DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS
MISSISSIPPI VALLEY DIVISION
1400 WALNUT STREET
VICKSBURG MS 39180-3262

CEMVD-PDM

31 August 2021

MEMORANDUM FOR Commander, Memphis District

SUBJECT: Approval of the Updated Review Plan for the Memphis Metropolitan Stormwater – North DeSoto County Integrated Feasibility Report and Environmental Impact Statement (IFR/EIS)

1. References:

a. USACE, CEMVM-ZA memorandum (Request for Approval of the Review Plan for the Memphis Metropolitan Stormwater – North DeSoto County Integrated Feasibility Report and Environmental Impact Statement (IFR/EIS)), 9 July 2021 (Encl 1)

b. USACE, CESPD-PDP memorandum (Review Plan Endorsement for the Memphis Metropolitan Stormwater-North DeSoto County, Mississippi, Flood Risk Management and Ecosystem Restoration Feasibility Study), 10 June 2021 (Encl 2)

c. ER 1165-2-217 (Review Policy for Civil Works), 1 May 2021

d. USACE, CEMVD-PD memorandum (Request for Approval of the Review Plan for the Memphis Metropolitan Stormwater – North Desoto County, Mississippi Feasibility Study), 9 August 2019 (Encl 3)

2. The enclosed updated Review Plan (RP) for the Memphis Metropolitan Stormwater – North DeSoto County IFR/EIS has been prepared in accordance with ER 1165-2-217 and has been coordinated with our staff and the Flood Risk Management Center of Expertise who concurred with the RP.

3. The original review plan, see reference 1.d, included only the Flood Risk Management authority. At the request of the non-federal sponsor, the Ecosystem Restoration authority has been added to the project. The RP has been updated to reflect this addition.

4. We hereby approve this RP, which is subject to change as circumstances require, consistent with project development under the Project Delivery Business Process. Non-substantive changes to this RP do not require further approval. Substantive revisions to this RP or its execution will require new written approval from this office. The district should post the approved RP to its internal website with sensitive information removed.

5. My point of contact for this action is Sarah Palmer, CEMVD-PDM, 601-634-5910, or Sarah.t.palmer@usace.army.mil.

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Date: 2021.08.31 08:26:12 -05'00'

Encls

EDWARD E. BELK, JR., P.E.
Director of Programs

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS
MEMPHIS DISTRICT
167 NORTH MAIN STREET B-202
MEMPHIS, TN 38103-1894

CEMVM-ZA (1105) 9 July 2021

MEMORANDUM FOR Commander, Mississippi Valley Division (CEMVD-PD/Mr. E. Belk), 1400 Walnut Street, Vicksburg, MS 39181

SUBJECT: Request for Approval of the Review Plan for the Memphis Metropolitan Stormwater – North DeSoto County Integrated Feasibility Report and Environmental Impact Statement (IFR/EIS)

1. References:

a. Memorandum, Review Plan Template Package, dated 16 October 2019.

b. EC 1165-2-217, Review Policy for Civil Works, dated 1 MAY 2021

c. Civil Works Director's Policy Memorandum, CW 2019-01, Subject: Policy and Legal Compliance Review, dated 9 JAN 2019.

d. Memorandum, CESPD-PDP (FRM-PCX), dated 10 JUN 2021 (Encl1)

2. This memo transmits the Review Plan (RP) (Encl 2) for the Memphis Metropolitan Stormwater – North DeSoto County Integrated Feasibility Report and Environmental Impact Statement (IFR/EIS) for your review and approval. The subject RP and RP Checklist (Encl 3) are based on the Review Plan Template Package Memorandum and EC 1165-2-217 referenced above.

3. This Review Plan has been updated from the original Review Plan in 2018 to include the Ecosystem Restoration authority. This Review Plan has been updated to reflect the EC 1165-2-217, 1 MAY 2021.

3. Based on the requirements outlined in EC 1165-2-217, a Type I IEPR is <u>not</u> anticipated to be required.

4. The point of contact is Elizabeth Burks at Elizabeth.m.burks@usace.army.mil.

3 Encls
1. FRM PCX Endorsement
2. Review Plan
3. Checklist

ZACHARY L. MILLER
Colonel, EN
Commanding

REVIEW PLAN

24 June 2021

Project Name: Memphis Metropolitan Stormwater-North DeSoto County Feasibility Study, DeSoto County, Mississippi

P2 Number: 444806

Decision Document Type: Feasibility Report with Integrated Environmental Impact Statement

Project Type: Flood Risk Management and Ecosystem Restoration

District: Memphis District
District Contact: Project Manager: 901-544-0761 Planner: 504-862-2737

Major Subordinate Command (MSC): Mississippi Valley Division
MSC Contact: Planning Specialist: 601-634-5869

Review Management Organization (RMO): Flood Risk Management Planning Center of Expertise in coordination with the Ecosystem Restoration Planning Center of Expertise

Flood Risk Management RMO Contact: Deputy Director: 415-503-6852; Regional Manager for MVD 314-331-8404

Key Review Plan Dates

Date of RMO Endorsement of Review Plan: 7 JUN 2021
Date of MSC Approval of Review Plan: Pending
Date of IEPR Exclusion Approval: 7 June 2021
Has the Review Plan changed since PCX Endorsement? Yes, Additional details have been added to comply with ER 1165-2-217 revision dated 1 MAY 2021.
Date of Last Review Plan Revision: Pending
Date of Review Plan Web Posting: Pending
Date of Congressional Notifications: Pending

Milestone Schedule	Scheduled	Actual	Complete
Alternatives Milestone:	Jan 18, 2019	Jan 18, 2019	Yes
Tentatively Selected Plan:	Feb 26, 2021	Feb 25, 2021	Yes
Release Draft Report to Public:	May 28, 2021	May 28, 2021	Yes
Agency Decision Milestone:	Sep 26, 2021	TBD	No
Final Report Transmittal:	*Aug 26, 2022	TBD	No
Senior Leaders Briefing:	*Dec 09, 2022	TBD	No
Chief's Report or Director's Report:	*Mar 15, 2023	TBD	No

*pending 3x3x3 exemption approval

Project Name: Memphis Metropolitan Stormwater-North DeSoto County Feasibility Study

Location: DeSoto County, Mississippi

Authority: The United States House of Representatives Committee on Transportation and Infrastructure adopted a resolution on March 7, 1996.

Memphis Metro Area, Tennessee and Mississippi

Resolved by the Committee on Transportation and Infrastructure of the United States House of Representatives, That, the Secretary of the Army review the report of the Chief of Engineers on the Wolf River and Tributaries, Tennessee and Mississippi, published as House Document Numbered 76, Eighty-fifth Congress, and other pertinent reports, to determine whether any modifications of the recommendations contained therein are advisable at this time, with particular reference to the need for improvements for flood control, environmental restoration, water quality, and related purposes associated with storm water runoff and management in the metropolitan Memphis, Tennessee area and tributary basins including Shelby, Tipton, and Fayette Counties, Tennessee, and DeSoto and Marshall Counties, Mississippi. This area includes the Hatchie River, Loosahatchie River, Wolf River, Nonconnah Creek, Horn Lake Creek, and Coldwater River Basins. The review shall evaluate the effectiveness of existing Federal and non-Federal improvements and determine the need for additional improvements to prevent flooding from storm water, to restore environmental resources, and to improve the quality of water entering the Mississippi River and its tributaries.

Sponsor: DeSoto County Board of Supervisors

Type of Study: The study will be a Flood Risk Management (FRM) and Ecosystem Restoration Feasibility Study. The study is fully funded under FY 2018 Work Plan.

SMART Planning Status: This is not a 3x3x3 compliant study (WRRDA 2014). The study will not be compliant with USACE DCW Memorandum 2018-05 issued 3 May 2018. The Tentatively Selected Plan (TSP) milestone was initially scheduled for 02 April 2020. At a pre-brief with the sponsor the Project Delivery Team (PDT) was asked to pause and integrate Ecosystem Restoration (ER) into the study. At that point in time the PDT began to investigate and formulate ER. While the team was able to coordinate and collaborate with the nonfederal sponsor and other stakeholders to identify NER alternatives, the 3-year schedule continued to slip. The actual TSP milestone occurred 26 February 2021 and the tentatively selected plans included a locally preferred flood risk management plan that is bigger in scope and cost than the NED plan, and a NER plan that includes grade control and riparian restoration on eleven streams. The additional scope has caused the Agency Decision Milestone (ADM) to occur three years after the signing of the feasibility cost-share agreement and as such, the PDT is requesting additional time to complete feasibility level design and reach the Chiefs Report Milestone. An exemption package is forthcoming.

Project Area: The authority covers a large area including six river basins, across five counties in two states. The area described in the budget fact sheets submitted in support

of the new start describe the study area as follows: The study area lies in the Horn Lake Creek and Coldwater River watersheds in DeSoto County, MS including the cities of Horn Lake, Southaven, Olive Branch, Walls, and Hernando. Impacts from flooding occur in the following basins: Horn Lake Creek and tributaries, and Coldwater River. At this time, the most significant issues are believed to be in the northern part of the county, but the entire county and all tributary basins will be considered.

The team determined that flood risks were concentrated in the Horn Lake Creek Basin and Coldwater River Basin. The Ecosystem Restoration evaluations will focus on stream degradation and channel instability identified in Horn Lake Creek, Camp Creek, Johnson Creek, and Hurricane Creek as well as the tributaries of the Coldwater River Basin.

Opportunities for recreation will be explored in conjunction with project features such as flood storage areas or channel modifications, as appropriate and feasible.

Interstate 55 bisects the area north to south and the I-69 corridor bisects it east to west. US Highways 51 and 61 also lie in the project area. Three major rail lines run north-south through the area. There are several large underground pipelines and an overhead TVA transmission line. The area lies approximately 2 miles south of the runways at Memphis International Airport.

Horn Lake Creek crosses into Tennessee before reentering Mississippi and flowing into the Mississippi River. The State of Tennessee and the City of Memphis may both have some regulatory control over some project features.

Problem Statement: Flooding and environmental degradation.

Major flood damage occurred in May 2010, May 2011, September 2014, and March 2016. The area received a Presidential Disaster Declaration in 2011. The U.S. Small Business Administration provided federal assistance after the 2014 flood. The US Coast Guard provided emergency evacuation assistance during the September 2014 event. Flooding inundates major transportation corridors and several neighborhoods, isolates communities, damages public infrastructure and development (residential, commercial and industrial), and threatens life safety. Repeated flooding occurs within the cities of Horn Lake, Southaven, and Olive Branch.

Unstable channels, lack of suitable riparian cover, altered flow regime, and loss of wetlands and floodplains all degrade habitat in the area. DeSoto County has the fastest growing population in the State of Mississippi (ranked 32 in the entire U.S.) which has caused impacts to the ecosystem. While some higher quality habitat remains, large-scale commercial, residential, and agricultural development has reduced floodplain and aquatic habitat, caused wetlands to be drained, and bottomland hardwood forests to be cleared. In addition, increased runoff has caused channel instability and an imbalance of scouring and sedimentation, further degrading aquatic habitat.

Purpose and Need

The study will address flood risk and aquatic habitat degradation by developing multi-purpose features to resolve flooding and channel instability problems in the project area. It will analyze environmentally sustainable solutions to address the problems associated with flooding and degraded habitat. Detention structures to reduce the flood peak were examined.

Grade control structures, bank stabilization features, as well as wetland and bottomland hardwood forest restoration for flood retention and environmental benefits were considered.

Recent development has reduced floodplain and aquatic habitat. Wetlands and bottomland hardwoods have been largely isolated or drained and developed. Increased runoff is causing channel instability, stream bed degradation, head-cutting, scouring and overall degrading aquatic habitat.

Planning Goals/Objectives

The primary goal of this study is to develop alternatives to reduce the severity of flood risk and risk to human life, businesses, and critical infrastructure. The federal objective of water and related land resources project planning is to contribute to National Economic Development (NED) consistent with protecting the Nation's environment, pursuant to national environmental statutes, applicable executive orders, and other federal planning requirements. Planning objectives represent desired positive changes to future conditions. All the objectives focus on alternatives within the study area and within the 50-year period of analysis from 2025 to 2075.

The secondary goal is to stabilize channels and connect/improve riparian buffer strips to minimize channel degradation and erosion to support aquatic ecosystem form and function along main stem channels and tributaries in the Desoto County watersheds.

The planning objectives for Flood Risk Management and Ecosystem Restoration are as follows:

- Objective 1. Reduce flood damages to businesses, residents, and infrastructure in DeSoto County.
    - Metric 1: The PDT will evaluate structure damage;
- Objective 2. Reduce risks to critical infrastructure.
    - Metric 2: The PDT will evaluate water surface elevation;
- Objective 3. Reduce risk to human life from flooding and rainfall events throughout the county.
    - Metric 3: The PDT will evaluate water surface elevation.
- Objective 4. Restore and protect aquatic and riparian ecosystems by stabilizing bank lines, reducing erosion and improving transport of stream flows over a 50 period of analysis.
    - Metric 4: The PDT will evaluate channel dimensions, sediment transport, channel bed diversity, pools, and fish cover/canopy density, riparian zones and canopy density, habitat units, and turbidity;
- Objective 5. Improve species richness through channel stabilization and habitat restoration.
    - Metric 5: The PDT will evaluate sediment inflows to channels, acres of riparian habitat preserved/planted;
- Objective 6. Improve water quality to support aquatic resources.
    - Metric 6: The PDT will evaluate suspended sediment, nutrients.

Federal Interest: This area has the fastest growing population in the State of Mississippi (ranked 32 in the entire U.S.) and has experienced repetitive flood events in May 2010, May 2011, September 2014, and March 2016.

Since 1994, three lives have been lost in DeSoto County due to flooding. The area received a Presidential Disaster Declaration in 2011 and flooding in September 2014 prompted a State of Emergency declaration. The Coast Guard responded to evacuate trapped residents, and the U.S. Small Business Administration provided federal assistance.

The PDT has identified a Tentatively Selected Plan (TSP) to address Flood Risk Management (FRM) concerns. The TSP is a Locally Preferred Plan (LPP) that includes a channel enlargement, three detention basins, along with the 0.04 AEP nonstructural to capture residual risk. This plan has an estimated cost of $62M.

The National Ecosystem Restoration Plan was identified as the TSP for habitat restoration. This plan addresses habitat degradation and channel instability in 11 channels with grade control and riparian restoration for an estimated cost of $35M.

