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Prairie Creek and Tributaries, Russellville, Arkansas, Draft Feasibility Report with a Draft Finding of No Significant Impact and a Draft Environmental Assessment

US Army Corps of Engineers

Little Rock District

Prairie Creek and Tributaries, Russellville, Arkansas

DETAILED PROJECT REPORT AND ENVIRONMENTAL ASSESSMENT
SMALL FLOOD RISK MANAGEMENT PROJECT (SECTION 205)

June 2015

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Prairie Creek and Tributaries, Russellville, Arkansas

Small Flood Risk Management Project (Section 205)

Executive Summary

This Detailed Project Report (DPR) and Environmental Assessment presents the results of a flood damage reduction feasibility study along Prairie Creek and Tributaries in the City of Russellville, Arkansas. The Little Rock District of the U.S. Army Corps of Engineers received a request from the mayor of Russellville, Arkansas, dated 12 July 2010, requesting a flood damage reduction study. The Corps of Engineers signed a feasibility cost sharing agreement with the City of Russellville on 20 April 2012.

Measures and alternatives were developed and evaluated based on appropriate engineering, economic, environmental, cultural, and social factors. The plans were evaluated for cost efficiency and flood risk reduction effectiveness, which resulted in an array of five alternative plans. The tentatively selected plan (TSP), Alternative 4, is the plan judged to have the greatest net economic benefit while being consistent with protecting the Nation's environment, the National Economic Development (NED) Plan.

The total annualized cost of implementing Alternative 4 is estimated at $643,640 including OMRR&R of $2,700. The annual benefits for Alternative 4 are estimated at $2,157,200. The benefit-to-cost ratio is 3.6 with the total project first cost estimated at $13,714,600. The project cost escalated through the midpoint of construction is $15,740,000 with a federal cost share of $9,188,500 and the non-Federal sponsor share of $6,551, 000 ($787,000 cash contribution plus $5,764,500 for Lands, Easements, Rights-of-Way, Relocations, and Disposal (LERRD) including design and construction management). Costs are at an October 2014 price level with an interest rate of 3.375%.

The TSP will install additional culverts under the Railroad Bridge on Engineers Ditch. On 2.2 miles of Prairie Creek: Reaches 4 and 5, the channel bottom will be widened to 20 feet. For Reach 3, channel widening will be 45 to 50 feet. Culverts will be installed at Commerce and West Parkway streets. The North El Paso culverts will be cleaned.

The selected plan complies with United States law, including appropriate environmental requirements, the Corps' Environmental Operating Principles, and meets all Corps of Engineers criteria. The District Engineer recommends that the selected plan be constructed under the authority of Section 205 of the 1948 Flood Control Act, as amended.

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Small Flood Risk Management Project (Section 205)

1 STUDY INFORMATION

This chapter provides basic background for the study. It also lists the steps in the Corps planning process and relates them to the organization of this report.

1.1 STUDY AUTHORITY

Section 205 of the Flood Control Act of 1948 (Public Law 80-858), as amended, authorizes the United States Army Corps of Engineers (USACE) to study, design, and construct flood risk management projects having a total Federal cost of less than $10 million without specific congressional action. It is part of the Continuing Authorities Program (CAP) which focuses on water resource-related projects of relatively smaller scope, cost, and complexity. Traditional USACE civil works projects are of wider scope and complexity and are specifically authorized by Congress.

The study was initiated at the request of the mayor of Russellville, Arkansas in a letter dated 12 July 2010.

1.2 PURPOSE AND SCOPE

The purpose of this report is to present the findings of a feasibility investigation that was conducted to determine if construction of flood risk management measures along Prairie Creek and tributaries in Russellville, Arkansas, is warranted. This report analyzes the problems and opportunities and expresses desired outcomes as planning objectives. Alternatives are then developed to address these objectives. These alternatives include a plan of no action and various combinations of structural and non-structural measures. The economic and environmental impacts of the alternatives are then evaluated and a feasible plan is tentatively selected. The report also presents details on Corps and sponsor participation needed to implement the plan. The report concludes with a recommendation for implementation.

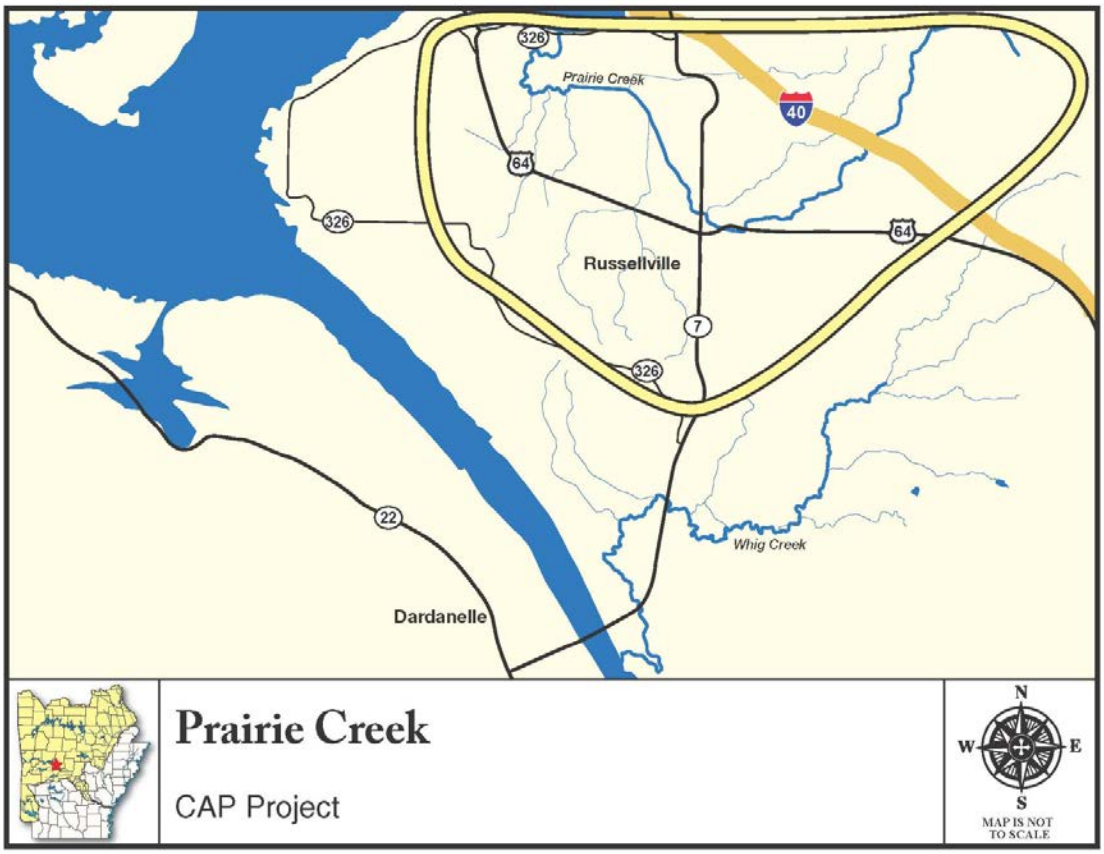

Figure 1-1 Project Location Map

1.3 LOCATION OF THE STUDY AREA

The study area is in Russellville, Pope County, Arkansas, which is located within the Arkansas River Basin, along Prairie Creek and its tributary, Engineers Ditch. The City of Russellville (population 27,920 by 2010 estimate) is located approximately 80 miles west of Little Rock, Arkansas, on the north side of the Arkansas River. The project area is generally centered in the center of the city of Russellville, the non-Federal sponsor. This study area encompasses approximately a six mile reach of Prairie Creek that passes through the city as well as four and a half miles of tributaries, which includes Engineers Ditch.

Downstream of the Union Pacific railroad tracks, the main branch of Prairie Creek and Engineers Ditch converges into Prairie Creek, which flows to the Russellville Dike and Pumping Station. The pump station releases water into Illinois Bayou, a backwater of the Arkansas River. The Prairie Creek watershed is primarily urban with a total area of 12.6 square miles. The largest tributary is Engineers Ditch with a total watershed area of 2.5 square miles. The upper portions of the basins are steep and contain the majority of the undeveloped land found within the watershed. The watershed slope becomes more mild leading to the middle portions, in which the City of Russellville lies. The lower portion of the watershed is a designated sump area behind the Russellville Dike

1.4 FHISTORY OF THE INVESTIGATION

The feasibility study was first initiated on 4 December 2002. A feasibility milestone report was submitted in December 2004, which indicated that there was a federal interest in continuing the feasibility study. However, by letter dated 21 June 2007, the City of Russellville requested that the study be terminated. A termination package was sent to Southwestern Division in July 2007. After experiencing a series of high water events in 2008, the City of Russellville requested that Little Rock District to re-initiate the Section 205 Feasibility study on July 12, 2010.

A feasibility cost sharing agreement (FCSA) between the City of Russellville and the Little Rock District Corps of Engineers was signed on April 20, 2012. Feasibility costs above the $100,000 100 percent Federal share are shared 50-50 between the City of Russellville and the Corps.

1.5 PRIOR REPORTS AND EXISTING PROJECTS

In 1964, the Russellville Dike and Pumping Station were constructed as part of Dardanelle Lake and Dam of the McClellan-Kerr Arkansas River Navigation System (MKARNS). The Corps purchased perpetual flowage easements covering 730 acres to elevation 334 along the downstream end of Prairie Creek from individual land owners. The dike, pumping station, and easements are necessary for the flood protection of the City of Russellville. Without this project, portions of Russellville, including Arkansas Tech University, would flood as a result of the higher water surface elevations of Lake Dardanelle.

2 PLAN FORMULATION

2.1 PROBLEMS AND OPPORTUNITIES

The first step in the planning process is to identify the problems and opportunities.

2.1.1 Problems

- Flooding damages downtown Russellville commercial, residential, and public facilities
- Flooding damages vehicles located in commercial and residential areas

2.1.2 Opportunities

The opportunity exists to improve the social well being of those who live and work in the flood-prone area along Engineers Ditch and Prairie Creek by alleviating the flood damages to homes, business, and infrastructure.

2.2 PLANNING OBJECTIVES AND CONSTRAINTS

2.2.1 NATIONAL OBJECTIVES

The national or Federal objective of water and related land resources planning is to contribute to national economic development consistent with protecting the nation's environment, pursuant to national environmental statutes, applicable executive orders, and other Federal planning requirements. Contributions to national economic development (NED) are increases in the net value of the national output of goods and services, expressed in monetary units. Contributions to NED are the direct net benefits that accrue in the planning area and the rest of the nation.

