particle pollution ($PM_{2.5}$) by the EPA.

No Action Alternative: Under the No Action Alternative, no adverse impacts to air quality would occur.

Proposed Action Alternative: The Proposed Action Alternative does not involve the construction of a facility that produces waste gases or particulate matter that are regulated under the Clean Air Act; therefore, the proposed project will not result in an increase in air emissions that will jeopardize the Clean Air Act attainment status of the area. To reduce temporary impacts to air quality associated with construction activities, the applicant will be required to water construction areas when necessary to prevent dust generation. State and local regulations ban open burning which contributes to the $PM_{2.5}$ pollution; since there will be no burning during construction, no impacts to air quality are anticipated. Emissions from fuel-burning internal combustion engines (e.g. heavy equipment and earth moving machinery) can temporarily increase the levels of some pollutants, including CO, Volatile Organic Compounds (VOCs), NO_2, O_3, and PM. These increases will be temporary, and the Proposed Action Alternative will not result in an adverse impact to air quality. Construction will be conducted during business hours of 8 am to 4 pm and equipment (bulldozers, excavators, and dump trucks) will be running six to eight hours per day with one to two units running in tandem.

3.1.3 Climate Change

The CEQ recently released guidance on how federal agencies should consider climate change in their decisions. CEQ guidance for NEPA documents suggests that direct and indirect greenhouse gas emissions be considered on federal actions (CEQ 2016). On March 28, 2022, EPA published a proposed rule that would set new, more stringent standards to reduce pollution from heavy-duty vehicles and engines starting in model year (MY) 2027. The proposed standards would significantly reduce emissions of smog- and soot-forming nitrogen oxides (NOx) from heavy-duty gasoline and diesel engines and set more stringent greenhouse gas (GHG) standards for certain commercial vehicle categories. This proposal is consistent with President Biden's Executive Order, "Strengthening American Leadership in Clean Cars and Trucks" and would ensure the heavy-duty vehicles and engines that drive American commerce are as clean as possible while charting a path to advance zero-emission vehicles in the heavy-duty fleet." According to the US EPA Regulations for Greenhouse Gas Emissions from Commercial Trucks & Buses, there are no thresholds established for construction equipment at this time but will be set in the future.

No Action Alternative: Under the No Action Alternative, no adverse impacts to climate change would occur.

Proposed Action Alternative: The project does not involve the construction of a facility that produces GHG; therefore, the proposed action will not result in a direct increase. Indirect increases in GHGs could occur during the construction phase where heavy machinery is used to excavate and grade the basins. Construction will be conducted during business hours of 8 am to 4 pm and equipment (bulldozers, excavators, and dump trucks) will be running six to eight hours per day with one to two units running at the same time. Calculation of CO_2 emissions for the project is not currently possible. All equipment and crews are local thus reducing CO_2 emissions because less travel would be required. The increases in GHG will be temporary, and the Proposed Action Alternative will not result in an adverse impact to climate change.

3.2 WATER RESOURCES

The following sections evaluated in this EA include water resources, water quality, wetlands, and floodplains.

3.2.1 Surface Water Resources and Water Quality

Redwing Ecological Services, Inc. (Redwing) wetland scientists conducted field visits on October 19, 20, and 23, 2020, to delineate jurisdictional waters of the U.S. within the project area. During the field investigation, wetland areas were identified through documentation of the presence or absence of hydric soils, wetland hydrology and hydrophytic vegetation per the guidelines of the *Regional Supplement to the Corps of Engineers Wetland Delineation manual: Eastern Mountains and Piedmont Region – Version 2.0* (April 2012). Jurisdictional waters (streams, lakes and ponds) were identified based on the presence of an ordinary high-water mark (OHWM), defined bed and bank features, and flow regime. Stream quality was evaluated using the Rapid Bioassessment Protocol developed by the EPA (Barbour 1999).

No jurisdictional waters are present within the existing and proposed basins. Non-jurisdictional features present within the existing and proposed basins include one intermittent stream measuring 250 linear feet (0.029 acre) in the Tara Court Basin, eight ephemeral streams totaling 1,395 linear feet (0.109 acre), and one wetland measuring 0.017 acre. The U.S. Army Corps of Engineers (USACE) issued an Approved Jurisdictional Determination (JD) based on the Navigable Waters Protection Rule (NWPR) on August 5, 2021 (Appendix C). The location of each identified waters/wetlands is depicted on Figure 4, Appendix A and the delineation is summarized in the table below.

Feature	Stream Length (feet)	Stream Width (feet)	Area (Acres)	Location	Status
Intermittent 1	250	5	0.029	Tara Court	Non-Jurisdictional
Intermittent Stream Total	**250**	--	**0.029**	--	--
Ephemeral 1	135	3	0.009	Logsdon DS 2	Non-Jurisdictional
Ephemeral 2	120	2.5	0.007	Logsdon DS 2	Non-Jurisdictional
Ephemeral 3	375	5	0.043	Woods Hollow #1	Non-Jurisdictional
Ephemeral 4	195	3	0.013	Ryan Court	Non-Jurisdictional
Ephemeral 5	160	3	0.011	Ryan Court	Non-Jurisdictional
Ephemeral 6	95	2.5	0.005	Tara Court	Non-Jurisdictional
Ephemeral 7	210	3	0.014	Tara Court	Non-Jurisdictional
Ephemeral 8	105	3	0.007	Woods Hollow #1	Non-Jurisdictional
Ephemeral Stream Total	**1,395**	**--**	**0.109**	**--**	**--**
Wetland 1	--	--	0.017	Kingswood East	Non-Jurisdictional
Wetland Total	**--**	--	**0.017**	--	--
Total Non-Jurisdictional Waters	**1,645**		**0.155**	**--**	**--**

Additionally, the Kentucky Geologic Map Service was utilized to determine the presence of existing wells, springs, seeps, or aquifers within the project area. Based on the review of the mapping, no wells, springs, seeps, or aquifers are within the . The nearest domestic well is 0.4-mile west of the Kingswood West Basin and the nearest monitoring well is 0.9-mile east of the Timberwood DS Basin. No drinking water resources are within the project area. The stormwater flow in the area is directed to the existing basins which then connect to sinkholes that eventually drain to the Salt River.

No Action Alternative: Under the No Action Alternative, the basins would continue to flood and overflow into downstream waters. Soil erosion due to flooding and the resulting downstream sediment deposition would continue to occur. Therefore, the No Action Alternative would continue to negatively affect water quality within the community and downstream of the project area.

Proposed Action Alternative: The existing nine basins (including the Timberwood DS expansion) do not contain any jurisdictional waters or wetlands and do not contain any wells, springs, seeps, or aquifers. Therefore, the excavation, grading and expansion of the nine existing basins will not adversely affect wetland resources including drinking water. However, in terms of the construction of two new basins, Tara Court Basin contains one non-jurisdictional intermittent stream that will be impacted by the basin development. The intermittent stream was determined to be poor quality (not supporting) using the Rapid Bioassessment Protocol (RBP) methodology based on high sediment deposits, bank erosion, disturbed riparian zone, and lack of epifaunal substrate and aquatic organisms. In addition, the intermittent stream watershed is small and starts from a wetland depression immediately west of Hill Street. Therefore, it is an upper watershed stream with minimal ecological function and poor aquatic habitat and water quality. During the October 20, 2020, site visit, the downstream portion of the intermittent stream exhibited flooding and heavy sediment deposition along portions of the bank. Once the Tara Court basin is constructed, the intermittent stream will flow through the basin. The intermittent stream will likely be temporarily impacted during initial grading activities but will be restored following construction activities. Stream banks will be

restored to pre-construction conditions after grading and stabilized with native seed and clean straw and an erosion control matting will be installed. During high flows from larger storm events, the flow of water through the intermittent stream will flood into the basin allowing sediment to settle. Therefore, the proposed basin at Tara Court will result in minimal impact to water sources and surface water as the stream is small in size and lacks significant ecological function and the basin area will continue to maintain the same water to the downstream basins. The Tara Court basin will provide a greater function to the area by providing storage capacity for flooding and decreasing sediment output to downstream waters.

Ryan Court contains two non-jurisdictional ephemeral streams that will likely be impacted for the basin development. The ephemeral streams flow only after and during precipitation events and function to carry runoff to downstream waters. The proposed basin at Ryan Court will replace the function of the ephemeral streams during low flow events and allow for stormwater runoff storage resulting in minimal impacts to water resources and surface water.

Although the intermittent and ephemeral streams are non-jurisdictional, they still play an important role in stormwater runoff. Impacts to the intermittent and ephemeral streams within the existing basin footprints will be negated through the excavation/construction of larger basins with low flow channels that will replace the functions of the existing streams. Stormwater runoff will be filtered through the basins and will eventually outlet into the Salt River. Excavating and constructing these existing and proposed basins will increase the water quality in the area and decrease the impact to the Salt River from sedimentation runoff. Indirect impacts through erosion and sedimentation will be controlled and minimized through the implementation of the SWPPP, which will be submitted to the appropriate agencies for review and approval. The SWPPP will propose the use of appropriate BMPs to prevent erosion and control sediment runoff. The BMPs proposed for the project include silt fence, rock check dams, stabilized construction entrances, a temporary stream crossing, and a pump around system.

Since the stream and wetland features in the existing and proposed basins are considered non-jurisdictional, no coordination with the USACE or the Kentucky Division of Water (KDOW) regarding acquisition of permits under Sections 404 and 401 of the Clean Water Act (CWA) is required. Construction of the project will require a general National Pollutant Discharge Elimination System (NPDES) permit for construction related activities, which is issued by the EPA and administered in Kentucky by the Kentucky Department of Water (KDOW) through the Kentucky Pollution Discharge Elimination System (KPDES) Construction General Permit. The KPDES will require appropriate BMPs to minimize the impacts to water quality and prevent degradation of the water quality downstream. Although implementation of the BMPs and the NPDES permit will minimize impacts, some short-term minor impacts to water temperature, turbidity and sedimentation may still occur. However, the long-term effects is expected to have an overall beneficial result to water quality due to less overtopping of basins resulting from decreased flooding and decreased downstream sedimentation. A detailed hydrologic model in the Master Plan was developed and based on the model, the Kingswood and Timberwood DS basins currently receive large amounts of runoff during rainfall events and to remediate these negative impacts and lessen the amount of runoff, improvements should be made to retain as much water as possible in upstream basins during major rain events. Therefore, expanding the upstream basins to hold more storm water during rain events will decrease the flooding and sediment that enters the downstream basins.

