US Army Corps of Engineers
Kansas City District

U.S. Army Corps of Engineers-Kansas City District

Finding of No Significant Impact

CITY OF TOPEKA, FLOOD RISK MANAGEMENT PROJECT

SHAWNEE COUNTY, KANSAS

December 2008

DEPARTMENT OF THE ARMY
KANSAS CITY DISTRICT, CORPS OF ENGINEERS
700 FEDERAL BUILDING
KANSAS CITY, MISSOURI 64106-2896

Finding of No Significant Impact

CITY OF TOPEKA
FLOOD RISK MANAGEMENT PROJECT
TOPEKA, KANSAS

SUMMARY

The U.S. Army Corps of Engineers, Kansas City District (USACE), at the request and with the cooperation of the City of Topeka (local sponsor), proposes to provide flood risk management for the City of Topeka, Kansas. Specifically, this project will correct the existing geotechnical and structural weaknesses and increase the reliability of the flood risk management system for the City of Topeka. The Topeka flood risk management levee system is located in Shawnee County, Topeka, Kansas at the confluence of Soldier Creek and the Kansas River, and is a unit of the Kansas River Basin System. The levee units in Topeka that are proposed for modifications in this plan are: South Topeka Unit, Waterworks Unit, Oakland Unit, and North Topeka Unit. Proposed improvements include the installation of landside underseepage berms, heel extensions, fill behind floodwalls, new pressure relief wells, a wall stiffener on Kansas Avenue Pump Station, stability berms, removal of the Fairchild Pump Station, replacement of a section of the floodwall, and replacement of floodwall gatewells and sluice gates. The Auburndale and Soldier Creek units were studied for deficiencies in the early phase of the project. However, there were no deficiencies found; therefore, no work has been proposed for the Auburndale and Soldier Creek units. The authority for the study of this project is provided by Section 216 of the 1970 Flood Control Act.

PUBLIC INVOLVEMENT

A public meeting was held on 14 November 1996 at the Garfield Community Center in Topeka, Kansas. The purpose was to inform the public of the proposed study and to get feedback on the alternatives proposed in the study. Comments were addressed by USACE representatives and a record of these comments was included in the 1997 Reconnaissance Report. A second public meeting was conducted October 22, 2008 during the 30-day public review period of the Draft EA and Feasibility Report. The Draft Report was mailed to Federal and state agencies, local media, residents within the affected community and other interested parties. All comments received during the public review period were addressed. Comments were received during the public review period from the following entities: City of Topeka, Friends of the Kaw, North Topeka Drainage District, U.S. Fish & Wildlife Service, Kansas State Historical Society,

Natural Resources Conservation Service, and Federal Aviation Administration. There were no comments that required reevaluation of the alternatives, identification of a new recommended plan, or a critical change to impact analysis. Copies of the comment letters and USACE responses can be found in the Appendix B of the Main Feasibility Report.

ALTERNATIVES

A total of four alternatives were evaluated in terms of individual and cumulative effects for the proposed project, which are Alternative 1-Recommended Plan, Alternative 2-Pressure Relief Wells, Alternative 3- Commercial Fill, Alternative 4- No-Action. These are addressed below.

Alternative 1- Recommended Plan: The Recommended Plan consists of the preferred alternatives for each levee unit and these are listed below. In addition, the Recommended Plan will require fill from two borrow areas. Fill will be obtained from two agricultural areas within the Oakland and South Topeka units. Approximately 19.3 acres will be excavated at the Oakland borrow site and 27.3 acres at the South Topeka borrow site.

Oakland Unit: A new earthen underseepage berm will be installed landward of the levee behind the water treatment plant. The berm will be placed along the toe of the levee for about 1,600 linear feet at a height of 6.5 feet, sloping to three feet thick at a distance of about 240 feet outward from the levee. At stations 75+50 and 220+00, heel extensions will be added to the manholes and to the East Oakland Pump Station to mitigate uplift pressures. Two feet of additional fill will be required behind the Shunganunga Creek floodwall to meet sliding stability requirements. About 388 cubic yards of fill will be used and will extend about five feet from the floodwall centerline and taper at a 1:3 slope.

North Topeka Unit: A new earthen underseepage berm will be installed landward of the levee from station 165+00 to 189+00. The berm will be placed along the levee toe for 2,400 linear feet. About 122,250 cubic yards of fill will be used for construction of the berm. New pressure relief wells will be installed along the levee for about 400 linear feet between stations 246+00 and 250+00. Six wells will be placed 75 feet apart and 75 feet deep. The existing Fairchild Pump Station will be removed. However, the below ground level structures will be left in place, filled with concrete-like material, and then covered with soil.

South Topeka Unit: A new earthen underseepage berm will be installed landward of the levee from station 22+00 to 48+00. The berm will be installed at the toe of the levee for about 2,200 linear feet. About 48,150 cubic yards of fill will be used for the construction of the berm. At station 74+41 to 93+86, the existing South Topeka floodwall will be removed and replaced. The new floodwall will be concrete and built along the existing wall alignment to the same length and height. Also, a working platform will be constructed on the bank of the river. This platform is not likely to extend into or impact

the river itself. Access to this area will be from the landside through the first removed section of the existing wall. The existing gate wells and sluice gates will be replaced as part of the floodwall replacement. Three existing manholes will require heel extensions to mitigate uplift pressures. In addition, a wall stiffener at Kansas Avenue Pump Station will be installed to meet the required strength factor for safety.

Waterworks Unit: Approximately two feet of additional fill will be placed behind the floodwall to meet sliding stability requirements. About 1,272 linear feet of fill will be placed along the tow of the wall to five feet out from the floodwall centerline and tapered on a 1 to 3 slope. At stations 13+07 and 15+95, two feet of backfill will be placed behind the stop-log gap sidewalls to address sliding stability. A total of 958 cubic yards of fill will be used to meet sliding stability requirements.

Alternative 2 - Pressure Relief Wells: Under this alternative, the proposed actions will be the same as those described in the Recommended Plan, except pressure relief wells will be installed in place of the proposed underseepage berms on the North Topeka, South Topeka and Oakland Units. The relief wells will be placed landward and within the maintained right-of-way of the levee. The relief well system provides the reliability required with minor, negligible environmental impacts. With the use of pressure relief wells, the amount of borrow material required will be reduced. Both the Waterworks and the Oakland stability berms will be supplied by a single borrow cell. However, this alternative will be more expensive than the recommended plan due to its associated annual operation and maintenance costs.

Alternative 3 - Commercial Fill: Under this alternative, the proposed actions will be the same as those described in the Recommended Plan except under this alternative, borrow fill will obtained from a commercial source. Commercially obtained fill will likely come from permitted dredging operations in the Kansas River. The estimated amount of commercial fill needed is about 281,000 cubic yards. Several large dump trucks will be used to haul the fill from the commercial dredge site to the project area. This option was not selected as part of the recommended plan because there is a risk that this option may not be available at the time of construction. However, if the total amount of fill needed cannot be obtained from the proposed borrow sites at the time of project construction; then commercial fill will be obtained if available.

Alternative 4 - No-Action Alternative: Under the No-Action Alternative, the proposed project will not be constructed by the USACE. Existing weaknesses in the levees system would be allowed to continue and the risks to public safety and community infrastructure from potential flooding would remain.

SUMMARY OF ENVIRONMENTAL IMPACTS

The recommended plan has relatively minor impacts to the natural environment with overall positive benefits to the socio-economic environment. Impacts to the natural environment are minor because the project is located within a previously disturbed environment that is highly industrial and urbanized. The recommended plan would not

result in any impacts to Federally-listed threatened or endangered species or their habitat. The proposed action would have no impact to sites listed on or eligible for inclusion on the National Register of Historic Places. Temporary, short-term construction impacts to natural and human environment would be related to noise, visual disturbance. The adverse impacts to the natural environment are minor and include the loss of about seven and one-half acres of woodland from the proposed construction of the underseepage berm at South Topeka unit. These impacts will be compensated through replanting and establishment of a natural area within a designated mitigation site. In addition, for borrow excavations from the two agricultural areas, appropriate measures will be taken to allow these areas to return to agricultural use after borrow and construction operations. For borrow operations, the top one foot of soil will be removed, stockpiled, and returned to the site after completion of excavation. In addition, excavation depths in agricultural areas will be kept to a minimum (four feet or less) to reduce impacts to field drainage and to allow farming operations to resume after construction is complete. Also, borrow cells will be excavated after the crops are harvested to avoid crop loss.

MITIGATION

Compensatory mitigation will include establishing a 15-acre planting regime within the South Topeka and North Topeka unit areas. Native tree and grass plantings will be implemented concurrently and/or following project construction. Additional mitigation measures will include the avoidance of construction activities in woodland areas during the migratory bird nesting season of April 1 to July 15. In addition, to minimize risk associated with HTRW contamination from proposed activities, any soil removed from a site associated with the levee work or borrow areas will be analyzed to ensure proper disposal.

CONCLUSION

Based on the environmental assessment, it has been determined that the Recommended Plan will not have any substantial adverse impacts on the natural and human environment. All practicable means to avoid and/or minimize adverse environmental effects have been incorporated into the Recommended Plan. Therefore, the Recommended Plan is the environmentally preferable alternative. Further, the USACE has determined that construction of the proposed project would not significantly impact the human environment and, therefore, an Environmental Impact Statement will not be prepared.

Date: 22 DEC 08

Roger A. Wilson, Jr.
Colonel, Corps of Engineers
District Commander

Environmental Assessment
City of Topeka
Flood Risk Management Study
Topeka, Kansas

December 2008

U.S. Army Corps of Engineers
Kansas City District
601 E 12th St.
Kansas City, Missouri 64106-2896

CITY OF TOPEKA,
FLOOD RISK MANAGEMENT STUDY
ENVIRONMENTAL ASSESSEMENT
DECEMBER 2008

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ENVIRONMENTAL ASSESSMENT

CITY OF TOPEKA,
FLOOD RISK MANAGEMENT STUDY

SHAWNEE COUNTY, KANSAS

1.0 INTRODUCTION

The U.S. Army Corps of Engineers (USACE), Kansas City District, has prepared this Environmental Assessment (EA) to evaluate the potential impacts associated with the recommended plan to provide flood risk management for the City of Topeka, Kansas. The Topeka Flood Risk Management Study is located at the confluence of Soldier Creek and the Kansas River, and is a unit of the Kansas River Basin System. The levee units in Topeka that are proposed for modifications in this plan are: South Topeka Unit, Waterworks Unit, Oakland Unit, and North Topeka Unit. The Auburndale and Soldier Creek units were studied for deficiencies in the early phase of the project. However, there were no deficiencies found; therefore, no work has been proposed for these units.

2.0 PURPOSE AND NEED FOR THE RECOMMENDED PLAN

The purpose of the recommended plan is to increase the reliability of the flood risk management system for the City of Topeka. The purpose of the recommended plan is to correct existing geotechnical and structural weaknesses and increase the reliability of the flood risk management system for the City of Topeka. The recommended plan is needed to reduce the risk to the local population from flooding due to levee failure and maintain the performance of the system as originally authorized and intended by Congress.

3.0 AUTHORITY FOR THE RECOMMENDED PLAN

This study is being conducted under the authority provided by Section 216 of the 1970 Flood Control Act. *(For more information, see the Feasibility Report page 3)*

4.0 PRIOR REPORTS

For information on prior reports, see the Feasibility Report.

5.0 PUBLIC INVOLVEMENT

A public meeting was held on 14 November 1996 at the Garfield Community Center in Topeka, Kansas. The purpose was to inform the public of the proposed study and to get feedback on the alternatives proposed in the study. Comments were addressed by USACE representatives and a record of these comments was included in the 1997 Reconnaissance Report. A second public meeting was conducted October 22, 2008 during the 30-day public review period of the Draft

EA and Feasibility Report. The Draft Report was mailed to Federal and state agencies, local media, residents within the affected community and other interested parties. All comments received during the public review period were addressed. There were no comments that required reevaluation of the alternatives, identification of a new recommended plan, or a critical change to impact analysis. On the Draft EA, one comment was received from the U.S. Fish and Wildlife Agency by letter dated, October 28, 2008. A copy of the USFWS letter and the USACE's response can be found in the Feasibility Report Appendix B.

6.0 LEVEE UNIT DESCRIPTIONS

For levee unit descriptions, see the Feasibility Report.

7.0 DESCRIPTION OF THE RECOMMENDED PLAN

The recommended plan consists of the preferred alternatives for each levee unit. The preferred alternatives are considered to have the highest net benefits, formulated to minimize negative environmental impacts, and designed to maximize cost-effectiveness. The recommended plan for each levee unit is listed below. Plate references in this Environmental Assessment, unless otherwise noted, are directed to the project maps found at the end of the Feasibility Report.

Oakland Unit

At station 64+00 to 80+00, a new earthen underseepage berm would be installed on the landward side of the levee behind the water treatment plant (Plate 6). The berm would be placed along the toe of the levee for about 1,600 linear feet at a height of 6.5 feet, sloping to three feet thick at a distance of about 240 feet outward from the levee. About 84,500 cubic yards of fill would be used.

At station 75+50, heel extensions would be added to the manholes by placing concrete on the existing foundation of the structure to increase its capacity to withstand uplift pressures

At station 220+00, heel extensions would be added to the East Oakland Pump Station to mitigate uplift pressures (Plate 8).

At station 485+86 to station 491+01, two feet of additional fill would be required behind the floodwall to meet sliding stability requirements (Plate 7). About 388 cubic yards of fill would be used and would extend about five feet out from the floodwall centerline and taper at a 1:3 slope.

North Topeka Unit

At station 165+00 to 189+00, a new earthen underseepage berm would be installed on the landward side of levee (Plate 2). The berm would be placed along the levee for 2,400 linear feet, seven feet thick at the levee toe sloping to three feet thick at a distance of 220 feet using 122,250 cubic yards of fill.

At station 246+00 to 250+00, new pressure relief wells would be installed along the levee for about 400 linear feet. About six wells would be placed 75 feet apart and 75 feet deep. The wells would be designed to drain to a central manhole using a buried header system. The total discharge of the system would be one cubic foot per second per well. The local sponsor will be required to pump the water down one foot below the existing ground level when the river is near the top of levee. A pad would be constructed on the slope for access. The North Topeka Railroad has a series of tracks just outside of the toe of the levee (about 100 feet from the levee). Temporary excavation for drilling access, a header pipe system and manhole installation would be done inside of the footprint.

At station 364+60, the existing Fairchild Pump Station (no longer used for flood risk management), would be removed (Plate 10). However, the below ground level structures (including the wet well and inlet/outlet pipes) would be left in place, filled with concrete-like material, and then covered with soil.

South Topeka Unit

At station 22+00 to 48+00, a new earthen underseepage berm would be installed on the landward side of the levee (Plate 4). The berm would be installed at the toe of the levee for about 2,200 linear feet, five feet thick at the levee toe sloping to three feet thick at a distance of 100 feet outward from the levee. About 48,150 cubic yards of fill would be used.

At station 74+41 to 93+86, the existing South Topeka floodwall would be removed and replaced (Plate 3). The existing floodwall is 1,944 linear feet of timber pile-founded concrete, about ten to 12 feet above ground and five to ten feet below grade. The existing wall is about one foot thick. The new floodwall would be concrete, and built along the existing wall alignment to the same length and height. About 3,322 cubic yards of concrete would be needed to construct the new floodwall and about 5,000 cubic yards of fill would be stockpiled on site to fill four floodwall monolith openings. The floodwall would be rebuilt in sections by demolishing and rebuilding one section at a time, driving foundation piles, and installing new pile caps. Also, a working platform would be constructed on the bank of the river. For the platform, material would be placed on the river side slope of the floodwall to provide an area wide enough for the placement of construction equipment. This platform is not likely to extend in or impact the river itself. Access to this area would be from the landside through the first removed section of the existing wall. After completion of the access/working area on the river side of the existing wall, removal of the remaining existing wall and construction of the new wall would be done from both sides of the wall. No more than four sections of the existing wall would be open at one time. The stockpiled fill would be used to close the sections as needed in case of flooding during construction.

The existing gate wells at stations 69+22, 75+62, 86+09, and 86+55, and the existing riverside sluice gates at stations 88+69 and 91+02 would be replaced as part of the floodwall replacement. At stations 16+07, 84+10, and 85+57 the existing manholes would require heel extensions to

mitigate uplift pressures. At station 75+84, a wall stiffener at Kansas Avenue Pump Station would be installed to meet the required strength factor for safety (Plate 3).

Waterworks Unit

At stations 0+78 to 7+00 and 10+00 to 16+50, two feet of additional fill would be required behind the floodwall to meet sliding stability requirements (Plate 5). About 1,272 linear feet of fill would be placed five feet out from the floodwall centerline and tapered on a 1:3 slope.

At stations 13+07 and 15+95, two feet of backfill would be placed behind the stop-log gap sidewalls[1] to address sliding stability (Plate 5). A total of 958 cubic yards of fill would be used to meet sliding stability requirements.

Borrow Areas

Implementation of the preferred alternative would use borrow from locations close to the existing levee alignment to minimize haul distance costs and allow access to existing local haul routes. The use of conventional scrapers, front end loaders, backhoes and haul trucks would be more economical than dredging materials from the Kansas River. To minimize environmental impacts on floodplain terrestrial habitat, borrow material would come from two areas within the Oakland and South Topeka units.

Oakland West borrow area: This site would be used to provide material for the underseepage and stability berm in the Oakland Unit. The borrow site is on the river side of the levee between river miles 82.1 and 81.0 in Shawnee County, Kansas (Plate 12) and is currently used for row cropping. Soils in this area are primarily from the Eudora-Muir association. About 84,888 cubic yards of material is required for the proposed work. The area needed for borrow is about 19.3 acres. This would include two borrow cells 1,400 feet by 300 feet excavated three feet deep. A 100 foot buffer between each cell would be maintained to allow equipment movement and ensure foreshore stability. To avoid impacts to treed areas, the cells would be located at least 50 feet from the tree line. Also, cells would be located at least 100 feet from the existing levee and more than 400 feet from the Kansas River.

South Topeka borrow area: This site would be used to provide material for the proposed underseepage berms at South Topeka and North Topeka units and the floodwall stability berms in the Waterworks Unit. The proposed borrow area is located riverward of the levee between river miles 86.9 and 86.1 in Shawnee County, Kansas (Plate 11). The proposed area is currently

1 Stop-log gaps are openings in the floodwall for roads, railroads tracks, gates, etc. and are so named because during a flood they are closed by stacking logs (railroad ties in most cases, aluminum "logs" in newer applications) in the opening. At each end of the opening is a groove in the wall that guides the placement of logs and holds them in place when the water rises. The section of the wall that contains the stop-log guide is referred to as the stop-log gap sidewall. The purpose of the stability berm behind these sections is to improve the structural factor of safety against sliding of the wall while under pressure from floodwaters.

used for row cropping. Soils in this area are primarily from the Eudora-Muir association. About 171, 344 cubic yards of material is required for the proposed work. The surface area needed for borrow is about 27.3 acres. It would have three borrow cells 1,000 feet by 400 feet excavated to four feet, each providing about 59,259 cubic yards of fill. Also, a 100 foot buffer between each cell would be maintained to allow equipment movement and insure foreshore stability. To avoid impacts to treed areas, the cells would be located at least 50 feet from the tree line. Also, cells would be located at least 500 feet from the existing levee and more than 300 feet from the Kansas River. These distances should prevent underseepage impacts and maintain bank stabilization.

Construction Schedule

Construction activities are expected to begin in 2010 and continue for a 3-year period thereafter.

Non-Government Land

The total project needs are 217 acres. Of this, 191 acres are for temporary construction easements, and 26 acres of sponsor-owned land used in perpetuity for the mitigation site.

Waste Disposal

The project construction would generate wastes from the removal of the floodwall and pump station. Anticipated wastes such as concrete and steel materials would be disposed at an existing commercial-land fill near the project area. Wastes generated from tree removal would be chipped and hauled offsite to a lumber mill or designated lumber stockyard.

8.0 ALTERNATIVES ORIGINALLY STUDIED BUT REMOVED FROM FURTHER CONSIDERATION

Several structural and non-structural alternatives were considered during the initial screening process, but were eliminated from further review because they did not meet the minimum technical criteria for the expected flood conditions. For a complete description of the structural and non-structural alternatives considered, but eliminated, see the Feasibility Report or Table 1 of Appendix A.

8.1 ALTERNATIVES CONSIDERED FURTHER

Pressure Relief Wells Alternative

Under this alternative, the proposed actions would be the same as those described in the recommended plan except pressure relief wells would be installed in place of proposed underseepage berms on the North Topeka, South Topeka and Oakland Units. With the use of pressure relief wells in place of berms, the amount of borrow material required for the

Waterworks and Oakland unit stability berms would be greatly reduced. Both the Waterworks and Oakland stability berms could be supplied by a single borrow cell. The cell at Waterworks would measure about 175 feet by 150 feet wide and 1 foot deep, and the cell at Oakland would measure about 105 feet by 100 feet wide and 1 foot deep.

Commercial Fill Alternative (All Units)

Under this alternative, the proposed actions would be the same as those described in the recommended plan except commercially obtained fill instead of borrow pits would be used. Commercially obtained fill would likely come from permitted dredging operations in the Kansas River. This could possibly provide a cost savings and minimize the environmental impact of borrow operations. At this time, only one commercial dredger is operating on the river in the Topeka area; and another is seeking a permit to operate a dredge in another reach east of Topeka. However, there is concern that these operators may not be able to provide the quantities necessary in addition to satisfying their existing commercial demands. The estimated amount of commercial fill needed is about 281,000 cubic yards.

No-Action Alternative (All Units)

Under the no-action alternative, the recommended plan would not be constructed by the Corps of Engineers.

9.0 ENVIRONMENTAL SETTING

General

The lower Kansas River basin includes three natural vegetation types: floodplain habitat consisting of cottonwood and willow trees (*Populus-Salix*), oak-hickory forest (*Quercus-Carya*) and bluestem prairie (*Andropogon-Panicum-Sorghastrum*). Typical dominant over story vegetation that may be found in the study area include American elm, American sycamore, eastern cottonwood, willow, beech, black walnut, and various oak species. Other plant species typically found in the area include maple, hackberry, hawthorn, honey locust, Osage orange, redbud, rough leaf dogwood, and slippery elm. Typical under story vegetation that may be found include reproduction of these species, with the ground layer containing species such as gooseberry, poison ivy, greenbrier, and prairie rose.

Climate

Topeka, Kansas has a typical continental climate. Characteristics of this climate are warm to hot summers, cold winters, moderate surface winds, and maximum precipitation in the warm season. In the winter months (December through February), the average daily temperature is 31.0 degrees Fahrenheit, the average daily minimum and maximum are 20.4 and 40.6 degrees

Fahrenheit, respectively. In the summer months (June through August), the average daily temperature is 76.8 degrees Fahrenheit. The average daily minimum and maximum temperatures are 65.1 and 87.3 degrees Fahrenheit. Precipitation is the heaviest from May through September when much of it falls during late evening or night time thunderstorms. The total average annual precipitation is 33 inches and the average annual snowfall is 21 inches.

Soils

The soils in the Topeka, Kansas area and floodplains of the surrounding streams are part of the Eudora-Muir soils association. The Eudora soils make up about 33 percent of this association; Muir soils, 25 percent; and minor soils, the remaining 42 percent. The Eudora soils occur mostly on intermediate levels in the valley and are above ordinary overflow of the Kansas River. Eudora soils are nearly level, well drained, light, and loamy. Their surface layer is grayish-brown silt loam about 12 inches thick. It is underlain by coarse loam or silt loam to about 42 inches. The material below this is stratified coarse silt loam to fine sand. Muir soils occupy intermediate and high levels of the river valley. They have a smooth surface and are nearly level and well drained. Their surface layer is dark-gray silt loam about 8 inches thick. The subsoil, about 54 inches thick, is silt loam to 20 inches and is silty clay loam below that depth. The rest of the association consists mainly of Kimo and Eudora soils that are closely intermingled with Sarpy and other soils. The Sarpy-Eudora complex consists of well-drained soils. These soils formed in medium-textured to moderately coarse textured alluvium and occur on the floodplain of the Kansas River. They experience occasional flooding, except in areas protected by the levee. Also, the soils survey for Shawnee County indicates that nearly all of this association outside of the municipal areas is used for cultivated crops. Corn, wheat, soybean, grain sorghum, and alfalfa are the primary crops.

Also, soils from river wash are typically found along the Kansas River. River wash soils consist of an unstable accumulation of sandy and silty alluvium. It occurs as sandbars and islands along the Kansas River and is only slightly above the riverbed. River wash is not suited to cultivated crops or pasture. Willows and cottonwoods are the native trees.

Floodplain Characteristics

Commercial, industrial, and residential developments are located in the floodplain of the study area behind the different levee units. Numerous city streets, county roadways, highways and railroads cross the floodplain. Also, the Philip Billard Airport, one water treatment plant, and two sewerage treatment plants are located in the floodplain.

10.0 AFFECTED ENVIRONMENT

The affected environments and resources described in this section are those recognized and required to be considered by various laws, executive orders, regulations, and other standards of national, state, or regional agencies and organizations; technical or scientific agencies; groups or individuals; and, the general public. The impacts of environmental resources addressed are summarized in Table 2 (Appendix A).

10.1 KANSAS RIVER AND ITS AQUATIC RESOURCES

Floodplain Description

The Kansas River is a major right-bank tributary of the Missouri River that begins at the confluence of the Republican River and Smoky Hill River near Junction City, Kansas. It flows 170.5 miles to its mouth in Kansas City, Kansas, where it joins the Missouri River at river mile 367.4 between the Fairfax-Jersey Creek and Central Industrial District Levee Units. The Kansas River basin above Topeka, Kansas, has 56,720 square miles of contributing and non-contributing surface area. Of this drainage, about 42,000 square miles are modified by existing reservoirs (Kansas Geological Survey, 1998). There are 16 Federal reservoirs within the basin that impact flow at Topeka. The project area is located within the Kansas River Middle Subbasin in Shawnee County, Kansas and the drainage area is about 500 square miles between Topeka and Wamego (KDHE, 2000). Solider Creek is the north bank tributary of the Kansas River at Topeka. Its basin is about 157 square miles and traverses southern Nemaha, Jackson and northern Shawnee counties flowing in a south-southeasterly direction. Shunganunga Creek flows northeasterly across the southern portion of the City of Topeka and joins the Kansas River about two miles east of the city. In addition, the Kansas River is listed on the Nationwide Rivers Inventory (NRI). The purposes of the inventory are several, including the identification of rivers which have potential to qualify for inclusion in the National Wild and Scenic Rivers System. The Kansas River was included in the inventory because of its outstanding scenic, recreational, fish, wildlife, and cultural values.

Water Quality

The designated uses for the Kansas River Middle Subbasin are Primary and Secondary Contact Recreation, Special Aquatic Life Support, Domestic Water Supply, Food Procurement, Irrigation, Industrial, Groundwater Recharge, and Livestock (Kansas Department of Health and the Environment, 2000). Water quality is monitored daily by the Kansas Department of Health and Environment (KDHE) at two sites along the Kansas River in Topeka, Station 258 at Topeka and Station 143 east of Topeka. The Kansas River Middle Subbasin is listed under Section 303(d) of the Clean Water Act as impaired waters by KDHE for not supporting Secondary Contact Recreation. Also, KDHE waste load modeling indicates impairment to aquatic life from elevated ammonia concentrations in the river at low flows. Historically, elevated ammonia concentrations in the river have been known to impact aquatic plants and animals, as well as affect primary and secondary recreation uses such as swimming and fishing. There are a number of National Pollution Discharge Elimination System permitted facilities along the river segment; however, only two discharge ammonia under their permits. Both permits are held by the City of Topeka (KDHE, 2000).

Aquatic Species

A list of typical fish species found in the project area can be obtained in the 2007 USFWS Coordination Act Report (Appendix C). The fisheries resources in the Middle Subbasin of the Kansas River are at their most sensitive during the spring spawning season, which is greatly influenced by flow releases from upstream reservoirs, especially Tuttle Creek Lake.

Future Conditions with Recommended Plan

No adverse impacts to aquatic resources or water quality are anticipated to occur from the implementation of the proposed plan. Construction activities for levee modifications would occur on the landward side of the levee, with the exception of riverward borrow construction areas. Replacement of the floodwall would occur along the existing alignment, and the floodwall platform is not anticipated to extend into or otherwise impact the river. Also, best management practices would be used to minimize the incidental fallback of material into the river during construction. Removal of the Fairchild Pump Station would not affect aquatic resources or water quality since the wet well and inlet/outlet pipes would not be removed.

Also, no adverse impacts to aquatic resources or water quality are anticipated to occur from soil borrowing activities. For all construction activities, best management practices would be used to minimize the introduction of fuel, petroleum products, or other deleterious material from entering into the waterway and adjacent resources. Such measures would include use of erosion control fences; storing equipment, solid waste, and petroleum products above the ordinary high water mark and away from areas prone to runoff; and requiring that all equipment be clean and free of leaks. Furthermore, all disturbed areas would be graded and seeded following construction. To prevent the spread of exotic and invasive species all equipment moved to and from the site would be thoroughly washed, and cleaned of any visible mud, seeds, plants, or animals.

Future Conditions with Use of Commercial Fill

This alternative is a modification to the Recommended Plan in which fill would be obtained from permitted dredging operations in the Kansas River. To address river bed degradation and other dredging-related impacts to the morphology and ecology of the river, the Corps implemented the Regulatory Plan for Commercial Dredging Activities on the Kansas River (1990). The Regulatory Plan contains restrictions that have been developed and implemented to limit the adverse impacts associated with commercial dredging activities on the Kansas River. The restrictions are intended to limit those impacts to a level which will have only minor effects on the morphology and ecology of the river and on public and private interests located in and along the river. No additional impacts are anticipated to occur from the use of commercial fill for levee berms. Fill will be deposited on dry land, more than 500 feet away from any water resource. To prevent fill from reaching water sources by wind or runoff, fill would be covered, stabilized or mulched, and silt fences would be used. With these management practices applied, the chances of the fill moving and reaching water resources is negligible.

Future Conditions with No-Action Alternative

Under the No-Action Alternative, there would be no modifications to the existing flood risk management system. However, in the absence of Federal action addressing levee improvements, a high water event could result in the release of a variety of industrial chemicals and

substantially impact the natural and human environment within the project area. Levee failure could result in adverse impacts to water quality from increased levels of nutrient loading and wastes, including runoff of pollutants from industrial sources, petroleum products, and non-point sources of human and animal wastes.

Future Conditions with Relief well Alternative

Under this alternative, relief well systems would be installed in lieu of berms at the North Topeka, South Topeka and Oakland levee units. The risk of encountering groundwater contamination was evaluated in the 2007 HTRW assessment (Appendix H). Based on the assessment, there is a potential risk that soil contamination may be encountered in the North Topeka unit where a relief well is proposed. This is due to a railroad located in close proximity of the site. Therefore, the design of the relief well system would minimize soil disturbance to the greatest extent practical, and any soil that is removed from the site during construction would be tested to ensure proper disposal. However, the risk of groundwater contamination at the South Topeka and Oakland sites is considered low because there are no known contaminated sites located in close proximity of the sites. No substantial post-construction impacts to water resources or water quality are anticipated from the installation of relief wells.

10.2 WETLANDS

This resource is institutionally important because of the Clean Water Act of 1977, as amended and Executive Order 11990 of 1977 (Protection of Wetlands). Wetlands are important because they provide habitat for various species of plants, fish, and wildlife, serve as ground water recharge areas, provide storage areas for storm and flood waters, serve as natural water filtration areas, provide protection from wave action, erosion, and storm damage, and provide various consumptive and non-consumptive recreational opportunities. Wetlands are publicly important because of the high value the public places on the functions and values that wetlands provide.

