



DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, SOUTHWESTERN DIVISION
1100 COMMERCE STREET
DALLAS, TX 75242-1317

MAY 07 2019

CESWD-RBT

MEMORANDUM FOR Commander, Fort Worth District, U. S. Army Corps of Engineers,
819 Taylor Street, Ft. Worth, TX 76102

SUBJECT: Revised Review Plan approval for Modified Central City Project

1. References:

a. CESWF-DE memorandum dated 5 March 2019, subject: Revised Review Plan for the Modified Central City Project

b. EC 1165-2-217, Water Resources Policies and Authorities - Review Policy for Civil Works, 20 February 2018

c. CESWD-RBT memorandum dated 4 March 2019, subject: Delegation of Authority for Review Plans for Civil Works Projects

2. In accordance with 1b and 1c, I hereby approve the enclosed Review Plan (RP) for the subject project.

3. Please post the final approved RP with a copy of this memorandum to the District's public internet website. Prior to posting to the District website, the names of USACE employees should be removed.

4. The point of contact for this action is Mr. Paul Komoroske, SWD Levee Safety Program Manager, at 817-565-6241.

Encl

A handwritten signature in black ink, appearing to read "PETE G. PEREZ", is located above the printed name.

PETE G. PEREZ, P.E.
Director, Regional Business Directorate

05 MAR 2019

MEMORANDUM FOR Chief, Business Technical Division, U.S. Army Corps of Engineers, Southwestern Division, (CESWD-RBT/Mr. Zalesak), 1100 Commerce Street, Dallas, TX 75242-1317

SUBJECT: Revised Review Plan for the Modified Central City Project

1. References:

a. Modified Central City Project, Fort Worth, Texas. Design and Construction Phases Revised Review Plan

b. Engineering Circular 1165-2-217, Water Resources Policies and Authorities Review Policy for Civil Works, 20 February 2018

2. Enclosed for your review and approval is the revised Central City Review Plan. This revision incorporates changes due to the reauthorization of Central City in the Water Resources Development Act of 2016 as well as changes in schedule and team members. The review plan was developed in accordance with Engineering Circular 1165-2-217.

3. Detailed information desired by your staff can be obtained by contacting the Project Manager, Gail Hicks, at 817-886-1900, or email gail.s.hicks@usace.army.mil.

Encl



KENNETH N. REED, PMP
Colonel, EN
Commanding



US Army Corps
of Engineers.

Prepared by:
SWF District
SWD Division

Modified Central City Project Fort Worth, Texas Design and Construction Phases Revised Review Plan

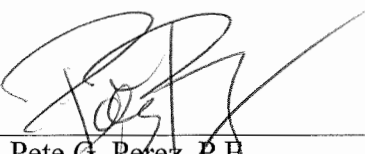
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Gail Hicks, PMP
Project Manager
USACE, CESWF-PM-C

ENDORSED
BY:

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Date: 2019.04.17 15:32:22 -04'00'
David E. Carlson, P.E.
Chief, Eastern Division
USACE, Risk Management Center

APPROVED
BY:


MAY 07 2019
Pete G. Perez, P.E.
Director, Regional Business
Directorate

MSC Approval Date: 7 Dec 2012
Last Revision Date: 7Mar 2019

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Section 1

Introduction

1.1 Purpose

This Review Plan (RP) for Modified Central City Project (P2 100573), will help ensure a quality-engineering project is developed by the Corps of Engineers in accordance with Engineer Circular (EC) 1165-2-217, "Review Policy for Civil Works". As part of the Project Management Plan this RP establishes an accountable, comprehensive, life-cycle review strategy for Civil Works products and lays out a value added process and describes the scope of review for the current phase of work. The EC outlines five general levels of review: District Quality Control/Quality Assurance (DQC), Agency Technical Review (ATR), Biddability, Constructability, Operability, and Sustainability (BCOES) Review, Safety Assurance Review (SAR), and Policy and Legal Compliance Review. This RP will be provided to Project Delivery Team (PDT), DQC, ATR, BCOES, and SAR Teams. The technical review efforts addressed in this RP are to augment and complement the policy review processes. The District Chief of Engineering has assessed that the life safety risk of this project is significant; therefore a SAR will be required for the bypass channel, gates, and dam, however not for the Valley Storage, Ecosystem Restoration, or Recreation sites as those are intended to flood, see Paragraph 5.1.

1.2 References

- EC 1165-2-217, Review Policy For Civil Works, 20 February 2018
- Engineer Regulation (ER) 1110-2-1150, Engineering and Design - Engineering and Design for Civil Works Projects, 31 August 1999
- ER 1110-1-12, Quality Management, 31 Mar 2011
- ER 415-1-11, Biddability, Constructability, Operability, Environmental and Sustainability Reviews, 1 January, 2013
- ER 1110-2-1156, Safety of Dams – Policy and Procedure, 31 Mar 2014
- ER 1110-1-8159, Engineering and Design - DrChecks, 10 May 2011
- ER 1180-1-6, Contracts - Construction Quality Management, 30 September 1995
- Engineer Manual (EM) 1110-2-1913 Design, Construction, and Evaluation of Levees, 30 April 2000
- EM 1110-1-1804, Engineering and Design - Geotechnical Investigations, 01 January 2001
- ER 1110-1-1807, Engineering and Design - Procedures for Drilling in Earth Embankments, 01 March 2006
- EM 1110-1-2908, Engineering and Design - Rock Foundations, 30 November 1994
- EM 1110-2-2901, Engineering and Design - Tunnels and Shafts in Rock, 30 May 1997

