CLEAN WATER ACT
SECTION 404(b)(1) EVALUATION (40 CFR 230)

BLACKSNAKE CREEK SECTION 205 Flood Risk Management
Draft Integrated Definite Project Report and Draft Environmental Assessment

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CLEAN WATER ACT
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BLACKSNAKE CREEK SECTION 205 FEASIBILITY STUDY

PROJECT DESCRIPTION

a. Location

Blacksnake Creek is a small left bank tributary of the Missouri River located in Andrew and Buchanan Counties, Missouri. The creek enters the City about 4.3 miles above its mouth and flows south-southwest through the City of St. Joseph to its confluence with the Missouri River (Figures 1 and 2).

b. General Description

The watershed has a total drainage area of 8.2 square miles. The channel in the lower 3.2 square miles of the basin is enclosed in a combined sewer of varying size up to 17 feet in diameter. The upper 5 square miles of the basin above the combined sewer inlet at Karnes Road is drained by open channel.

Blacksnake Creek is an urbanized stream that flows for about 3,200 linear feet through the project area. The channel was straightened and the bottom concrete lined for the last 530 linear feet of the channel before subverting into an underground channel (combined sewer) through an inlet located immediately north of Karnes Road and conveyed to the Missouri River. The storm system north of Karnes Road consists mostly of open channels, while the system south of Karnes Road is largely piped. The substrate of the unlined portions of the Creek is composed of clay. The Creek is incised and there is a large amount of concrete and asphalt debris in the channel, as well as a variety of litter.

A small ephemeral stream flows into Blacksnake Creek in the southeastern portion of the project area. This tributary is also incised with some litter observed during field observations, although to a lesser degree compared to the Creek. The stream is culverted, but does not contain concrete lined channel, a low water crossing and multiple culverts like the Creek.

During storm events greater than or equal to a 5-year frequency, the capacity of the Karnes Road combined sewer inlet is exceeded, flooding the area downstream of Karnes Road. During intense storm events (greater than or equal to a 5-year frequency), the Karnes Road combined sewer inlet capacity is exceeded. When this occurs, flow from Blacksnake Creek overtops Karnes Road and flows south via streets and yards to flood residential, commercial, and industrial properties within the City, including over 200 residential, commercial, and industrial structures along the St. Joseph Boulevard corridor. At least six major flood events have been recorded at this location, each resulting in major property damage.

c. Authority and Purpose

This study is authorized under Section 205 of the Flood Control Act of 1948, as amended by the Water Resources Development Act of 1986. Section 205, one of several existing authorities in

the Continuing Authorities Program (CAP), gives the U.S. Army Corps of Engineers (USACE) authority to plan, design, and construct small flood control projects that have not been specifically authorized by Congress. Federal participation in Section 205 projects is limited by statute to $10 million.

There have been at least six major flood events in recorded history, each causing major damages to developed property. One of the most damaging floods occurred on June 9, 1984, and caused several million dollars in damages. The remaining five significant storms happened in June 1943, June 1949, May and August of 1959, and May 1962. Ongoing upper basin development and floodplain encroachment are potential factors in continuing flood related damage during larger storm events. Therefore, the purpose of the project is to implement a flood risk management alternative to reduce flood risk and associated impacts to home and businesses along St. Joseph Boulevard. The City is also required to control sewer overflows as regulated by the Clean Water Act. The proposed action would be permitted and conducted under all general and regional conditions specified for regulatory compliance by the Kansas City District, Regulatory Branch. Section 401 Water Quality Certification would be obtained from the State of Missouri prior to construction.

Alternatives

Structural flood mitigation measures reduce flood hazard by keeping floodwaters away from people and damageable property. The structural measures considered included the excavation of a detention basin and construction of a detention dam, levee, and floodwall. Initial plan formulation included the development and engineering review of four dry detention plans for the area north of Karnes Road and east of St. Joseph Avenue, with levels of protection in the range of a 10- to 250-year flood event. The detention plans included:

- Raising Karnes Road to act as a detention dam, with associated drainage and outlet structures.
- Construction of a levee on the west side of the detention basin from Karnes Road to Savannah Road and a floodwall on the east bank of Blacksnake Creek north of Savannah Road to protect existing residences and structures.
- Excavation of the Blacksnake Creek floodplain north of Karnes Road to increase detention.
- Site grading, utility/sewer relocations and other appurtenances.
- Acquisition/buyout of properties.

The four initial dry detention plan alternatives are shown in Figure 3 and described below.

Alternative 1 - Alternative 1 raises Karnes Road to elevation 905 NGVD to act as a detention dam but includes no excavation of the existing basin to increase storage. This alternative also includes construction of a levee and a floodwall upstream of Karnes Road to provide protection to existing residences and structures. The levee would be located to the east of and parallel to St.

Joseph Avenue. The floodwall would be located farther upstream, just to the north of Savannah Road. In this alternative, an overflow spillway at Karnes Road would be the point of overtopping.

Alternative 2 - Alternative 2, in addition to the features of Alternative 1, would excavate the detention basin within the Blacksnake Creek floodplain north of Karnes Road between St. Joseph Avenue and an abandoned railroad right-of-way to increase the detention capacity.

Alternative 3 - Alternative 3 would increase the detention capacity of Alternative 2 by extending the detention area to the east of the abandoned railroad right-of-way. The abandoned railroad right-of-way would be removed to access the additional detention volume to the east.