No Impact to Wetlands Determination

The National Wetland Inventory database maps for the project area were consulted to determine wetland classifications within the project area. Also, Corps staff conducted wetland delineations on 13 October 2006. No wetlands were found within the proposed borrow areas on the riverward side of the levee or any other areas within the project footprint. The most likely areas to support wetlands are the riparian zones riverward of the levee where borrow material would be obtained. However, these areas did not meet the criteria for wetland classification; they contained either upland tree species, or agriculture, and they did not exhibit evidence of saturated or inundated soils.

10.3 PRIME AND UNIQUE FARMLAND

These resources are institutionally important because of the Food Security Act of 1985, as amended, and the Farmland Protection Policy Act of 1981. They are technically important because they provide habitat for open and forest-dwelling wildlife, and the provision or potential

for provision of forest products and human and livestock food products. These resources are publicly important because of their present economic value or potential for future economic value.

Existing Conditions

There are many areas of cropland in close proximity to the project sites, including within some of the proposed borrow sites. The National Resource Conservation Service (NRCS) was consulted for a determination of prime farmlands within the project area (see Appendix B). Both the Oakland and South Topeka proposed borrow areas are considered prime farmland. However, the North Topeka agriculture area is not considered prime farmland. The major crops planted are corn and soybeans.

The NRCS defines three main categories of farmland: prime, unique, and farmland of statewide importance. These are primarily based on soil type and the historic use of the land for farming. Prime farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. It must contain an adequate supply of moisture, acceptable acidity or alkalinity and sodium content, and few or no rocks. Also, it is not excessively erodible or saturated with water for long periods, and slopes between zero to eight percent. Unique farmland has a unique set of chemical and physical properties for producing certain high-value crops. Farmlands of statewide importance contain soils that do not meet the requirements for prime farmlands.

Future Conditions with the Recommended Plan

With the implementation of the recommended plan, beneficial impacts would consist of an increase in the reliability of the existing levee system that protects agriculture lands by reducing the risk of flood damage. Adverse impacts would include short term and minor impacts to three agriculture areas for obtaining borrow. Approximately 19.3 acres of the 98-acre Oakland site and 27.3 acres of 138-acre South Topeka site would be used for obtaining borrow. In addition, 12 acres of the North Topeka site would be disturbed from construction of the underseepage berm.

Prior to construction, the Corps will consider and discuss opportunities to restore the borrow areas in an environmentally acceptable manner with the land owners and the local sponsor, the community, and local resource agencies. Alternatively, the borrow areas can be returned to agricultural uses. If this is the preferred future condition, steps would be taken to minimize impacts and allow these areas to return to agricultural use after construction operations. Such measures would include preservation of the top layer of soil, which would be returned to the site, minimizing excavation depths to reduce impacts to the drainage of fields, and excavating after the harvest season to minimize impacts to crops.

Future Conditions with the Use of Commercial Fill

With this possible modification to the Recommended Plan, there would be no excavation required to obtain borrow fill, and disturbance of cropland would be limited to the construction of under seepage berm within the North Topeka unit. This disturbance would be short term and minor as farming operations would be allowed to return once construction is completed. Also, the beneficial impacts of this plan would be the same as those described under the recommended plan.

Future Conditions with the No-Action Alternative

Under the No-Action Alternative, there would be no modifications to the existing flood risk management system.

In the absence of Federal action addressing levee improvements, a high water event may result in inundation of agricultural lands for long periods of time causing loss of crops.

Future Conditions with the Relief well Alternative

Under this alternative, the amount of borrow material required would be substantially less than the amount required under the recommended plan; about 1,346 cubic yards for construction of stability berms in the Oakland and Waterworks units. The waterworks stability berm could be supplied by a single borrow cell 175 ft. by 150 ft. wide and one foot deep, and the Oakland stability berm could be supplied by a single borrow cell 105 ft. by 100 ft. wide and one foot deep. Therefore, the impacts on prime farmland areas would be minor and short term.

10.4 FOREST/WILDLIFE RESOURCES

This resource is institutionally important because of Section 906 of the Water Resources Development Act of 1986, and the Fish and Wildlife Coordination Act of 1958, as amended. Forest is technically important because it provides necessary habitat for a wide variety of species, it often provides a variety of wetland functions and values, is an important source of lumber and other commercial forest products, and provides various consumptive and non-consumptive recreational opportunities. Forest is also important because the general public highly values it for aesthetic, recreational, and commercial uses. Wildlife is technically important because they are a critical element of many valuable aquatic and terrestrial habitats; an indicator of the health of various aquatic and terrestrial habitats; and many species are important commercial resources. Wildlife is publicly important because of the high priority that the public places on their aesthetic, recreational, and commercial value.

Existing Conditions

Most of the forest and woodland in the study area has been greatly impacted by urban development. The impacts of the project to woodland and wildlife habitat within the project area are limited to the work within the South Topeka unit and construction of borrow areas.

The quality of the woodland within the South Topeka unit is considered moderate, and the age of the woodland stand is assumed to be about 30 years old. This woodland is part of the floodplain forest that extends along the Kansas River. The floodplain forest is considered the highest quality habitat in the Topeka area. A list of typical plant species found in the project area can be found in the mitigation plan (Appendix F).

Various wildlife species can be found using the riparian woodlands and grasslands along the banks of the Kansas River. These riparian areas provide food and cover for many wildlife species including various birds, mammals, reptiles, and amphibians. A list of typical species found in the project area can be found in the 2007 USFWS Coordination Act Report (Appendix C).

A community habitat suitability model for bottomland hardwoods (LDNR, 1994) was used to quantify net gains and losses of ecological value associated with future with project and future without project conditions, and the results are summarized in the mitigation plan (Appendix F).

Future Conditions with Recommended Plan

With implementation of the recommended plan, impacts to wildlife habitat would result from the removal of about seven and one-half acres of woodland for the construction of the underseepage berm at the South Topeka levee unit. Existing woodland habitat on either side of the impacted area would remain. Reducing the size of this woodland would result in a reduction in habitat quality and increase in competition among wildlife for available resources. In addition, during construction activities, wildlife species such as deer, and small mammals would most likely be temporarily displaced to adjacent woodlands and would be expected to return once project activities are completed. Wildlife species most likely at risk to be adversely impacted by the project action would include reptiles, amphibians and birds (USFWS, 2007). However, to minimize the impacts on migratory bird nesting, construction activities would be avoided in woodland areas during the nesting season from April 1 to July 15. In addition to offset the loss of this habitat, replacement of 15-acres of riparian habitat would be implemented. The results of the habitat model indicate a total of 15 acres of mitigation would provide enough compensation to offset the loss of 7.5 acres. The replacement habitat is expected to take up to 30 years to equal the value of the existing site. However, the production of soft mast and other edible seeds is expected to begin at about age ten.

In addition, any grassland areas disturbed from construction activities would be re-seeded following construction with rye, brome, fescue and then mulched. The entire mitigation plan can be found in Appendix F.

Future Conditions with Use of Commercial Fill

Impacts to woodlands would result from the removal of about seven and one-half acres of woodland for the construction of the underseepage berm at the South Topeka levee unit. Mitigation measures would be the same as those described under the recommended plan.

Future Conditions with No-Action Alternative

Under the No-Action Alternative, there would be no modifications to the existing flood risk management system; and the existing woodland is expected to continue to grow and reach full maturity by age 50, but would be subject to the potential risk of prolonged flooding due to levee failure. Vegetation that cannot tolerate prolonged flooding would experience anoxic stress and would die. Wildlife not adaptable to flooded conditions would be temporarily displaced until the water recedes.

Future Conditions with Relief well Alternative

With the installation of relief wells instead of the proposed underseepage berms, the amount of

borrow material required would be less and impacts to woodland areas would be avoided. Therefore, there would be no mitigation needed, and impacts on wildlife habitat would be minor and limited to grass and cropland areas. Grassland areas disturbed from construction activities would be re-seeded following construction with rye, brome and fescue and mulch.

10.5 ENDANGERED OR THREATENED SPECIES

This resource is institutionally important because of the Endangered Species Act of 1973, as amended, and the Bald Eagle Protection Act of 1940. Endangered or threatened species are technically important because the status of such species provides an indication of the overall health of an ecosystem. These species are publicly important because of the desire of the public to protect them and their habitats.

Existing Conditions

There are three federally-listed species that may occur within the project area: bald eagle (*Haliaeetus leucoccephalis*), Least Tern (*Sterna antillarum*), and Piping Plover (*Charadrius melodus*). However, no impacts to federally-listed threatened and endangered species are anticipated to occur as a result of the project action. The USFWS concurred with our determination by letter on May 29, 2007.

State listed endangered species in Shawnee County were obtained from the Kansas Department of Wildlife and Parks (KDWP) website (Appendix D). They include the American burying beetle (*Nicrophours americanus*), Eskimo curlew (*Numenius borealis*), least tern, peregrine falcon (*Falco peregrinus*), silver chub (*macrhybopsis storeriana*), and whooping crane (*Grus americana*). State listed threatened species include the bald eagle, eastern spotted skunk (*Spilogale putorius*), piping plover, smooth earth snake (*Virginia valeriae*), snowy plover (*Charadrius alexandrinus*), sturgeon chub (*Macrhybopsis gelida*), and Topeka shiner (*Notropis Topeka*). No impacts to state-listed endangered or threatened species are anticipated to occur as a result of the project action. The KDWP concurred with our determination by letter on June 1, 2007.

<u>Bald eagle</u>. Also federally-listed, they typically are found roosting near reservoirs and large rivers in Kansas during the winter months. Known nesting areas include Perry Reservoir (northeast of Topeka), Clinton Reservoir (southeast of Topeka), and the Kansas River, with parents and young remaining in the area during the spring and summer months.

<u>Least tern</u>. Also federally-listed, they are summer residents in Kansas. Nesting birds have been recorded in six central and western Kansas counties, at Jeffery Energy Center, and along the Kansas River. Terns require barren areas near water such as saline flats in salt marshes, sand bars in river beds, and shores of large impoundments. A dependable food supply of small fish and aquatic crustaceans must be nearby. Least terns may occur accidentally or occasionally as transients anywhere in the state.

<u>Piping plover</u>. Also federally-listed, they are rare migrants through Kansas. They require

sparsely vegetated shallow wetlands, open beaches and sandbars adjacent to or within streams and impoundments. Nesting has been recorded on sand bars along the Kansas River. Piping Plovers may occur occasionally anywhere in the state where suitable habitat is found.

Future Conditions with Recommended Plan

With implementation of the recommended plan, impacts to federally-listed species are not anticipated. This is because no work is proposed on the river itself that could affect habitat for piping plovers and least terns. Also, bald eagle habitat would be avoided; this includes any trees within 100 feet of the bank of the river which are over 50 feet in height and/or greater than 12 inches in diameter at breast height. The trees in the area proposed for removal are all within these parameters. In addition, no impacts to state-listed species are anticipated to occur from the proposed action.

Future Conditions with Use of Commercial Fill

If used, commercial fill would come from a preexisting site and/or from the Kansas River under the authority of the Corps Regulatory Program. To address river bed degradation and other dredging-related impacts, the Corps implemented the Regulatory Plan for Commercial Dredging Activities on the Kansas River (1990). The Regulatory Plan contains restrictions that have been developed and implemented to limit the adverse impacts associated with commercial dredging activities on the Kansas River. The restrictions are intended to limit those impacts to a level which will have only minor effects on threatened and endangered species and their habitat. No additional impacts are anticipated to occur from the use of commercial fill for levee berms.

Future Conditions with No-Action Alternative

Under the No-Action Alternative, there would be no modifications to the existing flood risk management system. In the absence of Federal action addressing levee improvements, a high water event could result in the release of a variety of industrial chemicals and substantially impact the natural and human environment within the project area. Levee failure would result in substantial impacts to a water quality, fisheries and wildlife, extensive property damage and potential loss of human life.

Future Conditions with Relief Well Alternative

With the installation of relief wells instead of the proposed underseepage berms, the amount of borrow material required would be less and impacts to woodlands would be avoided. Also, no work would be done on the river; therefore, there would be no impacts under this alternative.

10.6 CULTURAL RESOURCES

In compliance with National Historic Preservation Act, the Corps conducted a review of the National Register of Historic Places (NRHP), an appropriate records search at the Kansas State Historical Society, and a field reconnaissance of the project area. No NRHP properties are recorded in any of the proposed project locations or potential borrow areas. Also, the records search found no other archeological sites, historic structures, or shipwrecks recorded within any of these areas.

The field reconnaissance found that all of the areas have been severely disturbed by the existing levee construction or are located on recently accreted land and have little possibility of containing archeological sites or structures eligible for inclusion on the (NRHP). The Corps coordinated the results of the record search and reconnaissance with the Kansas State Historic Preservation Officer (SHPO) and recommended no further work for the project and that the project be allowed to proceed without further coordination with their office in letters dated June 13 and August 2, 2006. The SHPO concurred with these recommendations on July 5 and August 2006 respectively. The Corps also coordinated the project with affiliated Native American tribes thru the review of the EA during the 30-day public review period. If additional ground disturbing activities are needed for the project, further coordination with SHPO and Native American tribes would be required.

Also, in the unlikely event that archeological deposits or other cultural resources are encountered during construction, work in the area of discovery would cease. Before resuming, the inadvertent discoveries will be investigated and the findings coordinated with the appropriate SHPO and federally recognized Native American tribes.

Future Conditions with All Build Alternatives

No historic properties are recorded within the area of the proposed alternatives or borrow locations. These alternatives, all following the same alignment as the existing flood risk management system, were found to have a low potential for unrecorded archeological sites because they are located in areas severely disturbed by previous construction of the existing levee and are on accreted land. As a result of these disturbances, the Corps recommended no further investigations be conducted for any of the alternatives. The Kansas SHPO concurred with these recommendations.

Future Conditions with No-Action Alternative

The “No Action” alternative would result in no ground disturbances and would not have any effect on cultural resources.

10.7 VISUAL QUALITY

Existing Conditions

The Kansas River within the project area contains floodplain forest, sand bars, islands, and bluffs, which provide natural diversity to the river corridor landscapes. Cropland, grassland, and forested land are established in portions of the river’s floodplains. Existing levees and flood risk management mechanisms that have been installed to prevent bank or levee erosion interrupt the natural character of the river systems. However, flood risk management features have been in place for many years and in many instances may blend in with the adjacent natural landscape.

Future Conditions with recommended plan

Impacts to aesthetics would primarily occur during construction activities. These would be temporary, minor and would only occur within the construction areas. Also, the levees would be seeded with grasses on completion of construction.

Future Conditions with Use of Commercial Fill

With this possible modification to the Recommended Plan, the adjacent road system could receive short term aesthetic impacts of haul material deposited on the established haul travel routes. Several large dump trucks would be needed to haul the fill from the commercial dredge site to the project area. To minimize impacts to roads, the haul routes would be those that are the shortest available at the time, and follow approved truck routes. In addition, the contractor would be required to immediately remove or clean these materials from the paved roads, streets and/or highway.

Future Conditions with No-Action Alternative

Under the No-Action Alternative, there would be no modifications to the existing flood risk management system. In the absence of Federal action addressing levee improvements, a high water event could result in widespread aesthetic impacts including deposits of debris, dead trees and property damage.

Future Conditions with Relief Well Alternative

With the installation of relief wells instead of the proposed underseepage berms, impacts to visual quality would consist of several manholes installed in the grassy areas along the levee. This would cause a small aesthetic impact during construction; however, these areas are not used

as nature trails and are located along the levee right-of-way that is maintained for flood damage reduction. The addition of relief wells would only be a small addition to the existing flood risk management features. Once construction activities cease, areas around the relief wells would be re-seeded with grasses.

10.8 NOISE

Existing Conditions

This resource is institutionally important because of the Noise Control Act of 1972. The act establishes a national policy to promote an environment for all Americans free from noise that jeopardizes their health and welfare. A sound-level meter used to measure noise and the outputs are "decibels." For instance, a diesel truck at 50 feet produces a sound level of 85 decibels, a gas lawn mower at 3 feet produces a sound level of 95 decibels and normal speech at three feet is 65 decibels.

Existing sound levels throughout the Topeka metropolitan area are highly variable depending on location. Sound levels range from relatively loud noises associated with urban and industrial activities to very quiet rural environments. Noise sources within the project area include agricultural and industrial activities, traffic on roads, aircraft over-flights, and natural sounds such as wind through trees and water falling over rocks. It is highly unlikely that noise standards in the Topeka metropolitan area would be exceeded under existing conditions. In portions of the metropolitan area, especially near industrial areas, sound levels could occasionally exceed noise standards under certain conditions.

Ambient noise levels are generally dependent upon the level of urban development and associated activities conducted within a given area. Land uses within the project area consist of agricultural, residential, commercial, and industrial. The principal source of noise in the project area is from farming activities, motor vehicle traffic along major highways and in urban areas, industry, and to a lesser extent from railroad traffic.

Future Conditions with Recommended Plan

Project related impacts from noise would be from operation of construction related equipment and increased construction related traffic on area roads. During the 3-year design and construction period, every effort would be made to ensure the community is aware of the project and provides any suggestions to reduce construction noise. Also, source control, site noise emissions, and limited work hours will be used on the construction sites to minimize noise emissions. It is not anticipated that construction activities would increase noise levels beyond that typical of farming operations or area traffic in the vicinity. Therefore, noise impacts are not expected to be significant.

Future Conditions with Use of Commercial Fill

Construction activities would require using diesel-powered dump trucks on area roads. This would produce some noise during construction periods. However, it is not anticipated that construction activities would increase noise levels beyond that typical of farming operations or area traffic in the vicinity. Also, source control, site noise emissions, and work hours will be managed on the construction sites to minimize noise emissions.

Future Condition with No-Action Alternative

Under the No-Action Alternative, there would be no modifications to the existing flood risk management system. In the absence of Federal action addressing levee improvements, a high water event could result in unregulated and widespread noise from clean-up activities.

Future Conditions with Relief Well Alternative

With relief wells, impacts to noise would not be substantial and would be essentially the same as those described under the recommended plan.

10.9 AIR QUALITY

Existing Conditions

This resource is considered institutionally important because of the Clean Air Act of 1963, as amended. Air quality is technically important because of the status of regional ambient air quality in relation to the National Ambient Air Quality Standards (NAAQS). It is publicly important because of the desire for clean air expressed by virtually all citizens.

In accordance with the Clean Air Act, the U.S. Environmental Protection Agency set National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to the environment and public health. The six principal pollutants, also known as “criteria” pollutants, are: ozone, lead, particulate matter, carbon monoxide, nitrogen dioxide, and sulfur dioxide. The proposed project is located in Shawnee County, Kansas. Shawnee County and its surrounding counties are all in full attainment of all NAAQS. The surrounding counties in Kansas are rural and air emissions are not monitored.

Future Conditions with All Build Alternatives

With implementation of the recommended plan, minor, short-term impacts to air quality in the project area would result from construction activities. The air quality impacts would be localized and limited to those produced by heavy construction equipment and fugitive dust within the project area. The commercial-borrow source alternative would have a slight increase in emissions and dust on haul roads and areas of clearing and excavation, but is expected to be minor and short-term. The watering of road segments would be implemented to minimize the impact of dust and windblown particulate matter. Therefore, it is anticipated that

implementation of the proposed action would conform to the National Ambient Air Quality Standards. Air quality impacts are not expected to be significant.

Future Conditions with No-Action Alternative

Under the No-Action Alternative, there would be no modifications to the existing flood risk management system. In the absence of a Federal action addressing levee improvements, a high water event could result in the release of a variety of dust, and other contaminants from clean-up activities. Air pollution from a levee failure could be widespread and generally uncontrolled relative to the minor, short term air quality impacts from the project action.

10.10 SOCIOECONOMICS

Demography

Future Conditions with the Recommended Plan

The geotechnical and structural improvements planned for the South Topeka, Oakland, and North Topeka levees in the recommended alternative would prevent adverse economic impacts, including flood damage (in all but the most catastrophic events) and high insurance premiums, to the protected neighborhoods. Flood-related building disincentives that could discourage new business start-ups and expansion of existing businesses, eventually resulting in population losses in these neighborhoods, would be prevented. Also, modest transitory population increases could occur in the study area in connection with project construction.

Future Conditions with the Use of Commercial Fill

The commercial fill alternative would involve the same geotechnical and structural repairs as in the recommended alternative. Therefore, essentially the same demographic impacts would be expected in this alternative as the recommended plan: preventing potential flood damage and investment disincentives resulting in eventual population loss, modest transitory population increases could occur in the study area in connection with project construction.

Future Conditions with the No Action Alternative

Failure to implement the recommended plan or commercial fill alternative would likely result in an increasing pattern of flood damage in the Oakland, South Topeka and North Topeka areas from the larger Kansas River flood events. This could result in Federal decertification of the levees at some point during the 50-year analysis period. Already struggling low and middle-income neighborhoods would be saddled with the additional burdens of continual catastrophic flood damage and threats to public safety, as well as the cost of higher flood insurance premiums and the economic stagnation caused by stricter building code requirements.

Substantial population losses in these areas would be all but certain in the long term. Also, a

wider regional economic impact throughout the Topeka area would occur since many of the region's largest employers are behind the levees including Goodyear Tire, Payless Shoe Source, Burlington Northern Santa Fe Railroad, Hill's Pet Nutrition, Hallmark Cards, and Del Monte Foods. Any decisions by these companies to rule out expansion, reduce existing operations, or even relocate would result in substantial harm to the regional employment picture. Substantial job loss would eventually affect population levels both inside and outside the study area.

Future Conditions with the Relief Well Alternative

Under this alternative, the impacts would be the same as the recommended plan. Essentially the same demographic impacts would be expected in this alternative as the recommended plan: preventing potential flood damage and investment disincentives resulting in eventual population loss, modest transitory population increases could occur in the study area in connection with project construction.

Development and Economy

Past, Present, and Future

For information on future, past and present development trends, refer to Socioeconomics Appendix D, of the Feasibility Report.

Future Conditions with Recommended Plan

Restoring Topeka's levee system to the intended degree of flood risk management would benefit a large portion of the city's economic base. Large urban neighborhoods in North Topeka, Oakland, and South Topeka would avoid population loss associated with a pattern of severe flooding and would continue to create consumer demand for retail and service businesses. A number of large employers located in the floodplain would be able to continue operations and possibly expand, protecting jobs and the tax base, while additional companies might relocate to Topeka. The Topeka area's water supply and sewage treatment facilities would be protected from damage or disruption in most major Kansas River flood events.

Also, flood risk management would specifically benefit several prime areas for economic development in Oakland and North Topeka that are among the best industrial and commercial future development prospects in the region. Completion of the Oakland Expressway has opened up a new set of development possibilities for the Oakland area. Nearly 300 acres of undeveloped land near the intersection of the Oakland Expressway and Seward Avenue are available for industrial development, and nearly 400 acres of undeveloped land zoned for industrial and commercial uses lie within or adjacent to Billard Airport property.

In northwest Topeka, nearly 1,500 acres of undeveloped land are available for industrial or commercial uses near the intersection of U.S. Highways 24 and 75 and northwest of the intersection of Highway 75 and Lower Silver Lake Road. Much of this area will be somewhat

more challenging to develop than the comparable areas in Oakland, but development is nevertheless likely during the 50-year period of analysis. Further development prospects in North Topeka are gradually taking shape near the Kansas Avenue and Topeka Boulevard bridges over Soldier Creek. All of these areas probably would have a healthy future in the event of continuing flood damage reduction.

Future Conditions with Use of Commercial Fill

The use of commercial fill for the repair and restoration of Topeka's levee system would result in the same economic impact as the recommended plan. A large portion of the city's economic base would benefit. Large urban neighborhoods in North Topeka, Oakland, and South Topeka would avoid population loss associated with a pattern of severe flooding and would continue to create consumer demand for retail and service businesses. A number of large employers located in the floodplain would be able to continue operations and possibly expand in some cases, protecting jobs and the tax base, while additional companies might relocate to Topeka. The Topeka area's water supply and sewage treatment facilities would be protected from damage or disruption in most major Kansas River flood events. Potential areas for development in Oakland and North Topeka would become more attractive.

Future Conditions with No Action Alternative

Continuing neglect of the deficiencies in the Topeka levee system eventually will result in catastrophic flood damage affecting large urban neighborhoods and industrial areas. Large employers in the floodplain areas might suffer severe damage or at least operational interruptions serious enough to cause them to scale back their operations at flood-prone locations, cancel expansion plans, and possibly relocate from the region. Some small business owners would be ruined by flood damage. Other business owners and residents would incur large premium increases for flood insurance. Insurance requirements would discourage new business development and the entry of large private employers. The Topeka region's water supply facility behind the Waterworks levee unit and sewage treatment facilities in the North Topeka and Oakland areas could be damaged and their operations interrupted periodically. Also, Topeka would lose opportunities for development since many of the region's most attractive developable parcels are located in Oakland and North Topeka.

Future Conditions with Relief Well Alternative

Under this alternative, the impacts would be the same as those described under the recommended plan.

Transportation

Existing Conditions

Transportation consists of roads and byways that are found within the proposed project. The major transportation routes through Topeka are Interstate Highways 70 and 335, and State

Highways 75 and 24. East-west highway access through the city is provided by Interstate Highway 70, which roughly parallels the Kansas River, while U.S. Highway 24 provides a secondary east-west route on the northern side of the area. The main north-south access route is U.S. Highway 75. Interstate Highway 335 runs from Topeka to the southwest, eventually joining Interstate Highway 35, the "NAFTA Highway."

Future Conditions with the Recommended Plan

With implementation of the recommended plan, there would be slight disruptions to traffic with construction equipment traveling to and from the project area. However, no roads are anticipated to be blocked or closed for extended periods of time. Most of the project area would be accessed from the levee road and should not interfere with the normal flow of traffic.

Future Conditions with the Use of Commercial Fill

Trucks hauling fill to the construction site may have temporary impacts to local roads, causing congestion, and possibly damage to the roads. Specifically, there is the potential that the roads or bridge would require early maintenance due to excessive wear and tear. This maintenance could include milling off the existing surface to eliminate potential rutting and surface irregularities, patching the road and base in failed areas, overlaying with asphalt, and then replacing the pavement striping.

Future Conditions with the No-Action Alternative

The No-Action alternative would involve no construction activity and no change in project operations. This alternative could pose a problem to transportation during a 100-year flood event. Area roads could be flooded, impairing evacuation and rescue of the local population. Roads also could be washed out and require reconstruction.

Future Conditions with the Relief Well Alternative

With the installation of relief wells instead of the proposed underseepage berms, impacts to transportation resources would not be substantial and would be the same as those described under the recommended plan.

11.0 HAZARDOUS, TOXIC, AND RADIOACTIVE WASTES

A Hazardous, Toxic, and Radioactive Waste (HTRW) assessment was completed as part of the Topeka, Kansas Reconnaissance Report (USACE, 1997), and a more recent assessment (USACE, 2007) of the potential HTRW resources was completed. The conclusions of the 2007 assessment are summarized below, and a complete write-up is included in Appendix I. It included a database search and site visit to identify areas of concern within 500 feet of either side of the levee. No sites registered in the database were reported on the National Priorities List, Comprehensive Environmental Response, Compensation, and Liability Information System, and Kansas Hazardous Waste Sites Report. Project impacts due to HTRW are not expected to be significant.

Conclusions and Recommendations

Overall, the environmental assessment found very little risk associated with HTRW contamination on proposed activities. However there were three areas where there was a potential HTRW or solid waste impact to the proposed work. The lateral limits of any contamination must be established to ensure that remediation measures are incorporated into the final construction plans.

South Topeka Unit, Station 74+41 to 93+86

There is a possibility that groundwater below a portion of this area is contaminated with chlorinated solvents. The potential for floodwall replacement activities to encounter contaminated groundwater will be investigated during the Pre-Construction Engineering and Design phase. The operation of new facilities will not result in the discharge of groundwater to the surface.

South Topeka Borrow Site

A former city dump was identified at the southwest corner of the proposed borrow area. The limits of the disposal cells are unknown so there may not be as much borrow area available as anticipated. Investigations are recommended to determine the nature of materials accepted and the lateral limits of the dump. Also, samples from the proposed borrow should be collected and analyzed to ensure material to be used on other sites is clean.

Oakland Borrow Site

A former city dump was identified at the southwest corner of the proposed borrow area. It was described as having debris from a 1968 tornado. The limits of the disposal cells are unknown so there may not be as much borrow area available as anticipated. Investigations to determine the nature of materials accepted and the lateral limits of the dump will be conducted prior to the start of construction. Also, samples from the proposed borrow would be collected and analyzed to ensure material to be used on other sites is clean.

Also, any soil removed from a site associated with the levee work will be analyzed to ensure proper disposal. In addition, any soils used to upgrade the levee system will be analyzed to ensure it is not contaminated. Both of these practices will ensure that contamination will not be inadvertently spread from one site to another.

12.0 ENVIRONMENTAL JUSTICE

The Executive Order on Environmental Justice (EO 12898) requires consideration of social equity issues, particularly any potential disproportionate impacts to minority and low-income groups. This is to ensure that issues such as cultural and dietary differences are taken into consideration to ensure that adequate risk is evaluated (EPA, 2004). Environmental Justice (EJ) means the fair treatment and meaningful involvement of all people regardless of race, income, or culture, in the developing, carrying-out, and enforcing of environmental laws, regulations, and policies. In addition, the Executive Order on the Protection of Children from Environmental Health risks and Safety risks (EO 13045) requires the consideration of disproportionate impacts to children. Children under age five and elderly populations above age 65 are considered to be sensitive populations that may experience disproportionate impacts from environmental stressors.

To determine any potential impacts of this project to the surrounding populations, present and potential environmental impacts were taken into consideration with regards to the current facility concentration and compliance history to determine disproportionate environmental burden. To determine any potential EJ areas and/or sensitive populations, the racial, income, and age composition of the individual census tracts within, and adjacent to the study area, were examined using 2000 census data.

Facility Concentration

Currently there is no regional threshold to determine an acceptable concentration of facilities. However, the EJ Program relies on looking at facility density within the study area compared to surrounding communities and the county it resides in. High facility concentration with potential additional environmental and/or human health burdens increases the risk or harm that may be shouldered by low-income and/or minority populations. Any facilities located in close proximity to sensitively populated areas of children and/or elderly age groups are also of concern.

The North Topeka area reports the highest concentration of active permitted facilities within the study area, while the Oakland area reports the lowest concentration.

Demographic Composition

Tables 3 thru 7, Appendix A, provide localized demographic data for the areas and zip codes of the project area that include: Auburndale, South Topeka, Oakland, North Topeka, and Soldier Creek Urban**.** EPA Region 7 uses a 25% or greater threshold in the identification of low-income and/or minority populated areas as an indicator for the potential for environmental justice

concerns in conjunction with disproportionate environmental impacts. This threshold was determined through an economic and demographic analysis of the entire Region 7 area.

The South Topeka, Oakland, and North Topeka areas have the highest minority populations within the study area, and are represented by residents of African American and Hispanic or Latino heritage (Appendix A, Table 3). These areas also consistently had higher percentages of persons below the poverty level (Appendix A, Table 4). The core of Executive Order 12898 provides for the protection of both minority and low-income groups. Therefore, income and racial composition data from the 2000 Census were used to provide an overview of each levee unit in regards to their respective minority and income level composition. The Office of Management and Budget's Statistical Policy Directive 14 of the Census Bureau uses a set of money income thresholds that vary by family size and composition to determine who is poor. If a family's income is less than that family's threshold, then that family, and every individual in it, is considered poor.

Additional Environmental Justice Indicators

Additional environmental justice indicators such as education level, languages spoken, and percent children and elderly reveal trends about the socio-demographic aspects of a community that may be used to make generalizations about the population and the capacity of residents to cope with potential additional environmental stresses. The level of education and/or literacy rates for the adult population provides a critical measure of the likelihood and the ability of the community to know about and participate in public meetings, to comment on written proposals and to otherwise participate in the decision-making process. If tools used to encourage public participation are not tailored to local education rates, or perceived rates, the outreach process may be ineffectual (USEPA, 2004). Based on the educational attainment data of the percent of persons that earned high school diplomas or higher and college degree or higher, the areas of South Topeka, Oakland, and North Topeka have the lowest rates among all the study areas (Appendix A, Table 5).