The Corps has added a second national objective for Ecosystem Restoration in response to legislation and administration policy. This objective is to contribute to the nation's ecosystems through ecosystem restoration, with contributions measured by changes in the amounts and values of habitat.

2.2.2 PLANNING OBJECTIVES

The national objectives are general statements and not specific enough for direct use in plan formulation. The water and related land resource problems and opportunities identified in this study are stated as specific planning objectives to provide focus for the formulation of alternatives. These planning objectives reflect the problems and opportunities and represent desired positive changes to the without project conditions. The City of Russellville chooses not to add ecological restoration or recreation features to the project. Planning objectives are over the 50 year period of analysis and are as follows:

- Reduce flood damages along Prairie Creek through the year 2070
- Reduce flood damages along Engineers Ditch through the year 2070
- Reduce risk to life and safety in the project area by reducing flooding frequency.

2.2.3 PLANNING CONSTRAINTS

Unlike planning objectives that represent desired positive changes, planning constraints are things to be avoided. The planning constraints identified in this study are as follows:

- Limit traffic disruptions and the restriction of access to homes and businesses.
- Avoid the disruption of connectivity within the community.
- Obtain Union Pacific Engineers approval on the plans and specifications to modify the Union Pacific Railroad bridge on Engineers Ditch to confirm and verify that railroad industry standards will be met.
- Minimize structure and infrastructure relocations.
- Maintain the flood risk management provided by the Russellville Dike and Pump Station
- Limit flood damage reduction solutions to downstream of the point where the 10 percent discharge is greater than 800 cubic feet.

2.3 Existing Conditions

The overall problem is flooding along Prairie Creek and its tributaries. As development has occurred along the creek and its tributaries, the runoff has increased causing flooding in the downtown commercial, residential, and public facilities. This flooding causes traffic and safety hazards through the commercial heart of Russellville. The principal cause of the flood problems are insufficient channel size and constrictions from narrow bridges and culverts. Prairie Creek currently consists of vertical wall culverts or open channels. Narrow bridges and undersized culverts along Prairie Creek and its tributary, Engineers Ditch, contribute to the flooding. Figure 2-1 show the Prairie Creek and Engineers Ditch reaches.

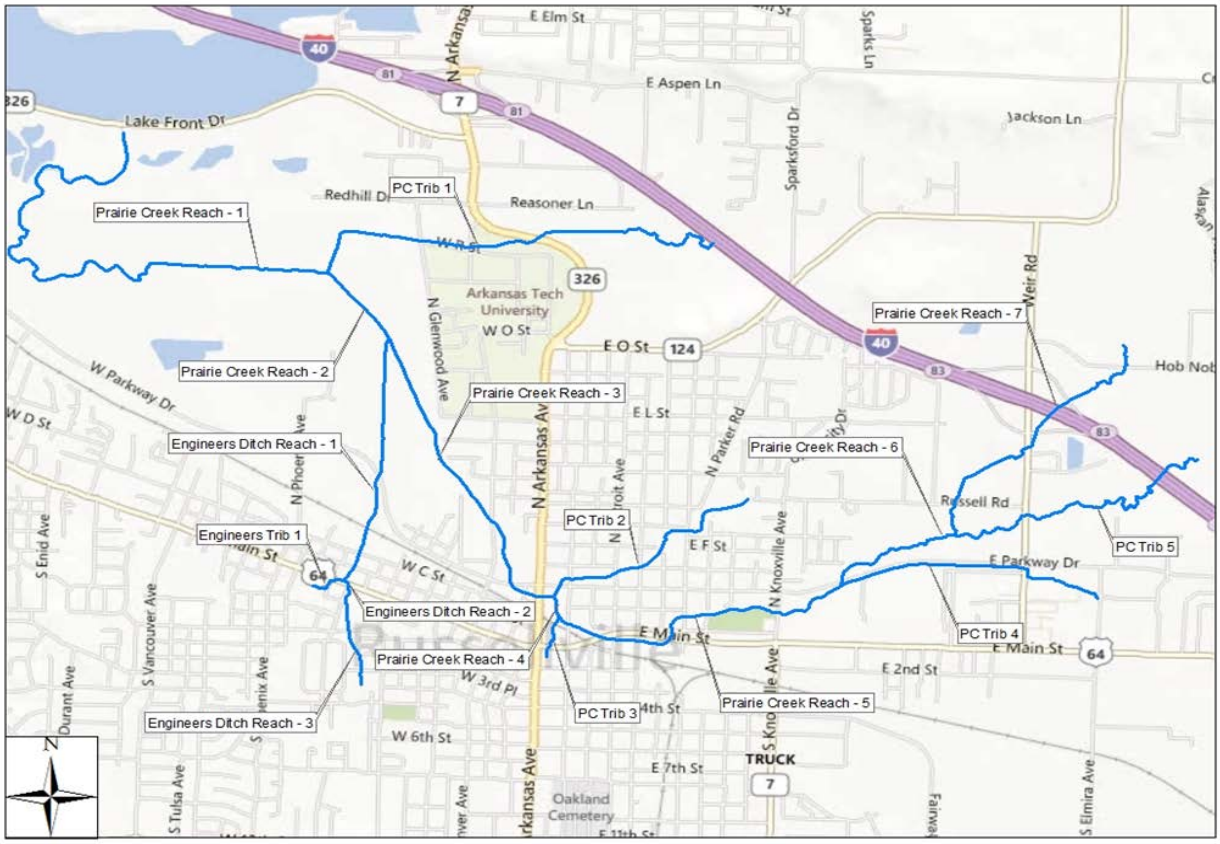

Figure 2-1: Prairie Creek Stream Network

Engineers Ditch experiences significant flooding from the confluence with Prairie Creek to just upstream of the Main Street culverts. The lower reach of Engineers Ditch is incapable of conveying flows resulting from an approximate 50 percent Annual Chance Exceedance (ACE). Backwater from the lower portion of the ditch creates evacuation problems for the commercial and residential areas upstream of Main Street. The floodwaters of Engineers Ditch are routed through a double barrel six foot by ten foot reinforced concrete box culvert and a triple barrel six foot by six foot reinforced concrete box culvert that convey flow under Main Street to the lower reach of Engineers Ditch. The Main Street culverts are incapable of passing flows which results in Main Street becoming inundated. The original channel consists of a trapezoidal natural channel with an approximate 10 foot to 15 foot bottom width and almost vertical side slopes. The existing channel has erosion problems at various locations within the channel and significant erosion at structure location.

Reach 3's channel geometry includes rectangular and trapezoidal channel sections with varying channel bottom width and side slope. The primary cause for flood damages along Reach 3 includes insufficient channel capacity and constriction in the channel due to inadequate bridge openings. Flooding along Reach 3 begins from a rainfall event that produces flows equivalent to the 67 percent frequency event.

The second segment of channel modifications of Prairie Creek includes Reach 4 and Reach 5. This segment has similar channel capacity issues as the previously described segment, but does not have the narrow bridge openings like other reaches of Prairie Creek.

The numbers of structures separated by type that fall within the maximum projected floodplain are shown in Table 2-1. The water flows from the east to the west through the middle of Russellville.

Table 2-1: Number of Structures within the Maximum Projected Floodplain

Reach	Number of structures in reach	Structures by type				Structure values ($)	Content values ($)
		Residential	Commercial	Industrial	Public		
ED1,2	58	25	23	8	2	6,395,900	8,371,200
ED3	33	23	6	0	4	8,523,300	10,431,500
ET1	3	2	1	0	0	400,700	375,700
PCT2	72	57	13	1	1	5,249,200	6,579,300
PCT3	14	1	11	1	1	7,776,600	5,256,100
PC,12,3	51	26	19	7	2	8,582,400	14,354,200
PC4,5A, 5B	65	42	14	1	0	6,795,200	7,110,800
Total	**296**	**176**	**87**	**21**	**12**	**43,723,300**	**53,812,800**

Equivalent Annual Damages were calculated for damages to structures, contents, and vehicles by FDA. Table 2-2 displays the without project estimates of Equivalent Annual Damages (EAD) as calculated by FDA.

Table 2-2: Equivalent Annual Damages, Without Project

Reach	EAD: Without Project ($)
ED1,2	602,300
ED3	740,600
ET1	20,800
PCT2	766,900
PCT3	2,333,600
PC1,3,4	717,400
PC5A	497,000
Total	**5,678,600**

Table 2-3: Annual Chance Exceedance Damages with Base Hydrology.

Table 2-3 Annual Chance Exceedance (Recurrence Interval) Damages, Base Hydrology								
	0.99 (1- yr)	**0.5 (2-yr)**	**0.2 (5-yr)**	**0.1 (10-yr)**	**0.04 (25-yr)**	**0.02 (50-yr)**	**0.01 (100-yr)51**	**0.002 (500-yr)**
Eng Ditch 1,2 Damage ($)	0	800	209,700	353,900	1,631,700	4,568,200	5,821,600	7,013,600
Structures (#)	0	4	21	27	33	47	51	52
Eng Ditch 3 Damage ($)	0	800	86,500	316,900	1,114,300	6,768,700	7,997,400	8,665,100
Structures (#)	0	3	10	17	19	25	25	29
Eng Trib 1 Damage ($)	0	0	0	0	28,900	150,500	184,400	213,100
Structures (#)	0	0	0	0	1	2	2	2
PC Trib 2 Damage ($)	400	66,200	884,700	1,509,200	2,219,300	2,464,500	2,748,600	3,545,300
Structures (#)	7	14	23	31	36	42	42	49
PC Trib 3 Damage ($)	2,200	28,500	724,900	2,175,800	5,431,000	6,515,600	6,738,300	7,019,700
Structures (#)	1	4	9	10	11	13	13	13
Prairie Crk 1,3 Damage ($)	800	63,000	253,900	653,200	1,368,800	2,233,900	3,188,400	4,568,200
Structures	1	5	12	25	28	31	32	36
Prairie Crk 4,5A,5B Damage ($)	300	23,300	524,100	970,200	1,353,400	1,760,600	2,177,100	3,372,000
Structures	1	12	33	43	48	52	53	57
Total Damage	3,700	182,600	2,683,800	5,979,200	13,147,400	24,462,000	28,855,800	34,397,000
Total Structures	10	42	108	153	176	211	218	238
Damages per Structure ($)	370	4,348	24,850	39,080	74,701	115,934	132,366	144,525

Historical flood events indicate that flooding along the basin can be flashy in nature with the water rising to maximum flows through the course of 1-2 hours and then receding over a 3-4 hours timeframe. Time of concentration is estimated at 4 to 6 hours for a 24-hour storm event. Flooding continues along the entire length of the study area, causing additional economic damages to residential, commercial, light industrial and public property.

