Agency Technical Review Summary Report

May 2020

For Review Of:

Rio Grande de Manati Flood Risk Management Study, Ciales, Puerto Rico Draft Integrated Feasibility Report & Environmental Assessment

March 2020
Pittsburgh District

Review Management Organization:
FRM PCX

US Army Corps of Engineers ®

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1. Introduction

This Agency Technical Review (ATR) Summary Report documents the ATR performed for the subject product(s). The home District point of contact for the review was Eric Merriam, Lead Planner and Elliott Porter, Project Manager. The ATR team and review was led by Katie Opsahl, Planner, CEMVP-PDF. The FRM-PCX was the Review Management Organization (RMO) responsible for managing the ATR and assuring the overall quality of the review.

2. References

The ATR was conducted in accordance or in coordination with the following documents:

a. Engineering Circular (EC) 1165-2-217, Civil Works Review, dated 20 February 2018.
b. Review Plan, Rio Grande de Manati, January 2019.
c. District Quality Control Report, March 2020

3. Review Details

a. DrChecks^{SM} Review Record

- *Project ID*: PR_RGdM
- *Project Name*: Puetro Rico Grande de Manati
- *Review ID/Edit*: 00003

b. Type of ATR: Draft

c. List of Product(s) Reviewed:

Table 1: Products Reviewed List

Document/Product Title	Approximate Page Count
Integrated Feasibility Report	152
Appendix A – Engineering	209
Appendix B –Environmental	255
Appendix C – Economic Analysis	71
Appendix D – Cost Engineering	22
Appendix E – Real Estate	34
Appendix F – Vertical Team Communications (not for public release)	1
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d. ATR Chronology

Table 2 ATR Chronology highlights specific milestones in the ATR timeline. For more complete ATR timeline refer to the ATR Work Plan's Table 5: ATR Schedule.

Table 2: ATR Chronology

Review Stage	Date
DQC/QA Documents Provided	2 March 2020
Review Documents Provided	24 February 2020
ATR Kickoff Meeting / Start of ATR	24 February 2020
ATR Completed	6 May 2020

4. Background Information

a. Brief Description of the Product(s) Reviewed: Products reviewed included the integrated draft feasibility report and environmental assessment and technical appendices.
b. Prior ATR History: None

5. ATR Team Composition

The ATR team leader (ATR Lead) was selected from outside the home MSC for added independence. The ATR was conducted by a certified review team selected from outside the home district and who were not involved in the day-to-day production of the product(s) reviewed. All the ATR team members, including the ATR Lead, are certified to perform ATR by their respective Communities of Practice.

The composition of the ATR team for this review was based from the study's latest review plan (2. References 1.b.), and the scope and content of the product(s) to be reviewed. The contact information and review roles for each ATR team member are provided in Enclosure 1 along with the PDT information. The experience, qualifications, and certifications of each ATR team member are provided in Enclosure 2.

6. Charge to Reviewers

The charge to reviewers established the specific objectives of the ATR and the specific assessment sought from the ATR team. The charge for this review was developed by the ATR Lead, in consultation with the RMO, Project Delivery Team (PDT), and ATR team as appropriate. It was based on the scope and content of the product(s) reviewed and informed by prior reviews (if any). The charge to reviewers is provided in Enclosure 3.

7. Assessment of DQC

In accordance with Reference 2c, the ATR team examined the relevant DQC records provided by the PDT to assess the apparent adequacy of the DQC effort for the subject product(s). Based on the examination of the DQC records provided, and of the product(s) submitted for review, it appears the DQC effort was adequate.

The DrChecks report appeared robust and contained comments from all disciplines and all comments were resolved.

8. Review Summary and Discussion of Significant Findings

58 comments were received, one was flagged as critical. All comments were closed and no comments require further coordination.

A complete record of ATR comments, responses, and associated resolutions is available in DrChecks^{SM} and a report is provided in Enclosure 4. The following is a summary of the:

a. Significant Closed Comments:

Once comment was flagged as critical (8431325), six comments were rated as high significance or critical without being flagged as critical. A summary of both the critical and significant comments are documented below.

Comment # 8431325 Hydraulics in the Engineering Appendix:
The comment focused on the Manning's n value that was used in the hydraulic modeling and HEC-FDA model. It was noted that the value may be reduced with the implementation of the TSP. The evaluation stated that at the time of the modeling it was unknown what the future with project floodplain would look like, thus the same value was used throughout and the PDT believes most of the uncertainties are captured in the HEC-FDA model as well as the results. The backcheck recommended text be included in the final report explaining that at the time of modeling early in the planning process it was uncertain whether the properties to be purchased would be demolished. Further, assuming that they would not be demolished was believed to be conservative relative to the Manning's n values used; demolition of the buildings would result in lower roughness values and ultimately lower water surface elevations.

Comment # 8422079 Geotechnical
The comment noted that the Engineering Appendix was missing the Rio Grande de Manati, Probability of Failure Expert Opinion Elicitation, dated 19-20 November 2019. The evaluator noted that the incorrect document was originally provided and then provided the correct document which satisfied the commenter and the comment was closed.

Comment # 8435545 Civil and Abbreviated Risk Analysis
The comment noted that contingencies of 40% were arrived at for all quantities most of which are lump sums. Additionally, the Abbreviated Risk Analysis appeared to underestimate the level and lack of quantities backup and level of design development presented within the draft report. Given the minimal information provided for quantities, a higher contingency range may be more appropriate. It was recommended that documentation for designs

be revisited and if needed revisit the CSRA. The evaluation noted that the information in Attachment 5 of the engineering appendix provides the information on quantities. The backcheck noted that without further information related to existing data used and only one cross section used to calculate quantities, the reviewer is uncertain if 40% contingency accurately captures the risks. Despite the backchek comment, the comment was closed without further discussion.

Comment # 8436639 Economics
The comment focused on the benefits for bank stabilization did not account for probability of failure. The action needed to resolve the comment was to provide justification for why the bridges are believed to represent an imminent threat of failure, and indicate whether (and how) the timing and probability of failure have been embodied in the benefit calculations. If they have not been, the benefits analysis will need to be revised to properly account for these variables. The comment was closed after the evaluator noted that recent policy decision for this study resulted in the removal of all bank stabilization analysis and features from the report.

Comment # 8436643 Economics
The comment noted that benefit calculations based on traffic detour/delay impacts are not done correctly. The PDT revised the benefit calculations based on the comment and the benefit to cost ratio was also updated.

Comment # 8437876 Planning
The comment noted that the report lacked a clear presentation of the future without project condition. The report was updated to clearly document the future without project conditions. The comment was closed with no further action.

Comment # 8435540 Civil
The comment noted that the quantities provided in the engineering appendix were lump sums and the reviewer was uncertain as to where the estimated quantities came from for each of the alternatives evaluated. It was recommended that backup methods and calculations be provided, specifically for the TSP, in an appendix. The information was provided to the reviewer and subsequently added to the engineering appendix. The reviewer provided a backcheck recommendation that additional text be added to the appendix to document where there quantities came from. The comment was closed with no further action.

9. Status of Cost Engineering Mandatory Center of Expertise (MCX) Coordination and Certification

The ATR has been coordinated with the Cost Engineering MCX. The review was done at the alternatives level. Cost Certification will occur after the ATR of the final report.

10. Lessons Learned

None

11. Statement of Completion of ATR

A Statement of Completion of Agency Technical Review is provided in Enclosure 5.

Enclosure 1

Contact Information and Review Role(s) of ATR Team & PDT Members

ATR TEAM CONTACT INFORMATION

Name	Office	Discipline	Phone Number
Katie Opsahl	CEMVP-PD-F	ATR Lead / Plan Formulator	(651) 290-5259
Allen Holland	CENWK-PMP-F	Economist / Flood Risk Analysis	(816) 389-3105
Kat McCain	CEMVP-PD-P	Environmental & Cultural Resources	(314) 331-8047
Ken Lampkin	CELRL-ED-T-H	Hydraulic Engineer	(502) 315-6458
Phillip Sauser	CENAP-EC-EB	Structural Engineer	(651) 769-3447
Kirk Sunderman	CEMVR-EC-DM	Civil Engineer	(309) 794-5140
Mike Navin	CEMVS-EC-GT	Geotechnical Engineer	(314) 331-8441
Scott DeSomber	CENWW-ECE	Cost Engineering	(509) 527-7542
Meredith Harmon	CENWK-RE	Real Estate	(816) 389-3557
William Veatch	CEMVN-ED-H	Climate Preparedness & Resilience	(504) 862-2858

PDT CONTACT INFORMATION

Name	Office	Position	Phone Number
Elliott Porter	CELRP-PM-EF	Project Manager	412-395-7479
Jorge Tous	CESAJ-PM-WN	PM Forward	904-763-8587
Andrea Carson	CELRP-PM-EF	Plan Formulation	412-395-7444
Eric R. Merriam	CELRP-PME-F	Plan Formulation	412-395-7185
Susannah Byrd	CELRP-PME-F	Economist	412-395-7164
Erin Stuart	CELRP-PME-V	Environmental Specialist	412-395-7517
John Rusnak	CELRP-EC-NC	Project Engineer/Civil Engineer	412-395-7239
Deepak Neupane	CELRP-ECG-G	Geotechnical Engineer	412-395-7349
Greg Meyer	CELRP-EC-NC	Structural Engineer	412-395-7513
David Druzbicki	CELRC-TS-D-C	Cost Engineer	312-846-5433
Huan Tran	CELRP-ECG-I	Geospatial Specialist	412-395-7512
Christina Urbanczyk	CELRP-ECG-WH	H&H Engineer	412-395-7202
James Kelly	CELRP-RE	Realty Specialist	412-395-7135

Enclosure 2

Experience and Qualifications of ATR Team Members

Katie Opsahl
ATR Lead & Plan Formulation
CEMVP-PD-F
Katie Opsahl is a planner in Regional Environmental Planning Division North, St. Paul District. Katie has been with the U.S. Army Corps of Engineers since 2010. She has served as a lead planner for several Continuing Authorities Program studies and General Investigations focusing on flood risk management and ecosystem restoration. Well versed in USACE planning process, including Risk Informed Planning, IWR Planning Suite, has served on feasibility teams and worked on projects in the design and implementation phase. Other experiences include graduate of USACE Planning Associates Program in 2014, 120-day detail as Planning Specialist for Mississippi Valley Division in 2018, and 120-day detail as Plan Formulation Section Chief in 2019. Katie was certified for Plan Formulation ATR in 2019.
Education: Masters of Urban and Regional Planning, Humphrey School of Public Affairs University of Minnesota, 2011; Bachelors of Science, Recreation and Leisure Services, 2006

Allen Holland
Economist & Flood Risk Analysis
CEMWK-PMP-F
Allen Holland is senior economist at USACE Kansas City District (CENWK), where he has 33 years of experience as a Corps economist and has worked on more than 50 studies with particular emphasis on risk-based economic analyses of flood damage. He is a subject matter expert in flood risk management and dam/levee risk consequence assessment and is certified as an ATR reviewer in these areas by the USACE Planning CoP. He also performs risk and uncertainty ATRs and has served as a technical (DQC) reviewer for both economics and risk on many studies. Mr. Holland's work has included feasibility analyses for existing Federal urban flood risk management projects protecting Kansas City MO/KS, the St. Joseph area (MO/KS), Topeka KS, and Manhattan KS, and he has been involved in Civil Works Review Boards for four major studies that successfully proceeded to design and construction phases. In recent years he has been involved in the evaluation of economic, social, cultural and environmental consequences for

several large-scale, collaborative Missouri River basin studies, including the Missouri River Recovery Program (MRRP) and the Missouri River Stream Bank Degradation Study. The economic analyses for these studies encompass a large range of inland water resource purposes, including flood risk management, water supply and quality, recreation, ecosystem restoration, hydropower, and inland navigation. He also performs consequence analyses for dam and levee safety. Mr. Holland holds a B.A. degree in economics from Park College (now Park University).