Information on whether languages other than English are spoken among the population, and percentage distribution of these languages, is important in determining effective public participation processes. According to the U.S. Census Bureau (2000), the most common language spoken at home, by individuals age five and over, is English. Spanish is the second language other than English that is spoken in the South Topeka, Oakland, and North Topeka study areas (Appendix A, Table 6). Residents residing in the Oakland study area have the lowest English proficiency rate and the highest population of Hispanic or Latino ethnicity residents. Additionally, there are a small percentage of persons residing in the study areas that speak an Asian or Pacific Island language as the most common language spoken at home.

Children under age five and elderly populations above age 65 are considered to be sensitive populations that may experience disproportionate impacts from environmental stressors. The table below provides insight into a subpopulation that exists within the study area in comparison to County averages (Appendix A, Table 7). Generalizations conclude that the Oakland study

area has the highest percent of children under age five and the Auburndale study area indicate the highest percent of residents age 65 and over.

Finding of No Disproportionate Impacts

Based on data obtained from EPA's Online Tracking Information System (OTIS) which contains detailed facility information, the study areas do not have a significant overburden concentration of permitted active and/or operating facilities that pose a disproportionate negative impact to the community. In addition, the facilities in the study areas do not have a disproportionate number permit violations. Although the project area does contain EJ populations such as minority and low-income groups, they would not be disproportionately impacted in a negative way; rather these groups would equally benefit from the reduced risk of flooding with the implementation of the project.

The levee modifications would be primarily constructed adjacent to and/or within industrial and agricultural areas, and are not anticipated to cause any disproportionate impacts to sensitive populations, but are anticipated to provide a safer living environment.

Public coordination of the project to the EJ communities within the affected area consisted of the following: The project was coordinated with EJ communities thru distribution of the project information to EJ contacts provided by EPA. Distribution of project information included notifications of the availability of information regarding the project, a project fact sheet, along with the project's website address, contact information for the project manager, an announcement of the public meeting that was held in Topeka, Kansas on October 22, 2008, and a media press release that was sent to local newspapers, radio stations in the Topeka and surrounding metropolitan area. No comments on the project were received from the EJ communities and contacts during the public involvement process. The public involvement process will continue to reach out and provide information to the communities affected by the proposed plan as implementation proceeds.

13.0 MITIGATION

The Topeka flood risk management project would impact about seven and one-half acres of a 25-acre woodland due to installation of an under seepage berm at the South Topeka unit. To offset the loss of this impact, a replacement of 15 acres of riparian woodlands is proposed. In addition to reduce impacts to nesting birds, no construction activities in woodland areas would occur during the migratory bird nesting season from April 1 to July 15. A detailed mitigation plan can be found in Appendix F.

14.0 CUMULATIVE IMPACTS

The proposed action consists of modifications to an existing levee system in the Topeka area. Cumulative impacts of the proposed action, consists of relatively minor adverse impacts to the natural environment and aesthetics, with overall positive benefits to the socio-economic

environment based on an improved level of protection to the local infrastructure. The project action is not expected to induce development since this plan would result in modifications to an existing levee system. The proposed action would not involve a levee raise or additional levees, but would only correct existing geotechnical and structural weaknesses to increase the reliability of the flood risk management system for the City of Topeka. Implementation of the project would involve temporary impacts to prime farmland identified as borrow sources, aesthetics, wildlife resources, and human environment thru construction- related noise and minor traffic disruptions. Adverse impacts are limited to the loss of seven and one-half acres of woodland. Mitigation for this loss would include replacement of the seven and one-half acres with 15 acres of soft and hard mast producing trees and shrubs, native grasses and forbs. In addition, to reduce impacts to nesting birds no construction activities in woodland areas would occur during the migratory bird nesting season from April 1 to July 15.

The project induced impacts to agricultural areas are considered temporary because steps would be taken to allow these areas to return to agricultural use after borrow and construction operations. Such measures would include preservation of the top layer of soil, which would be returned to the site, minimizing excavation depths to reduce impacts to the drainage of fields, and excavating after the harvest season to minimize impacts to crops. In addition, no adverse direct or indirect impacts to aquatic resources or water quality are anticipated to occur from project construction activities. For all construction activities, Best Management Practices would be used to minimize the introduction of fuel, petroleum products, or other deleterious material from entering into the waterway and adjacent resources. Control measures would include use of erosion control fences; storing equipment, solid waste, and petroleum products above the ordinary high water mark and away from areas prone to runoff; and requiring that all equipment be clean and free of leaks. In addition, no disproportionate impacts to minorities and low-income groups, and sensitive populations are anticipated to occur from project-related activities.

Past actions such as the clearing of forest for timber and urban and industrial development, flood control, as well as the conversion of forest to agriculture have contributed to substantial adverse impacts to the Kansas River ecosystem. Loss of floodplains and wetlands to agriculture and development has caused loss of biodiversity (USFWS, 2000). In general, flood risk management reservoirs, dams and weirs have lead to ecological deterioration, increases in contamination, disruption of sediment transfer, and hindrances to fish passage to upstream reaches (Merritt and Cooper, 2000; Mant and Janes, 2006). Also, river bed degradation of the Kansas River has been attributed to commercial sand and gravel dredging (Simons et al.1984 and Kansas Geological Survey, 1998). However, in 1990 the Corps implemented a regulatory program for commercial dredging activities on the Kansas River, which consisted of dredging restrictions to minimize impacts and a monitoring program to assess the impacts of permitted dredging activities.

Other land changes have resulted from construction of levee systems and major changes in transportation over the past several decades (e.g. highway construction and improvements, bridge replacements and rehabilitations). Federal flood risk management involvement within the Kansas River levee units was initiated between the 1940's and the early 1950's, and again after

the 1951 flood. The 1951 flood contributed to the support for building flood control reservoirs and improving levee systems throughout eastern Kansas. In Topeka, Federal flood risk management projects consisted of the construction of floodwalls, earthen levees, channel improvements and drainage structures for various levee units. Additional improvements to the levee system were completed in the late 1970s. Today, most of the project area is developed with residential, commercial and industrial development.

Future actions planned for the Topeka area over the next 20 years include major transportation projects (e.g. roads, bridges, transit services, paratransit services, bicycle facilities, and pedestrian facilities) and these actions may result in additional loss of woodland habitat.

In addition, the Kansas Department of Transportation is developing a long-range statewide transportation plan for various transportation improvements that include the Topeka area, which also could result in additional loss of existing woody areas.

The impacts resulting from proposed modifications to the existing levee system consist of minor and short term impacts on the human environment and include measures to compensate for the loss of woodland and restore grass and agriculture areas impacted from the project; as well as best management practices to avoid impacts to aquatic resources and water quality. Therefore, these project impacts are considered minor and insignificant when added to other past, present or future actions.

15.0 CONCLUSION

The purpose of the proposed action is to increase the reliability of the flood risk management system for the City of Topeka. During the study phase, issues of concern identified by Corps of Engineers' representatives were geotechnical and structural. The proposed modifications consist of installation of landside underseepage berms, heel extensions, fill behind floodwalls, new pressure relief wells, wall stiffener on Kansas Avenue Pump Station, stability berms, removal of Fairchild Pump Station, replacement of section of the floodwall, and replacements of floodwall gatewells and sluice gates.

This EA has assessed the environmental impacts of the recommended plan, and alternatives. The recommended plan represents the plan with the highest net economic benefits and has relatively minor impacts to the natural environment with overall positive benefits to the socio-economic environment. Impacts to the natural environment are minor because the project is located within a previously disturbed environment that is highly industrial and urbanized. The main impacts to the natural environment include the loss of about seven and one-half acres of woodland from the proposed construction of the underseepage berm at South Topeka unit. However, these impacts would be offset by replanting a total of 15 acres of woodland habitat within the South Topeka and North Topeka project areas. Additional mitigation measures would include the avoidance of construction activities in woodland areas during the migratory bird nesting season of April 1 to July 15. In addition, the environmental assessment found minimal risk associated with HTRW contamination from proposed activities. However, there were three

areas where a potential HTRW or solid waste impact could occur. Therefore, any soil removed from a site associated with the levee work or borrow areas would be analyzed to ensure proper disposal. Based on the environmental assessment, it has been determined that the recommended plan would not have any substantial adverse impacts on the natural and human environment. All practicable means to avoid and/or minimize adverse environmental effects have been incorporated into the recommended plan. Impacts are temporary, and as mitigated, are not expected to be significant. Therefore, the recommended plan is the environmentally preferable alternative.

16.0 COORDINATION

Preparation of this EA and a draft Finding of No Significant Impact (FONSI) has been coordinated with appropriate Federal, state, and local agencies. Copies of the EA and Feasibility Report were sent to the below agencies, environmental groups, and other interested parties during the 30-day public review period. All comments received during the public review period were addressed. Comments were received during the public review period from the following entities: City of Topeka, Friends of the Kaw, North Topeka Drainage District, U.S. Fish & Wildlife Service, Kansas State Historical Society, Natural Resources Conservation Service, and Federal Aviation Administration. There were no comments that required reevaluation of the alternatives, identification of a new recommended plan, or a critical change to impact analysis. Copies of the comment letters and USACE responses can be found in the Appendix B of the Main Feasibility Report.

- U.S. Department of the Interior, Fish and Wildlife Service, Region 6
- U.S. Environmental Protection Agency, Region VII
- USDA, National Resource Conservation Service, Kansas State Conservationist
- Federal Aviation Administration
- Federal Railroad Administration
- U.S. Federal Highway Administration
- U.S. Coast Guard Marine
- U.S. Geological Survey
- National Park Service
- U.S. Federal Emergency Management Agency, Region VII
- Kansas Biological Survey
- Kansas Department of Wildlife and Parks
- Kansas Geological Survey
- Kansas State Historical Society
- Kansas Water Office
- Kansas Department of Transportation
- Kansas Department of Health and Environment
- Kansas Department of Agriculture
- Kansas State Conservation Commission
-

17.0 COMPLIANCE WITH ENVIRONMENTAL LAWS AND REGULATIONS

Environmental compliance for the proposed action has been achieved. Coordination with the appropriate Federal and state agencies has been made in preparation of this EA.

The Endangered Species Act, Section 7, (USFWS) concluded on May 29, 2007, and (KDWP) on June 1, 2007 that the proposed action would not likely adversely affect any endangered or threatened species.

The National Historic Preservation Act, Section 106 concluded on August 25, 2006 for determination of No Affect on cultural resources. Coordination with tribal government was achieved during the 30-day public review period of the EA.

It was determined that the project action would not result in the placement of fill or dredged material in the waters of the U.S and wetlands; therefore, the Clean Water Act sections 401 and 404(b)(1) permits are not required for this project.

The Fish and Wildlife Coordination Act report (draft) was received on September 29, 2006, (final) was received on March 16, 2007.

The Clean Water Act, Section 402, National Pollution Discharge Elimination System (NPDES) permit would be obtained from the Kansas Department of Health and Environment during the design phase of the project as the plans and specifications for the project are completed.

Environmental Laws and Regulations Compliance	
Clean Air Act, as amended, 42 U.S. C. 7401-7671, et seq.	Full Compliance
Clean Water Act (Federal Water Pollution Control Act), 33 U.S.C. 1251, et seq.	Full Compliance
Coastal Zone Management Act, 16 U.S.C. 1451, et seq	Not Applicable
Endangered Species Act, 16 U.S.C. 1531, et seq.	Full Compliance
Estuary Protection Act, 16 U.S.C. 1221, et seq.	Not Applicable
Farmland Protection Policy Act, 7 U.S.C. 4201, et. seq.	Full Compliance
Federal Water Project Recreation Act, 16 U.S.C. 4601-12, et seq.	Not Applicable
Fish and Wildlife Coordination Act, 16 U.S.C. 661, et seq.	Full Compliance
Land and Water Conservation Act (16 U.S.C 4601-4 et seq	Not Applicable
Marine Protection, Research, and Sanctuaries Act 33 U.S.C. 1401, et seq	Not Applicable
National Environmental Policy Act, 42 U.S.C. 4321, et seq.	Full Compliance
National Historic Preservation Act of 1966, as amended, 16 U.S.C. 470a, et seq.	Full Compliance
Noise Control Act, 42 U.S.C. 4901-4918	Full Compliance
Rivers and Harbors Act, 33 U.S.C. 403, et seq.	Full Compliance
Watershed Protection and Flood Prevention Act, 16 U.S.C. 1001, et seq.	Full Compliance
Wild and Scenic River Act, 16 U.S.C. 1271, et seq.	Full Compliance

Protection & Enhancement of the Cultural Environment (Executive Order 11593)	Full Compliance
Floodplain Management (Executive Order 11988)	Full Compliance
Protection of Migratory Birds (Executive Order 13186)	Full Compliance
Protection of Wetlands (Executive Order 11990)	Full Compliance
Environmental Justice (Executive Order 12898)	Full Compliance

a. Full Compliance. Having met all requirements of the statute for the current stage of the project.
b. Not Applicable. No requirements for the statute required.

18.0 PREPARERS

This EA and the associated FONSI were prepared by Ms. Lekesha Reynolds (Biologist), with relevant sections prepared by Mr. Paul Speckin (HTRW); Mr. Timothy Meade (Cultural Resources); Mr. Alan Holland (Socio-Economics), and Mr. Eric Lynn (Project Manager). The address of the preparers is: U.S. Army Corps of Engineers, Kansas City, District; PM-PR, Room 843, 601 E. 12th St, Kansas City, MO 64106. In addition, the Environmental Justice section of this EA was prepared with the assistance of Ms. Debbie Bishop, an Environmental Justice Specialist of the U.S. Environmental Protection Agency, Region VII, Kansas City, Missouri.

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Appendix A.

Tables

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Table 1. Topeka, Kansas, Feasibility Study
Alternatives Matrix

Description of Problem by Levee Unit and Location	All Possible Alternative Corrective Measures Considered					Alternatives screening disscussion	**Alternatives carried thru Environmental Analysis**
	1	2	3	4	5		
North Topeka Unit, Station 364+60 Fairchild Pump Station Problem: Uplift	Operational changes	Heel Extension	Remove and replace	Remove and Dispose		Fairchild Pump Station out-dated and no longer used or maintained by sponsor. Recommend measure 4.	Remove and Dispose
North Topeka Unit, Station 246+00 to 250+00 Problem: Underseepage	Underseepage berm.	buried collector system.	Relief wells discharging to ground.	Relief wells discharging to manhole w/ temporary pumping.	Relief wells discharging to permanent pump station.	Insufficient area is available to install measure 1. Buried collector system is not as effective as relief wells in reducing underseepage pressures, and are more laborious and expensive. Uplift pressures are not high enough to allow for ground discharge. Pumping only required at times of high flow. Permanent pump station would increase construction cost and future O&M. Recommend measure 4.	Relief wells discharging to manhole w/ temporary pumping
North Topeka Unit, Station 165+00 to 189+00 Problem: Underseepage	Underseepage berm.	buried collector system.	Relief wells discharging to ground.	Relief wells discharging to manhole w/ temporary pumping.	Relief wells discharging to permanent pump station.	Sufficient open land is available to install measures 1, 2, and 3, but buried collector system is not as effective as relief wells in reducing underseepage pressures, and are more laborious and expensive. Uplift pressures are high enough to allow for ground discharge. Recommend either measures 1 or 3.	Underseepage berm and Relief wells
Oakland Unit, Station 220+00 East Oakland Pump Station Problem: Uplift	Operational changes	Heel Extension	Remove and Replace			Measure 1 will not provide sufficient uplift factor of safety. Measure 3 requires more labor and materials and is not more effective than measure 2. Recommend measure 2.	Heel Extension
Oakland Unit, Station 75+50 - Manhole Problem: Uplift	Heel Extension	Remove and Replace				Measure 1 will provide minimum uplift factor of safety. Measure 2 requires more labor and materials is not more effective than measure 2.	Heel Extension
Oakland Unit, Station 485+86 to 491+01 Problem: Sliding Stability	Stability berm	Foundation Mod				Measure 1 will provide minimum sliding stability factor of safety. Measure 2 provides the same effectiveness as measure 1, but is more expensive and complex.	Stability berm
Oakland Unit, Station 64+00 to 80+00 Problem: Underseepage	Underseepage berm.	buried collector system.	Relief wells discharging to ground.	Relief wells discharging to manhole w/ temporary pumping.	Relief wells discharging to permanent pump station.	Sufficient open land is available to install measures 1, 2, and 3. Buried collector system is not as effective as relief wells in reducing underseepage pressures, and are more laborious and expensive. Uplift pressures are high enough to allow ground discharge. Recommend either measures 1 or 3.	Underseepage berm and Relief wells
South Topeka Unit, Station 75+84 Kansas Avenue Pump Station Problem: Strength	Wall Stiffener	Remove and Replace	Remove and Dispose			Measure 1 will provide minimum strength factor of safety. Since the factor of safety can be obtained with measure 1, measures 2 and 3 are not preferred.	Wall stiffener
South Topeka Unit, Station 16+07 - Manhole Problem: Uplift	Heel Extension	Remove and Replace				Measure 1 will provide minimum uplift factor of safety. Measure 2 is more laborious and expensive.	Heel Extension
South Topeka Unit, Station 84+10 - Manhole Problem: Uplift	Heel Extension	Remove and Replace				Measure 1 will provide minimum uplift factor of safety. Measure 2 is more laborious and expensive.	Heel Extension
South Topeka Unit, Station 84+10a - Manhole Problem: Uplift	Heel Extension	Remove and Replace				Measure 1 will provide minimum uplift factor of safety. Measure 2 is more laborious and expensive.	Heel Extension
South Topeka Unit, Station 85+57 - Manhole Problem: Uplift	Heel Extension	Remove and Replace				Measure 1 will provide minimum uplift factor of safety. Measure 2 is more laborious and expensive.	Heel Extension
South Topeka Unit. Station 74+41 to 93+86 Problem: Floodwall foundation weakness	New wall on offset alignment	New wall on existing alignment and replace gate well and sluice gates currently on wall	Earthen Levee behind existing wall	Modify existing wall		Insufficient area is available to implement measures 1 and 3. Measure 4 would be difficult to install and maintain with the existing wall remaining in place. Recommend measure 2.	New floodwall on existing alignment
South Topeka Unit, Station 22+00 to 48+00 Problem: Underseepage	Underseepage berm.	buried collector system.	Relief wells discharging to ground.	Relief wells discharging to manhole w/ temporary pumping.	Relief wells discharging to permanent pump station.	Sufficient open land is available to install measures 1, 2 and 3, however measure 2 is not as effective as measure 3. Uplift pressures are high enough to allow for ground discharge. Recommend either measures 1 or 3.	Underseepage berm and Relief wells
Waterworks Unit, Station 0+78 to 7+00, 10+00 to 16+50 Problem: Sliding Stability	Stability berm	Foundation Mod	Wall replacement			Measure 1 will provide minimum sliding stability factor of safety. Measures 2 and 3 are more laborious and expensive than measure 1.	Stability berm
Waterworks Unit, Station 13+07 to 15+95 Problem: Sliding Stability	Stability berm	Foundation Mod	Wall replacement			Measure 1 will provide minimum sliding stability factor of safety. Measures 2 and 3 are more laborious and expensive than measure 1.	Stability berm

Table 2. Topeka, Kansas, Feasibility Study	**Environmental Impacts Summary**			
Environmental Resources	Alternatives			
	Recommended Alternative	No-Action	Alternative: Commercial Fill	Alternative: Relief Wells
Aquatic/ Water Quality	No adverse impacts to aquatic resources or water quality would be anticipated from the preferred alternative for the proposed levee units within the project area.	No action would result in catastrophic flood damage resulting in significant impacts to a water quality, fisheries and wildlife, extensive property damage and potential loss of human life.	No adverse impacts to aquatic resources or water quality are anticipated to occur.	No impacts on the existing groundwater or flowing conditions and no adverse impacts to aquatic resources or water quality are anticipated.
Wetlands	No impacts to wetlands are anticipated.	No impacts to wetlands are expected to occur under this alternative.	No impacts to wetlands are expected to occur under this alternative.	No impacts to wetlands are expected to occur under this alternative.
Prime and Unique Farmlands	Two prime farmland sites would be impacted to obtain borrow fill. Impacts are considered minor and short-term.	No action would result in catastrophic flood damage resulting in significant impacts to a water quality, farmland, fisheries and wildlife, extensive property damage and potential loss of human life.	Disturbance of prime farmland would be minor and limited to the construction of under seepage berm within the North Topeka unit.	Disturbance of prime farmland areas would be minor and significantly less than those described under the recommended plan.
Wildlife	Impacts to wildlife habitat would result from the permanent removal of approximately 7.5 acres of woodland for the construction of the underseepage berm at the South Topeka levee unit.	No action would result in catastrophic flood damage resulting in significant impacts to a water quality, fisheries and wildlife, extensive property damage and potential loss of human life.	Impacts to wildlife habitat would result from the removal of approximately nine acres of woodlands for the construction of the underseepage berm at the South Topeka levee unit.	Wldlife habitat within the project area would be avoided.
Forest/Vegetation	Impacts to woodlands would result from the removal of approximately 7.5 acres of woodland for the construction of the underseepage berm at the South Topeka levee unit. However, those impacts would be offset thru tree plantings and prairie establishement within a 15- acre area along the riverbank.	No action would result in catastrophic flood damage resulting in significant impacts to a water quality, fisheries and wildlife, extensive property damage and potential loss of human life.	Impacts to woodlands would result from the removal of approximately 7.5 acres of woodland for the construction of the underseepage berm at the South Topeka levee unit. However, those impacts would be offset thru tree plantings and prairie establishement within a 15- acre area along the riverbank.	Impacts to forest and vegetated resources within the project area would be avoided.
Endangered and Threatened Species	No adverse impacts are anticipated.	No action would result in catastrophic flood damage resulting in significant impacts to a water quality, fisheries and wildlife, extensive property damage and potential loss of human life.	minor effects on threatened and endangered species and their habitat expected to occur associated with obtaining dredged material of the Kansas River.	No impacts to the aquatic resources are expected to occur under this alternative.
Cultural	No historic properties are recorded within the area of the proposed alternatives or borrow locations.	No impacts to the aquatic resources are expected to occur under this alternative.	No impacts to the aquatic resources are expected to occur under this alternative.	No impacts to the aquatic resources are expected to occur under this alternative.
Noise	Construction activities would not increase noise levels beyond that typical of farming operations or area traffic in the vicinity.	No action would result in catastrophic flood damage resulting in unregulated and widespread noise from clean-up activities.	Construction activities would not increase noise levels beyond that typical of farming operations or area traffic in the vicinity.	Construction activities would not increase noise levels beyond that typical of farming operations or area traffic in the vicinity.
Air Quality	Minor, localized, and short-term impacts to air quality in the project area would result from construction activities.	No action would result in catastrophic flood damage resulting in the release of a variety of dust, and other contaminants from clean-up activities.	Minor, localized and short-term impacts to air quality in the project area would result from construction activities.	Minor, short-term impacts to air quality in the project area would result from construction activities.
Visual Quality	Impacts would be temporary, minor and would only occur within the construction areas.	No action would result in catastrophic flood damage resulting in widespread aesthetic impacts from deposits of debris, dead trees and property damage.	Under this plan, the roads could receive short term aesthetic impacts of haul material deposited on the established haul travel routes; however, the contractor would be required to immediately remove or clean these materials.	No significant impacts to this resource are anticipated.
Demography	This plan would prevent adverse economic impacts, including flood damage (in all but the most catastrophic events) and high insurance premiums, to the protected neighborhoods.	Failure to implement the recommended plan or commercial fill alternative would likely result in an increasing pattern of flood damage in the Oakland, South Topeka and North Topeka areas from large Kansas River events.	This plan would prevent adverse economic impacts, including flood damage (in all but the most catastrophic events) and high insurance premiums, to the protected neighborhoods.	This plan would prevent adverse economic impacts, including flood damage (in all but the most catastrophic events) and high insurance premiums, to the protected neighborhoods.
Development and Economy	This plan would benefit a large portion of the city's economic base. Specifically would porvide protection for several prime areas for economic development in Oakland and North Topeka that are among the best industrial and commercial future development prospects in the region.	No action would result in catastrophic flood damage affecting large urban neighborhoods. Large employers in the floodplain areas might suffer severe damage. Some small business owners would be ruined by flood damage.	This plan would benefit a large portion of the city's economic base. Specifically would porvide protection for several prime areas for economic development in Oakland and North Topeka that are among the best industrial and commercial future development prospects in the region.	This plan would benefit a large portion of the city's economic base. Specifically would porvide protection for several prime areas for economic development in Oakland and North Topeka that are among the best industrial and commercial future development prospects in the region.
Transportation	This plan would cause short-term, minor disruptions to traffic with the maneuvering of construction equipment to and from the project area.	No action could pose a problem to transportation during a 100-year flood event. Area roads could be flooded impairing evacuation and rescue of the local population.	Trucks hauling fill material to the construction site may have temporary impacts to local roads, causing congestion, and possibly causing damage to the roads.	This plan would cause slight disruptions to traffic with the maneuvering of construction equipment to and from the project area.

Table 3: STUDY AREA SOCIOECONOMIC CHARACTERISTICS (RACE)

Based on 2000 Census

ANALYSIS AREA	White	Black or African American	American Indian and Alaska Native	Asian	Native Hawaiian and Other Pacific Islander	Some Other Race	Two or More Races	Hispanic or Latino (of any race)
State of Kansas	86.1%	5.7%	0.9%	1.7%	0.0%	3.4%	2.1%	7.0%
Shawnee County	82.9%	9.0%	1.2%	1.0%	0.0%	3.2%	2.7%	7.3%
Topeka MSA	82.9%	9.0%	1.2%	1.0%	0.0%	3.2%	2.7%	7.3%
City of Topeka	78.5%	11.7%	1.3%	1.1%	0.0%	4.1%	3.3%	8.9%
Silver Lake	96.8%	0.1%	0.7%	0.2%	0.1%	0.6%	1.5%	1.8%
AUBURNDALE								
Census Tract 21	79.3%	12.5%	1.4%	0.7%	0.1%	3.3%	2.7%	7.8%
Census Tract 21 - Block Group 4	91.0%	3.8%	0.9%	0.7%	0.0%	0.7%	2.8%	3.4%
Census Tract 21 - Block Group 5	90.1%	3.7%	1.9%	0.6%	0.0%	1.1%	2.6%	3.2%
Census Tract 22	92.4%	2.1%	0.6%	0.3%	0.0%	2.3%	2.3%	4.4%
Census Tract 22 - Block Group 1	89.1%	3.7%	1.3%	0.4%	0.0%	2.1%	3.5%	4.1%
Census Tract 22 - Block Group 3	90.4%	1.9%	0.7%	0.1%	0.0%	3.6%	3.3%	7.0%
Census Tract 41	91.6%	4.0%	0.7%	0.5%	0.0%	1.5%	1.7%	4.6%
Census Tract 41 - Block Group 1	89.4%	5.5%	1.0%	0.4%	0.0%	1.8%	2.0%	4.9%
Census Tract 41 - Block Group 2	93.7%	2.3%	0.8%	0.4%	0.0%	1.2%	1.6%	3.3%
SOUTH TOPEKA								
Census Tract 6	73.8%	11.6%	2.9%	0.5%	0.0%	5.5%	5.9%	12.7%
Census Tract 6 - Block Group 1	80.5%	5.1%	2.7%	0.4%	0.0%	5.7%	5.6%	11.6%
Census Tract 22	92.4%	2.1%	0.6%	0.3%	0.0%	2.3%	2.3%	4.4%
Census Tract 22 - Block Group 1	89.1%	3.7%	1.3%	0.4%	0.0%	2.1%	3.5%	4.1%
Census Tract 40	56.9%	26.1%	2.8%	1.0%	0.0%	9.4%	3.8%	18.8%
Census Tract 40 - Block Group 1	62.7%	8.8%	3.4%	0.0%	0.0%	21.7%	3.4%	34.6%
Census Tract 40 - Block Group 2	58.6%	28.8%	2.9%	1.7%	0.1%	5.5%	2.5%	16.5%
Census Tract 40 - Block Group 3	49.2%	34.8%	2.9%	0.8%	0.0%	8.0%	4.3%	15.3%
OAKLAND								
Census Tract 9	85.7%	2.1%	2.7%	0.3%	0.0%	6.6%	2.5%	12.8%
Census Tract 9 - Block Group 1	82.8%	1.9%	2.7%	0.2%	0.0%	7.9%	4.6%	16.1%
Census Tract 9 - Block Group 2	85.6%	1.8%	2.9%	0.1%	0.0%	6.6%	3.1%	13.1%
Census Tract 9 - Block Group 3	87.3%	1.5%	2.6%	0.8%	0.0%	5.0%	2.8%	10.4%
Census Tract 9 - Block Group 4	86.4%	3.1%	2.6%	0.3%	0.1%	7.0%	0.6%	12.3%
Census Tract 10	74.4%	2.0%	1.7%	0.2%	0.0%	17.0%	4.7%	34.5%
Census Tract 10 - Block Group 1	84.0%	2.1%	1.0%	0.0%	0.0%	8.3%	4.5%	22.6%
Census Tract 10 - Block Group 2	78.0%	1.9%	1.8%	0.6%	0.0%	14.7%	3.0%	25.9%
Census Tract 10 - Block Group 3	66.4%	0.5%	2.4%	0.0%	0.0%	24.8%	5.8%	52.9%
Census Tract 10 - Block Group 4	68.5%	2.8%	1.6%	0.2%	0.0%	21.2%	5.7%	40.6%
Census Tract 11	46.8%	20.4%	2.3%	0.0%	0.0%	23.6%	6.9%	40.8%
Census Tract 11 - Block Group 1	52.3%	23.4%	2.1%	0.0%	0.0%	16.7%	5.4%	28.6%
Census Tract 11 - Block Group 2	44.0%	19.0%	2.2%	0.1%	0.0%	25.6%	9.0%	41.5%
Census Tract 11 - Block Group 3	44.3%	18.9%	2.6%	0.0%	0.0%	27.9%	6.4%	51.1%
NORTH TOPEKA								
Census Tract 7	87.0%	6.3%	1.7%	0.3%	0.0%	1.5%	3.1%	5.3%
Census Tract 7 - Block Group 1	87.4%	5.9%	2.2%	0.0%	0.0%	1.4%	3.1%	4.3%
Census Tract 7 - Block Group 2	86.7%	6.5%	1.4%	0.5%	0.0%	1.6%	3.1%	5.8%
Census Tract 8	88.6%	3.4%	2.8%	0.4%	0.0%	1.6%	3.0%	5.3%
Census Tract 8 - Block Group 1	94.6%	1.2%	1.7%	0.2%	0.0%	0.4%	1.9%	3.1%
Census Tract 8 - Block Group 2	92.2%	2.9%	1.2%	0.0%	0.1%	1.1%	2.4%	3.3%
Census Tract 8 - Block Group 3	86.0%	4.2%	2.1%	1.2%	0.0%	2.5%	4.0%	8.3%
Census Tract 8 - Block Group 4	82.5%	5.1%	5.9%	0.2%	0.0%	2.5%	3.8%	6.4%
Census Tract 34	96.6%	0.6%	0.7%	0.3%	0.1%	0.5%	1.3%	2.4%
Census Tract 34 - Block Group 2	96.2%	1.0%	0.6%	0.4%	0.1%	0.6%	1.2%	2.2%
Census Tract 35	96.4%	0.3%	0.9%	0.3%	0.0%	0.8%	1.2%	2.0%
Census Tract 35 - Block Group 1	96.5%	0.6%	0.9%	0.2%	0.0%	0.9%	0.9%	1.5%
SOLDIER CREEK URBAN								
Census Tract 8	88.6%	3.4%	2.8%	0.4%	0.0%	1.6%	3.0%	5.3%
Census Tract 8 - Block Group 1	94.6%	1.2%	1.7%	0.2%	0.0%	0.4%	1.9%	3.1%
Census Tract 33.01	95.2%	0.8%	1.1%	0.3%	0.0%	1.5%	1.2%	5.0%
Census Tract 33.01 - Block Group 1	95.2%	0.8%	1.1%	0.3%	0.0%	1.5%	1.2%	5.0%
Census Tract 34	96.6%	0.6%	0.7%	0.3%	0.1%	0.5%	1.3%	2.4%
Census Tract 34 - Block Group 1	96.9%	0.3%	0.9%	0.3%	0.0%	0.4%	1.2%	2.6%
Census Tract 34 - Block Group 2	96.2%	1.0%	0.6%	0.4%	0.1%	0.6%	1.2%	2.2%
Census Tract 35	96.4%	0.3%	0.9%	0.3%	0.0%	0.8%	1.2%	2.0%
Census Tract 35 - Block Group 1	96.5%	0.6%	0.9%	0.2%	0.0%	0.9%	0.9%	1.5%