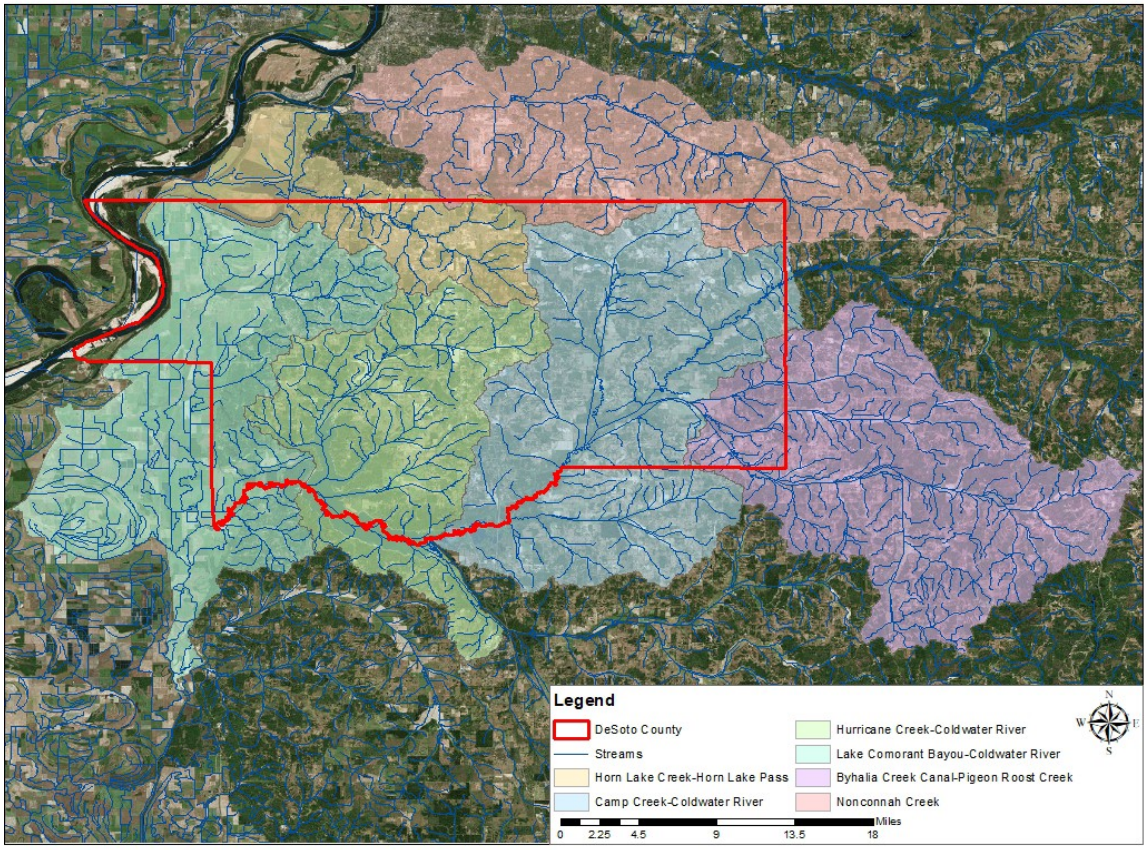
Risk Identification: DeSoto County has over 170,000 residents. Flooded roads put 20,000 – 30,000 people at risk during major rain events and limit access to emergency and medical services. Flooding inundates major transportation corridors and several neighborhoods, isolates communities, damages public infrastructure and development (residential, commercial and industrial), and threatens life safety. The water rises very quickly, and roads become inundated before first responders can close them to prevent people from driving into deep water. There are numerous neighborhoods with ingress/egress routes that can be blocked for hours which prevent ambulances, police and fire from reaching residents. Closed roads also interfere with school bus routes and extend the time students are on the bus up to 3 hours. Three deaths were attributed to flooding between 1994 and 2006

The following assumptions are part of the projected without-project condition:

- According to local planners, the Horn Lake Creek basin was considered 35% developed in the year 2000.
- DeSoto County experienced some significant flooding and some flash flooding during the 10-year period (1994 to 2004). Four of the most recent and largest-magnitude floods that occurred in the Horn Lake Creek basin were in November 2001, December 2001, October 2002, and December 2002.
- Some developments are located very close to the top banks of Horn Lake Creek. More residences and businesses are located within the 100-year floodplain than when the 1993 Flood Insurance Rate Maps were completed.
- Attempts by adjacent business owners and the cities of Southaven and Horn Lake, MS to clean out the channel from debris and overgrowth has not done a lot to alleviate flooding to residences and businesses, or the overtopping of roads in the area.
- The Horn Lake Drainage Basin is expected to be approximately 95% developed by the year 2027 and is expected to remain at this percentage until the year 2050 and beyond. This projection is based on proposed changes in land use and population increases.

- In proportion to this increase in development, the area will see an increase in flow discharges.

Figure 1 Areas impacted by September 11, 2014 flood event



The HEC-FDA model was used to generate a stage-damage relationship for each structure category in the basins identified as having flood risk under existing conditions (2026). The number and type of structures that are damaged by each of annual exceedance probability events for the year 2026 (future without-project conditions) is listed in Table 1.

Table 1 Total Economic Damage by Probability Event in 2026 ($1,000s)			
Annual Exceedance Probability (AEP)	**Residential**	**Non-Residential**	**Total**
Existing Condition (2026)			
0.20 (5 yr)	3	6	9
0.10 (10 yr)	4,055	6,474	10,530
0.04 (25 yr)	8,328	12,919	21,247
0.02 (50 yr)	13,577	19,939	33,516
0.01 (100 yr)	19,983	26,514	46,497
0.005 (200 yr)	33,586	37,560	71,145
0.002 (500 yr)	50,246	48,710	98,954

Flood Risk Management: The PDT identified measures and alternatives that would work to

reduce flood damages to businesses, residents, and infrastructure in DeSoto County, which would be measurable by evaluating structural damages. In addition, measures and alternatives were evaluated based on their ability to reduce risks to human life from flooding and rainfall events, and risks to critical infrastructure, both of which would be measurable by evaluation of water surface elevation. The PDT identified the critical work plan areas, or areas where structural damages were expected to occur, to be in the Horn Lake Creek Basin and the Upper Coldwater Basin. The PDT began formulation with a review of the concepts in the 2005 Horn Lake Creek Study. The 2005 plan focused entirely on the area known as Bullfrog Corner within the Horn Lake Creek Basin. The 2005 plan included detention for downstream inducements, channel enlargement and stabilization along Horn Lake Creek (HLC), stabilization of Cow Pen Creek at its confluence with HLC, and clean out of a diversion ditch and placement of a weir and berm on the drainage ditch just upstream of Bullfrog Corner. While the 2005 plan was screened, many of the individual components of that alternative were retained. The PDT evaluated five types of structural measures and both physical and non-physical nonstructural measures.

Fifteen Flood Risk Management (FRM) alternatives were assembled through the plan formulation process, including alternatives for no-action and nonstructural. Alternative plans were identified using one or more of the retained management measures that were carried forward after the initial measure screening evaluation. Nonstructural alternatives include elevating residential, and flood proofing commercial structures in both Horn Lake Creek and Coldwater Basin.

Table 2 Flood Risk Management Measures Evaluated

Measure ID		Description	Type	Location	Screened (S) or Retained (R)
Detention	1	Large Scale Reservoir (Conceptual)	Removed large portion of peak flows to determine if effective	in Horn Lake Creek	S
	6	Sewerage Lagoon	Detention to handle inducements from the 2005 plan	NW of bullfrog corner	S
	9	Rocky Creek	Detention	Elmore Rd	R
	10	Horn Lake Creek (HLC)	Detention	Elmore Rd.	S
	11	Lateral D	Detention	Church and Airways	R
	12	Cow Pen	Detention	Nail and Hurt Rd Detention	R
	13	Horn Lake Creek (HLC)	Detention	Goodman at Hwy 51	S
	N/A	Airways and I-55	Detention	Airways and I-55 near Tanger	S
	N/A	Detention with berms	Detention with berms	Same locations as 3A-3F	S
Remove Constrictions	N/A	Bridge Modification/Removal	Remove and replace	Railroad, Hwy 51, Elmore Rd.	S
	N/A	Clearing and Snagging	dredge, clear and snag	HLC and tributaries	S
Nonstructural	N/A	Zoning Ordinances	FEMA/Sponsor responsibility	HLC and Coldwater	R[s]
	N/A	Buy Outs	If qualify	HLC and Coldwater	R

	N/A	Flood Proofing Commercial Structures	Wet or Dry	HLC and Coldwater	R
	N/A	Elevate Residential Structures	25, 50, 100 yr.	HLC and Coldwater	R
	N/A	Elevate Roads and Bridges	Not within USACE authority	HLC and Coldwater	R^s
Levees and Floodwalls	15A	Rocky Creek Ring Levee at Shelby Apartments	Around Communities	RC just north of confluence with HLC	S
	15B	Rocky Creek Levee 2 b/w I-55 and Airways	Around Communities	RC b/w I-55 and airways	S
	15C	HLC Levee 1- Airways and Elmore	Around Communities	HLC b/w Airways and Elmore	S
	15D	HLC Levee 2 -bullfrog corner	Around Communities	HLC @ Hwy 51 and Goodman	S
	N/A	HLC Drainage Ditch Levee	Block Flows down Bull Frog Drainage Ditch	large levee ringing bullfrog corner from I55 S. of Goodman Rd to RR	S
Channel Enlargement	18	HLC Channel enlargement	with rip rap	RM 18.86-19.41	R
	N/A	HLC Channel enlargement large	without concrete lining, move sewer interceptor	RM 19.41-19.82	S
	N/A	HLC Concrete lined	with concrete lining	RM 19.41-19.82	S
Re-route flows	N/A	Re-route HLC at RR bridge	New channel alignment	HLC @ RR bridge	S
	N/A	Berm with a diversion weir, side slope 1:4, crown width of 10. Ditch bottom width of 20' side slope of 1:2.5.	Remove channel obstructions along ditch south of Goodman Road at Hwy 51	RM 18.80 – 19.91	S

R^s: Retained for the sponsor.

Table 3 Final Array of NED Alternatives

Alt ID	Description	Measures Included	Status	Reason for removal)	B/C Ratio
1A	Three Detention sites	Rocky Creek Detention, Cow Pen Creek Detention and Lateral D Detention	Retained	Maximizes Net Benefits	.83
1B	Three Detention sites plus 50YR nonstructural	Rocky Creek Detention, Cow Pen Creek Detention and Lateral D Detention plus 50YR nonstructural	Retained	Maximizes Net Benefits	1.14
2A	Three Detention sites+ Horn Lake Creek Channel Enlargement RM 18.86-19.41	Rocky Creek Detention, Cow Pen Creek Detention and Lateral D Detention+ HLC Channel Enlargement	Retained	Maximizes Net Benefits	1.08
3A	Horn Lake Creek Channel Enlargement RM 18.86-19.41	HLC Channel Enlargement	Retained	Maximizes Net Benefits	2.33
3B	Horn Lake Creek Channel Enlargement RM 18.86-19.41+	HLC Channel Enlargement +Aggregated nonstructural at HLC and Coldwater	Screened	Elongated Channel Enlargement reduces more damages & 25 YR NS is optimized	1.66

	50YR nonstructural aggregation				
4A	25 YR Nonstructural Aggregation	25 YR Nonstructural in Horn Lake Creek and Coldwater Basins	Retained	Maximizes Net Benefits	1.25
4B	50 YR Nonstructural Aggregation	50 YR Nonstructural in Horn Lake Creek and Coldwater Basins	Screened	25 YR Nonstructural is optimal	1.06
5A	Extended Horn Lake Channel Enlargement	Extended the HLC Channel Enlargement from river mile 18.6-19.4	Retained	Maximizes Net Benefits	2.46
5B	Extended Horn Lake Channel Enlargement+ 25 YR Nonstructural	HLC Channel Enlargement (RM 18.6-19.4) + 25 YR Nonstructural	Retained	Maximizes Net Benefits	1.69
6A	Extended Horn Lake Channel Enlargement+ Lateral D Detention	HLC Channel Enlargement (RM 18.6-19.4) + Lateral D Detention	Retained	Maximizes Net Benefits; NED plan	1.65
6B	Extended Horn Lake Channel Enlargement+ Lateral D Detention+ 25 YR Nonstructural	HLC Channel Enlargement (RM 18.6-19.4) + Lateral D Detention+ 25 YR Nonstructural	Retained	Maximizes Net Benefits	1.66
7A	Extended Horn Lake Channel Enlargement + Cow Pen, Lat D, Rocky Detention+ 25 YR Nonstructural	Extended Horn Lake Channel Enlargement Rocky Creek Detention, Cow Pen Creek Detention and Lateral D Detention+25 YR Nonstructural	Retained	Locally Preferred	1.22

Ecosystem Restoration: Seventeen Streams were evaluated for ecosystem restoration. Those streams that were identified as degradational were retained for further evaluation. Initial evaluation began with meetings with the sponsor and stakeholders (local Mayors, engineers, and planners) to identify problem areas. Streams were evaluated using LIDAR and GIS data. Streams included in the initial formulation included four streams that drain west into Mississippi River including: Horn Lake Creek, Cow Pen Creek, Rocky Creek and Nonconnah Creek and thirteen streams that drain south into the Coldwater Basin and ultimately to Arkabutla Lake including: Coldwater River, Lick Creek, Nolehoe Creek, Camp Creek, Hurricane Creek, Cane Creek, Mussacuna Creek, Johnson Creek, Cuffawa, Short Fork, Red Banks, Pigeon Roost, and Byhalia.

Initial discussions with USACE team members in Vicksburg and partners at Engineer Research and Development Center (ERDC) indicated that the Coldwater River is a stable channel and as such does not require bank stabilization, which is the primary ER objective of this study. This allowed the PDT to screen this stream. Evaluations of Cow Pen Creek, Rocky Creek, Pigeon Roost and Byhalia identified that these streams were either stable or agraddational. Streams that were aggradational or stable were also screened because they were found to not meet the primary objective which is to restore and protect aquatic and riparian

ecosystems by decreasing channel side slopes and stabilizing bank lines which will improve transport of stream flows and sediment over a 50 period of analysis.

Ecosystem restoration management measures were developed for the remaining eleven streams through a brainstorming process led by team's environmental lead along with partners at the Engineer Research and Development Center (ERDC). Alternative plans were identified using a channel stability assessment completed by the Engineer Research and Development Center (ERDC). This method uses existing LIDAR data to assess the stream corridor conditions based on analysis of the longitudinal profile and cross-sections.