Kat McCain, PH.D.
Environmental & Cultural Resources
CEMVP-PD-P
Dr. McCain began her career with the Corps of Engineers, St. Louis District in 2010 as an Ecologist. Prior to the Corps, she was the state-wide floodplain and ecosystem restoration ecologist for the Missouri Department of Conservation. She has been the Regional Planning and Division North Planning Section Chief located in St. Louis since 2013. She is also a Water Resources Certified Planner, PROSPECT instructor for Environmental Impact Assessment course, and the ECO-PCX account manager for the Mississippi Valley Division. Kat has experience with civil works projects within Continuing Authorities, General Investigation, BBA supplemental work, and specifically authorized projects, including the Upper Mississippi River Restoration (UMRR) Program. She has led studies and supported the ecosystem restoration, flood risk management, and coastal storm risk management mission areas. Her primary areas of expertise include restoration ecology, environmental planning, NEPA (EA and EIS; One Federal Decision), environmental compliance (e.g., ESA, FWCA, EFH, CWA, CAA), habitat evaluation and quantification, mitigation, and adaptive management and monitoring.
Education: Bachelor of Arts, summa cum laude, Biology, Augustana College, Rock Island, IL, Minors: Environmental Studies, Geography, and Religion, 2002; Master of Science, Biological Sciences, Western Illinois University, Macomb, IL, July 2004, Emphasis: plant ecology, wetland and riverine ecology, 2004; Doctor of Philosophy, Biology, Kansas State University, Manhattan, KS, Emphasis: Restoration Ecology, 2008; National Environmental Policy Act Certification, Utah State University; graduate certificate, 2017

Kenneth Lampkin, P.E.
Hydraulic Engineer
CELRL-ED-T-H
Mr. Lamkin's expertise includes: Hydrologic and Hydraulic design and evaluation of navigation project and flood risk management projects. Utilization of GIS technology in H&H study and analysis. Familiar with related

hydrologic and hydraulic evaluations including duration curves, erosion studies, application of probabilistic techniques, water surface profiles, steady and unsteady flow modeling (1-D and 2-D) and design calculations.
Since 1998, Mr. Lampkin has served as a hydraulic engineer in the Hydrology and Hydraulic Design Section in the Louisville District. Present responsibilities include providing direction for and execution of H&H portions of Local Protection, Navigation, and Dam Safety projects and studies. Serves as H&H Regional Technical Specialist for LRD (H&H – Navigation). Serves as Hydraulic Engineer for Olmsted Locks and Dam PDT, providing technical input for design and construction related issues for in-the-wet construction and operations. Coordinates and oversees physical and numerical modeling in support of construction and environmental decision making for that project. Also serves as Louisville District Hydropower Coordinator, performing as project manager for multi-discipline teams in review of all aspects of non-federal hydropower development at Louisville District navigation and flood control projects, including design reviews, 33 U.S.C. 408 approvals, and construction coordination. These reviews require understanding the potential for multi-disciplinary impacts to the existing project, including hydrodynamics and navigation, structural, geotechnical, environmental, legal, operations and maintenance.
Served as Hydraulic Engineer for the Louisville District Levee Cadre for East St. Louis BCRA and Plaquemines Parish Risk Assessments, performing complex hydrodynamic 2-D modeling utilizing HEC-RAS and/or FLO-2D in support of team consequence analysis. Has also served as Project Engineer or Hydraulic Engineer for Civil Works Flood Risk Management studies and construction projects, Planning Assistance to States Studies, and other specialized studies, utilizing or developing HEC-HMS, HEC-RAS (Steady- and Unsteady-state) models and other specialized software. These numerical models require use of GIS and geospatial data to improve the accuracy of hydrologic and hydraulic parameters used in these models. Other responsibilities include H&H Inspector and Team Member during Periodic Assessments and Inspections for dams within the Louisville District.
Education: B.S., Engineering Science, University of Louisville1993. M. Eng.; Civil Engineering (Water Resources), University of Louisville 1994' M. Science, Geography and Environmental Resources (Water Resource Planning), Southern Illinois University of Carbondale, 2009

Phillip W. Sauser, P.E.
Structural Engineer
CENAP-EC-EB
Structural Engineer with the US Army Corps of Engineers. Responsibilities include development, implementation, and maintenance of the USACE Hydraulic Steel Structures (HSS) and Bridge Safety Program, design and evaluation of flood control, navigation, and other water control projects,

design and evaluation of HSS and bridges, and inspection of HSS, bridges, and dams. Also serves as the USACE National Technical Specialist for HSS Bridge Safety and Technical Focus Team leader for the USACE HSS and Bridge Safety Programs.
Education: Bachelor of Science in Civil Engineering – South Dakota School of Mines and Technology, Rapid City, South Dakota, 1986**;** Master of Science in Civil Engineering – University of Minnesota, Minneapolis, Minnesota, 1989

Kirk Sunderman, P.E.
Civil Engineer
CEMVR-EC-DM
Mr. Sunderman is known for his expertise on leading regional, multi-discipline, technical design teams on large and complex flood risk management, navigation, and vertical construction projects. He has strong communication and collaboration skills developed through years of experience with customers, public, outside agencies and media outlets. Civil Engineering design skills include site planning and development, utilities, geometric design, civil plans and profile, and 3-D modeling (Inroads and Sketchup). Over 20 years experience in leading flood emergency response teams, conducting levee inspections and modification reviews. Conducted well over a 100 reviews (DQCRs, ATRs, BCOES) on planning, engineering, and construction documents. He co-authored a policy that set MVR guidelines for documenting civil engineering analysis.
Education: Bachelor of Science, Civil Engineering, Iowa State University, 1991

Mike Navin, P.E., PhD
Geotechnical Engineer
CEMVS-EC-GT
Dr. Mike Navin is a Geotechnical Engineer in the St. Louis District, where he started as a CO-OP in 1991 and has 28 years of experience, with a BS from the University of Missouri in 1993, MS and PhD from Virginia Tech (1999 and 2005). Mike is the lead instructor for PROSPECT 250, Seepage and Piping, and taught Earth Pressures and Foundations while at VT. He has been involved with many Risk Assessments for Dams and Levees, typically where seepage related issues are the predominant failure mode, and has served on the PDT for updates the EM's 1110-2-1901, -1913, -1914, and -2502 (those are Seepage, Levees, Relief Wells, and Floodwalls). Performed numerical stress-strain analyses with the program FLAC for his research on column-supported embankments, for the development of the T-Wall design procedure and for other structures in New Orleans that form part of the HSDRRS.

Scott DeSomber, P.E., C.C.E.

Cost Engineering
CENWW-ECE
Mr. DeSomber is a National Technical Specialist in the Cost Engineering Center of Expertise (MCX), located in Walla Walla, WA. He is a civil engineer and applied mathematician with a combined 15 years of experience. He has served as a cost engineer and reviewer on both civil works and military projects spanning from munitions clean-up to lock and dam restoration.
Mr. DeSomber's primary role concerns the maintenance and publication of EP 1110-1-8 and EM 1110-2-1304. However, starting in 2019, he also undertook the role of an ATR reviewer, as the need for additional Cost ATR reviewers has become apparent. He has recently completed ATR reviews for the Newark and Kansas City Districts.
Mr. DeSomber earned a B.S. in Mathematics at Gonzaga University in 2003 and a second B.S. in Civil Engineering at Washington State University, 2013. He obtained his P.E. license in 2017 and is currently registered with the Corps of Engineers as a certified cost engineer.
Mr. DeSomber has served in many lead roles, both developing and reviewing budgets for the U.S. Army Corps of Engineers. He became a USACE Cost ATR reviewer in 2015.

Meredith Harmon
Real Estate
CENWK-RE
Meredith Harmon has worked in Corp real estate for 11 years and is currently the team lead for NWK Civil Cost Shared and MRRP programs. She is the NWK SME for planning projects, educating team members on the planning process, reviewing each REP during DQC and participating in a number of ATRs for FRM and Ecosystem Restoration projects.

William Veatch
Climate Preparedness & Resilience
CEMVN-ED-H
Mr. Will Veatch is a Hydrologist with the New Orleans District. He currently serves in the Water Management Section of the Hydrology and Hydraulics Branch of the New Orleans District, and is also a Regional Technical Specialist for Climate Change Adaptation for the Mississippi Valley Division. Will's responsibilities include river forecasting, regulation of water control structures, data management, and supporting engineering studies and designs with statistical analyses of river flow, precipitation, and coastal water levels. As a technical specialist he supports teams throughout USACE with integration of climate adaptation and resilience into designs and other studies, and through ATR and policy compliance reviews. He is a national Subject Matter Expert in the areas of sea level change and inland hydrology nonstationarity with the Climate Preparedness and Resilience Community of

Practice. He is a member of several interagency teams and has served on international partnership missions in the Netherlands, Brazil, and South Korea. Will holds a BA degree in Environmental Studies (Hydrology focus) from the University of Colorado and an MS degree in Hydrology from the University of Arizona. He is registered Professional Hydrologist with the American Institute of Hydrology.

Enclosure 3

Charge to Reviewers

Charge to Reviewers

A. Objective.

A. The Agency Technical Review Team (ATR Team) will review products/documents listed in Table 1 Products to be Reviewed List of this work plan and ensure they are consistent with established agency criteria, guidance, procedures, and policy for this mission area. The ATR Team will assess whether the analyses presented are technically sound and comply with published Corps guidance, and that the document explains the analyses and results in a reasonably clear manner for the public and decision makers.

The following charge is issued as directive statements to encourage critical thinking by the ATR Team, and will guide the focus of the review.

B. Charge Statement

Specific Technical Charge Questions:

- Do the approaches and methodologies appropriately account for uncertainties associated with, and limitations of, the available data?
- Are the approaches and methodologies used to arrive at the recommended plan appropriate given the level of detail required and information available to the team?
- Does the main report appropriately capture the level of detail provided in the associated appendices?

Specific Policy Charge Questions:

- Do the methods and outcomes provided in the report meet relevant requirements set forth in USACE policy and guidance?

- Do the recommendations and strategies for implementation provided for the stability and scour measures comply with USACE policy and guidance?

Enclosure 4

DrChecks Report of All Comments

Comment Report: All Comments
Project: Puerto Rico_Rio Grande de Manati
Review: FY20 Integrated Feasibility Draft Report ATR Rvw
Displaying 58 comments for the criteria specified in this report.

Id	Discipline	DocType	Spec	Sheet	Detail
8422079	Geotechnical	Planning Report	n/a	n/a	n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**
Coordinating Discipline(s): Geotechnical

Concern. The Engineering Appendix is missing the Rio Grande de Manati, Probability of Failure Expert Opinion Elicitation, dated 19-20 November 2019.
Basis for concern. Without the EOE report it is difficult to assess the basis for the proposed limits of stream bank protection. Section 3.1.2.1 in the Engineering Appendix cited a 1971 report that recommended heavy rocks at the left abutment to PR-145, which should be addressed because it was not in the recommended plan. This section also references a 2012 report that indicated 9 to 16 feet of scour at bridge piers and abutments.
Significance of concern. High.
Possible action to resolve concern. It would be good to compare and contrast scour predicted in these reports with observed performance. Figures 7 to 11 are effective in demonstrating why stone protection is warranted at PR-149. I assume there were not similar observations at PR-6685 and PR-145 bridges.

Submitted By: Michael Navin (314 331-8441). Submitted On: Feb 27 2020

1-0 Evaluation **Concurred**

It appears that the version of Appendix A that was meant for public release was uploaded. The correct file will be uploaded to DrChecks this morning (2/28). I have also emailed you the Appendix A document that has the expert elicitation report included.

Thank you for the quick comment and I apologize for the confusion.

Submitted By: Eric Merriam (412-395-7185) Submitted On: Feb 28 2020

1-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: Michael Navin (314 331-8441) Submitted On: Mar 30 2020

Current Comment Status: **Comment Closed**

8422083	Geotechnical	Planning Report	n/a	n/a	n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**
Coordinating Discipline(s): General

Figure 6 in the Engineering Appendix is mislabeled with PR-149 Bridge pointing to what must be PR-6685 Bridge. Many of the references in the text in the Engineering Appendix are to Figure XX and Table XX. There are also 2 typos in the main report; Section 1.3.1.3 on page 6 should be "while failure in zone 2 is threatening PR?6685" rather than "while failure is zone 2 is threatening PR?6685," and Section 4.1.2 on page 86 references Figure 3-7 which I believe should be Figure 4-1 on the following page.

Submitted By: Michael Navin (314 331-8441). Submitted On: Feb 27 2020

1-0 Evaluation **Concurred**

JR response)
1. Figure 6 in the Engineering Appendix will be revised to reflect PR-6685 bridge.
2. Figure and Table numbers in the Geotechnical Attachment to the Engineering Appendix will be revised to the correct reference.
3. Section 1.3.1.3 in the Planning Report will be revised to make the recommended change.
4. Section 4.1.2 Figure reference will be corrected.

Submitted By: John Rusnak (412-395-7239) Submitted On: Mar 04 2020

1-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: Michael Navin (314 331-8441) Submitted On: Mar 30 2020

Current Comment Status: **Comment Closed**

8422095 Geotechnical Planning Report n/a n/a n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**
Coordinating Discipline(s): Geotechnical

Concern. Engineering Appendix 4.4.2. The assumed temporary cofferdam constructed of a jersey barrier and plastic sheeting would only provide a minimal amount of protection from river flows.
Basis for concern. It is unclear where this would be needed, but would only be effective on horizontal, paved surfaces. Although a typical Jersey barrier stands 32 inches (81 cm) tall, they should not be relied upon to hold more water than a small portion of that height when placed on natural ground because they are relatively narrow and would tilt and be unstable.
Significance of concern. Medium.
Possible action to resolve concern. The cost estimate may need a high contingency for this cofferdam to allow for a different method or surface preparation of an uneven ground surface. Especially for the PR 149 Bridge right pier that appears may be underwater.

Submitted By: Michael Navin (314 331-8441). Submitted On: Feb 27 2020

1-0 Evaluation **Concurred**

Jersey Barriers and sand bags were the initially assumed method of river diversion for the work being considered. Since the initial quantity submission to the Cost Engineer, a quote for long-term rental of a 2000ft long, 7ft high "Portadam" river diversion structure was received. Based on that quote the contingency for that item was increased to 70%. That revised cost is considered reasonable. Also, this portadam is probably more (longer) than we need for the optimized alternative (TSP).