Table 4: STUDY AREA SOCIOECONOMIC CHARACTERISTICS (MINORITY&POVERTY)								
Based on 2000 Census								
ANALYSIS AREA	**Black or African American**	**American Indian and Alaska Native**	**Asian**	**Native Hawaiian and Other Pacific Islander**	**Some Other Race**	**Two or More Races**	**Hispanic or Latino (of Any Race)**	**% Below Poverty in 1999**
State of Kansas	5.7%	0.9%	1.7%	0.0%	3.4%	2.1%	7.0%	9.9%
Shawnee County	9.0%	1.2%	1.0%	0.0%	3.2%	2.7%	7.3%	9.6%
Topeka MSA	9.0%	1.2%	1.0%	0.0%	3.2%	2.7%	7.3%	9.6%
City of Topeka	11.7%	1.3%	1.1%	0.0%	4.1%	3.3%	8.9%	12.4%
Silver Lake	0.1%	0.7%	0.2%	0.1%	0.6%	1.5%	1.8%	4.2%
AUBURNDALE								
Census Tract 21	12.5%	1.4%	0.7%	0.1%	3.3%	2.7%	7.8%	6.7%
Census Tract 21 - Block Group 4	3.8%	0.9%	0.7%	0.0%	0.7%	2.8%	3.4%	1.7%
Census Tract 21 - Block Group 5	3.7%	1.9%	0.6%	0.0%	1.1%	2.6%	3.2%	5.8%
Census Tract 22	2.1%	0.6%	0.3%	0.0%	2.3%	2.3%	4.4%	6.4%
Census Tract 22 - Block Group 1	3.7%	1.3%	0.4%	0.0%	2.1%	3.5%	4.1%	10.3%
Census Tract 22 - Block Group 3	1.9%	0.7%	0.1%	0.0%	3.6%	3.3%	7.0%	9.6%
Census Tract 41	4.0%	0.7%	0.5%	0.0%	1.5%	1.7%	4.6%	6.5%
Census Tract 41 - Block Group 1	5.5%	1.0%	0.4%	0.0%	1.8%	2.0%	4.9%	5.7%
Census Tract 41 - Block Group 2	2.3%	0.8%	0.4%	0.0%	1.2%	1.6%	3.3%	3.2%
SOUTH TOPEKA								
Census Tract 6	11.6%	2.9%	0.5%	0.0%	5.5%	5.9%	12.7%	33.2%
Census Tract 6 - Block Group 1	5.1%	2.7%	0.4%	0.0%	5.7%	5.6%	11.6%	42.0%
Census Tract 22	2.1%	0.6%	0.3%	0.0%	2.3%	2.3%	4.4%	6.4%
Census Tract 22 - Block Group 1	3.7%	1.3%	0.4%	0.0%	2.1%	3.5%	4.1%	10.3%
Census Tract 40	26.1%	2.8%	1.0%	0.0%	9.4%	3.8%	18.8%	37.5%
Census Tract 40 - Block Group 1	8.8%	3.4%	0.0%	0.0%	21.7%	3.4%	34.6%	35.2%
Census Tract 40 - Block Group 2	28.8%	2.9%	1.7%	0.1%	5.5%	2.5%	16.5%	36.0%
Census Tract 40 - Block Group 3	34.8%	2.9%	0.8%	0.0%	8.0%	4.3%	15.3%	41.0%
OAKLAND								
Census Tract 9	2.1%	2.7%	0.3%	0.0%	6.6%	2.5%	12.8%	8.7%
Census Tract 9 - Block Group 1	1.9%	2.7%	0.2%	0.0%	7.9%	4.6%	16.1%	0.0%
Census Tract 9 - Block Group 2	1.8%	2.9%	0.1%	0.0%	6.6%	3.1%	13.1%	7.3%
Census Tract 9 - Block Group 3	1.5%	2.6%	0.8%	0.0%	5.0%	2.8%	10.4%	12.9%
Census Tract 9 - Block Group 4	3.1%	2.6%	0.3%	0.1%	7.0%	0.6%	12.3%	12.4%
Census Tract 10	2.0%	1.7%	0.2%	0.0%	17.0%	4.7%	34.5%	11.9%
Census Tract 10 - Block Group 1	2.1%	1.0%	0.0%	0.0%	8.3%	4.5%	22.6%	8.2%
Census Tract 10 - Block Group 2	1.9%	1.8%	0.6%	0.0%	14.7%	3.0%	25.9%	10.8%
Census Tract 10 - Block Group 3	0.5%	2.4%	0.0%	0.0%	24.8%	5.8%	52.9%	10.9%
Census Tract 10 - Block Group 4	2.8%	1.6%	0.2%	0.0%	21.2%	5.7%	40.6%	16.0%
Census Tract 11	20.4%	2.3%	0.0%	0.0%	23.6%	6.9%	40.8%	26.5%
Census Tract 11 - Block Group 1	23.4%	2.1%	0.0%	0.0%	16.7%	5.4%	28.6%	20.4%
Census Tract 11 - Block Group 2	19.0%	2.2%	0.1%	0.0%	25.6%	9.0%	41.5%	32.1%
Census Tract 11 - Block Group 3	18.9%	2.6%	0.0%	0.0%	27.9%	6.4%	51.1%	27.1%
NORTH TOPEKA								
Census Tract 7	6.3%	1.7%	0.3%	0.0%	1.5%	3.1%	5.3%	14.0%
Census Tract 7 - Block Group 1	5.9%	2.2%	0.0%	0.0%	1.4%	3.1%	4.3%	12.4%
Census Tract 7 - Block Group 2	6.5%	1.4%	0.5%	0.0%	1.6%	3.1%	5.8%	15.2%
Census Tract 8	3.4%	2.8%	0.4%	0.0%	1.6%	3.0%	5.3%	19.8%
Census Tract 8 - Block Group 1	1.2%	1.7%	0.2%	0.0%	0.4%	1.9%	3.1%	8.6%
Census Tract 8 - Block Group 2	2.9%	1.2%	0.0%	0.1%	1.1%	2.4%	3.3%	17.0%
Census Tract 8 - Block Group 3	4.2%	2.1%	1.2%	0.0%	2.5%	4.0%	8.3%	24.3%
Census Tract 8 - Block Group 4	5.1%	5.9%	0.2%	0.0%	2.5%	3.8%	6.4%	27.9%
Census Tract 34	0.6%	0.7%	0.3%	0.1%	0.5%	1.3%	2.4%	2.2%
Census Tract 34 - Block Group 2	1.0%	0.6%	0.4%	0.1%	0.6%	1.2%	2.2%	3.0%
Census Tract 35	0.3%	0.9%	0.3%	0.0%	0.8%	1.2%	2.0%	2.5%
Census Tract 35 - Block Group 1	0.6%	0.9%	0.2%	0.0%	0.9%	0.9%	1.5%	2.0%
SOLDIER CREEK URBAN								
Census Tract 8	3.4%	2.8%	0.4%	0.0%	1.6%	3.0%	5.3%	19.8%
Census Tract 8 - Block Group 1	1.2%	1.7%	0.2%	0.0%	0.4%	1.9%	3.1%	8.6%
Census Tract 33.01	0.8%	1.1%	0.3%	0.0%	1.5%	1.2%	5.0%	0.5%
Census Tract 33.01 - Block Group 1	0.8%	1.1%	0.3%	0.0%	1.5%	1.2%	5.0%	0.5%
Census Tract 34	0.6%	0.7%	0.3%	0.1%	0.5%	1.3%	2.4%	2.2%
Census Tract 34 - Block Group 1	0.3%	0.9%	0.3%	0.0%	0.4%	1.2%	2.6%	2.9%
Census Tract 34 - Block Group 2	1.0%	0.6%	0.4%	0.1%	0.6%	1.2%	2.2%	3.0%
Census Tract 35	0.3%	0.9%	0.3%	0.0%	0.8%	1.2%	2.0%	2.5%
Census Tract 35 - Block Group 1	0.6%	0.9%	0.2%	0.0%	0.9%	0.9%	1.5%	2.0%

Table 5: STUDY AREA SOCIOECONOMIC CHARACTERISTICS (EDUCATION)		
Based on 2000 Census		
ANALYSIS AREA	**Percent High School Graduate or Higher**	**Percent Bachelor's Degree or Higher**
State of Kansas	86.0%	25.8%
Shawnee County	88.1%	26.0%
Topeka MSA	88.1%	26.1%
City of Topeka	85.9%	25.3%
Silver Lake	92.5%	22.3%
AUBURNDALE		
Census Tract 21	87.0%	24.4%
Census Tract 21 - Block Group 4	86.4%	25.8%
Census Tract 21 - Block Group 5	96.1%	23.8%
Census Tract 22	88.9%	28.2%
Census Tract 22 - Block Group 1	93.0%	27.2%
Census Tract 22 - Block Group 3	81.3%	18.5%
Census Tract 41	89.3%	25.3%
Census Tract 41 - Block Group 1	86.8%	21.2%
Census Tract 41 - Block Group 2	94.5%	33.7%
SOUTH TOPEKA		
Census Tract 6	79.6%	12.0%
Census Tract 6 - Block Group 1	78.0%	5.3%
Census Tract 22	88.9%	28.2%
Census Tract 22 - Block Group 1	93.0%	27.2%
Census Tract 40	70.7%	6.7%
Census Tract 40 - Block Group 1	61.3%	8.1%
Census Tract 40 - Block Group 2	80.8%	4.7%
Census Tract 40 - Block Group 3	58.4%	4.0%
OAKLAND		
Census Tract 9	79.8%	7.2%
Census Tract 9 - Block Group 1	83.8%	9.4%
Census Tract 9 - Block Group 2	83.2%	9.3%
Census Tract 9 - Block Group 3	84.0%	5.2%
Census Tract 9 - Block Group 4	71.8%	5.4%
Census Tract 10	71.2%	6.6%
Census Tract 10 - Block Group 1	67.2%	10.2%
Census Tract 10 - Block Group 2	73.3%	5.4%
Census Tract 10 - Block Group 3	79.1%	5.2%
Census Tract 10 - Block Group 4	68.1%	5.1%
Census Tract 11	58.5%	4.7%
Census Tract 11 - Block Group 1	62.7%	5.7%
Census Tract 11 - Block Group 2	60.1%	4.5%
Census Tract 11 - Block Group 3	53.3%	4.1%
NORTH TOPEKA		
Census Tract 7	78.5%	5.9%
Census Tract 7 - Block Group 1	76.1%	7.0%
Census Tract 7 - Block Group 2	80.0%	5.2%
Census Tract 8	71.0%	5.9%
Census Tract 8 - Block Group 1	74.8%	9.3%
Census Tract 8 - Block Group 2	80.7%	5.0%
Census Tract 8 - Block Group 3	71.3%	7.9%
Census Tract 8 - Block Group 4	58.5%	2.0%
Census Tract 34	93.4%	23.6%
Census Tract 34 - Block Group 2	95.7%	24.8%
Census Tract 35	92.3%	20.2%
Census Tract 35 - Block Group 1	95.1%	23.5%
SOLDIER CREEK URBAN		
Census Tract 8	71.0%	5.9%
Census Tract 8 - Block Group 1	74.8%	9.3%
Census Tract 33.01	91.4%	16.8%
Census Tract 33.01 - Block Group 1	91.4%	16.8%
Census Tract 34	93.4%	23.6%
Census Tract 34 - Block Group 1	95.0%	26.1%
Census Tract 34 - Block Group 2	95.7%	24.8%
Census Tract 35	92.3%	20.2%
Census Tract 35 - Block Group 1	95.1%	23.5%

Table 6: STUDY AREA SOCIOECONOMIC CHARACTERISTICS (LANGUAGE)		
Based on 2000 Census		
ANALYSIS AREA	**Language Spoken at Home: English Only**	**Speak English Less than "Very Well"**
State of Kansas	91.3%	3.9%
Shawnee County	93.9%	2.4%
Topeka MSA	93.9%	2.4%
City of Topeka	93.0%	2.8%
Silver Lake	98.2%	0.3%
AUBURNDALE		
Census Tract 21	94.4%	2.4%
Census Tract 21 - Block Group 4	96.5%	1.0%
Census Tract 21 - Block Group 5	100.0%	0.0%
Census Tract 22	96.2%	2.3%
Census Tract 22 - Block Group 1	100.0%	0.0%
Census Tract 22 - Block Group 3	90.9%	6.4%
Census Tract 41	96.7%	0.9%
Census Tract 41 - Block Group 1	96.7%	0.9%
Census Tract 41 - Block Group 2	97.9%	1.0%
SOUTH TOPEKA		
Census Tract 6	97.5%	1.0%
Census Tract 6 - Block Group 1	98.7%	0.7%
Census Tract 22	96.2%	2.3%
Census Tract 22 - Block Group 1	100.0%	0.0%
Census Tract 40	83.6%	7.4%
Census Tract 40 - Block Group 1	66.2%	15.8%
Census Tract 40 - Block Group 2	90.9%	3.4%
Census Tract 40 - Block Group 3	93.5%	3.0%
OAKLAND		
Census Tract 9	96.2%	1.4%
Census Tract 9 - Block Group 1	98.5%	0.0%
Census Tract 9 - Block Group 2	94.5%	2.2%
Census Tract 9 - Block Group 3	97.7%	1.1%
Census Tract 9 - Block Group 4	95.6%	1.6%
Census Tract 10	82.8%	7.5%
Census Tract 10 - Block Group 1	84.2%	7.3%
Census Tract 10 - Block Group 2	81.6%	10.2%
Census Tract 10 - Block Group 3	78.1%	11.0%
Census Tract 10 - Block Group 4	85.8%	3.3%
Census Tract 11	68.8%	19.2%
Census Tract 11 - Block Group 1	85.7%	11.5%
Census Tract 11 - Block Group 2	67.2%	16.4%
Census Tract 11 - Block Group 3	55.5%	27.8%
NORTH TOPEKA		
Census Tract 7	94.0%	1.7%
Census Tract 7 - Block Group 1	90.7%	3.0%
Census Tract 7 - Block Group 2	96.1%	0.9%
Census Tract 8	95.5%	2.0%
Census Tract 8 - Block Group 1	96.7%	2.0%
Census Tract 8 - Block Group 2	98.6%	0.0%
Census Tract 8 - Block Group 3	94.8%	2.8%
Census Tract 8 - Block Group 4	92.4%	3.1%
Census Tract 34	97.0%	1.0%
Census Tract 34 - Block Group 2	97.5%	0.7%
Census Tract 35	96.8%	0.9%
Census Tract 35 - Block Group 1	95.4%	1.5%
SOLDIER CREEK URBAN		
Census Tract 8	95.5%	2.0%
Census Tract 8 - Block Group 1	96.7%	2.0%
Census Tract 33.01	97.8%	0.9%
Census Tract 33.01 - Block Group 1	97.8%	0.9%
Census Tract 34	97.0%	1.0%
Census Tract 34 - Block Group 1	95.6%	2.1%
Census Tract 34 - Block Group 2	97.5%	0.7%
Census Tract 35	96.8%	0.9%
Census Tract 35 - Block Group 1	95.4%	1.5%

Table 7: STUDY AREA SOCIOECONOMIC CHARACTERISTICS (AGE)				
Based on 2000 Census				
ANALYSIS AREA	**Median Age**	**% Under 5**	**% Under 18**	**% 65 and Over**
State of Kansas	35.3	7.0%	26.5%	13.2%
Shawnee County	37.2	6.8%	25.2%	13.7%
Topeka MSA	37.1	6.8%	25.3%	13.7%
City of Topeka	36.4	7.1%	24.3%	15.0%
Silver Lake	37.1	5.9%	28.3%	10.8%
AUBURNDALE				
Census Tract 21	34.3	7.0%	23.3%	14.9%
Census Tract 21 - Block Group 4	36.4	6.4%	19.6%	16.2%
Census Tract 21 - Block Group 5	36.7	6.1%	22.1%	12.8%
Census Tract 22	39.4	7.9%	25.2%	16.7%
Census Tract 22 - Block Group 1	36.1	6.3%	26.5%	11.5%
Census Tract 22 - Block Group 3	39.1	7.7%	21.4%	15.7%
Census Tract 41	37.0	6.6%	18.4%	19.3%
Census Tract 41 - Block Group 1	40.2	5.3%	12.7%	26.7%
Census Tract 41 - Block Group 2	35.1	6.6%	21.7%	13.9%
SOUTH TOPEKA				
Census Tract 6	30.5	9.3%	29.5%	8.4%
Census Tract 6 - Block Group 1	30.6	9.9%	29.6%	9.8%
Census Tract 22	39.4	7.9%	25.2%	16.7%
Census Tract 22 - Block Group 1	36.1	6.3%	26.5%	11.5%
Census Tract 40	34.8	9.0%	21.5%	11.7%
Census Tract 40 - Block Group 1	32.7	7.2%	25.5%	11.2%
Census Tract 40 - Block Group 2	33.4	1.9%	12.9%	6.4%
Census Tract 40 - Block Group 3	34.8	9.0%	28.2%	14.6%
OAKLAND				
Census Tract 9	35.7	7.0%	26.1%	14.6%
Census Tract 9 - Block Group 1	31.1	9.8%	30.1%	12.9%
Census Tract 9 - Block Group 2	32.1	8.5%	26.8%	12.2%
Census Tract 9 - Block Group 3	37.4	6.1%	24.3%	16.6%
Census Tract 9 - Block Group 4	41.4	4.8%	24.3%	17.6%
Census Tract 10	39.6	6.7%	24.7%	16.6%
Census Tract 10 - Block Group 1	43.7	5.7%	20.2%	21.4%
Census Tract 10 - Block Group 2	34.4	7.3%	26.6%	14.0%
Census Tract 10 - Block Group 3	38.2	6.8%	24.0%	20.5%
Census Tract 10 - Block Group 4	36.8	9.0%	25.8%	16.2%
Census Tract 11	28.5	10.1%	34.2%	10.6%
Census Tract 11 - Block Group 1	30.3	10.2%	32.7%	14.7%
Census Tract 11 - Block Group 2	28.4	11.1%	34.5%	9.1%
Census Tract 11 - Block Group 3	28.6	9.7%	34.0%	8.7%
NORTH TOPEKA				
Census Tract 7	32.0	7.7%	31.3%	11.5%
Census Tract 7 - Block Group 1	35.1	7.7%	27.1%	15.9%
Census Tract 7 - Block Group 2	29.3	6.7%	32.6%	9.8%
Census Tract 8	38.2	7.4%	23.8%	13.4%
Census Tract 8 - Block Group 1	35.7	7.0%	24.5%	10.6%
Census Tract 8 - Block Group 2	40.2	6.7%	21.7%	17.6%
Census Tract 8 - Block Group 3	40.6	6.3%	24.1%	14.5%
Census Tract 8 - Block Group 4	37.8	8.1%	23.6%	13.5%
Census Tract 34	39.8	6.0%	26.4%	10.4%
Census Tract 34 - Block Group 2	38.7	6.5%	27.4%	7.2%
Census Tract 35	37.4	6.2%	29.5%	11.2%
Census Tract 35 - Block Group 1	39.0	5.1%	29.5%	9.3%
SOLDIER CREEK URBAN				
Census Tract 8	38.2	7.4%	23.8%	13.4%
Census Tract 8 - Block Group 1	35.7	7.0%	24.5%	10.6%
Census Tract 33.01	40.9	6.0%	25.4%	13.8%
Census Tract 33.01 - Block Group 1	40.9	6.0%	25.4%	13.8%
Census Tract 34	39.8	6.0%	26.4%	10.4%
Census Tract 34 - Block Group 1	41.7	6.1%	24.5%	14.9%
Census Tract 34 - Block Group 2	38.7	6.5%	27.4%	7.2%
Census Tract 35	37.4	6.2%	29.5%	11.2%
Census Tract 35 - Block Group 1	39.0	5.1%	29.5%	9.3%

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Appendix B.

Agency Coordination Letters

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United States Department of Agriculture

NRCS

Natural Resources Conservation Service
3231 Southwest Van Buren Street, Suite 2
Topeka, Kansas 66611-2291

Phone: 785-267-5721
FAX: 785-266-8293
www.ks.nrcs.usda.gov

October 17, 2006

Ms. Lekesha Reynolds
U.S. Army Corps of Engineers
PM-PR, Room 846
601 E 12th St
Kansas City, Missouri 64106

Ref: Letter and map of October 13, 2006, requesting wetland and CRP locations for possible levee work in Topeka, Kansas.

Dear Ms. Reynolds,

A review of the proposed work area has been made. The current procedure is that we do not have "wetland mapped areas" as such. What we have now is "certified wetlands" as a result of individual landowners requesting a wetland determination on agricultural land. In those cases a sight visit and analysis to made to determine if wetlands exist. No requests have been made by landowners in the proposed areas indicated on the map. So we would have no information as to the wetland status.

A few other items related to wetlands. The Natural Resources Conservation Service through a MOA with your agency determines wetland issues as long as the landuse is agricultural. This kind of work would change its' status to "non-ag" of which then your agency would make the determination. The areas indicated may also be under your agency's jurisdiction due to it's proximity to "The Waters of The U.S.. And finally, there are a few areas of impounded water that may also have wetland considerations.

On the item of the Conservation Reserve Program (CRP) areas. The Farm Service Agency (FSA) in our same building is the agency that manages enrolled land in the CRP. I reviewed the map with Mark Nieman, CED, with FSA and he indicated there was no current land enrolled at the locations indicated in the CRP.

If you have any questions feel free to give me a call.

Sincerely,

Dennis J. Brinkman

Dennis J. Brinkman
DISTRICT CONSERVATIONIST

The Natural Resources Conservation Service provides leadership in a partnership effort to help people conserve, maintain, and improve our natural resources and environment.

An Equal Opportunity Provider and Employer

NRCS
United States Department of Agriculture
Natural Resources Conservation Service
1125 Westport Drive
Manhattan, Kansas 66502-2860

"A Partner in Conservation Since 1935"

Phone: 785-776-5182
FAX: 785-539-7983
www.ks.nrcs.usda.gov

August 28, 2006

Lekesha Reynolds
U.S. Army Corps of Engineers, PM-PR
601 E. 12th Street, Room 843
Kansas City, Missouri 64106

Re: Topeka, Kansas Levees Project.

Dear Ms. Reynolds:

Thank you for the opportunity to review the improvement project the Corps levees along the Kansas River in Topeka, Kansas.

Attached to this letter is form AD-1006, which in indicates the Farmland Conversion Impact Ratings for the four sites where borrow material is proposed to be taken from. As for any other environmental issues for which the Natural Resources Conservation Service is responsible for evaluating, I see no negative concerns at this point in time.

If I can be of further assistance, please let me know.

Sincerely,

Alan R. Boerger
Resource Conservationist

Cc: Lynn Thurlow, Soil Conservationist, NRCS, Salina, Kansas.
Dennis Brinkman, District Conservationist, NRCS, Topeka, Kansas.
Ken Hoffman, ASTC(FO), NRCS, Manhattan, Kansas.

The Natural Resources Conservation Service provides leadership in a partnership effort to help people conserve, maintain, and improve our natural resources and environment.

An Equal Opportunity Provider and Employer

U.S. Department of Agriculture

FARMLAND CONVERSION IMPACT RATING

PART I *(To be completed by Federal Agency)*	Date Of Land Evaluation Request: August 15, 2006
Name Of Project: Topeka Levees	Federal Agency Involved: U.S.A.C.E Kansas District
Proposed Land Use: Borrow areas for fill	County And State: Shawnee County, KS
PART II *(To be completed by NRCS)*	Date Request Received By NRCS: 8/22/06

Does the site contain prime, unique, statewide or local important farmland? *(If no, the FPPA does not apply – do not complete additional parts of this form).*	Yes ☑	No ☐	Acres Irrigated: 7,900 / Average Farm Size: 276 Ac.
Major Crop(s): Corn - Soybeans	Farmable Land In Govt. Jurisdiction Acres: 111,900 % 31.5		Amount Of Farmland As Defined in FPPA Acres: 154,600 % 43.5
Name Of Land Evaluation System Used: LESA	Name Of Local Site Assessment System: —		Date Land Evaluation Returned By NRCS: 8/28/06

PART III *(To be completed by Federal Agency)*	Alternative Site Rating: Site A	Site B	Site C	Site D
A. Total Acres To Be Converted Directly	43.0	98.0	138.0	364.0
B. Total Acres To Be Converted Indirectly				
C. Total Acres In Site	0.0 43.0	0.0 98.0	0.0 138.0	0.0 364.0
PART IV *(To be completed by NRCS)* Land Evaluation Information				
A. Total Acres Prime And Unique Farmland	6.0	55.0	41.0	0
B. Total Acres Statewide And Local Important Farmland	37.0	43.0	97.0	364.0
C. Percentage Of Farmland In County Or Local Govt. Unit To Be Converted	<1	<1	<1	<1
D. Percentage Of Farmland In Govt. Jurisdiction With Same Or Higher Relative Value	78	43	78	100
PART V *(To be completed by NRCS)* Land Evaluation Criterion Relative Value Of Farmland To Be Converted *(Scale of 0 to 100 Points)*	0 14	0 56	0 33	0 0

PART VI *(To be completed by Federal Agency)* Site Assessment Criteria *(These criteria are explained in 7 CFR 658.5(b)*	Maximum Points	Site A	Site B	Site C	Site D
1. Area In Nonurban Use	15	7	13	14	5
2. Perimeter In Nonurban Use	15	9	6	0	8
3. Percent Of Site Being Farmed	20	5	0	20	0
4. Protection Provided By State And Local Government	20	0	0	0	0
5. Distance From Urban Builtup Area	15	5	5	5	5
6. Distance To Urban Support Services	15	0	0	0	0
7. Size Of Present Farm Unit Compared To Average	10	0	0	0	0
8. Creation Of Nonfarmable Farmland	10	0	0	0	0
9. Availability Of Farm Support Services	5	0	0	1	0
10. On-Farm Investments	20	2	0	5	0
11. Effects Of Conversion On Farm Support Services	10	1	1	5	0
12. Compatibility With Existing Agricultural Use	10	0	0	0	0
TOTAL SITE ASSESSMENT POINTS	160	0 29	0 25	0 50	0 18
PART VII *(To be completed by Federal Agency)*					
Relative Value Of Farmland *(From Part V)*	100	0 14	0 56	0 33	0 0
Total Site Assessment *(From Part VI above or a local site assessment)*	160	0 29	0 25	0 50	0 18
TOTAL POINTS *(Total of above 2 lines)*	260	0 43	0 81	0 83	0 18

Site Selected:	Date Of Selection	Was A Local Site Assessment Used? Yes ☐ No ☐

Reason For Selection:

(See Instructions on reverse side)

Form AD-1006 (10-83)

This form was electronically produced by National Production Services Staff

Reynolds, Lekesha W NWK

From: Davis, Nate [nated@wp.state.ks.us]
Sent: Friday, June 01, 2007 2:08 PM
To: Reynolds, Lekesha W NWK
Subject: Topeka Flood Damage Reduction Project

KDWP Track: 20070264 CO: SN Ref: D1.1103
upgrades to levee system surrounding Topeka

Ms. Reynolds,

Impacts to state-listed species should not be significant; however, we recommend mitigation of the 7 acres of woodlands that will be impacted along the South Topeka Unit. Please feel free to contact our office for recommendations on where & how to implement effective mitigation.

Thank you,

Nate Davis
Ecologist;KDWP,Environmental Services Section;512 SE 25th Ave,Pratt,KS 67124
620.672.0795 (O)620.450.8311 (C),nated@wp.state.ks.us
http://www.kdwp.state.ks.us/news/other_services/threatened_and_endangered_species

Reynolds, Lekesha W NWK

From: Susan_Blackford@fws.gov
Sent: Tuesday, May 29, 2007 1:20 PM
To: Reynolds, Lekesha W NWK
Cc: Mike_LeValley@fws.gov; Susan_Blackford@fws.gov
Subject: Re: T& E coord. For Topeka FR Prj

Attachments: USFWS coord. T_E species.doc

USFWS coord. T_E species.doc (...

To: Lekesha Reynolds, Corps of Engineers, Kansas City District
From: Susan Blackford, U.S. Fish and Wildlife Service
Date: May 29, 2007

In accordance with section 7(c) of the Endangered Species Act (16 U.S.C. 1531 et seq.), and based on the information presented to the Service to date, we agree with your determination that there should be no adverse impacts to Federally listed threatened and endangered species from the Topeka Flood Damage Reduction Study (previously called the Topeka Local Flood Protection Project).

Susan Blackford
U.S. Fish and Wildlife Service
2609 Anderson Ave.
Manhattan, KS 66502
785-539-3474 ext. 102
Susan_Blackford@fws.gov

"Reynolds, Lekesha W NWK" <Lekesha.W.Reynolds@nwk02.usace.army.mil>
05/18/2007 08:52 AM

To <mike_LeValley@fws.gov>
cc <susan_blackford@fws.gov>
Subject T& E coord. For Topeka FR Prj

Hi Mike

Please see the attached memo. The map was too large to email. Susan has a hardcopy map. If not I can mail more.
If you have any questions, please call me.

Please respond as soon as possible, but no later than May 31st.

Thanks,

Lekesha W. Reynolds
Corps of Engineers

KSR&C No. 06-07-001

KANSAS

KATHLEEN SEBELIUS, GOVERNOR

Kansas State Historical Society
Jennie Chinn, *Executive Director*

August 25, 2006

Timothy Meade
Cultural Resource Manager
Kansas City District, Corps of Engineers
700 Federal Building
Kansas City, Missouri 64106-2896

RE: Possible Borrow Locations
Levee Construction Along the Kansas River
Shawnee County

Dear Mr. Meade:

In accordance with 36 CFR 800, the Kansas State Historic Preservation Office has examined its cultural resources files and has reviewed your letter (dated August 2, 2006) describing plans for borrow areas associated with improvements to the levee system in Topeka and North Topeka in Shawnee and Jefferson Counties. The proposed borrow areas are all situated between the existing levees and the Kansas River. This area has little potential for archeological sites and as you have pointed out, has been subjected to considerable recent disturbance. We therefore concur with the conclusion that use of the proposed borrow areas during the levee construction project will have no effect on historic properties as defined in 36 CFR 800. This office has no objection to use of the proposed borrow areas.

Any changes to the project, which include additional ground disturbing activities, will need to be reviewed by this office prior to beginning construction. If construction work uncovers buried archeological materials, work should cease in the area of the discovery and this office should be notified immediately.

This information is provided at your request to assist you in identifying historic properties, as specified in 36 CFR 800 for Section 106 consultation procedures. If you have questions or need additional information regarding these comments, please contact Tim Weston at 785-272-8681 (ext. 214).