Alternative 4 - Alternative 4 would increase the detention capacity of Alternative 3 by removing a portion of Karnes Road, extending the levee downstream of Karnes Road to Northwest Parkway, and additional excavation within the basin area. This alternative does not include the replacement of Karnes Road. In this alternative, an overflow spillway at Northwest Parkway would be the point of overtopping.

Based on the initial value engineering review of the alternatives and discussions with the project sponsor, three additional alternatives were developed using the natural topography and a lower pool height to eliminate the need for the traditional and costly structures (detention dam, levee, and floodwall) of Alternatives 1 through 4. The four alternative detention plans are shown in Figure 4 and described below.

Alternative 5 - The Blacksnake Creek floodplain north of Karnes Road between St. Joseph Avenue and an abandoned railroad right-of-way would be excavated to increase the detention capacity. The abandoned railroad right-of-way along the east side of the basin would be removed to access additional detention volume to the east. An overflow spillway would be constructed at an elevation of 895 NGVD on Karnes Road. In this alternative, an overflow spillway at Karnes Road would be the point of overtopping.

Alternative 6 - Alternative 6 would increase the detention capacity of Alternative 5 by excavating the area between Karnes Road and Northwest Parkway. Culverts would be constructed to provide a connection between the areas north and south of the Karnes Road. In this alternative, an overflow spillway constructed at an elevation of 895 NGVD at Northwest Parkway would be the point of overtopping.

Alternative 7 - Alternative 7 would increase the detention capacity of Alternative 6 by expanding the basin north of Karnes Road to the west. This alternative would require the purchase and demolition of the residences on the west side of the basin along St. Joseph Avenue. In this alternative, an overflow spillway constructed at an elevation of 895 NGVD at Northwest Parkway would be the point of overtopping.

Subsequent to the development of Alternatives 1 through 7, the City approved a transportation plan that included the City's abandonment of the Karnes Road section crossing the basin. Therefore, an additional alternative that excavates the abandoned Karnes Road was formulated.

Alternative 8 - Alternative 8 modifies Alternative 6 by removing Karnes Road. The removal of Karnes Road reduces construction cost by eliminating the need to raise, reconstruct, and armor the road, and for the installation of culverts to provide a hydraulic connection between the basin areas north and south of the road.

Figure 3 – Alternatives 1 through 4

Figure 4 – Alternatives 5 through 8

BLACKSNAKE CREEK FLOOD CONTROL DETENTION BASIN ALTERNATIVES 5 THROUGH 8

Legend

- Abandoned Right-of-Way
- Blacksnake Creek
- Down Slope Direction
- Excavation Contours
- Karnes Road Removed
- Spillway
- Concrete Culvert under Karnes Road
- Inlet to Combined Sewer
- Detention Area (Excavated)
- Filled Area
- Parcel

N W E S

400 200 0 400 Feet

A nonstructural flood risk management study was completed as a separate task for this project. Nonstructural measures considered during this study include structure acquisition and demolition/relocation, structure elevation, flood proofing, localized flood reduction measures, flood emergency preparedness system, and floodplain regulation.

No Action

The no action alternative is unacceptable as it would not provide a means to decrease combined sewer overflows and flooding along St. Joseph Boulevard. Flooding and adverse socioeconomic impacts would continue to occur. The City would not be in compliance as they are required to control sewer overflows as regulated by the Clean Water Act, Missouri Department of Natural Resources and U.S. Environmental Protection Agency.

Recommended Plan

Due to the large number of homes and businesses in the flood prone area, structure acquisition is not practical. In addition to the acquisition and demolition/relocation cost based on socioeconomic analysis, removal of these structures would significantly reduce the City's tax base. Therefore, nonstructural alternatives were screened out of feasibility. The no action alternative does not beet the basic project purpose of reducing flood risk and compliance with the Clean Water Act. Alternatives 5 through 8 meet the project purpose and do not include the costly structural measures of Alternatives 1 through 4.

Alternatives 1 through 4 are not preferred as these alternatives were formulated with traditional flood risk management structures including detention dam, levee, and floodwall that are typically very expensive to construct and maintain. These alternatives are variants of the same basic plan which include raising Karnes Road to act as a dry detention dam with an overflow spillway. Alternative 1 includes no excavation for the detention area upstream of Karnes Road, while 2, 3 and 4 involve increasing amounts of excavation. All four alternatives would include a levee/floodwall combination upstream of Karnes Road, which is meant to protect homes in that area from any adverse effects of the detention basin. Alternative 4 extends the detention basin downstream of Karnes Road, removing a short portion of Karnes and adding a second levee.

Alternatives 5 through 8 are also variants of the same plan. Like Alternatives 1 through 4, these plans involve dry detention upstream of Karnes Road. Unlike Alternatives 1 through 4, they use the natural topography and a lower pool height to avoid the need for the Karnes Road dam and levee/floodwall combination upstream. The dry detention area in Alternative 5 is upstream of Karnes Road. Alternative 6 extends it a short distance downstream to Northwest Parkway, as in Alternative 4. Alternative 7 expands the detention area upstream of Karnes to the west.