- EM 1110-1-1802, Geophysical Exploration for Engineering and Environmental Investigations, 31 August 1995
- ER 1110-2-1806, Engineering and Design - Earthquake Design and Evaluation for Civil Works Projects, 31 July 1995
- EM 1110-2-1901, Engineering and Design - Seepage Analysis and Control for Dams, 30 April 1993
- EM 1110-2-1902, Engineering and Design - Slope Stability, 31 October 2003
- EM 1110-2-1913, Engineering and Design - Design and Construction of Levees, 30 April 2000
- EM 1110-2-2502, Engineering and Design - Retaining and Flood Walls, 29 September 1989
- EM 1110-2-2906, Engineering and Design - Design of Pile Foundations, 15 January 1991
- ER 1110-1-1901, Project Geotechnical and Concrete Materials Completion Report for Major USACE Project, 22 February 1999
- EM 1110-2-1906, Laboratory Soils Testing, 20 August 1986
- EM 1110-2-1911, Engineering and Design - Construction Control for Earth and Rock-Fill Dams, 30 September 1995
- EM 1110-2-2000, Engineering and Design - Standard Practice for Concrete for Civil Works Structures, 31 March 2001
- EM 1110-2-2301, Test Quarries and Test Fills, 30 September 1994
- EM 1110-2-2302, Engineering and Design - Construction with Large Stone, 24 October 1990
- EM 1110-2-2002, Evaluation and Repair of Concrete Structures, 30 June 1995
- EM 1110-2-2006, Engineering and Design - Roller-Compacted Concrete, 15 January 2000
- EM 1110-2-2100, Engineering and Design - Stability Analysis of Concrete Structures, 1 December 2005
- EM 1110-2-2102, Waterstops and Other Preformed Joint Materials for Civil Works Structures, 30 September 1995
- EM 1110-2-2104, Engineering and Design - Strength Design for Reinforced-Concrete Hydraulic Structures, 20 August 2003
- EM 1110-2-2502, Engineering and Design - Retaining and Flood Walls, 29 September 1989
- EM 1110-2-2504, Engineering and Design - Design of Sheet Pile Walls, 31 March 1994
- EM 1110-2-2906, Engineering and Design - Design of Pile Foundations, 15 January 1991
- EM 1110-2-4300, Instrumentation for Concrete Structures, 30 November 1987

- EM 1110-2-6051, Engineering and Design - Time-History Dynamic Analysis of Concrete Hydraulic Structures, 22 December 2003
- EM 1110-2-6053, Engineering and Design - Earthquake Design and Evaluation of Concrete Hydraulic Structures, 01 May 2007
- EM 1110-206054, Inspection, Evaluation and Repair of Hydraulic Steel Structures, 1 December 2001
- ER 1110-2-100, Periodic Inspection and Continuing Evaluation of Completed Civil Works Structures, 15 February 1995
- EM 1110-2-2902, Engineering and Design - Conduits, Culverts, and Pipes, 31 March 1998
- EM 1110-2-3600, Engineering and Design - Management of Water Control Systems, 30 November 1987
- ER 1110-2-240, Water Control Management, 8 October 1998
- ER 1130-2-530, Flood Control Operations and Maintenance Policies, 30 October 1996
- EM 1110-2-2105, Engineering and Design - Design of Hydraulic Steel Structures, 31 May 1994
- EM 1110-2-2701, Engineering and Design - Vertical Lift Gates, 30 November 1997
- EM 1110-2-3105, Mechanical and Electrical Design of Pumping Stations, 30 November 1999
- ETL 1110-2-584, Design of Hydraulic Steel Structures, 30 June 2014
- ER 1110-1-1300 - Cost Engineering Policy and General Requirements, 30 September 2014
- ER 1110-2-1302 - Civil Works Cost Engineering - 15 September 2008
- EM 385-1-1, Safety and Health Requirements, 15 September 2008
- Project Management Plan (PMP)
- Design Decision Document (DDD) for Bypass Channel, #1-11, dates vary
- DDD for Oxbow Sites, OX#1-12, dates vary
- Final Environmental Impact Statement, January 2006
- Final Supplement No. 1 to the Final Environmental Impact Statement (FSEIS), March 2008
- Upper Trinity River Central City Fort Worth, Texas Modified Project Report, April 2008
- Trinity River Vision Master Plan, April 2003
- Memorandum for the Deputy Commanding General for Civil and Emergency Operations, 15 June 2018
- CECW-SWD memorandum, 8 September 2017

- Memorandum for Commander, Fort Worth District (CESWF-PM), 20 Sep 2017
- Water Infrastructure Improvements for the Nation Act (WIIN)/Water Resources Development Act (WRDA) 2016
- Water Resources Development Act of 2007, Sections 2034 & 2035, Pub. L. 110-114. Privacy Act, 5 U.S.C. § 522a as amended, 8 November 2007
- National Academy of Sciences, Background Information and Confidential Conflict Of Interest Disclosure, (BI/COI) FORM 3, May 2003

1.3 Review Management Organization

The USACE Risk Management Center (RMC) is the Review Management Organization (RMO) for this project.