No geotechnical studies have been completed for the proposed project. The project area contains the potential for karst conditions with numerous sinkholes that have the potential to connect to groundwater. Since the existing and proposed basins are located in upper watersheds and construction activities, including excavation of basins, will likely not be deep enough to affect groundwater, the City of Radcliff does not anticipate adverse effects to groundwater or drinking water in the area. Indirect impacts to groundwater through erosion and sedimentation will be controlled and minimized through the implementation of the SWPPP, which will be submitted to the appropriate agencies for review and approval.

3.2.2 Wetlands

Executive Order (EO) 11990, Protection of Wetlands, requires federal agencies to avoid to the extent possible the long and short-term adverse impacts associated with the destruction or modification of wetlands. The NEPA compliance process requires federal agencies to consider direct and indirect impacts to wetlands, which may result from federally funded actions.

As with EO 11988, FEMA applies the Eight-Step Decision-Making Process to ensure that it funds projects consistent with EO 11990. NEPA's reference to executive orders requires consideration of project alternatives. FEMA's regulation 44 CFR Part 9 involves a decision-making method to meet its objectives using the Eight-Step Decision-Making Process.

According to 44CFR Part 9.4 wetlands are those areas which are inundated or saturated by surface or ground water within a frequency sufficient to support, a prevalence of vegetation or aquatic life typically adapted for life in saturated of seasonally saturated soil condition. By definition in 44 CFR Part 9.4 there are no mapped jurisdictional wetlands on the existing or proposed basin sites. During the wetland delineation assessment one intermittent stream measuring 250 linear feet (0.029 acre), eight ephemeral streams totaling 1,395 linear feet (0.109 acre), and one non jurisdictional wetland measuring 0.017 acre (Figure 4, Appendix A) was found. Appropriate Erosion Prevention and Sediment Controls (EPSC) measures, including silt fences, will be installed during construction to prevent sediment from exiting the construction site. No wetlands are mapped on the National Wetland Inventory (NWI) within the project area (Figure 5, Appendix A). There are four open water ponds (PUB) mapped outside the project area west of the Veterans Memorial Parkway and Crestview Drive intersection and northwest of the Kingswood West Basin (Figure 5, Appendix A). There are two mapped emergent wetlands (PEM) and one mapped scrub-shrub wetland (PSS) outside the project area, northeast and southeast of the Bramlett Basin (Figure 5, Appendix A). These mapped wetlands do not appear to drain to the basins and would not be affected by the proposed basin expansions and construction.

No Action Alternative: Under the No Action Alternative, no impacts to the wetlands will occur.

Proposed Action Alternative: The proposed project avoids impacts to jurisdictional wetlands; therefore, the Proposed Action Alternative will not adversely affect wetland resources. Indirect impacts to downstream wetlands will be prevented through the use of appropriate EPSC measures during construction, including silt fences, to prevent sediment from exiting the construction site. Since the project does not propose any jurisdictional impacts, the Section 404 and 401 permitting processes with USACE and KDOW are not required and compliance with EO 11990 has been met.

3.2.3 Floodplains

Executive Order (EO) 11988 requires federal agencies to avoid to the extent possible the long and short-term adverse impacts associated with occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative. FEMA's regulations for complying with EO 11988 are promulgated in 44 CFR Part 9. FEMA applies the Eight-Step Decision-Making Process to ensure that it funds projects consistent with EO 11988. The Eight-Step Decision-Making Process is to be completed for projects within special flood hazard areas. The project is not located within the FEMA mapped 100-year floodplain or a special flood hazard area (Figure 6, Appendix A). The FEMA panel number is 21093C0130D with an effective date of August 16, 2007.

No Action Alternative: Under the No Action Alternative, no impacts to the FEMA 100-year floodplain will occur and the project is not within a special flood hazard area as indicated on Figure 6, Appendix A. However, the No Action Alternative would result in repetitive flooding of residences and based on the hydrologic model in the Master Plan, 97 residences would remain within the modeled theoretical 100-year flooding area.

Proposed Action Alternative: The project will not contribute to development within the FEMA 100-year floodplain and will not affect the functions or values of the FEMA 100-year floodplain within or downstream of the project area. Currently both the Timberwood and Kingswood watersheds have multiple overtopping basins, and 97 residences lie within the limits of a theoretical 100-year flood event according to the hydrologic model in the Master Plan by Qk4 (Appendix E). The Proposed Action Alternative will help control flood waters by increasing existing basin capacities through excavation, regrading, and expansion, and construction of two new basins in the Timberwood watershed. Additionally, there are only two houses proposed for demolition because of the Timberwood DS expansion. These houses are located at 878 Timberwood Drive and 1025 Scenic Drive and would be completely torn down for the expansion. The Proposed Action Alternative will reduce the maximum flood elevation in the Kingswood watershed to 703.15 feet, which is below the basin's critical elevation of 704.00 feet and will reduce the maximum flood elevation in the Timberwood watershed to 704.28 feet, which is below the critical value of 705.00 feet. Therefore, the Proposed Action Alternative will remove the 97 residences from the theoretical 100-year flooding area.

Additional positive effects of the Proposed Action Alternative include reducing the impact of flooding roadways that pose a safety hazard for resident drivers and emergency vehicles. Negative effects of the Proposed Action Alternative include stream and wetland disturbance. However, the functionality of the basins will be similar to the existing function of the streams and wetlands proposed for impact and the basins will have more flood storage than the existing features. The on-site streams and wetlands are considered non-jurisdictional as they do not have a direct surface connection to downstream waters, but they do provide flood storage. Additionally, the flood storage provided by the basins will help reduce sedimentation to downstream waters and increase water quality to the Salt River since flood waters will eventually be routed to the Salt River. The expansion and construction of the basins will result in tree removal of less than 5 acres. Due to the minimal clearing proposed, the benefits of creating additional flood storage outlined above will outweigh the necessary tree clearing to excavate, regrade, expand, and construct the basins.

Minimization measures for the Proposed Action Alternative include utilizing the existing basins and property for additional floodplain storage instead of creating new basins which would result in more impacts to ecological features and potentially the 100-year floodplain. Indirect impacts to downstream floodplains will be prevented through the use of appropriate EPSC measures during construction including silt fences to prevent sediment from exiting the construction site. The Proposed Action Alternative has been designed to reduce the footprint/disturbance within the existing nine basins and two proposed basins. The Proposed Action Alternative has been designed to minimize impacts to the floodplain through the use of EPSC measures and the increase of basin capacity and addition of two new basins for flooding intake to reduce sedimentation and flooding,

No impacts to jurisdictional streams will occur. There is one non-jurisdictional intermittent stream and eight non-jurisdictional ephemeral streams within the project area. None of these streams are located within the FEMA 100-year floodplain; therefore, no *Application for a Permit to Construct Across or Along a Stream* in a floodway is necessary to submit to the KDOW Floodplain Division. In addition, the Project will not require sign-off from the local floodplain coordinator with the City of Radcliff.

3.3 BIOLOGICAL RESOURCES

An assessment of the biological environment for Threatened and Endangered Species and Terrestrial and Aquatic Environment is discussed in more detail below.

3.3.1 Threatened and Endangered Species and Critical Habitat

In accordance with Section 7 of the Endangered Species Act (ESA) of 1973, the Project was evaluated for the presence or absence of federally listed threatened and endangered species. The ESA requires any federal agency that funds, authorizes, or carries out an action to ensure that their action is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of designated critical habitats.

The U.S. Fish and Wildlife Service (USFWS) Information for Planning and Conservation (IPaC) website was used to obtain an official list of federally endangered or threatened species that may occur within the project area or be affected by the project. The IPaC (Project Code: 2022-0020747) identified the potential for three mammals, the gray bat (*Myotis grisescens*), the Indiana bat (*Myotis sodalis*) and the northern long-eared bat (*Myotis septentrionalis*) and one mussel, the pink mucket (*Lampsilis abrupta*), to occur within the vicinity of the project. Redwing assessed the potential for the proposed project to impact federally listed threatened/endangered species through a combination of in-house review and field surveys on October 19, 20, and 23, 2020. Species listed on the IPaC report, the presence or absence of suitable habitat for these species within the project area, and potential effects on each species are summarized in the following table and discussed below.

Species	Common Name	Status	Habitat Present?	Species Likely Impacted?
Myotis grisescens (Mammal)	gray bat	E	No	No
Myotis sodalist (Mammal)	Indiana bat	E	Summer	Yes
Myotis septentrionalis (Mammal)	northern long-eared bat	T	Summer	Yes
Lampsilis abrupta (Mussel)	pink mucket	E	No	No

E = Federally Endangered Species; T = Threatened

Indiana and Northern Long-Eared Bats: The federally endangered Indiana bat and the federally threatened northern long-eared bat require distinct habitat types during the winter and summer months. Winter habitat is restricted to suitable underground hibernacula typically consisting of caves located in karst areas; however, these species also hibernate in cave-like locations, including abandoned mines. During the habitat assessment, a pedestrian survey of the project area was performed to identify caves, abandoned mines, sinkholes, and other underground features that could be considered suitable winter habitat.

Summer habitat for the Indiana and northern long-eared bats consists of a variety of forested habitats utilized for roosting, foraging, and commuting. These habitats include forested blocks and linear features that consist of dense or loose aggregates of trees with variable amounts of canopy closure. Suitable summer roosting habitat is defined as trees (live or dead) with a diameter at breast height (dbh) of five inches or greater for the Indiana bat and three inches or greater for the northern long-eared bat that exhibit exfoliating bark, crevices, or cracks. Northern long-eared bats have also been found roosting in man-made structures, including barns, sheds, and bat houses. Typical foraging habitat for both species includes closed to semi-open forested habitats, where bats forage along forest edges and the tree canopy. Commuting habitat is used to travel between roosting and foraging areas, and typically includes forest edges and linear features, including riparian corridors and wooded fencerows.

No critical habitat was identified for these species such as rock shelters, mine portals, karst features, or suitable sinkholes or caves. In addition, no winter habitat for the Indiana bat or northern long-eared bat is present. The mixed-age upland woods habitat was identified as suitable summer roosting habitat for the Indiana and northern long-eared bats. The identified summer roosting habitat was marked on aerial photographs, and the location and extent of this habitat was transferred into ArcGIS to calculate habitat acreages. The project is located within an area designated by the USFWS as “Potential” habitat for the Indiana bat and northern long-eared bat, and within the vicinity of Known Summer 1 and Swarming habitat for the Indiana bat and Known Swarming 2 habitat for the northern long-eared bat (Figure 7, Appendix A). The project area contains a total of 4.44 acres (including 14 individual trees) of suitable summer roosting Indiana and northern long-eared bat habitat (Figure 8, Appendix A).