Alternative 8 is similar to Alternative 6 but takes into account the City's plan to abandon the section of Karnes Road crossing the basin as part of its approved area transportation plan. The abandonment of Karnes Roads allows a reduction in cost by eliminating the need to raise, reconstruct, and armor the road, and for the installation of culverts to provide a hydraulic connection between the basin areas north and south of the road. The volume gained by the removal of Karnes Road is used to construct utility pads around three 161 KV power poles that were to be relocated under Alternative 6 while maintaining the same detention volume. The cost

savings associated with removing Karnes Road and not relocating the 161 KV power poles out of the basin is approximately $1 million. Therefore, Alternative 8 is the Preferred Alternative.

d. General Description of Fill Material

The total estimated amount of soil fill to be placed is 2,700 cubic yards. Clean soil fill would be obtained from a commercial borrow source.

Approximately 33,120 tons of riprap for erosion control and 3800 tons of aggregate surfacing would be placed. Rock would be obtained from an approved quarry and meet the criteria specified in Engineering Manual 1110-2-1601, Engineering and Design - Hydraulic Design of Flood Control Channels.

e. Description of the Proposed Fill Placement Sites

Fill material would be placed around the transmission tower pads, inlet and outlet locations, overflow embankments, and at other locations of potential excessive erosion such as creek bends or tall basin side slopes. Fill material will consist of aggregate surfacing for access roads and riprap for erosion control around the transmission tower pads, inlet and outlet locations, overflow embankments, and at other locations that could experience excessive erosion such as creek bends or tall basin side slopes.

Some material excavated from the creek and stream would be combined with fill and moved around to shape the creek and stream channel and banks. It is estimated that about 2,700 cubic yards of soil fill would be used for the Creek and 53 cubic yards of soil fill would be used for the stream.

Of the 2,650 total linear feet of Blacksnake Creek within project area, 1,200 linear feet would be excavated three to four feet deeper than the existing creek substrate. The creek bottom would also be widened an average of 20 feet along its length as it is currently incised. Areas that are realigned for power pole foundations would bump the channel out and function as small meanders. The estimated amount of material to be excavated below the ordinary high water mark (OHWM) totals 44,000 cubic yards and the estimated total amount of fill is approximately 2,700 cubic yards for a net excavation of 41,300 cubic yards. Excavated material will be reused as fill and would be moved around to shape the stream and streambanks. Remaining suitable material would be used to elevate power pole foundations.

Approximately 2,140 tons of riprap would be placed below the ordinary high water mark (OHWM) at creek bends. Approximately 30,980 tons of rock would be placed above the OHWM. Placement of rock above the OHWM includes around power pole pads, at the primary and secondary spillways, and at river bends. Approximately 3,800 tons of aggregate will be used for permanent and temporary access roads.

The ephemeral stream to the east of Blacksnake Creek would be impacted similar to the Creek. The total stream length is 1,380 linear feet, 240 linear feet of stream be realigned and 1,060 linear feet of stream would be shaped to convey flow more efficiently. The estimated amount of material to be excavated below the OHWM totals 284 cubic yards and the total estimated amount

of fill required is 53 cubic yards. Excavation would not occur deeper than the existing streambed and excavated material would be moved around to shape the stream and stream banks. Sixty linear feet of the existing channel would be permanently filled. Flow would be directed into the Creek similar to existing conditions.

f. Description of Disposal Method

Material would be placed at the fill site by mechanical means. Equipment would be standard earthmoving construction equipment.

1. REVIEW OF COMPLIANCE (§230.10[A]-[D])

A review of the proposed activity indicates that:

a. The proposed rock and soil fill and rock placement does not occur in a special aquatic site. Rock and soil placement must be placed within the aquatic ecosystem to fulfill its basic purpose.

b. The activity does not appear to (1) violate applicable state water quality or effluent standards; (2) jeopardize the existence of Federally listed endangered or threatened species or their habitat; and (3) violate requirements of any Federally designated marine sanctuary.

c. The activity will not cause or contribute to significant degradation of a water of the United States including adverse effects on human health, life stages of organisms dependent on the aquatic ecosystem, ecosystem diversity, productivity and stability, and recreational, aesthetic, or economic values.

d. Appropriate and practicable steps would be taken to minimize potential adverse impacts of grading and rock placement on the aquatic ecosystem through the use of best management practices (BMPs) incorporated into the construction specifications.

2. TECHNICAL EVALUATION FACTORS (SUBPARTS C-F)

a. Physical and Chemical Characteristics of the Aquatic Ecosystem (Subpart C)

1. Substrate impacts. 1,200 linear feet of the Blacksnake Creek channel substrate would be excavated three to four feet deeper than the existing creek substrate. The creek bottom would also be widened an average of 20 feet along its length as it is currently incised. The estimated amount of material to be excavated below the Creek ordinary high water mark (OHWM) totals 44,000 cubic yards. Excavated material will be reused as fill and would be moved around to shape the stream and streambanks. Remaining suitable material would be used to elevate power pole foundations.

   Approximately 2,140 tons of riprap would be placed below the ordinary high water mark (OHWM) at creek bends. Approximately 30,980 tons of rock would be placed above the OHWM. Placement of rock above the OHWM includes around power pole

pads, at the primary and secondary spillways, and at river bends. Approximately 3,800 tons of aggregate will be used for permanent and temporary access roads.

The ephemeral stream to the east of Blacksnake Creek would be impacted similar to the Creek. 240 linear feet of stream be realigned and 1,060 linear feet of stream would be shaped to convey flow more efficiently. The estimated amount of material to be excavated below the OHWM totals 284 cubic yards and the total estimated amount of fill required is 53 cubic yards. Excavation would not occur deeper than the existing streambed and excavated material would be moved around to shape the stream and stream banks. Sixty linear feet of the existing channel would be permanently filled. Flow would be directed into the Creek similar to existing conditions.