Section 2

Project Description

2.1 Project Description

The project is located in Fort Worth, Texas. The Fort Worth Central City Modified Project (FWCCMP) has various components including an approximate 8,400-foot bypass channel, three isolation gates, low water dam and lock, and valley storage mitigation sites (Gateway Park, Ham Branch, Riverside Park, Rockwood Park West, Samuels Avenue and University Drive), to provide flood risk management functions along the Clear Fork and West Fork of the Trinity River. This review plan covers the entire project; flood risk management, ecosystem restoration, and recreation. Upon completion, the authorized project will restore the Standard Project Flood (SPF) level of protection for the federally authorized Fort Worth Floodway project. A project map showing the bypass channel and proposed valley storage sites is attached (see Attachment 1).

The features that were a part of the 2008 Modified Central City project remain a part of the new 2016 authorization. The change in authorization included a raise in the total project cost from \$220M to \$810M and placed a cap of \$5.5M federal funds for recreation. The authorization also changed the cost share from \$110M federal/\$110M non-Fed to the traditional cost share ratios for each business line.

The following is a description of the features of the project:

i. Valley Storage Sites

Using the valley storage requirement of 5,250 acre-feet established through the hydraulic evaluation, a Geographic Information System (GIS) map of environmentally sensitive areas, and a topographic layer within GIS, hydraulic engineers selected areas from the initial valley storage analysis that could, with excavation or control structures accommodate valley storage. The team then worked in an iterative process to maximize opportunities to accommodate valley storage while avoiding or minimizing adverse effects to significant habitats. Opportunities were also identified to optimize the dual purposes of attaining valley storage and potential habitat development by identifying valley storage areas that are primarily grassland and disturbed. This process is described in detail in the FSEIS, pages 3-6 through 3-9. The District Chief of Engineering and Construction has assessed that a SAR will not be required for the Valley Storage areas as those areas are intended to flood. Various Valley Storage sites also include Ecosystem Restoration, and/or Recreation sites.

The following is a list of the current primary valley storage sites:

- Ham Branch Valley Storage and Aquatic Mitigation
- Riverside Park Valley Storage
- Rockwood Park Valley Storage
- Gateway - Oxbow Valley Storage
- University Drive Valley Storage
- Samuels Avenue Valley Storage

The Recommended Valley Storage Plan shown on Table 1-1 in the Modified Project report includes all the valley storage sites and are preliminarily estimated to provide substantially more valley storage than the required 5,250 acre-feet, five additional sites were identified as “contingency” sites within the Recommended Plan. These contingency sites could be used to supplement additional valley storage requirements in the event that roughness coefficients of optimal riparian woodland development as refined during detailed design, or other design constraints, necessitate additional storage. Habitat development in some areas may be needed to provide the roughness factor required to slow the water flow. If it is determined, as the design of the project is refined and developed during the Preconstruction Engineering and Design (PED) phase, that additional valley storage might be required beyond what the primary sites could achieve, use of any contingency site would be on an “as needed” basis only.

i. Bypass Channel North and South

As described in the FSEIS, and Modified Project Report, the bypass channel would be approximately 30 feet below the existing grade and is approximately 8,400 feet long and 300 feet wide between the top of levee and hardwall. The bypass channel would extend from the Clear Fork of the Trinity River downstream of West Seventh Street to the West Fork of the Trinity River, intersecting the West Fork of the Trinity River approximately 2,600 feet upstream of the existing confluence with the Clear Fork of the Trinity River. The channel would continue to the northeast and rejoin the West Fork of the river 8,500 feet downstream of the existing confluence with the Clear Fork of the river. The Channel is comprised of an earthen levee on the North side and a floodwall (hardwall) on the South side. The Bypass Channel also has recreation elements (pedestrian bridges and pocket parks).

Due to the WIIN Act, with the increase in funding authorization, the Government may now cost share in the pocket parks and the pedestrian bridges that are part of the channel. A SAR is required for the channel.

ii. Gates

There are three isolation gates that are a part of the project. The Clear Fork gate is located at the confluence of the bypass channel and the Clear Fork of the Trinity River. The Trinity Point gate is located at the midpoint of the new bypass channel and intersects the West Fork of the Trinity River. The Tarrant Regional Water District (TRWD) gate is located downstream at the confluence of the bypass channel and the West Fork of the Trinity River. These gates are designed to protect the interior area east of the bypass channel from flood flows.

In the previous authorization, the Sponsor was required to build the Trinity Point gate as a base condition, without federal matching funds, due to the \$220m limit on the previous authorization. Due to the WIIN Act, and the increase in funding authorization, the Trinity Point gate is now added to the authorized project for cost sharing. A SAR is required for the gates.

iii. Bridges

The Modified Central City project includes both vehicle (Main Street, Henderson Street, and White Settlement Road) and pedestrian (Main Street, Trinity Point, and West Fork) bridges. The number and

location of these bridges was primarily determined in consideration of the recommendations of the transportation analysis and enhancing continuity of the regional trail system. Design considerations for the bridges were dominated by their potential effects on the hydraulic performance of the project and the urban design intent to facilitate small boat traffic throughout the system.