Although NOAA issues severe weather warnings, Russellville lacks a flood warning system. City officials place roadblocks when flood waters create hazardous and dangerous conditions. In response to high water events, residents have little time to place sandbags to protect structures and property.

Another problem is excessive debris in the sump area near the Russellville dike. The quantity of debris impedes flow even with frequent clean ups and channel maintenance. The debris is carried from within the watershed of Prairie Creek, including Engineers Ditch and consists of organic material, such as leaves and fallen limbs, to garbage material from development and the human environment. Figure 2-2 displays the 500-year floodplain.

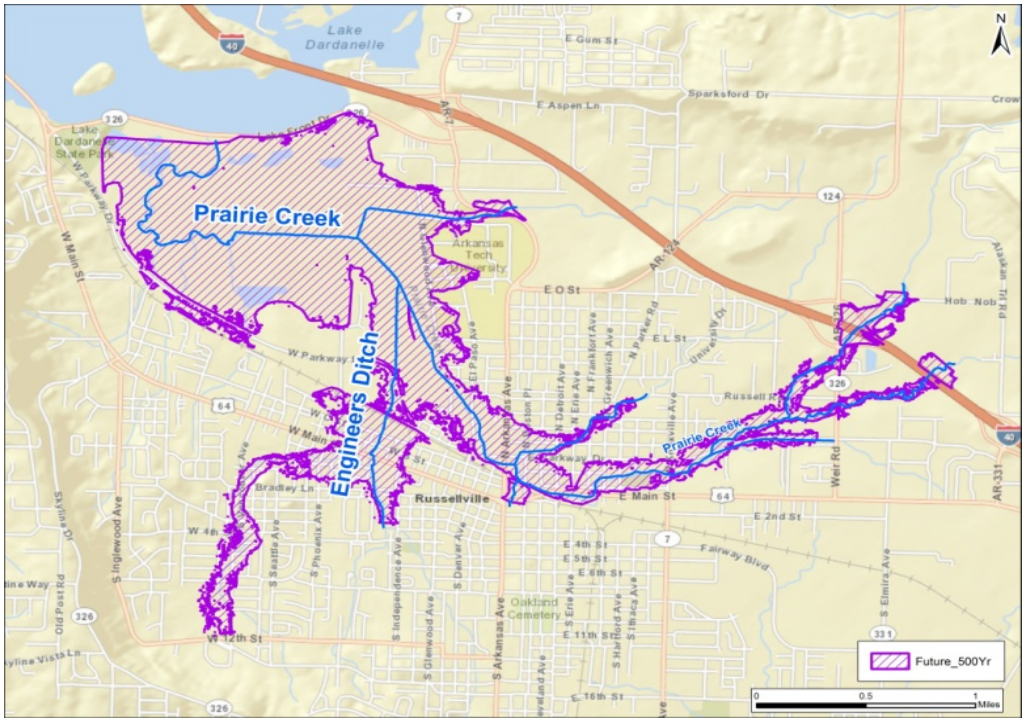

Figure 2-2: Prairie Creek 500-year Floodplain

2.4 DEVELOPMENT OF ALTERNATIVE PLANS

A wide variety of management measures were developed that would address one or more of the planning objectives. These measures were then evaluated and screened. Alternative plans were developed, which comprised one or more of the management measures.

2.4.1 INITIAL SCREENING OF MEASURES

The team, under the SMART planning scheme, was able to screen out measures that would provide no significant benefits, had added costs, or provided little reduction in flow. Because of the potential flashy nature of the flooding, numerous measures were also eliminated from consideration.

2.4.1.1 NO ACTION

The Corps is required to consider the option of "No Action" as one of the alternatives in order to comply with the requirements of the National Environmental Policy Act (NEPA). With the No Action measure, which is synonymous with the "Without Project Condition," it is assumed that no project would be implemented by the Federal Government or by local interests to achieve the planning objectives.

2.4.1.2 NON-STRUCTURAL MEASURES

Non-structural plans are designed to reduce urban flood damages by utilizing methods that do not significantly impact the environment and do not attempt to contain or otherwise divert the flow of floodwaters. Damages can be reduced by removing structures from the floodplain, flood proofing/raising structures, permanent evacuation within the floodplain, floodplain management, and flood forecasting/temporary evacuation.

Flood proofing includes measures such as raising access roads and escape routes, installing valves on sewer lines, providing watertight coverings for door and window openings, sump pumps to drain seepage, sealing of cracks, steel bulkheads on brick walls to close off entrances, constructing levees and floodwalls around individual buildings or groups of buildings, and coating walls of structures with a waterproof membrane. Flood proofing is more easily applied at the time of new construction. Structures within the floodplain in the study area include residential, public, and commercial, with the most damages occurring in commercial properties. Frequently, the type of structure is not amenable to flood proofing. Additionally, floods on Prairie Creek are expected to occur with little warning, such that structures may not be occupied at the time of a flood event and temporary flood proofing measures could not be implemented. The flashy nature of Prairie Creek does not lend itself to flood proofing, or anything with a closure, because of the lack of warning time. Therefore, flood proofing, both wet and dry and levee closures, will not be considered further in this study.

Raising structures in-place was considered and found to be an unacceptable solution. Many of the structures are slab on grade. This type of structure is cost-prohibitive to elevate. Also, there are sections of the creek that have flood velocities greater than five feet per second, which is considered fast and highly erosive. It is not recommended to raise buildings in place leaving the buildings and occupants subject to these velocities.

Buyouts of structures in the floodplain were considered. Removing 28 structures form the 2-year event floodplain had the greatest net benefits of $774,100. The 25-year footprint plan would remove 159 structures, but it is not economically justified. Connectivity within the community would be disrupted with buyout plans especially as the area includes one of the primary commercial areas in Russellville.

The flashy nature of the flooding with insufficient warning time makes a flood warning system ineffective.

The City of Russellville has participated in the National Flood Insurance Program since July 18, 1970. Its effective Flood Insurance Rate Map (FIRM) is dated April 17, 2012. Prior to project completion, a Conditional Letter of Map Revision (CLOMR) to the Federal Emergency Management Agency (FEMA) will be coordinated to update the City's floodplain maps for changes to the Prairie Creek floodplain.

Floodplain management was examined to reduce flood risk. Components include zoning regulations, subdivision regulations, and building codes. Zoning regulations would permit prudent use and development of the floodplain. The flood damage center is a developed commercial area in the floodplain for which additional floodplain regulations would not stop existing flood damages. Floodplain regulations limit flood damages to future growth in the undeveloped areas and limit additional flood damages to existing development. With the exception of buyouts, nonstructural measures were eliminated from further consideration.

2.4.1.3 Levees and Floodwalls

Levee systems traditionally provide high levels of protection to flood prone areas but often require substantial amounts of real estate between the stream and the structures being protected unless an existing levee is in-place and only a small strip of real estate is required. Floodwalls (usually made of concrete) are used in lieu of levees in situations where the acquisition of real estate for the levee or other topographic problems may be cost prohibitive. The feasibility of either of these measures is based on the cost and availability of real estate, the number of structures along the levee alignment, and the additional costs necessary to alleviate interior drainage problems to prevent induced damages in adjacent areas. Construction of individual levees or floodwalls around specific structures or small groups of structures would not be feasible due to the limited warning time to operate closure structures.

A levee system alternative was considered; but the proximity of structures with the lack of available space makes a levee physically infeasible. Floodwalls, which require less real estate acquisition, are historically much more expensive than any other alternative, either structural or nonstructural. Based on the value of the properties to be protected, and considering the length of the reach, the floodwall alternative would be prohibitively expensive. In addition, the City of Russellville expressed their desire to keep connectivity within the community; levees and floodwalls is a direct conflict with this desire. Therefore, levees and floodwalls were eliminated from further consideration.

2.4.2 Measures Evaluated for Alternatives

2.4.2.1 Channel Improvements

Channel improvement measures consist of modifying an existing channel by either increasing the cross-sectional area of the stream channel (widening and/or deepening), straightening and realigning the stream channel, and/or reducing the friction losses of an existing channel through concrete lining. The design of the channel modification can vary significantly and is primarily based on the topography of the existing stream channel and the existing development of properties within the floodplain. Other factors to consider in the design of these hydraulic channel improvement alternatives include the existence of known or potential significant ecological and cultural resources as well as contaminated material.

Measures were developed to reduce flood stages in the most significant locations. They were not designed to a specific level of protection; rather, they were designed to maximize the benefits while reducing the real estate required. Due to the separate nature of Engineers Ditch and Prairie Creek, each stream was analyzed separately.

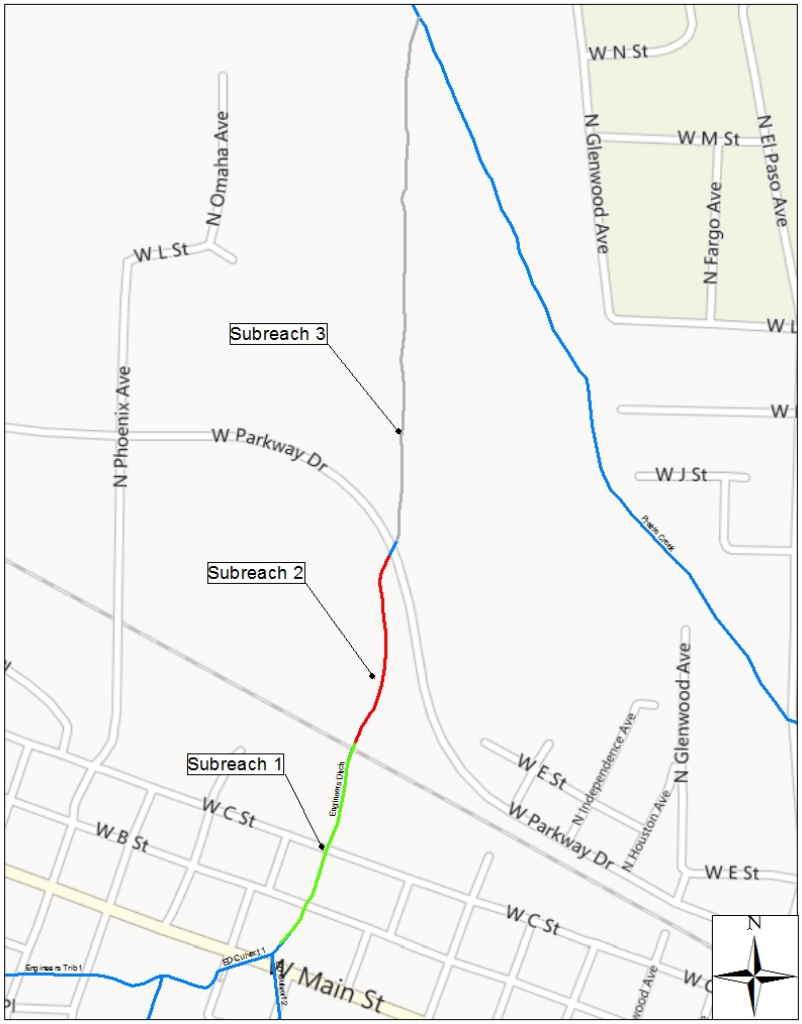

Figure 2-3: Engineers Ditch SubReaches

2.4.2.1.1 Engineers Ditch

The modifications within Engineers Ditch have been segmented into three sub reaches where modifications differ from one another. Figure 2-3 displays the locations of the sub reaches of Engineers Ditch. The modifications to Engineers Ditch are designed to increase conveyance and capacity of the lower reach just downstream of Main Street. With improved conveyance in the lower reach of Engineers Ditch, the Main Street culverts are more efficient at evacuating the floodwaters of Engineers Ditch and Tributaries, and reduce the frequency of overtopping of Main Street.