Submitted By: John Rusnak (412-395-7239) Submitted On: Mar 04 2020

1-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: Michael Navin (314 331-8441) Submitted On: Mar 30 2020

Current Comment Status: **Comment Closed**

8426061	Structural	Engineering Appendix	n/a	n/a	n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**
(Document Reference: Appendix A)
Coordinating Discipline(s): Hydraulics

The selected plan includes protection of bridge piers due to existing scour and the potential for additional scour under future floods. The referenced scour report indicates the potential of 9-16 feet of scour and that this will lead to failure of the bridge. However, failure will only occur if the remaining length of embedded pile results in instability. Was this check done in the scour report? Was the bridge classified as scour critical? Are pile lengths documented? The answers to these questions will help determine of countermeasures are needed or not. Please provide a copy of the scour report for review.

Submitted By: Phil Sauser (651-290-5722). Submitted On: Mar 01 2020

1-0 Evaluation **Concurred**

A copy of the referenced scour report (Engineering Appendix paragraph 3.1.2.1) was forwarded on 3 mar 2020 to the reviewer in a separate email. Please provide additional comments (if required) once that document is reviewed.

Submitted By: John Rusnak (412-395-7239) Submitted On: Mar 04 2020

1-1 Backcheck Recommendation **Open Comment**

The scour report includes a recommendation to conduct further evaluation (called Phase 3) to determine impacts from predicted scour. Report Attachment 4 references such an evaluation and indicates the bridge was determined to be at risk from predicted scour (Scour Critical) although no detail was provided as to what that evaluation was and how criticality was determined. Please verify the results of the phase 3 evaluation, or provide a copy of the evaluation, and verify the need for countermeasures. Given the scour countermeasures are included in most alternatives, this should not impact the decision of the selected alternative.

Submitted By: Phil Sauser (651-290-5722) Submitted On: Mar 07 2020

2-0 Evaluation **Concurred**

Copy of Phase 3 Report was provided to reviewer under separate email . Any comments arising from review of this document will be considered and the Engineering Appendix revised as appropriate.

Submitted By: John Rusnak (412-395-7239) Submitted On: Mar 25 2020

2-1 Backcheck Recommendation **Close Comment**

Report confirms scour criticality. I recommend adding a brief summary on the methodology and results of the phase 3 analysis. One to two sentences should suffice. Phase 3 report includes a recommendation for completion of a Phase 4, Recommendations. recommend this also be briefly summarized in the report.

Submitted By: Phil Sauser (651-290-5722) Submitted On: Mar 31 2020

Current Comment Status: **Comment Closed**

8426073	Structural	Engineering Appendix	n/a	n/a	n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**
(Document Reference: Appendix A)
Coordinating Discipline(s): Hydraulics

Reference Figure 17 (incorrectly identified as Figure 16 in paragraph 2.1.4.2). The statement "Height of the floodwall will vary to maintain a constant elevation" is slightly confusing. The exposed height will vary with variations in the terrain, correct? Is the quantity of concrete based on survey data? What if the existing terrain results in a height greater than 8 feet? Is that possible? If so, how does that impact the assumed design and corresponding costs?

Submitted By: Phil Sauser (651-290-5722). Submitted On: Mar 01 2020

1-0 Evaluation **Concurred**

(JRusnak response)

1. Figure 16 has been revised per comment.

2. Height of floodwall will vary based on topography although top elevation to be at or just above 25 year flood elevation.

3. Concrete quantities were not based on survey data rather they were based on the cross section provided (eight-foot maximum height) applied consistently along the wall perimeter.

4. For the purposes of this report and cost estimate, the wall was based on the cross section provided.

5. No alternate wall style was considered. Any design departing from that anticipated will probably increase cost.

6. As an aside, the wall is not included in the TSP (Recommended Plan)

Submitted By: John Rusnak (412-395-7239) Submitted On: Mar 04 2020

1-1 Backcheck Recommendation **Close Comment**
Response is sufficient.

Submitted By: Phil Sauser (651-290-5722) Submitted On: Mar 31 2020

Current Comment Status: **Comment Closed**

8426075	Structural	Engineering Appendix	n/a	n/a	n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**
(Document Reference: Appendix A, page 45)

See last sentence. Please clarify bridge failure mode and how the bridge deck is lost when the bridge is overtopped.

Submitted By: Phil Sauser (651-290-5722). Submitted On: Mar 01 2020

1-0 Evaluation **Concurred**
See response to comment 8426076. A copy of the draft Expert Opinion Elicitation was provided to the reviewer in a separate email.

Submitted By: John Rusnak (412-395-7239) Submitted On: Mar 04 2020

1-1 Backcheck Recommendation **Open Comment**
See response to comment 8426076.

As written, the failure mode is loss of bridge deck whereas I believe the failure includes the entire bridge. Please clarify.

Submitted By: Phil Sauser (651-290-5722) Submitted On: Mar 31 2020

2-0 Evaluation **Concurred**
As stated ... "The elicitation team identified the 0.01 AEP flood event as the threshold event that would result in increased risk of failure due to erosion and scour."
Bridge deck failure (or for the purpose of this report "bridge failure") was presumed once the water surface exceeded the elevation of the bottom chord.

The team did not discriminate between deck failure and bridge failure in this regard.

Submitted By: John Rusnak (412-395-7239) Submitted On: Apr 07 2020

2-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Phil Sauser (651-290-5722) Submitted On: Apr 15 2020

Current Comment Status: **Comment Closed**

8426076	Structural	Engineering Appendix	n/a	n/a	n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**
(Document Reference: Appendix A, Attachment 4)

Please provide the draft Expert Opinion Elicitation for review.

Submitted By: Phil Sauser (651-290-5722). Submitted On: Mar 01 2020

1-0 Evaluation **Concurred**
A copy of the draft Expert Opinion Elicitation was provided to the reviewer in a separate email.

Submitted By: John Rusnak (412-395-7239) Submitted On: Mar 04 2020

1-1 Backcheck Recommendation **Open Comment**
Provide documentation that qualifies the elicitation team members as experts in the fields related to this evaluation.

Submitted By: Phil Sauser (651-290-5722) Submitted On: Mar 31 2020

2-0 Evaluation **Concurred**
Elicitation team members qualifications has been added to the Draft Elicitation Report (Attachment to Engineering Appendix)

Submitted By: John Rusnak (412-395-7239) Submitted On: Apr 07 2020

2-1 Backcheck Recommendation **Close Comment**
The attached serves as an acceptable response. USACE guidance appears to be fairly loose on this topic and I believe it is important to document the process and why the process chosen is acceptable. This includes level of expertise needed, consequences of failure, risks associated with the process, amount and quality of data needed versus what was used, and resolution of the various expert opinions into a final opinion.

Submitted By: Phil Sauser (651-290-5722) Submitted On: May 04 2020 (Attachment: RE__Rio_Grande_-_ATR_remaining_comments_.msg)

Current Comment Status: **Comment Closed**

8427535	Real Estate	Feasibility Study	9	n/a	n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**
Coordinating Discipline(s): Real Estate

REVIEW CONCERN: REP has conflicting statements on NFS land ownership within the project. NFS owns no land vs NFS owns river banks + 3 meters. REP needs to identify NFS lands which may be used for the project and include maps/tables to reflect.

_____

BASIS FOR THE CONCERN: ER405-1-12 Chapt 12

_____

SIGNIFICANCE OF THE CONCERN: Med

_____

ACTION NEEDED TO RESOLVE THE CONCERN: Determine what lands the NFS owns which may be used for the project. Update section 9 of the report, maps and tables.

Submitted By: Meredith Harmon (816-389-3557). Submitted On: Mar 02 2020

1-0 Evaluation **Concurred**

The maps and tables will be updated when the property is surveyed for the final acquisition maps and appraisals.

Submitted By: James Kelly (412-395-7135) Submitted On: Mar 24 2020

1-1 Backcheck Recommendation **Close Comment**

Concur with path forward

Submitted By: Meredith Harmon (816-389-3557) Submitted On: Mar 31 2020

Current Comment Status: **Comment Closed**

8427552 Real Estate Feasibility Study 21 n/a n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**
Coordinating Discipline(s): Real Estate

REVIEW CONCERN: REP states utility relocations have not been identified. Utility relocations can have a significant impact on project costs and schedule. Main report also does not address utility relocations.

_____

BASIS FOR THE CONCERN: ER405-1-12 Chapt 12, PGN

_____

SIGNIFICANCE OF THE CONCERN: med

_____

ACTION NEEDED TO RESOLVE THE CONCERN: Identify impacted utilities and discuss how the project will address them. Preform a realty assessment or Attorney's Opinion of Compensability to determine if the relocations would take place with project funds.

Submitted By: Meredith Harmon (816-389-3557). Submitted On: Mar 02 2020

1-0 Evaluation **Concurred**

Utility Relocations will be identified at the PED stage and a realty assessment will be performed then.

Submitted By: James Kelly (412-395-7135) Submitted On: Mar 24 2020

1-1 Backcheck Recommendation **Close Comment**

Path forward is very risky and it could add significant project costs.

Submitted By: Meredith Harmon (816-389-3557) Submitted On: Mar 31 2020

Current Comment Status: **Comment Closed**

8427586 Real Estate Feasibility Study 26 n/a n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

REVIEW CONCERN: Project schedule and RE acquisition schedule do not align. Acquiring 67 tracts will not be completed in the 18 months outlined in the feasibility study for design, advertisement and award.

_____
BASIS FOR THE CONCERN: ER405-1-12

_____
SIGNIFICANCE OF THE CONCERN: low

_____
ACTION NEEDED TO RESOLVE THE CONCERN: Team needs to coordinate and set realistic project schedule for PED/Construction

Submitted By: Meredith Harmon (816-389-3557). Submitted On: Mar 02 2020

1-0 Evaluation **Concurred**
The Project scheduled was revised and the acquisition schedule was changed to 36 month.

Submitted By: James Kelly (412-395-7135) Submitted On: Mar 24 2020

1-1 Backcheck Recommendation **Close Comment**
Concur with path forward

Submitted By: Meredith Harmon (816-389-3557) Submitted On: Mar 31 2020

Current Comment Status: **Comment Closed**

8427623	Real Estate	Feasibility Study	Exhibit A	n/a	n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

REVIEW CONCERN: REP is missing "exhibit a" the NFS capability checklist. This document is vital to ensure the NFS is prepared for and understands its requirement for the project. It should be included within the REP

_____
BASIS FOR THE CONCERN: ER405-1-12 Chapt 12

_____
SIGNIFICANCE OF THE CONCERN: low

_____
ACTION NEEDED TO RESOLVE THE CONCERN: Work with the NFS to completed the capability checklist.

Submitted By: Meredith Harmon (816-389-3557). Submitted On: Mar 02 2020

1-0 Evaluation **Concurred**
The NFS checklist was obtained from the Sponsor and added to the REP.

Submitted By: James Kelly (412-395-7135) Submitted On: Mar 24 2020

1-1 Backcheck Recommendation **Close Comment**
concur with path forward

Submitted By: Meredith Harmon (816-389-3557) Submitted On: Mar 31 2020
Current Comment Status: **Comment Closed**

8429138 Cost Engineering Cost Estimate n/a n/a n/a
Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

1 General Information of Cost ATR

1.1 FOR INFORMATION ONLY: The following Cost ATR is in support of the Tentatively Selected Plan (TSP). The TSP level review will consider consistency and fairness in estimate development for each alternative, clear indication of each alternative and traceability to the main report. For the estimates, TSP level review will focus on higher level scoping comments, consistency in supporting databases (estimate dates, labor rates, cost book, equipment), prime and subcontractor markups and assignments, major unit prices in materials, crews and installation, contingencies.

1.2 FOR INFORMATION ONLY: The TSP review does not include a separate Cost DX ATR Certification. The certification is reserved for funding level documents such as the recommended plan. The recommended plan will require a more thorough cost ATR and focus on the following products: Main Report, record of DQC and quantities, MCACES MII estimates, project and construction schedule, risk-based contingencies, total project cost summary and cost appendix.

1.3 FOR INFORMATION ONLY: Quantities, unit prices, and estimate in general appear to be well organized and supported by historical costs. Notes are present in quantity development to support assumptions made.

Submitted By: Scott DeSomber ((509) 527-7542). Submitted On: Mar 03 2020

1-0 Evaluation **Concurred**
Concur, No action required.