The three vehicle bridges are currently under construction, using Federal Highway Administration funds, and are not considered part of the Corps project, therefore no SAR is required.

The two of the three pedestrian bridges were not a part of the Corps project due to the \$220m funding. The Trinity Point pedestrian bridge was a non-project component. Due to the WIIN Act, with increased funding, all three of the pedestrian bridges are now added to the authorized project for cost sharing. A SAR is required for the pedestrian bridges. Two of the three bridges are part of the channel, therefore these two bridges will be included in the channel SAR. The third bridge will have a separate SAR.

iv. Interior Water Feature

Urban Revitalization objectives of the project sponsors include the creation of an interior water feature or focal point. Two miles of the existing West Fork would function as a controlled, quiescent watercourse with a water feature or urban lake approximately 900-feet long in the interior area. The ultimate location, size, and shape of the lake represented a compromise between the urban design objectives, hazardous, toxic, and radioactive waste considerations, bridge relocations, and cost. The selected location avoids any impact to the historic Main Street Bridge and to a nearby capped landfill and minimizes excavation while maximizing the relationship of the lake and shoreline to the site orientation and potential land use opportunities.

The interior water feature was not a part of the original cost shared Corps project, but with the increased funding, the water feature is now added to the authorized project for cost sharing as a recreation component. A SAR is not required for this feature as it is a lake. The Government will be able to use approximately 140 ac-ft of valley storage credit due to the island created by the Trinity River and the gates.

v. Samuels Avenue and Marine Creek Dam, Lock and Channel Expansion

A fixed low water dam and lock is proposed on Marine Creek at the confluence with the main stem of the West Fork of the Trinity River to maintain water connectivity. Several alternatives were evaluated for the Marine Creek low water dam including both the use of a gated or fixed structure as well as varying the crest width and height. A fixed structure is recommended on Marine Creek as it is able to meet the design requirements of not increasing the existing 100-year water surface elevations on Marine Creek and reducing environmental impacts, while also reducing construction, operation, and maintenance costs. This fixed dam would also pass lower frequency storms without operation or controls. This structure will have a crest elevation of 516.5 National Geodetic Vertical Datum (NGVD) and a crest length of 200 feet. The Marine Creek upper bank channel will need to be widened by approximately 50 feet near the dam site in order to accommodate the 200 feet of crest length needed to pass the 100-year flow without causing increases in water surface elevations upstream.

Widening of Marine Creek and construction of a small recreational boat turnaround basin is proposed just upstream of 23rd Street at the limits of the 516.5 NGVD pool elevation. Bank stabilization would be accomplished through the use of compacted concrete with rip-rap at appropriate locations. Maintenance access would be provided for trash and debris removal. The downstream or outfall of the low water dam would be sloped and appropriately rip-rapped to assure adequate re-aeration of both low and high flows.

This combination of structures meets the goals and objectives of the Trinity River Vision Master Plan to enhance neighborhood linkages by impounding water to a point upstream on Marine Creek, thus providing a waterway within the combined Clear Fork and West Fork system to connect the Cultural

District, Downtown, and the Rockwood Park area to the Stockyards area. This modified proposal also reduces adverse impacts to aquatic and riparian habitats of Marine Creek and eliminates adverse impacts to Lebow Creek.

While the Marine Creek dam and channel expansion were included in the Corps project under the FRM business line for cost sharing, the lock was on the recreation business line and therefore a sponsor cost due to the funding limit. Due to the WIIN Act, with increased funding the lock is now added to the authorized project for cost sharing. A SAR is required for the dam and lock. As the Government is capped at \$5.5M for recreation, the Sponsor included the lock in the bond package that was approved by the voters. The Sponsor will provide the funds to the Corps for the lock design and construction.

In order to achieve the urban design objectives, a channel dam is needed to maintain water levels in the project interior at a relatively constant normal water surface elevation of approximately 525 NGVD. In order to comply with the hydraulic imperatives, the dam also must have the capability to lower the crest elevation to allow the passage of flood flows. The project goal of linking the Stockyards to the rest of the city via the river limited site considerations to locations downstream of the Marine Creek confluence with the West Fork. Other considerations included relocations, erosion and scour potential, and safety factors.

Samuels Ave dam was a base condition due to the \$220m limit on the previous authorization. Due to the WIIN Act, and the increase in funding, the dam is now added to the authorized project for cost sharing. A SAR is required for the dam.

vi. Storm Water Pump Station

A storm water pumping station is required to drain the island created by the channel in the event that storm water rises on the interior. During major flood events, the isolation gates would be closed and excess interior drainage would be pumped. The pump station would house four pumps with 100 cubic feet per second (cfs) capacity per pump. One pump would be a spare pump, allowing maintenance to be performed without reducing the capacity of the pump station below 300 cfs at any time.

The storm water pumping station was a non-project component due to the \$220m limit on the previous authorization. Due to the WIIN Act, and the increase in funding, the dam is now added to the authorized project for cost sharing. A SAR is required for the pump station and will be incorporated into the TRWD gate SAR.