The ER management measures were developed and correlated to the ecosystem restoration objectives. Included were measures that were thought to best address the stream stability, erosion, and ecosystem degradation concerns in the study area. The measures were then evaluated by a screening process based on the planning objectives and constraints, as well as the opportunities and problems of the study/project area

Table 3 Ecosystem Restoration Measures Evaluated

Type	Measure ID	Description	Location	Screened (S) or Retained (R)
Grade Control	ER-1	Low Drop Structures	All streams	R
	ER-2	High Drop Structures	All Streams	S
Bank Stabilization	ER-3	Riser pipes	All streams	R
	ER-4	Lateral stabilization with stone to protection	All streams	R
	ER-5	Rip Rap	All streams	R
Terrestrial Habitat Construction	ER-6	Riparian Buffer Strips	All streams	R
	ER-7	Constructed Habitat	All streams	S
In stream maintenance	ER-8	Clearing and Snagging	Hurricane, Johnson, Horn Lake Creek	S
In stream habitat Construction	ER-9	Streambank terracing	All streams	S
	ER-10	In-line detention	Horn Lake Basin	R

Table 4 Final Array of Ecosystem Restoration Alternatives

Stream	Alt #	Alternative Description	Average Annual Habitat Units (AAHUs)
Horn Lake Creek	HLC-1	14 GCS	45
	HLC-4	14 GCS+ 17 acres riparian	60
	HLC-5	14 GCS+ 64 acres riparian	101
Nonconnah Creek	NoN-1	7 GCS	1
	NoN-4	7 GCS+ 5 acres riparian	6
	NoN-5	7 GCS+107 acres riparian	65
Camp Creek	CP-1	7 GCS	15
	CP-4	7 GCS + 47 acres riparian	61
	CP-5	7 GCS + 98 acres riparian	98
Cane Creek	CN-1	9 GCS	3
	CN-4	9 GCS + 6 acres riparian	9
	CN-5	9 GCS + 66 acres riparian	54
Hurricane Creek	HC-1	9 GCS	6
	HC-4	9 GCS+ 22 acres riparian	25
	HC-5	9 GCS+ 160 acres riparian	140
Johnson Creek	JC-1	11 GCS	20
	JC-4	11 GCS+ 43 acres riparian	59
	JC-5	11 GCS+ 122 acres riparian	113
Lick Creek	LC-1	3 GCS	3
	LC-4	3 GCS+ 11 acres riparian	11
	LC-5	3 GCS+ 36 acres riparian	24
Mussacuna Creek	MC-1	3 GCS	3
	MC-4	3 GCS+ 9 acres riparian	11
	MC-5	3 GCS+ 57 acres riparian	40
Nolehoe Creek	NL-1	11 GCS	28
	NL-4	11 GCS+17acres riparian	43
	NL-5	11 GCS +32 acres riparian	54
Red Banks	RB-1	5 GCS	10
	RB-4	5 GCS+24 acres riparian	28
	RB-5	5 GCS + 48 acres riparian	46
Short Fork	SF-1	9 GCS	6
	SF-4	9 GCS+ 12 acres riparian	17
	SF-5	9 GCS+ 106 acres riparian	84

1. FACTORS AFFECTING THE LEVELS OF

REVIEW Scope of Review.

- Will the study likely be challenging?
  Yes. There has been significant public interest in widening the scope of the feasibility study to include environmental benefits. The initial scope focused on Flood Risk Management in the northern portion of DeSoto County (Horn Lake Creek and Upper Camp Creek Basins). Nineteen months after the study start date the nonfederal sponsor requested that Ecosystem Restoration be considered and resulted in the inclusion of 10 additional streams across DeSoto County. There will be some challenges because much of the area is developed and there is little room for detention/retention, bypass, etc. The sponsor is capable and cooperative and is fully engaged and working with stakeholders. stakeholders.
- Is the project study for an activity for which there is ample experience within USACE and the industry to treat the activity as being routine? This study involves routine flood risk management modeling, study analysis and alternative development in an area heavily studied by team members engaged in this study. The Ecosystem Restoration effort is also routine, involving experienced engineers and biologists familiar these streams, degradation conditions and alternative solutions. The Delta Headwaters Authority, while focused on reduced sedimentation in degrading streams, has provided significant data, analysis, and construction knowledge on streams selected for ecosystem restoration. Municipality and County Engineers and Drainage Districts are also engaged and provide additional local data.
- Does the project study have minimal life safety risk? Life safety risk is minimal for this project. This project reduces current life safety scenarios caused by flooding. Channel enlargement and grade control for ecosystem restoration do not pose as risks to life safety. In line detention basins have been proposed that are below grade with minimal above grade embankment. It is estimate that little to negligible life risk is associated with these in line detention basins. This will be confirmed with qualitative assessment.
- Provide a preliminary assessment of where the project risks are likely to occur and assess the magnitude of those risks. Some of the H&H and economic data is more than 15 years old and will need to be updated/validated throughout the course of the study. Much of the FIRM mapping in the county has been updated in the last 5-7 years and there is concern with the accuracy of the FIRM map as compared to future hydrodynamic modeling within the study. Increased development requires that the structural inventory and hydrology be updated and can result in more benefits. Measures/alternatives can change once this information is available. The PDT contacted USFWS and EPA regarding the study and those agencies have no significant issues at this time.
- Do existing conditions, failure of the project, or future conditions pose a significant threat to human life or the environment? Existing conditions can pose a significant threat to human life. Major flood damage occurred in May 2010, May 2011, September 2014, and March 2016. The area received a Presidential Disaster Declaration in 2011 and flooding in September 2014 prompted a State of Emergency declaration. The Coast Guard responded to evacuate trapped residents, and the U.S. Small Business Administration provided federal assistance. Flooding inundates major

transportation corridors (including hospital routes) and several neighborhoods, isolates communities, damages public infrastructure and development (residential, commercial and industrial), and threatens life safety. Since 1994, three lives have been lost in DeSoto County due to flooding. Failure of this project and future conditions with project do not pose a significant threat to human life or the environment.

- Is the project likely to be justified by life safety or is the study or project likely to involve significant life safety issues? Overall, the project will be justified based on reduction of flood damages however certain elements of the study may be justified by life safety concerns.

- Has the Governor of an affected state requested a peer review by independent experts? No

- Will it likely involve significant public dispute as to the project's size, nature, or effects? No, some members of the public may be disappointed that the proposed plan does not provide relief to localized issues.

- Is the project/study likely to involve significant public dispute as to the economic or environmental cost or benefit of the project? No, the study is not controversial. There have been previous studies and projects in the area and the public has not identified any concerns. The County is well funded and capital improvement projects meet with little opposition to the economic costs. Much of the area is urbanized and the streams are already degraded. The previous study, which did not result in construction, had no public opposition and no significant environmental impacts.

- Is the information in the decision document or anticipated project design likely to be based on novel methods, involve innovative materials or techniques, present complex challenges for interpretation, contain precedent-setting methods or models, or present conclusions that are likely to change prevailing practices? Not at this time. Previous studies in the area have identified traditional solutions to the flooding issues and ecosystem restoration measures are well established. The stream condition index model is novel and is being developed for the region. This study will be the first time this model is being utilized. PDT members have extensive experience in the area and do not foresee implementation of anything novel or innovative.

- Does the project design require redundancy, resiliency, and/or robustness, unique construction sequencing, or a reduced or overlapping design/construction schedule? Not anticipated at this time.

- Is the estimated total cost of the project greater than $200 million? No, at TSP the two recommended plans (FRM+ER) had a combined first cost of $97M

- Will an Environmental Impact Statement be prepared as part of the study? Yes.

- Is the project expected to have more than negligible adverse impacts on scarce or unique tribal, cultural, or historic resources? No. Although there are Indian mounds in the northwestern part of the study area and there is a likelihood of other cultural sites, at this time it is not anticipated that they will be located within the project area. The pre-contact settlement of Desoto County extends as far back as the Woodland and Mississippian Periods (1000 B.C. to 1400 A.D.) with the majority of sites of this age having been identified within this study area. During and after the Civil War, this area was developed as large plantations by planters for cultivation of cotton. Since the late 20th century, Desoto County has had considerable suburban development related to the growth of Memphis. The most likely project area with construction features has been surveyed in the past and no significant resources were found. The project archaeologist is experienced in the area and has conducted a preliminary records search on the entire area and has found no indication of any unavoidable resources. Some of the likely project features would likely serve to stabilize degrading stream reaches; degrading reaches pose a greater threat to resources than the project would.

- Is the project expected to have substantial adverse impacts on fish and wildlife species and their habitat prior to the implementation of mitigation measures? Unavoidable impacts to fish and wildlife resources are expected, and compensatory mitigation will be required. Urbanization and large-scale agriculture have caused degradation of streams and adjacent habitats; however, these areas do still provide habitat functions. With compensatory mitigation, impacts are not expected to be considered substantial by the public or interagency team.

- Before implementation of mitigation measures, does the project have no more than a negligible adverse impact on a species listed as endangered or threatened species under the Endangered Species Act of 1973 (16 U.S.C. § 1531 et seq.) or the critical habitat of such species designated under such Act No. The USFWS has concurred with a not likely to adversely affect determination. There are two listed species, the Northern long eared bat and Wood stork in the study area. In addition to species in need of conservation including the Yazoo darter, Yazoo Shiner, Southern red-bellied dace, and Piebald madtom (currently petitioned for listing under the Endangered Species Act). The PDT will work with USDA NRCS to identify and avoid impacts to prime and unique farmlands within the study area.

2. REVIEW EXECUTION PLAN

This section describes each level of review to be conducted. Based upon the factors discussed in Section 1, this study will undergo the following types of reviews:

District Quality Control. All decision documents (including data, analyses, environmental compliance documents, etc.) undergo DQC. This internal review process covers basic science and engineering work products. It fulfils the project quality requirements of the Project Management Plan.

Technical Editing. All report documents (including data, analyses, environmental compliance documents, etc.) undergo technical editing. This internal review process covers document grammar and formatting.

Agency Technical Review. ATR is performed by a qualified team from outside the home

district that is not involved in the day-to-day production of the project/product. These teams will be comprised of certified USACE personnel. The ATR team lead will be from outside the home MSC. If significant life safety issues are involved in a study or project a safety assurance review should be conducted during ATR.

Independent External Peer Review. Type I IEPR is not recommended. See Section 2.c. The MSC Commander will make final determination on IEPR. This is the most independent level of review and is applied in cases that meet criteria where the risk and magnitude of the project are such that a critical examination by a qualified team outside of USACE is warranted. A risk- informed decision has been made that Type I IEPR is not required and would not substantially benefit the study.

Cost Engineering Review. All decision documents shall be coordinated with the Cost Engineering Mandatory of Expertise (MCX). The MCX will assist in determining the expertise needed on the ATR and IEPR teams. The MCX will provide the Cost Engineering certification. The RMO is responsible for coordinating with the MCX for the reviews. These reviews typically occur as part of ATR.

Model Review and Approval/Certification. EC 1105-2-412 mandates the use of certified or approved models for all planning work to ensure the models are technically and theoretically sound, compliant with USACE policy, computationally accurate, and based on reasonable assumptions.

Policy and Legal Review. All decision documents will be reviewed for compliance with law and policy. ER 1105-2-100, Appendix H provides guidance on policy and legal compliance reviews. These reviews culminate in determinations that report recommendations and the supporting analyses and coordination comply with law and policy, and warrant approval or further recommendation to higher authority by the home MSC Commander. These reviews are not further detailed in this section of the Review Plan.

Public Review. The district will post the Review Plan and approval memo on the district internet site. All names and contact information (e.g., phone numbers, email addresses) of USACE individuals must be redacted before posting. Public comment on the adequacy of the Review Plan will be accepted and considered within 5 business days of receipt. Table 5 provides the schedules and costs for reviews. The specific expertise required for the teams are identified in later subsections covering each review. These subsections also identify requirements, special reporting provisions, and sources of more information.

Table 5: Levels of Review

Product(s) to undergo Review	Review Level	Start Date	End Date	Cost	Complete
SCI Model	Model Review (see EC 1105-2-412)	5/1/21	5/27/21	$5,000	Yes
ECAM Model	Model Review (see EC 1105-2-412)	5/1/21	10/1/21	$5,000	No

Draft Feasibility Report and EIS	District Quality Control	04/12/21	5/4/21	$33,000	Yes
	Agency Technical Review	5/28/21	07/28/21	$60,000	No
	Policy and Legal Review	5/28/21	07/28/21	n/a	No
	Public Review Period	5/28/21	7/12/21	n/a	Yes
Final Feasibility Report and EIS *	District Quality Control	*5/30/22	6/19/22	$29,000	No
	Agency Technical Review	*06/20/22	08/25/22	$30,000	No
	Policy and Legal Review	*08/26/22	10/26/22	n/a	No

*These dates are pending 3x3 exemption approval

a. DISTRICT QUALITY CONTROL

The home district shall manage DQC and will appoint a DQC Lead to manage the local review (see ER 1165-2-217, section 4.7, page 21). Table 6 identifies the required expertise for the DQC team.

Table 6: Required DQC Expertise

DQC Team Disciplines	Expertise Required
DQC Lead	A senior professional with extensive experience preparing Civil Works decision documents and conducting DQC. The lead may also serve as a reviewer for a specific discipline (such as engineering, planning, economics, environmental resources, etc.).
Planning	A Water Resources Planner with 5 years of experience in urban Flood Risk Management and Ecosystem Restoration Projects. Measures include channel enlargement, detention basins, channel stabilization, and riparian restoration.
Economics	An economist with experience in Flood Risk Management and Ecosystem Restoration Projects as well as the IWR Suite (CEICA) and HEC-FDA models used in the study (see Table 5).
Environmental Resources	Environmental Specialist with experience in FRM and NER projects, NEPA documentation, and habitat models.
Cultural Resources	Cultural Resource Specialist with experience in historic properties, Native American sites, and programmatic agreements.
Hydrology/Hydraulic Engineering	Senior Engineer with experience in Flood Risk Management and Ecosystem Restoration Projects including structural and non-structural alternatives and the HEC-RAS, model.
Civil Design	Senior Engineer with experience in flood risk management and ecosystem restoration projects to include detention, channel modification, grade control and stream bank stabilization

Geotechnical	Senior Engineer with experience in flood risk management and ecosystem restoration features to include detention, channel modification, grade control and stream bank stabilization.
Cost Engineering	The Cost Engineering panel member should have 15 years demonstrated experience or combined equivalent of education and experience assessing flood risk management and ecosystem restoration features to include detention, channel modification, grade control and stream bank stabilization
Real Estate	Senior Real Estate Specialist with experience in Flood Risk Management and Ecosystem Restoration policy, urban land acquisition and appraisal, and LERRDS.

Quality Control and DQC. Quality Control should be performed continuously throughout the study. DQC reviewers will be embedded throughout document development by scheduled involvement at key decision points. DQC of Report Summaries, Draft Reports and Final Reports will be done in Dr Checks and a specific certification of DQC completion is required. Documentation of DQC should follow the District Quality Manual and the MSC Quality Management Plan. An example DQC Certification statement is provided in ER 1165-2-217, page 81.

1. Documentation of Planning Quality Control Checks will be completed in accordance with the RPEDS SOP for DQC. Initial and continuous reviews are identified as "Quality Checks." Other Divisions will document Quality Control Checks according to their standard practices. Quality Control Checks will be performed by senior level staff, such as supervisors and team leaders, but not individuals who have produced the original work or who managed or reviewed documents produced by outside contractors. Quality Checks evaluate assumptions, loadings, design parameters, constraints, equations, model inputs, quantities, and references used to complete the design and/or analysis. Thorough annotation, conclusions should be provided in an accompanying narrative to allow the reviewer/checker to assure their validity.

2. The conclusions resulting from Quality Checks should be annotated and provided in an accompanying narrative to allow the reviewer/checker to assure their validity.

3. Quality Control Checks will include but is not limited to the following team members: Plan Formulation, Environmental, Economics, Project Management, Counsel, Engineering and Real Estate Divisions.