Gray Bat: This federally endangered species roosts in caves year-round but utilizes different caves during the winter and summer. Gray bats have also been known to roost in abandoned mines and other cave-like structures, under bridges, and in culverts. Typical foraging habitat for the gray bat includes riparian areas and open water bodies, such as rivers, streams, lakes, and reservoirs.

Commuting habitat for this species primarily consists of wooded corridors used to travel between roosting and foraging habitat.

No critical habitat was identified for this species. During the habitat assessment, no caves, abandoned mines, suitable sinkholes, suitable bridges, or suitable culverts were identified within the project area. Based on these findings, no suitable hibernacula or roosting habitat for the gray bat is present. The ephemeral streams and intermittent stream do not represent gray bat foraging habitat due to their small size and flow regime. The project is surrounded by residential development and commuting habitat for the gray bat is absent due to the lack of connection to other large tracts of forested land and the lack of forested areas within or adjacent to residential development.

Pink Mucket: The federally endangered mussel species potentially occurring on the project site is typically found in small to large rivers in shallow or deep water. Coarse sediments, such as sand and gravel, are preferred habitat, though some of the species tolerate muddy sediments. Stream habitat on site was evaluated to identify any areas that would provide suitable habitat for these species. The on-site ephemeral and intermittent streams were not considered mussel habitat due to their small size and flow regime. Additionally, no mussel species were observed in the streams.

Section 7 consultation with the USFWS has been completed and a concurrence letter was received from USFWS on March 24, 2022 (FWS 2022-0020747). A copy of the correspondence is provided in Appendix C. The results are discussed in the proposed action alternative below.

A Request for Information was submitted to the Kentucky Department of Fish and Wildlife Resources (KDFWR) on October 13, 2020. A response letter dated November 10, 2020, KDFWR stated that documented species near the proposed project include the gray bat, Indiana bat, and northern long-eared bat. A copy of correspondence with the KDFWR is attached as Appendix C.

A Request for State Protected Species Coordination was submitted to the Kentucky State Nature Preserves Commission (KSNPC) on October 12, 2020, requesting documentation of known occurrences of state endangered, threatened, special concern plants and animals or exemplary natural communities. A response letter from KSNPC was received on October 12, 2020, and identified the state threatened plant slender blazing star (*Liatris cylindracea*), state endangered insect elfin skimmer (*Nannothemis bella*), critically endangered plant American ginseng (*Panax quinquefolius*), and the state endangered plant royal catchfly (*Silene regia*) may be within one mile of the project area. A copy of correspondence with the KSNPC regarding state-protected species is attached as Appendix C.

No Action Alternative: Under the No Action Alternative, no impacts to federally or state threatened/endangered species will occur.

Proposed Action Alternative: The USFWS concurred that the project will have “no effect” on the gray bat or pink mucket due to the lack of suitable habitat. Habitat for federally protected species in the project area is limited to 4.44 acres (including 14 individual trees) of summer roosting habitat for the Indiana bat and northern long-eared bat. Of these 4.44 acres, the proposed project will require the removal of 0.27-acre of “Known Summer 1” habitat for the Indiana bat and 4.17 acres of “Potential” habitat for the Indiana bat. All of

the 4.44 acres of clearing proposed is located within "Potential" habitat for the northern long-eared bat. Tree clearing is proposed in the unoccupied season of October 15 to March 31. The USFWS concurred with a determination of "may affect, not likely to adversely affect" for the Indiana bat and northern long-eared bat. The 4(d) rule will be used to address impacts to the northern long-eared bat since the project is not located within 0.25 mile of a known hibernacula or 150 feet of a known maternity roost tree. To be in compliance with the USFWS-Kentucky Field Office Revised Conservation Strategy for Forest-Dwelling Bat in the Commonwealth of Kentucky (June 2016), the City of Radcliff will contribute a payment of **$9,960.00** to the Imperiled Bat Conservation Fund (IBCF) to address tree clearing impacts to 0.27-acre of "Known Summer 1" habitat and 4.17-acre of "Potential" habitat for the Indiana bat. The payment will be made prior to any tree clearing.

Regarding state threatened or endangered species, no habitat for the slender blazing star, elfin skimmer, American ginseng, or royal catchfly was observed within the project area. The existing and proposed basins lack suitable habitat necessary for state listed species. The area has been previously disturbed and currently dominated by maintained lawn and old field species. Therefore, no effect on state listed species is anticipated as a result of the proposed action.

3.3.2 Terrestrial and Aquatic Environment

The proposed project area is in the northern portion of the City of Radcliff (Figure 1, Appendix A). The project consists of eleven distinct areas including eight existing basins, two proposed basins, and one basin that will be enlarged. The basins range in size from approximately 0.7 acre to 1.6 acres and are all located within the Timberwood and Kingswood watersheds. The terrestrial environment in the project area is typical of residential neighborhood settings and includes maintained lawn with scattered trees and small woodlots. Habitats consist of old field succession in maintained basins, young and mixed aged woods with scrub habitat (Figure 2, Appendix A).

The Timberwood DS, Logsdon DS Main, Bramblett, Kingswood East, and Kingswood West Basins are dominated by maintained lawn with scattered trees and shrubs. The proposed basins at Ryan Court and Tara Court and the existing Woods Hollow #1 and Logsdon DS 2 Basins exhibit mostly mixed-age wooded areas. The Raven Street and Armour Lane exhibit mostly young woods and scrub habitat with some mature trees.

The maintained lawn habitat is dominated by species such as tall fescue (*Schedonorus arundinacea*), Kentucky bluegrass (*Poa pratensis*), field garlic (*Allium vineale*), common dandelion (*Taraxacum officinale*), red clover (*Trifolium pratense*), white clover (*Trifolium repens*), narrowleaf plantain (*Plantago lanceolata*), Lady's thumb (*Persicaria maculosa*), calico aster (*Symphyotrichum lateriflorum*), old-field aster (*Symphyotrichum pilosum*), common violet (*Viola sororia*), curly dock (*Rumex crispus*), English plantain (*Plantago major*), Johnson grass (*Sorghum halepense*), Japanese stiltgrass (*Microstegium vimineum*), tall ironweed (*Vernonia gigantea*), and yellow foxtail (*Setaria pumila*). These species are listed as facultative wetland (FACW), facultative (FAC), facultative upland (FACU) and upland (UPL) on *The National Wetland Plant List: Eastern Mountain and Piedmont Final Regional Wetland Plant List – May 2018* (NWPL).

Common species within the young woods and scrub habitat include red mulberry (*Morus rubra*), white mulberry (*Morus alba*), Bradford pear (*Pyrus calleryana*), multiflora rose (*Rosa multiflora*), autumn olive

(*Elaeagnus umbellata*), black walnut (*Juglans nigra*), sugar maple (*Acer saccharum*), bush honeysuckle (*Lonicera maackii*), eastern red cedar (*Juniperus virginiana*), box elder (*Acer negundo*), Canada goldenrod (*Solidago canadensis*), giant ragweed (*Ambrosia trifida*), sassafras (*Sassafras albidum*), white snakeroot (*Ageratina altissima*), Japanese honeysuckle (*Lonicera japonica*), trumpet creeper (*Campsis radicans*), common privet (*Ligustrum vulgare*), black snakeroot (*Sanicula odorata*), American pokeweed (*Phytolacca americana*), spicebush (*Lindera benzoin*), ground ivy (*Glechoma hederacea*), calico aster, old field aster, Lady's thumb, and Japanese stiltgrass. These species are listed as FACW, FAC, FACU and UPL on the NWPL.

Common species within the mixed-age woods include silver maple (*Acer saccharinum*), black willow (*Salix nigra*), green ash (*Fraxinus pennsylvanica*), red maple (*Acer rubrum*), tulip poplar (*Liriodendron tulipifera*), sycamore (*Platanus occidentalis*), hackberry (*Celtis occidentalis*), white oak (*Quercus alba*), American elm (*Ulmus americana*), cottonwood (*Populus deltoides*), black cherry (*Prunus serotina*), bitternut hickory (*Carya cordiformis*), black walnut, sugar maple, box elder, multiflora rose, sassafras, spicebush, coralberry (*Symphoricarpos orbiculatus*), winter creeper *(Euonymus fortunei),* Japanese honeysuckle, common violet, Lady's thumb, white snakeroot, and Japanese stiltgrass. These species are listed as FACW, FAC, FACU and UPL on the NWPL. Common species within the emergent wetland habitat include shortleaf spikesedge (*Kyllinga brevifolia*) and yellow nutsedge (*Cyperus esculentus*). These species are listed as FACW on the NWPL.

One non-jurisdictional intermittent stream and eight non-jurisdictional ephemeral streams were identified within the proposed project area. Many of the ephemeral streams are in maintained basins or low quality and have poor aquatic habitat. The intermittent stream was assessed for aquatic organisms and only a few snails were observed in the stream bed. No fish or other aquatic organisms were present. There has not been a site-specific wildlife survey completed for the project areas; however, common urban mammals, birds, and reptiles were observed during the field assessment are likely to be present within or near the project area.

No Action Alternative: Under the No Action Alternative, no additional impacts to the terrestrial and aquatic environment will occur.

Proposed Action Alternative: The Proposed Action Alternative will require clearing of mixed-age wooded habitat and some disturbed young woods and scrub habitat within the project area. Some of the wooded habitat proposed for clearing represents suitable summer roosting habitat for two federally listed bat species. A further discussion of these impacts is provided in Section 3.3.1.

The vegetation to be removed during excavation, regrading, and construction in the existing basins is dominated by low-quality species and some invasive and exotic species. Due to the disturbed nature of the habitat within the existing basins, no impact to terrestrial environments is anticipated for the regrading, excavation, and expansion of the nine existing basins. The construction of the two proposed basins will result in a conversion of low quality mixed-aged woods to a maintained basin area. Most of the mixed-age woods consists of several invasive species. Due to the minimal on-site wooded habitat and location of the proposed basins in existing dense residential areas, no significant impacts to terrestrial environments are anticipated.