Submitted By: David Druzbicki (312-846-5433) Submitted On: Mar 04 2020

1-1 Backcheck Recommendation **Close Comment**
No action required

Submitted By: Scott DeSomber ((509) 527-7542) Submitted On: Mar 30 2020
Current Comment Status: **Comment Closed**

8429140 Cost Engineering Cost Estimate n/a n/a n/a
Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

2 Documents Received

2.1 FOR INFORMATION ONLY: The following documents were received 26 Feb 2020.

• Abbreviated Risk Analyses
o Manati ARA Alt 1 2.18.20.xlsx
o Manati ARA Alt 2 2.18.20.xlsx
o Manati ARA Alt 3 2.18.20.xlsx
o Manati ARA Alt 3 Opt 2.18.20.xlsx
o Manati ARA Alt 4 2.18.20.xlsx
• Estimate
o Rio G de Manati Alternatives 2_3_20.mlp
• Quantities
o Demo - Alt 3 Optim BuyoutStructuresInformation_forCosting.xlsx
o Manati Prevous Levee Floodwall Design Cost for Alt 1.msg
o Rio Grande Manati_ALT 2 Channel Improve Qty 8_14_19 NPL Checkeds.xlsx
o Rio Grande Manati_ALT 4 Channelization Qtys.pdf
o Rio Grande Manati-Alt 3 Optimized Qtys_Rev 23 JAN 20.pdf
o Rio Grande Manati-Alts 1 and 3 Qtys.pdf
• O&M
o Rio Manati O&M Costs.xlsx
• Schedules
o Construction Schedule Alt 3 Rio Grande de Manati 02_05_20.mpp
• TPCSs
o Rio Grande de Manati Alt 1 TPCS 02_19_20.xlsx
o Rio Grande de Manati Alt 2 TPCS 02_19_2020.xlsx
o Rio Grande de Manati Alt 3 Optimized TPCS 02_19_20.xlsx
o Rio Grande de Manati Alt 3 TPCS 02_19_20.xlsx
o Rio Grande de Manati Alt 4 TPCS 02_19_20.xlsx
• Reports Elements
o Integrated_Feasibility_Report.pdf
o Appendix_D_-_Cost_Engineering.pdf

2.2 FOR INFORMATION ONLY: Files received are well organized and complete. Values are typically consistent across documents.

Submitted By: Scott DeSomber ((509) 527-7542). Submitted On: Mar 03 2020

1-0 Evaluation **Concurred**
Concur, no action required.

Submitted By: David Druzbicki (312-846-5433) Submitted On: Mar 04 2020

1-1 Backcheck Recommendation **Close Comment**
No action required.

Submitted By: Scott DeSomber ((509) 527-7542) Submitted On: Mar 30 2020
Current Comment Status: **Comment Closed**

8429141	Cost Engineering	Cost Estimate	n/a	n/a	n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

3 Cost Estimates

3.1 FOR INFORMATION ONLY: Quantities provided were spot checked within the estimate. Estimate quantities matched, and the estimate contained notes to explain assumptions made to obtain costs from quantities. Assumptions appear to be reasonable.

3.2 FOR INFORMATION ONLY: Estimate markups, labor, fuel, and equipment all appear to be reasonable.

Submitted By: Scott DeSomber ((509) 527-7542). Submitted On: Mar 03 2020

1-0 Evaluation **Concurred**
Concur, no action required.

Submitted By: David Druzbicki (312-846-5433) Submitted On: Mar 04 2020

1-1 Backcheck Recommendation **Close Comment**
No action required.

Submitted By: Scott DeSomber ((509) 527-7542) Submitted On: Mar 30 2020

Current Comment Status: **Comment Closed**

8429142	Cost Engineering	Other	n/a	n/a	n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

4 Contingency/Risk Register

4.1 FOR INFORMATION ONLY: Calculated contingencies in ARA's are all around 40%. Risks and contingency magnitude appear to be reasonable.
• Primary Risks for the TSP are as follows
1. CE-3 Site Access: Channel is difficult to access due to steep slopes and bridges. Small equipment may need to be brought in order to access channel from under the bridges, making productivities slower. Water diversion and bypass pumping / dewatering may be needed.
? $625,484 contributed to contingency.
2. EST-3 Bank Protection: The cost estimate considers the provided quantities plus possible waste. The estimate has been developed based on the provided SOW from the PDT. The cost estimator used other PR projects as a base reference to increase the cost estimate accuracy. In addition, the cost estimator established various assumption to fill unknowns. If any of the information used for the development of the cost estimate change, the final cost will be affected. The magnitude will vary according to the change. Labor rates used are National Rates which are considerably higher than current PR rates, this should help mitigate upside of cost risk.
? $443,772 contributed to contingency.
3. AS-3 Bank Protection: 8a or small business for acquisition.
? $404,568 contributed to contingency.
3. T-3 Bank Protection: May need additional qty by the time work is done due to changing conditions.

? $404,568 contributed to contingency.

Submitted By: Scott DeSomber ((509) 527-7542). Submitted On: Mar 03 2020

1-0 Evaluation **Concurred**
Concur, no action required.

Submitted By: David Druzbicki (312-846-5433) Submitted On: Mar 04 2020

1-1 Backcheck Recommendation **Close Comment**
No action required.

Submitted By: Scott DeSomber ((509) 527-7542) Submitted On: Mar 30 2020
Current Comment Status: **Comment Closed**

8429145 Cost Engineering Other n/a n/a n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

5 OTHER

5.1 FOR INFORMATION ONLY: 30 & 31 Account Percentages: TPCS shows 30 account percentage of 17% and 31 account at 8%. At first glance, these values appeared to be low. However, given the scope and duration of the TSP, these percentages appear to be reasonable.

Submitted By: Scott DeSomber ((509) 527-7542). Submitted On: Mar 03 2020

1-0 Evaluation **Concurred**
Concur, no action required.

Submitted By: David Druzbicki (312-846-5433) Submitted On: Mar 04 2020

1-1 Backcheck Recommendation **Close Comment**
No action required.

Submitted By: Scott DeSomber ((509) 527-7542) Submitted On: Mar 30 2020
Current Comment Status: **Comment Closed**

8429146 Cost Engineering Cost Estimate n/a n/a n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

3.3 Contracting Plan
• CONCERN: Reviewing assigned contractors showed that the prime contractor and subcontractor are both excavation contractors. Please review assigned contractors to ensure consistent assignment across all alternatives and features. How is contractor assignment being determined?
• EXAMPLE 1: Alt 3 Optimized, bank protection, clearing and grubbing (Sub Assigned) vs. Alt 4, Concrete Channel, Clearing and Grubbing (Prime Assigned)
• EXAMPLE 2: Alt 1, bridge scour, riprap (sub assigned) vs. Alt 1, bank protection, riprap (Prime Assigned)
• SIGNIFICANCE: Minor

• RESOLUTION: Review the estimate of alternatives and ensure a consistent contracting plan for all alternatives in which the prime contractor and subcontractor perform consistent features of work across all alternatives. Add notes to contractor (MII contractor tab) to describe assumed capabilities and specialties of at least the prime contractor. Description of subcontractor can be catch all that is employed when work is outside of prime assumed specialization.

Submitted By: Scott DeSomber ((509) 527-7542). Submitted On: Mar 03 2020

1-0 Evaluation **Concurred**

Concur. I tried to maintain about a 50% prime usage for the various alternatives. I assumed that with the large influx of supplemental funding there will be a fairly high amount of work that will be need to be done by subcontractors.

Submitted By: David Druzbicki (312-846-5433) Submitted On: Mar 24 2020

1-1 Backcheck Recommendation **Close Comment**

Explanation provided is sufficient and reasonable.

Submitted By: Scott DeSomber ((509) 527-7542) Submitted On: Mar 30 2020

Current Comment Status: **Comment Closed**

8429147	Cost Engineering	Cost Estimate	n/a	n/a	n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

3.4 Quantities
• CONCERN: Quantities in takeoff do not match those within estimate and/or are not completely understood.
• INSTANCES:
o Alt 1. & 3 Takeoff does not match MII
? Bank Protection
• Clear and Grub
• Excavation
• Backfill
• Filter Layer
• Geotextile
• Rip Rap
o Alt 2
? Bridge Scour
• MII contains quantities of Rio Grande Manati – Alts 1 and 3 Qtys.pdf. Is this correct?
? Bank Protection
• Quantities not found to support estimate.
? Floodwall – WWTP
• Quantities not found to support estimate.
o Alt 3
? No issues
o Alt 3 Opt.
? No issues
o Alt 4

? 1,800,000 SF at 9" used in MII, 53,350 CY in takeoff. These are close but don't match exactly. Waste is in unit price.
• SIGNIFICANCE: Unknown.
• RESOLUTION: Review quantities in takeoffs and estimate. Make changes as needed so that estimate and takeoffs match.

Submitted By: Scott DeSomber ((509) 527-7542). Submitted On: Mar 03 2020

1-0 Evaluation **Concurred**
Concur. Quantities have been verified and MII adjusted as needed.

Submitted By: David Druzbicki (312-846-5433) Submitted On: Mar 24 2020

1-1 Backcheck Recommendation **Close Comment**
Backcheck quantities and/or estimate have been adjusted to both match. Issues resolved.

Submitted By: Scott DeSomber ((509) 527-7542) Submitted On: Mar 30 2020
Current Comment Status: **Comment Closed**

8429148 Cost Engineering Cost Estimate n/a n/a n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

5.2 Midpoint of Construction – Alt. 3 TPCS
• CONERN: Construction schedule shows construction starting 9/22/22 and ending 6/27/25. TPCS uses 2021Q4 as midpoint of construction.
• SIGNIFICANCE: Minor
• RESOLUTION: Adjust TPCS to match construction schedule. Check other alternatives too for the correct midpoint of construction since 2021Q4 appears to be used across the board. Adjust as needed.

Submitted By: Scott DeSomber ((509) 527-7542). Submitted On: Mar 03 2020

1-0 Evaluation **Concurred**
Concur. Schedules and midpoints have been updated.

Submitted By: David Druzbicki (312-846-5433) Submitted On: Mar 24 2020

1-1 Backcheck Recommendation **Close Comment**
TPCS midpoints have been updated as requested.

Submitted By: Scott DeSomber ((509) 527-7542) Submitted On: Mar 30 2020
Current Comment Status: **Comment Closed**

8431321 Hydraulics Feasibility Study n/a pg 50 n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**
(Document Reference: 3.3.3)

" The channel was designed to maximize benefit
within the existing channel morphology and to minimize the need to alter existing public and provide infrastructure."

What AEP was identified as having the maximum benefit? It states later in document 0.1 AEP. Add more discussion here as to how it was arrived at this AEP as basis for design.

Submitted By: Ken Lamkin (502-315-6458). Submitted On: Mar 04 2020

1-0 Evaluation **Check and Resolve**
PDT to check and resolve in that this statement may have been based on the HEC-FDA output or may have been referring to the use of the 0.1 AEP because of Maria's impacts during the expert elicitation.

Submitted By: John Rusnak (412-395-7239) Submitted On: Mar 20 2020

1-1 Backcheck Recommendation **Close Comment**
Revised language in document seems to add adequate explanation

Submitted By: Ken Lamkin (502-315-6458) Submitted On: Apr 14 2020

2-0 Evaluation **Concurred**
Concur

Submitted By: John Rusnak (412-395-7239) Submitted On: Apr 07 2020

Backcheck not conducted

Current Comment Status: **Comment Closed**

8431323	Hydraulics	Engineering Appendix	n/a	n/a	n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**
(Document Reference: 1.2.3.2.1)

I think it needs to be briefly stated why there was a need to add the LiDAR data, and qualitatively describe any significant areas with differences to existing model. Briefly discuss re-calibration

Submitted By: Ken Lamkin (502-315-6458). Submitted On: Mar 04 2020

1-0 Evaluation **Concurred**
(C Urbanczyk response after discussing with JRusnak and PM)(PM and JR concur)
Post-Maria LiDAR was not available at the commencement of this study, and the PDT was directed by the vertical team to use available, pre-Maria LiDAR due to the condensed timeline. It is recommended that post-Maria LiDAR be incorporated into the hydraulic model, wherever available, and that new wet sections be surveyed. Based on imagery pre- and post-Maria, the overbank land cover appear to be similar, although the channel

geometry is noticeably different in certain areas, particularly around bends due to sediment erosion and deposition.
The hydraulic model was retrieved from FEMA and was previously calibrated based on the available data at the time. No new data was available at the commencement of this study, so the FEMA model was assumed to be representative of existing conditions. The PDT is aware of the limitations of the FEMA model and highly recommends the incorporation of new LiDAR and survey data and re-calibration during the design phase. Text will be added to the report to provide more explanation based on this comment.

Submitted By: John Rusnak (412-395-7239) Submitted On: Mar 20 2020

1-1 Backcheck Recommendation **Close Comment**
Copy/pasting this response into the document will satisfactorily resolve this comment.

Submitted By: Ken Lamkin (502-315-6458) Submitted On: Mar 30 2020
Current Comment Status: **Comment Closed**

8431324	Hydraulics	Engineering Appendix	n/a	n/a	n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**
(Document Reference: 1.2.3.2.2)

"Overall changes to the resulting water surface profiles in the existing conditions model was, on average, less than one foot."

What was the range of changes?

Submitted By: Ken Lamkin (502-315-6458). Submitted On: Mar 04 2020

1-0 Evaluation **Concurred**
Revise language to read...
Water Surface Elevation difference ranged from 0.1 ft. (0.3% during the 50-yr event) to 2.7 ft. (4.4 % during the 500-yr event).