4. The DQC process should integrate the Quality Management Plan, Quality Checks, and a detailed peer review/checking of all documents, computations, and graphics, etc. that are contained in a project report, including NEPA and other environmental compliance products and in-kind services provided by local sponsors.

5. The following DQC reviews are required for RPEDS produced decision documents to be submitted for culmination in a Chief's or Directors Report:

    a. Existing Conditions DQC. This review will include plan formulation and environmental DQC team members, at a minimum. The purpose of this DQC is to review historic, existing, and future without project conditions, and problems, opportunities, goals and objectives. If the study purpose is navigation, then the team

should include economics. The review will cover scoping and preliminary analysis. The plan formulation reviewer will compare the risks and consequences identified in the RP, PMP, and risk register to ensure that risks and consequences are being considered, and if they need to be, revised appropriately and are being addressed. A Quality Control check can be included for OC, engineering and economics if beneficial. This will generally be conducted 45 days following the Alternatives Milestone. Existing Conditions DQC was completed by the PDT 7 March 2019 .

b. Focused Array DQC. This review will include plan formulation, economics and environmental. The review will consider measures, screening criteria, and the initial and focused array of alternatives. It will also review model selections and incorporation of risk and uncertainty details among other actions identified. The reviewers will compare the risks and consequences identified in the RP, PMP, and risk register. This will generally be conducted 45 days following the Alternatives Milestone. The final DQC of the focused array occurred February 2021, just prior to the TSP milestone.

c. Draft Report/TSP DQC. Will include reviews by the PDT and OC, as well as the entire DQC team as identified in the Review Plan. The review will cover all plan formulation issues being presented in the draft report, including risk informed approaches as documented in the respective checklist. It will be conducted and stored in the DQC folders on the RPEDS SharePoint, and the MFR produced will be in the form of a Review Report, complete with documentation and resolution of DQC comments for use by an ATR Team, as applicable, and a DQC certification form accompanied by the complete set of checklists. The plan formulation reviewer will compare the risks and consequences identified in the RP, PMP, and risk register to ensure that risks and consequences are being considered, and if they need to be, revised appropriately and are being addressed. If a TSP risk assessment is identified in the RP and PMP, or if a risk buy-down plan is identified in the planning process, the plan formulation reviewer will assure it was conducted and addressed and documented correctly in the report. While this will generally be conducted 30 days following the TSP milestone, this study was granted an extension and the Draft Report/TSP DQC began 45 days after TSP on April 12, 2021,

d. Final Report DQC. Similar to the Draft Report DQC, the review will include the full gamut of considerations ranging from PDT and OC review to formal DrChecks comments made by the entire DQC Team. A Review Report will be prepared as the MFR for use by subsequent ATR, in conjunction with a completed set of checklists. This will generally be conducted 30 days prior to submission to MVD.

Documentation of completed DQC should be provided to the MSC, RMO and ATR Team leader prior to initiating an ATR. The ATR team will examine DQC records and comment in the ATR report on the adequacy of the DQC. Missing or inadequate DQC documentation can result in delays to the start of other reviews.

b. AGENCY TECHNICAL REVIEW

The ATR will assess whether the analyses are technically correct and comply with guidance, and that documents explain the analyses and results in a clear manner. An RMO manages ATR. The review is conducted by an ATR Team whose members are certified to perform reviews. Lists of certified

reviewers are maintained by the various technical Communities of Practice (see ER 1165-2-217, section 5.5.3, page 28-29). Table 7 identifies the disciplines and required expertise for this ATR Team.

Table 7: Required ATR Team Expertise

ATR Team Disciplines	Expertise Required
ATR Lead	A senior professional with extensive experience preparing Civil Works decision documents and conducting ATR. The lead should have the skills to manage a virtual team through an ATR. The lead may serve as a reviewer for a specific discipline (such as planning).
[1]Planning	An ATR-approved Senior or Certified Planner with experience in urban FRM and ER projects. Measures include channel modification, detention, bank stabilization and riparian restoration.
Economics	A senior economist with experience in flood risk management and ecosystem restoration projects, life safety models, IWR-Planning suite, as well as structural and non-structural measures.
[1]Environmental Compliance	Senior Environmental Compliance Specialist with experience in FRM and ER projects. This includes experience in urban flooding, habitat models to assess channel work, wetlands, bottomland hardwoods and appropriate mitigation measures. Measures include channel modification, detention, bank stabilization and riparian restoration.
Cultural Resources	Senior Cultural Resource Specialist with experience in historic properties, Native American sites, and programmatic agreements.
Hydrology and Hydraulic Engineering	Senior Engineer with experience in Flood Risk Management and Ecosystem Restoration Projects including structural and non-structural alternatives and HEC-RAS models.
Civil Design	Senior Engineer with experience in Flood Risk Management and Ecosystem Restoration Projects to include detention, channel modification, grade control and stream bank stabilization.
Geotechnical	Senior Engineer with experience in Flood Risk Management and Ecosystem Restoration Projects included detention/retention and channel modification including grade control and stream bank stabilization.
Cost Engineering	The Cost Engineering panel member should have demonstrated experience in flood risk management and ecosystem restoration features including detention/retention, grade control and stream bank stabilization. Understanding and experience in USACE processes, contracting acquisition procedures, estimating software (MCACES) and cost regulations (such as ER1110-1-1300, ER1110-2-1302, ETL1110-2-573) is required. The Cost Engineering CX in Walla Walla District trains and maintains a list of qualified cost ATR reviewers. The Cost Engineering CX ATR coordinator will assign a qualified reviewer for decision documents who is knowledgeable in the types of applied E&C solutions.
Real Estate	Senior Real Estate Specialist with experience in Flood Risk Management and Ecosystem Restoration to include policy considerations, urban land acquisition and appraisal, and LERRDS.

Climate Preparedness and Resilience CoP Reviewer	A member of the Climate Preparedness and Resiliency Community of Practice (CoP) certified to perform ATR for Inland Flood Risk Management.
Risk and Uncertainty	A subject matter expert in multi-discipline flood risk analysis to ensure consistent and appropriate identification, analysis, and written communication of risk and uncertainty.

[1] This study requires reviewers who are certified in Environmental Compliance as well as Environmental Planning, these can be filled either by Planning or Environmental or some combination of both.

Documentation of ATR. DrChecks will be used to document all ATR comments, responses and resolutions. Comments should be limited to those needed to ensure product adequacy. All members of the ATR team should use the four-part comment structure (see ER 1165-2-217, section 5.8.3, page 32). If a concern cannot be resolved by the ATR team and PDT, it will be elevated to the vertical team for resolution using the ER 1165-2-217 issue resolution process. Concerns can be closed in DrChecks by noting the concern has been elevated for resolution. The ATR Lead will prepare a Statement of Technical Review (see ER 1165-2-217, Section 5.11, page 34), for the draft and final reports, certifying that review issues have been resolved or elevated. ATR may be certified when all concerns are resolved or referred to the vertical team and the ATR documentation is complete.

c. INDEPENDENT EXTERNAL PEER REVIEW

(i) Type I IEPR.

Type I IEPR is managed outside of the USACE and conducted on studies. Type I IEPR panels assess the adequacy and acceptability of the economic and environmental assumptions and projections, project evaluation data, economic analysis, environmental analyses, engineering analyses, formulation of alternative plans, methods for integrating risk and uncertainty, models used in the evaluation of environmental impacts of proposed projects, and biological opinions of the project study.

Recommendation on Type I IEPR. Type I IEPR is not planned to be conducted for this study. The project does not meet the three mandatory conditions in WRDA 2007, Section 2034 requiring IEPR including: determination by the Chief as controversial; requested IEPR by the Governor; or project cost of $200 million or more. LTG Spellmon visited the project area in January 2021 and met Desoto County Board of Supervisors (Sponsors) and Congressional staffers supporting this project. The team provided a brief for the project and he found no potential for significant controversy. The project has support of the Sponsor, stakeholders, State/Federal agencies. The current estimate for this project, constructed, is $97M (including flood risk management and ecosystem restoration components). As documented in Section 1, additional discretionary questions have also been addressed as negative. There are no significant adverse environmental impacts driving another Agency to request IEPR. The project has no more than negligible adverse impacts on scarce or unique tribal, cultural, The project has no substantial adverse impacts on fish and wildlife species and their habitat prior to implementation of mitigation measures. Before implementation of mitigation measures, the project has no more than a negligible adverse impact on a species listed as endangered or threatened species under the Endangered Species Act of 1973 or the critical habitat of such species designated under such Act. There are no significant life safety concerns and no novel methods used for this study. There are no complex challenges or precedent setting methods/model and the study is not likely to

change prevailing practices. This project does not include rehabilitation or replacement of existing hydropower turbines, lock structures, or flood control gates within the same footprint or for the same purpose as an existing water resource project. The N. Desoto study's Tentatively Selected Plan is simplistic is nature: adding flood control features such as channel enlargement and detention basins as well as ecosystem restoration components such as riparian buffer strips and grade control made of stone. Construction methods will remain within industry standards.

(ii) Type II IEPR.

The second kind of IEPR is Type II IEPR. These Safety Assurance Reviews are managed outside of the USACE and are conducted on design and construction for hurricane, storm and flood risk management projects or other projects where existing and potential hazards pose a significant threat to human life. A Type II IEPR Panel will be convened to review the design and construction activities before construction begins, and until construction activities are completed, and periodically thereafter on a regular schedule.

Decision on Type II IEPR. Type II IEPR is anticipated, however the District Chief of Engineering will decide whether to conduct a SAR at a later date.

Products to Undergo Type II IEPR. TBD

d. MODEL CERTIFICATION OR APPROVAL

EC 1105-2-412 mandates the use of certified or approved models for all planning activities to ensure the models are technically and theoretically sound, compliant with USACE policy, computationally accurate, and based on reasonable assumptions. Planning models are any models and analytical tools used to define water resources management problems and opportunities, to formulate potential alternatives to address the problems and take advantage of the opportunities, to evaluate potential effects of alternatives and to support decision making. The use of a certified/approved planning model does not constitute technical review of a planning product. The selection and application of the model and the input and output data is the responsibility of the users and is subject to DQC, ATR, and IEPR.

The following models may be used to develop the decision document:

Table 8: Planning Models.

Model Name and Version	Brief Model Description and How It Will Be Used in the Study	Certification / Approval
HEC-FDA 1.4.2	The program integrates hydrologic engineering and economic analysis to formulate and evaluate plans using risk-based analysis methods. It will be used to evaluate/compare plans to aid in selecting a recommended plan.	Certified
ECAM	The Economic Consequences Model (ECAM) is a regional economic development model that is utilized to measure the effects of unmitigated floodwaters on regional production and employment. Thus, this model assesses negative impacts to regional economies	Pending approval for single use.

RECONS	This program provides estimates of regional economic impacts and contributions associated with USACE projects. Contributions are measured as economic output, jobs, income, and value added at a local, state and national level	Certified
SCI Model	The Stream Condition Index (SCI) is a multi-scale watershed assessment that incorporates the complete condition of the stream including hydrology/hydraulics, geomorphology, water quality, and plant and animal habitat.	Pending certification for regional use.
IWR-Planning Suite II	The IWR-Plan was developed by the Institute of Water Resources as accounting software to compare habitat benefits among alternatives. This model will be used to determine best buy alternatives and incremental cost analysis of alternatives.	Certified
LifeSim 2.0.	The program integrates hydrologic engineering, economic analysis, and social behavior to compute the potential for loss of life in the study area. Quantifying loss of life can help inform various alternatives about life safety through a risk-based analysis. When certified, it would be used to assess the impacts of features which are intended to reduce life safety risks.	Enterprise Life Safety Model, will be certified prior to final report.

EC 1105-2-412 does not cover engineering models used in planning. The responsible use of well-known and proven USACE developed and commercial engineering software will continue. The professional practice of documenting the application of the software and modeling results will be followed. The USACE Scientific and Engineering Technology Initiative has identified many engineering models as preferred or acceptable for use in studies. These models should be used when appropriate. The selection and application of the model and the input and output data is still the responsibility of the users and is subject to DQC, ATR, and IEPR.

Table 9: Engineering Models. These models may be used to develop the decision document:

Model Name and Version	Brief Model Description and How It Will Be Used in the Study	Approval Status
HEC-RAS 5.0 (River Analysis System)	The software performs 1-D steady and unsteady flow river hydraulics calculations and has capability for 2-D (and combined 1-D/2-D) unsteady flow calculations. It will be used for steady flow analysis to evaluate the future without-project and future with-project conditions.	HH&C CoP Preferred Model
MII v4.4.2 (Cost Engineering Software)	The software is a detail cost estimating software application. MII provides an integrated cost engineering system that meets the USACE requirements for preparing cost estimates. It is a requirement for the DoD Cost Engineering COP.	Cost Engineering Preferred Software

e. POLICY AND LEGAL REVIEW

Policy and legal compliance reviews for draft and final planning decision documents are delegated to the MSC (see Director's Policy Memorandum 2018-05, paragraph 9).

(i) Policy Review.

The policy review team is identified through the collaboration of the MSC Chief of Planning and Policy and the HQUSACE Chief of the Office of Water Project Review. The team is identified in Attachment 1 of this Review Plan. The makeup of the Policy Review team will be drawn from Headquarters (HQUSACE), the MSC, the Planning Centers of Expertise, and other review resources as needed.

- The Policy Review Team will be invited to participate in key meetings during the development of decision documents as well as SMART Planning Milestone meetings. These engagements may include In-Progress Reviews, Issue Resolution Conferences or other vertical team meetings plus the milestone events.
- The input from the Policy Review team should be documented in a Memorandum for the Record (MFR) produced for each engagement with the team. The MFR should be distributed to all meeting participants.

- In addition, teams may choose to capture some of the policy review input in a risk register if appropriate. These items should be highlighted at future meetings until the issues are resolved. Any key decisions on how to address risk or other considerations should be documented in an MFR.

(ii) Legal Review.

Representatives from the Office of Counsel will be assigned to participate in reviews. Members may participate from the District, MSC and HQUSACE. The MSC Chief of Planning and Policy will coordinate membership and participation with the office chiefs.

- In some cases, legal review input may be captured in the MFR for the particular meeting or milestone. In other cases, a separate legal memorandum may be used to document the input from the Office of Counsel.

- Each participating Office of Counsel will determine how to document legal review input.

3. OPTIONAL – FUTURE REVIEWS

To be determined after a Recommended Plan is selected.