2.2 Project Sponsor

The non-Federal Sponsor for the Project is the Tarrant Regional Water District (TRWD). Products and analyses provided by non-Federal sponsors as in-kind services are subject to DQC, ATR, and SAR. Peer Review of Sponsor In-Kind Contributions include the design of the pedestrian bridges and utility relocations.

Section 3

District Quality Control

3.1 Requirements

All implementation documents (including supporting data, analyses, reports, environmental compliance documents, water control manuals, etc.) shall undergo DQC in accordance with EC 1165-2-217. The District shall perform these minimum required reviews in accordance with SWD QMS 06501 QC/QA

Procedures for Civil Works Study and Design located on the USACE QMS website.

<https://apps.usace.army.mil/sites/QMS/DC/QMSDocumentLibrary/Forms/1%20Basic%20List%20%20Grp%20by%20Function.aspx?ProcessQStringToCAML=1>

See Attachment 2, Table 3 for the DQC Lead, reviewers, and reviewer's disciplines.

3.2 Documentation

Documentation of DQC activities is required and will be implemented by the process linked in paragraph 3.1.

3.3 DQC Schedule and Estimated Cost

Although DQC is always seamless, the milestone reviews scheduled are shown in **Error! Reference source not found.** The cost for the DQC ranges from \$32,000 to \$64,000 depending on the feature under review.

Section 4

Agency Technical Review

4.1 Requirements

All implementation documents (including supporting data, analyses, reports, environmental compliance documents, etc.) shall undergo ATR in accordance with EC 1165-2-217. ATR reviews will occur seamlessly, including early involvement of the ATR team for validation of key design decisions, and at the scheduled milestones as shown in Section 4.6. A site visit will be scheduled for the ATR Team. The ATR team site visit will be scheduled concurrently with the SAR team site visit.

4.2 Documentation of ATR

Documentation of ATR will occur using the requirements of EC 1165-2-217. This includes the four part comment structure and the use of DrChecksSM.

4.3 Products to Undergo ATR

The ATR team will begin reviewing Design Documentation Reports and Plans and Specifications for the bypass channel, 3 gates, pumping station, 2 low water crossing dams, lock, and valley storage sites at the 60% review. See Attachment 3 for a schedule listing the ATR reviews for the project.

4.4 Required Team Expertise and Requirements

ATR teams will be established in accordance with EC 1165-2-217. The following disciplines will be required for ATR of this project:

ATR Lead: The ATR team lead is a senior professional outside the home MSC with extensive experience in preparing Civil Works documents and conducting ATRs. The lead has the necessary skills and

experience to lead a virtual team through the ATR process. The ATR lead may also serve as a reviewer for a specific discipline, in this case, Civil Engineering.

Geotechnical Engineer – Reviewer shall have experience in the field of geotechnical engineering, analysis, design, and construction of mass concrete dams. The geotechnical engineer shall have experience in subsurface investigations, rock and soil mechanics, internal erosion (seepage and piping), slope stability evaluations, erosion protection design, and earthwork construction. The geotechnical engineer shall have knowledge and experience in the forensic investigation of seepage, settlement, stability, and deformation problems associated with high head dams and appurtenances constructed on rock and soil foundations.

Hydraulic Engineer – Reviewer shall have experience in the analysis and design of hydraulic structures related to dams including the design of hydraulic structures (e.g., spillways, outlet works, and stilling basins). The hydraulic engineer shall be knowledgeable and experienced with the routing of inflow hydrographs through multipurpose flood control reservoirs utilizing multiple discharge devices, Corps application of risk and uncertainty analyses in flood damage reduction studies, and standard Corps hydrologic and hydraulic computer models used in drawdown studies, dam break inundation studies, hydrologic modeling and analysis for dam safety investigations.

Mechanical Engineer – Reviewer shall have experience in machine design, machine rehabilitation and familiarity with design of mechanical gates and controls for flood control structures.

Structural Engineer – Reviewer shall have experience and be proficient in performing stability analysis, finite element analysis, seismic time history studies, and external stability analysis including foundations on high head mass concrete dams. The structural engineer shall have specialized experience in the design, construction and analysis of floodwalls, concrete flood walls and steel gates.

Construction Engineer – Reviewer should be a senior level, professionally registered engineer with extensive experience in the engineering construction field with particular emphasis on floodwall and levee projects. The Construction reviewer should have a minimum of 10 years of experience.

Environmental - Reviewer should be experienced in National Environmental Policy Act (NEPA) process and analysis, and have a biological or environmental background.

Other ATR Members – depending on the feature, there may also be Architectural, Electrical, Real Estate, Cost Estimating, Cultural Resources, and other Environmental disciplines. All Engineering and construction reviewers will be certified in CERCAP. See Attachment 3 for a list of the ATR team members and disciplines.