Note that this pertains to the difference in WSE from correcting the flow change locations from the original model to the FWOP that we used (which is what the comment was referencing)- this isn't reflective of the change in WSE from the original model to the TSP

Submitted By: John Rusnak (412-395-7239) Submitted On: Mar 17 2020

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Ken Lamkin (502-315-6458) Submitted On: Mar 30 2020
Current Comment Status: **Comment Closed**

8431325	Hydraulics	Engineering Appendix	n/a	n/a	n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**
(Document Reference: 3.3.1.4.1.1) [**Critical/Flagged.**]

"No modifications to the geometry were made to account for the properties that are proposed to be bought out (relocation of residents in the 0.04 AEP floodplain) because it is unknown whether the properties would be demolished."

Through out the main report it says that the structures in the 0.04 AE floodplain would be demolished. Therefore some reduction in Manning's n should be appropriate?

Submitted By: Ken Lamkin (502-315-6458). Submitted On: Mar 04 2020

1-0 Evaluation **Concurred**

(JR response)
At the time of the modeling, it was unknown as to whether the properties / homes were to be bought out and remain OR if they were to be bought and demolished post buy-out. Thus the Manning's n value was not changed.
There are many uncertainties within the project (and model) and we believe most of these uncertainties are captured within the current HEC-FDA model as well as the results produced by this model.

Submitted By: John Rusnak (412-395-7239) Submitted On: Mar 10 2020

1-1 Backcheck Recommendation **Close Comment**

Discussion needs to say something to the effect that at time of modeling early in the planning process it was uncertain whether the properties to be purchased would be demolished. Assuming that they would not be demolished was believed to be conservative relative to the Manning's n values used; demolition of the buildings would result in lower roughness values and ultimately lower water surface elevations.

Submitted By: Ken Lamkin (502-315-6458) Submitted On: Mar 30 2020

Current Comment Status: **Comment Closed**

8433254 General Planning Report n/a n/a n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

PDF with comment bubbles and word document provided with minor editorial changes for team to consider.

Submitted By: Kathryn Mccain (314-331-8047). Submitted On: Mar 05 2020

1-0 Evaluation **Concurred**

All comments in the PDF have been addressed. A response to comments document was sent back to the reviewer via email.

Submitted By: Eric Merriam (412-395-7185) Submitted On: Mar 24 2020

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Kathryn Mccain (314-331-8047) Submitted On: Mar 30 2020
Current Comment Status: **Comment Closed**

8433256 Environmental Planning Report n/a n/a n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**
(Document Reference: Section 3.5.2.2)

Concern: Unclear impacts to soils and prime farmlands. Alternative narratives state impacts to soils/prime farmlands would occur, but then states no significant impacts. AD1006 not prepared to compare/quantify alternatives nor mentioned that it would be completed in the future if during PED prime soils would be impacted by recommended plan.

Basis: 7 USC 4201; CEQ 1508.27 (b)3

Significance: Low

Recommendation: Quantify the impacts to better articulate why those impacts are not significant. For example. Alternative 1 would impact approximately 5 acres of soils classified as prime farmland; however, within the study area there is 200 acres of prime farmland; the conversion of 2.5% of prime farmland was determined to be not significant.
Add sentence about that an AD1006 would be completed in the future if during PED the recommended plan was found to impact prime farmlands.

Submitted By: Kathryn Mccain (314-331-8047). Submitted On: Mar 05 2020

1-0 Evaluation **Concurred**
Concur. Impacts quantified and sentence added regarding completion of AD1006 in PED if prime farmlands will be impacted by recommended plan. Information added to sections 3.5.2.2, 5.1.2.2, and 5.4.8 in report.

Submitted By: Erin Stuart (412-395-7517) Submitted On: Mar 09 2020

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Kathryn Mccain (314-331-8047) Submitted On: Mar 19 2020
Current Comment Status: **Comment Closed**

8433259 Environmental Planning Report n/a n/a n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**
(Document Reference: Section 3.5 and Chapter 5)

Concern: Incomplete information about alternatives (section 3.5) and the proposed actions (chapter 5 – recommended plan) related to direct effects vs. indirect effects

Basis: NEPA 102(2)(C)iii; CEQ 1502.22; 1502.16; 1508.27(b); 1508.7

Significance: Medium

Recommendation: Clearly call out direct effects vs indirect effects of proposed actions on all the resources in Chapter 3 and Chapter 5. It appears that the Cultural section (3.5.7) is the only resource that calls out direct vs indirect effects.

Submitted By: Kathryn Mccain (314-331-8047). Submitted On: Mar 05 2020

1-0 Evaluation **Concurred**

Concur. Paragraphs added to the beginning of sections 3.5 and 5.1. Indirect effects are specified in the environmental resource categories where appropriate under sections 3.5 and 5.1.

Submitted By: Erin Stuart (412-395-7517) Submitted On: Mar 09 2020

1-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: Kathryn Mccain (314-331-8047) Submitted On: Mar 19 2020

Current Comment Status: **Comment Closed**

8433263 Environmental Planning Report n/a n/a n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**
Coordinating Discipline(s): General

Concern: List of Preparers not provided

Basis: 1502.17; 1502.18

Significance: Low

Recommendation: Per CEQ include list of names and experience of persons primarily responsible for preparing NEPA document

Submitted By: Kathryn Mccain (314-331-8047). Submitted On: Mar 05 2020

1-0 Evaluation **Concurred**

Concur. List of preparers added to report.

Submitted By: Erin Stuart (412-395-7517) Submitted On: Mar 09 2020

1-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: Kathryn Mccain (314-331-8047) Submitted On: Mar 19 2020

Current Comment Status: **Comment Closed**

8433264	Environmental	Planning Report	n/a	n/a	n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**
Coordinating Discipline(s): General

Concern: Distribution List not provided

Basis: 1502.19

Significance: Low

Recommendation: Include distribution list of groups or individuals that the draft report was sent to ensure full and honest notification and disclosure.

Submitted By: Kathryn Mccain (314-331-8047). Submitted On: Mar 05 2020

1-0 Evaluation **Concurred**
Concur. Distribution list added to 5.5.2 in report.

Submitted By: Erin Stuart (412-395-7517) Submitted On: Mar 09 2020

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Kathryn Mccain (314-331-8047) Submitted On: Mar 19 2020
Current Comment Status: **Comment Closed**

8435501	Civil	Feasibility Study	Last sentence of Section 3.	Page 4 of 152.	n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**
(Document Reference: Main Report)
Coordinating Discipline(s): Project Management

Review Concern: Additional economic analysis determined the floodwall to protect the waste water treatment plant was not incrementally justified.

Basis for Concern: There may be other measures to consider to improve the situation in lieu of a floodwall.

Significance of Concern: Low - Creation of a more holistic Tentatively Selected Plan.

Recommended Action to Resolve Concern: If not already looked at, consider a measure for the WWTP that is less expensive than construction of a floodwall. Flood proofing the facilities to make equipment and physical features resilient to flood inundation and overtopping. Determine if there are easier actions such as elevating power or control equipment if existing locations are at risks from flooding.

Submitted By: Kirk Sunderman (309-794-5140). Submitted On: Mar 06 2020

1-0 Evaluation **Concurred**

floodproofing was considered (but not costed out) and listed in the initial set of FR measures considered for the WWTP. At the time of initial screening it was considered impractical and screened out of consideration. One of the reasons why was the need to elevate ALL components approximately eight to ten feet above finished floor level (ant that was for protection from the approx. 25 year storm). A flood wall was considered more applicable to the location.

Submitted By: John Rusnak (412-395-7239) Submitted On: Mar 20 2020

1-1 Backcheck Recommendation **Close Comment**

Noted

Submitted By: Kirk Sunderman (309-794-5140) Submitted On: Mar 30 2020

Current Comment Status: **Comment Closed**

8435515	Civil	Feasibility Study	Section 4.1.1 Non-Structural Relocation	Page 108 of 152.	n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**
(Document Reference: Main Report)
Coordinating Discipline(s): Planning - Plan Formulation

Review Concern: Zoning/restrictions of land after structures are bought out and removed is not prominently presented under the Tentatively Selected Plan. Somewhat touched on in section 4.7.5 Project-Specific Considerations.

Basis for Concern: Planned future zoning or restrictions is not for properties having current structures removed from them is not stated within the main text of the recommended plan. Unfamiliar as to how effective the local sponsor will be in administering and maintaining compliance of restricted zoning areas.

Significance of Concern: Low - Important that the local sponsor understands the future restrictions that will be required on the properties to be bought out. Prevention of future structures being built and prevention of fill material placement that could inhibit floodplain conveyance.

Recommended Action to Resolve Concern: State if this will be a FEMA, USACE or local buyout program where the land is deeded to the local government with its use restricted to open space where no future structures can be built or fill material allowed. The land must remain open and at its current elevation in perpetuity. State permissible uses the land may have in the future.

Submitted By: Kirk Sunderman (309-794-5140). Submitted On: Mar 06 2020

1-0 Evaluation **Concurred**

The following section was added to both the description of the original relocation alternative and the description of the recommended plan:

"The local sponsor would retain ownership of the acquired property and must ensure no future development or fill would occur; however, the acquired area could be deeded to

the local government converted to undeveloped public space (e.g., recreational/sports fields)."

Submitted By: Eric Merriam (412-395-7185) Submitted On: Mar 20 2020

1-1 Backcheck Recommendation **Close Comment**
Verified response is now in report.

Submitted By: Kirk Sunderman (309-794-5140) Submitted On: Mar 30 2020
Current Comment Status: **Comment Closed**

8435523	Civil	Feasibility Study	Section 4.6 OMRR&R	Page 119 of 152.	n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**
(Document Reference: Main Report)
Coordinating Discipline(s): Planning - Plan Formulation

Review Concern: Future commitment from local sponsor on OMRR&R and inspections.

Basis for Concern: Based on other recovery projects and emergency engineering support operations, much of the country's existing infrastructure has not been adequately funded or maintained.

Significance of Concern: Medium - Accountability for federal dollars spent at the front end to operate throughout the planned life span.

Recommended Action to Resolve Concern: Recommend consideration be given to have designs on this project be both robust and resilient to account for minimum maintenance that may occur over its life span. Items might include having thicker layers of revetment or weighted toes beyond the minimums provided by design guidance.
Report should set the stage for the local sponsor to take the necessary steps to qualify the system into the PL84-99 program to insure formal inspections will be conducted by USACE on an annual basis. USACE inspection reports often serve as the accountability factor and impetus for local entities to fund and correct deficiencies found during inspections.

Submitted By: Kirk Sunderman (309-794-5140). Submitted On: Mar 06 2020

1-0 Evaluation **Concurred**
Conceptual FR measures within the TSP are considered robust. The type and size of riprap is to be the largest size that addresses flood risk reduction requirements, streambank protection requirements and which is commercially available. These criteria were balanced against the cost of implementing the Recommended Plan.

The PDT recognizes and it should be further acknowledged that certain aspects of the Recommended Plan design may change as the design is refined (and heads into the PED Phase) based on updated site conditions.

Additionally, although the goal is not to set the project up to be included in the PL84-99

Program, that discussion can occur at a later date.

Submitted By: John Rusnak (412-395-7239) Submitted On: Mar 17 2020

1-1 Backcheck Recommendation **Close Comment**
Concur with evaluation.

Submitted By: Kirk Sunderman (309-794-5140) Submitted On: Mar 30 2020

Current Comment Status: **Comment Closed**

8435533 Civil Feasibility Study Section 3.2.1.2 Bridges n/a n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**
(Document Reference: Engineering Appendix A)
Coordinating Discipline(s): Project Management

Review Concern: Design of bridge PR-145 designated as "still under construction" per the main report.

Basis for Concern: Uncertainty on new design and how it fits into the channel conveyance (will there be more flowage capacity, the same, or less) as it pertains to the recommended plan. Expert elicitation anticipates removal of spans and failure of bridge for the 0.005 AEP event.

Significance of Concern: Low – Likely too late to provide input on bridge design.

Recommended Action to Resolve Concern: Determine if there are any opportunities for the FRM designers to review and weigh in on the new bridge. Opportunity to perhaps provide input (or verify) on items such as foundation, deck, abutments, etc... from a FRM perspective. USACE expertise could potentially improve the design when it comes to resiliency when subjected to larger flood events and weighing in on potential design bridge features such as flow capacities that may have impacts on design features planned downstream within the Tentatively Selected Plan.

Submitted By: Kirk Sunderman (309-794-5140). Submitted On: Mar 06 2020

1-0 Evaluation **Concurred**
With respect to the subject bridge, PR is performing their own design (based on what should be appropriate criteria)

We agree that this may be an opportunity to provide some input to their process, however this is a separate effort and is considered out of USACE authority to assist with design of the structure.

Submitted By: John Rusnak (412-395-7239) Submitted On: Mar 17 2020

1-1 Backcheck Recommendation **Close Comment**
Noted.

Submitted By: Kirk Sunderman (309-794-5140) Submitted On: Mar 30 2020

Current Comment Status: **Comment Closed**

8435540	Civil	Feasibility Study	Section 2.2 Basis of Quantities	n/a	n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**
(Document Reference: Appendix D - Cost Estimate)
Coordinating Discipline(s): Project Management

Review Concern: Section states "quantity take off is contained in the Engineering Appendix".