2. Suspended particulates/turbidity impacts. A temporary diversion channel capable of accommodating the Blacksnake Creek base flow would be excavated within the construction footprint to facilitate detention basin. The substrate of the diversion channel would be graded and compacted to minimize increased suspended particulates and associated turbidity.

   Similar to the temporary diversion channel, the Creek and ephemeral stream substrate would be compacted to keep existing soils in place during construction. Sediment that has accumulated behind asphalt, concrete, and miscellaneous trash dumped into the creek, and to a lesser extent the stream, would be removed prior to construction and the substrates would be compacted with existing and fill soils. Best management practices such as trenched silt fencing and staked hay bales would be used to minimize soil entering the Creek from bank shaping and adversely impacting downstream water quality.

   Fill material consisting of aggregate surfacing for access roads and riprap for erosion control would be placed around the transmission tower pads, inlet and outlet locations, overflow embankments, and at other locations that could be eroded such as Creek bends and side slopes. The placement of rock fill in areas of potential erosion would stabilize the Creek and prevent erosion to minimize suspended particulates and turbidity. Therefore, increased suspended particulates and turbidity impacts within and downstream of the project area are anticipated to be short-term, minor and construction related.

   Construction activities are not expected to produce any significant change in suspended particulate matter or turbidity of the Missouri River, or other drainages located within the vicinity of the project area. No noticeable impacts to dissolved oxygen levels, toxic metals, organics or pathogens are anticipated as debris would be removed from the Creek prior to construction. Daylighting the creek and stream as a result of riparian corridor removal is anticipated to increase water temperatures. Water temperature would decrease with underground flow and dissolved oxygen would increase with water mixing at the Missouri River outfall. Photosynthetic, filter feeder, and sight feeder impacts are expected to be minimal as the existing aquatic ecosystem viability is very limited.

3. Water column impacts. Water chemistry, clarity, color, odor, taste, dissolved gas levels, nutrients, and eutrophication would not be anticipated to be affected by a temporary stream diversion, detention basin excavation, soil fill and rock placement for erosion control. A short-term, minor construction related impact to water clarity could occur following construction and stabilization of the creek and stream channels and banks. Best management practices would be used to prevent water quality impacts during and post construction.
4. Alteration of current patterns and water circulation. The Creek is channelized with no rock and riffle, and very minimal pool due to very low base flows. No adverse effects to current patterns or water circulation were identified. The creek is channelized and slight meandering around transmission tower pads for an approximate length of 900 feet is incorporated into the project design. Debris removal from the creek channel and banks, broadening of the creek channel, and the incorporation of slight meanders along the creek would positively alter current patterns and water circulation.
5. Alteration of normal water fluctuations/hydroperiod. The project as designed is anticipated to decrease fluctuation and increase hydroperiod during heavy precipitation events. Increasing hydroperiod would provide for settling of particulates prior to flowing downstream and would benefit water quality. No adverse effects to normal water fluctuations/hydroperiod were identified.
6. Alteration of salinity gradients. Salinity determinations are not applicable to the area.

b. Biological Characteristics of the Aquatic Ecosystem (Subpart D)

1. Effect on threatened/endangered species and their habitat. No threatened or endangered species occur within or adjacent to the stream. The Federally endangered pallid sturgeon (*Scaphirhynchus albus*) inhabits the Missouri River downstream. A potential minor, short-term construction related increase in suspended particluates and turbidity would not be anticipated to adversely affect the pallid sturgeon as this species is adapted to large, turbid rivers.
2. Effect on the aquatic food web. The proposed action should have no significant effect on the aquatic food web. No significant impacts to benthos, plankton, or nekton are anticipated as the aquatic food web is minimal and already severely impacted by channelization, culverts and concrete lined channel, a low water crossing and debris dumped into and adjacent to the creek.
3. Effect on wildlife (mammals, birds, reptiles, and amphibians). Construction is anticipated to have a long-term, minor impact to wildlife due to removal of riparian corridor and daylighting the stream. Wildlife would be expected to use adjacent habitat during construction. Areas of similar habitat occur upstream of the proposed detention basin. Tree removal would be mitigated by replacing impacted trees within the watrershed. The Recommended Plan would result in positive impacts to water quality as combined sewer overflows and overland flooding would decrease.