Sincerely,

Jennie Chinn, Executive Director and
State Historic Preservation Officer

Timothy Weston
for

Patrick Zollner
Deputy SHPO

6425 SW Sixth Avenue • Topeka, KS 66615-1099
Phone 785-272-8681 Ext. 205 • Fax 785-272-8682 • Email jchinn@kshs.org • TTY 785-272-8683
www.kshs.org

U.S. Army Corps of Engineers, Kansas City District

Appendix C.

U.S. Fish and Wildlife Service Coordination Act Report

City of Topeka, Kansas
Flood Risk Management Study
Environmental Assessment

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
Kansas Ecological Services Office
2609 Anderson Avenue
Manhattan, Kansas 66503-6172

March 16, 2007

Dr. Christopher White
U.S. Army Corps of Engineers, Kansas City District
Rm 843, PM-PR
601 E. 12th Street
Kansas City, MO 64106

Dear Dr. White:

Enclosed is our Final Fish and Wildlife Coordination Act Report for the Topeka Local Flood Protection Project (Topeka, Kansas). This FCAR was prepared in accordance with provisions of the Fish and Wildlife Coordination Act (16 U.S.C. 661 et seq.). It constitutes the report of the Secretary of the Interior on the project within the meaning of Section 2 (b) of this Act.

This report is intended to accompany the U.S. Army, Corps of Engineers Environmental Assessment on the proposed project.

Please note the following changes in the FCAR from the Draft CAR.

* Recommendations 2 and 4 have been modified.

* Recommendation 9 has been added.

*A short discussion of the woodland and native vegetation impacts at the South Topeka Unit underseepage berm and the proposed mitigation areas has been added to the Executive Summary and Introduction sections.

*Expanded the discussion of the importance of native vegetation in the Terrestrial Resources Section (page 6).

*The Fish and Wildlife Resources With the Project has been modified to reflect the new recommendation #9 (page 21).

*The Invasive Species Best Management Practice recommendation has been modified. This is located under the Mitigation Discussion Section (page 23).

We are also transmitting a copy of this Final report to the Kansas Department of Wildlife and Parks for review and have requested a letter of concurrence if they generally agree with our report. We will forward their letter of concurrence upon receipt for incorporation within our

report as an appendix.

If you have any questions concerning this final report, please contact Ms. Susan Blackford, of my staff, at 785 539-3474 ext. 102.

Sincerely,

Michael J. LeValley

Michael J. LeValley
Field Supervisor

Enclosure

MJL/shb

FINAL FISH AND WILDLIFE COORDINATION ACT REPORT FOR THE TOPEKA, KANSAS LOCAL FLOOD PROTECTION PROJECT

PREPARED FOR THE

The Kansas City District
U.S. Army Corps of Engineers
Kansas City, Missouri

Prepared by

U.S. Fish and Wildlife Service
Kansas Ecological Services Field Office
Manhattan, Kansas
March, 2007

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Figure 7	Topeka LFPP Wetlands – Western Oakland Borrow Area
Figure 8	Topeka LFPP Wetlands – Eastern Oakland Borrow Area

EXECUTIVE SUMMARY

The Kansas River flood of 1993 caused flood damage to industrial and other properties inside the Topeka, Kansas Local Flood Protection Project (Topeka LFPP) levees due to internal runoff and seepage. The existing levees and other flood protection works provide protection for about the 100-year event. The proposed improvements consist of land side underseepage berms, manhole foundation heel extensions, fill behind floodwalls, new pressure relief wells, gatewells, sluice gates, and floodwall replacements. The Fairchild Pump Station will be abandoned in place. As part of the abandonment, the Corps will remove the above grade structure and fill the below-grade structure and outlet lines with flowable fill. The Madison Street Pump Station will be removed and replaced. No concerns were identified in the Soldier Creek or Auburndale Units. The South Topeka Unit underseepage berm potentially would have the greatest impacts. The work for this unit will impact approximately 5 acres of woodland habitat landward of the levee for construction of the underseepage berm. This loss of woodland habitat is proposed to be mitigated at the borrow/mitigation area west of the North Topeka Unit which would restore approximately 10 acres of cropland and bare ground to a woodland riparian area with native trees, shrubs, and grasses.

Riparian vegetation is the only significant resource anticipated to be impacted by the proposed flood control work. The few, remaining areas of native vegetation represent valuable wildlife habitat. There are many areas of cropland in close proximity to the project sites, including within some of the proposed borrow sites. Areas of native vegetation should be avoided if possible or mitigated.

RECOMMENDATIONS

1. Riparian and wetland habitats should be avoided to the maximum extent practicable when selecting borrow sites for the proposed levee improvements. Compensatory mitigation should be undertaken for unavoidable impacts. Since channelization, levee construction and floodplain development have already resulted in dramatic loss of riparian and wetland habitats in the Kansas River basin within the project area, the Corps should focus on bare or cropland areas for borrow.

2. Levees and levee easements should be seeded with native, warm-season grasses such as buffalo grass (*Buchloe dactyloides*). Buffalo grass is a drought tolerant, perennial, native, turf grass that reaches a height of 8 – 10 inches.

3. The Corps should create wetland mitigation habitat to compensate for the loss of wetland acreage from construction of the projects in accordance with the FWS Region 6 Wetland Mitigation Guidelines, generally at a minimum of 1.5:1 ratio for emergent wetland and at a 2:1 ratio for forested wetland. If farmed wetland is directly impacted by borrow activities it should be mitigated at a 1.0 to1.0 ratio.

4. Removal of woodlands and other native vegetation should be avoided where possible. If avoidance if not possible a mitigation plan should be developed in coordination with the U.S. Fish and Wildlife Service (Service), Environmental Protection Agency (EPA), and the Kansas Department of Wildlife and Parks (KDWP). Woody vegetation and native grasses should be replaced by establishing two acres of native vegetation for every acre impacted.

5. Best Management Practices to prevent the transport of invasive species to or from the construction sites should be included as an integral component of the project.

6. Establish native vegetation riverward of levee segments where riparian woodlands are sparse or nonexistent or where invasive species, e.g. reed canary grass, have become established.

7. All disturbed areas should be immediately planted with native vegetation following construction to prevent erosion and the establishment of invasive species.

8. The potential use of borrow sites for wetland and aquatic habitat enhancement and public recreation should be investigated with the project sponsors and borrow site owners. The City of Topeka is interested in developing a greenway and public access to the Kansas River within the project limits.

9. If possible, establish mitigation areas prior to the onset of impacts from the project to lessen the impacts to wildlife from habitat loss.

INTRODUCTION

This Final Fish and Wildlife Coordination Act Report (FCAR) is submitted pursuant to the Fish and Wildlife Coordination Act (16 U.S.C. 661 et seq.), and the fiscal year 2005 Scope-of-Work Agreement between the U.S. Fish and Wildlife Service (Service) and the U.S. Army Corps of Engineers, Kansas City District (Corps) for the City of Topeka Local Flood Protection Project, Shawnee County, Kansas (LFPP). The FCAR is designed to accompany and is to be incorporated into the Corps' Environmental Assessment on the proposed project. The Service has previously provided a draft Planning Aid Letter (PAL) dated August 29, 1997, a final PAL dated September 4, 1997, and an update to the final PAL dated December 15, 2005.

This study was authorized under authority of Section 205 of the Flood Control Act of 1948, as amended.

Following the flood of 1951, that caused approximately $34,000,000 in damages, an extensive array of eight principal units were built to protect Topeka against future floods. Construction features include some 41.6 miles of levees, over 1,000 feet of flood wall, riprap of levees, five separate systems of relief wells, 17.1 miles of modified channels, 11 pumping plants to take care of interior drainage and relief well discharge, four railroad bridges, and major alterations to two Kansas River railway bridges. Construction of project features required extensive alteration of Topeka's' existing street and highway bridges. The cost of constructing all complete units of the Topeka LFPP was about $21,175,000 Federal and $10,383,000 non-Federal. In addition to the local protection project, the city is now protected by an array of upstream Federal flood control reservoirs on tributaries to the Kansas River Basin. Projects that have come on-line since 1951 include Tuttle Creek Reservoir, Milford Reservoir, Wilson Reservoir, and Glen Elder Reservoir.

The present identified flood problems that surfaced after the flood of 1993 include flood damage to industrial and other properties and damage inside the levees caused by internal runoff and seepage. The existing levees and other flood protection works provide protection for about the 100-year event.

Issues identified in the Topeka LFPP consist of geotechnical and structural concerns. Geotechnical concerns are related to underseepage beneath the levee which may occur during high flow events. If underseepage is allowed to surface on the land side uncontrolled during a flood, it can create a failure of the levee foundation by piping. Underseepage pressures can be countered using either underseepage berms (additional soil placed on the ground surface) to prevent flow to the surface, or by pressure relief wells that provide a controlled path for the underseepage. Berms are usually the preferred method based on lower installation cost and maintenance needs, but require more real estate for installation and borrow areas. In locations where real estate is not available, relief wells can be installed.

Structural concerns are generally related either to uplift pressures or stability weaknesses. Similar to underseepage, uplift pressures are caused by high water on one side of the levee and can severely affect those underground structures located near the levee. This includes manholes, pump stations, and drainage structures (gatewells, sluice gates, and pipes). The easiest method to counter uplift pressures is by installing heel extensions to the structure in question, which is essentially the pouring of a concrete collar around the base of the structure. This may require extensive excavation around the structure. If the structure cannot be sufficiently modified to counteract the pressures, it would need to be replaced, or if no longer a necessary part of the protection system, abandoned.

Stability concerns have been identified at several of the concrete floodwall and closure gap structures. The direct pressure of high water on one side of the structure during a flood may cause either sliding, overturning, or breaking of the structure. The primary method to counter this concern is the installation of a stability berm on the land side of the structure to provide additional support. Structures that cannot be corrected using stability berms require replacement.

No new levees have been proposed for this project. The proposed improvements consist of land side underseepage berms, manhole foundation heel extensions, fill behind floodwalls, new pressure relief wells, and gatewell, sluice gate, and floodwall replacements. The Fairchild Pump Station will be abandoned in place, with removal of the above grade structure and filling of the below-grade structure and outlet lines with flowable fill. The Madison Street Pump Station will be removed and replaced. No concerns were identified in the Soldier Creek or Auburndale Units. The Corps has estimated the amount of needed borrow to be in excess of 281,000 cubic yards.

The South Topeka Unit underseepage berm potentially would have the greatest impacts. The work for this unit will impact approximately 5 acres of woodland habitat landward of the levee for construction of the underseepage berm. This loss of woodland habitat is proposed to be mitigated at the borrow/mitigation area west of the North Topeka Unit which would restore approximately 10 acres of cropland and bare ground to a woodland riparian area with native trees, shrubs, and grasses.

Most of the borrow will be used to construct underseepage and stability berms. Work concerning manholes, pump stations, and floodwalls will occur in previously disturbed areas and, for the most part, urbanized areas and will require little, if any borrow. The only alternatives identified by the Corps for the project is the source of borrow. The alternatives consist of 1) the use of up to four possible borrow areas in close proximity to levee areas which will need borrow or 2) the use of commercially obtained borrow.

DESCRIPTION OF THE STUDY AREA

The project is located in Topeka, Shawnee County, Kansas, in the northeastern part of the State. The project area encompasses levees on both sides of the Kansas River beginning

just east of the sewage treatment plant to the western edge of Topeka near North Highway 75 (approximate River Miles 77.6 to 88.6) (Figure 1).

Topeka is the State Capitol with a US Census 2000 estimated population of 122,377 (Retrieved September 7, 2006 from http://topeka.areaconnect.com/statistics.htm). Topeka is located on the banks of the Kansas River about 84 miles above the junction with the Missouri River. The total drainage area of the Kansas River basin above Topeka is approximately 56,720 square miles. Mean annual discharge is approximately 5,871 cfs. The river flows west to east through the center of the city. Although much of the City south of the river is above flood heights, important railroad and industrial developments, the municipal water works, a sewage treatment plant, and the municipal airport are located on the 3,300-acre flood plain along the south bank of the river. Shunganunga Creek and its tributary Deer Creek are the primary tributaries draining south and southwestern Topeka. Shunganunga Creek enters the Kansas River just to the east of Philip Billard Airport. The north Topeka area, consisting of approximately 5,100 acres, includes business, residential, industrial, and specialized farm developments. Three tributaries enter the Kansas River within this area. They are Soldier, Halfday, and Indian Creeks.

The levees were built close to the Kansas River constricting its floodplain and limiting the amount of riparian habitat. In many areas the levees were built near the top of the banks of the river. At one of the narrowest points near downtown Topeka, the area between the levees on opposite sides of the Kansas River is less than one-half mile wide. The areas between the river and levees contain much of the remaining available wildlife habitat in the project area. The proposed borrow areas are located between the levees and the river as close as possible to the work sites. The Corps is proposing four borrow areas labeled as Waterworks/North Topeka borrow area, South Topeka borrow area, East Oakland and West Oakland borrow area. As an alternative, the Corps is also evaluating the use of commercially obtained borrow in which the source may be from river dredging.

The Soil Survey, Shawnee County, Kansas (USDA 1970) identifies the primary soil associations of the project area as the Eudora-Muir, Martin-Sogn, and Pawnee-Shelby-Morrill associations. Most of the proposed borrow areas occur in the Eudora-Muir association which is deep, well-drained or moderately well drained soils that have a clay or clay loam subsoil on benches in the Kansas River Valley. The other two soil associations are described in the same manner except they are found on uplands.

Terrestrial Resources

Most of the vegetation in the study area has been greatly impacted by urban development and agricultural land clearing. The major land use of the project area is urban, with cropland being the second major land use (Figure 2). There are a few small patches of native prairie in or near the project area and pockets of riparian woodlands. The area between the levees, which includes the Kansas River, contains much of the remaining

wildlife habitat. The remaining areas of native vegetation provide vital habitat for local wildlife, and migrating songbirds. The lack of native vegetation is a limiting factor for the populations of these species. As the establishment of native vegetation may take years, or even decades for woodlands, the removal of existing areas may cause further declines in the numbers of individuals and the numbers of species that are dependent on these areas. Mitigating the loss of these areas at a 2:1 ratio offers some compensation for the temporal loss of habitat and allows space for planting an a greater number of trees than were removed in acknowledgment that many of those planted will not survive to maturity.

The Kansas River provides important habitat for wildlife in an area in which the primary landcover types are urban and agricultural. The river provides waterfowl and shorebird resting feeding, and staging areas during migration. In spring and summer, sandbars and islands provide protected feeding and potential nesting sites for Canada geese and shorebirds. Stream banks provide habitat for bank swallows, belted kingfishers, beaver, and muskrat. Many riparian areas are sparsely vegetated with "weedy" annuals or mowed grass.

In a few areas the riparian vegetation is more robust consisting of native tree species like cottonwood, willow, sycamore, American elm, and maple, along with grasses, shrubs, and herbaceous species. These riparian areas provide food and cover for many neotropical migrant birds, and wintering habitat for the bald eagle. Currently, riparian woodlands in the project area consist mainly of small pockets of trees riverward of the levees.

The riparian woodland that remains along the Kansas River is the highest quality habitat in the Topeka area. It offers the greatest vegetative diversity and degree of interspersion with other habitat types, which is important to many wildlife species. Additionally, riparian woodlands are important for preventing streambank erosion; intercepting sediments and pollutants before entering streams; providing shade and leaf detritus to the stream; and providing recreational opportunities through fishing, nature study, and wildlife observation.

White-tail deer, raccoons, and other wildlife also use riparian habitats. Linear corridors of habitat, such as that found along the Kansas River, allow animals to disperse throughout their ranges, preventing genetic isolation and allowing the reestablishment of populations in areas, like Topeka, where wildlife may have been eliminated in the past.

As indicated previously, Soldier and Shunganunga creek have been channelized and contained within a levee system within north and south Topeka respectively. The new channels were cut through agricultural fields and the raw earth of the new levee banks and stream channel were planted to grasses. There are a few individual trees on the banks of the stream but no area remains that would qualify as riparian woodland.

Reptiles, amphibians and birds are the local wildlife most likely to be impacted from the project with most of the impacts due to the taking of borrow.

Thompson and Ely (1989) report that 424 bird species have been recorded in Kansas. The state's central location is an important contributing factor to this large species count, containing both eastern deciduous forest and the central grasslands and it is on a major flyway. Kansas is also a wintering area for far-northern birds, as well as a breeding area for typically southern species. Our major rivers funnel in stragglers from the Rocky Mountains. Many migratory songbird species are dependent on woodlands, and especially riparian woodlands, for food, shelter, and raising of young. As a prairie state, bird species dependent on grasslands are predominant in Kansas. However, as a group, grassland birds are declining at a faster rate than any other group of birds in North America.

Reptiles and amphibians found in Shawnee County include the tiger salamander, plains spadefoot, American toad, Woodhouse's toad, Blanchard's cricket frog, western chorus frog, gray treefrog, plains leopard frog, bullfrog, plains narrowmouth toad, common snapping turtle, ornate box turtle, western painted turtle, red-eared slider, midland smooth softshell turtle, western spiny softshell turtle, ground skink, five-lined skink, great plains skink, prairie skink, prairie-lined racerunner, western worm snake, prairie ringneck snake, rough green snake, eastern yellowbelly racer, black rat snake, bullsnake, prairie kingsnake, common kingsnake, milk snake, red-sided garter snake, lined snake, Texas brown snake, Graham's crayfish snake, northern water snake, copperhead, massasauga, and timber rattlesnake.

Aquatic Resources

Aquatic resources of the area consist of the Kansas River and the north or left bank tributary stream Soldier Creek and the right bank tributary Shunganunga Creek to the south. The quality of these streams varies according to a number of factors.

Ninety-nine species of fish inhabit the Kansas River basin of which at least 19 are probably introduced, non-native species. The distribution and abundance of most species have changed markedly in this century in response to reservoir construction and land use changes. Cross and Collins (1995) state that species found in the lower Kansas River and within the immediate area of Topeka are gizzard shad, bigmouth buffalo, black buffalo, shorthead redhorse, channel and flathead catfish, freshwater drum, longnose gar, shortnose gar, river carpsucker, silver chub, speckled chub, emerald shiner, red shiner, sand shiner, goldeye, plains minnow and common carp (an introduced species), shovelnose sturgeon, American eel, speckled chub, western silvery minnow, sturgeon chub, creek chub, blue sucker, green sunfish, orangespot sunfish, largemouth bass, white crappie, and orangethroat darter. A Kansas State University fish survey of the Kansas River between River Miles 75 and 79 found most of the above fish. The dominant species found during the survey were river carpsucker, red shiner, sand shiner, and western mosquitofish. In addition, the survey found two species, the blue sucker and the quillback, that are listed as State of Kansas Species in Need of Conservation (SINC) (Craig Paukert, pers. comm., September 25, 2006).

In a 1977 report, Kansas River Basin, Kansas, Preliminary Stream Survey, by the Kansas Forestry, Fish and Game Commission, angler utilization from approximately Junction City to Kansas City was 29,909 angler days per year. With increasing population during the last 20 years within the river corridor from Junction City to Kansas City, recreation and angler days have, no doubt, also increased.

The proposed flood control improvements will take place within a reach of the Kansas River identified by the Kansas Water Authority in the 1992 State Water Plan, as suitable for development, management, and promotion for its recreational opportunities. The river that divides Topeka, however, is under utilized by the resident population. This may be due, in part to a lack of adequate access or development of park lands riverward of the flood control levee system. Several boat launching facilities and fisherman-access sites have been constructed along the Kansas River in recent years. One access site, named the Topeka Seward Avenue Kaw River Access, has been developed in the project area. Boating use of the river through the Topeka area is problematic due to the hazard presented by the Topeka Low Head Dam. Portage around this hazard is difficult.

Soldier Creek, a north bank tributary, joins the Kansas River at Topeka. The narrow watershed of approximately 157 square miles, traverses southern Nemaha, Jackson, and northern Shawnee Counties flowing in a south-southeasterly direction. Approximately one half of the present Pottawatomie Indian Reservation lies in the lower Soldier Creek Basin.

The mainstem of Soldier Creek has been extensively altered in the lower reach for flood control purposes. An extensive array of levees, channelization and other stream alteration work has been completed but stream degradation caused by these stream alterations has persisted. The channel degradation, which includes both widening and deepening of the stream channel through erosion, has slowly moved upstream endangering roads, bridges, and railroads and destroying much of the remaining stream-side vegetation. In response to the degradation, grade control structures have been installed, to help slow down and perhaps stop the severe erosion, scouring, silting, and water quality degradation that has occurred.

Shunganunga Creek originates approximately 2.5 miles west of Sherwood Lake. From Sherwood Lake it flows northeasterly across the city of Topeka, and joins the Kansas River about 2.25 miles east of the city. West of Topeka, the banks are heavily wooded with mature trees and mixed shrubs. From 15th street east, the channelized banks are devoid of trees, but include a fair cover of mixed weeds and grasses. Land use of this watershed is estimated to be 95% urban development. The remaining five percent is cultivated to primarily milo and soybeans. Urbanization and channelization have made most of the area inaccessible or unattractive for fishing.

Soldier and Shunganunga Creek have been classified as moderate fishery resource (Value Class III) by the Kansas Department of Wildlife and Parks, (formerly the Kansas Fish and Game Commission). There are several important game fish present in these streams including catfish, crappie, and walleye. Due to channelization, these streams have

shallow water, steep mud banks, and very little diversity within the city limits. In this lower reach most fishing is confined to backwater areas of the Kansas River at the mouth of each stream. In its upper reach Soldier Creek still supports specialized species including stoneroller, bluntnose minnow, sand shiner, and slender madtom.

Wetlands

Wetlands on the Kansas River floodplain in close proximity to Topeka are small and contain water seasonally. During drier years most wetlands are farmed. Therefore, vegetation diversity is relatively low and consists mostly of annual species such as smartweed and foxtail barley. These wetlands are important for the production of invertebrates and serve as habitat for amphibians. When not cropped, they provide habitat for cottontail rabbit, ring-neck pheasant, and many non-game animals. Wetlands are present in the cut-off remnants of the old Soldier Creek and Shunganunga Creek channels. These wetlands consist of narrow linear habitats with prairie cordgrass, smartweed, switchgrass, and cattails in the wettest areas. Remnants of the riparian woodlands that covered their banks also persist in a few areas, particularly the old channel of Shunganunga Creek on the Billard Airport grounds and at the mouth of the old Soldier Creek where it enters the Kansas River.

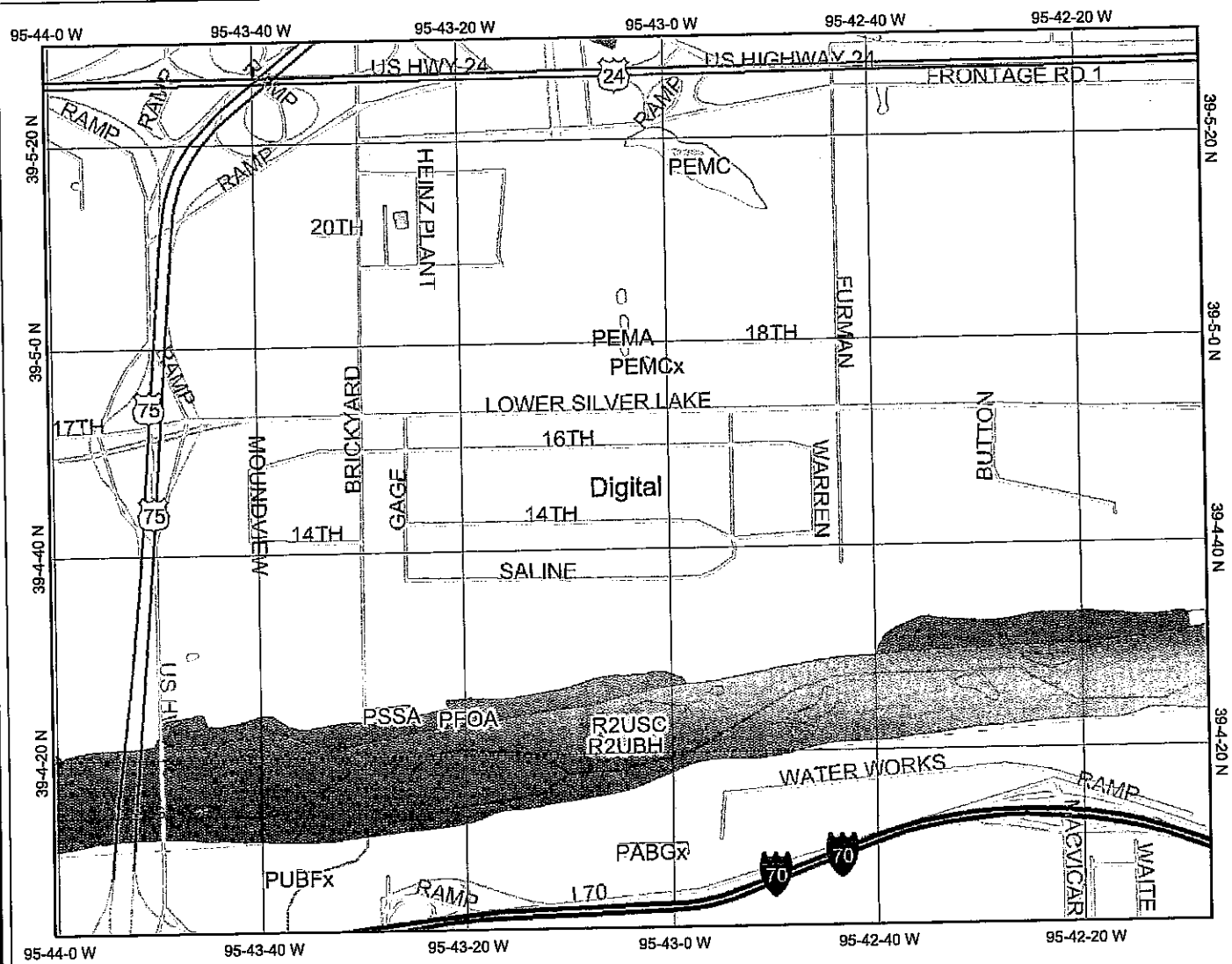
The National Wetland Inventory database indicates the existence of wetlands within the project area (Figures 3 – 8). Wetland impacts should be mitigated in accordance with the FWS Region 6, Wetland Mitigation Guidelines presented in the Mitigation Discussion section.

Federal Threatened and Endangered Species

Section 7 of the Endangered Species Act, 87 Stat. 884, as amended, requires Federal Agencies to ask the Secretary of the Interior, acting through the U.S. Fish and Wildlife Service, whether any listed or proposed endangered species may be present in the area of each Federal construction project. If the project may effect listed species, the Corps of Engineers should initiate formal Section 7 consultation with this office. If there will be no effect, or if the Fish and Wildlife Service concurs in writing that there will be beneficial effects, further consultation is not necessary.

There are three federally-listed species that may occur within the project area. The bald eagle (*Haliaeetus leucoccephalis*), federally-listed as threatened, frequents reservoirs and large rivers in Kansas during the winter months. Perry Reservoir (northeast of Topeka), Clinton Reservoir (southeast of Topeka), and the Kansas River also have nesting pairs of bald eagles, with parents and young remaining in the area throughout the spring and summer months. Eagles use large trees and snags in close proximity to water. If any trees at least 50 feet tall and/or 24 inches diameter at breast height (dbh) or 10 or more trees greater than 12 inches dbh are to be removed riverside of the levees, consultation with the Service may be required pursuant to section 7 of the Endangered Species Act (16 U.S.C. 1531 et seq.).

Topeka LFPP Wetlands



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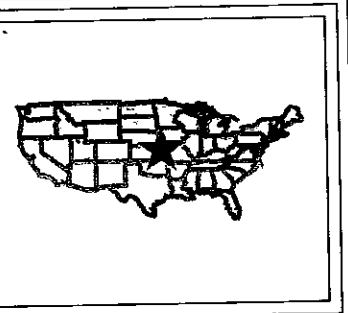

Legend

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- Major Roads
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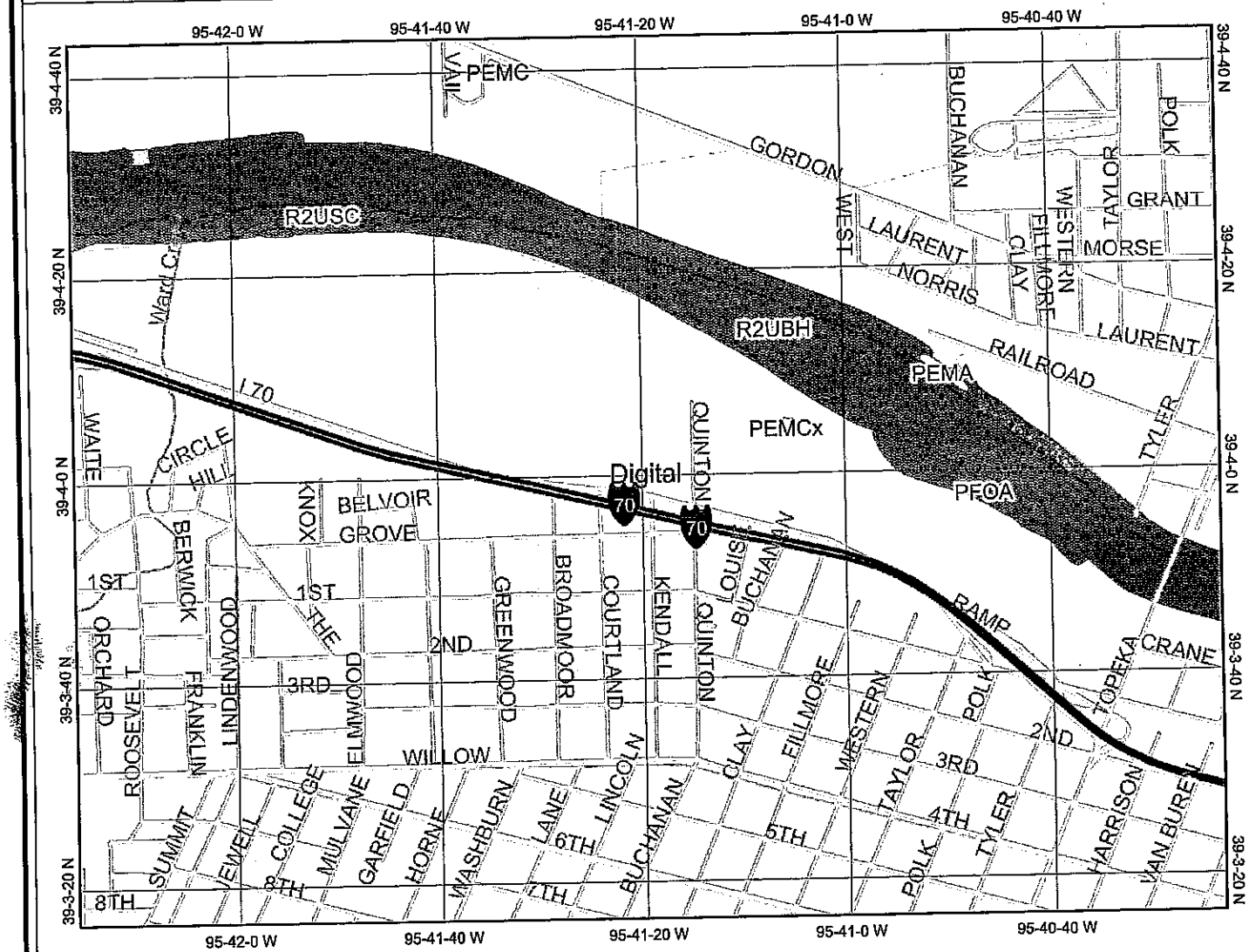
- Roads
- Lower 48 Wetland Polygons
- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine
- NHD Streams
- Urban Areas 300K

Scale: 1:25,000

This map is a user generated static output from an Internet mapping site and is for general reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable. THIS MAP IS NOT TO BE USED FOR NAVIGATION.