Basis for Concern: I'm not finding any summary/tabulation of quantities within the Appendix A – Engineering Appendix. I'm only finding general descriptions under each alternative along with a few typical details. Most line items within the construction estimate are presented as lump sums (LS).

Significance of Concern: Critical - Uncertain as to where the estimated quantities came from for the each of the alternatives evaluated.

Recommended Action to Resolve Concern: Provide backup of the methods and calculations used to arrive for project alternatives, especially the Tentatively Selected Plan. Documentation of quantities and calculations need to be provided within an appendix of the feasibility report.

Submitted By: Kirk Sunderman (309-794-5140). Submitted On: Mar 06 2020

1-0 Evaluation **Concurred**

Attachment 5 - Alternative Quantity Summaries and Tabulations - is to be added to the Engineering Appendix. A copy of this attachment (Initially labelled Attachment 6) was provided to the reviewer under separate email.
This Attachment documents the quantities used to cost each Alternative. The Alternative numbering was changed during the report writing effort but the information provided is consistent with what was costed and provided under the Cost Appendix.

Submitted By: John Rusnak (412-395-7239) Submitted On: Mar 20 2020

1-1 Backcheck Recommendation **Close Comment**

The following suggestion was provided to better define the quality of quantity takeoffs.

One thing I suggest adding to the appendix is a paragraph or two that generally explains where the quantities came from. For example, most cross sections for quantities appear to be a typical cross section representing the entire length. Is this a conservative, meaning more of a worse case cross section, or is it more representative of more of an average. State what data was used to define existing topography (I believed this was discussed during the kickoff meeting but this would be good place to put it into writing.) Explain where the quantities (lengths, areas, volumes) were pulled from. Were they pulled from GIS, previous developed plans, Google Earth?

Submitted By: Kirk Sunderman (309-794-5140) Submitted On: Mar 30 2020

Current Comment Status: **Comment Closed**

8435545	Civil	Feasibility Study	Basis of Design, Basis of Quantities, Abbreviated Risk Analysis	n/a	n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**
(Document Reference: Appendix D - Cost Estimate)
Coordinating Discipline(s): Project Management

Review Concern: Contingencies of 40% arrived at for all quantities most of which are lump sums.

Basis for Concern: The Abbreviated Risk Analysis appears to under estimating the level and lack of quantities back up and level of design development presented within the draft report. Contingency range for this class of estimate is stated as 30% to 100%. I would think the contingency applied to cost line items should be more towards the high end of this range given the minimal information presented on calculations and quantities.

Significance of Concern: Critical – Impacts B/C ratios of each alternative.

Recommended Action to Resolve Concern: Provide documentation of designs and quantity development within the feasibility report and/or revisit abbreviated Costs and Schedule Risk Analysis.

Submitted By: Kirk Sunderman (309-794-5140). Submitted On: Mar 06 2020

1-0 Evaluation **Concurred**
Quantity Summary and tabulations wre to be provided as Attachment 5 to the Engineering Appendix.
The Alternative numbering and related quantities included are consistent with what was included in the cost estimate.

Submitted By: John Rusnak (412-395-7239) Submitted On: Mar 20 2020

1-1 Backcheck Recommendation **Close Comment**
Absence of a statements on existing data used for topography, assumptions when only one typical cross section is used for total volume calculations, etc... to develop quantities leaves me uncertain if 40% contingency accurately captures the risks.

Submitted By: Kirk Sunderman (309-794-5140) Submitted On: Mar 30 2020
Current Comment Status: **Comment Closed**

8436618	Economics	Feasibility Study	n/a	n/a	n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

(The following comment is entered for the purpose of documenting the scope of the economic review and does not require any PDT response other than simple acknowledgement.)

The economic review examined the main feasibility report (Draft Integrated Feasibility Report and Environmental Assessment) and the economics appendix (Appendix C). The PDT also provided the HEC-FDA study file used in the economic analysis. The model was spot-checked in terms of

various aspects, including: (a) input functions - the stage-damage functions, exceedance probability functions, stage-discharge functions; (b) entry of economic occupancies and structure inventory variables such as uncertainty factors; (c) output files such as the SdErrors and warning files; (d) damage-frequency function with uncertainty; (e) consistency of results as shown in the model with the report.

This economic review also served as a training exercise for a number of USACE Northwestern Division economists who "shadowed" on the review. These economists read the report, prepared some preliminary reactions/comments, and then participated in a group discussion on 5 March 2020 that guided preparation of the Dr Checks comments. The economists who shadowed the review included Holly Bender (NWK); Taylor Bolt (NWO), Jeff Cavanaugh (NWO), Dennis Johnson (NWP), Tyler Kelley (NWO), Drew Minert (NWO) and Nicole Wininger (NWO).

Submitted By: Allen Holland (816-389-3105). Submitted On: Mar 06 2020

1-0 Evaluation **Concurred**
No action needed.

Submitted By: Susannah Byrd (412-395-7164) Submitted On: Mar 11 2020

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Allen Holland (816-389-3105) Submitted On: Mar 25 2020

Current Comment Status: **Comment Closed**

8436622	Economics	Feasibility Study	n/a	n/a	n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

Concern: Structure values (section 2.3.1) are based on questionable assumptions and data for some items that would affect the scale of damages and benefits.

Basis: (1) Depreciated replacement values (DVRs) for structures outside the sampled group are based on estimates of area in square feet made in Google Earth, which generally has a high level of uncertainty when estimating areas. The square foot estimates made by the appraisers for the sample could have been used to calibrate the Google Earth estimates, but there is no indication that they were. (2) The report states that the RE appraisal team recommended an uncertainty of 25% in either direction for their estimated DRVs. But that assumption is reflected in the FDA model by a normal distribution with a standard deviation of 25%, which is not really what the team implied. A literal interpretation of their words would point to using a triangular distribution with miminum and maximum set at 75% and 125%. A 25% standard deviation with a normal distribution would suggest far more actual uncertainty than foreseen by the appraisers. (3) Also, use of the flat 25% standard deviation for all structures – sample and non-sample – seems ill-advised, as the values for the structures outside the sampled group would have higher uncertainty.

Significance: Medium.

Action: (1) Suggest calibrating the Google Earth measurements using the sample and then adjusting

estimated square footage for structures as appropriate. (2) The uncertainty for structure value probably should be changed to a triangular distribution in FDA. (3) Also suggest using a larger uncertainty factor for structures outside the sample than for those within it.

Submitted By: Allen Holland (816-389-3105). Submitted On: Mar 06 2020

1-0 Evaluation **Concurred**

1. Structure square footage was calibrated using the sampled values. This clarification/documentation was added to the appendix.
2. Following discussions with real estate, it was determined that using the distribution with more uncertainty was more reasonable for the study area. Additionally, a brief @Risk model was run using the two different distributions; the differences in mean and median were negligible. The normal distribution will be used; more documentation was added to defend using this distribution.
3. Following discussions with real estate, they stated that using the same uncertainty was reasonable, especially while using a normal distribution, which allows for more uncertainty. Additionally, about 70% of the structures involved in the non-structural relocations were included in the sample. The structures in this area are all of similar construction type and age, so it is appropriate to rely on the sampled uncertainty.

Submitted By: Susannah Byrd (412-395-7164) Submitted On: Mar 20 2020

1-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: Allen Holland (816-389-3105) Submitted On: Mar 25 2020

Current Comment Status: **Comment Closed**

8436624	Economics	Feasibility Study	n/a	n/a	n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

Concern: Economic occupancies (sections 2.3.1.6 and 2.3.1.7) include questionable assumptions and data.

Basis: (1) ER 1105-2-100 requires that economic analyses using any dataset of generic values and/or damage functions must provide justification for applying that dataset to a particular study area. The report provides little or no justification for the use of generic nonresidential content-to-structure value ratios (CSVRs) and depth-damage functions (DDFs) from a Sacramento study. The Sacramento dataset was never approved for use in other locales outside that regions, and its applicability to a study area more than 3,000 miles away is very questionable. Building codes undoubtedly are very different and may, as one example, reflect hurricane risk in Puerto Rico but not in Sacramento. Flooding patterns could be different as well: the report does not indicate whether Ciales floods involve saltwater. If so, DDFs for freshwater flooding would not be as applicable. Use of the dataset in previous studies is not in itself a justification. (2) Determination of uncertainty factors for first-floor elevations is unclear. According to Appendix C, on page 15, it seems that ground elevations are assumed to have a standard deviation of 0.6 feet while residential and commercial properties have an additional foundation height standard deviation of 0.3 feet. This would suggest a total first-floor elevation standard deviation of 0.9 feet, but most of the residential

occupancies in the FDA model show a standard deviation of 1.32 feet and the commercial/public occupancies generally are 1.1 feet. In addition, based on Table 6.5 from EM 1110-2-1619, it appears that LIDAR mapping would be considered aerial survey, and aerial survey with 2-foot contours would suggest a standard deviation of 0.3 feet.

Significance: Medium, but perhaps mainly a matter of adding discussion/documentation.

Action: (1) Provide justification for use of the Sacramento data in the Ciales study area. If the dataset was approved for Puerto Rico for previous studies, maybe you just need to furnish more details on the basis of that approval. But in any event, you clearly need a discussion with more consideration of flooding patterns and building codes. (2) Clarify how the specific standard deviations for first-floor elevations were computed to arrive at the standard deviations found in the FDA model. Suggest you also reconsider and either revise or confirm the ground elevation standard deviation based on EM 1619.

Submitted By: Allen Holland (816-389-3105). Submitted On: Mar 06 2020

1-0 Evaluation **Concurred**

1. Concur; more justification was added to the appendix. FYI the damages within this area are due to freshwater flooding, not salt water flooding, which aligns with the Sacramento curves. This clarification was added to the appendix, along with additional details regarding similarities in building types.

2. Concur; it appears that during an import of occupancy types (or some FDA input) the FFE uncertainties for non-residential structures were changed. The FDA modeling was updated and all of the tables that report damages. However, the uncertainties for residential structures in the model were correct. A table was added to the appendix to show the calculations for finding the FFE standard deviation. Regardless, adding the standard deviations together is not statistically accurate; to combine the standard deviations, the sum of squares (variances) must be found, and the square root of that figure is the combined standard deviation. The description and table in the appendix makes this more clear.

Regarding the LIDAR contour; the LIDAR used for modeling is actually in meters, and the contour interval is 1-meter (3.3 feet). Because this is between the two contour intervals shown in the table, it was decided by myself and the team's hydraulic engineer to be more conservative and use the higher standard deviation corresponding to the 5-foot contour interval. This documentation was also added to the appendix.

Submitted By: Susannah Byrd (412-395-7164) Submitted On: Mar 20 2020

1-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: Allen Holland (816-389-3105) Submitted On: Mar 25 2020

Current Comment Status: **Comment Closed**

8436627	Economics	Feasibility Study	n/a	n/a	n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

Concern: Evaluation of damage calculations for alternatives is hampered by missing and/or erroneous information.

Basis: (1) Study reaches are not described in the report. There is little or no information regarding the predominant land use(s) in each reach, number of structures, and the presence of any major businesses/facilities, substantial residential developments or commercial districts. Differences in water behavior from one reach to another that might have been considered in drawing the reach boundaries also are not discussed. (2) The NED plan is not very clearly identified prior to the optimization section. Table 36 seems to be the basis of the NED plan determination, and it does not even provide overall totals for the alternatives, so it isn't readily apparent which one has the highest net benefits. (3) The tables summarizing the damage results have several data entry errors, often lack price level annotation, and do not include frequencies corresponding to the stages.

Significance: Medium – just need added documentation and, in some cases, corrections or revisions. Reasonableness of the EAD calculations as broken out by reach is impossible to assess without information on the study reaches. Tables with stages but without frequencies also make it very difficult to assess the reasonableness of the damages.

Action: (1) Add description of the reaches to the report. (2) Clearly identify the NED plan in section 5.1.2 before going into optimization, and provide a more complete Table 36 that shows totals for each alternative as a basis for that determination. (3) For all tables that use river stages, provide an additional column showing the frequency corresponding to each stage. (4) Correct errors in tables: Table 10 has an erroneous data entry at station 32235.51; Table 13 has a total that increases from stage 195 to 200 and then decreases again from 200 to 205; Table 31 has a total of $33,000 for stage 145 despite individual categories all equaling zero. Check other tables for similar errors. (5) Add price levels to tables that do not have it: Tables 6 through 9, 13 through 24, 31 through 34, 39 through 42. Also, on p. 16 toward the bottom, "depth-damage relationship" should be "stage-damage relationship."

Submitted By: Allen Holland (816-389-3105). Submitted On: Mar 06 2020

1-0 Evaluation **Concurred**

1. A description of the reaches was added.
2. There is more information regarding the initial NED plan in the appendix.
3. Adding frequencies next to the river stages is not possible because each of the cross sections in the reach has a different flow frequency. It would not be accurate to put a frequency at a river stage for an entire reach. Instead, I added a sentence before each stage-damage section to refer to the WSPs shown in an earlier section.
4. All damage tables were updated due to re-running FDA. Checked all other tables for data entry errors.
5. Price levels were added to the tables listed (and others). All 'depth-damage relationship' phrases were changed to 'stage-damage relationship'.