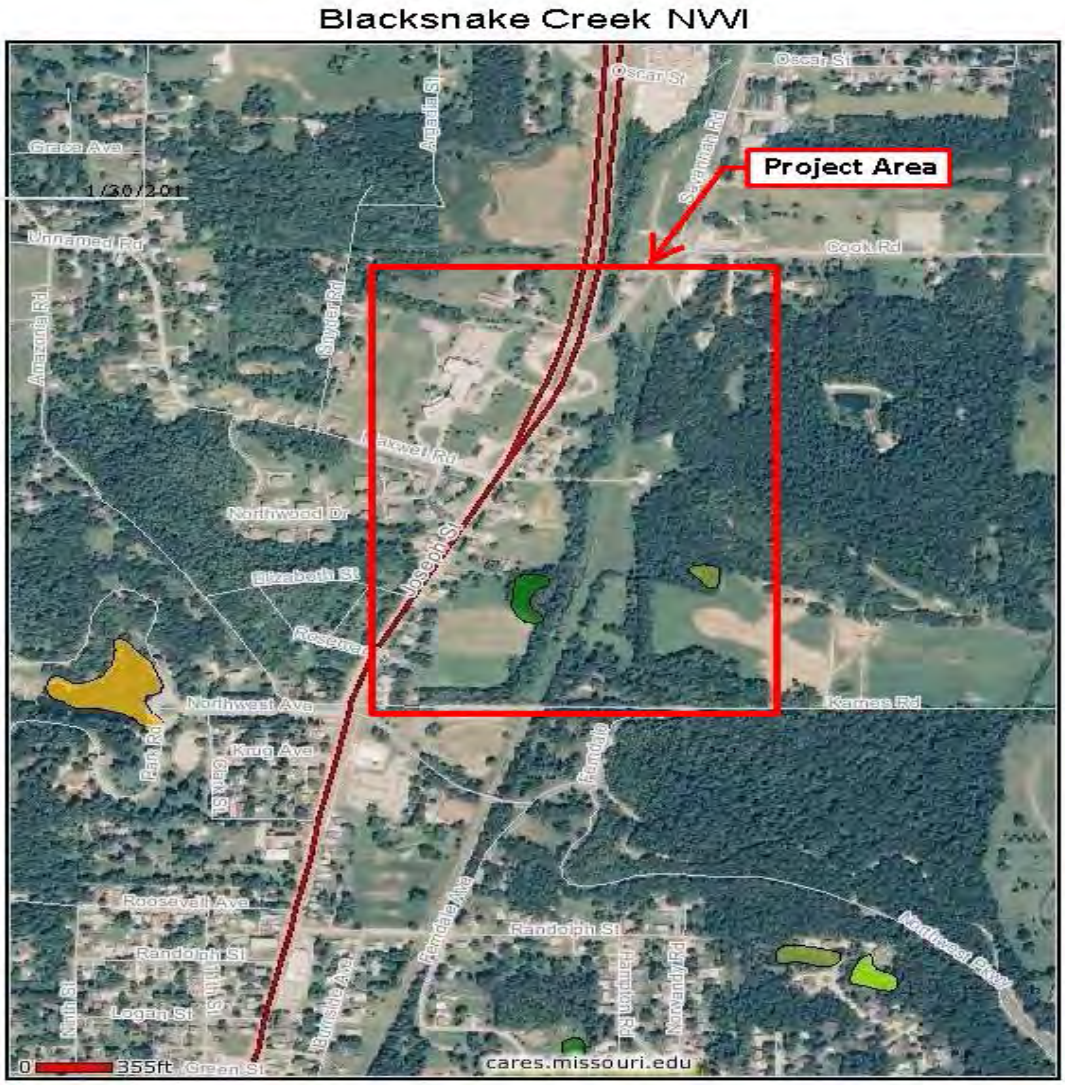
c. Special Aquatic Sites (Subpart E)

1. Sanctuaries

2. Wetlands
3. Mud flats
4. Vegetated shallows
5. Coral reefs
6. Riffle and pool complexes

The proposed action would have no adverse effect on sanctuaries, wetlands, mud flats, vegetated shallows, or riffle and pool complexes as none exist within the vicinity of detention basin excavation. Although an NWI-mapped wetland is located within the area of detention basin excavation, this mapped wetland is riparian corridor and not wetland due to a lack of wetland hydrology, as verified during field reconnaissance (Figure 5).

Figure 5 – Blacksnake Creek NWI



d. Human Use Characteristics (Subpart F)

1. Effects on municipal and private water supplies
2. Recreational and commercial fisheries impacts
3. Effects on water related recreation
4. Aesthetic impacts
5. Effects on parks, national and historical monuments, national seashores, wilderness areas, research sites, and similar preserves.

The proposed action would have no substantial adverse effect on municipal and private water supplies, recreational or commercial fisheries, water-related recreation, parks, national and historical monuments, national seashores, wilderness areas, research sites, or similar preserves. A moderate, long-term adverse impact to aesthetics would occur due to the removal of riparian corridor and excavation for detention, particularly to residents along St. Joseph Avenue whose property faces the Creek, and those who drive along the roads in the vicinity of Blacksnake Creek. Similar habitat occurs upstream of the proposed detention basin. Tree mitigation would occur in areas upstream of the impacted riparian corridor.

3. EVALUATION OF FILL MATERIAL (SUBPART G)

a. The following information has been considered in evaluating the biological availability of possible contaminants in fill material: physical characteristics. Soil fill material would be obtained from a CENWK approved commercial source and local quarry, and rock would be obtained from an existing quarry located in Missouri or Kansas that meets the criteria specified in Engineering Manual 1110-2-1601, Engineering and Design - Hydraulic Design of Flood Control Channels. Construction material would be chemically stable and non-contaminating. Neither the rock or soil fill nor its placement would cause relocation or increases of contaminants in the aquatic system.

4. DISPOSAL SITE DELINEATION (§230.11[F])

a. The following factors, as appropriate, have been considered in evaluating the disposal site: depth of water at the disposal site, current velocity, direction, variability at disposal site, and the degree of turbulence. The project area and disposal site have also been evaluated for the presence of special aquatic sites and waters of the U.S. No special aquatic sites are located within the vicinity of construction or disposal.