The modified channel alternatives were designed to increase channel capacity and reduce the potential for slope damages and/or failure. The modified channel consists of widening the channel bottom and stabilizing the bank with a lesser side slope and/or riprap where needed. Initially, 11 different measures were created that included varying the bottom width of the modified channel, extent/length of modifications made, removal, widening, or replacing of the West B and West C Street bridges. Different types of modification to the railroad embankment were also examined. The original 11 measures were screened and reduced to three measures. The measures were reduced based on construction cost, reduction in water surface elevation, whether or not the measure provided additional benefits, and reduction in flow conveyance.

The removal of the West B Street and West C Street bridges was screened out because it would have adverse effects on the flow of traffic according to the City.

With the above channel modifications implemented, the Main Street culverts are capable of evacuating more flow, although the extra flow does not significantly impact the stage upstream of Main Street. One measure that could reduce the stage upstream of Main Street is to increase the size or quantity of the Main Street culverts. This measure was eliminated due to the high construction cost and the relatively low amount of total damages occurring upstream of Main Street.

2.4.2.1.2 Prairie Creek

A measure designed to reduce damages along Prairie Creek include channel modifications to the existing channel. Two segments of Prairie Creek, where significant damages occur, were selected for channel modifications. The first segment consists of Prairie Creek Reach 3. The modified channel measures were designed to increase channel capacity and reduce the potential for slope damages and/or failure. The modified channel consists of widening the channel bottom and stabilizing the bank with a lesser side slope and/or riprap and concrete where needed. The initial 11 measures for Reach 3 include varying the bottom width of the modified channel, extent/length of modifications made and removal, widening, or replacing of the North Commerce Ave Bridge and W Parkway Bridge. Of the 11 measures screened, four were screened out due to the high construction cost and low flood stage reductions.

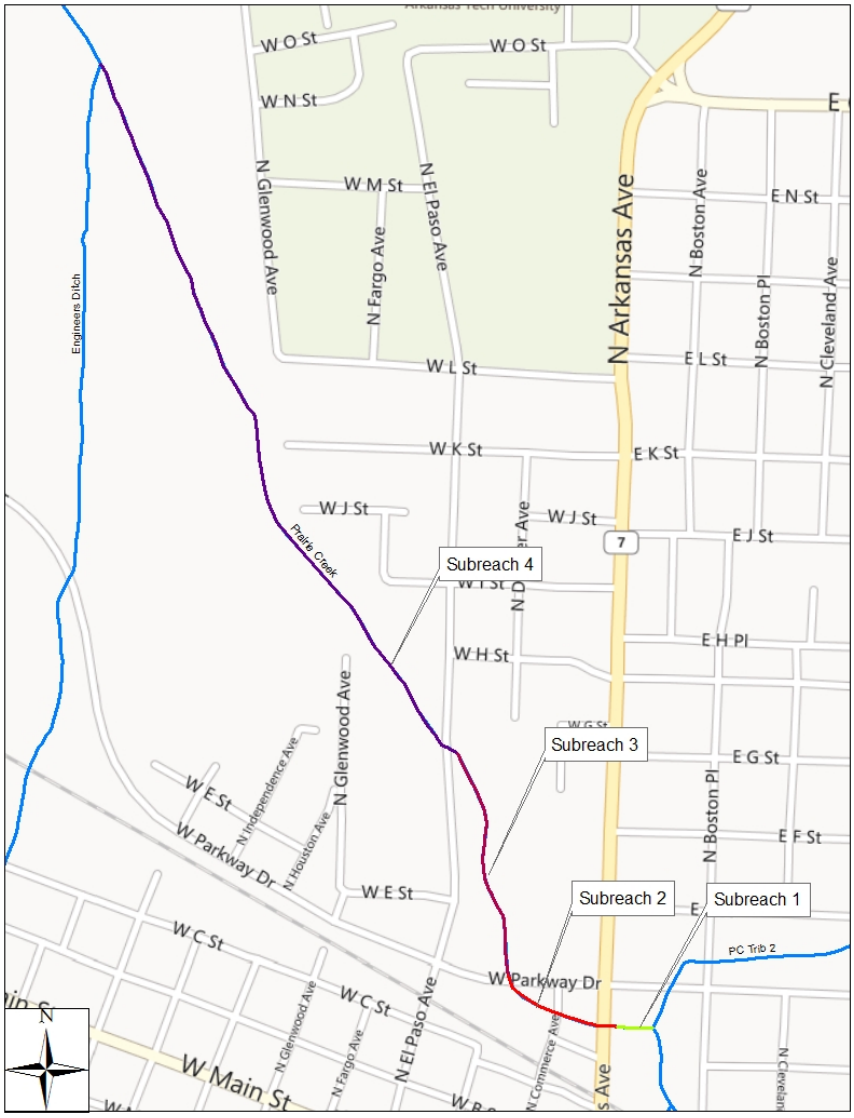

Figure 2-4: Prairie Creek Reach 3 Subreach Map

Four measures were screened out with the removal of the N. Commerce Street Bridge, which was screened out due adverse effects on traffic flow. The modifications to Prairie Creek Reach 3 have been segmented into four sub reaches. Figure 2-4: Prairie Creek Reach 3 Subreach Map displays the locations of the sub reaches of Prairie Creek Reach 3.

The second segment of channel modifications of Prairie Creek includes Reach 4 and Reach 5. This segment has similar channel capacity issues as the previously described segment, but

does not have the narrow bridge openings like other reaches of Prairie Creek. The set of measures identified in this segment consists of modifications to the channel only. These measures include varying the channel bottom widths. All the structures located along Reach 4 and Reach 5 will remain in their current condition. Figure 2-5 displays the sub reaches located in Prairie Creek Reach 4 and Reach 5.

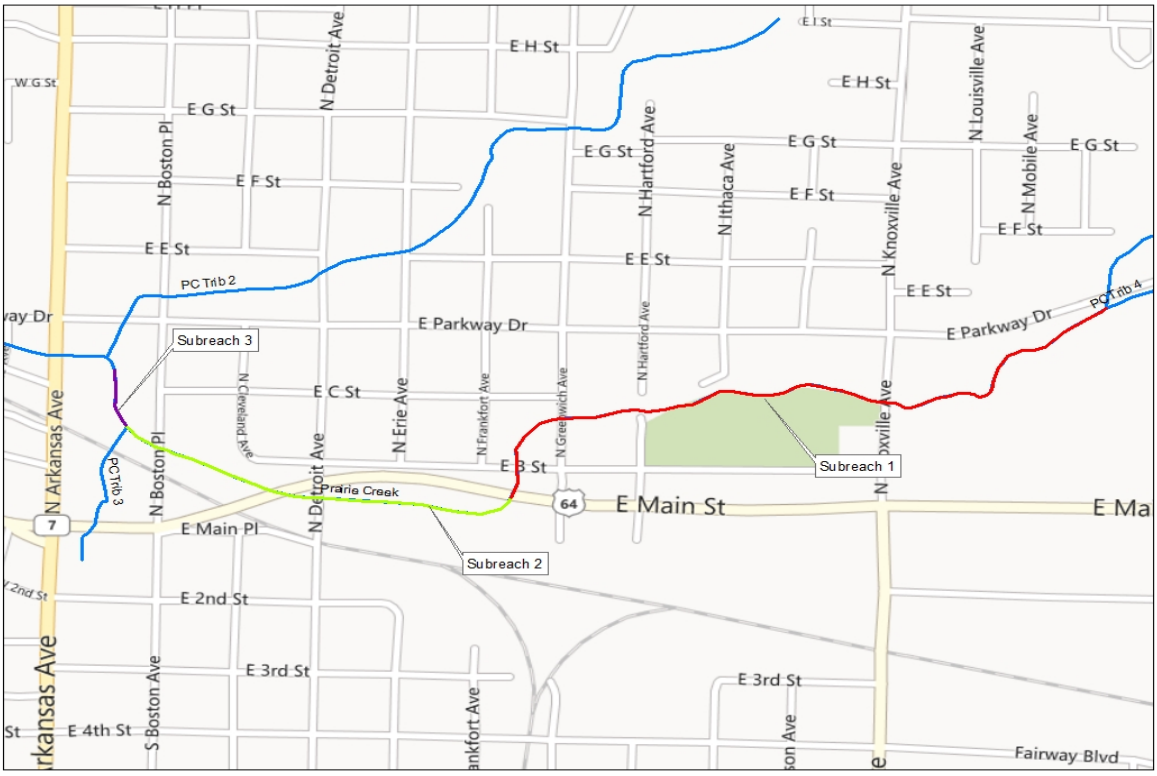

Figure 2-5: Prairie Creek Reach 4 and Reach 5 sub reach map

2.4.2.2 Detention Basins

This alternative consists of constructing one or more structures to provide flood storage to detain peak flood flows and lessen downstream flood damages. Detention is used to temporarily impound floodwaters for later release when the downstream conditions permit. The feasibility of this measure depends heavily on the volume and timing of the flood flows, and the availability of an impoundment site capable of providing sufficient storage.

Two detention basins were developed to reduce the flow within Prairie Creek reaches 3 – 5. The location of the detention basins was selected primarily on the availability of real estate. Another factor in the location of the detention ponds was their ability to reduce flows within the damage reaches. The flood storage areas are displayed as SA-1 and SA-2 in Figure 2-6.