Figure 3. Map includes the Waterworks Unit, North Topeka Unit, and the Waterworks-North Topeka Borrow/Mitigation Area

Topeka LFPP Wetlands



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- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine
- NHD Streams
- Urban Areas 300K

N

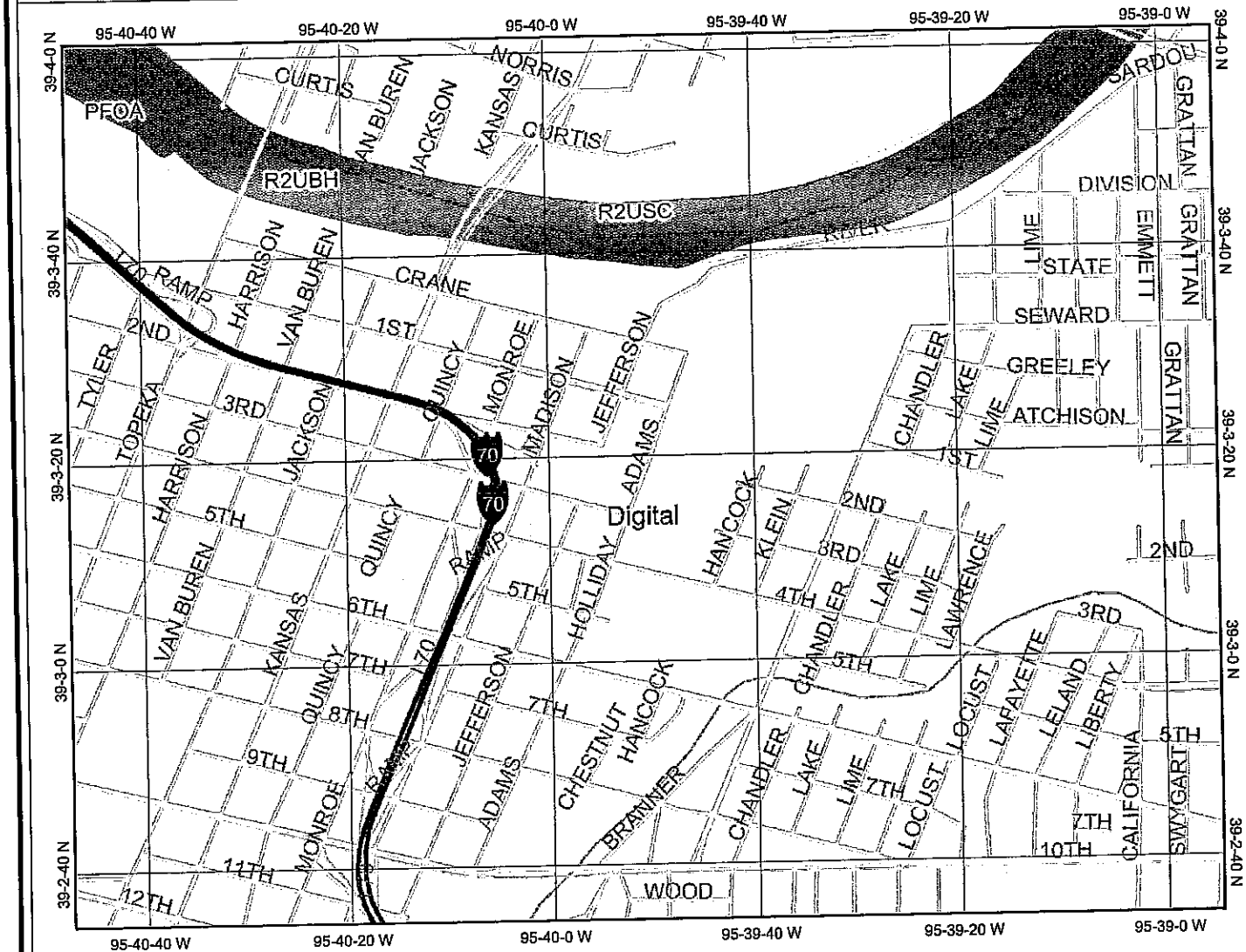
Scale: 1:25,000

Map center: 39° 4' 0" N, 95° 41' 20" W

This map is a user generated static output from an Internet mapping site and is for general reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable. THIS MAP IS NOT TO BE USED FOR NAVIGATION.

Figure 4. Map includes the South Topeka Borrow area and the western South Topeka Unit

Topeka LFPP Wetlands



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- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine
- NHD Streams
- Urban Areas 300K

Scale: 1:25,000

Map center: 39° 3' 18" N, 95° 39' 51" W

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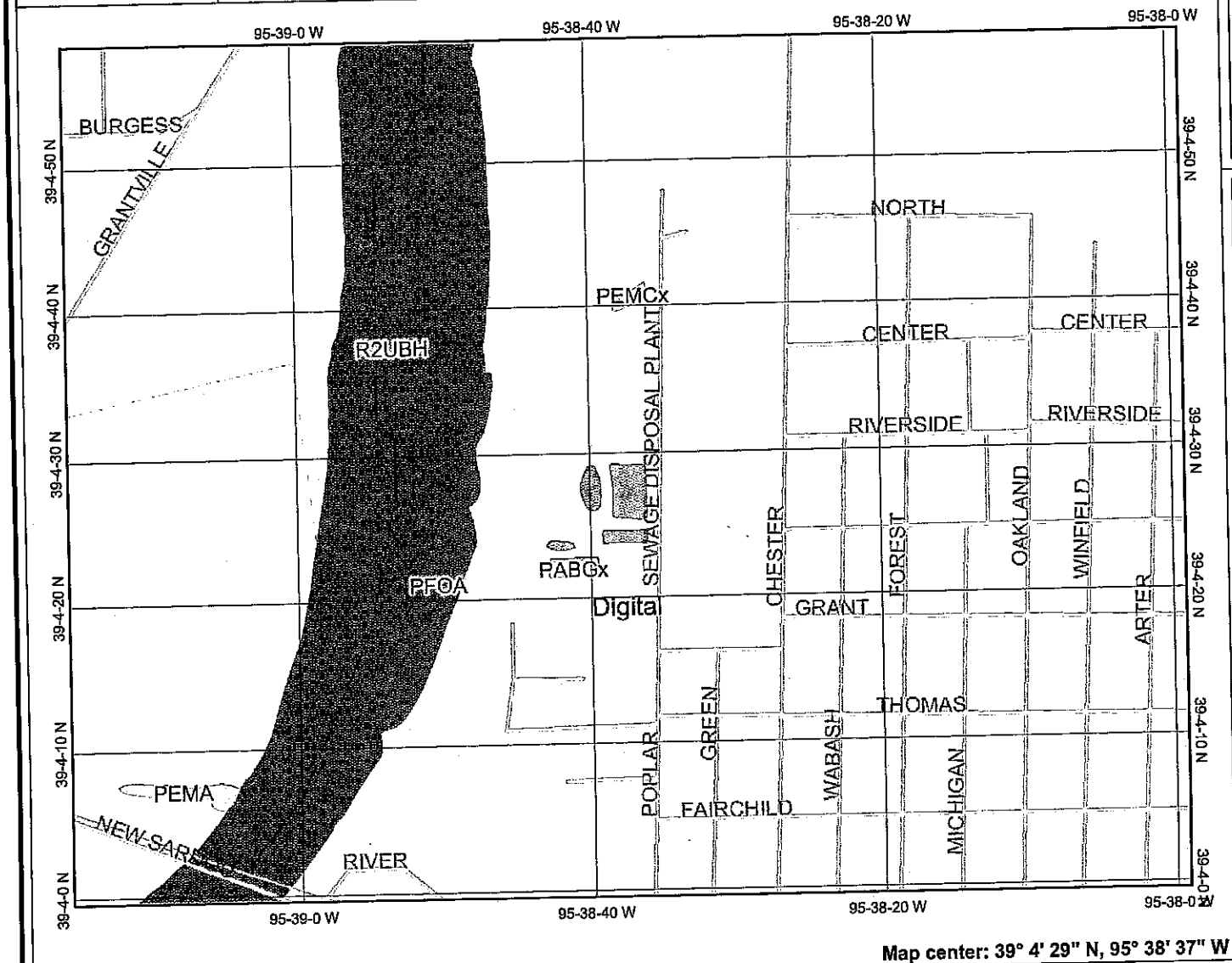
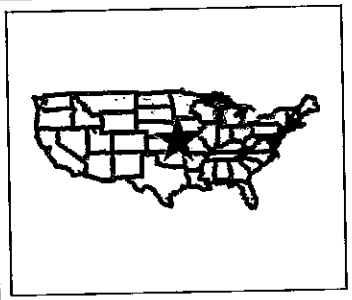
Figure 5. Map includes the eastern South Topeka Unit and the southern Oakland Unitt

Topeka LFPP Wetlands





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- Estuarine and Marine Wetland
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- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine
- NHD Streams
- Urban Areas 300K

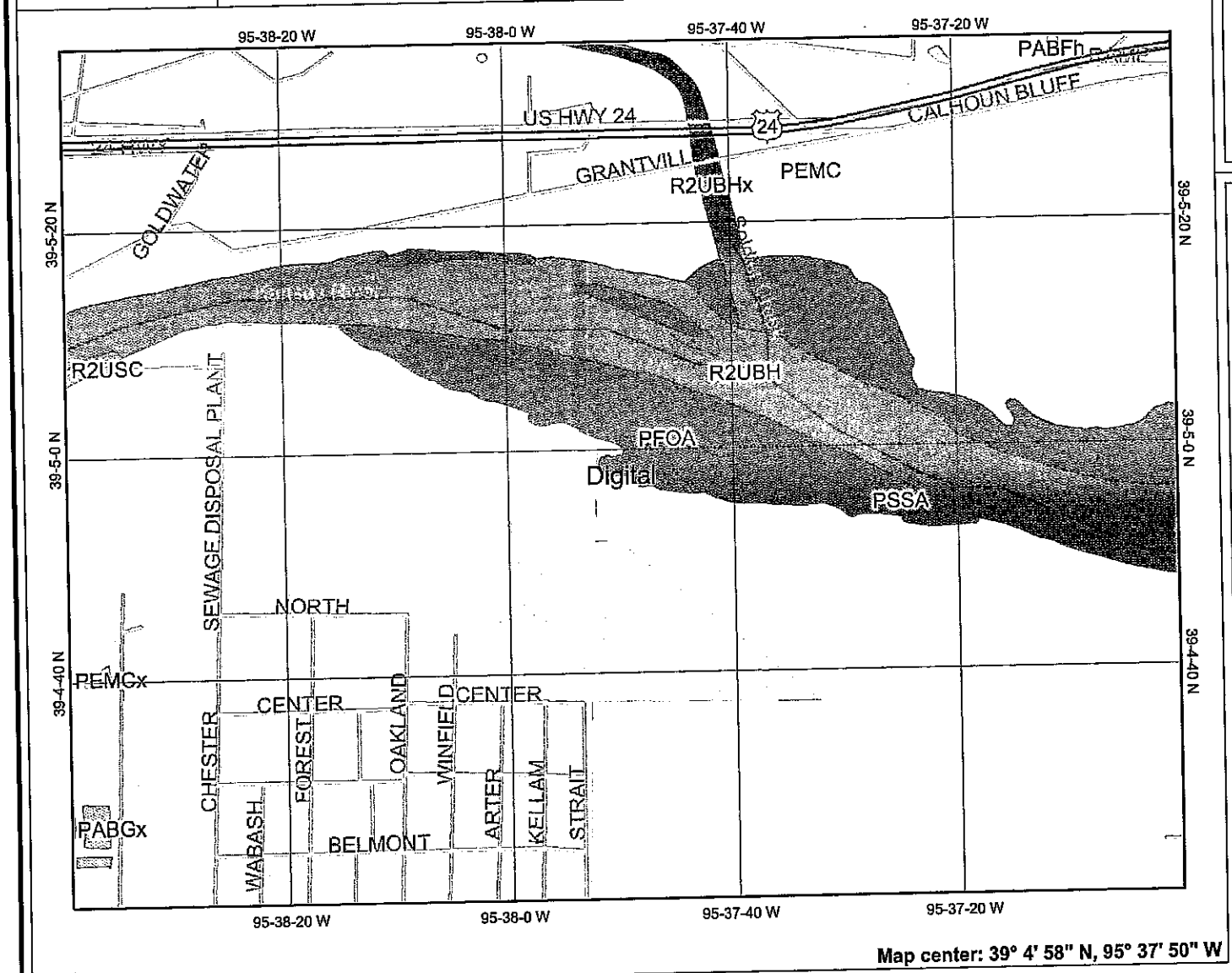
Scale: 1:17,000

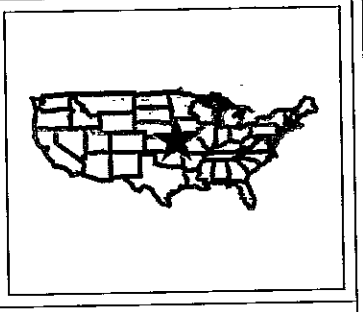
Map center: 39° 4' 29" N, 95° 38' 37" W

This map is a user generated static output from an Internet mapping site and is for general reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable. THIS MAP IS NOT TO BE USED FOR NAVIGATION.

Figure 6. Map includes the northern Oakland Unit

Topeka LFPP Wetlands





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- Lower 48 Wetland Polygons
- Estuarine and Marine Deepwater
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- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine
- NHD Streams
- Urban Areas 300K

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Scale: 1:22,000

This map is a user generated static output from an Internet mapping site and is for general reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable. THIS MAP IS NOT TO BE USED FOR NAVIGATION.

Figure 7. Map includes the western Oakland Borrow Area

In addition, if any project activity appears likely to harass or disturb any bald eagle observed at or near any construction site, this office should be notified prior to commencement of the activity, so that an assessment may be made of the potential for adverse impacts. An activity which harasses a bald eagle or any listed species and disrupts its normal breeding, feeding, or sheltering activities to the extent that harm or injury results is a prohibited taking under the Endangered Species Act.

The high flows on the Kansas River in July 1993 and in May 1995 caused many new high elevation sandbars on the Kansas River. This flood-induced habitat was attractive to piping plovers (*Charadrius melodus*), federally-listed as threatened, and least terns (*Sterna antillarum*), federally-listed as endangered. The first documented nesting of least terns and piping plovers was in 1996 and 1997, respectively (Busby 1997). This was the first nesting of piping plover ever recorded in Kansas and the first time least terns were known to nest along the Kansas River. Since 1998, nesting locations of these two bird species have been monitored throughout the breeding season to determine productivity of the species (Boyd 2005).

Our office has worked closely with the Kansas City District Corps of Engineers (Corps) to monitor nesting tern and plover colonies on the Kansas River. We are involved in water release decisions made by the Corps in an attempt to avoid direct take of active nests. Beginning in 1997, the Service's Kansas Field Office staff has conducted boat surveys of the upper Kansas River, searching for tern and plover nesting colonies. Currently, the tern and plover nests nearest to the Topeka LFPP area are at Kansas River Miles 109 and 65. However, suitable habitat exists in the Kansas River within the Topeka LFPP area.

The State of Kansas lists several species as threatened or endangered as occurring in Shawnee County that are also Federally-listed species. These include the American burying beetle, Eskimo curlew, whooping crane and Topeka shiner. While these species may occur in Shawnee County, suitable habitat for them is not present in the project area and therefore they have not been included in this Section.

Migratory Bird Treaty Act

Under the Migratory Bird Treaty Act (MBTA), construction activities in prairies, wetlands, stream, and woodland habitats, including the removal of upland borrow, and those that occur on bridges (e.g., which may affect swallow nests on bridge girders) that would otherwise result in the taking of migratory birds, eggs, young, and/or active nests should be avoided. Although the provisions of the MBTA are applicable year-round, most migratory bird nesting activity in Kansas occurs during the period of April 1 to July 15, although some migratory birds are known to nest outside this period. If the proposed project may result in the take of nesting migratory birds, the Service recommends a field survey during the nesting season of the affected habitats and structures to determine the presence of active nests. Our office should be contacted immediately for further guidance if a field survey identifies the existence of one or more active bird nests that cannot be avoided temporally or spatially by the planned activities.

State Listed Species

Kansas State Law (K.S.A. 32-504, 32-507: effective May 1, 1981) requires persons undertaking or sponsoring publicly funded or State or Federally Assisted action which is likely to impact endangered or threatened wildlife habitat where they are likely to occur, to obtain a project action permit from the Secretary of the Kansas Department of Wildlife and Parks (KDWP) prior to initiation of such action. In addition to the federally-listed threatened and endangered species, the State lists additional species that may be of concern within the project areas.

The KDWP maintains a list of State listed threatened and endangered species and species in need of conservation (SINC). The following list of species was retrieved September 22, 2006 from http://www.kdwp.state.ks.us/news/content/pdf/7035. As these lists are periodically updated, the Corps should contact KDWP directly for the most current information at Environmental Services Section, 512 SE 25th Ave, Pratt KS 67124-8174.

State-listed endangered species in Shawnee County include American burying beetle (*Nicrophorus americanus*), Eskimo curlew (*Numenius borealis*), least tern (*Sterna antillarum*), peregrine falcon (*Falco peregrinus*), silver chub (*Macrhybopsis storeriana*), and whooping crane (*Grus americana*).

State listed threatened species in Shawnee County includes bald eagle (*Haliaeetus leucocephalus*), eastern spotted skunk (*Spilogale putorius*), piping plover (*Charadrius melodus*), smooth earth snake (*Virginia valeriae*), snowy plover (*Charadrius alexandrinus*), sturgeon chub (*Macrhybopsis gelida*), and Topeka shiner (*Notropis topeka*). In addition, the State has designated critical habitat for the bald eagle along the Kansas River corridor and for the sturgeon chub in the Kansas River (Jim Hays, pers. comm.. Sept. 25, 2007).

SINC species listed for Shawnee County include black tern (*Chlidonias niger*), bobolink (*Dolichonyx oryzinvorus*), Cerulean warbler (*Dendroica cerulean*), golden eagle (*Aquila chrysaetos*), Henslow's sparrow (*Ammodramus henslowii*), plains minnow (*Hybognathus placitus*), short-eared owl (*Asio flammeus*), southern bog lemming (*Synaptomys cooperi*), southern flying squirrel (*Glaucomys volans*), tadpole madtom (*Noturus gyrinus*), timber rattlesnake (*Crotalus horridus*), whip-poor-will (*Camprimulgus vociferous*), and yellow-throated warbler (*Dendroica dominica*).

EVALUATION OF ALTERNATIVES CONSIDERED

Previous alternatives considered included 1-foot incremental heightening of the existing levee system at five of the eight levee units located along portions of the Kansas River and Soldier Creek. The units that were considered for levee improvements were the North Topeka, Oakland, Soldier Creek Diversion, South Topeka, and Waterworks. Levee height was proposed to be increased 1, 2, 3, 4, or 5 feet maximum with a

corresponding widening of the levee base to accommodate the increase in height. The levee raises would have been accomplished on the landward-side whenever possible to maintain the present floodway cross-section.

The levee raise alternatives have not been brought forward and under the current proposal no new levees have been proposed for this project. The proposed improvements consist of land side underseepage berms, manhole foundation heel extensions, fill behind floodwalls, new pressure relief wells, and gatewell, sluice gate, and floodwall replacements. The Fairchild Pump Station will be abandoned in place, with removal of the above grade structure and filling of the below-grade structure and outlet lines with flowable fill. The Madison Street Pump Station will be removed and replaced. No concerns were identified in the Soldier Creek or Auburndale Units. The Corps has estimated the amount of needed borrow to be in excess of 281,000 cubic yards (cy).

The following is a list of the specific modifications proposed for the Topeka Levee system by unit and location.

Oakland Unit

- Station 64+00 to 80+00, install new land side underseepage berm. 6.5 feet of fill, 240 ft. wide, 70,000 cubic yards (cy) material.

- Station 75+50. Manhole requires foundation heel extensions to mitigate uplift pressures.

- Station 220+00. East Oakland Pump Station requires heel extensions to mitigate uplift pressures.

- Station 489+50. 2 ft. of additional fill required behind floodwall to meet sliding stability requirements.

- Station 489+81. 2 ft. of additional fill required behind floodwall to meet sliding stability requirements.

North Topeka Unit

- Approximately Station 165+00 to 189+00, install new land side underseepage berm. 7 feet of fill, 220 feet wide, 140,000 cy material

- Station 246+00 to 250+00 install new pressure relief wells. Need 6 wells spaced at 75 feet, each a length of 75 feet. The wells are to drain to a central manhole using a buried header system; the total discharge of the system is to be 1 cfs per well or 6 cfs total (2700 GPM). The drainage district will be required to pump the water down 1 foot below existing ground when the river is near the top of levee. A pad should be constructed on the slope for access. The railroad has a series of tracks just outside of the toe of the levee. Work may need to be done

inside of the footprint (temporary excavation for drilling access, header pipe system and manhole installation).

- Station 364+60. Fairchild Pump Station to be abandoned in place. Fill below-grade structure and outlet lines with flowable fill. Remove above-grade structure.

South Topeka Unit

- Approximately Station 22+00 to 48+00, install new land side underseepage berm. 5 feet of fill 100 feet wide, 71,000 cy material.

- Station 74+41 to 93+86. Remove and replace existing pile founded concrete floodwall.

- Station 69+22. Gatewell to be replaced as part of floodwall replacement.
- Station 75+62. Gatewell to be replaced as part of floodwall replacement.
- Station 86+09. Gatewell to be replaced as part of floodwall replacement.
- Station 86+55. Gatewell to be replaced as part of floodwall replacement.

- Station 16+07. Manhole requires heel extensions to mitigate uplift pressures.
- Station 84+10. Manhole requires heel extensions to mitigate uplift pressures.
- Station 84+10a. Manhole requires heel extensions to mitigate uplift pressures.
- Station 85+57. Manhole requires heel extensions to mitigate uplift pressures.

- Station 88+69. Riverside sluice gate to be replaced along with floodwall.
- Station 91+02. Riverside sluice gate to be replaced along with floodwall.

- Station 75+84. Install wall stiffener at Kansas Avenue Pump Station to meet required strength factor of safety.

- Station 86+00. Remove and replace Madison Street Pump Station.

Waterworks Unit

- Stations 0+78 to 7+00 and 10+00 to 16+50. 2 ft. of additional fill required behind floodwall to meet sliding stability requirements. Total of 1,272 linear feet of fill extending 5 feet out from floodwall centerline then tapered at a 1 on 3 slope.

- Stations 13+07 and 15+95. 2 ft. of backfill behind stoplog gap sidewalls to address sliding stability.

There are no concerns identified in the Soldier Creek or Auburndale Units.

The only alternatives under consideration concern the source of borrow. The Corps is considering the use of borrow from several sites riverward of the levees that would be in close proximity to the work sites or alternatively to use commercially obtained borrow.

If the Corps uses commercially obtained borrow it may likely come from permitted dredging operations in the Kansas River. Dredging for sand and gravel has been permitted on the Kansas River and in the recent past dredging operations were active near the project area. To address river bed degradation and other dredging-related impacts to the morphology and ecology of the river and impacts to other public and private interests the Corps implemented the Regulatory Plan for Commercial Dredging Activities on the Kansas River (1990). The Plan mandates that the maximum allowable reduction in the surface elevations of the riverbed is 2 feet for each reach of the river at which time it is termed a "dredged-out reach". At that point the dredging operation must move out of that particular river reach. Due to river bed degradation only one commercial dredger is still operating on the river in the Topeka area although another is seeking a permit to operate a dredge in another reach east of Topeka (Joshua Marx, COE, pers. comm.).

FISH AND WILDLIFE RESOURCES WITHOUT THE PROJECT

Much of the land in the project areas has been converted to urban uses and cropland. Existing wildlife habitat is scarce and generally low quality due to habitat fragmentation and replacement of native vegetation with non-native or low quality vegetation. We do not anticipate much change in land use, and therefore impacts to fish and wildlife resources, if the project does not occur.

FISH AND WILDLIFE RESOURCES WITH THE PROJECT

Grassland strips occurring on and adjacent to the levee and the toe would be temporarily impacted during construction grading, sloping, and grubbing for the seepage and stability berms. Impacts would be temporary but would cease to provide habitat to existing wildlife during project construction and for approximately two to three years after project completion or until the grassland vegetation is well established.

Riparian vegetation is the only significant resource anticipated to be impacted by the proposed flood control work. The few, remaining areas of native vegetation represent valuable wildlife habitat. Areas of native vegetation should be avoided. There are many areas of cropland in close proximity to the project sites, including within some of the proposed borrow sites. Work in the riparian areas area will displace wildlife that currently use the area due to disturbances from noise, dust, human activity, machinery and destruction of habitat. Depending on construction timing, this displacement could result in serious consequences to wildlife such as loss of reproduction and possible death of individual animals from accidents (crossing roads and unknown hazards in new areas), starvation, competition for other areas, etc. There is little refuge habitat in close proximity to the project area and available habitat is presumably at carrying capacity

which further reduces the likelihood of wildlife surviving the displacement and intensifies the competition for the limited habitat available. Although the temporal displacement may be relatively short, the repercussions could be long-term. Impacts to migrating songbirds are of particular concern. Existing wildlife travel corridors linking the borrow areas and other areas of suitable floodplain upstream and downstream of the borrow area should be maintained during project construction. Establishment of mitigation areas prior to the onset of project construction would lessen the impacts to wildlife from habitat loss.

Construction activities would cause temporary, short-term impacts to fish and wildlife from noise, dust; and the presence of workers and machinery. Runoff from construction areas, access roads, staging areas and unprotected fills could degrade water quality inside the levee system. Accidental spills of fuels, lubricants, hydraulic fluids, and other petrochemicals would be harmful to aquatic life.

Remaining wetlands in the project area are few and relatively small. Impacts to these wetlands should be avoided. In addition, the removal of fill from cropland areas has the potential to cause the loss of farmed wetland. Farmed wetland should be delineated within the borrow site and should be avoided if possible. If an unavoidable loss is incurred, the quantity and quality of the farmed wetland will determine the amount of compensation necessary to offset project losses. The wetland mitigation plan would be developed in coordination with the Corps, EPA, and KDWP. This plan should include site locations, time frames, construction plans, a monitoring plan, progress reports, and standards of success. This plan should be a condition of any permit issued for the project. Borrow operations could be used to create wetlands or aquatic habitats. The potential for borrow sites to be designed to enhance habitat should be initiated with the project sponsors and borrow site owners. The completed plan should be implemented regardless of whether impacted wetlands are classified as jurisdictional for purposes of the Clean Water Act.

MITIGATION DISCUSSION

The Service has established a mitigation policy used as guidance in determining resource categories and recommending mitigation (46 FR: 7644-7663).

We have determined that most of the wildlife habitat that would be affected by the raising of existing levees (levee footprints and easements) is in Resource Category No. 4 (habitats of medium to low value). For this category, loss of habitat value should be minimized.

Forested wetland and riparian woodland are consistent with Resource category No. 2 that is, habitats are of high value that are relatively scarce or becoming scarce on a national or regional basis. Forested wetlands have been found to support significantly higher abundance and diversity of bird species compared to upland forests (Brinson 1981).

Losses attributed to the project would require in-kind mitigation (replacement of habitat value lost with equal habitat values of the same kind of habitat as those eliminated). The cost of mitigating habitat losses should be included as a project cost. Mitigation for impacts to these areas should be included in the mitigation plan developed in cooperation with the Service, EPA, and KDWP.

The National Wetland Inventory (NWI) database indicates that wetlands exist within the project area. A jurisdictional wetland determination will be necessary if levee alignments or borrow areas directly impact wetlands. The quantity and quality of existing wetlands will determine the amount of compensation necessary to offset project losses. A wetland mitigation plan would be developed in coordination with the Corps, Service, EPA, and KDWP. This plan would include site locations, time frames, construction plans, a monitoring plan, progress reports, and standards of success. This plan would be a condition of any Section 404 permit issued for the project. The plan should be implemented regardless of the regulatory nature of the wetland. Impacts to farmed wetlands should be mitigated at a minimum 1:1 ratio. Minimum replacement ratios for compensatory wetland mitigation should be based on the following guidelines:

U.S. Fish and Wildlife Service, Region 6
Wetland Mitigation Policy Guidance (8/97)
Recommended Minimum Replacement Ratios

Mitigation Type	Ratio	Type of Wetland Being Mitigated
Advance Creation	1.5:1	forested, scrub-shrub
	1:1	emergent
Concurrent Creation	2:1	forested, scrub-shrub
	1.5:1	emergent
Advance Restoration	1.5:1	forested, scrub-shrub
	1:1	emergent
Concurrent Restoration	2:1	forested, scrub-shrub
	1.5:1	emergent
Advance Enhancement	3:1	forested, scrub-shrub
	2:1	emergent
Concurrent Enhancement	4:1	forested, scrub-shrub
	3:1	emergent

Whenever possible, we recommend upland trees within the construction right-of-way remain undisturbed. While the trees may be young now, they are closer to a mature and more valuable stage than newly established tress.

Trees at least 50 feet tall and /or 24-inches dbh riverside of the levees should be avoided. Removal of these trees may adversely affect the habitat of the bald eagle.

Under the Migratory Bird Treaty Act (MBTA), construction activities in prairies, wetlands, stream and woodland habitats, including the removal of upland borrow, and those that occur on bridges (e.g., which may affect swallow nests on bridge girders) that would otherwise result in the taking of migratory birds, eggs, young, and/or active nests should be avoided. To minimize impacts to birds protected under the MBTA, construction areas should be surveyed for the presence of nesting birds during the general migratory bird nesting season of March through August. Disturbance of nesting areas should be avoided until nesting is completed.

Vegetation clearing and construction related soil disturbances can cause sediment-laden runoff to enter waterways. To minimize impacts associated with erosion, contractors should employ silt curtains, coffer dams, dikes, straw bales or other suitable erosion control measures adjacent to floodplain water bodies or tributaries affected by the project. Construction related petrochemical spills can also negatively impact fish and wildlife resources. Therefore, measures should be implemented prior to construction to minimize the likelihood of petrochemical spills.

Invasive species have been identified as a major factor in the decline of native flora and fauna and their ecosystems. Invasive species of particular concern in Kansas include the zebra mussel (*Dreissena polymorpha*), Eurasian watermilfoil (*Myriophyllum spicatum*), purple loosestrife (*Lythrum salicaria*), Johnson grass (*Sorghum halepense*), sericea lespedeza (*Lespedeza cuneata*), salt cedar (*Tamarix spp.*), and reed canary grass (*Phalaris arundinacea*). Executive order 13112 Section 2 (3) directs Federal agencies to not authorize, fund, or carry out actions that it believes are likely to cause or promote the introduction or spread of invasive species in the United States or elsewhere and to ensure that all feasible and prudent measures to minimize risk of harm will be taken in conjunction with the actions. Proactive measures to prevent the inadvertent spread of exotic and invasive species would appear to satisfy this directive. Therefore we recommend the implementation of the following BMP.

> All equipment brought on site will be thoroughly washed to remove dirt, seeds, and plant parts. Any equipment that has been in any body of water within the past 30 days will be thoroughly cleaned with hot water greater 140° F (typically the temperature found at commercial car washes) and dried for a minimum of five days before being used at this project site. In addition, before transporting equipment from the project site all visible mud, plants and fish/animals will be removed, all water will be eliminated, and the equipment will be thoroughly cleaned. Anything that came in contact with water will be cleaned and dried following the above procedure.

Section 2 of the Fish and Wildlife Coordination Act requires the Service to identify project related opportunities to enhance fish and wildlife. The enhancement recommendations discussed below refer to project related creation of wildlife habitat, over and above that required to mitigate losses attributable to project construction.

Native trees, grasses and forbs, noted for their high wildlife value, could be established along the landward and stream-side base of the existing levee system. Native vegetation often takes longer to become fully established; however when established, stands of native vegetation provide excellent soil binding characteristics, valuable wildlife habitat and require fewer maintenance costs. The Service, the Kansas Department of Wildlife and Parks, and the Natural Resource Conservation Service offer assistance programs and could work with the City of Topeka to develop vegetation management plans.