Submitted By: Susannah Byrd (412-395-7164) Submitted On: Mar 24 2020

1-1 Backcheck Recommendation **Open Comment**

For #3, there has to be some way to match up the stages and frequencies. The data on stages by itself is meaningless otherwise. If there is a significant difference in flows for the same stage from one end of a reach to another, suggest showing the range of frequencies. (Tables 33-36)

Otherwise, OK.

Submitted By: Allen Holland (816-389-3105) Submitted On: Mar 25 2020

2-0 Evaluation **Concurred**

Concur; the range of frequencies have been added as a separate column to all damages by reach tables.

Submitted By: Susannah Byrd (412-395-7164) Submitted On: Mar 30 2020

2-1 Backcheck Recommendation **Close Comment**

OK, with the addition of the frequencies to the EAD tables to allow the context of a stage-frequency relationship, the EAD do appear to be reasonable.

Submitted By: Allen Holland (816-389-3105) Submitted On: Mar 30 2020

Current Comment Status: **Comment Closed**

8436632	Economics	Feasibility Study	n/a	n/a	n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

Concern: Documentation of costs (pp. 45-6) used in the benefit-cost analysis is incomplete.

Basis: (1) Calculations for interest during construction are not shown. (2) Assumptions for OMRR&R costs used in the analysis are not included. (3) On p. 46, there is a reference to a certified cost estimate in section 5.1.5.1, but there is no such section.

Significance: Probably low, but reasonableness of annual cost computations cannot be verified without IDC and OMRR&R documentation.

Action: (1) Provide table(s) showing IDC calculations. (2) Discuss OMRR&R costs in terms of what sorts of tasks are assumed for each alternative and what the cost estimates are based on. (3) Correct the certified cost estimate reference (which may be trying to refer to Table 45?).

Submitted By: Allen Holland (816-389-3105). Submitted On: Mar 06 2020

1-0 Evaluation **Concurred**

1. A table focused on IDC calculations was added.
2. Discussion regarding the OMRR&R costs are now included.
3. This statement was removed.

Submitted By: Susannah Byrd (412-395-7164) Submitted On: Mar 24 2020

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Allen Holland (816-389-3105) Submitted On: Mar 25 2020
Current Comment Status: **Comment Closed**

8436635 Economics Feasibility Study n/a n/a n/a
Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

Concern: Life loss potential receives minimal consideration in the report.

Basis: The discussion of life loss is minimal and does not seem to be based on any LifeSIM modeling. It would seem that there might be at least some potential for life loss where flooding occurs in a hurricane context. Also, the report says that there have been at least 35 recorded flood events historically, but it does not say whether any of them involved fatalities. The report does have some good relevant information in section 3.2 on depths, but does not discuss warning time or quantify reductions in population at risk in the selected plan.

Significance: Could be high if life loss is a legitimate concern.

Action: Indicate why no LifeSIM model was done for this analysis (and add that information to the report as well). If life loss concerns are believed by the PDT to be very minimal, as seems to be the case, beef up the brief qualitative discussions in the economic appendix to at least include whether there have been previous flood fatalities and what level of warning time is typically available in floods affecting Ciales. Also suggest trying to quantify effect of the alternatives on reducing population at risk, even if it is a back-of-the-envelope estimate done outside of a LifeSIM analysis.

Submitted By: Allen Holland (816-389-3105). Submitted On: Mar 06 2020

1-0 Evaluation **Concurred**
Concur; discussion regarding the lack of LifeSim modeling has been added to various sections of the appendix. Additionally, estimated PAR numbers have been added to each alternative.

A LifeSim model was not run for this study because life safety risk has historically not been an issue in the study area. There have been 10 major flood events (35 total floods) within the past 50 years and there have been 0 fatalities, including Hurricane Maria. Additionally, only one alternative was found to be economically feasible and it also reduces life safety risk the most significantly. Running a LifeSim model would only confirm this, so there was no need to build the model. Additionally, because the recommended plan is strictly non-structural, there is no transferred risk or induced risk as a result of the alternative. This discussion was also added to the report.

Submitted By: Susannah Byrd (412-395-7164) Submitted On: Mar 20 2020

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Allen Holland (816-389-3105) Submitted On: Mar 25 2020
Current Comment Status: **Comment Closed**

8436637 Economics Feasibility Study n/a n/a n/a
Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

Concern: Project performance is not reported.

Basis: ER 1105-2-100 requires the reporting of project performance data (annual exceedance probability, long-term risk and assurance in single events). These items are not included in the appendix.

Significance: Low, but the documentation is required and is easily available from the HEC-FDA outputs.

Action: Add to Appendix C a table summarizing both without-project and with-project performance data.

Submitted By: Allen Holland (816-389-3105). Submitted On: Mar 06 2020

1-0 Evaluation **Concurred**
Concur; project performance information was added towards the end of the FRM section of the appendix. Information on both the FWOP and Alt 3B were added.

Submitted By: Susannah Byrd (412-395-7164) Submitted On: Mar 20 2020

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Allen Holland (816-389-3105) Submitted On: Mar 25 2020
Current Comment Status: **Comment Closed**

8436639 Economics Feasibility Study n/a n/a n/a
Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

Concern: Benefits in the bank stabilization analysis do not account for timing and probability of failure.

Basis: Section 14-type analyses should estimate when bank failure would be most likely to occur in the future and what the probability of failure would be. Annualized damages and benefits are then discounted according to these assumptions. While probability of failure analysis has been done for this report, it does not appear that failure of the bridges here necessarily represents an imminent threat as required in EP 1105-2-58, 29.a.2 ("These facilities must have been properly maintained but be in imminent threat of damage or failure..."). And the timing and probability of failure evaluation appears not to have been applied to the economics, which apparently assumes that the failure would occur immediately at the outset of the period of analysis.

Significance: High, bordering on critical, as proper discounting for time and probability of failure probably would greatly reduce the benefits.

Action: Provide justification for why these bridges are believed to represent an imminent threat of failure, and indicate whether (and how) the timing and probability of failure have been embodied in the benefit calculations. If they have not been, the benefits analysis will need to be revised to properly account for these variables.

Submitted By: Allen Holland (816-389-3105). Submitted On: Mar 06 2020

1-0 Evaluation **Check and Resolve**

Will address this comment after MSC review. Recommend leaving this comment open until document has been updated for both ATR comments and MSC comments.

Submitted By: Susannah Byrd (412-395-7164) Submitted On: Mar 24 2020

1-1 Backcheck Recommendation **Open Comment**

Fair enough, the comment will remain open for now.

Submitted By: Allen Holland (816-389-3105) Submitted On: Mar 25 2020

2-0 Evaluation **Non-concurred**

Pending a resolution on a policy concern, the following is the proposal for resolution:

Concur that the BCR was previously too high. However, using the correct Section 14 methodology (time savings calculation and using variable vehicle operation costs) caused the BCRs to significantly decrease. Both BCRs dropped from double digits to 2.47 (PR-6685) and 6.64 (PR-149 Bridge).

Section 14's do not usually require an expert opinion elicitation (EOE) in order to obtain the probability of failure. The EOE was tasked to the PDT by HQ in order to prove the banks are significantly at-risk. As a result of the EOE, elements of the initial NED plan were removed due to an area not being at significant enough risk of failure. The other two areas, PR-6685 and PR-149 are at significant risk based on the FN chart the RMC utilizes for all risk assesments. Additionally, the probability of failures only correspond to a 100-year event, so it is not appropriate to use this single probability to prorate all benefits.

Section 14 analyzes do not account for when the failure will occur. Other Section 14 analyzes do not have a probability of failure to incorporate into the economic benefits, therefore it would not be appropriate to try to do so for this study.

Additionally, the bank stabilization measures are being recommended as a separate Section 14, so it should follow standard Section 14 methods and guidance. The calculations in the most updated economic appendix now follow standard Section 14 methods and guidance.

Submitted By: Susannah Byrd (412-395-7164) Submitted On: Apr 30 2020

2-1 Backcheck Recommendation **Open Comment**

I am more concerned about reflecting the timeline for potential failure than the probability of failure. Agree that reflecting probability of failure might be too much for this particular analysis and I won't push that further.

As to when the failure might occur, the statement that "Section 14 analyses do not account for when the failure will occur" is completely invalid in my experience. Obviously, no one knows exactly when in the future stream bank failure would occur; it's an educated guess by an engineer, and it doesn't require a lot of detailed back-up. But that sort of estimate is always done in any Section 14 economic analysis if there is any doubt about whether failure is imminent. The engineering elements of your PDT make their best guess as to when failure might occur based on the current conditions of the stream bank. It may be that conditions along the stream bank are trending in the wrong direction but those conditions would not actually be bad enough to make failure likely (as opposed to just quite possible)until, say, 5 years down the road. In which case, that needs to be reflected in the economic analysis. The PDT engineers may also decide, based on their expertise and best judgment, that failure is reasonably likely anytime in the period of analysis (i.e., starting now). If that is the case, so state and then your current revised calculations should be OK.

Submitted By: Allen Holland (816-389-3105) Submitted On: May 06 2020

3-0 Evaluation **For Information Only**

The recent policy decision for this study results in the removal of all bank stabilization analyses from the report. However, your comment response is noted for future Section 14 analyses/if the current analysis is used in a technical appendix or note.

Submitted By: Susannah Byrd (412-395-7164) Submitted On: May 06 2020

3-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: Allen Holland (816-389-3105) Submitted On: May 06 2020

Current Comment Status: **Comment Closed**

8436643	Economics	Feasibility Study	n/a	n/a	n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

Concern: Benefit calculations based on traffic detour/delay impacts are not done correctly.

Basis: (1) Operating costs per mile of $0.575 have been used in the analysis, but this cost per mile probably includes fixed costs as well as variable costs. Only variable costs should be used in the economic analysis since the fixed costs occur whether or not a project is implemented, and the variable costs are usually only about a third of the total costs per mile. (2) Minimum wage is used in computing delay costs, while median family income is the standard basis for these costs. (3) The delay time costs here are based upon an estimated average number of occupants per vehicles, but this is appropriate only for work trips. It should be assumed that some percentage of trips are for social/recreational purposes, and for these trips, occupants per vehicle are not considered.

Significance: High. The first and third points mentioned above imply that the traffic benefits are inflated. The second point would usually point to underestimation of these benefits since median family income is usually a lot higher than minimum wage, but I'm not sure that is the case in Puerto Rico.

Action: Revise the computation of traffic benefits to include (1) variable operating costs per mile only rather than total costs per mile, (2) median family income rather than minimum wage, and (3) some breakdown of total trips by purpose, with multiplication by the number of vehicle occupants done only for work trips

Submitted By: Allen Holland (816-389-3105). Submitted On: Mar 06 2020

1-0 Evaluation **Concurred**

Concur; all of your suggestions have been implanted. The methodology detailed above is now the methodology for the streambank benefits. This part of the report will need to be edited significantly. Will not edit this part until the MSC review is completed, but all of your suggestions have been added.

1. Utilizing a variable operating cost that was publicized by AAA in 2016; this cost was updated to 2019 price levels. It is almost 1/3 of the cost I was previously using.
2. Median family income is now being used. This figure is approximately $14,000 for the study area, so this also reduces the annual benefits.

3. Concur; the purposes are allocated as: Work, 46%; Social/Rec, 27%; Other, 27%. The basis for these percentages is an assumption about work trips: Started with work traveling taking part on 5 out of 7 days (71%). Then looked at the unemployment rate (8%) and then took into account those of retirement age (25%) in Ciales. This brought the assumed percentage of work travel down to 46%. The other trips were then divided equally - there was no other data to accurately capture social/rec trips versus 'Other' trips.

There is no better data available for types of trips for Puerto Rico. Please feel free to reach out if you are not comfortable with the new assumptions.

Recommend keeping this comment open until the appendix is finalized following the MSC review.

Submitted By: Susannah Byrd (412-395-7164) Submitted On: Mar 20 2020

1-1 Backcheck Recommendation **Open Comment**

The revised approach seems appropriate. We will wait and see what impact there is on the results, including the economic justification for that aspect of the project. Comment remains open for now.

Submitted By: Allen Holland (816-389-3105) Submitted On: Mar 25 2020

2-0 Evaluation **Concurred**

The Section 14 type analysis was updated to accurately reflect both the variable operating cost of a vehicle and the time savings calculations. The method described above is used. The final figures used are the AAA 2016 variable operating costs indexed to FY20 price levels and the most recent median family income for the Municipality of Ciales. The purposes are allocated similarly to the comment response, but altered slightly. The economic appendix is fully updated to match this approach and all of the new assumptions are documented. The updated BCRs are now 2.47 (PR-6685) and 6.64 (PR-149 Bridge).

Submitted By: Susannah Byrd (412-395-7164) Submitted On: Apr 28 2020

2-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: Allen Holland (816-389-3105) Submitted On: May 06 2020

Current Comment Status: **Comment Closed**

8437112	Civil	Design Memorandum or Report	n/a	n/a	n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

Channel protection includes dewatering cost for installation of scour countermeasures. It is my experience dewatering is not normally required for this type of work and the cost estimate may be excessive. Please reconsider the need for dewatering in future cost developments. Given this item is included in most alternatives, there should be no impact to the alternative selected.