Figure 2-6: Detention Basin Location

2.5 ALTERNATIVE FORMULATION

An incremental analysis for each reach resulted in selecting economically efficient measures to form six alternatives from these remaining measures. The preliminary economic analysis to determine which measures to retain to form plans is in the Economic Appendix.

- The No Action Alternative or Without Project Conditions
- Buyout Plan for the 2-year frequency event
- Alternative 1 – Targets frequent rainfall events
- Alternative 2 – Provide the highest level of protection for all frequency events
- Alternative 3 – Targets less frequent rainfall events
- Alternative 4 – Formulated to a reduced budget, incrementally built plan to not exceed $7 million of Federal expenditure.
- Alternative 5 – Same as Alternative 4; but with the removal of West B and West C Street bridges.

2.5.1 No Action Alternative/Without Project Conditions

The without project conditions assumes no changes or improvements over time. It assumes the City will enact regulations in the flood plain that will not allow the flows to increase over time. It also assumes the City will continue to maintain the infrastructure associated with the Prairie Creek and Engineers Ditch. The City will continue to incur about $5,678,600 in estimated equivalent annual damages to the 238 structures in the 500-year floodplain.

2.5.2 Buyout Plan (2-year event)

This alternative removes all 28 structures from the 2-year floodplain (with flood damages of at least $500) with a buyout.

2.5.3 Alternative 1

This alternative targets the frequent rainfall events.

- Engineers Ditch – The channel will be widened to a 20 or 25 foot bottom depending on the sub reach number. West B and West C Street bridges will both be replaced. Two additional culverts will be placed under the Union Pacific Railroad.
- Prairie Creek Reach 4 and Reach 5 – The channel will be widened to a 20 foot bottom with 1V:2.5H SS.
- Prairie Creek Reach 3 – channel will be widened to 45 or 50 feet depending on the sub reach section. Culverts will be added to the Commerce Bridge and the West Parkway Bridge. The North El Paso culverts will be cleaned.

2.5.4 Alternative 2

This alternative provides the highest level of protection for all frequencies.

- Engineers Ditch –The channel will be widened to a 20 or 25 foot bottom depending on the sub reach number. West B and West C Street bridges will both be replaced. Two additional culverts will be placed under the Union Pacific Railroad.
- Prairie Creek Reach 4 and Reach 5 – The channel will be widened to a 20 foot bottom with 1V:2.5H SS.
- Prairie Creek Reach 3 – channel will be widened to 45 or 50 feet depending on the sub reach section. Culverts will be added to the Commerce Bridge and the West Parkway Bridge. The North El Paso culverts will be cleaned.
- Include Storage Area 1

2.5.5 Alternative 3

This alternative targets the low frequency events.

- Engineers Ditch – The channel will be widened to a 20 or 25 foot bottom depending on the sub reach number. West B and West C Street bridges will both be replaced. Two additional culverts will be placed under the Union Pacific Railroad.
- Prairie Creek Reach 3 – channel will be widened to 45 or 50 feet depending on the sub reach section. Culverts will be added to the Commerce Bridge and the West Parkway Bridge. The North El Paso culverts will be cleaned.
- Include Storage Area 1

2.5.6 Alternative 4

This alternative targets a reduced budget, with an incrementally built plan. Pieces added to the plan, up to a budget which does not exceed $7 million of Federal expenditure.

- Engineers Ditch – The channel will **not** be widened. West B and West C Street bridges will **not** be replaced. Additional culverts will be installed under the Railroad Bridge.

- Prairie Creek Reach 4 and Reach 5 – The channel will be widened to a 20 foot bottom with 1V:2.5H SS.
- Prairie Creek Reach 3 – channel will be widened to 45 or 50 feet depending on the sub reach section. Culverts will be added to the Commerce Bridge and the West Parkway Bridge. The North El Paso culverts will be cleaned.

2.5.7 Alternative 5

Alternative 5 targets a reduced budget, with an incrementally built plan. Pieces added to the plan, up to a budget which does not exceed $7 million of Federal expenditure.

- Engineers Ditch – The channel will **not** be widened. West B and West C Street bridges will be removed. Additional culverts will be installed under the Union Pacific Railroad Bridge
- Prairie Creek Reach 4 and Reach 5 – The channel will be widened to a 20 foot bottom with 1V:2.5H SS.
- Prairie Creek Reach 3 – channel will be widened to 45 or 50 feet depending on the sub reach section. Culverts will be added to the Commerce Bridge and the West Parkway Bridge. The North El Paso culverts will be cleaned.

3 EVALUATION AND COMPARISON OF ALTERNATIVES

Alternative evaluation and comparison is the fifth step in the planning process. Note that all alternatives limit flood damage reduction solutions to downstream of the point where the 10 percent discharge is greater than 800 cubic feet.

3.1 FORMULATION CRITERIA

The final array of alternative plans is compared using four formulation criteria suggested by the U.S. Water Resources Council. These criteria are completeness, effectiveness, efficiency, and acceptability. The final array includes alternatives that are all variations of channel widening.

3.1.1 Completeness

Completeness is the extent to which a given alternative plan provides and accounts for all necessary investments or other actions to ensure the realization of the planned effects. All necessary implementation actions have been accounted for in the planning process. It is an indication of the degree that the outputs of the plan are dependent upon the actions of others.

3.1.2 Effectiveness
Effectiveness is the extent to which an alternative plan alleviates the specified problems and achieves the specified opportunities. All of the plans in the final array provide some contribution to the specified problems and opportunities.

3.1.3 Efficiency
Efficiency is the extent to which an alternative plan is the most cost-effective means of alleviating the specified problems and realizing the specified opportunities, consistent with protecting the Nation's environment.

3.1.4 Acceptability
Acceptability is the workability and viability of the alternative plan with respect to acceptance by State and local entities and the public and compatibility with existing laws, regulations, and public policies. All of the plans in the final array must be in accordance with Federal law and policy. Public concerns will be addressed following the 30-day public review of this draft document.

3.2 Environmental Operating Principles
The selected plan will **strive to achieve environmental sustainability** by working to reduce the overland velocity to maintain existing habitat. The study team coordinated with environmental agencies to **proactively consider environmental consequences**. The study **created mutually supporting economic and environmentally sustainable solutions to** reduce risk of flooding to the downtown area of Russellville, Arkansas. The plans were consistent with all applicable laws and policies, and the Corps and its non-Federal sponsors **continue to meet corporate responsibility and accountability** for the project in accordance with those laws and policies. The study team used appropriate ways and means to assess cumulative impacts to the environment through the National Environmental Policy Act and with the use of engineering models, environmental surveys, and coordination with natural resource agencies. As a result of **employing a risk management and systems approach throughout the life cycle of the project,** the project design evolved to address as many concerns as possible with no mitigation required to address adverse impacts**.**

3.3 Campaign Plan
- **Goal 2: Transform Civil Works**

  The team developed a comprehensive and sustainable solution to the Russellville's flooding problem in collaboration with stakeholders to provide a lasting solution.
- **Goal 3: Reduce Disaster Risks**

  Construction of the project will mitigate disaster impacts to the nation.
- **Goal 4: Prepare for Tomorrow**

  The team practiced resiliency in person and process to deliver a high quality solution to meet the Nation's engineering challenges on into the future.

3.3.1 System of Accounts
A method of displaying the positive and negative effects of various plans was to use the System of Accounts as suggested by the U.S. Water Resources Council. The accounts are categories of long-term impacts, defined in such a manner that each proposed plan can be easily compared to one another. The four accounts used to compare proposed water resource

development plans were the national economic development (NED), environmental quality (EQ), regional economic development (RED) and other social effects (OSE) accounts.

3.3.1.1 National Economic Development (NED)

The intent of comparing alternative flood control plans in terms of national economic development was to identify the beneficial and adverse effects that the plans may have on the national economy. Beneficial effects were considered to be increases in the economic value of the national output of goods and services attributable to a plan. Increases in NED were expressed as the plans' economic benefits, and the adverse NED effects were the investment opportunities lost by committing funds to the implementation of a plan.

The economic analysis evaluated the alternatives on the basis of flood-related costs and damages avoided. Flood damages and costs considered in the economic analysis included flood damages to residential and nonresidential structures and contents, damages to vehicles, and public damages (infrastructure and emergency response expenditures). The economic justification of an alternative was determined by comparing the expected annual benefits to the expected annual costs. If the annual benefits for an alternative exceed the annual costs, then the alternative was considered economically justified. In such cases, the benefit-to-cost ratio (BCR) was greater than 1.0.

For this analysis, the expected annual cost of an alternative was determined by considering a number of factors, including construction cost, timing of construction period, interest during construction, and operation, maintenance, repair, rehabilitation, and replacement (OMRR&R) costs. The costs were based on an October 2014 price level, a period of analysis of 50 years, and were annualized to an annual equivalent cost using the FY 2014 Federal Discount Rate of 3.375 percent. The expected annual cost for an alternative was subtracted from the expected annual benefit to compute the net annual benefit. For the Prairie Creek study, the year the proposed project is expected to be in operation (the base year) was set at 2021. A complete economic summary can be found in Appendix C.

3.3.1.2 Environmental Quality (EQ)

The environmental quality account was another means of evaluating the plans to assist in making recommendation. The EQ account was intended to display the long-term effects that the alternative plans may have on significant environmental resources. The Water Resources Council defined significant environmental resources as those components of the ecological, cultural, and aesthetic environments that, if affected by the alternative plans, could have a material bearing on the decision-making process.

3.3.1.3 Regional Economic Development (RED)

The regional economic development account was intended to illustrate the effects that the proposed plans would have on regional economic activity, specifically, regional income, and regional employment.

3.3.1.4 Other Social Effects (OSE)

The other social effects (OSE) account typically includes long-term community impacts in the areas of public facilities and services, recreational opportunities, transportation and traffic and man-made and natural resources.

3.4 TRADE-OFF ANALYSIS

The first trade-offs to be considered in evaluating the final alternative plans are to distinguish between the No Action Alternative and the other action alternatives. This is followed by the trade-off between the action alternatives.

The no action alternative ranks lower than the action alternatives in that it is not effective in meeting any of the planning objectives. It has no positive benefits or impacts, since it is the basis from which the impacts and benefits are measured. It does not, however, involve incurring the implementation cost or adverse impacts of the action alternatives.

The second level of trade-offs to consider is those between the action alternatives. Of the action alternatives considered, there are no significant trade-offs since each of the alternatives are forms of hydraulic channel improvements within the same areas.

3.5 PLAN SELECTION

3.5.1 Rationale for Designation of NED Plan

Federal policy requires that the feasibility study identify the plan that reasonably maximizes net NED benefits consistent with protecting the environment. This NED Plan must be recommended for implementation unless there are overriding reasons for recommending another plan. The NED Plan was determined by evaluating the net economic benefits for each individual reach. Alternative 4 is the NED plan.