Invasive species are present within the existing and proposed basins and are listed as a Severe or Significant Threat by the Kentucky Exotic Plant Pest Council include white mulberry (*Morus alba*), Bradford pear (*Pyrus calleryana*), multiflora rose (*Rosa multiflora*), autumn olive (*Elaeagnus umbellata*), bush honeysuckle (*Lonicera maackii*), common privet (*Ligustrum vulgare*), Japanese honeysuckle (*Lonicera japonica*), tall fescue (*Schedonorus arundinacea*), Kentucky bluegrass (*Poa pratensis*), Lady's thumb (*Persicaria maculosa*), Johnson grass (*Sorghum halepense*), Japanese stiltgrass (*Microstegium vimineum*), and *winter creeper (Euonymus fortunei).*

The proposed project will require grading and excavation in each of the 11 basins that will result in the removal of the existing native and invasive ground cover, including woody species. After construction activities, the basins will then be reseeded with a native seed mix. Therefore, based on the proposed actions for the project, this project is not likely to contribute to the introduction or spread of invasives species. A letter was sent to USFWS on March 17, 2022, to request additional recommendations from the USFWS regarding invasives species. A response letter from USFWS was received on May 13, 2022, and the USFWS stated no concerns regarding the spread of invasives resulting from the proposed project based on mechanical removal of existing invasive trees, plants, and grasses, regular mowing, and replanting of native seeds where possible. The response letter is included in Appendix C.

The project will not involve impacts to any jurisdictional streams or wetlands. Impacts to one non-jurisdictional intermittent stream and eight non-jurisdictional ephemeral streams may occur. The intermittent and ephemeral streams do not provide suitable habitat for aquatic species. Therefore, the Proposed Action Alternative is not anticipated to have an adverse effect on aquatic species.

3.4 CULTURAL RESOURCES

Cultural resources include historic architectural properties (including buildings, structures, and objects), prehistoric and historic archaeological sites, historic districts, designed landscapes, and traditional cultural properties. The primary federal statutes that apply to cultural resources are the National Environmental Policy Act (NEPA) and Section 106 of the National Historic Preservation Act of 1966 (NHPA), as amended. The NHPA created the National Register of Historic Places (NRHP) and criteria to determine if cultural resources are eligible for listing in the NRHP. The NHPA defines historic properties as any prehistoric or historic district, site, building, structure, or object that is listed in, or eligible for listing in, the NRHP (36 CFR 800.16). When NRHP-eligible properties are present, federal agencies must assess the effect of the undertaking on them and consider ways to avoid, minimize, or mitigate potential adverse effects.

As defined in 36 CFR § 800.16(d), the Area of Potential Effect (APE), "is the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if such properties exist." In addition to identifying historic properties that may exist in the proposed project's APE, federal agencies must also determine, in consultation with the appropriate State Historic Preservation Officer (SHPO) and interested Tribal Historic Preservation Officers (THPO), what effect, if any, the action will have on historic properties. Interested Tribal partners include Absentee Shawnee Tribe of Oklahoma, Cherokee Nation of Oklahoma, Delaware Nation, Eastern Shawnee Tribe of Oklahoma, Eastern Band of Cherokee, Miami Tribe of Oklahoma, Osage Nation, Peoria Tribe of Oklahoma, Shawnee Tribe, and United Keetoowah Band of Cherokee. All interested Tribal partners were given 45

days to respond to consultation initiated by FEMA. Consultation letters and responses can be found in Appendix C.

3.4.1 Archaeological Resources and Historic Properties

The APE for archaeological resources is defined on the basis of construction plans and encompasses the limits of the proposed project, permanent and temporary easements, and the footprint for the proposed Ryan Court and Tara Court Basins. For above ground resources, the APE included identification of historic resources located adjacent to the proposed Ryan Court and Tara Court Basins, and proposed expansion of nine (9) drainage basins in Radcliff, Kentucky.

Cultural Resource Analysts, Inc. (CRA) conducted a cultural resources survey on November 18, 2020, titled *Cultural Historic Study for the Proposed North Logsdon Flood Mitigation Project in Hardin County, Kentucky* (CRA Project Number: K20R009). The survey documented three houses forty-five (45) years of age or older: HD 1140, HD 1150, and HD 1151. All three (3) of the documented historic properties lacked integrity and were determined not eligible for listing in the NRHP.

On November 23 and 24, 2020, CRA conducted a Phase 1 archaeological survey, the results of this survey were included in a report entitled *Archaeological Survey for the Proposed North Logsdon Flood Mitigation Project in Hardin County, Kentucky.* Through shovel testing conducted in 20-meter intervals, no archaeological sites or intact deposits were identified within the APE of the proposed Ryan Court and Tara Court basins.

No Action Alternative: Under the No Action Alternative, no impacts to historic properties or archaeological resources would occur.

Proposed Action Alternative: The proposed action would involve the establishment of two new drainage basins in the City of Radcliff: Ryan Court Basin (37.847768, -85.962221) and Tara Court Basin (37.847689, -85.965883), the demolition of two 1980s houses due to repetitive flooding: 878 Timberwood Drive (37.8480539, -85.9603866) and 1025 Scenic Drive (37.8481034 -85.9600585), and upgrades to eight (8) existing basins in the project area to increase drainage capacity. In accordance with Section 106 of the NHPA, and the implanting regulations, 36 CFR Part 800, FEMA submitted final drafts of the Cultural Resources Survey and Phase I Archaeological Survey and consulted with the Kentucky Heritage Council (SHPO) and federally recognized Tribes with an ancestral interest in the project area on July 7, 2021, with a finding of No Historic Properties Affected for this undertaking in accordance with 36 CFR 800.4(d)(1). FEMA specified the following conditions to be placed on the project for the treatment of fortuitous finds or unexpected discoveries during ground disturbing activities within the project area:

If human remains or intact archaeological features or deposits (e.g. arrowheads, pottery, glass, metal, etc.) are uncovered, work in the vicinity of the discovery will stop immediately and all reasonable measures to avoid or minimize harm to the finds will be taken. The applicant will ensure that archaeological discoveries are secured in place, that access to the sensitive area is restricted, and that all reasonable measures are taken to avoid further disturbance of the discoveries. The applicant's contractor will provide immediate notice of such discoveries to the applicant. The applicant shall contact the Kentucky Heritage Council Site Protection Program and FEMA within 24 hours of the discovery. Work in the vicinity of the discovery may

not resume until FEMA has completed consultation with SHPO, Tribes, and other consulting parties as necessary. In the event that unmarked human remains are encountered during permitted activities, all work shall stop immediately, and the proper authorities notified in accordance with Kentucky Statutes, Section 72.02.

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

A response was received from KHC on August 9, 2021, and from the Cherokee Nation on August 3, 2021 concurring with FEMA's determination of No Historic Properties Affected. Final concurrence was received from the Eastern Band of Cherokee Indians during a continued consultation meeting held on April 18, 2022. Therefore, under the Proposed Action Alternative no impacts to historic properties to historic properties or archaeological resources would occur. The Kentucky SHPO requested final copies of the architectural and archaeological reports. All correspondence can be found in Appendix C.

3.5 SOCIOECONOMIC RESOURCES

The socioeconomic resources (environmental justice, hazardous materials, noise, public services and utilities, public safety and security, visual resources, and zoning and land use) are discussed in more detail below.

3.5.1 Socioeconomics

The proposed project is in Radcliff, Hardin County, Kentucky located south of Fort Knox army compound (Figure 1, Appendix A). The proposed project consists of 11 distinct locations. The flood mitigation project area varies in size from 0.7 acre to 1.6 acres with a total measuring approximately 12.8 acres. Based on available U.S. Census Bureau (USCB) data for 2019, Radcliff has an estimated population of 22,914 individuals, with an average household size of 2.52 people (USCB 2020). Based on available U.S. Census Bureau (USCB) data for 2019, Radcliff has an estimated population of 22,914 individuals, with an average household size of 2.52 people (USCB 2020). Moreover, the USCB (2020) reported approximately 49.3 percent of the population were men and 50.7 percent were women, an estimate of 90 percent of the people over 25 years of age are high school graduates, and approximately 20.4 percent were college graduates. In addition to the USCB 2020 report, the USCB 2021 report indicated the 2015 to 2019 per capita for Radcliff residents was $24,933 and the median household income was $46,105 which were slightly less than the state average of $28,178 and $50,589, respectively, for the same period.

Based on available U.S. Census Bureau (USCB) data for 2019, Hardin County has an estimated population of 110,958 individuals, with an average household size of 2.56 people (USCB 2020). Moreover, the USCB (2020) reported approximately 49.9 percent of the population were men and 50.1 percent were women, an estimate of 90.5 percent of people over 25 years of age are high school graduates, and approximately 23 percent were college graduates. The 2015 to 2019 per capita for Hardin County residents was $28,606, and the median household income was $54,367. The per capita and median incomes for Hardin County were slightly higher than the state average, which was $28,178 and $50,589, respectively, for the same time period (USCB 2021).

No Action Alternative: Under the No Action Alternative, there would be no direct socioeconomic impacts to Radcliff or Hardin County. There would be a continued risk of damage to infrastructure and private property from flood events and continued negative economic impacts affecting the cost of repairs, loss of property and/or disruption of services for the City of Ratcliff and Hardin County property owners.

Proposed Action Alternative: The Proposed Action Alternative would reduce the risk of flooding and flood-related damage in the project area by removing 97 residences from the theoretical 100-year flood area in the hydrologic model. Additionally, two houses would be demolished for the expansion of Timberwood DS Basin located at 878 Timberwood Drive (37.848114, -85.960440) and 1025 Scenic Drive (37.848165, -85.960001). The acquisition of these properties will be voluntary, and the homeowners will be paid a negotiated fair market price budgeted for $600,000. The proposed project will have a positive economic impact and overall benefit to the community as it will reduce flooding currently impacting the area. Hardin County will benefit from the reduction of flood damage, repair costs, loss of property, and disruption of services from future flood events.

3.5.2 Environmental Justice (Executive Order 12898)

On February 11, 1994, President Clinton signed EO 12898, entitled, “Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations”. The EO directs federal agencies, “to make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States”.

The proposed project is in Radcliff, Kentucky. Based on available USCB data for 2019, Radcliff has an estimated population of 22,914 individuals, of which 56.9 percent is white, 29.1 percent is black, 9.9 percent is Hispanic or Latino, 7.6 percent reported two or more races, 3.1 percent is Asian, and 0.5 percent is American Indian or Alaska Native (USCB 2020). The median household income during 2015 to 2019 was $46,105 with 20.6 percent of the population of the City of Radcliff living below the poverty level (USCB 2021).

The minority population in the state of Kentucky is 17.1 percent, significantly lower than the rate in Radcliff of 49.3 percent. Minority population percentages for the City of Radcliff are as follows, 29.1 percent is African American, 9 percent is Hispanic or Latino, 7.6 percent reported two or more races, 3.1 percent is Asian, and 0.5 percent is American Indian or Alaska Native (USCB 2020). Between 2015 and 2019, the medium household of $46,105 for the City of Radcliff was lower than the state median household income of $50,589, with a corresponding poverty level rate (20.6 percent) almost double the state poverty level rate of 10.5 percent (USCB 2021). Demographics in the vicinity of the proposed project are representative of that for the City of Radcliff.