A total of 660,000 bank cubic yards are estimated to be excavated for the detention basin. Spoil separation and disposal is to occur at the existing softball complex (Complex), located approximately 1.9 miles west of the proposed detention basin excavation. Soil unsuitable for levee construction, estimated at 160,000 bank cubic yards, is to be graded into the existing ground. Rock and debris would be disposed in an appropriate landfill. Approximately 500,000 bank cubic yards would be stockpiled at Elwood Bottoms, located approximately 2.9 miles south of the Complex and used as fill for the MRLS 471-460 levee raise located approximately 0.3 miles west of the Complex. A buffer of at least 100 feet

would be used at the Complex to prevent spoil from entering the Missouri River. Stockpiled soil would be covered and/or seeded to prevent erosion and contained by silt fencing.

The Complex and Elwood Bottoms contain NWI-mapped wetlands. Wetlands mapped in the vicinity of the Complex are primarily located in the southern portion of the Complex, and adjacent to the Missouri River. Some wetland acreage is mapped adjacent to the ball fields (Figure 6 Softball Complex NWI). Elwood Bottoms has been severely disturbed due to tree clearing, earthmoving, and agricultural activity. One emergent wetland is NWI-mapped within the area of proposed spoil placement (Figure 7 Elwood Spoil Area NWI). This wetland was not observed to exist during field reconnaissance. Construction specifications would preclude the placement of spoil would not be placed within or adjacent to existing wetlands or in areas where runoff could enter existing wetlands. All areas of borrow and spoil placement will be assessed for changed conditions prior to construction.

Figure 6 – Softball Complex NWI

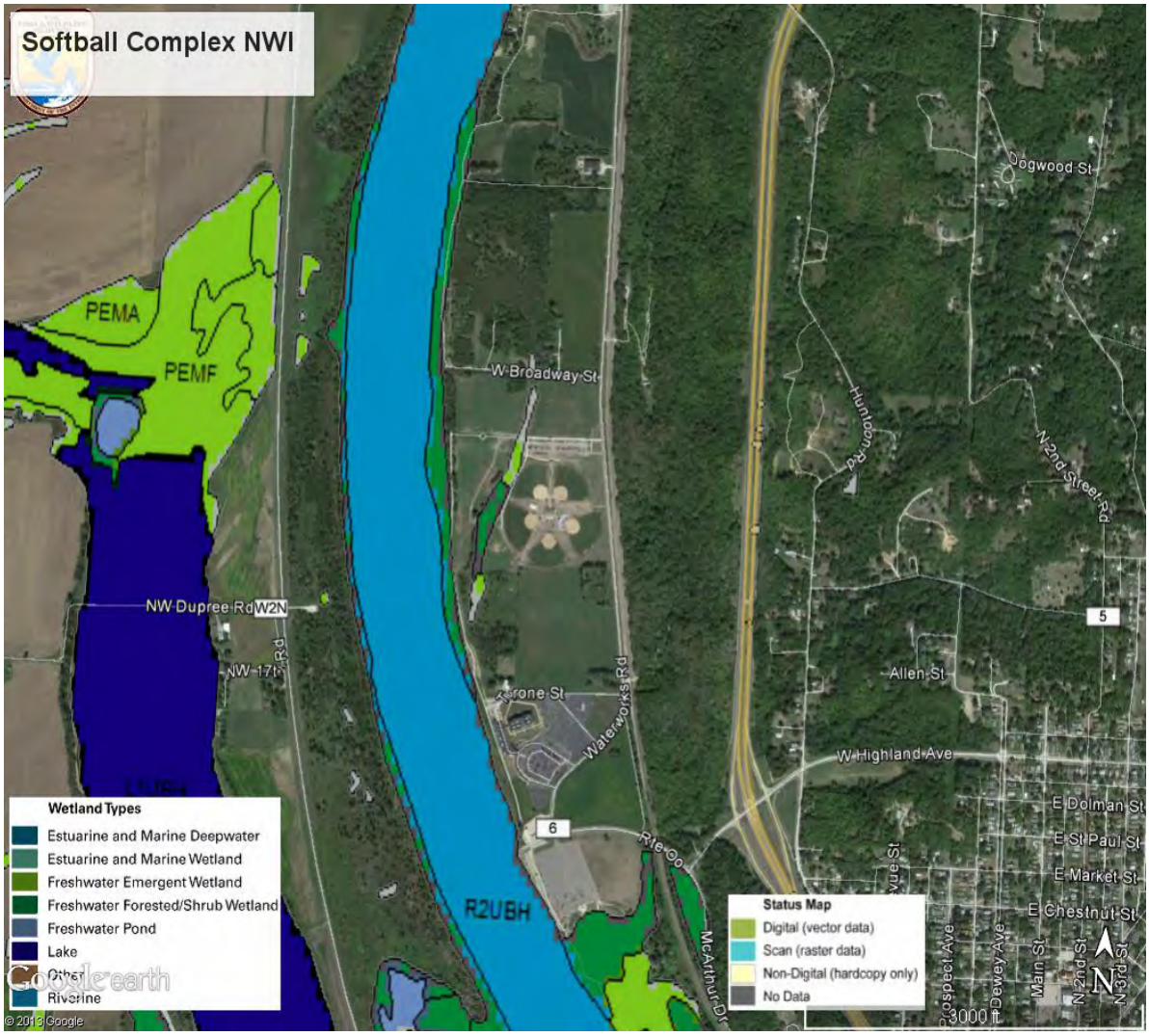
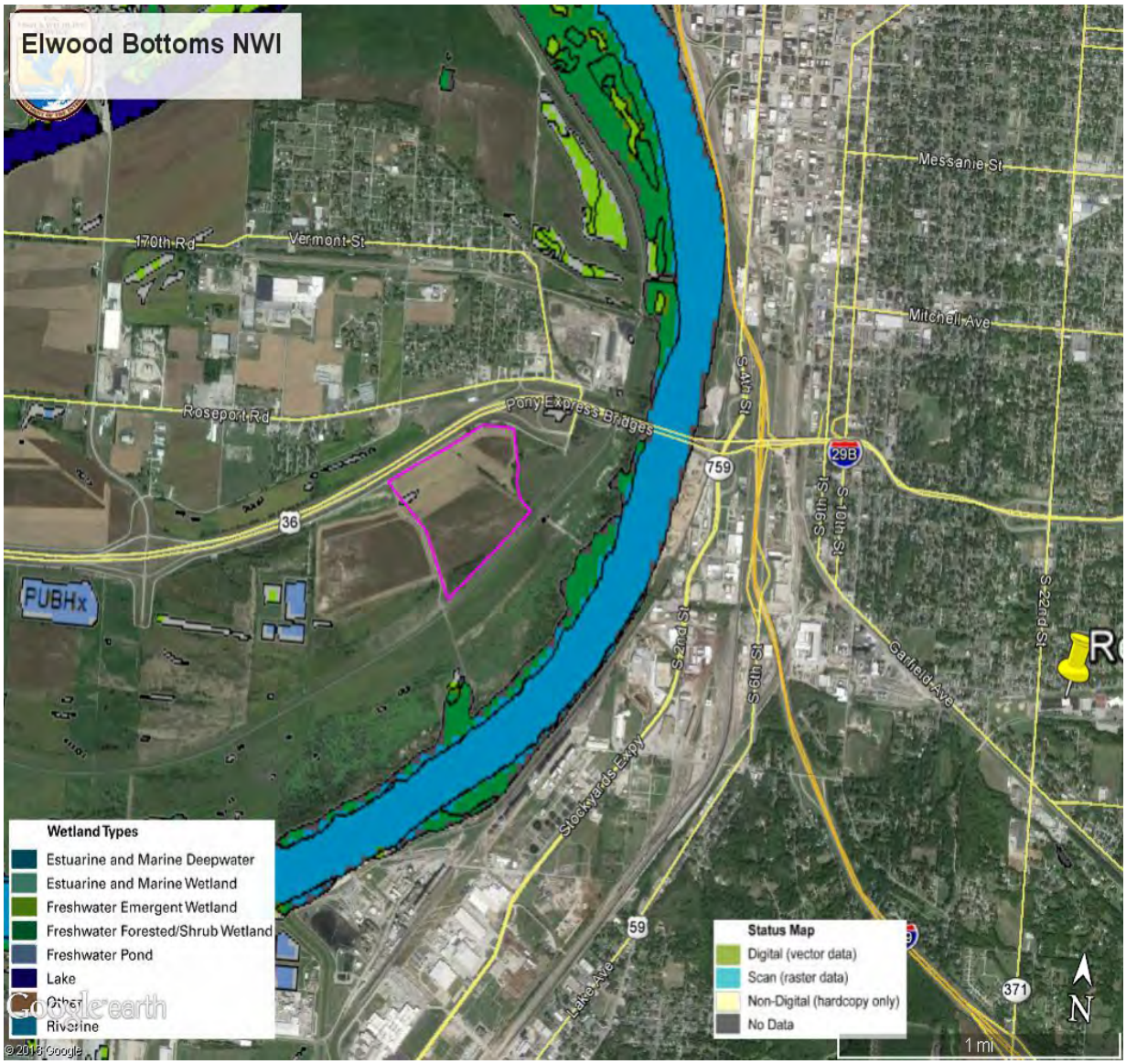