ATR Team	Bypass Channel	Gates/ pump station	Rockwood & University Valley Storage	Samuels & Marine Creek Dam/Lock & Channel expansion	Rockwood Park Eco	Gateway Park Ecosystem Restoration and Beach St bridge
Civil/Lead	X	X	X	X	X	X
Structural	X	X	X	X		X
Electrical	X	X	X	X		
Mechanical	X	X		X		
Geotechnical	X	X	X	X		X
H & H	X	X	X	X	X	X
Architect	X	X	X			X
Cost Engineering	X	X	X	X	X	X
Operations	X	X	X	X	X	X
Cultural Resources	X	X	X	X	X	X
Environmental	X	X	X	X	X	X
Construction	X	X	X	X	X	X
Real Estate	X	X	X	X	X	X

Table 1 ATR Disciplines

4.5 Statement of Technical Review Report

At the conclusion of each ATR effort, the ATR team will prepare a review report with a completion and certification memo. The report will be prepared in accordance with EC 1165-2-217.

4.6 ATR Schedule and Estimated Cost

Although ATR is always seamless, the preliminary ATR milestone schedule is listed in Appendix 2. The cost for each ATR is approximately \$84,000, depending on the feature reviewed.

Section 5

Safety Assurance Review

5.1 Decision on SAR

The District Chief of Engineering and Construction has made a risk-informed-decision that the channel, gates, and low water dams/lock of this project pose a significant threat to human life (public safety) and therefore a SAR will be performed on those features. The District Chief of Engineering and Construction has made a risk-informed-decision that the Valley Storage sites do not pose a significant threat to human

life (public safety) and therefore a SAR will not be performed on those features as they are designed to intentionally flood to hold water and slow down the velocity of the Trinity River. The project made the commitment to have a zero impact on the river, therefore the Valley Storage sites are created to keep the elevation of the river within the existing levels.

5.2 Products to Undergo SAR

A SAR will be performed on the final Design Documentation Reports (DDR), 60% Plans and Specifications (P&S), final P&S, during the midpoint of the construction and at final construction.

5.3 Required SAR Panel Expertise

SAR panels will be established in accordance with EC 1165-2-217. In coordination with the RMC, the following disciplines will be required for SARs of this project:

Geotechnical Engineer - The Geotechnical engineering panel member should be a senior-level geotechnical engineer with experience in the field of geotechnical engineering, analysis, design, and construction of floodwalls and levees. The Panel Member should have knowledge and experience in the forensic investigation and evaluation of seepage and piping, settlement, slope stability, and deformations problems associated with floodwalls and embankments constructed on weathered and jointed rock and alluvial soils. The Panel Member should have experience in the design and construction of seepage barriers or cutoff walls. The Panel Member should have experience in failure mode analysis, risk assessment of floodwalls and levees, and evaluating risk reduction measures for dam safety assurance projects.

Civil / Structural Engineer – The Civil/Structural engineering panel member shall have experience and be proficient in performing stability analysis, finite element analysis, seismic time history studies, and external stability analysis including foundations on floodwalls, mass concrete dams. The structural engineer shall have specialized experience in the design, construction and analysis of floodwalls, steel gates, and concrete dams.

SAR Team	Bypass Channel	Gates/pump station	Rockwood & University Valley Storage	Samuels & Marine Creek Dam/Lock & Channel expansion	Rockwood Park Eco	Gateway Park Ecosystem Restoration and Beach St bridge
Civil/Lead	X	X	X	X	X	X
Structural	X	X	X	X		X
Electrical						
Mechanical						
Geotechnical	X	X	X	X		X
H & H						
Architect						
Cost Engineering						
Operations						
Cultural Resources						
Environmental						
Construction						

Table 2 SAR Disciplines

5.4 Documentation of SAR

Documentation of SAR will be prepared in accordance with EC 1165-2-217.

5.5 Scope, Schedule, and Estimated Cost of SAR's

The SAR's will be performed in accordance with EC 1165-2-217. SAR reviews will occur at the milestones shown in Attachment 3. The estimated cost for the SAR's of this project are in the range of \$50,000 to \$100,000. This estimate will be refined when the Scope of Work for the SAR task order is completed. Milestones to consider for a SAR are at the midpoint and final design in the Design Documentation Report; at the completion of the plans, specifications, and cost estimate; at the midpoint of construction for a particular contract, prior to final inspection, or at any critical design or construction decision milestones.

Section 6

Policy and Legal Compliance Review

All implementation documents will be reviewed throughout the project for law and policy compliance. These reviews culminate in reported recommendations, supporting analyses, and coordination that comply with law and policy. These items warrant approval or further recommendation to higher authority by the home MSC Commander. DQC (Product Review) and ATR augment and complement the policy review processes by addressing compliance with pertinent published Army policies.

Section 7

Public Posting of Review Plan

As required by EC 1165-2-217, the approved RP will be posted on the Division public website (<https://www.swf.usace.army.mil/About/Organization/PPMD/Peer-Review-Plans/>). This is not a formal comment period and there is no set timeframe for the opportunity for public comment. If and when comments are received, the PDT will consider them and decide if revisions to the RP are necessary.

Section 8

Review Plan Approval and Updates

The MSC Commander, or delegated official, is responsible for approving this RP. The Commander's approval reflects vertical team input (involving the District, MSC, and RMC) as to the appropriate scope, level of review, and endorsement by the RMC. The RP is a living document and should be updated in accordance with EC 1165-2-217. All changes made to the approved RP will be documented in **Error! Reference source not found.**, Table 9 RP Revisions. The latest version of the RP, along with the Commanders' approval memorandum, will be posted on the District's webpage and linked to the HQUSACE webpage. The approved RP should be provided to the RMO.