ATTACHMENT 1: TEAM ROSTERS

Table 10. Project Delivery Team Members

Name	Position	Phone Number	E-mail
Elizabeth Burks	Project Manager	901-544-0761	Elizabeth.M.Burks@usace.army.mil
Don Davenport	Hydraulic Engineer	901-544-3393	Donald.R.Davenport@usace.army.mil
Cherie Price	Senior Plan Formulator	504-862-2737	Cherie.Price@usace.army.mil
Andrea Crowther-Carpenter	Biologist	901-544-0817	Andrea.l.carpenter@usace.army.mil
Jon Korneliussen	Technical Lead - Civil Engineer	901-544-3479	Jon.E.Korneliussen@usace.army.mil
Brian Johnson	Real Estate Specialist	901-579-3623	Brian.S.Johnson@usace.army.mil
Jeromy Carpenter	Cost Engineer	901-544-0810	Jeromy.G.Carpenter@usace.army.mil
Kenosha Davis	Program Analyst	901-544-0705	Kenosha.K.Davis@usace.army.mil
Jennifer Roberts	Planner	504-862-1272	Jennifer.C.Roberts@usace.army.mil
Tracy Huffman	DeSoto County Project Manager	662-429-2100.	tracy.huffman@waggonereng.com
Evan Stewart	Economist	314-331-8042	Evan.M.Stewart@usace.army.mil
Jordan Lucas	Economist	309-794-5648	Jordan.Lucas@usace.army.mil
Pam Lieb	Archaeologist	901-544-0710	Pamela.D.Lieb@usace.army.mil
Ann Bruck	Office of Counsel	901-606-3775	Ann.M.Bruck@usace.army.mil

Table 11. District Quality Control Team Members

DQC Team Disciplines		Expertise Required
DQC Lead	Brandon Davis	A senior professional with extensive experience preparing Civil Works decision documents and conducting DQC. The lead may also serve as a reviewer for a specific discipline (such as engineering, planning, economics, environmental resources, etc.).
Planning	Darren Flick	A Water Resources Planner with 5 years of experience in urban Flood Risk Management and Ecosystem Restoration Projects. Measures include channel enlargement, detention

		basins, channel stabilization, and riparian restoration.
Economics	Diane Karnish	An economist with experience in Flood Risk Management and Ecosystem Restoration Projects as well as the IWR Suite (CEICA) and HEC-FDA models used in the study (see Table 5).
Environmental Resources	Sandra Stiles	Environmental Specialist with experience in FRM and NER projects, NEPA documentation, and habitat models.
Cultural Resources	Jason Emory	Cultural Resource Specialist with experience in historic properties, Native American sites, and programmatic agreements.
Hydrology/Hydraulic Engineering	MacKenzie Gabaldon & Ray Wilson	Senior Engineer with experience in Flood Risk Management and Ecosystem Restoration Projects including structural and non-structural alternatives and the HEC-RAS, model.
Civil Design	Biobarasha Dambo	Senior Engineer with experience in flood risk management and ecosystem restoration projects to include detention, channel modification, grade control and stream bank stabilization
Geotechnical	Ben Tatum	Senior Engineer with experience in flood risk management and ecosystem restoration features to include detention, channel modification, grade control and stream bank stabilization.
Cost Engineering	Conrad Stacks	The Cost Engineering panel member should have 15 years demonstrated experience or combined equivalent of education and experience assessing flood risk management and ecosystem restoration features to include detention, channel modification, grade control and stream bank stabilization
Real Estate	Karen Vance Orange	Senior Real Estate Specialist with experience in Flood Risk Management and Ecosystem Restoration policy, urban land acquisition and appraisal, and LERRDS.

Experience and Qualifications of DQC Team Members

DQC Lead **Brandon Davis:** Brandon Davis has 12 years of Planning experience having worked as Plan Formulator, Economist, and Environmental Compliance Section Chief. Subject matter expert in Agriculture flood risk management. 11 years of preparing feasibility and technical documents. 8 plus years conducing DQC on feasibility, CAP documents, and economic analysis. Currently building DQC section for RPEDS. B.S. and M.S. degrees in Agriculture Economics

Planning **Darren Flick:** Darren Flick has 5 years of planning experience. Lead planner on Port of New Orleans Access Channel Deepening Navigation project, Lower Santa Cruz FRM Feasibility Study, Lake Mary Road FRM Cap, Bayou Segnette SELA FRM Study, and I am writing several Mitigation OMRR&R manuals.

Economics **Diane Karnish:** Diance Karnish has. 23 years with the Corps of Engineers (Rock Island, Omaha, St. Louis, Walla Wall, and St. Paul Districts and North Atlantic Division). Technical and

management experience in planning; plan formulation; environmental planning; environmental compliance and impact assessment; programs and project management, economics Plan Formulation, Flood Risk Management, Environmental Compliance, Project Management, Major Rehabilitation, Social and Economic Impact Assessment, BRAC Impact Assessment, Incremental Cost Analysis, NEPA, and Noise impact assessment. B.S. - Economics, Iowa State University and B.BA. - Management, Iowa State University.

Environmental Resources Sandra Stiles Sandra Stiles has a Bachelor of Science degree and over 32 years of experience with the US Army Corps of Engineers. She has 25 years' experience working directly in the Civil Works planning process and NEPA. Ms. Stiles has served on over 100 agency technical review teams for all types of Civil Works planning projects for numerous Districts throughout the Nation. Examples of projects she has reviewed for compliance with Corps planning guidelines and environmental laws and regulations include Flood Risk Reduction projects for Fort Worth, Galveston, Tulsa, Los Angela's, San Francisco, Savannah, Wilmington, Raleigh, Atlanta, Mobile and New York Districts; Restoration projects for Tulsa, Albuquerque, Rock Island, Mobile, Atlanta, Savannah and Galveston Districts.

Cultural Resources Jason Emory Jason Emory has 19 years of archaeological experience, having worked for the U.S. Army Corps of Engineers, the Federal Emergency Management Agency, the Louisiana State Historic Preservation Office, the Chitimacha Tribal Government, URS, Inc., and Earth Search, Inc. These varied roles have allowed Mr. Emery to develop a deep understanding of historic preservation compliance actions from multiple perspectives, providing substantial knowledge of consultation practice and the application of archaeological and historic research to Environmental compliance. USACE projects of note: Supporting the MRL SEIS II, Cultural and Tribal Resources, and development of multi-state Programmatic Agreement; IHNC Amended MOA development; and RTS mentoring and support for 8 different planning studies over the last several years.

Hydrology/Hydraulic Engineering MacKenzie Gabaldon & Ray Wilson Ray Wilson is Chief of Hydrology, Hydraulics, and River Engineering Section of Hydraulics Branch at MVK. Ray has 32 years of experience including the design of hydraulic structures, the design of erosion control structures, and open channel hydraulics. MacKenzie Gabaldon (P.E and BSCE) has 6 year's experience as a Hydraulics and Hydrology Engineer. Prior to USACE, worked 5 years in the private industry as a civil designer/electrical utility design engineer.

Civil Design Biobaragha Dambo Bio Dambo, E.I. , B.S.C.E Civil Engineering has 5 years of Experience In Civil Design and Land Development

Geotechnical Ben Tatum Ben Tatum has 12 years experience with the Memphis District. Graduated with a Master's of Civil Engineering from the University of Memphis (2009) and a Bachelor's of Civil Engineering from the University of Tennessee (2007). Licensed Professional Engineer (P.E.) in TN since 2013.

Cost Engineering Conrad Stacks Conrad Stacks is a USACE Certified Senior Cost Engineer with 20 plus years with the Memphis District. Conrad coordinates Relocations with MVM RE and serves as the MVM Storm Water Coordinator. Prior to working for MVM Conrad worked for the U.S Forest Service 3 years, MS DOT 2 years, MS Department of Environmental Quality 12 years, 9 years construction equipment sales, and 5 years road construction superintendent. B.A. in Finance 1982 and a B.S. in Civil Engineering 1987: MS EIT #5808.

Real Estate Karen Vance Orange: Karen Vance Orange is a Senior Realty Specialist with the New

Orleans District. She has 17 years' experience with the Corps of Engineers and has served as a Real Estate Planning Project Delivery Team Member for multiple large- and small-scale Flood Risk Management, Coastal Storm Risk Management, Deep Draft Navigation, CAP and Ecosystem Restoration projects. She also serves as a certified Agency Technical Reviewer for Flood Risk Management, Coastal Storm Risk Management, Deep Draft Navigation, Ecosystem Restoration, CAP and Beneficial Use of Dredged Material projects.

Table 12. Agency Technical Reviewer

AGENCY TECHNICAL REVIEW		
ATR Team Disciplines	**Name**	**Expertise Required**
ATR Lead	Brad Thompson	A senior professional with extensive experience preparing Civil Works decision documents and conducting ATR. The lead should have the skills to manage a virtual team through an ATR. The lead may serve as a reviewer for a specific discipline (such as planning).
[1]Planning	Brad Thompson & Aaron Quinn	An ATR-approved Senior or Certified Planner with experience in urban FRM and ER projects. Measures include channel modification, detention, bank stabilization and riparian restoration.
Economics	Justin Brewer & Kelly Baxter Osborne	A senior economist with experience in flood risk management and ecosystem restoration projects, life safety models, IWR-Planning suite, as well as structural and non-structural measures.
[1]Environmental Compliance	Dave Crane	Senior Environmental Compliance Specialist with experience in FRM and ER projects. This includes experience in urban flooding, habitat models to assess channel work, wetlands, bottomland hardwoods and appropriate mitigation measures. Measures include channel modification, detention, bank stabilization and riparian restoration.
Cultural Resources	Sandy Barnum	Senior Cultural Resource Specialist with experience in historic properties, Native American sites, and programmatic agreements.
Hydrology and Hydraulic Engineering	Dan Pridal & Roger Kay	Senior Engineer with experience in Flood Risk Management and Ecosystem Restoration Projects including structural and non-structural alternatives and HEC-RAS models.
Civil Design	Heather Anderson	Senior Engineer with experience in Flood Risk Management and Ecosystem Restoration Projects to include detention, channel modification, grade control and stream bank stabilization.
Geotechnical	Charles Bishop	Senior Engineer with experience in Flood Risk Management and Ecosystem Restoration Projects included detention/retention and channel modification including grade control and stream bank stabilization.
Cost Engineering	Bill Bolte	The Cost Engineering panel member should have demonstrated experience in flood risk management and ecosystem restoration features including detention/retention, grade control and stream bank stabilization. Understanding and experience in USACE processes, contracting acquisition procedures, estimating software (MCACES) and cost regulations (such as ER1110-1-1300, ER1110-2-1302, ETL1110-2-573) is required.

Real Estate	Rick Nole	Senior Real Estate Specialist with experience in Flood Risk Management and Ecosystem Restoration to include policy considerations, urban land acquisition and appraisal, and LERRDS.
Climate Preparedness and Resilience CoP Reviewer	Chistensen	A member of the Climate Preparedness and Resiliency Community of Practice (CoP) certified to perform ATR for Inland Flood Risk Management.
Risk and Uncertainty	Drew Minert	A subject matter expert in multi-discipline flood risk analysis to ensure consistent and appropriate identification, analysis, and written communication of risk and uncertainty.

Experience and Qualifications of ATR Team Members

ATR Lead/Plan Formulation Reviewer: **Brad Thompson**, CENWO-PMA; Phone: 402-995-2678; Email: Bradley.e.thompson@usace.army.mil. Mr. Thompson is the Chief, Planning Branch, U.S. Army Corps of Engineers, Omaha District. He is a certified Agency Technical Reviewer for plan formulation. He has 25 years of Corps Planning/Project management experience and has lead plan formulation, DQC, and ATR efforts for multiple studies across different districts in ecosystem restoration, flood risk management, navigation, watershed analysis, and water supply planning. He currently serves as a Planning CAPSTONE instructor and Risk Informed Planning Mentor. He has professional registration with the Project Management Institute and American Institute of Certified Planners. He was recognized as a Water Resources Certified Planner by USACE in 2017 and completed the Planning Associates Program in 2003. Brad earned a master's in Urban and Regional Planning from the University of Iowa, Iowa City, Iowa, in 1994.

Economics Reviewer FRM: Justin Brewer, CENWO-PMA-B; Phone: 402-995-2685; Email: Justin.Brewer@usace.army.mil. Mr. Brewer is a district economist in Planning Branch, U.S. Army Corps of Engineers, Omaha District. He is a certified Agency Technical Reviewer in economics in the Flood Risk Management (FRM) business line. He has 10 years of experience in Corps planning and economics, primarily in FRM. He is currently in his second year of the Planning Associates Program. Justin earned a BS in Economics from the University of Nebraska-Omaha.

Economics Reviewer ER: Ms. Kelly Baxter is an Economist for the Planning, Environmental, and Fish Division, U.S. Army Corps of Engineers, Northwestern Division. She is a certified Agency Technical Reviewer for Ecosystem Restoration, Flood Risk Management, Recreation, and Water Supply studies. She has 11 years of Corps Planning experience and has served as the economic lead on numerous Corps planning studies and NEPA efforts. She is currently serving as the Lead Economist on the Columbia River Treaty. Kelly earned her master's degree in Economics from the University of Wyoming.

Economics Reviewer Life Safety: Drew D. Minert, CENWO-PMA-B, 402-995-2061 email: drew.d.minert@usace.army.mil. Mr. Drew Minert is the Chief of the Economics and Planning Quality Review Section in the Planning Branch of the Omaha District. Mr. Minert has over 12 years of USACE planning and economics experience including serving as the economics lead on several large and

complex flood risk management GI studies. He also served as the human considerations technical lead on the Missouri River Recovery Management Plan EIS. Mr. Minert is ATR certified in Flood Risk Management and Dam and Levee Safety. He has a Master's of Science degree in Risk Management from Notre Dame of Maryland University as well as Bachelor's of Science degrees in Economics and Statistics from the University of Missouri-Columbia.

Environmental Compliance Reviewer: Dave Crane, CENWO-PMA-C; Phone: 402-995-2676; Email: David.j.crane@usace.army.mil. Dave is an Environmental Resources Specialist in the Environmental and Cultural Resources Section, Planning Branch, U.S. Army Corps of Engineers, Omaha District. He is a certified Agency Technical Reviewer for environmental compliance. He has 14 years of Corps Planning experience and has served as the environmental lead on numerous studies and construction efforts. He's currently serving as the environmental lead on the Omaha District's PL 84-99 response to the 2019 Midwest flooding as well as during design of the Denver Urban Waterways Restoration Project. Dave earned a bachelor's in Environmental Studies from the University of Nebraska, Omaha, Nebraska in 2008.

Environmental Planning Reviewer: **Aaron Quinn**, CENWO-PM-AC; Phone: 402-995-2669; Email: Aaron.t.quinn@usace.army.mil. Mr. Quinn is the Acting Chief, Environmental and Cultural Resources Section, Planning Branch, U.S. Army Corps of Engineers, Omaha District. He is a certified Agency Technical Reviewer for ecosystem restoration and environmental compliance. He has 11 years of Corps Planning experience and has served as the environmental lead on numerous Corps planning studies and environmental compliance efforts. He is currently serving as the environmental lead on the Fort Peck, Montana test flow release EIS and served as the environmental lead for the Missouri River Management Plan EIS which was a 5+ year-long Missouri River basin-wide study. Aaron earned a master's in Environmental Law from Vermont Law School, South Royalton, Vermont in 2007.