Figure 7 - Elwood Spoil Area NWI



b. Mixing Zone Determination: An evaluation of the appropriate factors in 4a above indicates that the disposal site and/or size of mixing zone are appropriate.

5. ACTIONS TO MINIMIZE ADVERSE EFFECTS (SUBPART H)

All appropriate and practicable steps, as warranted, would be taken through application of recommendations of §230.70-230.77 to ensure minimal adverse effects of the proposed fill placement. These actions include the following:

a. In order to minimize and/or avoid adverse effects on the aquatic ecosystem, the Corps will minimize impacts to the terrestrial and aquatic environment and use uncontaminated fill material. All activities will comply with standard Corps measures, directives, and policies to ensure environmental protection during construction and minimize construction-related pollution. The following lists some of the environmental protection measures and policies.
(1) Temporary erosion control measures (silt fences, berms, dikes, drains, etc.) will be provided and maintained.

(2) The Contractor will obtain all applicable construction permits including an NPDES permit from MDNR for stormwater discharges from the project's construction work areas. Contractors shall adhere to all requirements of the NPDES stormwater discharge permit and all additional permit requirements.

(3) Dust will be reduced in work areas by sprinkling with water or other methods that are permitted to reduce hazard and nuisance.

(4) Disturbed areas area shall be graded, filled and seeded.

(5) Contractors will employ machinery of appropriate size for the fill placement activities.

(6) Fuel, chemical and other materials stored at the project site shall be stored in a manner that minimizes the discharge of product to waters of the state.

(7) Deleterious material removed from the stream and separated from suitable soil at the Complex would not be used as fill material and disposed in an appropriate landfill.