Section 9

Engineering Models

The use of certified, validated, or agency approved engineering models is required for all activities to ensure the models are technically and theoretically sound, compliant with USACE policy, computationally accurate, and based on reasonable assumptions. The responsible use of well-known and proven USACE developed and commercial engineering software will continue and the professional practice of documenting the application of the software and modeling results will be followed. 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, BCOES, policy and legal review, and SAR (if required). Where such approvals have not been completed, appropriate independent checks of critical calculations will be performed and documented. The following engineering models, software, and tools are anticipated to be used:

Model Name	Version	Validation Date
HEC-RAS (River Analysis System)	4.0	HH&C CoP Preferred Model

Table 3 Models and Status

Section 10

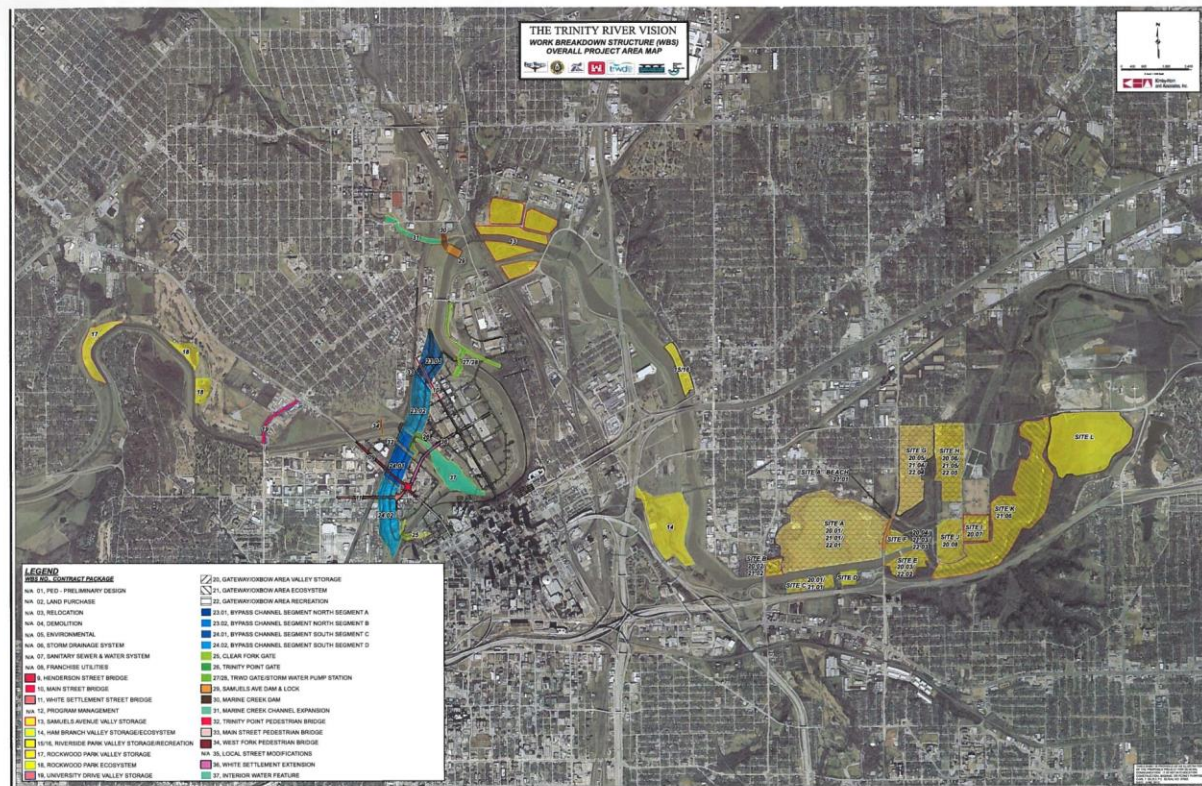
Review Plan Points of Contact

Title	Organization	Phone
Project Manager	CESWF-PM-C	817-886-1900
Senior Reviewer	CEIWR-RMC	304-399-5217