3.5.2 Rationale for Tentatively Selected Plan

The tentatively selected plan is the NED Plan, Alternative 4, because it provides the greatest net benefits, it has no significant environmental impacts, and it is the sponsor's preferred choice. The plans comparison is shown in the following table. Each of the plans was compared using preliminary cost estimates, a 3.375 percent interest rate, October 2014 price level, and a 50-year economic life. Detailed economic analysis is shown in the Economic Appendix. Alternative 4 is the least cost plan of the six plans in the final array. A lesser cost plan was not formulated as the PDT determined that eliminating, or scaling back, measures associated with Alternative 4 would result in an incomplete project and violate at least one of the planning objectives.

Table 3-1 Plan Comparison

Plan	Investment Cost $	BCR	Net Benefits $
Buyout (2-Yr)	12,325,000	2.5	784,100
Alternative 1	11,198,000	3.6	1,598,600
Alternative 2	14,385,100	2.8	1,520,000
Alternative 3	12,452,900	2.9	1,390,000
Alternative 4	**9,108,200**	**4.7**	**1,696,800**
Alternative 5	10,841,600	3.8	1,489,800

3.6 RISK AND UNCERTAINTY

Evaluation of the existing condition and proposed alternatives was conducted using a risk-based analytical framework as described in Engineering Manual 1110-2-1619, *Risk-Based Analysis for Flood Damage Reduction Studies*. The analysis is described in detail in Appendix B – Engineering Appendix (Hydrology and Hydraulics) and Appendix C – Economic Analysis.

The HEC-FDA Flood Damage Reduction Model includes risk-based analysis methods that follow Federal and Corps of Engineers regulations (ER 1105-2-100). The program quantifies uncertainty in discharge-exceedance probability, stage discharge, and stage damage functions and thus incorporates uncertainty into the economic analysis. Probability estimates generated by HEC-FDA are shown in Tables 3-2 and 3-3 below.

Table 3-2
Expected Annual Damage

	Expected Annual Damage ($) Plans calculated with Uncertainty	
Plan Name	**Total With Project**	**Benefits**
Buyout	$4,283,631	$1,314,669
Alt 1	$3,481,840	$2,196,763
Alt 2	$3,351,751	$2,326,852
Alt 3	$3,567,629	$2,110,974
Alt 4	$3,521,449	$2,157,154
Alt 5	$3,579,428	$2,031,639

Table 3-3
Total Without Project

Reach	EAD: Without Project ($)
ED1,2	602,300
ED3	740,600
ET1	20,800
PCT2	766,900
PCT3	2,333,600
PC1,2,3	717,400
PC4,5A,5B	497,000
Total	**5,678,600**

4 DESCRIPTION OF THE TENTATIVELY SELECTED PLAN

Alternative 4 is the tentatively selected plan (TSP). It has the greatest excess benefits over costs as determined using preliminary cost estimates for all plans. The plan consists of installing two – eight foot culverts at the railroad bridge crossing Engineers Ditch. On Prairie Creek Reaches 4 and 5, – The channel will be widened to a 20 foot bottom width with 1 Vertical to 2.5 Horizontal side slopes. On Prairie Creek in Reach 3, the channel will be widened to 45 or 50 feet depending on the sub reach section. At Commerce and West Parkway, culverts (covered channel) will be added. The North El Paso culverts will be cleaned.

With the designation of Alternative 4 as the TSP, further design, and cost estimating was done to have a feasibility level cost estimate of the selected plan. The resulting design and cost estimate are significantly more expensive than the preliminary plan versions. After consulting with the design engineer and cost engineer, the team concluded that all of the alternatives would cost significantly higher. However, it was determined that the relative rankings of the alternatives would remain the same. The fully funded project cost of the TSP is presented in Table 4-1.

Table 4-1: Cost Estimate by Feature Code (Fully Funded)

Feature Code	Subtotal
01 – Lands and Damages	$4,571,000
02 - Relocations	$1,402,000
09- Channels and Canals	$8,370,000
30- Planning Engineering and Design	$841,000
31 – Construction Management	$556,000
Total Project Cost	**$15,740,000**

The estimated project first cost is $13,714,600 at an Oct 2014 price level. The 3.6 benefit to cost ratio is computed at an interest rate of 3.375 percent with a two year construction period and a 50-year period of analysis. The excess benefits over costs are $1,564,000, annual benefits are $2,157,200, and annual costs are $593,100 including annual operation and maintenance costs of $2,700.

The economic analysis for the TSP (Alternative 4) based on the updated design and cost estimate is presented in Table 4-2.

Table 4-2
Economic Analysis, TSP (Alternative 4)

FEASIBILITY ANALYSIS 1-Oct-2014 (Cost estimate updated on 1 Oct 2014)	
Item	Amount
Interest Rate,%	3.375%
Interest Rate, Monthly	0.281%
Construction Period, Years	2.00
Economic Life, Years	50
Project First Cost	13,714,600
Interest During Construction	452,900
Investment Cost	14,167,500
Annual Cost	
Amortized Cost	590,500
OMRR&R	2,700
Total Annual Cost	593,200
Annual Benefits	
Structures, Contents, Auto	2,157,200
Total Annual Benefits	2,157,200
Benefit-to-Cost Ratio	3.6
Excess Benefits over Costs	1,564,000

Project First Cost excludes $648,400 of financial costs that result from the cost of rebuilding a new facility being greater than the in-kind replacement cost.

Table 4-3
Single Event Damages Comparison
TSP/NED (Alternative 4) and No Action Plan

Item \ Freq	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
No Action Plan							
Total Damage $	182,600	2,683,800	5,979,200	13,147,400	24,462,000	28,855,800	34,397,000
Total Structures	42	108	153	176	211	218	238
Damage/Struc	4,348	24,850	39,080	74,701	115,934	132,366	144,525
Alt 4, NED Plan							
Total Damage $	20,929	1,003,994	3,684,277	7,672,168	12,206,120	16,962,480	24,490,299
Total Structures	7	78	122	144	167	190	213
Damage/Struc	3,000	12,872	30,200	53,278	73,091	89,276	114,978
Benefits, Alt 4							
Damage Reduced	161,671	1,679,806	2,294,923	5,475,232	12,255,880	11,893,320	9,906,701
Struc Removed from Floodplain	35	30	31	32	44	28	25

Table 4-3 displays the number of structures flood by frequency event for the without project condition/No Action Plan and for Alternative 4, the designated NED (and TSP) Plan. The TSP removes 28 (13%) of the 218 structures from the 100-year floodplain while reducing the 100-flood event flood damages by $11, 893,300 (41%). The TSP removes 44 (21%) of the 211 structures in the 50-year flood plain and reduces flood damages by $12,255,900 (50%).

5 Design and Construction Considerations

No new data was collected to determine the quantity calculations. Engineering judgment was used to supplement where no data was available. Conservative estimates were made to assure that the quantities would be sufficient for budgeting purposes. A sediment study was not conducted because the creek bottom is on bedrock and scouring is not expected to be a problem.

The data used to determine the channel excavation is from 2003 LIDAR data with two foot contours. There are numerous variations from the existing conditions to the LIDAR surface. To account for inconsistencies, a conservative cross section was used to determine a typical cross section for a reach.

Little dependable utility data was available for the design. All electrical and gas utilities were determined by visual inspection, site visits, and photos of the site. To account for quantity variations, a conservative estimate was made to assume that the entire utility would need to be relocated if it was in within the channel alignment.

Box culverts were sized based on the amount of cross sectional area required to provide the conveyance. Lengths of culverts were based on the existing road widths. Cast in place culverts were more efficient than precast due to the size and number of culverts needed. Cast

in place culverts allow for a smaller channel cross section because the intermediate wall thickness is significantly smaller. These items were engineered after the original hydrology and hydraulic design. Cast in place is a more expensive structural item, but allows for less channel excavation, which saves excavation and land acquisition costs. An Operations and Maintenance Manual will be completed upon project construction completion. The Non-Federal Sponsor will also be provided a copy of the as-built drawings.

6 Real Estate Requirements

A Real Estate Plan is included as Appendix D.

7 ENVIRONMENTAL CONSEQUENCES

Impacts to the natural and cultural resources of the project area are expected to be minimal and temporary. There are no endangered, threatened, or proposed species or critical habitat occurring in the project area. Short-term socioeconomic benefits are expected as a result of employment from the construction project. The tentatively selected plan will achieve compliance with all applicable environmental laws and statutes. The Environmental Assessment provides further details.

7.1 Environmental Compliance

No significant environmental impacts have been identified to date. See Table 7-1 for the status of compliance.

7.2 Executive Order 11988, Floodplain Management Compliance

In compliance with EO 11988, dated 24 May 1977 as implemented by ER 1165-2-26, dated 30 March 1984; plans were formulated to avoid or minimize adverse effects to the flood plain and avoid inducing development in the flood plain, if practicable. To reduce flood hazard and risk while minimizing the impacts of floods on human safety, health and welfare; floodplain modification was unavoidable. Nonstructural measures were evaluated; but had fewer net benefits. Removing structures from the floodplain would improve natural floodplain values and return it to a more natural condition; but it did not have the greatest net benefits. Thus, the Proposed Action is compliant with EO 11988, Flood Plain Management.

The city developed along its creeks so there is considerable infrastructure subject to flooding including residences, public and commercial enterprises, and railroads within in the 100-year flood plain. The proposed project consists of channel and culvert widening with all of the project effects within the flood plain. The general public will be advised of the project's location in the flood plain and their views and comments obtained.

Of the 218 structures in the 100-year floodplain, the project will remove 28. The damage per structure will be reduced 33 percent ($132,400 to $89,300 at the 100-year flood event). The stabilization of the channel bank will reduce erosion and sediment deposition into the creek. Along Prairie Creek at Parkway, the water surface elevation is lowered 3 feet. At E. Parkway and E. Main, the 100-year flood height is one foot lower with the project; at other locations, the flood height difference is less. On Engineers Ditch at the railroad, the 100-year

flood height is 5 feet lower, tapering to no difference at W. Third Place. The lower flood heights will result in less debris being washed into the creek.

The recommended plan is not likely to induce development in the base flood plain as flooding will still occur. For new development, the city has flood plain management regulations. There are no known actions outside of the flood plain that would reduce flood risk. Downstream of the proposed project is a sump area with a right to occasionally flood flowage easement for the Lake Dardanelle pumping station that precludes floodplain development. It allows for the preservation of its natural and beneficial values.