6. FACTUAL DETERMINATIONS (§230.11)

A review of the appropriate information as identified in items 2-5 above indicates that there are short-term and long-term environmental effects of the proposed detention excavation as related to: a. Physical substrate disposal site; Water circulation, fluctuation, and salinity; c. Suspended particulates/turbidity; d. Contaminant availability; e. Aquatic ecosystem structure and function; and f. Disposal site.

Although soil would be stockpiled for later reuse, the physical substrate would be graded upon soil removal. Therefore, a minor, short-term adverse impact would occur due to the stockpiling of soils and grading upon soil removal. The creek is channelized and incized with no rock and

riffle, and very minimal pool due to very low base flows. The existing condition of the ephemeral stream is impacted similar to the creek, but to a lesser degree. No adverse effects to water circulation were identified. Slight meandering around transmission tower pads for an approximate length of 900 feet within the creek is incorporated into the project design. Debris removal from the creek channel and banks, broadening of the creek and stream channel, and the incorporation of slight meanders along the creek would positively impact water circulation. The project as designed is anticipated to decrease fluctuation and increase hydroperiod during heavy precipitation events. There would be no anticipated change in the salinity of the freshwater system. A short-term, construction related adverse impact may occur to water quality due to an increase in suspended particulates/turbidity during construction. Best management practices would be incorporated into the project construction specifications to avoid, or otherwise minimize a potential increase in suspended particulates/turbidity.

Construction of the Recommended Plan would decrease the frequency of combined sewer overflows, decrease flood risk and increase hydroperiod, which would provide for settling of particulates prior to flowing downstream and provide a long-term positive impact to downstream water quality. Clean soil and rock would be obtained from commercial sources to prevent the potential availability of contaminants.

The no action alternative would leave the creek in its current state and result in minor, short-term and moderate, long-term adverse impacts as selective clearing, littering, increased incision and erosion would be anticipated to continue.

The ephemeral stream is not as severely impacted by incision and littering as the creek and does not contain concrete lined channel, a low water crossing, or multiple culvert removal and functions more as a natural system. Positive impacts to the stream primarily include stream widening and bank shaping, which would prevent future increased incision and is considered a long-term, moderate positive impact. Therefore, all of the action alternatives proposed including the Recommended Plan would result in minor, long-term positive impacts to the stream and overall moderate, long-term adverse impacts to the stream due to direct impacts resulting from construction, tree removal and daylighting the stream. The no action alternative would be anticipated to result in short-term and long-term adverse impacts to the stream and downstream water quality due to litter accumulation, increased incision and erosion.

Missouri Stream Mitigation Method (MSMM) calculations were used to determine the debits and credits associated with the proposed project. Calculations are included in Appendix B as they were received as agency coordination response to the public notice. The project results in the mitigation of impacts to 2,650 linear feet of perennial stream (Blacksnake Creek) and 240 feet of adjacent ephemeral stream. Based on these measurements and the type of impact anticipated to occur, the result of the calculations was a total net debit of 9,388.02.

In-kind stream mitigation would be conducted using an in-lieu fee mitigation program as no available stream bank mitigation credits are available within the vicinity of the Blacksnake

Creek watershed. As of January 14, 2016, 2,274 in-lieu fee credits are available within the Nishnabotna/Platte Rivers Geographic Service Area through the Missouri Conservation Heritage Foundation Stream Stewardship Trust Fund and 10,000 stream credits are available from the Land Learning Foundation within the same service area. Therefore, mitigation would be completed using one of these resources following the signing of a project partnership between CENWK and the City of St. Joseph, MO. The PPA signing is currently estimated to occur in late September, 2016.

The City's future maintenance of the both the Creek and the stream to convey flow is also considered a long-term, minor positive impact as they would remove litter and deleterious material that impedes flow. Post construction operation and maintenance would primarily include periodic mowing and debris removal from the channel, combined sewer inlet, and spillway, riprap replacement, and reseeding of erosion prone areas. Therefore, operation and maintenance activities are not anticipated to result in appreciable post construction adverse impacts to aquatic habitat as they would function to convey flow and prevent erosion.

A minor, short-term adverse would occur at the disposal site due to the separation of deleterious material from soil and the stockpiling of soil. Deleterious material would be removed from the Complex and properly disposed. Any soil incidentally left at the Complex would be graded into existing soil to existing conditions elevation. Stockpiling of soil at Elwood Bottoms is also considered a minor, short-term impact as grading to existing conditions would occur upon soil removal.

Determination of Cumulative Impacts on the Aquatic Ecosystem. Based upon stream impact assessment, there would be a long-term, minor overall adverse impact to the aquatic ecosystem as a result of the Recommended Plan. Stream disturbance coupled with riparian tree removal and daylighting the creek and stream is considered a moderate, long-term adverse impact as although the aquatic ecosystem is very limited and low quality under existing conditions, the project will likely change the aquatic community that is currently present within the project area.

Determination of Secondary Impacts on the Aquatic Ecosystem. No short-term or long-term secondary impacts to the aquatic ecosystem are anticipated. The purpose of the project is to decrease combined sewer overflows and increase flood risk management in compliance with the Clean Water Act.

7. EVALUATION RESPONSIBILITY:

Prepared by: _____

Mr. Richard A. Skinker – Biologist DATE
Plan Formulation Section

Reviewed by: _____

Mr. Jason W. Farmer, Chief DATE
Environmental Resources Section