No Action Alternative: Under the No Action Alternative, all populations within the project area in Radcliff would continue to be at risk of the economic impacts associated with flooding. Therefore, the No Action Alternative would not have a disproportionately high and adverse effect on human health or minority and low-income populations and is in compliance with EO 12898.

Proposed Action Alternative: The Proposed Action Alternative would have a beneficial effect on all populations living and working in the vicinity of the project area, including low-income and minority populations. The proposed action will reduce the risk of damage to personal property, the community, and human safety and welfare from future flood events. No disproportionately high and adverse impacts on low-income or minority populations would result from the Proposed Action. Therefore, the Proposed Action complies with EO 12898.

3.5.3 Hazardous Materials

The presence of hazardous waste materials was assessed through a reconnaissance of the project area, and a review of environmental database information, historical aerial photographs, and historical topographic quadrangle maps. Since eight of the eleven basins will be excavated/regraded within the existing footprint, an assessment of these basins was not conducted. A reconnaissance was conducted by Linebach Funkhouser, Inc. (LFI) in November 9, 2020 for the expansion of the Timberwood DS Basin, the proposed Ryan Court Basin, and the proposed Tara Court Basin. The reports for each of the three basins, dated November 17, 2020, are provided as Appendix G.

Timberwood DS Basin Expansion: The reconnaissance of the Timberwood DS Basin project site identified the presence of two houses located at 878 Timberwood Drive and 1025 Scenic Drive. No obvious evidence of any current or former underground storage tanks (USTs) or above ground storage tanks (ASTs) were identified. No obvious indications of generation, use, storage, treatment, or disposal of hazardous substances/wastes or petroleum produced were observ
ed.

A review of files maintained by the EPA and Kentucky Department for Environmental Protection (KDEP) was conducted by Environmental Data Resources (EDR) on November 10, 2020, to evaluate the regulatory history of the Timberwood DS Basin project area and surrounding properties. The EDR environmental database search did not identify the subject property or any adjoining properties on the American Society for Testing and Materials (ASTM) or All Appropriate Inquires (AAI) required databases. The EDR database search did not identify any listings within the established search radii (<0.1 mile) on ASTM or AAI required databases.

A search for aerial photographs of the Timberwood DS Basin project area and surrounding properties was conducted by EDR and provided to LFI in an *Aerial Photo Decade Package* dated November 11, 2020. Aerial photographs were provided for various years ranging from 1959 to 2016. The Timberwood DS Basin and surrounding areas were predominately undeveloped property from 1959 to 1978 and was predominantly residential development from 1987 to 2019. Based on the available information and site reconnaissance, LFI considers the Timberwood DS Basin project area to be of low environmental concern and does not recommend any further evaluation.

Proposed Ryan Court Basin: The reconnaissance of the proposed Ryan Court Basin project site identified no current structures. No obvious evidence of any current or former USTs or ASTs were identified. No obvious indications of generation, use, storage, treatment, or disposal of hazardous substances/wastes or petroleum produced were observed during the reconnaissance.

A review of files maintained by the EPA and KDEP was conducted by EDR on November 10, 2020 to evaluate the regulatory history of the proposed basin site and surrounding properties. The EDR environmental database search did not identify the proposed Ryan Court Basin project area or any adjoining properties on the ASTM or AAI required databases. The EDR database search did not identify any listings within the established search radii (<0.1 mile) on ASTM or AAI required databases.

A search for aerial photographs of the proposed basin site and surrounding areas were conducted by EDR and provided to LFI in an *Aerial Photo Decade Package* dated November 11, 2020. Aerial photographs were provided for various years ranging from 1959 to 2016. The property was predominately wooded, and the surrounding areas were predominately undeveloped property from 1959 to 1978. The proposed basin site has remained forested, but the surrounding area has been predominantly residential development from 1987 to 2019. Based on the available information, LFI considers the proposed Ryan Court Basin area to be of low environmental concern and does not recommend any further evaluation.

Proposed Tara Court Basin: The reconnaissance of the proposed Tara Court Basin project site identified no current structures. No obvious evidence of any current or former USTs or ASTs were identified. Minor household dumping and natural debris piling areas were observed. No obvious indications of generation, use, storage, treatment, or disposal of hazardous substances/wastes or petroleum produced were observed during the reconnaissance.

A review of files maintained by the EPA and KDEP was conducted by EDR on November 10, 2020, to evaluate the regulatory history of the proposed basin property and surrounding properties. The EDR environmental database search did not identify the proposed basin area or any adjoining properties on the ASTM or AAI required databases. The EDR database search did identify one listing within the established search radii (<0.1 mile) on ASTM or AAI required databases. The listing was a former meth lab at 2010 Hill Street, Lot 2 property; however, the incident was closed on September 2, 2011. Therefore, it does not represent a recognized environmental condition (REC).

A search for aerial photographs of the proposed Tara Court Basin and surrounding areas was conducted by EDR and provided to LFI in an *Aerial Photo Decade Package* dated November 11, 2020. Aerial photographs were provided for various years ranging from 1959 to 2016. The proposed project area was predominately wooded, and the surrounding areas were predominately undeveloped property from 1959 to 1978. The proposed project area has remained forested, but the surrounding area has been predominantly residential development from 1987 to 2019. Based on the available information, LFI considers the proposed Tara Court Basin to be of low environmental concern and does not recommend any further evaluation.

No Action Alternative: Under the No Action Alternative, no ground would be disturbed, and no hazardous materials would be encountered or disturbed. Any existing hazardous materials would remain in their present condition. Thus, the No Action Alternative will not result in the generation or disruption of hazardous materials.

Proposed Action Alternative: The excavation of the two proposed basins and one expanded basin outside of the existing footprint is not expected to expose hazardous materials or produce hazardous wastes. If suspected hazardous materials are found during construction (e.g., through the discovery of buried solid

waste, discolored soils, etc.), appropriate measures will be taken to identify, remove, and dispose of the waste and any associated contaminated soils. Hazardous materials discovered, generated, or used during construction would be handled and disposed in accordance with applicable local, state, and federal regulations.

The project includes the demolition of two existing houses within the Timberwood DS Basin expansion area located at 878 Timberwood Drive and 1025 Scenic Drive. The houses were built in 1986 and 1985, respectively. Since the houses were built after 1980, an assessment for potential asbestos-containing materials and lead-based paint in accordance with the requirements for National Emission Standards for Hazardous Air Pollutants (NESHAP) will not be necessary. However, if hazardous materials are discovered during demolition, the disposal of those materials would be conducted in accordance with all federal, state and local abatement and disposal requirements.

3.5.4 Noise

Noise is considered unwanted sound and is typically measured in decibels (dB). Noise is federally regulated by the Noise Control Act of 1972 and is administered by the EPA. The EPA's guideline for outdoor sound level states that sound in excess of 55 dB are "normally not acceptable" for noise-sensitive land uses such as residences, schools, and hospitals. Noise events in the project vicinity are presently associated with climatic conditions (wind, thunder), transportation noise (traffic on roads, airplanes), "life sounds" (people talking, children playing, etc.) and sounds from Fort Knox including occasional loud training exercise involving aircrafts and weapons firing.

The Project is in a dense residential area approximately three miles south of Fort Knox, which is an active military base. An aerial photograph of the project areas and adjacent properties are depicted on Figure 2, Appendix A. Some of the project basins are completely surrounded by or adjacent to residences.

No Action Alternative: Under the No Action Alternative, there would be no change to current noise levels and no construction activities related to flood risk reduction would occur.

Proposed Action Alternative: The Proposed Action Alternative will involve temporary short-term increases in noise levels during construction with the utilization of excavators, bulldozers, and dump trucks. The staging areas will be on the vacant land surrounding the basins. The construction equipment on the site will meet all federal, state, and local noise requirements. Construction noise is considered exempt from the local noise ordinance which can be located in the Code of Ordinances on the City's website. To minimize the noise impact, construction will be restricted to normal business hours (8 am to 4 pm) to the maximum extent possible. .

The nearest school to the project area is 1.3 miles south of the Woods Hollow #1 Basin and the nearest hospital is 2.6 miles southeast of the Woods Hollow #1 Basin. Construction noises are not anticipated to reach the school or hospital and therefore, no noise disturbance will incur. There are no long-term effects to noise levels anticipated with this proposed action.

3.5.5 Traffic and Circulation

Presently, multiple public streets provide access to the project areas. Logsdon Parkway bisects the Timberwood watershed and runs south of the Kingswood Watershed. The neighborhoods contain numerous 2-lane side streets with direct access to the existing and proposed basins. Some of these roads experience flooding during heavy rainfall events due to the efficiency of the basins.

No Action Alternative: Under the No Action Alternative, there would be no changes to current traffic conditions or circulation. The No Action Alternative would continue to have a long-term negative impact on local traffic when road closures occur due to flooding.

Proposed Action Alternative: The Proposed Action Alternative will involve an increase in construction related traffic during the modifications of the existing eight basins, the construction of the Ryan and Tara Court basins, the expansion of the Timberwood DS Basin, and the demolition of the two houses at the Timberwood DS Basin. Construction equipment and materials will be transported to and from the project sites until construction is complete. This additional traffic would be minimal and would likely not interfere with local residents or other drivers traveling in the vicinity of the project area. If construction requires a neighborhood road to be closed, traffic could be detoured on alternate routes. Access to all properties would be maintained during construction activities and residents would be notified of any road closures or detours at least 30 days prior. Short-term, the Proposed Action Alternative would result in increased construction traffic and potential road closures and detours. These short-term impacts would be resolved after construction completion. Long-term, the Proposed Action Alternative would have a positive impact on local traffic by reducing the likelihood of flooding and limited accessibility during flooding events.

3.5.6 Public Services and Utilities

Presently the City of Radcliff provides police and fire protection to the project area, and ambulance services are provided by the Hardin County Ambulance Services. The Radcliff Police Department is located 1.1 miles southeast of the Woods Hollow #1 Basin and the Radcliff City Fire Department is located 1.7 miles southeast of the Woods Hollow #1 Basin. Additionally, nearby schools located one to two miles southeast of the Woods Hollow #1 Basin include: Meadow View Elementary, North Park Elementary, Radcliff Elementary, North Middle School, and North Hardin High School.