Table 4 RP POC's

ATTACHMENT 1

Project Map



ATTACHMENT 3

Schedule of Reviews

Component	Submittal	Type of Review	Review Start	Status
Bypass Channel-Henderson Piers	100% P&S	DQC	8-Aug-12	Complete
Bypass Channel-White Settlement Piers	60% P&S	DQC	1-Nov-12	Complete
Bypass Channel-Henderson & White Settlement Piers	100% P&S	ATR	16-Nov-12	Complete
	BCOES Certified		9-Jul-14	Complete
Gateway Oxbow-Sites A&C	75% DDR & 50% P&S	DQC	5-Sep-12	Complete
	100% DDR&P&S	DQC	18-May-13	Complete
	100% DDR&P&S	ATR	23-Apr-14	Complete
	Revised P&S due to VE	BCOES	17-Dec-14	Complete
Ham Branch Valley Storage (not including Mitigation)	30% P&S	DQC	01-Oct-11	Complete
	90% P&S	DQC	08-Aug-12	Complete
	Redesign Trash Rack	DQC	11-Feb-13	Complete
	BCOES Certified		01-Apr-14	Complete
Riverside Park Valley Storage	60% P&S	DQC & BCOES	11-Sep-13	Complete
	90% P&S	DQC & BCOES	29-May-13	Complete
	100% P&S	DQC & BCOES	25-Mar-15	Complete
	BCOES - re-certify due to 6 month lag from certification to construction.		8-Apr-16	Complete
Oxbow Phase 2, Sites H&I	30% P&S	DQC & BCOES	5-Dec-16	Complete
	60% P&S	DQC & BCOES	17-Mar-17	Complete
	60% P&S	ATR	17-Mar-17	Complete

	90% P&S	DQC & BCOES	11-Jul-17	Complete
	100% P&S	DQC & BCOES	14-Aug-17	Complete
	Corrected Final	Backcheck	13-Jul-18	Complete
	BCOES Certified		17-Dec-18	Complete
Rockwood Park West and University Dr Combined Design	50% DDR	DQC	Nov-12	Rejected
	30% Cutoff Wall Design	DQC	Mar-16	Complete
	Initial P&S & DDR	DQC & BCOES	FY20	
	Intermediate P&S & DDR	DQC & BCOES		
	Intermediate P&S & DDR	ATR		
	Final P&S & DDR	DQC & BCOES		
	Corrected Final	Backcheck		
	BCOES Certified			
North Bypass Channel	Initial P&S & DDR	DQC & BCOES	03-Feb-17	Complete
	Intermediate P&S & DDR	DQC & BCOES	01-Sep-17	Rejected
	Intermediate P&S & DDR	ATR & SAR	01-Sep-17	Pending backcheck
	Intermediate P&S & DDR - Revised	DQC & BCOES	On Hold	Pending Funding – T4C current design contract
	Final P&S & DDR	DQC & BCOES		
	Corrected Final	DQC & BCOES		
	BCOES Certified			
	SAR in Construction			
South Bypass Channel	Initial P&S & DDR	DQC & BCOES	FY21	
	Intermediate P&S & DDR	DQC & BCOES		
	Intermediate P&S & DDR	ATR & SAR		

	Final P&S & DDR	DQC & BCOES		
	Corrected Final	DQC & BCOES		
	BCOES Certified			
	SAR in Construction			
Clear Fork and Trinity Point Isolation Gates	15% DDR	DQC	Jun-13	Complete
	30% DDR	DQC	Oct-13	Complete
	Initial P&S & DDR	DQC & BCOES	FY21	
	Intermediate P&S & DDR	ATR & SAR		
	Final P&S & DDR	DQC & BCOES		
	Corrected Final	DQC & BCOES		
	BCOES Certified			
	SAR in Construction			
TRWD Isolation Gate and Pumping Station	Initial P&S & DDR	DQC & BCOES	FY21	
	Intermediate P&S & DDR	DQC & BCOES		
	Intermediate P&S & DDR	ATR & SAR		
	Final P&S & DDR	DQC & BCOES		
	Corrected Final	DQC & BCOES		
	BCOES Certified			
	SAR in Construction			
Gateway Park-Site E	30% P&S & DDR	DQC & BCOES	Feb-15	Complete
	60% P&S & DDR	DQC & BCOES	May-15	Complete
	60% P&S & DDR	ATR	May-15	Pending final backcheck

	Final P&S & DDR	DQC & BCOES	FY21	
	Corrected Final	DQC & BCOES		
	BCOES Certified			
Ham Branch Mitigation	30% P&S	DQC	01-Oct-11	Complete
	90% P&S	DQC	08-Aug-12	Complete
	Final P&S & DDR	DQC & BCOES	FY22	
	Final P&S & DDR	ATR		
	Corrected Final	DQC & BCOES		
	BCOES Certified			
Sam Ave Dam, Marine Creek Dam, Lock and creek expansion	Initial P&S & DDR	DQC & BCOES	FY22	
	Intermediate P&S & DDR	DQC & BCOES		
	Intermediate P&S & DDR	ATR & SAR		
	Final P&S & DDR	DQC & BCOES		
	Corrected Final	DQC & BCOES		
	BCOES Certified			
	SAR in Construction			

Table 8 Schedule

ATTACHMENT 4

Review Plan Revisions

Revision Date	Description of Change	Page/Paragraph Number
27 Aug 2012	Creation of Review Plan	all
22 Oct 2012	Team members added to ATR	p. 15
13 Nov 2012	SWD edits	all
27 Nov 2012	New Format	all
12 Dec 2016	Change in Team Members, Schedule, and Scope of Review Plan	p. 3 & 14-17
16 Mar 2016	Change in Team Members, Schedule, and Scope of Review Plan	p. 3 & 14-17
8 Aug 2017	Change in Team Members, Schedule, format, and Scope of Review Plan	all
21 Sep 2018	Change in Team Members, Schedule, format, and Scope of Review Plan	all
7 Mar 2019	Change in Team Members, Schedule, format, and Scope of Review Plan	all

Table 9 RP Revisions