If agreeable to the project sponsors and borrow site owners, borrow sites could be designed and managed to enhance wetland and aquatic habitat, and recreational access.

RECOMMENDATIONS

1. Riparian and wetland habitats should be avoided to the maximum extent practicable when selecting borrow sites for the proposed levee improvements. Compensatory mitigation should be undertaken for unavoidable impacts. Since channelization, levee construction and floodplain development have already resulted in dramatic loss of riparian and wetland habitats in the Kansas River basin within the project area, the Corps should focus on bare or cropland areas for borrow.

2. Levees and levee easements should be seeded with native, warm-season grasses such as buffalo grass (*Buchloe dactyloides*). Buffalo grass is a drought tolerant, perennial, native, turf grass that reaches a height of 8 – 10 inches.

3. The Corps should create wetland mitigation habitat to compensate for the loss of wetland acreage from construction of the projects in accordance with the FWS Region 6 Wetland Mitigation Guidelines, generally at a minimum of 1.5:1 ratio for emergent wetland and at a 2:1 ratio for forested wetland. If farmed wetland is directly impacted by borrow activities it should be mitigated at a 1.0 to1.0 ratio.

4. Removal of woodlands and other native vegetation should be avoided where possible. If avoidance if not possible a mitigation plan should be developed in coordination with the U.S. Fish and Wildlife Service (Service), Environmental Protection Agency (EPA), and the Kansas Department of Wildlife and Parks (KDWP). Woody vegetation and native grasses should be replaced by establishing two acres of native vegetation for every acre impacted.

5. Best Management Practices to prevent the transport of invasive species to or from the construction sites should be included as an integral component of the project.

6. Establish native vegetation riverward of levee segments where riparian woodlands are sparse or nonexistent or where invasive species, i.e. reed canary grass, has become established.

7. All disturbed areas should be immediately planted with native vegetation following construction to prevent erosion and the establishment of invasive species.

8. The potential use of borrow sites for wetland and aquatic habitat enhancement and public recreation should be investigated with the project sponsors and borrow site owners. The City of Topeka is interested in developing a greenway and public access to the Kansas River within the project limits.

9. If possible, establish mitigation areas prior to the onset of impacts from the project to lessen the impacts to wildlife from habitat loss.

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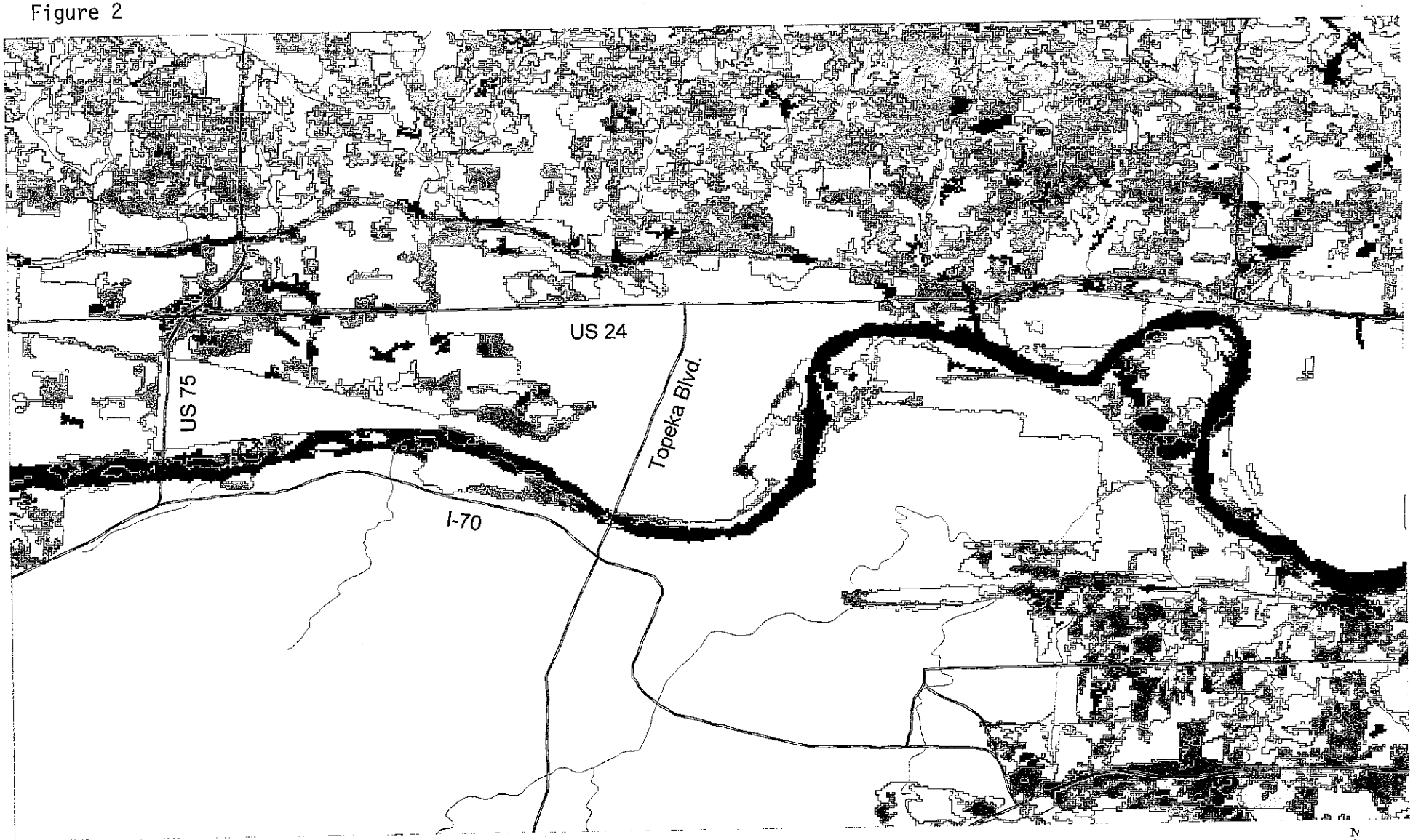
Figure 2



TOPEKA LOCAL FLOOD PROTECTION PROJECT
Land Cover

N

Highways

- Ash - Elm - Hackberry Floodplain Forest
- Bur Oak Floodplain Woodland
- CRP (Conservation Reserve Program)
- Cattail Marsh
- Cottonwood Floodplain Forest
- Cottonwood Floodplain Woodland
- Cultivated Land
- Freshwater Marsh
- Low or Wet Prairie
- Maple - Basswood Forest
- Mixed Oak Floodplain Forest
- Mixed Oak Ravine Woodland
- Mixed Prairie
- Non-Native Grassland
- Oak - Hickory Forest
- Pecan Floodplain Forest
- Post Oak - Blackjack Oak Forest
- Tallgrass Prairie
- Urban Areas
- Water

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Appendix D.

State Listed Federal Endangered Species List and Kansas Bird List

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KANSAS BIRDS: Species List for Shawnee County, KS

GEESE, SWANS
____ Greater White-fronted Goose
____ Snow Goose
____ Ross's Goose
____ Cackling Goose
____ Canada Goose*
____ Trumpeter Swan
____ Tundra Swan

DUCKS
____ Wood Duck*
____ Gadwall
____ [Eurasian Wigeon]†
____ American Wigeon
____ American Black Duck
____ Mallard*
____ Blue-winged Teal
____ Cinnamon Teal
____ Northern Shoveler
____ Northern Pintail
____ Green-winged Teal
____ Canvasback
____ Redhead
____ Ring-necked Duck
____ Greater Scaup
____ Lesser Scaup
____ Black Scoter
____ Long-tailed Duck
____ Bufflehead
____ Common Goldeneye
____ Barrow’s Goldeneye
____ Hooded Merganser
____ Common Merganser
____ Red-breasted Merganser
____ Ruddy Duck

PHEASANTS
____ Ring-necked Pheasant*

GROUSE
____ Greater Prairie-Chicken*

TURKEYS
____ Wild Turkey*

QUAIL
____ Northern Bobwhite*

LOONS
____ Red-throated Loon
____ Common Loon

GREBES
____ Pied-billed Grebe*
____ Horned Grebe
____ Eared Grebe
____ Western Grebe

PELICANS
____ American White Pelican

CORMORANTS
____ Double-crested Cormorant

HERONS
____ American Bittern
____ Least Bittern
____ Great Blue Heron*
____ Great Egret
____ Snowy Egret
____ Little Blue Heron
____ Tricolored Heron
____ Cattle Egret
____ Green Heron*
____ Black-crowned Night-Heron
____ Yellow-crowned Night-Heron*

VULTURES
____ Turkey Vulture

HAWKS, KITES, EAGLES
____ Osprey
____ Swallow-tailed Kite
____ Mississippi Kite
____ Bald Eagle
____ Northern Harrier*
____ Sharp-shinned Hawk
____ Cooper's Hawk*
____ Northern Goshawk
____ Red-shouldered Hawk
____ Broad-winged Hawk*
____ Swainson's Hawk*
____ Red-tailed Hawk*
____ Ferruginous Hawk
____ Rough-legged Hawk
____ Golden Eagle

FALCONS
____ American Kestrel*
____ Merlin
____ Peregrine Falcon*
____ Prairie Falcon

RAILS, GALLINULES
____ King Rail
____ Virginia Rail
____ Sora
____ Common Moorhen
____ American Coot*

CRANES
____ Sandhill Crane
____ Whooping Crane

PLOVERS
____ Black-bellied Plover
____ American Golden-Plover
____ Snowy Plover
____ Semipalmated Plover
____ Piping Plover*
____ Killdeer*

STILTS, AVOCETS
____ American Avocet

SANDPIPERS
____ Spotted Sandpiper
____ Solitary Sandpiper
____ Greater Yellowlegs
____ Willet
____ Lesser Yellowlegs
____ Upland Sandpiper*
____ Hudsonian Godwit
____ Marbled Godwit
____ Ruddy Turnstone
____ Sanderling
____ Semipalmated Sandpiper
____ Western Sandpiper
____ Least Sandpiper
____ White-rumped Sandpiper
____ Baird's Sandpiper
____ Pectoral Sandpiper
____ Dunlin
____ Stilt Sandpiper
____ Buff-breasted Sandpiper
____ Long-billed Dowitcher
____ Wilson's Snipe
____ American Woodcock
____ Wilson's Phalarope
____ Red-necked Phalarope

GULLS
____ Laughing Gull
____ Franklin's Gull
____ Bonaparte's Gull
____ Ring-billed Gull
____ Herring Gull
____ Glaucous Gull
____ Sabine's Gull
____ Black-legged Kittiwake

TERNS
____ Least Tern*
____ Caspian Tern
____ Black Tern
____ Common Tern
____ Forster's Tern

PIGEONS, DOVES
____ Rock Pigeon*
____ Eurasian Collared-Dove
____ White-winged Dove†
____ Mourning Dove*
____ Inca Dove

CUCKOOS
____ Yellow-billed Cuckoo*
____ Black-billed Cuckoo*
____ Groove-billed Ani

BARN OWLS
____ Barn Owl

OWLS
____ Eastern Screech-Owl
____ Great Horned Owl*
____ Snowy Owl
____ Barred Owl*
____ Long-eared Owl
____ Short-eared Owl
____ Northern Saw-whet Owl

GOATSUCKERS
____ Common Nighthawk*
____ Common Poor-will
____ Chuck-will's-widow*
____ Whip-poor-will

SWIFTS
____ Chimney Swift*

HUMMINGBIRDS
____ Magnificent Hummingbird†
____ Ruby-throated Hummingbird*
____ Rufous Hummingbird

KINGFISHERS
____ Belted Kingfisher*

WOODPECKERS
____ Red-headed Woodpecker*
____ Red-bellied Woodpecker*
____ Yellow-bellied Sapsucker
____ Downy Woodpecker*
____ Hairy Woodpecker*
____ Northern Flicker*
____ Pileated Woodpecker

FLYCATCHERS
____ Olive-sided Flycatcher
____ Eastern Wood-Pewee*
____ Yellow-bellied Flycatcher
____ Alder Flycatcher
____ Willow Flycatcher
____ Least Flycatcher
____ Eastern Phoebe*
____ Vermilion Flycatcher
____ Great Crested Flycatcher*
____ Western Kingbird*
____ Eastern Kingbird*
____ Scissor-tailed Flycatcher*

SHRIKES
____ Loggerhead Shrike*
____ Northern Shrike

VIREOS
____ White-eyed Vireo
____ Bell's Vireo*
____ Yellow-throated Vireo*
____ Blue-headed Vireo
____ Warbling Vireo*
____ Philadelphia Vireo
____ Red-eyed Vireo*

JAYS, MAGPIES, CROWS
____ Blue Jay*
____ Clark's Nutcracker
____ Black-billed Magpie
____ American Crow*

LARKS
____ Horned Lark*

SWALLOWS
____ Purple Martin*
____ Tree Swallow*
____ N. Rough-winged Swallow*
____ Bank Swallow*
____ Cliff Swallow*
____ Barn Swallow*

CHICKADEES, TITMICE
____ Black-capped Chickadee*
____ Tufted Titmouse*

NUTHATCHES
____ Red-breasted Nuthatch
____ White-breasted Nuthatch*

CREEPERS
____ Brown Creeper

WRENS
____ Carolina Wren*
____ Bewick's Wren*
____ House Wren*
____ Winter Wren
____ Sedge Wren
____ Marsh Wren

KINGLETS
____ Golden-crowned Kinglet
____ Ruby-crowned Kinglet

GNATCATCHERS
____ Blue-gray Gnatcatcher*

THRUSHES
____ Eastern Bluebird*
____ Townsend's Solitaire
____ Veery
____ Gray-cheeked Thrush
____ Swainson's Thrush
____ Hermit Thrush
____ Wood Thrush*
____ American Robin*
____ Varied Thrush

THRASHERS
____ Gray Catbird*
____ Northern Mockingbird*
____ Brown Thrasher*

STARLINGS
____ European Starling*

PIPITS
____ American Pipit
____ Sprague's Pipit

WAXWINGS
____ Bohemian Waxwing
____ Cedar Waxwing*

WARBLERS
____ Blue-winged Warbler
____ Golden-winged Warbler
____ Tennessee Warbler
____ Orange-crowned Warbler
____ Nashville Warbler
____ Northern Parula
____ Yellow Warbler*
____ Chestnut-sided Warbler
____ Magnolia Warbler
____ Cape May Warbler
____ Black-throated Blue Warbler
____ Yellow-rumped Warbler
____ Black-throated Gray Warbler
____ Black-throated Green Warbler
____ Blackburnian Warbler
____ Yellow-throated Warbler
____ Pine Warbler
____ Prairie Warbler
____ Palm Warbler
____ Bay-breasted Warbler
____ Blackpoll Warbler
____ Cerulean Warbler
____ Black-and-White Warbler
____ American Redstart
____ Prothonotary Warbler*
____ Worm-eating Warbler
____ Ovenbird
____ Northern Waterthrush
____ Louisiana Waterthrush*
____ Kentucky Warbler*
____ Connecticut Warbler
____ Mourning Warbler
____ Common Yellowthroat*
____ Hooded Warbler
____ Wilson's Warbler
____ Canada Warbler
____ Yellow-breasted Chat

TANAGERS
____ Summer Tanager*
____ Scarlet Tanager
____ Western Tanager

SPARROWS
____ Green-tailed Towhee
____ Spotted Towhee
____ Eastern Towhee
____ American Tree Sparrow
____ Chipping Sparrow*
____ Clay-colored Sparrow
____ Brewer's Sparrow
____ Field Sparrow*
____ Vesper Sparrow
____ Lark Sparrow*

____ Lark Bunting*
____ Savannah Sparrow
____ Grasshopper Sparrow*
____ Baird's Sparrow
____ Henslow's Sparrow*
____ Le Conte's Sparrow
____ Nelson's Sharp-tailed Sparrow
____ Fox Sparrow
____ Song Sparrow
____ Lincoln's Sparrow
____ Swamp Sparrow
____ White-throated Sparrow
____ Harris's Sparrow
____ White-crowned Sparrow
____ Golden-crowned Sparrow
____ Dark-eyed Junco
____ Lapland Longspur
____ Smith's Longspur

GROSBEAKS, BUNTINGS

____ Northern Cardinal*
____ Rose-breasted Grosbeak*
____ Black-headed Grosbeak
____ Blue Grosbeak*
____ Lazuli Bunting
____ Indigo Bunting*
____ Painted Bunting*
____ Dickcissel*

BLACKBIRDS, ORIOLES

____ Bobolink
____ Red-winged Blackbird*
____ Eastern Meadowlark*
____ Western Meadowlark
____ Yellow-headed Blackbird
____ Rusty Blackbird
____ Brewer's Blackbird
____ Common Grackle*
____ Great-tailed Grackle*
____ Brown-headed Cowbird*
____ Orchard Oriole*
____ Baltimore Oriole*

NORTHERN FINCHES

____ Pine Grosbeak
____ Purple Finch
____ House Finch*
____ Red Crossbill*
____ White-winged Crossbill
____ Common Redpoll
____ Pine Siskin
____ Lesser Goldfinch
____ American Goldfinch*
____ Evening Grosbeak

OLD WORLD SPARROWS

____ House Sparrow*

† Fewer than ten Kansas records
[ ] Hypothetical species
* Documented breeding species, meeting the requirements for a Probable or Confirmed Breeder as defined by the Kansas Breeding Bird Atlas Project.

This list was compiled from records of the Kansas Ornithological Society, Kansas Breeding Bird Atlas Project, and the Kansas Biological Survey.

August 20, 2006

Please report any birds not on this list to Max Thompson, Southwestern College, Dept of Biology, 100 College St., Winfield, KS 67156, maxt@cox.net

Rare birds noted with † should be reported to the Kansas Bird Records Committee (KBRC) care of Chuck Otte, 613 Tamerisk, Junction City, KS 66441 otte@nqks.com

More information on reporting rare birds can be found at the KBRC home page on the Kansas Ornithological Society's Web site at: http://ksbirds.org

Please report additions or errors on this list to Chuck Otte, 613 Tamerisk, Junction City, KS 66441 otte@nqks.com

320 species

The taxonomic sequence and nomenclature used in this list follow the *Checklist of North American Birds*, 7th edition, American Ornithologists Union, 1998, updated through the 47th Supplement, 2006, (*Auk* 123:926-936).

Shawnee County

THREATENED AND ENDANGERED SPECIES

American Burying Beetle *Nicrophorus americanus* **State:** END **Federal:** END **Critical Habitat:** NO

Bald Eagle*Haliaeetus leucocephalus* **State:** THR **Federal:** THR **Critical Habitat:** YES

Eastern Spotted Skunk *Spilogale putorius* **State:** THR **Federal:** NA **Critical Habitat:** NO

Eskimo Curlew *Numenius borealis* **State:** END **Federal:** END **Critical Habitat:** NO

Least Tern*Sterna antillarum* **State:** END **Federal:** END **Critical Habitat:** YES

Peregrine Falcon*Falco peregrinus* **State:** END **Federal:** NA **Critical Habitat:** YES

Piping Plover*Charadrius melodus* **State:** THR **Federal:** THR **Critical Habitat:** YES

Silver Chub *Macrhybopsis storeriana* **State:** END **Federal:** NA **Critical Habitat:** NO

Smooth Earth Snake *Virginia valeriae* **State:** THR **Federal:** NA **Critical Habitat:** NO

Snowy Plover *Charadrius alexandrinus* **State:** THR **Federal:** NA **Critical Habitat:** NO

Sturgeon Chub*Macrhybopsis gelida* **State:** THR **Federal:** CAN **Critical Habitat:** YES

Topeka Shiner*Notropis topeka* **State:** THR **Federal:** END **Critical Habitat:** YES

Whooping Crane *Grus americana* **State:** END **Federal:** END **Critical Habitat:** NO

SPECIES IN NEED OF CONSERVATION

Black Tern *Chlidonias niger* **State:** SNC **Federal:** NA **Critical Habitat:** NA

Bobolink *Dolichonyx oryzivorus* **State:** SNC **Federal:** NA **Critical Habitat:** NA

Cerulean Warbler *Dendroica cerulea* **State:** SNC **Federal:** NA **Critical Habitat:** NA

Golden Eagle *Aquila chrysaetos* **State:** SNC **Federal:** NA **Critical Habitat:** NA

Henslow's Sparrow *Ammodramus henslowii* **State:** SNC **Federal:** NA **Critical Habitat:** NA

Plains Minnow *Hybognathus placitus* **State:** SNC **Federal:** NA **Critical Habitat:** NA

Short-eared Owl *Asio flammeus* **State:** SNC **Federal:** NA **Critical Habitat:** NA

Southern Bog Lemming *Synaptomys cooperi* **State:** SNC **Federal:** NA **Critical Habitat:** NA

Southern Flying Squirrel *Glaucomys volans* **State:** SNC **Federal:** NA **Critical Habitat:** NA

Tadpole Madtom *Noturus gyrinus* **State:** SNC **Federal:** NA **Critical Habitat:** NA

Timber Rattlesnake *Crotalus horridus* **State:** SNC **Federal:** NA **Critical Habitat:** NA

Whip-poor-will *Camprimulgus vociferus* **State:** SNC **Federal:** NA **Critical Habitat:** NA

Yellow-throated Warbler *Dendroica dominica* **State:** SNC **Federal:** NA **Critical Habitat:** NA

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Appendix E.

Figures
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U.S. Army Corps of Engineers, Kansas City District

Appendix F.

Mitigation Plan

City of Topeka, Kansas
Flood Risk Management Study
Environmental Assessment

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Mitigation Plan
City of Topeka
Flood Risk Management Study
Topeka, Kansas

April 2008

U.S. Army Corps of Engineers
Kansas City District
601 E 12th St.
Kansas City, Missouri 64106-2896

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MITIGATION PLAN
TOPEKA, KANSAS, LEVEE FEASIBILITY STUDY

1.0 SITE DESCRIPTION

The Topeka flood risk management project will impact about seven and one-half acres of a 25-acre woodland due to installation of an under seepage berm at the South Topeka unit. This woodland is part of the floodplain forest that extends along the Kansas River in the Topeka, Kansas section of Shawnee County. The riparian floodplain forest that remains along the Kansas River is considered the highest quality habitat in the Topeka area. Specifically, this woodland is located near the South Topeka levee unit, beginning at river miles 86.0 to 85.4. The south border of the woodland is the border for developed urban areas including a railroad and major U.S. Interstate Highway (see Figure 4).

The quality of the woodland is considered moderate based on the habitat quality assessment model, and it is assumed that the woodland is about 30 years old. Woody species found in this area are typical of those found within the Kansas River riparian floodplain which includes species such as the eastern cottonwood (*Populus deltoides*), silver maple (*Acer saccharinum*), black walnut (*Juglans nigra*), sandbar willow, (*Salix exigu*), box elder (*Acer negundo*), Siberian elm (*Ulmus pumila*), sycamore (*Platanus occidentalis*), and white mulberry (*Morus alba*). The herbaceous layer contains species such as Nettle (*Urtica*), pokeweed (*Phytolacca*), white snakeroot (*Polygala sp*), Japanese honeysuckle (*Lonicera japonica)*, and common blue violet (*viola septentrionalis*).

2.0 COMPENSATION AND AVOIDANCE

To offset the loss of this habitat, a tree planting program covering 15 acres is recommended based on the results of the habitat model. The assumption that the proposed impacted area would take up to 30 years to reestablish native vegetation equal to the current value was considered in the model. Further, it was assumed that many of the planted trees will not survive to maturity due to weather, predation, disease, etc. The restored site would provide wildlife habitat suitable to support those species found within the existing site.

In accordance with the Migratory Bird Treaty Act, additional mitigation measures would include the avoidance of construction activities in woodland areas during the migratory bird nesting season from April 1 to July 15. These recommendations coincide with the U.S. Fish and Wildlife Coordination Act Report.

3.0 JUSTIFICATION

Quantitative- Habitat Quality Assessment Model

A community habitat suitability model for bottomland hardwoods (LDNR, 1994) was used to quantify net gains and losses of ecological value associated with future with project and future without project conditions. This model is a modification of the U.S. Fish and Wildlife Service's habitat evaluation procedure (HEP). Target years used for the project ranged from baseline, 0 to 50 years. A total of seven variables were used as indicators to assess habitat value (species association, maturity, understory and midstory percentages, hydrology, forest size, surrounding

land use, and disturbance). To assess the suitability of the habitat for providing resting, foraging, and breeding for wildlife species, habitat suitability indices (HSI) were calculated for each target year of the project. The HSI is presented as a value between 0 and 1.0, and is a measure of habitat quality. The HSI value is multiplied by the habitat quantity to produce a habitat value measure termed Habitat Units (HU). The habitat units were calculated across the life of the project and the average annual habitat units (AAHUs) were compared under future with project and future with project conditions (see Appendix G).

Future without Project (FWOP)

Without the project, the woodland is expected to continue to grow and reach full maturity by age 50. The total AAHU for Future without the project is 13.92. At the end of 50 years, FWOP would yield HSI value of 0.60, which is considered slightly above a moderate value. A HSI value of 0.60 is generally less than expected for mature woodland, but the model used to generate this value is influenced by the proximity of the site to a major disturbance such as an interstate highway, as well as the land use of the surrounding area which is primarily agriculture, industrial and residential development.

Future with Project Conditions (FWPC)

Future project conditions with and without mitigation were analyzed separately. Based on the HSI indices of the model, removal of about 8 acres would reduce the quality of the woodland from moderate (0.41) to low (0.29) at project year one. In addition, this would reduce the amount of resources available for supporting wildlife and promote opportunities for invasive species establishment within the impacted area. For the model analysis, it was assumed that the remaining 17 acres of disturbed woodland site would continue to develop towards maturity. The output of the model projects by project age 50, the disturbed site without mitigation would yield a HSI value of 0.46. This value is relatively low when compared to the "future project conditions with-mitigation measures" where a HSI value of 0.80 is projected. The average annual habitat units for the "with-mitigation measures" are 7.49, and without-mitigation measures yield an average of 6.62 habitat units. When the AAHUs of mitigation-measures are added to those of the without-mitigation measures, a total of 14.11 AAHUs are gained for future with project conditions (see Appendix G).

Conclusion

The results of the habitat model indicate that future with project AAHUs minus future without project AAHUs would result in a net change of zero. Therefore, a total of 15 acres of mitigation would compensate for the loss of 7.5 acres of habitat.

QualitativeAssessment

The woodland site at the South Topeka unit provides important habitat for various wildlife species and is part of the floodplain forest that extends along the Kansas River. The Kansas River riparian corridor provides crucial habitat for many species which are of biological, cultural, and/or commercial importance. Thousands of waterfowl use the Kansas River channel and floodplain during migration and wintering. Several species of commercially valuable furbearers occur in the riparian habitats, including muskrat, mink, beaver, raccoon, and both red and grey fox. The riparian forests and meadows provide migration and nesting habitat for many species of birds, including many declining neotropical migratory songbirds (USFWS BiOp,

2000). The Kansas Ornithological Society has listed 320 bird species found in Shawnee County. At least 80 of those species have been identified as nesting within Shawnee County. Removal of this woodland area may cause further decline in the numbers of species that depend on these areas, as the native vegetation may take years to reestablish (USFWS, 2007). Also, the project area offers potential perching and nesting habitat for endangered species such as the bald eagle and Indiana bat.

Although the Topeka Levee system separates this area from the river, this woodland provides an important corridor to facilitate the movement of flora and fauna between other patches of natural habitat. Specifically, it allows plants to propagate from one patch to another, and wildlife species to move in response to environmental changes or escape from predators.

Moreover, the availability of riparian woodland areas in the project area is scarce and declining. There is little refuge habitat in close proximity to the project area and available habitat is presumably at carrying capacity, which further reduces the likelihood of wildlife surviving the displacement and intensifies the competition for the limited habitat available (USFWS, 2007). S.H. Long wrote that the Kansas River valley in 1905 contained forests of cottonwood, sycamore, etc, interspersed with meadows about one-half mile wide" (Thwaites 1905b). Further downstream near present-day Lawrence (KS), Douglas County, Fitch and McGregory (1956) reported from early accounts in the 1950's that the floodplain contained "rich mesophytic forest of predominantly oak-hickory type." Continuing bank erosion, coupled with floodplain encroachment, has reduced the perennial riparian vegetation native to the Kansas River channel. Though accurate data are not available for pre- and post-construction periods, it is likely that at present there is very little riparian forest which meets naturalist Thomas Say's (Thwaites 1905b) description. Also, bank stabilization projects, some of which may be detrimental to aquatic habitats and channel hydraulics, could be reduced or eliminated if suitable riparian vegetation were maintained (Sanders et al. 1993).

5.0 MITIGATION SITE SELECTION

The mitigation plantings would be at the impacted site and within at the North Topeka unit of the project area. The North Topeka mitigation site is located between river miles 87.8 to 87.5, and upstream of the impacted site at South Topeka (see Figure 13). It is owned by the city of Topeka and is part of the existing riparian forest corridor along the Kansas River. Selected because it contains similar soil types and plant species to those of the impacted site, it offers the greatest vegetative diversity and degree of interspersion with other habitat types, which are important to many wildlife species.

The area between the levees, which includes the Kansas River, contains much of the remaining available wildlife habitat. The riparian forest that remains along the Kansas River is the highest quality habitat in the Topeka area. The mitigation site provides closer access to the river than the impacted site, which is important for waterfowl and shorebird resting, and feeding and staging areas during migration. Also, this site contains two disturbed areas, one is currently bare land and the other is planted with row crops. If these areas are planted with native species, they would provide beneficial habitat for area wildlife. This is especially important in an area where much of the riparian forest has been developed. Within the impacted site, plantings would consist of native species as well as mast-producing tree species to provide additional year-round sources of food for wildlife.

The proposed North Topeka mitigation site is dominated by cottonwood and box elder (*Acer ndegundo*) trees and Siberian elm shrubs. The agricultural field located within this site contains soy beans, occasional dock (*Rumex* sp.), giant foxtail grass (*Setaria faberii*), and annual ragweed (*Ambrosia artemisiifolia*). The western border of the field is dominated by Johnson grass (*Sorghum halepense*), goosefoot (*Chenopodium* sp.), annual sunflower (*Helianthus annuus*) and goldenrod (*Solidago* sp.), with some occasional Siberian elm (*Ulmus pumila*) and cottonwood (*Populus deltoides*) shrubs.

6.0 PLANT LIST

The mitigation plan will include plantings of various species of native trees, shrubs, forbs and grasses such as those listed below. A planting plan will be developed and made available during the Design Phase of the project.

Acer saccharinum/Sliver Maple
Carya illinuensis/Pecan
*Carya laciniosa/*Shellbark Hickory
*Crataegus phaenopyrum/*Hawthorn
*Diospyros virginiana/*Persimmon
Juglans nigra/Black Walnut
Quercus alba/ White Oak
Quercus macrocarpa/Bur Oak
Prunus Americana/American Plum
Populus deltoids/ Eastern cottonwood

Shrubs
Ribes missouriense/Gooseberry
Cornus drummondii/Roughleaf Dogwood
*Cornus foemina/*Gray dogwood
*Amelanchier arborea/*Common serviceberry
*Prunus virginiana/*Common Chokeberry
*Sambucus Canadensis/*Elderberry

Forbs
Asclepias tuberosa /Butterfly weed
Aster novae-angliae/ New England Aster
Cassia fasciculate/ Patridge Pea
Coreopsis lanceloata/ Sand Coreopsis
Echinacea purpurea / Broad-Leaved Purple Coneflower
Heliopsis helianthoides / False Sunflower
Liatris aspera/ Rouge Blazing Star
Lupinus perennis/ Wild Lupine
Ratibida pinnata/ Yellow Coneflower
Rudbeckia hirta / Black-Eyed Susan

Temporary Cover and Grasses
Avena sativa/ Seed Oats

Lolium multiflorum/ Annual Rye
Andropogon gerardii/ Big blue stem
Andropogon scoparius/ Little blue stem
Bouteloua curtipendula/ Side Oats Grama
Elymus Canadensis/Canada wild rye
Panicum virgatum/Switch grass
Sorghastrum nutans/ Indian grass

7.0 WORK PLAN

Within the impacted site, about five acres of trees and shrubs would be planted landward of the levee, behind the constructed under seepage berm. All trees and shrubs would be container grown and of the root-production method (RPM). The 3-gallon container grown trees would be at least 2-3 feet tall when planted. Trees would be spaced 20 x 20 feet apart within and between rows to allow trees to canopy in approximately 20 years (NRCS 1999). Larger shrubs such as dogwood and chokecherry would be spaced at least 10 x 10 feet apart. Smaller shrubs such as beautyberry would be spaced at least 4-6 feet apart (NRCS, 1999 and Tylka, 2002). The entire planting area would equal 2,200 linear feet x 100-foot wide.