There are also numerous public utilities, including power and sewer lines, located along public right of ways within and adjacent to the project areas. Hardin County Water District No. 1 provides sewer and water for the project area. Nolin Rural Electric Co-Op (RECC) provides electric, and Louisville Gas & Electric (LG&E) provides natural gas. Kingswood East, Bramblett, and Raven Street Basins all have overhead powerlines and utility poles within the basin areas to be excavated and expanded. Timberwood DS Basin has two utility poles outside the basin area with one along Scenic Drive and one along Timberwood Drive. Timberwood DS Basin has two sanitary manholes outside the basin area on the west side near Timberwood and one sanitary manhole outside the basin area on the east side near Scenic Drive. Logsdon DS Main Basin has a sanitary manhole just outside the proposed project area near North Logsdon Parkway (coordinates in decimal degrees: 37.846793, -85.964261). Raven Street Basin has one sanitary manhole within the central portion of the existing basin area (37.854112, -85.961384). Kingswood East Basin has an existing sewer pump station in the central portion of the existing basin area (37.852402, -85.961094). Logsdon DS Main Basin has a gas pipeline in the western portion of the existing basin area, near Logsdon DS2 Basin (37.846628, -85.965007).

No Action Alternative: The No Action Alternative could negatively affect utilities during flooding events. Utilities that are located within some of the existing basins experience flooding and increased potential for contaminated water overflow from flooded sewer lines and manholes. Additionally, emergency response personnel; police, fire and ambulance services, would not be able to access locations within the project area during a flood event because of limited accessibility, dangerous conditions and prolonged response times.

Proposed Action Alternative: The Proposed Action Alternative will have short-term, minor, negative impacts on public services and utilities during construction activities. The appropriate agency, including Hardin County Water District NO. 1, RECC, and LG&E will be notified prior to excavation to avoid damaging underground utilities. Additionally, the outages of services are anticipated for less than one hour for most impacts, but four to eight hours at the most. Overhead electric lines, sewer manholes, the pump station, and gas pipelines will be protected using construction best management practices. Caution will be used during construction to avoid contact with overhead utility lines. Utility poles near the excavation limits will be structurally braced during construction and signage will be used to warn construction workers/truck drivers of any low wiring or alternative routes needed to avoid impacts.

All underground utilities will be called into 811 prior to excavations and flagged to ensure all are located. There will be one utility relocation in the Kingswood Basin. No other utility relocations are necessary. Electric lines in the Kingswood Basin will be buried and provide a positive benefit to the immediate area served due to downed lines in being a safety issue during flooding events. If any interruption of service is necessary to complete the project, affected users would be notified ahead of time by Hardin County Water District NO. 1, RECC, or LG&E via phone alerts, emails, or postings online. The loss of service would be expected to be short-term and minor, for less than one hour for most impacts, but four to eight hours at the most. The Proposed Action Alternative will also provide benefits to police and fire departments by decreasing the amount of labor needed to respond during local flooding events due to road closures and emergencies related to flooding of houses. There are no negative long-term effects to public services and utilities anticipated for this proposed action.

3.5.7 Public Safety and Security

Safety and security issues that have been considered in this analysis include the health and welfare of the area residents, the public at-large, and the protection of personnel involved in construction activities. The potential for flooding in the Timberwood and Kingswood watershed is a safety concern for the City of Radcliff. Damaged and flooded roads are a public safety concern due to direct hazards and increased response times for emergency services which poses potentially life-threatening situations for people caught in floodwaters. As discussed in Section 3.5.6, the nearest police station and fire station are one to three miles southeast of the project area. Standing water in residential and other structures can pose a health and safety risk for residents due to the presence of biological hazards, such as sanitary sewer backup. Numerous public utilities, including powerlines and sewer lines, are located within and adjacent to the project area. Kingswood East, Bramblett, and Raven Street Basins all have overhead powerlines and utility poles within the basin areas. Timberwood DS and Logsdon DS Main Basins have sanitary manholes just outside the proposed project area and Raven Street Basin has one sanitary manhole within the project

area. Kingswood East Basin has an existing sewer pump station in the central portion of the project area. Logsdon DS Main Basin has a gas pipeline in the western portion of the project area.

EO 13045, Protection of Children, requires federal agencies to make it a high priority to identify and assess environmental health and safety risks that may disproportionately affect children. Mitigation measures to ensure children safety in accordance with the EO 13045 may include the scheduling of construction activities during the summer months when school is not in session, employing appropriate signage and fencing, and ensuring that construction activities and building designs are compliant with the County Board of Education and the State Department of Education.

No Action Alternative: Under the No Action Alternative, there would be no changes to safety and security and no effects to the EO 13045. The potential for flooding would remain and there would be public health and safety concerns about the flooding of infrastructure and residential properties. Temporary road closures and the ability of emergency personnel to efficiently access certain areas could be adversely affected. Law enforcement would respond to ensure local traffic have passible ingress and egress to the community. The City of Radcliff and Hardin County would incur the economic costs of repair and maintenance of public structures damaged by future flood events. Additionally, children in the residential areas would be at a higher risk of safety issues due to flooding of roads and homes.

Proposed Action Alternative: Current flooding as a result of inefficient basins could overload sanitary sewers and water systems, causing a potential sewer backup, loss of potable water, and power outages in the flooded area. The Proposed Action Alternative would help protect public health during future storm events by reducing the risk of flooding to the residential properties and associated utilities. Overhead electric lines, sewer manholes, the pump station, and gas pipelines will be protected. Electric lines will be buried and no longer exposed, which is a positive benefit since downed lines in flooded areas cause safety issues. The pump station in the Kingswood East Basin will experience lower flooding levels and thereby, will be less likely to overflow sewage into the watershed, which will be a public benefit. Implementing the Proposed Action Alternative would also have a positive impact on public safety by decreasing the risk of flooded roads resulting in a public safety concern and decreasing response time for emergency services.

Mitigation measures to ensure the protection of children in accordance with the EO 13045 during construction activities will be ensured. During construction activities, safety measures to mitigate potential impacts to the general public, including children, entail employing appropriate signage and safety fencing to warn the public/children of construction activities and restrict access to the sites. To minimize risks to safety and human/children health, all construction activities for the Proposed Action Alternative would be performed using qualified personnel trained in the proper use of the appropriate equipment including all appropriate safety precautions. Additionally, all activities would be conducted in a safe manner in accordance with the standards specified in Occupational Safety and Health Act (OSHA) regulations.

3.5.8 Visual Resources

The Project is located within a dense residential area, approximately three miles south of Fort Knox, which is an active military base. An aerial photograph of the project areas and adjacent properties is depicted on Figure 2, Appendix A. Appendix B contains photographs of the project area. The general landscape

character of the project area is single-family residential homes with neighborhood roads. The visual landscape is fragmented due to the alternating sceneries between residential homes and patches of woods.

No Action Alternative: Under the No Action Alternative, there would be no impact to the visual character of the project area.

Proposed Action Alternative: The Proposed Action Alternative would have long-term adverse impacts on visual resources in and near the project area based on the clearing of wooded vegetation in the existing and proposed basin locations. The existing and proposed basins will not look the same after construction due to the lack of wooded vegetation in the basins, re-grading/excavation, and re-seeding. The Proposed Action Alternative would have short-term adverse impacts on visual resources in and near the project area because of construction activities and the presence of construction equipment. Following construction activities, the basins will be re-seeded and covered with straw for stabilization, but not replanted with forested vegetation as they need to be maintained. Minimization measures for visual resources for the Proposed Action Alternative include utilizing the existing basins and property for additional floodplain storage instead of creating new basins which would result in more impacts to visual resources through the conversion of property that is not currently being maintained as a basin. Additionally, the primary constituents in the view shed of the proposed project are the residents in the neighborhood. Based on a public meeting held on May 29, 2018, there was no public concern since it would reduce flooding of houses and roadways in the area. No public comments were recorded or addressed during this meeting. Additionally, during the field assessment performed by Redwing in October 2020, numerous neighbors immediately adjacent to the existing and proposed basins approached the field crew to discuss the project and were excited for the possibility of decreased flooding within their community.

The construction of the two proposed basins will result in a conversion of mostly mixed-age woods to a maintained basin area and excavation of the existing eight basins will result in the conversion of scrub or wooded basin areas into maintained/cleared basins. Therefore, the conversion of the basins to maintained lawn will result in a long-term visual impact. However, the reduction of flooding in the area outweighs the long-term visual disturbance needed for constructing and maintaining the basins as open areas instead of wooded/scrub areas.

3.5.9 Zoning and Land Use

The City of Radcliff was established in 1956. The *Zoning Ordinance and General Development Regulations* for the City of Radcliff were authored by Paul R. Tice II, Planner under the guidance of the Radcliff Planning Commission. The ordinance was developed during the months of November and December of 1983 and January, February, and March of 1984. As stated in the document, the purpose of the Zoning Ordinance is:

1) To encourage development which will act towards implementing the newly created and adopted *Comprehensive Plan*
2) To make the Zoning Ordinance consistent with the newly created and adopted *Subdivision Regulations.*
3) To improve the over-all appearance of Radcliff with special emphasis of the mobile home, multi-family, and commercial developments.
4) To allow flexibility in the zoning scheme while insuring compatibility between differing land uses.

5) To allow the citizens of Radcliff the maximum opportunity to use their property while protecting the welfare and value of the surrounding properties.

The project area is located within the City of Radcliff, and thereby, must follow the Zoning Ordinance. The existing and proposed basins are all located in areas that are residentially zoned, including R-2 (low density, single-family), R-3 (medium density, single-family and duplex), and R-4 (high density, single-family and duplex). The project areas are located in residential neighborhoods, immediately adjacent to single-family homes and duplexes. An aerial photograph depicting land use of the project areas and adjacent properties is depicted on Figure 2, Appendix A.

The area known today as the City of Radcliff was once known as the Mill Creek area of Kentucky, as shown by the first map of Kentucky published by John Filson in 1784. Local histories record that both Daniel Boone and his brother, Squire Boone, spent quite a bit of time in the area, which is attested to by the Boone family cemetery located on Fort Knox, just a few miles north of Radcliff. Thomas Lincoln, father of the 16th President Abraham Lincoln, purchased his first farm on Mill Creek in 1807. The Lincolns passed through the area during 1814 on their way to Indiana by way of road, known today in Radcliff as Spring Street. Fort Duffield was constructed in 1861 (currently approximately 10 miles northeast of Radcliff) and was located on what was known as Muldraugh Hill on a strategic point overlooking the confluence of the Salt and Ohio Rivers and the Louisville Nashville Turnpike. The area was contested by both Union and Confederate forces. The Mill Creek area became significant during the Civil War as numerous soldiers passed through the area between 1862 and 1863. The Mill Creek area was renamed to Radcliff in 1919. During World War II, thousands of soldiers trained at Fort Knox and spend their leisure hours in Radcliff

Prior to 1998, the land use of the project area was agricultural land with patches of forested area. After 1998, the land use became residential and has since remained the same. Therefore, land use in the project area has remained the same for 24 years. The construction of basins in residential neighborhoods follows the Zoning Ordinance for the City of Radcliff.