Cultural Reviewer: Sandra Barnum, CENWO-PM-AC; Phone: 402-995-2674; email: sandra.v.barnum@usace.army.mil. She has 29 years of Corps Planning experience, including numerous EAs, EISs, and Reconnaissance, Feasibility and GI studies. Certified Agency Technical Reviewer for Cultural Resources, with over 10 years of previous ATR experience. Serves as SME for the Omaha District. Professional registration as a Registered Professional Archaeologist. Earned Master's Degrees in Anthropology in 1991, and Museum Studies in 1992 at the University of Nebraska- Lincoln.

Hydrology & Hydraulics and Overall Risk Reviewer: Roger Kay, P.E., Supervisory Hydraulic Engineer, CENWO-EDH-D. Mr. Kay is a hydraulic engineer with over 30 years of experience in hydraulics, hydrology, and water management with USACE, and currently serves as Chief, Hydraulics Section. He received a B.S. and M.S. from Iowa State University in Agricultural Engineering with an emphasis on Soil and Water. As a civil engineer with USACE, he has worked on numerous FRM and ecosystem restoration feasibility studies, as well as numerous dam safety related studies including SPRA, IES, and DSMS. He has also been an ATR reviewer on a number of IES and DSMS reports and a consistency reviewer for PA and SQRA reports, as well as an ATR reviewer on multiple FRM and ecosystem restoration projects for hydrology, hydraulics, risk management and ice engineering. Mr. Kay previously served as a regional technical specialist in hydrology with USACE and has authored several publications.

Hydrology & Hydraulics ER / Civil Design: Daniel Pridal currently serves as the Chief, River and Reservoir Engineering Section, Omaha District Corps of Engineers. He has over 30 years of experience with the Corps as a Hydraulic Engineer. He graduated with a M.S. in Civil Engineering, Texas A&M, 1987 and is a registered professional engineer. He has contributed on a variety of Missouri River projects with emphasis on the design, analysis, and preparation of plans and specifications. His analysis skills have

been applied for a variety of projects including flood damage reduction studies, stable channel design, ecosystem restoration, design of hydraulic structures, and the design of erosion protection features. He has extensive experience with one-dimensional and two-dimensional models, both steady and unsteady flow, for hydraulic design and analysis such as UNET, HEC-RAS, and SMS.

Civil Engineer: Heather L. Anderson P.E., CEMVR-EC, 309-794-5445. Ms. Anderson began her career as a student in Environmental Engineering section in 1993. After graduation from University of Iowa in 1996, she gained additional experience in Structural Engineering, Project Management, and Environmental Engineering. She was promoted to Chief of Environmental Engineering just prior to the 2008 Flood. Ms. Anderson has served in the Assistant Chief of Engineering and Construction Division position since 2016. During her career she has developed skills in the following areas serving as lead engineer or advisor: Team Leader/Manager for Ecosystem Restoration Projects, Major Rehabilitation and Maintenance Projects, and PL84-99. Ms. Anderson has design experience in the following areas: Dredging (Environmental), Island Creation, Levee systems, Stream Restoration, Reforestation, Water Level Management, Shoreline/Bankline Protection, Fish Passage, Side Channel /Backwater Restoration, Floodplain Restoration, and structural design associated with flood proofing, prestressed floating guide-walls, scour protection and retaining wall stability. Dredged Material Management Plans/implementation, Reliability Analysis, Hydraulic Steel Structures, Bridge, Lock, and Dam inspections and reports.

Geotech Reviewer: Charles E Bishop, Jr, PE, CEMVR-EC-G, 309-794-5561, Charles.E.Bishop@usace.army.mil. Mr. Bishop has a Bachelor of Science degree in Civil Engineering Technology from Rochester Institute of Technology and a Master of Science degree in Civil Engineering (Geotechnical emphasis) from the University of Colorado-Boulder. He is a registered professional engineer in Iowa (PE #17121). Mr. Bishop is the Section Chief of the Foundations and Instrumentation Section in the Geotechnical Branch, Engineering & Construction Division, Rock Island District (MVR). He has worked in the MVR Geotechnical Branch for 15 years, as a Program Manager for Flood Risk Management and Continuing Authorities Programs in MVR, and 11 years with private consulting and construction companies performing various site exploration, construction testing, engineering design, and construction management activities. He served as co-lead for the Mississippi Valley Division Levee Risk Assessment Cadre and co-facilitated Periodic Assessments in New England (Barre Falls Dam), Huntington (RD Bailey Dam), and Baltimore (Jennings Randolph Dam) Districts. Mr. Bishop has performed design, analysis, construction, and inspection on many civil works projects including flood control and navigation dams, navigation locks, levees and floodwalls in MVR and throughout USACE. Example project experience includes: Illinois Waterway 2020 Consolidated Closure and Major Rehabilitation at Lagrange Lock, Peoria Lock, Starved Rock Lock, and Marseilles Lock; designed and monitored instrumentation for dewatering of 12 lock chambers in MVR between 2015 and 2020; designed more than 30 levee and flood wall repair projects due to damage from 2008, 2013, and 2019 floods in MVR; design for Natomas Reach F levee in Sacramento District; design and construction oversight for multiple levee and flood wall reaches in New Orleans District as part of Task Force Guardian, HPO, PRO, and directly for MVN. Mr. Bishop served as a technical reviewer on more than 50 Agency Technical Review teams between 2010 and 2020, acting as ATR Lead on more than 20 of those reviews. Example ATR experience includes: Kansas City Pump Station Modifications – Argentine & Central Industrial District (NWK) – ATR lead; Winslow, AZ Section 205 Levee Design (SWF); Sacramento and San Joaquin Rivers PL84-99 Levee Repair Projects (SPK) – ATR lead; Selma, AL Flood Risk Management Feasibility Study (SAM); Wood River-Mel Price Lock Downstream Levee Seepage Repairs (MVS); Montgomery Lock, Upper Ohio Project (LRP), Charleroi Lock Replacement (LRP), Kentucky Lock (LRN); Chicago Lock Floor Repair (LRC).

Real Estate Reviewer: Rick Noel, J.D. and RECO, CENWO-RE; Phone: 402-995-2832; Email:

rick.l.noel@usace.army.mil. Mr. Noel is the Chief, Civil Branch, Real Estate Division, U.S. Army Corps of Engineers, Omaha District. He is a certified Agency Technical Reviewer for Ecosystem and Flood Risk Management Projects. He has over 41 years of experience in the Real Estate Division as both an Attorney and Supervisory Realty Specialist. During the past 15 years he has been responsible for land acquisition and planning for both federal and cost shared projects. He has reviewed over 100 Real Estate Planning Reports. For the past several years, he has served as the Real Estate Reviewer on the ATR team reviewing the Fargo Morehead Flood Risk Management Project. He was recognized by HQUSACE in 2015 as the Corps Real Estate Specialist of the year. Rick earned a BS in Business Administration from the University of Nebraska and a Juris Doctor from Creighton University School of Law.

Climate Preparedness Reviewer: Jennifer Christensen, CENWO-ED-HE, 402-995-2015, Jennifer.P.Christensen@usace.army.mil. Ms. Christensen is a hydrologic engineer with over 10 years of experience in hydrology and a member of the Climate Preparedness and Resilience Community of Practice (CPR CoP). She is a certified CERCAP reviewer in inland hydrology climate change. She received a B.S. in Civil Engineering and a M.S. in Environmental Engineering from Colorado State University with an emphasis in modeling urban hydrology. As a graduate research assistant at CSU, she used EPA-SWMM to model storage facilities, water quality, and groundwater as well as assisted in writing the EPA-SWMM Applications Manual. As a civil engineer with USACE, she has been involved in the development of qualitative inland hydrology climate change analyses in accordance with Engineering and Construction Bulletin No. 2018-14 and its predecessors. She has been a reviewer on projects for climate change assessments, hydrology, statistical analysis, and dam safety.

Cost Estimating Reviewer: William Bolte, CENWW-ECE, 509-527-7585, William.g.bolte@usace.army.mil. Mr. Bolte is a technical specialist at the Cost Engineering and ATR Mandatory Center of Expertise, Walla Walla District. He is a cost engineer with over 15 years of experience in military, hazardous, toxic, and radioactive waste, and civil works projects including flood risk management and navigation improvement projects. Since 2011, Mr. Bolte has served as the assistant cost ATR coordinator for the Mandatory Center of Expertise performing ATRs on various civil works projects throughout the nation. On average Mr. Bolte has been involved with over forty ATRs per year, ranging from $5 million or less Continuing Authorities Program projects to multi-billion dollar programmatic updates. Mr. Bolte has also served many lead roles in developing and reviewing budgets for Department of Energy and USACE projects. Mr. Bolte earned a bachelor's degree in civil engineering and master's degree in structural engineering from the Missouri University of Science and Technology, Rolla. He is a licensed engineer in the state of Washington. Mr. Bolte is registered with USACE as a Certified Cost Engineer.

Table 13. Policy & Legal Compliance Review Team

POLICY AND LEGAL COMPLIANCE REVIEW TEAM			
Name	Office	Position	Phone Number
Jeff Strahan	CECW-PC	HQ Advisor	202-761-8643
Sarah Palmer	CEMVD-PD-L	Review Manager	601-634-5910
Matt Mallard	CEMVD-PD-L	Plan Formulation	601-634-5869
Brian Maestri	CEMVD-PD-L	Economics	601-634-5077
Greg Miller	CEMVD-PD-L	Environmental	504-862-2310
Jennifer Ryan	CEMVD-PD-L	Cultural Resources	601-634-5931
Andy Gaines	CEMVD-RB-W	H&H Engineer	601-634-5946
Melissa Mullen	CEMVD-RB-T	Geotech/Levee Safety	901-544-0716
Jennifer Chambers	CEMVD-RB-T	Structural	601-634-7162

Chanel Mueller	CEMVP-EC-H	Climate Change	651-290-5610
James Briggs	CEMVD-PD-SP	Real Estate	601-634-5860
Daryl Glorioso	CECC-MVD	Counsel	601-634-5770
Philip LaBarre	CEMVD-RB-T	Cost Engineering	601-634-5921

Review Plan Checklist for Decision Documents

Date:	5/3/2021		
Originating District:	CEMVM		
Project/Study Title:	Memphis Metro North DeSoto County, Mississippi		
PWI #:			
District POC:	Elizabeth Burks		
PCX Reviewer:			

Please fill out this checklist and submit with the draft Review Plan when coordinating with the appropriate RMO. Any evaluation boxes checked 'No' indicate the RP possibly may not comply with EC 1165-2-217 and should be explained. Additional coordination and issue resolution may be required prior to MSC approval of the Review Plan.

REQUIREMENT	REFERENCE	EVALUATION	
1. Is the Review Plan (RP) a standalone document?		☑ Yes	☐ No
a. Does it include a cover page identifying it as a RP and listing the project/study title, originating district or office, and date of the plan?		☑ **Yes**	☐ **No**
b. Is the purpose of the RP clearly stated and EC 1165-2-217 referenced?		☑ **Yes**	☐ **No**
c. Does it reference the Project Management Plan (PMP) of which the RP is a component?	EC 1165-2-217 Section 7.a	☑ Yes	☐ No
d. Does it succinctly describe the three levels of peer review: District Quality Control (DQC), Agency Technical Review (ATR), and Independent External Peer Review (IEPR)?	EC 1165-2-217, Sections 8, 9 and 10.	☑ **Yes**	☐ **No**
e. Does it identify the title, subject, and purpose of the decision document to be reviewed?	EC 1165-2-217, Section 7.e.(1)	☑ **Yes**	☐ **No**
f. Does it list the names and disciplines of the Project Delivery Team (PDT)?*	EC 1165-2-217, Section 7.e.(1)	☑ **Yes**	☐ **No**
**Note: It is highly recommended to put all team member names and contact information in an appendix for easy updating as team members change or the RP is updated. Also note that rosters should be removed or redacted to protect Personally Identifiable Information prior to posting the Review Plan on the internet.*			
2. Is the RP detailed enough to assess the necessary level and focus of peer review?	EC 1165-2-217, Section 3.a	☑ Yes	☐ No
a. Does it indicate which parts of the study will likely be challenging?	EC 1165-2-217, Section 7.a.(1)	☑ Yes	☐ No
b. Does it provide a preliminary assessment of where the project risks are likely to occur and what the magnitude of those risks might be?	EC 1165-2-217, Section 7.a.(1)	☑ Yes	☐ No
c. Does it indicate if the project/study will require an environmental impact statement (EIS)?	EC 1165-2-217, Section 11.d.(1).b	☑ Yes	☐ No
Will an EIS be prepared?	Yes		
If yes, IEPR is required.			

REQUIREMENT	REFERENCE	EVALUATION	
d. Does it address if the project report is likely to contain influential scientific information or be a highly influential scientific assessment?	EC 1165-2-217, Section 15.d	☑ Yes	☐ No
Is it likely to contain influential scientific information? If yes, IEPR is required.		no	
e. Does it address if the project is likely to have significant economic, environmental, and social affects to the nation, such as (but not limited to):	EC 1165-2-217, Section 11.a.	☑ Yes	☐ No
* more than negligible adverse impacts on scarce or unique cultural, historic, or tribal resources?	EC 1165-2-217, Section 11.d.(4), a.	☐ Yes	☑ No
* substantial adverse impacts on fish and wildlife species or their habitat, prior to implementation of mitigation?	EC 1165-2-217, Section 11.d.(4),a.	☐ Yes	☑ No
* more than negligible adverse impact on species listed as endangered or threatened, or to the designated critical habitat of such species, under the Endangered Species Act, prior to implementation of mitigation?	EC 1165-2-217, Section 11,.d.(4),a.	☐ Yes	☑ No
Is it likely? If yes, IEPR is required.		no	
f. Does it address if the project/study is likely to have significant interagency interest?	EC 1165-2-217, Section 1,b.,(4) and Section 7.f..(1)	☑ Yes	☐ No
Is it likely? If yes, IEPR is required.		no	
g. Does it address if the project/study likely involves significant threat to human life (safety assurance)?	EC 1165-2-217, Section 1,b.,(1)	☑ Yes	☐ No
Is it likely? If yes, IEPR is required.		no	
h. Does it provide an estimated total project cost?	EC 1165-2-217, Section 1.b.(2)	☑ Yes	☐ No
What is the estimated cost:	97million		
(best current estimate; may be a range)			
Is it > $200million? If yes, IEPR is required.	WRDA 2014, Sec. 1044.	☐ Yes	☑ No
i. Does it address if the project/study will likely be highly controversial, such as if there will be a significant public dispute as to the size, nature, or effects of the project or to the economic or environmental costs or benefits of the project?	EC 1165-2-217, Section 11.d.(1),d.	☑ Yes	☐ No
Is it likely? If yes, IEPR is required.		no	