At the North Topeka site, within the bare area, about five and on-half acres of trees would be planted near the river, followed by one-half acre of shrubs. Trees would be spaced 20 x 20 feet apart and the shrubs would be spaced 10 x 10 feet apart. Within the adjacent crop area, approximately four acres of native grasses and forbs would be planted. The total amount of mitigation plantings at both sites would be 15.0 acres. In addition, the plantings would include native woody species, forbs and grasses that are suitable for the area and that have multiple values suited for timber, cover, nuts, fruit, browse, nesting and aesthetics. A non-competitive, perennial ground cover such as Virginia wild rye (*Elymus virginicus*) or red top panic grass (*Panicum rigidulum*) would be planted within the tree and shrub rows. The method of planting would include hand or machine planting techniques suited to achieving proper depths and placement of planting root stock. Invasive species within the project area would be controlled during site preparation and annual maintenance.

8.0 MONITORING PLAN

Site visits would be made by Corps personnel soon after levee construction, once mitigation plantings are completed, and every year thereafter for five years or until the plants are fully established. Site assessments would include an evaluation of vegetation growth, types of species, hydrology, and photos. This would be done at each visit to help make performance determinations and future recommendations.

9.0 PERFORMANCE STANDARDS

Success of the habitat would be based on the establishment of continuous healthy, flourishing growth of native vegetation. Also, the percentage native species survival would be considered in determining site success. The minimum factor used to determine success would be 85% of the plantings having healthy, flourishing growth at the end of three years. Invasive species would be controlled as they are observed. Best Management Practices (BMPs) would be used to prevent

the inadvertent spread of exotic and invasive species to or from the mitigation areas. This includes insuring that all equipment brought on or from the site would be thoroughly washed to remove dirt, seeds, and plant parts. Any equipment that has been in any body of water within the past 30 days will be thoroughly cleaned with hot water greater than 140 degrees Fahrenheit and dried before being used at this project site.

10.0 SITE PROTECTION

Current access to the proposed mitigation site is limited and hard to reach by the general public, making disturbance of the mitigation sites unlikely. The area is owned by the city of Topeka, which is also the local sponsor of the project. The city will retain ownership of the mitigation site after project construction is completed. There is no public access to the levees at this time; and the Corps will obtain a permanent easement to ensure the protection of these areas. In addition, interpretative signs would be posted around the site highlighting the COE's restoration efforts.

11.0 MAINTENANCE

Trees

To minimize the amount of care needed after planting, extra steps would be taken during the installation. This includes using biodegradable weed barrier mat or organic mulch to limit the growth of weeds; a 24/30 photodegradable plastic tree guard or similar protection device to protect young trees against rodent and deer damage; and a slow-release fertilizer applied around each tree. In addition, a noncompetitive, perennial ground cover would be planted over the entire area. This will help reduce the amount of weeds growing after site preparation. In addition, a watering and care plan will be developed and implemented. Also, it is preferred that the areas be allowed to regenerate naturally from the existing seed bank

Native Grass/Forbs

The newly seeded native grass/forbs would receive the equivalent of one inch of water per week for the first 6 to 8 weeks, either via rainfall or irrigation. Since burning is not practical, native grass/forbs areas would be mowed in late fall annually during the first three years, and every third year thereafter to keep out woody growth. Invasive species would be controlled as soon as they are noticed.

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Appendix G

Community Habitat Model Spreadsheet

City of Topeka, Kansas
Flood Risk Management Study
Environmental Assessment

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Summary Sheet AAHU Calculation

Project: Topeka Flood Risk Management Project, Riparian Woodlands

Future With Project-damaged		mitigated	Total	Cumulative
TY	Acres	x HSI	HUs	HUs
0	15	0.00	0.00	
1	15	0.00	0.00	0.00
5	15	0.00	0.00	0.00
10	15	0.34	5.15	12.87
15	15	0.41	6.19	28.36
20	15	0.52	7.74	34.84
30	15	0.62	9.25	84.96
40	15	0.71	10.71	99.78
50	15	0.80	12.06	113.83
			Total CHUs =	374.64
			AAHUs =	7.49

Future With Project n		damaged	Total	Cumulative
TY	Acres	x HSI	HUs	HUs
0	17	0.29	4.93	
1	17	0.29	4.97	4.95
5	17	0.32	5.43	20.79
10	17	0.34	5.85	28.18
15	17	0.35	5.95	29.48
20	17	0.41	7.04	32.46
30	17	0.41	7.04	70.39
40	17	0.41	7.04	70.39
50	17	0.46	7.84	74.41
			Total CHUs =	331.04
			AAHUs =	6.62

Future Without Project			Total	Cumulative
TY	Acres	x HSI	HUs	HUs
0	25	0.41	10.25	
1	25	0.41	10.34	10.29
5	25	0.42	10.57	41.82
10	25	0.49	12.33	57.25
15	25	0.55	13.74	65.17
20	25	0.60	15.00	71.83
30	25	0.60	15.00	149.95
40	25	0.60	15.00	149.95
50	25	0.60	15.00	149.95
			Total CHUs =	696.22
			AAHUs =	13.92

NET CHANGE IN CHUs DUE TO PROJECT

A. Future With Project CHUs =	705.68
B. Future Without Project CHUs =	696.22
Net Change (FWP - FWOP) =	9.46

NET CHANGE IN AAHUs DUE TO PROJECT

A. Future With Project AAHUs =	14.11
B. Future Without Project AAHUs =	13.92
Net Change (FWP - FWOP) =	0.19

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U.S. Army Corps of Engineers, Kansas City District

Appendix H

Mitigation Cost Analysis

City of Topeka, Kansas
Flood Risk Management Project
Environmental Assessment

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SUMMARY

Compensatory mitigation is required for the Topeka Flood Damage Reduction project due to the lost of approximately seven and one-half acres of woodland from project construction. The purpose of this document is to identify and describe the process used for determination of the least cost plan for mitigation. The level of effort for the cost-analysis performed for this project is commensurate with the project's level of impact and in accordance with the cost analysis procedures detailed in ER 1105-2-100, Appendix C-3.E(8), as follows:

(1) Inventory and Categorize Ecological Resources.
(2) Determine Significant Net Losses.
(3) Define Mitigation Planning Objectives.
(4) Determine Unit of Measurement.
(5) Identify and Assess Potential Mitigation Strategies.
(6) Define and Estimate Costs of Mitigation Plan.
(7) Display Costs.

STEPS 1 THROUGH 5

Section 10.4 of the EA, and the Mitigation Plan in Appendix F, present an inventory and categorization of the ecological resources affected by the proposed project and address the resource significance (Steps 1 and 2).

The Mitigation Planning Objective, as identified in the Mitigation Plan, Section 2, is to offset lost habitat due to project implementation (Step 3). A Community Habitat Model (Appendix G) was conducted to determine the quality of lost habitat in Habitat Units (HU)s (Step 4). Based on the results of the habitat assessment model and the qualitative assessment, documented in the mitigation plan, the amount of compensatory mitigation was determined to be 15 acres. The mitigation plan and habitat model were coordinated with the U.S. Fish and Wildlife Service (USFWS). The USFWS concurred with the USACE on October 28, 2008 that the proposed mitigation for the project's impacts is adequate (Appendix B – Feasibility Report)

To determine the most cost effective plan for mitigation, potential mitigation strategies were identified and three alternative plans were formed for consideration (Step 5). The mitigation site and the 15-acre planting regime was the same for each alternative because the USACE's objective was to fully compensate for the number of average annual habitat units lost due to the project. Therefore, the 15-acre planting regime for all three plans was based on the results of the same habitat assessment model. However, each alternative plan differed in the density of trees planted within the mitigation site. The spacing regimes were based on the National Resource Conservation Service's (NRCS) specifications for developing a riparian forest (NRCS, 1999). The difference in cost per alternative was based on the number of trees proposed. The alternative with the lowest cost was selected as the recommended plan for mitigation (Table 1).

STEP 6 – Define and Estimate Costs of Mitigation Plans

For the three alternatives considered, a combination of trees, shrubs, and native grasses was incorporated in each alternative plan to provide optimum wildlife habitat. The plant species selected for all plans were identical and based on coordination with the U.S. Fish and Wildlife Service. Native tree species were incorporated into the plans because natives are easily adapted to the area and are less expensive than non-native species. The spacing of trees within each plan varied from 10-20 feet for trees and 6 to 10 feet for shrubs. The size of tree seedlings affects the overall purchase cost. For each alternative 3-gal container- grown tree stock was used. The cost of the 3-gal container grown tree is about $9.50 per tree. This cost was the lowest rate available in the state-wide area and was provided by the Forest Keeling Nursery in Missouri. The use of bare-root seedlings was considered but eliminated. Typically, bare root-seedling trees cost less than 3-gal container grown trees, but their survival rate has not been as successful. Bare root seedlings require a longer period to establish their root systems and usually require additional care beyond the initial installation period, such as watering, which would increase tree planting cost. Therefore, 3-gal container grown trees were used. The average cost for installation labor was estimated at $35.00 per tree. This estimate was obtained from Terra Technologies, Inc, a local restoration contracting company, and was compared with costs from other contractors that have provided similar services. Compared to other cost estimates, the cost for labor was considered reasonable.

STEP 7 – Display Costs

The three planting plans were developed and their costs were compared and discussed below and displayed in Table 1.

Alternative 1 (Recommended plan): The costs for alternative 1 are represented in Table 2. This alternative assumes that each large tree is spaced 20 x 20 feet and each shrub is spaced 10 x 10 feet apart. This alternative assumes the maximum recommended spacing allowed, which yields a total of 110 trees per acre and 436 shrubs per acre. For 11 acres of trees, this gives a total of 1,972 trees. The total cost for alternative 1 is **$77,806.00**.

Alternative 2: The costs for alternative 2 are represented in Table 3. This alternative assumes that each large tree is spaced 12 x 12 feet and each shrub is spaced 10 x 10 feet apart. This alternative assumes the least recommended spacing allowed, which yields a total of 304 trees per acre and 436 shrubs per acre. For 11 acres of trees, this gives a total of 3,912 trees. The total cost for alternative 2 is **$166,076.00**.

Alternative 3: The costs for alternative 3 are represented in Table 4. This alternative assumes that each large tree is spaced 15 x 15 feet and each shrub is spaced 10 x 10 feet apart. This alternative assumes the median recommended spacing allowed, which yields a total of 195 trees per acre and 436 shrubs per acre. For 11 acres of trees, this gives a total of 2,822 trees. The total cost for alternative 3 is **$116,481.00.**

Recommended Alternative (Selected Plan)

Alternative 1 provides the best planting plan compared to the other two alternatives examined. This alternative is the least cost alternative to provide the required amount of habitat units to offset losses due to the project.

Spacing of trees at 20 x 20 feet apart is the preferred method because this spacing provides enough room for the trees to fully canopy in about 20 years. In large natural areas, restoration plantings have been more successful in the long term when trees were properly spaced, and provided the proper care at installation than those that were planted very densely (NRCS, 1999).

This plan was coordinated with the U.S. Fish and Wildlife Service and their recommendations are incorporated into the plan.

Table 1. Topeka Mitigation Cost Analysis Summary

No. of trees	Cost	Tree spacing
1,972	$77,806.00	20 x20
3,912	$166,076.00	12 x 12
2,822	$116,481.00	15 x 15
*Cost varies with the number of trees proposed per acre		

Table 2. Alternative 1-Recommended Plan

Trees in 3 gallon containers	Acres	Amount/Acre	Purchase	Installation	Total
Shellbark Hickory	10	10	$ 9.50	$ 35.00	$ 4,450.00
Swamp White Oak	10	10	$ 9.50	$ 35.00	$ 4,450.00
Bur Oak	10	10	$ 9.50	$ 35.00	$ 4,450.00
Pin Oak	10	10	$ 9.50	$ 35.00	$ 4,450.00
Silver Maple	10	20	$ 9.50	$ 35.00	$ 8,900.00
Pecan	10	10	$ 9.50	$ 35.00	$ 4,450.00
Cottonwood	10	10	$ 9.50	$ 35.00	$ 4,450.00
American Plum	10	10	$ 9.50	$ 35.00	$ 4,450.00
Hawthorn	10	10	$ 9.50	$ 35.00	$ 4,450.00
Persimmon	10	10	$ 9.50	$ 35.00	$ 4,450.00
Total Trees per acre		110			
3 gallon container Shrubs					
Gray Dogwood	1	72	$ 9.50	$ 35.00	$ 3,204.00
Common Chokecherry	1	72	$ 9.50	$ 35.00	$ 3,204.00
Flowering Dogwood	1	72	$ 9.50	$ 35.00	$ 3,204.00
Serviceberry	1	72	$ 9.50	$ 35.00	$ 3,204.00
Elderberry	1	72	$ 9.50	$ 35.00	$ 3,204.00
Beautyberry	1	72	$ 9.50	$ 35.00	$ 3,204.00
Total shrubs per acre		436			
Native grass seeding mix	4	1	$395/acre	$ 500/acre	$ 3,580.00
Site Preparation-herbicide				$ 250/acre	$ 3,750.00
Delivery Fees				$ 1/tree	$ 1,972.00
Temporary Grass Cover				$ 30/acre	$ 330.00
Total	15	1972			$ 77,806.00
Purchase prices from Forrest Keeling Nursery 2007 Wholesale Catalog					
Installation prices from Terra technologies, Inc. Feb 7, 2007					
Installation prices include labor, weed mat, tree guard, fertilizer and water, w/1-yr guarantee					
Native grass seeding mix prices from JFNew Inc. 2006 Resource Catalog					

Table 3. Alternative 2

Trees in 3 gallon containers	Acres	Amount/Acre	Purchase	Installation	Total
Shellbark Hickory	10	30	$ 9.50	$ 35.00	$ 13,350.00
Swamp White Oak	10	30	$ 9.50	$ 35.00	$ 13,350.00
Bur Oak	10	30	$ 9.50	$ 35.00	$ 13,350.00
Pin Oak	10	30	$ 9.50	$ 35.00	$ 13,350.00
Silver Maple	10	40	$ 9.50	$ 35.00	$ 17,800.00
Pecan	10	30	$ 9.50	$ 35.00	$ 13,350.00
Cottonwood	10	30	$ 9.50	$ 35.00	$ 13,350.00
American Plum	10	30	$ 9.50	$ 35.00	$ 13,350.00
Hawthorn	10	30	$ 9.50	$ 35.00	$ 13,350.00
Persimmon	10	24	$ 9.50	$ 35.00	$ 10,680.00
Total Trees per acre		304			
3 gallon container Shrubs					
Gray Dogwood	1	72	$ 9.50	$ 35.00	$ 3,204.00
Common Chokecherry	1	72	$ 9.50	$ 35.00	$ 3,204.00
Flowering Dogwood	1	72	$ 9.50	$ 35.00	$ 3,204.00
Serviceberry	1	72	$ 9.50	$ 35.00	$ 3,204.00
Elderberry	1	72	$ 9.50	$ 35.00	$ 3,204.00
Beautyberry	1	72	$ 9.50	$ 35.00	$ 3,204.00
Total shrubs per acre		436			
Native grass seeding mix	4	1	$395.00	$ 500/acre	$ 3,580.00
Site Preparation-herbicide				$ 250/acre	$ 3,750.00
Delivery Fees				$ 1/ tree	$ 3,912.00
Temporary Grass Cover				$ 30/ acre	$ 330.00
Total	15	3912			$ 166,076.00
Purchase prices from Forrest Keeling Nursery 2007 Wholesale Catalog					
Installation prices from Terra technologies, Inc. Feb 7, 2007					
Installation prices include labor, weed mat, tree guard, fertilizer and water, w/1-yr guarantee					
Prairie seeding mix prices from JFNew Inc. 2006 Resource Catalog					

Table 4. Alternative 3

Trees in 3 gallon containers	Acres	Amount/Acre	Purchase	Installation	Total
Shellbark Hickory	10	20	$ 9.50	$ 35.00	$ 8,900.00
Swamp White Oak	10	20	$ 9.50	$ 35.00	$ 8,900.00
Bur Oak	10	20	$ 9.50	$ 35.00	$ 8,900.00
Pin Oak	10	20	$ 9.50	$ 35.00	$ 8,900.00
Silver Maple	10	50	$ 9.50	$ 35.00	$ 22,250.00
Pecan	10	20	$ 9.50	$ 35.00	$ 8,900.00
Cottonwood	10	15	$ 9.50	$ 35.00	$ 6,675.00
American Plum	10	10	$ 9.50	$ 35.00	$ 4,450.00
Hawthorn	10	10	$ 9.50	$ 35.00	$ 4,450.00
Persimmon	10	10	$ 9.50	$ 35.00	$ 4,450.00
Total Trees per acre		195			
3 gallon container Shrubs					
Gray Dogwood	1	72	$ 9.50	$ 35.00	$ 3,204.00
Common Chokecherry	1	72	$ 9.50	$ 35.00	$ 3,204.00
Flowering Dogwood	1	72	$ 9.50	$ 35.00	$ 3,204.00
Serviceberry	1	72	$ 9.50	$ 35.00	$ 3,204.00
Elderberry	1	72	$ 9.50	$ 35.00	$ 3,204.00
Beautyberry	1	72	$ 9.50	$ 35.00	$ 3,204.00
Total shrubs per acre		436			
Native grass seeding mix	4	1	$395.00	$ 500/acre	$ 3,580.00
Site Preparation-herbicide				$ 250/acre	$ 3,750.00
Delivery Fees				$ 1/tree	$ 2,822.00
Temporary Grass Cover				$ 30/acre	$ 330.00
Total	15	2822			$ 116,481.00
Purchase prices from Forrest Keeling Nursery 2007 Wholesale Catalog					
Installation prices from Terra technologies, Inc. Feb 7, 2007					
Installation prices include labor, weed mat, tree guard, fertilizer and water, w/1-yr guarantee					
Native grass seeding mix prices from JFNew Inc. 2006 Resource Catalog					

REFERENCES

Forest Keeling Nursery 2007 Wholesale Catalog, *Walk-A-Way System Specifications*, Elsberry, MO.

JFNew, Inc. 708 Roosevelt Road, Walkerton, Indiana, 46574

NRCS, 1999. National Resource Conservation Service, Conservation Practice Standard and General Specifications. *Riparian Forest Buffer, Code 391*, Iowa.

Terra Technologies, 8680 W. 96th St. Ste 100, Overland Park, Kansas 66212

U.S. Army Corps of Engineers, Kansas City District

Appendix I

Hazardous, Toxic and Radioactive Wastes Assessment

City of Topeka, Kansas
Flood Risk Management Project
Environmental Assessment

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HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE ASSESSMENT

Topeka Flood Risk Management Project
February 2007

A Hazardous, Toxic, And Radioactive Waste (HTRW) assessment was completed as part of the Topeka, Kansas Reconnaissance Report (USACE, 1997). It included a database search and site visit to identify areas of concern within 500 feet of either side of the levee. No sites registered in the database were reported on the National Priorities List, Comprehensive Environmental Response, Compensation, and Liability Information System, and Kansas Hazardous Waste Sites Report.

The assessment identified four areas of concern if the design included disturbance of land side soil:

- Union Pacific Railroad – a potential area of concern due to three above ground storage tanks currently in use.
- Magnus Co., Inc. AT&SF Yards West Gate – this site showed up in the database as a result of site discovery and two subsequent preliminary assessments, but its location could not be determined.
- Fenced yard – located on the south bank of the Kansas River west of the railroad bridge along river road. Contents unknown.
- Remaining area on Oakland Unit – there were several sites listed either in the Leaking Underground Storage Tank database or Registered Storage Tanks database whose status had not been visually confirmed with site visit.

Since completion of the assessment, more precise areas of proposed work have been identified for the project. With this information an updated environmental assessment was performed to determine the risk of the proposed activities being impacted by contaminated sites. The following sources of information were used in the assessment:

- USEPA Enviromapper Database search for known HTRW Sites
- Kansas Department of Health and Environment (KDHE) Bureau of Environmental Remediation database search for known contaminated sites
- KDHE Bureau of Waste Management Solid Waste database
- KDHE database of Permitted Storage Tanks
- KDHE database of Leaking Above Ground and Underground Storage Tanks
- Discussions with existing and former KDHE employees
- Site photographs

Following is a discussion of each of the proposed areas of work and the potential risks associated with HTRW contamination impacting the alternatives being considered for each of those areas.

North Topeka Unit, Station 165+00 to 189+00 – Problem: Underseepage

Alternatives to address the underseepage problem in this area include the addition of an underseepage berm or installation of relief wells. Based on the data in the assessment, there are no known contaminated sites in the immediate vicinity. There were seven leaking underground storage tank sites located to the north and northwest of this area and two contaminated sites located to the northwest, but the sites were located 2,000 to 6,700 feet from this area. Therefore, there is little or no risk of encountering soil contamination associated with the identified sites. In terms of groundwater contamination that may impact the relief well alternative, groundwater flow in this area is described as being in the east-northeasterly direction. Therefore, there appears to be very low risk that groundwater contamination from these sites would have migrated towards of the work area. The only potential concern is rubble piles that show up on a site photo and may interfere with placement of the underseepage berm. However, this does not appear to be an HTRW concern. The only HTRW concern is to ensure that any soil brought on-site for use in an underseepage berm has been tested and certified to be clean.

North Topeka Unit, Station 246+00 to 250+00 – Problem: Underseepage

For this area, space for installation of an underseepage berm is limited due to the close proximity of railroad tracks. Therefore, relief wells were considered the only feasible alternative to address the underseepage. There are no known contaminated sites in the vicinity of this area. The only potential concern is the close proximity to the railroad tracks. Petroleum and polyaromatic hydrocarbon contamination in soil is not uncommon near railroad tracks, particularly in areas where loading, off-loading, and staging of rail cars occurs. Therefore, there is a potential risk that soil contamination may be encountered in this area. It is recommended that the design of the relief well system minimize soil disturbance to the greatest extent practical. Any soil that is removed from the site during construction will need to be tested to ensure proper disposal.

North Topeka Unit, Station 364+60, Fairchild Pump Station – Problem: Uplift

The alternative selected for this location is removal and disposal of the pump station. There are no known contaminated sites in the vicinity of this proposed work. The nature of this work (demolition and disposal of a structure) is not likely to be significantly impacted even if a contaminated site were located nearby. The only concern would be to ensure any soil brought in to backfill the void left by removal of the structure has been tested and certified to be clean.

Waterworks Unit, Station 0+78 to 7+00 and 10+00 to 16+60 – Problem: Sliding Stability

The alternative selected to address the sliding stability of floodwall in this area includes the addition of a stability berm adjacent to the wall. The only concern is to ensure the material brought on-site for use has been tested and certified to be clean.

South Topeka Unit, Station 75+84, Kansas Avenue Pump Station – Problem Strength

The work associated with this location is reinforcing the structure of the pump station, so there is little or no risk of HTRW impacting this work.

South Topeka Unit, Station 86+00, Madison St. Pump Station – Problem: Uplift

The alternatives considered for this location that could be impacted by HTRW contamination involve removal and replacement or heel extension. However, based on the HTRW assessment, the risk of contamination impacting either alternative is very low. However, any soil removed from the site should be tested to ensure proper disposal and any soil brought onto the site should be tested to ensure it is clean.

South Topeka Unit, Stations 16+07, 84+10, 84+10a, 85+57, Manholes – Problem: Uplift

The alternatives considered at each of these locations are either removal or replacement of the manhole or the addition of a heel extension. Based on the HTRW assessment, there are no known contaminated sites located near the manhole at station 16+07, but there are several known contaminated sites located to the east, south, and west of the manholes at stations 84+10 and 85+67. Even though there are contaminated sites in the vicinity, it is not believed that contamination exists at the exact location of the manholes. Also, the proposed work appears to cover a fairly small footprint at each of these locations. Therefore, the risk of HTRW having a significant impact on this work is considered low. However, any soil removed from these locations should be tested and properly disposed based upon test results.

South Topeka Unit, Station 74+41 to 93+86 – Problem: Floodwall foundation weakness

The alternative selected for this location is removal and replacement of the floodwall on the existing alignment. Also, it includes the replacement of four gate wells and three sluice gates as part of the wall replacement. There are several known contaminated sites located to the east, south, and west of this

location. There is no known soil contamination in the immediate vicinity of the wall. However, the description from the Scotch Cleaners site located to the southeast of the site indicates a groundwater plume of chlorinated solvents is emanating from this site and extends north-northeast to the Kansas River. This plume is likely to be present below the floodwall. Therefore, any work associated with the wall, gate well, or sluice gate replacement that will encounter groundwater is at high risk of being negatively impacted by the contaminated plume.

South Topeka Unit, Station 22+00 to 48+00 – Problem: Underseepage

The alternatives being considered for this location are either an underseepage berm or relief wells. Research associated with the HTRW assessment identified two known contaminated sites about 1,000 feet east of this location. The primary contaminates on these sites was lead and some limited petroleum contamination. Based on their proximity and nature of the contamination, the risk of these sites impacting the proposed work is low. There is another site located 2,700 feet to the southwest of the proposed work where an underground storage tank was removed. There was no contamination found during removal of the tank so it is not believed this site poses any HTRW risk to the work. There are also railroad tracks located south of the site, but they appear to be far enough away not to pose a contaminant risk to the proposed work. However, any soil removed from the site should be tested to ensure proper disposal and any material brought onto the site should be tested to ensure it is clean.

Oakland Unit, Station 220+00, East Oakland Pump Station – Problem: Uplift

The work proposed at this location is to add a heel extension to resist uplift pressures. There are several former solid waste facilities identified within 400 feet to the east and north east of this location. These are identified as construction and demolition disposal facilities so there is not believed to be any risk of HTRW contamination associated with these sites. This combined with the fact that the proposed work will be isolated to a small footprint adjacent to the existing pump station, makes the risk of HTRW contamination impacting the work very low.

Oakland Unit, Station 75+50, Manhole – Problem: Uplift

The alternatives considered at this location are removal and replacement of the manhole or the addition of a heel extension. Based on the HTRW assessment, there were several underground storage tanks closed about 1,300 feet southeast of the site. The description provided indicated very little contamination found during these removals. No other sites were identified near this location. Therefore, it is believed the risk of HTRW contamination impacting the work is very low. However, any soil removed from these locations should be tested and properly disposed based upon test results.

Oakland Unit, Station 485+86 to 491+01 – Problem: Sliding Stability

The alternative selected to address the sliding stability of floodwall in this area includes the addition of a stability berm adjacent to the wall. The only HTRW concern for this work is to ensure the material brought on-site for use has been tested and certified to be clean.

Oakland Unit, Station 64+00 to 80+00 – Problem: Underseepage

The alternatives being considered for this location are either an underseepage berm or relief wells. Based on the HTRW assessment , there were several undergrouind storage tanks (UST) closed about 1,300 feet southeast of the site. The description provided indicated very little contamination was found during the removal of the tanks. No other sites were identified near this location. Since these sites are 1,300 feet from the proposed work, there is little or no HTRW risk of impacting the underseepage berm alternative. Also, there was no contaminated groundwater concern cited in associated with the UST removals, therefore risk of groundwater contamination impacting relief well installation and operation is considered low. However, any soil removed from the site should be tested to ensure proper disposal and any material brought onto the site should be tested to ensure it is clean.

South Topeka Borrow Site

The HTRW assessment found only one site with a potential impact to the use of this area as a borrow site. A site located at the southwest corner of the proposed borrow area was once permitted as a city dump. It is not known what types of waste were accepted at this facility or the lateral limits of the disposal cells. Even if contaminated material were disposed in this area, it is unlikely to impact areas outside the disposal cells. Liquid waste or contaminants mobilized by infiltrating precipitation would migrate vertically until intercepting groundwater rather than horizontally. Therefore, the borrow areas would still be usable provided an adequate buffer zone between the disposal cells and borrow areas is established. However, depending on the lateral limits of the disposal cells, there may not be as much borrow material available for use as anticipated.

It is recommended that more detailed information regarding the lateral limits of the disposal areas be obtained through research and field investigations if necessary. After the limits of the disposal area is determined and the remaining area available for borrow established, it is recommended that samples for chemical analysis be collected from the proposed borrow area. This will ensure that no contamination material is being transferred from one location to another within the project limits.

Oakland Borrow Site

The HTRW assessment found only one site with a potential impact to the use of this area as a borrow site. A site located at the southwest corner of the proposed borrow area was once permitted as a city dump. Information provided on the site indicated that debris from the 1968 tornado was buried in that location. The range of waste types is unknown that may have been disposed in this location or the lateral limits of the disposal cells. Even if contaminated material were disposed in this area, it is unlikely to impact areas outside the disposal cells. Liquid waste or contaminants mobilized by infiltrating precipitation would migrate vertically until intercepting groundwater rather than horizontally. Therefore, the borrow areas would still be usable provided an adequate buffer zone between the disposal cells and borrow areas is established.

However, depending on the lateral limits of the disposal cells, there may not be as much borrow material available for use as anticipated. It is recommended that more detailed information regarding the lateral limits of the disposal areas be obtained through research and field investigations if necessary to more closely estimate the amount of borrow available. After the limits of the disposal area is determined and the remaining area available for borrow established, it is recommended that samples for chemical analysis be collected from the proposed borrow area. This will ensure that no contamination material is being transferred from one location to another within the project limits.

Conclusions and Recommendations

Overall, the environmental assessment found very little risk associated with HTRW contamination on proposed activities. However there were three areas where there was a potential HTRW or solid waste impact to the proposed work. There is a need to insure that the lateral limits of any contamination be established to insure that remediation measures are incorporated into the final construction plans.

South Topeka Unit, Station 74+41 to 93+86

There is a high probability that groundwater below this area is contaminated with chlorinated solvents. Any alternatives that will encounter groundwater during construction activities have a high risk of encountering HTRW. Also, if

operation of the new facilities results in the discharge of groundwater to the surface, environmental impacts will need to be evaluated.

South Topeka Borrow Site

A former city dump was identified at the southwest corner of the proposed borrow area. The limits of the disposal cells are unknown so there may not be as much borrow area available as anticipated. Investigations are recommended to determine the nature of materials accepted and the lateral limits of the dump. Also, samples from the proposed borrow should be collected and analyzed to ensure material to be used on other sites is clean.

Oakland Borrow Site

A former city dump was identified at the southwest corner of the proposed borrow area. It was described as having debris from a 1968 tornado. The limits of the disposal cells are unknown so there may not be as much borrow area available as anticipated. Investigations are recommended to determine the nature of materials accepted and the lateral limits of the dump. Also, samples from the proposed borrow should be collected and analyzed to ensure material to be used on other sites is clean.

Also, it is recommended that any soil removed from a site associated with the levee work be analyzed to ensure proper disposal. Any soils used to upgrade the levee system should be analyzed to ensure it is not contaminated. Both of these practices ensure that contamination is not being inadvertently spread from one site to another.

Prepared by Paul Speckin,
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