No Action Alternative: Under the No Action Alternative, there would be no impact to land use or zoning. Flooding of the residential homes and roads would continue to occur, resulting in decreased property value and adverse impacts to land use in the area

Proposed Action Alternative: The Proposed Action Alternative would not require any impacts to zoning as the basins are authorized in residential zones. In addition, no zoning permits or KYTC permits would be required to excavate, regrade, expand, and construct the basins. No short- or long-term effects to zoning would be caused by the Proposed Action Alternative.

Minimization measures for land use for the Proposed Action Alternative include utilizing the existing basins and property for additional floodplain storage instead of creating new basins which would result in the conversion of property that is not currently being maintained as a basin. The two proposed basins will be converted from forested area into maintained basins resulting in long term negative effects to land use. However, long term positive effects to land use would be associated with the basins since the probability of flooding would be reduced. Short-term effects to land use would be present during construction. The excavating, grading, and clearing would remove all existing vegetation. However, an approved

Construction Plan, EPSC plan, and SWPPP will be implemented and maintained throughout the construction activities and the areas will be re-vegetated after construction completion.

3.6 COMPARISON OF ALTERNATIVES

A summary of potential impacts associated with the No Action and Proposed Action Alternatives is provided in the following table. The table also describes the measures used to mitigate potential impacts to resources.

Affected Environment	Impacts by Alternative	Impacts by Alternative	Mitigation
	No Action	**Proposed Action**	
Geology, Seismicity, and Soils	No Impacts	There will be no impacts to underlying geological resources including wells or aquifers. There will be short-term soil disturbances.	An approved Construction Plan, EPSC plan, and SWPPP will be implemented and maintained throughout the construction activities.
Air Quality	No Impacts	The proposed project will not result in a long-term increase in air emissions that jeopardize the Clean Air Act attainment status. There is the potential for temporary impacts to air quality associated with the construction activities such as dust and vehicle emissions from construction equipment.	To minimize the potential temporary impacts to air quality, disturbed ground surfaces will be watered, as needed, to prevent dust generation. Fuel-burning equipment running times will be minimized to the extent possible.
Climate Change	No Impacts	The proposed project will not result in a long-term increase in greenhouse gas emission. There is the potential for temporary impacts to greenhouse gases associated with the construction activities.	Fuel-burning equipment running times will be minimized to the extent possible.
Water Resources and Water Quality	There would likely be continued degradation of water quality and increased soil erosion as a result of flooding.	No jurisdictional streams or wetlands will be impacted for the Project. Long-term positive results on surface water quality due to reduced soil erosion and sediment deposition associated with flood events.	An approved Construction Plan, EPSC plan, and SWPPP will be implemented and maintained throughout the construction activities. Under the CWA, Section 404 and Section 401 permit CWA approval is not required since all water/wetland features are non-jurisdictional.
Wetlands	No Impacts	No impacts to jurisdictional wetlands are proposed.	An approved Construction Plan, EPSC plan, and SWPPP will be implemented and maintained throughout the construction activities. The USACE issued an Approved JD under the NWPR on August 5, 2021. Under the CWA, Section 404 and Section 401 permit CWA

			approval is not required since the wetland is non-jurisdictional
Floodplain Management	No Impacts	The Project is not located within the 100-year FEMA floodplain. The Project will not affect the functions or values of the floodplain, nor would any project activities affect the floodplain downstream of the Project area. Additionally, the Proposed Action Alternative would not contribute to the development within the 100-year floodplain.	This Proposed Action Alternative will reduce the maximum flood elevation below the critical value and will remove 97 residences in the project area from the modeled theoretical 100-year flooding area. Since there are no jurisdictional streams and none of the basins are within the FEMA 100-year floodplain, no state Floodway Construction Permit or a Local Floodplain Permit will be required.
Threatened and Endangered Species	No Impacts	Long-term impacts to federally threatened/ endangered species are not anticipated. Short-term impacts will involve the clearing of minimal suitable summer roosting habitat for the federally listed Indiana bat and northern long-eared bat. No impacts to state listed threatened/endangered species are anticipated.	Section 7 consultation with the USFWS has been completed. No effects to the gray bat or mussel species is proposed. Tree clearing of 4.44 acres of suitable summer habitat will be completed in the unoccupied season. The 4(d) rule be used to address impacts from tree clearing for the northern long-eared bat. A per-acre fee payment for the Indiana bat totaling $9,960.00 will be made to the IBCF prior to clearing. Based on the proposed actions for the project, this project is not likely to contribute to the introduction or spread of invasives species.
Terrestrial and Aquatic Environment	No Impacts	Due the disturbed/maintained nature of the existing basins and minimal conversion of wooded area to maintained basins in the proposed basins, no significant impacts to terrestrial environments are anticipated. Tree clearing of suitable habitat for the federally listed Indiana bat and northern long-eared bat will occur within Project area. The project will require impacts to non-jurisdictional intermittent and ephemeral streams, and a non-jurisdictional wetland.	Section 7 consultation with the USFWS will occur prior to project start. Suitable habitat for the Indiana bat and northern long-eared bat will not be cleared until USFWS sign-off is obtained and a per-acre fee payment is made for the Indiana bat to the IBCF prior to clearing. Impacts to streams and wetlands will be negated through the excavation/construction of larger basins with low flow channels and depressional areas that will replace the functions of the existing streams and wetland.
Historic Structures	No Impacts	No Impacts	Based upon the findings of the cultural historic survey, the records review indicates that there are no previously surveyed resources located adjacent to or within the project area of the APE. CRA conducted a field survey and documented three previously unidentified sites (Sites 1-3 [HD 1149, HD 1150, and HD 1151]). The report recommended that Sites 1-3 are not eligible for inclusion in

			the NRHP under Criterion A, B, or C. A finding of No Historic Properties Affected is recommended for the proposed project. Section 106 consultation with SHPO is on-going.
Archaeological Resources	No Impacts	No Impacts	There are no known archaeological sites within the project area and no archaeological sites were identified during the Phase I archaeological survey of the project area. Additionally, there are no sites listed in, or eligible for listing in, the NRHP that will be affected by the Proposed Action Alternative. A finding of archaeological clearance is recommended. If any previously unrecorded archaeological materials are encountered during construction activities, construction activities should cease, and the City of Radcliff should notify FEMA and the KHC immediately. If human skeletal material is discovered, construction activities should cease, and FEMA, the KHC, the local coroner, and the local law enforcement agency must be notified within 24 hours of the discovery.
Socioeconomic	Adverse impacts to City of Radcliff residents living in the flooded area	Long-term beneficial effect due to reduced flooding, reduced damage and repair, reduced property economic burden on the City of Radcliff and Hardin County.	The Project will be a positive benefit to the community due to reduced flooding and associated costs, and increased safety in flood prone areas.
Environmental Justice	No disproportionately high and adverse impacts on any minority or low-income population and complies with EO12898	No disproportionately high and adverse impacts on any minority or low-income population, and complies with EO12898. Beneficial effect on all local residents, including low-income and minority populations, as it would reduce the risk of harm to community and personal property during future flood events. Two houses are proposed for demolition as a result of the Timberwood DS expansion.	The Project will be a benefit to the community, including minority and low-income populations, due to reduced flooding. The City will negotiate a fair sale price with the current property owners based on appraisals of the property at a later date.
Hazardous Materials	No Impacts	No impacts are anticipated.	Two existing houses will be demolished. Since the houses were built after 1980, no asbestos abatement or lead permit issues are anticipated. Any hazardous materials discovered, generated, or used during construction activities will be

			handled and disposed of in accordance with applicable federal, state, and local regulations.
Noise	No Impacts	Long-term adverse impacts associated with the project are not anticipated. Short-term impacts will involve increase in noise levels associated with construction equipment.	To mitigate for the short-term increases to noise associated with construction equipment, construction activities will only occur during normal business hours to the maximum extent possible.
Traffic and Circulation	Long-term negative impact on local traffic when road closures occur during flooding	There are no long-term adverse impacts associated with the project. Short-term impacts could include traffic detours or road closures during construction activities. Long-term benefits include reduced road closures, increased accessibility and response times for police and fire departments during flood events.	Construction activities will only occur during normal business hours to the maximum extent possible. Residents will be notified of any temporary detours or road closures, if necessary.
Public Services and Utilities	No direct impacts on public services and utilities Adverse impacts during flooding if utilities are damaged, including flooded sanitary sewers and manholes, loss of potable water and power outages or down transmission lines Adverse impacts if flooding results in increased emergency response times	There will be one utility relocation in the Kingswood Basin. Any interruption in services would be short-term and users would be notified. Long-term benefits on utilities due to reduced risk of flood damage and potential for contamination of water. Beneficial long-term effects on public services such as decreased response times and better accessibility for police, fire departments and ambulance services during flood events.	There are no anticipated long-term effects on public services or utilities. The Project will be a benefit to the community due to reduced flooding.
Safety and Security	Direct impacts on public health and safety, posing potentially life-threatening situations with people caught in floodwater Adverse impacts during flooding due to biological hazards, such as sewer backups in flooding houses Adverse impacts if flooding results to public safety through damaged and flooded roads, limited accessibility for police and fire department to emergency situations and increased	Short-term minor impacts during construction activities. Long-term benefits to public safety from reduced risk of flooding include reduced hazardous situations from floodwaters, decreased health risk from biological hazards, such as sewer backups, and increased accessibility and decreased response times for emergency vehicles.	To minimize the short-term impacts to safety and security, the contractor will ensure that only trained and qualified employees are used during construction. The contractor will follow all federal, state, and local environmental and safety regulations. The Project will be a benefit to the community due to reduced flooding.

	emergency response times		
Visual Resources	Long-term impacts to visual resources	Long-term impacts to visual resources due to changing the landscape from scrub/wooded areas to open/maintained areas. Short-term impacts to visual resources consist of clearing of trees in two proposed basin areas and disturbance of existing basins from grading activities. There are two houses proposed for demolition as a result of the Timberwood DS expansion.	The Project will have a positive effect or the community due to reduced flooding. The City will negotiate a fair sale price with the current property owners based on appraisals of the property at a later date.
Zoning and Land Use	No direct impacts to land use and zoning would be anticipated		

4.0 CUMULATIVE IMPACTS

Cumulative effects are defined under NEPA as impacts on the environment which result from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions regardless of what entity undertakes the action (40 CFR 1508.1(g)(3)). The primary purpose of the project is to provide efficient and effective stormwater control measures to remove as many homes as possible from the theoretical 100-year floodplain, reduce safety risks to the traveling public caused by flooding, and decrease loss of property and damages to residences from flooding events.