REQUIREMENT	REFERENCE	EVALUATION	
j. Does it address if the information in the decision document will likely be based on novel methods, present complex challenges for interpretation, contain precedent-setting methods or models, or present conclusions that are likely to change prevailing practices?	EC 1165-2-217, Section 1,b.,(7)	☑ Yes	☐ No
Is it likely? If yes, IEPR is required.		no	
3. Does the RP define the appropriate level of peer review for the project/study?	EC 1165-2-217, Section 8.a.	☑ Yes	☐ No
a. Does it state that DQC will be managed by the home district in accordance with the Major Subordinate Command (MSC) and district Quality Management Plans?	EC 1165-2-217, Section 8.a.	☑ Yes	☐ No
b. Does it state that ATR will be conducted or managed by the lead PCX?	EC 1165-2-217, Section 9.c.(1)	☑ Yes	☐ No
c. Does it state whether IEPR will be performed?	EC 1165-2-217, Section 4.b.	☑ Yes	☐ No
Will an IEPR be performed?	no, not required per EC 1165-2-217		
d. Does it provide a defensible rationale for the decision on IEPR?	EC 1165-2-217, Section 11.d.	☑ Yes	☐ No
e. Does it state that IEPR will be managed by an Outside Eligible Organization, external to the Corps of Engineers?	EC 1165-2-217, Section 11.c.	☐ Yes N/A	☐ No N/A
4. Does the RP explain how ATR will be accomplished?	EC 1165-2-217, Section 7	☑ Yes	☐ No
a. Does it identify the anticipated number of reviewers?	EC 1165-2-217, Section 7	☑ Yes	☐ No
b. Does it provide a succinct description of the primary disciplines or expertise needed for the review (not simply a list of disciplines)?	EC 1165-2-217, Section 7	☑ Yes	☐ No
c. Does it indicate that ATR team members will be from outside the home district?	EC 1165-2-217, Section 9.c.(1).a.	☑ Yes	☐ No
d. Does it indicate that the ATR team leader will be from outside the home MSC?	EC 1165-2-217, Section 9.c.	☑ Yes	☐ No
e. Does the RP state that the lead PCX is responsible for identifying the ATR team members and indicate if candidates will be nominated by the home district/MSC?	EC 1165-2-217, Section 7	☑ Yes	☐ No
f. If the reviewers are listed by name, does the RP describe the qualifications and years of relevant experience of the ATR team members?*	EC 1165-2-217, Section 7	☑ Yes	☐ No

REQUIREMENT	REFERENCE	EVALUATION	
**Note: It is highly recommended to put all team member names and contact information in an appendix for easy updating as team members change or the RP is updated.*			
5. Does the RP explain how IEPR will be accomplished?	EC 1165-2-217, Section 11	☑ Yes	☐ No
a. Does it identify the anticipated number of reviewers?	EC 1165-2-217, Section 11	☐ Yes	☑ No
b. Does it provide a succinct description of the primary disciplines or expertise needed for the review (not simply a list of disciplines)?	EC 1165-2-217, Section 11	☐ Yes	☑ No
c. Does it indicate that the IEPR reviewers will be selected by an Outside Eligible Organization?	EC 1165-2-217, Section 4.k.(1) & Section 2.a.	☑ Yes	☐ No
d. Does it indicate the IEPR will address all the underlying planning, safety assurance, engineering, economic, and environmental analyses, not just one aspect of the project?	EC 1165-2-217, Section 7.c	☑ Yes	☐ No
6. Does the RP address peer review of sponsor in-kind contributions?		☑ Yes	☐ No
a. Does the RP list the expected in-kind contributions to be provided by the sponsor?	EC 1165-2-217, Section 7.e.(9)	☑ Yes	☐ No
b. Does it explain how peer review will be accomplished for those in-kind contributions?	EC 1165-2-217, Section 8.a	☑ Yes	☐ No
7. Does the RP address how the peer review will be documented?			
a. Does the RP address the requirement to document ATR and IEPR comments using DrChecks?	EC 1165-2-217, Section 7.d.(1)	☑ Yes	☐ No
b. Does the RP explain how the IEPR will be documented in a Review Report?	EC 1165-2-217, Section 11	☑ Yes	☐ No
c. Does the RP document how written responses to the IEPR Review Report will be prepared?	EC 1165-2-217, Section 7.e.(15)	☑ Yes	☐ No
d. Does the RP detail how the district/PCX will disseminate the final IEPR Review Report, USACE response, and all other materials related to the IEPR on the internet and include them in the applicable decision document?	EC 1165-2-217, Section 7.d.(2).a	☑ Yes	☐ No
8. Does the RP address Policy Compliance and Legal Review?	EC 1165-2-217, Section 7,a., (2),c.	☑ Yes	☐ No
9. Does the RP present the tasks, timing and sequence (including deferrals), and costs of reviews?	EC 1165-2-217, Section 7, e., (11)	☑ Yes	☐ No
a. Does it provide a schedule for ATR of the draft and final reports and other supporting materials?	EC 1165-2-217, Section 3.g	☑ Yes	☐ No
b. Does it include interim ATR reviews for key technical products?	EC 1165-2-217, Section 3.g	☑ Yes	☐ No

REQUIREMENT	REFERENCE	EVALUATION	
c. Does it present the timing and sequencing for IEPR?	EC 1165-2-217, Section 4.c.	☑ Yes	☐ No
d. Does it include cost estimates for the peer reviews?	EC 1165-2-217, Section 7.a.(2)	☑ Yes	☐ No
10. Does the RP indicate the study will address Safety Assurance factors?	EC 1165-2-217, Section 12	☑ Yes	☐ No
Factors to be considered include:			
Where failure leads to significant threat to human life	EC 1165-2-217, Section 12.h.(1).(c)	☑ Yes	☐ No
Novel methods\complexity\ precedent-setting models\policy changing conclusions	EC 1165-2-217, Section 12.i.(1)	☑ Yes	☐ No
Innovative materials or techniques	EC 1165-2-217, Section 12.i.(3)	☑ Yes	☐ No
Design lacks redundancy, resiliency of robustness	EC 1165-2-217, Section 12.i.(2)	☑ Yes	☐ No
Unique construction sequence or acquisition plans	EC 1165-2-217, Section 12.i.(3)	☑ Yes	☐ No
Reduced\overlapping design construction schedule	EC 1165-2-217, Section 12.i.(3)	☑ Yes	☐ No
11. Does the RP address model certification requirements?	EC 1105-2-412	☑ Yes	☐ No
a. Does it list the models and data anticipated to be used in developing recommendations (including mitigation models)?	EC 1165-2-217, 7.e.(2).(b).(7)	☑ Yes	☐ No
b. Does it indicate the certification/approval status of those models and if certification or approval of any model(s) will be needed?	EC 1165-2-217, 7.e.(2).(b).(7)	☑ Yes	☐ No
c. If needed, does the RP propose the appropriate level of certification/approval for the model(s) and how it will be accomplished?	EC 1105-2-412 and EC 1165-2-217, 7.e.(2).(b).(7).	☑ Yes	☐ No
12. Does the RP address opportunities for public participation?		☑ Yes	☐ No
a. Does it indicate how and when there will be opportunities for public comment on the decision document?	EC 1105-2-410, Section 7.a.(2).(d)	☑ Yes	☐ No
b. Does it indicate when significant and relevant public comments will be provided to reviewers before they conduct their review?	EC 1165-2-217, Section 7.e.(4)	☑ Yes	☐ No
c. Does it address whether the public, including scientific or professional societies, will be asked to nominate potential external peer reviewers?	EC 1165-2-217, Section 7.e.(2).(b).(7).	☑ Yes	☐ No
d. Does the RP list points of contact at the home district and the lead PCX for inquiries about the RP?	EC 1165-2-217, Section 7.e.(1)	☑ Yes	☐ No
13. Does the RP address coordination with the appropriate Planning Center(s) of Expertise?	EC 1165-2-217, Section 9.c.(1)	☑ Yes	☑ No
a. Does it state if the project is single or multi-purpose? Single Multi x	EC 1165-2-217, Section 9.c.(1)	☑ Yes	☐ No

REQUIREMENT	REFERENCE	EVALUATION	
List purpose(s):	Flood Risk Reduction, Ecosystem Restoration		
b. Does it identify the lead PCX for peer review? Lead PCX: FRM	EC 1165-2-217, Section 9.c.(1)	☑ Yes	☐ No
c. If multi-purpose, has the lead PCX coordinated the review of the RP with the other PCXs as appropriate? Yes	EC 1165-2-217, Section. 9.c.(1), b.	☑ Yes	☐ No
14. Does the RP address coordination with the Cost Engineering Mandatory Center of Expertise (MCX) in Walla Walla District for ATR of cost estimates, construction schedules and contingencies for all documents requiring Congressional authorization?	EC 1165-2-217, Section. 9.c.(1), d.	☑ Yes	☐ No
a. Does it state if the decision document will require Congressional authorization?		☐ Yes	☑ No
b. If Congressional authorization is required, does the plan state that coordination will occur with the Cost Engineering DX?	EC 1165-2-217, Section 7.i.(3).b	☐ Yes	☑ No
15. Other Considerations: This checklist highlights the minimum requirements for an RP based on EC 1165-2-217. Additional factors to consider in the RP include, but may not be limited to:		☑ Yes	☐ No
a. Is there a request from a State Governor or the head of a Federal or state agency to conduct IEPR likely?	EC 1165-2-217, Section 11.d.(1).(c)	☐ Yes	☑ No
b. Is the home district expecting to submit a request to exclude the project study from IEPR?	EC 1165-2-217, Section 7.f.(1) and Section 11.d	☑ Yes	☐ No
c. Are there additional Peer Review requirements specific to the home MSC or district (as described in the Quality Management Plan for the MSC or district)?		☐ Yes	☑ No
d. Are there additional Peer Review needs unique to the project study?		☐ Yes	☑ No

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS
SOUTH PACIFIC DIVISION
450 GOLDEN GATE AVENUE
SAN FRANCISCO CALIFORNIA 94102-3661

CESPD-PDP (FRM-PCX) 10 June 2021

MEMORANDUM FOR Mr. Troy Constance, Chief, Regional Planning and Environment Division South, New Orleans District (CEMVN-RPEDS)

SUBJECT: Review Plan Endorsement for the Memphis Metropolitan Stormwater-North DeSoto County, Mississippi, Flood Risk Management and Ecosystem Restoration Feasibility Study

1. Reference: Engineering Regulation (ER) 1165-2-217, Civil Works Review Policy, 1 May 2021

2. The Flood Risk Management Planning Center of Expertise (FRM-PCX) endorses the subject review plan, dated 7 June 2021, for approval by the Mississippi Valley Division (MVD). The review plan has been updated to incorporate ecosystem restoration into the study and to reflect a risk-informed decision not to perform Independent External Peer Review (IEPR).

3. The FRM-PCX, as the assigned Review Management Organization, reviewed the enclosed plan for compliance with reference 1. The FRM-PCX review was led by Ms. Michelle Kniep, FRM-PCX Regional Manager for MVD. All review comments have been satisfactorily resolved.

4. The FRM-PCX concurs with the level and scope of review identified in the review plan, including the decision to not perform IEPR. The project does not meet any of the mandatory triggers for performing IEPR: the estimated total project cost is not greater than $200 million; the Governor of an affected state has not requested peer review by independent experts; and the project is not considered controversial due to significant public dispute over the size, nature, effects, or environmental costs or benefits of the project. Additionally, the review plan provides a risk-informed rationale supporting the decision to not perform IEPR.

5. Please include this memorandum when transmitting the review plan to MVD for approval. Upon approval of the review plan, please provide a copy of the approved plan, a copy of the approval memorandum, and the link to where the plan is posted on the District website to Ms. Kniep.

6. Thank you for the opportunity to assist in the preparation of the review plan. Please coordinate any future updates to the plan with Ms. Kniep.

Encl

ERIC THAUT
Deputy Director, Flood Risk Management
Planning Center of Expertise

CF:
CEMVP-PD-F (Kniep)
CEMVP-PD-P (McCain)
CENWO-PM-A (Thompson)
CEMVM-PM-D (Burks)
CEMVN-PDS-C (Roberts)

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, MISSISSIPPI VALLEY DIVISION
1400 WALNUT STREET
VICKSBURG, MS 39180-3262

CEMVD-PD

9 AUG 2019

MEMORANDUM FOR Commander, Memphis District

SUBJECT: Request for Approval of the Review Plan for the Memphis Metropolitan Stormwater-North Desoto County, Mississippi Feasibility Study

1. References:

a. Memorandum, CEMVM-PM, 9 April 2019 subject as above (encl).

b. EC 1165-2-217, Review Policy for Civil Works, 20 February 2018.

2. The enclosed Review Plan (RP) for the Memphis Metropolitan Stormwater-North Desoto County, Mississippi Feasibility Study has been prepared in accordance with EC 1165-2-217 and has been coordinated with MVD Staff and the FRM-PCX who concurred with the RP.

3. The MVD hereby approves this RP, which is subject to change as circumstances require, consistent with project development under the Project Delivery Business Process. Non-substantive changes to this RP do not require further approval. Substantive revisions to this RP or its execution will require new written approval from this office. The district should post the approved RP to its public website [if required], with sensitive information removed.

4. The MVD point of contact for this action is Sarah Palmer, CEMVD-PDM, (601) 634-5910.

BUILDING STRONG and Taking Care of People!

James A Bodron

Encl

JAMES A. BODRON, P.E., SES
Director of Programs

Encl 3

DEPARTMENT OF THE ARMY
MEMPHIS DISTRICT CORPS OF ENGINEERS
167 NORTH MAIN STREET B-202
MEMPHIS, TENNESSEE 38103-1894

CEMVM-PM

9 APR 2019

MEMORANDUM FOR Commander, Mississippi Valley Division (CEMVD-PDM/ Ms. Sarah Palmer)

SUBJECT: Request for Approval of the Review Plan for the Memphis Metropolitan Stormwater-North DeSoto County, Mississippi Feasibility Study

1. References

   a. Memorandum, Review Plan Template Package, dated 31 July 2018

   b. Engineering Circular (EC) 1165-2-217, Review Policy for Civil Works, dated 20 February 2018

   c. Civil Works Director's Policy Memorandum, CW 2019-01, subject: Policy and Legal Compliance Review , dated 9 January 2019

   d. Memorandum, CESPD-PDP (FRM-PCX), dated 11 March 2019 (ENCL 1)

2. This Memorandum transmits the Review Plan (ENCL 2) for Memphis Metropolitan Stormwater-North DeSoto County, Mississippi Feasibility Study for your review and approval. The subject Review Plan and Review Plan Checklist (ENCL 3) are based on the Review Plan Template Package Memorandum and EC 1165-2-217 referenced above.