The project meets the objective of reducing the probability and consequences of flood risk while altering a small footprint within the flood plain. No critical action is identified within the 500-year flood plain. Residential structures number 176 of the structures within the floodplain with an estimated 442 household members. The plan reduces the equivalent annual damages by 38 percent; but there are approximately $24.5 million in residual damages with a 500-year flood event. Russellville will publicize the residual flood risk annually under the terms of the Project Partnership Agreement.

Table 7-1: Status of Project with Applicable Laws and Statutes

Item	Compliance
Federal Statutes Archaeological and Historic Preservation Act, as amended, 16 U.S.C. 469, et seq.	Full
Clean Air Act of 1977, as amended, 42 U.S.C. 7609, et seq.	Full
Clean Water Act, as amended, (Federal Water Pollution Control Act), 33 U.S.C. 1251, et seq.	Full*
Coastal Zone Management Act, 16 U.S.C. 1451, et seq.	N/A
Endangered Species Act, 16 U.S.C. 1531, et seq.	Full
Estuary Protection Act, 16 U.S.C. 1221, et seq.	N/A
Federal Water Project Recreation Act, 16 U.S.C. 460-12, et seq.	Full
Fish and Wildlife Coordination Act, 16 U.S.C. 661, et seq.	Full
Land and Water Conservation Fund Act, 16 U.S.C. 460/ -460/-11, et seq.	N/A
Marine Protection, Research and Sanctuary Act, 33 U.S.C. 1401, et seq.	N/A
National Environmental Policy Act, 42 U.S.C. 4321, et seq.	Full
National Historic Preservation Act, 16 U.S.C. 470a, et seq.	Full
Rivers and Harbor Act, 33 U.S.C. 401, et seq.	N/A
Watershed Protection and Flood Prevention Act, 16 U.S.C. 1001, et seq.	N/A
Wild and Scenic Rivers Act, 16 U.S.C. 1271, et seq.	Full
Executive Orders, Memorandums, etc. Executive Order 11988, Floodplain Management, May 24, 1977 (42 CFR 26951; May 25, 1977)	Full
Executive Order 11990, Protection of Wetlands, May 24, 1977 (42 CFR 26961; May 25, 1977)	Full
Council on Environmental Quality Memorandum of August 11, 1980: Analysis of Impacts on Prime or Unique Agricultural Lands in Implementing the National Environmental Policy Act.	Full
Executive Order 12114, Environmental Effects Abroad of Major Federal Actions.	N/A
Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, February 11, 1994.	Full
State and Local Policies Arkansas Water Quality Standards	Full*

Note: The compliance categories used in this table were assigned based on the following definitions:
Full Compliance (Full): Having met all requirements of the statute, Environmental Order (EO) or other environmental requirements for the current stage of planning.
Ongoing: Coordination ongoing, and should be completed prior to signature of FONSI.
Not Applicable (N/A): No statute, E.O. or other environmental requirement for the current stage of planning.
Full*: All necessary permits/certifications will be acquired prior to project implementation and/or construction.

8 IMPLEMENTATION REQUIREMENTS

The plan of improvement tentatively selected in this report will be subject to a series of review and procedures before it can be completed as a Federal project. The following steps are involved in the review and implementation process:

- Review and approval of Detailed Project Report by the Division Engineer,
- Division request funding for the preparation of plans and specifications of the Tentatively Selected Plan,
- Review of the model Project Partnership Agreement (PPA), without deviations, by the Division Office of Counsel (A PPA with deviations must receive Headquarters approval),
- Execute the PPA (cost sharing agreement) between the Corps and the City of Russellville, Arkansas,
- Preparation of construction plans and specifications,
- District review and approval of plans and specifications, Approval of the project for construction by the Division Engineer,
- Commitment of construction funds by Headquarters, The City of Russellville acquires the necessary real estate and performs all necessary relocations for construction and maintenance of the project,
- Advertise construction contract,
- Receipt of cash contribution from the City of Russellville,
- Headquarters allocates Federal construction funds, and
- Award the construction contract.

The formal execution of the PPA, as stated above, will be required before construction of the project can begin. The final acceptance and transfer of the project to the City of Russellville would follow the delivery of an Operation &Maintenance manual and the as-built drawings.

9 Cost Apportionment

Sharing of costs between Federal and non-Federal interests for non-reservoir type flood control improvements is based on standard requirements that are set forth by law. Under these requirements, the non-Federal project sponsor is required to furnish all lands, easements, and rights-of-way necessary to construct the project. In addition, the local sponsor is required to relocate all affected utilities, highways, and buildings. A minimum cash contribution equal to 5 percent of the project implementation cost associated with flood damage reduction is also required from the local sponsor prior to initiation of construction. The non-federal expenditures for a Section 205 project which has been identified as the NED plan, shall be at least 35 percent, but not exceed 50 percent of the total project first cost. Table 9 shows the proposed apportionment of the project first cost between the Federal Government and the City of Russellville in accordance with the policies outlined above. The estimated cost of the tentatively selected plan is $15,740,000. The total non-federal cash contribution is $787,000 with a total share of $6,551,000. The total Federal funds to be expended are within the $10,000,000 statutory limit. The total estimated Federal expenditure of $9,437,500 consists of study costs ($249,000) and project costs ($9,188,500).

Table 9, Cost Apportionment

Cost Apportionment of Alternative 4, NED Plan

Feature	Federal Cost	Non-Federal Cost	Total Cost
Lands	$409,000	$4,162,000	$4,571,000
Relocations	$0	$1,402,000	$1,402,000
Subtotal	$409,000	$5,564,000	$5,973,000
General Construction Features:			
Channels and Canals	$8,370,000	$0	$8,370,000
Engineering & Design	$720,300	$120,700	$841,000
Construction Management	$476,000	$79,800	$556,000
TOTALS	$9,975,500	$5,764,500	$15,740,000
Minimum Cash Contribution (5%)	($787,000)	$787,000	$0
Additional Cash Requirement	$0	$0	$0
TOTAL SPONSOR CASH	($787,000)	$787,000	
FINAL COST ALLOCATION	$9,188,500	$6,551,500	$15,740,000
COST SHARE PERCENTAGES	58.4%	41.6%	

Notes:
1. Costs are from the MCACES estimate.
2. Costs include escalation.

10 Permits

Clean Water Act: At present time, no Section 404 permit is required. However, if during the plans and specifications phase a disposal site is located in any wetlands or other waters of the United States, a section 404 permit will be obtained.

11 Views of non-Federal sponsors and any other agencies having implementation responsibilities

The City of Russellville, Arkansas has expressed the desire for implementing the project and sponsoring project construction in accordance with the items of local cooperation that are set forth in the recommendations chapter of this report.

12 SUMMARY OF COORDINATION, PUBLIC VIEWS AND COMMENTS

12.1 COORDINATION

12.1.1 PUBLIC AGENCY COORDINATION

Public Agency involvement will consist of notification of the availability of the Draft Detailed Project Report, Draft Environmental Assessment, and Draft Finding of No Significant Impact and 30-day comment period on the documents.

12.1.2 PUBLIC INVOLVEMENT

Public involvement will consist of the 30-day comment period on the Draft Detailed Project Report, Draft Environmental Assessment, and Draft Finding of No Significant Impact.

12.2 PUBLIC VIEWS AND RESPONSES

The Final Detailed Project Report will be completed after comments are received during the 30-day public comment period. A complete list of public comments and responses will be included in the Environmental Assessment that will be provided with the final report.

13 RECOMMENDATIONS

Pending public review and comment on the finding of no significant impact (FONSI), I have considered all significant aspects in the overall public interest. The aspects considered included environmental, social, and economic effects, and engineering feasibility. I recommend the improvements for flood risk management for the Prairie Creek and Engineers Ditch, Russellville, Arkansas, project be implemented. Alternative 4 is the tentatively selected plan to be implemented under the authority of Section 205, Flood Control Act of 1948, as amended. The estimated first cost of the tentatively selected plan is $13,714,600. The estimated annual OMRR&R cost is $2,700, total annual costs are $593,200, and the project has a benefit-to cost ratio of 3.6 with annual benefits of $2,157,200. The Federal portion of the estimated first cost including inflation through the midpoint of construction is $9,188,500. The non-Federal sponsor shall, prior to implementation, agree to perform the following items of local cooperation:

a. Provide at least 35 percent but no more than 50 percent of total project costs allocated to structural flood control, as further specified below:

(1) Provide, during construction, any additional funds needed to cover the non-Federal share of design costs;

(2) Provide all lands, easements, and rights-of-way, including suitable borrow and dredged or excavated material disposal areas, and perform or assure the performance of all relocations determined by the Government to be necessary for the construction, operation, and maintenance of the project;

(3) Provide or pay to the Government the cost of providing all retaining dikes, wasteweirs, bulkheads, and embankments, including all monitoring features and stilling basins, that may be required at any dredged or excavated material disposal areas required for the construction, operation, and maintenance of the project; and

(4) Provide, during construction, any additional costs as necessary to make its total contribution equal at least 35 percent but no more than 50 percent of total project costs allocated to structural flood control.

b. Give the Government a right to enter, at reasonable times and in a reasonable manner, upon land which the local sponsor owns or controls for access to the project for the purpose of inspection, and, if necessary, for the purpose of completing, operating, maintaining, repairing, replacing, or rehabilitating the project.

c. Assume responsibility of operating, maintaining, replacing, repairing, and rehabilitating (OMRR&R) the project or completed functional portions of the project, including mitigation features without cost to the Government, in a manner compatible with the project's authorized purpose and in accordance with applicable Federal and State laws and specific directions prescribed by the Government in the OMRR&R manual and any subsequent amendments thereto.

d. Comply with Section 221 of Public Law 91-611, Flood Control Act of 1970, as amended, and Section 103 of the Water Resources Development Act of 1986, Public Law 99-662, as amended, which provides that the Secretary of the Army shall not commence the

construction of any water resources project or separable element thereof, until the non-Federal sponsor has entered into a written agreement to furnish its required cooperation for the project or separable element.

e. Hold and save the Government free from all damages arising from the construction, operation, maintenance, repair, replacement, and rehabilitation of the project and any project-related betterments, except for damages due to the fault or negligence of the Government or the Government's contractors.

f. Keep and maintain books, records, documents, and other evidence pertaining to costs and expenses incurred pursuant to the project to the extent and in such detail as will properly reflect total project costs.

g. Perform, or cause to be performed, any investigations for hazardous substances that are determined necessary to identify the existence and extent of any hazardous substances regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 USC 9601-9675, that may exist in, on, or under lands, easements or rights-of-way necessary for the construction, operation, and maintenance of the project; except that the non-Federal sponsor shall not perform such investigations on lands, easements, or rights-of-way that the Government determines to be subject to the navigation servitude without prior specific written direction by the Government.