Positive effects of the Proposed Action Alternative include reducing the impact of flooding in the area that pose a safety hazard for residents, drivers, and for emergency vehicles that need to access areas. The proposed action will reduce the impact of flooding of utilities including electrical powerlines and sewage pump stations. Negative effects of the Proposed Action Alternative include stream and wetland disturbance and minimal tree clearing. However, the functionality of the basins will be similar to the existing function of the streams and wetlands proposed for impact and the basins will have more flood storage than the existing features. Additionally, the expansion and construction of the basins will result in tree removal of less than five acres total. Due to the minimal clearing proposed, the benefits of reducing loss and damage to property, outweigh the necessary tree clearing to excavate, regrade, expand, and construct the basins.

Presently, the City of Radcliff is not aware of on-going or planned projects in the vicinity of the North Logsdon Flood Mitigation Project. The Project area is currently highly developed, and no additional basin work is being proposed at this time. Therefore, future projects are not likely to impact resources in the vicinity of the project area due to the developed nature of the community and the location of the project near Fort Knox. The long-term benefits to successful completion of this project for the community and the environment, particularly for socioeconomic resources and drainage improvements, far exceed any temporary impacts. Cumulative impacts are not anticipated as a result of this project.

5.0 PUBLIC PARTICIPATION

FEMA is the leading federal agency for the North Logsdon Flood Mitigation Project for ensuring compliance with NEPA. The lead agency is responsible for determining the level of environmental documentation required for the project and assisting in an efficient review of the project.

The City of Radcliff notified the adjacent landowners of the project via certified mail and was presented at a public meeting held on May 29, 2018, at the Radcliff Town Hall No comments were recorded during the public meeting and no public concern expressed since it would reduce flooding of houses and roadways in the area. A copy of the Public Meeting attendance sheet is provided as Appendix D.

The City of Radcliff will notify the public of the availability of the EA through publication of a Public Notice in the local newspaper of record. FEMA will conduct a 30-day public comment period commencing on the initial date of publication of the Public Notice.

6.0 MITIGATION MEASURES AND PERMITS

The City of Radcliff will follow all local, state, and federal rules and regulations pertaining to the proposed project. The City of Radcliff, along with FEMA, will obtain all necessary permits and consultations prior to construction of the proposed project. The following table summarizes the permits required for construction activities of the North Logsdon Flood Mitigation Project.

Agency	Permit
Federal	
SHPO	Section 106 Cultural/Historic Consultation
USFWS	Endangered Species Act – Section 7 Consultation
State	
KDOW	NOI for KPDES permit
Local	
City of Radcliff / Hardin County	EPSC and SWPPP Approval / Certificate of Appropriateness

The following mitigation measures will be implemented during construction of the proposed project:

1. The City of Radcliff is responsible for obtaining and complying with all required local, state and federal permits and approvals.

2. The City of Radcliff will monitor ground disturbance during the construction phase. Should human skeletal remains or historic or archaeological materials be discovered during construction, all ground-disturbing activities on the project site shall cease and the applicant shall notify the coroner's office (in the case of human remains), FEMA, SHPO, and the KHC.

3. If deviations from the proposed scope of work result in substantial design changes, the need for additional ground disturbance, additional removal of vegetation, or in any other unanticipated changes to the physical environment, the City of Radcliff will contact FEMA, and a re-evaluation under NEPA and other applicable environmental laws will be conducted by FEMA.

4. The City of Radcliff will develop and implement a SWPPP, which includes an EPSC plan, outlining the BMPs to be installed prior to commencement of construction activities.

5. Following construction, the basins and other disturbed areas will be seeded with an appropriate species of turf grass.

6. Construction activities will take place during normal business hours to the extent possible.

7. Tree clearing will take place between October 1 and March 31 and a per acre fee for tree clearing impacts is required prior to any tree clearing occurring.

8. Fuel burning equipment running times will be minimized to the extent possible.

9. Two houses will be demolished for the Timberwood DS Basin expansion. The two houses are located at 878 Timberwood Drive and 1025 Scenic Drive. The City of Radcliff will negotiate a fair sale price with the current property owners based on appraisals of the property at a later date.

10. If any asbestos containing material, lead based paint, and/or other toxic materials are found during construction activities, the applicant must comply with all federal, state and local abatement and disposal requirements. Upon closeout, the applicant must provide Notice of Demolition or

Asbestos Renovation forms and confirmation that any ACM were taken to an authorized landfill for such materials

11. Unusable equipment, debris and material shall be disposed of in an approved manner and location. In the event significant items (or evidence thereof) are discovered during implementation of the project, applicant shall handle, manage, and dispose of petroleum products, hazardous materials and toxic waste in accordance to the requirements and to the satisfaction of the governing local, state and federal agencies.

12. Any hazardous materials discovered, generated, or used during construction will be handled in accordance with applicable federal, state, and local regulations.

13. If any previously unrecorded archaeological materials are encountered during construction activities, construction activities should cease, and the City of Radcliff should notify FEMA and the KHC immediately. If human skeletal material is discovered, construction activities should cease, and FEMA, the KHC, the local coroner, and the local law enforcement agency must be notified within 24 hours of the discovery. If an entrance to a cave is discovered during the tree removal and construction process, work shall halt, and consultation reinitiated.

14. Parties finding a dead, injured, or sick northern long-eared bat or Indiana bat must promptly notify the appropriate USFWS Kentucky Ecological Services Field Office, KYEM, and FEMA. Email: KENTUCKYES@FWS.GOV and Phone Number: 502-695-0468

15. Conduct tree removal activities outside of the northern long-eared and Indiana bat pup season and the active season (April 1 to November 14).

16. Avoid clearing suitable spring staging and fall swarming habitat within a 5-mile radius of known or assumed northern long-eared bat hibernacula during the staging and swarming seasons (April 1 to May 15 and August 15 to November 14, respectively).

17. Minimize use of herbicides and pesticides. If necessary, spot treatment is preferred over aerial application.

18. Evaluate the use of outdoor lighting during the active season and seek to minimize light pollution by angling lights downward or via other light minimization measures.

19. Participate in actions to manage and reduce the impacts of white-nose syndrome on northern long-eared and Indiana bat. Actions needed to investigate and manage white-nose syndrome are described in a national plan the Service developed in coordination with other state and federal agencies.

7.0 CONSULTATIONS AND REFERENCES

Barbour, M.T., J. Gerritseri, B.D. Snyder and J.D. Stribling. 1999. Rapid Bioassessment Protocols for Use in Streams and Wadeable Rivers: Periphyton, Benthic Macroinvertebrates, and Fish. Second Edition. EPA 841-99-002. USEPA Office of Water Washington, D.C.

Council on Environmental Quality (CEQ). 2016. Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in the National Environmental Policy Act.

Qk4. 2019. North Logsdon Storm Water Master Plan. Prepared for the City of Radcliff, April 24, 2019.

The Navigable Waters Protection Rule: Definition of "Water of the United States". Fed. Reg. Vol. 85. No. 77, Pp. 22250 (April 21, 2020).

U.S. Army Corps of Engineers. 2012. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region (Version 2.0). U.S. Army Engineer Research and Development Center, Vicksburg, Mississippi. 180 pgs.

U.S. Army Corps of Engineers. 2018. The National Wetland Plant List: Eastern Mountain and Piedmont Final Regional Wetland Plant List. May 2018.

U.S. Census Bureau (USCB). "State and County Quick Facts." http://quickfacts.censu.gov/qfd/index.htm. Accessed October 16, 2020 and January 15, 2021.

U.S. Department of Agriculture – Natural Resources Conservation Service (NRCS). "Suitabilities and Limitations for Use: Farmland Classifications." Web Soil Survey. http://websoilsurvey.nrcs.usda.gov/app/websoilsurvey.aspx. Accessed October 29, 2020.

U.S. Department of Homeland Security. Federal Emergency Management Agency (FEMA) (2011). Guidelines in the Preparation of an Environmental Assessment. FEMA-Region 6, March 2011-Draft.

U.S. Environmental Protection Agency (USEPA). "Nonattainment Areas for Criteria Pollutants (The Green Book)" https://www.epa.gov/green-book. Accessed October 29, 2020.

U.S. Environmental Protection Agency (USEPA). "Regulations for Greenhouse Gas Emissions from Commercial Trucks & Buses" https://www.epa.gov/regulations-emissions-vehicles-and-engines/regulations-greenhouse-gas-emissions-commercial-trucks. Accessed June 10, 2022.

U.S. Fish and Wildlife Service Kentucky Ecological Services Field Office (USFWS-KFO) 2016. Revised Conservation Strategy for Forest – Dwelling Bats in the Commonwealth of Kentucky. Kentucky Ecological Services Field Office. Frankfort, KY. 32 pp.

U. S. Geological Survey – Earthquake Hazards Program (USGS). USGS Magnitude 2.5+ Earthquakes. https://earthquake.usgs.gov/. Accessed October 22, 2020.

8.0 LIST OF PREPARERS

Kiersten R. Fuchs, Senior Project Manager – RES Kentucky, LLC dba Redwing Ecological Services

Kaitlin J. Ilnick, Project Manager II – RES Kentucky, LLC dba Redwing Ecological Services

Neal Crawford, P.E. – Qk4

David Curry – City of Radcliff

Nick Grinstead, MPP – Hazard Mitigation Grant Program, University of Kentucky Martin School of Public Policy and Administration

Somalia James, Environmental Protection Specialist- Federal Emergency Management (FEMA)

Angelika Phillips PhD, Supervisory Environmental Protection Specialist- Federal Emergency Management (FEMA)

APPENDIX A

FIGURES

APPENDIX B

PHOTOGRAPHS

APPENDIX C

AGENCY CONSULTATIONS

- **USDA Natural Resources Conservation Service**
- **U.S. Fish and Wildlife Letters**
- **Kentucky Department of Fish and Wildlife Resources**
- **Kentucky State Nature Preserves**
- **Approved Jurisdictional Determination**
- **National Historic Preservation Act (Section 106)**

APPENDIX D

PUBLIC MEETING ATTENDANCE SHEET

APPENDIX E

NORTH LOGSDON STORM WATER MASTER PLAN

APPENDIX F

TRANSACTION SCREEN LETTERS