3. Based on the requirements outlined in EC 1165-2-217, a Type I IEPR is anticipated to be required for this project.

4. The point of contact is Marsha Raus, Project Manager, (901) 544-3455.

Encls

MICHAEL A. ELLICOTT
COL. EN
Commanding

REVIEW PLAN

July 24, 2019

Project Name: Memphis Metropolitan Stormwater-North DeSoto County Feasibility Study, DeSoto County, Mississippi

P2 Number: 444806

Decision Document Type: Feasibility Report with Integrated Environmental Assessment

Project Type: Flood Risk Management

District: Memphis District
District Contact: PM: 901-544-3455; Planner: 601-631-7104

Major Subordinate Command (MSC): Mississippi Valley Division
MSC Contact: Planning Specialist: 601-634-5869

Review Management Organization (RMO): Flood Risk Management Planning Center of Expertise
RMO Contact: Deputy Director: 415-503-6852; MVD POC; 314-331-8404

Key Review Plan Dates

Date of RMO Endorsement of Review Plan: Mar 11, 2019
Date of MSC Approval of Review Plan: Pending
Date of IEPR Exclusion Approval: N/A
Has the Review Plan changed since PCX Endorsement? Yes
Date of Last Review Plan Revision: Pending
Date of Review Plan Web Posting: Pending
Date of Congressional Notifications: Pending

Milestone Schedule

	Scheduled	Actual	Complete
Alternatives Milestone:	Jan 18, 2019	Jan 18, 2019	Yes
Tentatively Selected Plan:	Nov 15, 2019	TBD	No
Release Draft Report to Public:	Jan 10, 2020	TBD	No
Agency Decision Milestone:	May 15, 2020	TBD	No
Final Report Transmittal:	Mar 12, 2021	TBD	No
Senior Leaders Briefing:	Jun 15, 2021	TBD	No
Chief's Report or Director's Report:	Aug 15, 2021	TBD	No

Project Name: Memphis Metropolitan Stormwater-North DeSoto County Feasibility Study

Location: DeSoto County, Mississippi

Authority: The United States House of Representatives Committee on Transportation and Infrastructure adopted a resolution on March 7, 1996.

Memphis Metro Area, Tennessee and Mississippi

Resolved by the Committee on Transportation and Infrastructure of the United States House of Representatives, That, the Secretary of the Army review the report of the Chief of Engineers on the Wolf River and Tributaries, Tennessee and Mississippi, published as House Document Numbered 76, Eighty-fifth Congress, and other pertinent reports, to determine whether any modifications of the recommendations contained therein are advisable at this time, with particular reference to the need for improvements for flood control, environmental restoration, water quality, and related purposes associated with storm water runoff and management in the metropolitan Memphis, Tennessee area and tributary basins including Shelby, Tipton, and Fayette Counties, Tennessee, and DeSoto and Marshall Counties, Mississippi. This area includes the Hatchie River, Loosahatchie River, Wolf River, Nonconnah Creek, Horn Lake Creek, and Coldwater River Basins. The review shall evaluate the effectiveness of existing Federal and non-Federal improvements, and determine the need for additional improvements to prevent flooding from storm water, to restore environmental resources, and to improve the quality of water entering the Mississippi River and its tributaries.

Sponsor: DeSoto County Board of Supervisors

Type of Study: The study will be a Flood Risk Management (FRM) Feasibility Study. The study is fully funded under FY 2018 Work Plan.

SMART Planning Status: This is a 3x3x3 compliant study (WRRDA 2014). Study will be compliant with USACE DCW Memorandum 2018-05 issued 3 May 2018.

Project Area: The authority covers a large area including six river basins, across five counties in two states. The area described in the budget fact sheets submitted in support of the new start describe the study area as follows: The study area lies in the Horn Lake Creek and Coldwater River watersheds in DeSoto County, MS including the cities of Horn Lake, Southaven, Olive Branch, Walls, and Hernando. Impacts from flooding occur in the following basins: Horn Lake Creek and tributaries, and Coldwater River. At this time, the most significant issues are believed to be in the northern part of the county, but the entire county and all tributary basins will be considered. Internal and public scoping will refine the study area.

The specific project areas have not been defined at this time.

There are no known, critical habitats, state parks, prime and unique farmlands or national parks, monuments or refuges in the study area. There are listed species that may occur in the general study area. Arkabutla Reservoir (USACE) lies along the southern portion of the county.

There are Indian mounds in the northwestern part of the study area and there is a likelihood of other cultural sites.

Opportunities for ecosystem restoration and recreation will be explored in conjunction with project features such as flood storage areas or channel modifications, as appropriate and feasible.

Interstate 55 bisects the area north to south and the I-69 corridor bisects it east to west. US Highways 51 and 61 also lie in the project area. Three major rail lines run north-south through the area. There are several large underground pipelines and an overhead TVA transmission line. The area lies approximately 2 miles south of the runways at Memphis International Airport.

Horn Lake Creek crosses into Tennessee before reentering Mississippi and flowing into the Mississippi River. The State of Tennessee and the City of Memphis may both have some regulatory control over some project features.

Problem Statement: Flooding and environmental degradation.

Major flood damage occurred in May 2010, May 2011, September 2014, and March 2016. The area received a Presidential Disaster Declaration in 2011. The U.S. Small Business Administration provided federal assistance after the 2014 flood. The US Coast Guard provided emergency evacuation assistance during the September 2014 event. Flooding inundates major transportation corridors and several neighborhoods, isolates communities, damages public infrastructure and development (residential, commercial and industrial), and threatens life safety. Unstable channels, lack of suitable riparian cover, altered flow regime, and loss of wetlands and floodplains all degrade habitat in the area. Repeated flooding occurs within the cities of Horn Lake, Southaven, and Olive Branch.

DeSoto County has the fastest growing population in the State of Mississippi (ranked 32 in the entire U.S.). Recent development has reduced floodplain and aquatic habitat. Most of the wetlands and bottomland hardwoods have been drained and developed. Increased runoff is causing channel instability, scouring and smothering aquatic habitat.

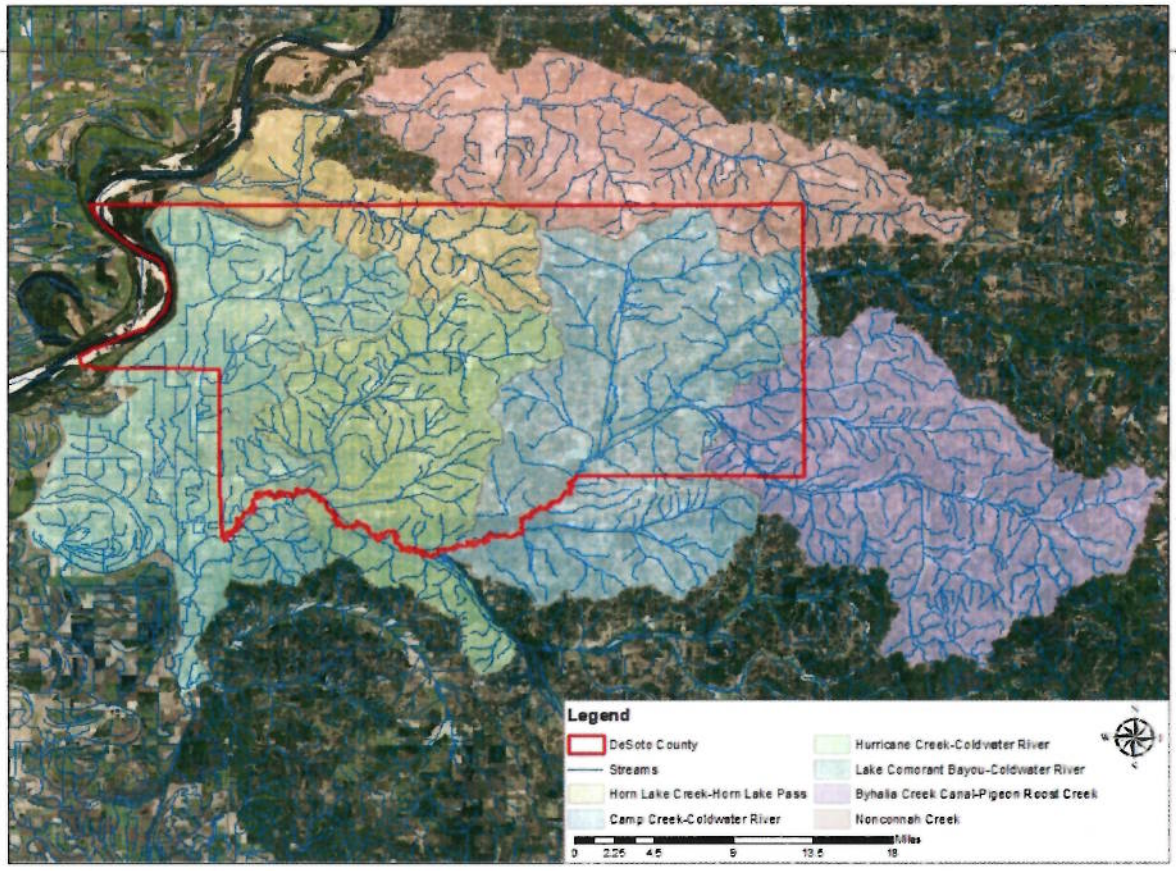
Federal Interest: This area has the fastest growing population in the State of Mississippi (ranked 32 in the entire U.S.) and has experienced repetitive flood events in May 2010, May 2011, September 2014, and March 2016.

Since 1994, three lives have been lost in DeSoto County due to flooding. The area received a Presidential Disaster Declaration in 2011 and flooding in September 2014 prompted a State of Emergency declaration. The Coast Guard responded to evacuate trapped residents, and the U.S. Small Business Administration provided federal assistance.

Risk Identification: DeSoto County has over 170,000 residents. Flooded roads put 20,000 – 30,000 people at risk during major rain events and limit access to emergency and medical services. Flooding inundates major transportation corridors and several neighborhoods, isolates communities, damages public infrastructure and development (residential, commercial and industrial), and threatens life safety. The water rises very quickly and roads become dangerously inundated before first responders can close them to prevent people from driving into deep water. There are numerous neighborhoods with ingress/egress routes that can be blocked for hours which prevent

ambulances, police and fire from reaching residents. Closed roads also interfere with school bus routes and extend the time students are on the bus up to 3 hours. Three deaths were attributed to flooding between 1994 and 2006.

DeSoto Study: 10 Digit HUC Basins and Streams Within Study Area



1. FACTORS AFFECTING THE LEVELS OF REVIEW

Scope of Review.

- Will the study likely be challenging? No. Public controversy is unlikely. The project is in an urban setting and there are few environmental concerns. There will be some challenges because much of the area is developed and there is little room for detention/retention, bypass, etc. The sponsor is capable and cooperative and is fully engaged in managing stakeholders.

- Provide a preliminary assessment of where the project risks are likely to occur and assess the magnitude of those risks. Some of the H&H and economic data is more than 15 years old and will need to be updated/validated throughout the course of the study. Much of the FIRM mapping in the county has been updated in the last 5-7 years and there is concern with the accuracy of the FIRM map as compared to future hydrodynamic modeling within the study. Increased development requires that the structural inventory and hydrology be updated and can result in more benefits. Measures/alternatives can change once this information is

available. The PDT contacted USFWS and EPA regarding the study and those agencies have no significant issues at this time.

- Is the project likely to be justified by life safety or is the study or project likely to involve significant life safety issues? Overall the project will be justified based on reduction of flood damages, however certain elements of the study may be justified by life safety concerns.

- Has the Governor of an affected state requested a peer review by independent experts? No

- Will it likely involve significant public dispute as to the project's size, nature, or effects? No, some members of the public may be disappointed that the proposed plan does not provide relief to localized issues.

- Is the project/study likely to involve significant public dispute as to the economic or environmental cost or benefit of the project? No. There have been previous studies and projects in the area and the public has not identified any concerns. The County is well funded and capital improvement projects meet with little opposition to the economic costs. Much of the area is urbanized and the streams are already degraded. The previous study, which did not result in construction, had no public opposition and no significant environmental impacts.

- Is the information in the decision document or anticipated project design likely to be based on novel methods, involve innovative materials or techniques, present complex challenges for interpretation, contain precedent-setting methods or models, or present conclusions that are likely to change prevailing practices? Not at this time. Previous studies in the area have identified traditional solutions to the flooding issues. PDT members have extensive experience in the area and do not foresee anything novel or innovative.

- Does the project design require redundancy, resiliency, and/or robustness, unique construction sequencing, or a reduced or overlapping design/construction schedule? Not anticipated at this time.

- Is the estimated total cost of the project greater than $200 million? Not likely.

- Will an Environmental Impact Statement be prepared as part of the study? No. An EA is anticipated at this time.

- Is the project expected to have more than negligible adverse impacts on scarce or unique tribal, cultural, or historic resources? No. Although there are Indian mounds in the northwestern part of the study area and there is a likelihood of other cultural sites, at this time it is not anticipated that they will be located within the project area. The most likely project area with construction features has been surveyed in the past and no significant resources were found. The project archaeologist is experienced in the area and has conducted a preliminary records search on the entire area and has found no indication of any unavoidable resources. Some of the likely project features would likely serve to stabilize degrading stream reaches; degrading reaches pose a greater threat to resources than the project would.

- Is the project expected to have substantial adverse impacts on fish and wildlife species and their habitat prior to the implementation of mitigation measures? No. The area is urbanized and the streams and habitats are degraded. Some mitigation may be required under USACE policy, but the impacts are unlikely to be "substantial" even without mitigation. In the past, USFWS has recommended any required mitigation be done in adjoining watersheds that provide more opportunity for sustainable habitat.

- Is the project expected to have, before mitigation measures, more than a negligible adverse impact on an endangered or threatened species or their designated critical habitat? No. There is no designated critical habitat and the only species that may occur in the county are not likely to use the habitats associated with the streams.

2. REVIEW EXECUTION PLAN

This section describes each level of review to be conducted. Based upon the factors discussed in Section 1, this study will undergo the following types of reviews:

PDT Review. The PDT will review the completed products (Report Summary, Draft Report, Final Report) prior to DQC.

District Quality Control. All decision documents (including data, analyses, environmental compliance documents, etc.) undergo DQC. This internal review process covers basic science and engineering work products. It fulfils the project quality requirements of the Project Management Plan.

Agency Technical Review. ATR is performed by a qualified team from outside the home district that is not involved in the day-to-day production of the project/product. These teams will be comprised of certified USACE personnel. The ATR team lead will be from outside the home MSC. If significant life safety issues are involved in a study or project a safety assurance review should be conducted during ATR.

Independent External Peer Review. Type I IEPR will be performed. This is the most independent level of review, and is applied in cases that meet criteria where the risk and magnitude of the project are such that a critical examination by a qualified team outside of USACE is warranted. A risk-informed decision is made as to whether Type I IEPR is appropriate.

Cost Engineering Review. All decision documents shall be coordinated with the Cost Engineering Mandatory of Expertise (MCX). The MCX will assist in determining the expertise needed on the ATR and IEPR teams. The MCX will provide the Cost Engineering certification. The RMO is responsible for coordinating with the MCX for the reviews. These reviews typically occur as part of ATR.

Policy and Legal Review. All decision documents will be reviewed for compliance with law and policy. ER 1105-2-100, Appendix H provides guidance on policy and legal compliance reviews. These reviews culminate in determinations that report recommendations and the supporting analyses and coordination comply with law and policy, and warrant approval or further recommendation to higher authority by the home MSC Commander. These reviews are not further detailed in this section of the Review Plan.