h. Assume complete financial responsibility for all necessary cleanup and response costs of any CERCLA regulated materials located in, on, or under lands, easements, or rights-of-way that the Government determines necessary for the construction, operation, or maintenance of the project.

i. Agree that, as between the Federal Government and the non-Federal sponsor, the non-Federal sponsor shall be considered the operator of the project for the purpose of CERCLA liability, and, to the maximum extent practicable, operate, maintain, repair, replace, and rehabilitate the project in a manner that will not cause liability to arise under CERCLA.

j. Prescribe and enforce regulations to prevent obstruction of or encroachment on the Project that would reduce the level of protection it affords or that would hinder operation or maintenance of the Project.

k. Comply with the applicable provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, Public law 91-646, as amended by title IV of the Surface Transportation and Uniform Relocation Assistance Act of 1987 (Public Law 100-17), and the Uniform Regulations contained in 49 CFR part 24, in acquiring lands, easements, and rights-of-way, and performing relocations for construction, operation, and maintenance of the project, and inform all affected persons of applicable benefits, policies, and procedures in connection with said act.

l. Comply with all applicable Federal and State laws and regulations, including Section 601 of the Civil Rights Act of 1964, Public Law 88-352, and Department of Defense Directive 5500.11 issued pursuant thereto, as well as Army Regulation 600-7, entitled "Nondiscrimination on the Basis of Handicap in Programs and Activities Assisted or Conducted by the Department of the Army," and Section 402 of the Water Resources Development Act of 1986, as amended (33 U.S.C. 701b-12), requiring non-Federal preparation and implementation of floodplain management plans.

m. Provide the nonfederal cost share of that portion of total cultural resource preservation mitigation and data recovery costs attributable to structural and nonstructural flood control that are in excess of one percent of the total amount authorized to be appropriated for structural and nonstructural flood control.

n. Inform affected interests, at least annually, regarding the limitations of the protection afforded by the project.

o. Publicize floodplain information in the areas concerned and provide this information to zoning and other regulatory agencies for their guidance and leadership in preventing unwise future development in the floodplain and in adopting such regulations as may be necessary to ensure compatibility between future development and protection levels provided by the project.

p. Do not use Federal funds to meet the non-Federal sponsor's share of total project costs unless the Federal granting agency verifies in writing that the expenditure of such funds is authorized.

q. Agree that any part of the project identified as approved for proposed advanced work for credit under Section 104 of Public Law 99-662 must be compatible with tentatively selected flood control project, and that any credit granted shall not relieve the non-Federal sponsor of its requirement to pay, in cash, 5 percent of total project costs allocated to structural flood control.

r. Agree to pay for all costs in excess of the $10,000,000 limitation on the Government's total financial obligations for planning, design, and construction of the project specified in Section 205 of the Flood Control Act of 1948, Public Law 80-858, as amended (33 U.S.C. 701s).

Courtney W. Paul
Colonel, Corps of Engineers
District Engineer

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DRAFT FONSI

DRAFT FINDING OF NO SIGNIFICANT IMPACT

NAME OF PROPOSED ACTION: Prairie Creek and Tributaries, Russellville, Arkansas.

PURPOSE AND NEED FOR THE PROPOSED ACTION: Flooding in Russellville, Arkansas, has occurred in downtown commercial, residential and public facilities and has caused traffic and safety hazards. Rainfall run-off, which has increased from upstream city development, flows from several tributaries and collects downstream of the city in a sump area for the pump station. Debris (trees and litter) from city streets continues to impede flow conveyance in spite of the frequent cleanup and channel maintenance. Debris also affects pump station capacity and requires frequent cleanup. Damages are primarily caused by inadequate flow conveyance in the upstream reaches.

The Little Rock District, US Army Corps of Engineers (USACE) is conducting this Environmental Assessment (EA) in accordance with the Council on Environmental Quality (CEQ) guidelines pursuant to the National Environmental Policy Act (NEPA) of 1969.

ALTERNATIVES: In addition to the proposed action (Alternative 4), a No Action alternative was evaluated in the Environmental Assessment.

No Action Alternative. - The "No Action" alternative, which is synonymous to the "Without Project Condition," it is assumed that no project would be implemented by the Federal Government or by local interests to achieve the planning objectives. Under this action, flooding and subsequent damages are likely to increase over time due to continued development in the upstream reaches of Prairie Creek and its tributaries.

Proposed Action. – The proposed action (Alternative 4) includes widening approximately 11, 785 feet of Prairie Creek channel and culvert installation on the Railroad Bridge on Engineers Ditch. This proposed action will produce an estimated $1,513,600 in annual net benefits.

ANTICIPATED ENVIRONMENTAL IMPACTS: Consideration of the effects disclosed in the EA, and a finding that they are not significant, is necessary to prepare a "Finding of No Significant Impact" (FONSI). This determination of significance is required by 40 CFR 1508.13. Additionally, 40 CFR 1508.27 defines significance at it relates to consideration of environmental effects of a direct, indirect or cumulative nature.

Criteria that must be considered in making this finding are addressed below, in terms of both context and intensity. The significance of both short and long term effects must be viewed in several contexts: society as a whole (human, national); the affected region; the affected interests; and the locality. The context for this determination is primarily local. The context for this action is not highly significant geographically, nor is it controversial in any significant way.

Consideration of intensity refers to the magnitude and intensity of impact, where impacts may be both beneficial and adverse. Within this context, the magnitude and intensity of impacts in the Prairie Creek and Tributaries Flood Risk Management Study, Russellville, Arkansas, are not significant. The determination for each impact topic is listed below.

1. The degree to which the action results in both beneficial and adverse effects. A significant effect may exist even if the Federal agency believes that on balance the effect will be beneficial. The EA indicates that there will be beneficial effects from a major reduction of flood damage that are incurred during each flood event. Temporary disruption of traffic routes during construction will be the major adverse effects.

2. The degree to which the action affects public health or safety. No adverse effects to public health or safety will result from the Proposed Action and implementation will provide increased safety for the public by keeping a major portion of the frequent flood flows in the within the channel and off streets.

3. The degree to which the action affects unique characteristics of the potentially affected area, such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas. The proposed action will not have significant impacts to wetlands due to their absence within the proposed channel widening project footprint. A recognized wetland occurs in the sump area near the pump station, but no significant impacts are expected to this wetland from construction related activities.

4. The degree to which effects on the quality of the human environment are likely to be highly controversial. The project will benefit the public through increased awareness of flooding and flood impacts. Therefore the Little Rock District, Corps of Engineers, does not regard this activity as controversial.

5. The degree to which the possible effects on the human environment is highly uncertain or involves unique or unknown risks. The uncertainty of the impacts of this action is low since the City is required to provide a clean corridor for construction activity, thus eliminating the risk of unknown HTRW issues. Any contamination areas that are discovered to be within the project footprint will be remediated prior to channel construction.

6. The degree to which the action may establish a precedent for future actions with significant impacts. Because the proposed action involves reducing existing persistent flood damages and improves public safety and awareness, the action should not establish a precedent for significant future impacts.

7. Whether the action is related to other actions with individually insignificant but cumulatively significant impacts. There are no other known individual actions associated with this project, therefore there are no cumulatively significant impacts identified in this action.

8. The degree to which the action may adversely affect items listed or eligible for listing in the National Register of Historic Places, or other significant scientific, cultural or historic resources. There are no known structures eligible for National Register of Historic Places listing, or other significant scientific, cultural, or historic resource sites in the proposed construction footprint.

9. The degree to which the action may adversely affect an endangered or threatened species or its critical habitat. The proposed action will not affect any Threatened & Endangered species since none have been documented in the project area.

10. Whether the action threatens a violation of Federal, state or local law or requirements imposed for the protection of the environment. No such violations will occur. All applicable Federal, state or local laws and regulations will be complied with during the implementation of the action.

CONCLUSIONS: The impacts identified in the prepared EA have been thoroughly discussed and assessed. No impacts identified in the EA would cause any significant adverse effects to the human environment. Therefore, due to the analysis presented in the EA and comments received from a 30-day public review period that began on xxxx, 2015 and ended on xxxx, 2015, it is my decision that the preparation of an Environmental Impact Statement (EIS) as required by the National Environmental Policy Act (NEPA) is unwarranted and a "Finding of No Significant Impact" is appropriate. The signing of this document indicates the Corps final decision of the proposed action as it relates to NEPA. The EA and FONSI will be held on file in the Environmental Branch, Planning and Environmental Division, Little Rock District, US Army Corps of Engineers, for future reference. Consultation with regulatory agencies will be ongoing to insure compliance with all federal, state, regional, and local regulations and guidelines.

_____ _____

Date

COURTNEY W. PAUL
Colonel, US Army
District Engineer

APPENDIX A
CORRESPONDENCE

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Russellville
ARKANSAS

Public Works
Engineering / Street / Traffic / Fleet

12 July 2010

Col Glen Masset , District Engineer
U.S. Army Corps of Engineers
Attn: Planning Division
P.O. Box 867
Little Rock, Arkansas 72203-0867

Dear Col. Masset,

We would like to request the continuation of a small flood control(Section205)study under the Continuing Authorities Program. The scope of the study was to investigate methods to reduce flooding in and around Russellville, AR.

In order to conduct this study, we understand that your District would request study funs from Headquarters, U.S. Army Corps of Engineers through your Division office. We understand that a Section 205 study consists of a feasibility phase whereby the first $100,000.00 of the feasibility phase is at 100% Federal cost. Any additional study costs would be cost-shared 50%/50% between the U.S. army Corps of Engineers and the City of Russellville, and would require the execution of a Feasibility Cost Sharing Agreement between the City of Russellville and The Corps of Engineers.

We understand that should we agree to an approved project, and proceed into the plans and specifications phase that the costs to prepare plans and specifications would be cost shared 65% Federal and 35% City. All project implementation costs(beyond the feasibility study costs) including construction cost and construction management costs would be shared 65% Federal and 35% City of Russellville.

We understand that the City of Russellville would assume all responsibility for operation and maintenance of a Corps project resulting from this study.

Sincerely,

TYRONE WILLIAMSON

Tyrone Williamson
Mayor
City of Russellville

716 North El Paso • Russellville, AR 72801
Phone: 479 968-2406

The Natural Choice, In The Natural State!

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APPENDIX B
ENGINEERING APPENDIX

APPENDIX C
ECONOMIC APPENDIX

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APPENDIX D
REAL ESTATE PLAN

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