Submitted By: Phil Sauser (651-290-5722). Submitted On: Mar 07 2020

1-0 Evaluation **Concurred**

The PDT still believes that some kind of barrier\dewatering may be needed, particularly where the bank is to be rebuilt or where site conditions dictate in other locations (scour protection).

However, dewatering will be revisited relative to the costing of the TSP measures at a later date; at that time removal of this measure MAY be considered.

At this stage it will still be included in the estimates.

Submitted By: John Rusnak (412-395-7239) Submitted On: Mar 17 2020

1-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: Phil Sauser (651-290-5722) Submitted On: Mar 31 2020

Current Comment Status: **Comment Closed**

8437875	Planning - Plan Formulation	Feasibility Study	n/a	n/a	n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

Review Concern: 1.1.3 Agency Stakeholder - this section talks about PR housing department working with USACE & others to relocate structures using existing programs. What exactly are the programs/structures/how is this being accomplished? Additionally FEMA text acknowledges that there has already been a relocation.
Basis for Concern: Overlap of this effort and how it works with the TSP. If others are doing similar work, why is USACE best positioned to implement this effort?
Significance: low
Recommended Action: Include additional information to document where/how this is being accomplished. As currently written it is unclear of where and when and under what authority relocations are happening.

Submitted By: Katie Opsahl (651-290-5259). Submitted On: Mar 08 2020

1-0 Evaluation **Concurred**

The revised report provides additional information regarding the relocation efforts being conducted by the PR Housing Department and FEMA. In short, the PR Housing Department is conducting a voluntary program to repair, reconstruct, or relocate eligible single family residences impacted by hurricanes Irma and/or Maria. This a voluntary program and is only available to certain residents based on level of damage, age, and income. Therefore, we anticipate the vast majority (if not all) of the homes included in our proposed relocation are not pursuing this program. We did, however, seek to maximize participate in this program in order to cut down on our overall project cost, as well as to get folks relocated as quickly as possible.

FEMA is only relocating the 110 public housing units within the study area. This program does not consider all private homes or businesses in the study area.

Our TSP would result in the mandatory relocation of anyone that is left in the 25 year floodplain and is necessary to reduce risk to the majority of private homes and businesses that remain.

Submitted By: Eric Merriam (412-395-7185) Submitted On: Mar 16 2020

1-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: Katie Opsahl (651-290-5259) Submitted On: Mar 20 2020

Current Comment Status: **Comment Closed**

8437876	Planning - Plan Formulation	Feasibility Study	n/a	n/a	n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

Review Concern: No clear presentation of future without project conditions
Basis for Concern: No clear presentation of what the FWOP is, this forms the basis for which all alternatives are compared against. Section 2 current and future conditions is limited to current conditions. 2.3 Foretasted Ecological Setting talks about the FWOP but is limited to the ecological setting, but isn't enough to cover all the bases. The report lacks focused discussion on the FWOP. What will happen within the study area if no federal action is taken.
Significance: High (critical)
Recommended Action: Include a specific section that documents the FWOP conditions.

Submitted By: Katie Opsahl (651-290-5259). Submitted On: Mar 08 2020

1-0 Evaluation **Concurred**

I was using the outline for integrated feasibility reports found on the planning toolbox:

https://planning.erdc.dren.mil/toolbox/library/smart/integratedreportPPT.pdf

Based on this outline I had attempted to capture the FWOP within the "Forecasted Setting" section. However, I agree that this leads to a lack in focus of the critical aspects of the FWOP that will affect plan formulation process. Therefore, I created a new section titled "2.4 FWOP Summary" that focuses on providing a summary of FWOP conditions that will have a direct impact on the planning process.

Submitted By: Eric Merriam (412-395-7185) Submitted On: Mar 20 2020

1-1 Backcheck Recommendation **Close Comment**

Revisions meet the intent of the comment, thank you for providing the link (I have saved it for my records - great resource).

Submitted By: Katie Opsahl (651-290-5259) Submitted On: Mar 20 2020

Current Comment Status: **Comment Closed**

8437878	Planning - Plan Formulation	Feasibility Study	n/a	n/a	n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

Review Concern: Study area description is lacking critical information for the reader to fully understand the context of the study area.
Basis for Concern: Important part of the planning process and telling the story of what makes this area in need of federal assistance.
Significance: low
Recommended Action: Provide additional details about the community, number of people, major economic drivers (cannabis plant that employs or will employ 75 people???), critical infrastructure, are they cut off from major services in the event of a disaster.

Submitted By: Katie Opsahl (651-290-5259). Submitted On: Mar 08 2020

1-0 Evaluation **Concurred**

We bolstered this section to include a more thorough description of the study area and how it is impacted. This description now includes:

1- the number and types of structures impacted.
2- a note that although the study area includes some businesses, the majority of commercial activity occurs within portions of Ciales that are outside of the floodplain (and thus outside our study area).
3- a description of the roads and bridges within the study area that are inundated or have been damaged during previous floods.
4- a discussion of how inundation of and damage to roads/bridges could lead to isolation and increased life and safety risk.

Submitted By: Eric Merriam (412-395-7185) Submitted On: Mar 16 2020

1-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: Katie Opsahl (651-290-5259) Submitted On: Mar 20 2020

Current Comment Status: **Comment Closed**

8437879	Planning - Plan Formulation	Feasibility Study	n/a	n/a	n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

Review Concern: Figure 3-2 – initial array of alternatives. The graphic is a nice summary of the combinations of options, but the report lacks a full discussion of how these were grouped. Need documentation of how/why the options were combined or why some were not combined. Are there any options that are exclusive or dependent on the reach above or below?
Basis for Concern: Basis for how measures are combined into alternatives.
Significance: low
Recommended Action: Consider adding a few sentences under 3.3.3 which documents the general process of how options were grouped to get the final result shown in figure 3-2.

Submitted By: Katie Opsahl (651-290-5259). Submitted On: Mar 08 2020

1-0 Evaluation **Concurred**

Completely agree. We implemented the recommendations made by the reviewer and added a paragraph to section 3.3.3 that documents how and why the options were combined the way they were.

Submitted By: Eric Merriam (412-395-7185) Submitted On: Mar 20 2020

1-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: Katie Opsahl (651-290-5259) Submitted On: Mar 20 2020

Current Comment Status: **Comment Closed**

8437880	Planning - Plan Formulation	Feasibility Study	n/a	n/a	n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

Review Concern: Section 3.3.3 Summary of Alternatives. Discussion within this section mentions 0.04 AEP, but there is no backup information (I would have assumed there would have been more existing information on the hydraulics) on how and why this AEP was selected as the design. It is understood that additional analysis may be done that would modify this, but there is no information in the report to tell the reader/decision maker why.
Basis for Concern: Rationale for formulation of alternatives and evaluation/comparison of alternatives.
Significance: medium
Recommended Action: Include information on how and why the AEP for each alternative was selected. 3.1 planning strategy or right before the full description of the alternatives could further document this rationale. Or Alt 3 has a good statement.

Submitted By: Katie Opsahl (651-290-5259). Submitted On: Mar 08 2020

1-0 Evaluation **Concurred**

We appreciate this comment and agree that the reader needs to have a better understanding as to why we chose the AEP we did for the initial alternative development and comparison. We took the reviewer's advice and included a paragraph in section 3.3.3 that documents this. This paragraph reads:

"Unless stated otherwise, measures and associated alternatives were generally developed in an attempt to reduce risks associated with the 0.04 AEP event. During the initial analysis of the future without project condition, it was determined that there was a much greater incremental change in inundation depth and area between the 0.1 and 0.04 AEP events as compared to the difference between the 0.04 to 0.02 or the 0.02 to 0.01 AEP events. Thus, the 0.04 AEP event represents the event with the greatest relative increase in damages and associated risk. Consequently, developing, evaluating, and comparing the initial array of alternatives based on the 0.04 event was determined to be an effective way to assess their ability to reduce damages and risk."

Submitted By: Eric Merriam (412-395-7185) Submitted On: Mar 20 2020

1-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: Katie Opsahl (651-290-5259) Submitted On: Mar 20 2020

Current Comment Status: **Comment Closed**

8437882	Planning - Plan Formulation	Feasibility Study	n/a	n/a	n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

Review Concern: Alternative 5 – screening is weak.
Basis for Concern: Just because the team is limited monetarily and there is a time constraint on the study doesn't mean that this alternative can be so easily dismissed. Don't rely on the study cost/time – the fully screen a measure/alternative it should be screened based on effectiveness, efficiency, acceptability, completeness. The reference the appendix isn't intended for the public and didn't containing information, only dates of meetings/discussion. There is no meat to this appendix.
Significance: low
Recommended Action: Bolstering the discussion and can a rough order of magnitude cost or environmental impacts or social impacts be documented to screen this alternative. Consider screening using the four P&G criteria.

Submitted By: Katie Opsahl (651-290-5259). Submitted On: Mar 08 2020

1-0 Evaluation **Concurred**

We had removed alternative 5 from additional analysis at the direction of the vertical team. However, we agree and understand that alternatives are screened based on the P&G criteria. We did bolster this description to better capture our discussions with the vertical team as to whey they recommended removing. This section now reads:

"Construction of an upstream reservoir could alleviate flood risk downstream, including throughout the study area. However, steep topography upstream of the study area would limit the ability to construct a reservoir large enough to effectively reduce flood risk and damages within Ciales. Steep topography also limits development along the river upstream of the study area, and highly developed areas downstream of the study area are protected by existing levees. Consequently, Ciales would account for the majority of benefits associated with reservoir construction, and these benefits would not be enough to offset the large anticipated cost. The Rio Grande de Manati represents one of only a few undammed and unimpeded large river systems within the region and is important habitat for a diverse aquatic community, including a number of amphidromous species that migrate between estuarine and inland aquatic habitats. Construction of a reservoir would result in significant impacts to hydrology, aquatic habitats, and associated aquatic communities. For these reasons, the PDT--in coordination with the vertical team--removed Alternative 5 from further consideration."

At this time, we don't really have the time or resources to create a rough order of magnitude cost. However, the above text does capture the internal discussions with the PDT and discussions with the vertical team that led to it being screened.

In reference to your comment regarding Appendix F, the version for public review had originally been posted to DrChecks, which is why it didn't show anything beyond the cover sheet. However, this appendix has since been removed per a policy review comment.

Submitted By: Eric Merriam (412-395-7185) Submitted On: Mar 20 2020

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Katie Opsahl (651-290-5259) Submitted On: Mar 20 2020
Current Comment Status: **Comment Closed**

8437883	Planning - Plan Formulation	Feasibility Study	n/a	n/a	n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

Review Concern: TSP – relocation of structures. Was any consideration given to alternative uses (recreation or ecosystem restoration benefits) for the 0.04 AEP floodplain once evacuated? Throughout the report, but not specifically within the TSP discussion, there is mention that the floodplain would be converted to floodplain. Is there a plan to plan and claim any ecosystem benefits?
Basis for Concern: Completeness of the alternative, potentially missing opportunities that could be incorporated.
Significance: low
Recommended Action: Consider if alternative uses would be appropriate or not and document the decision.

Submitted By: Katie Opsahl (651-290-5259). Submitted On: Mar 08 2020

1-0 Evaluation **Concurred**
We will plant the evacuated area with native vegetation to restore the floodplain. It is my understanding that the local sponsor will be the entity acquiring the real estate, and they will maintain ownership. They will not be permitted to develop the property; however, they can enter into an agreement with another entity (e.g., the municipality) that allows undeveloped use of the land (e.g., recreational fields or trails). However, it will be up to the sponsor as to how the land gets used.

I inserted text into the report to make that more clear. This text is now in the description of the original alternative (Alternative 3), as well as in the description of the recommended plan.

Submitted By: Eric Merriam (412-395-7185) Submitted On: Mar 20 2020

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Katie Opsahl (651-290-5259) Submitted On: Mar 20 2020
Current Comment Status: **Comment Closed**

8437884	Planning - Plan Formulation	Feasibility Study	n/a	n/a	n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

Review Concern: Table 3-3 – unclear what costs are included in the cost estimates
Basis for Concern: Lack of understanding of what items were included or not included in the estimates for each alternative.
Significance: low
Recommended Action: Add a footnote to the table, or sentence within the paragraph of what was included (O&M, construction cost, LERRDS, number of relocations, etc).

Submitted By: Katie Opsahl (651-290-5259). Submitted On: Mar 08 2020

1-0 Evaluation **Concurred**

All costs include project first costs and operation and maintenance costs. We only included real estate costs for measures that were incrementally justified. This was done to save time and money and would not impact the outcome of the evaluation and comparison process. Adding real estate costs to a measure/plan that is not justified (i.e., BCR
The following text was added to the paragraph to clarify:

"All costs include estimated project first costs and operation and maintenance costs. Costs of land, easements, rights-of-way, relocation, and disposal areas were only estimated and included for measures that are incrementally justified (i.e., BCR > 1), including stability and scour measures and relocations."

Submitted By: Eric Merriam (412-395-7185) Submitted On: Mar 16 2020

1-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: Katie Opsahl (651-290-5259) Submitted On: Mar 20 2020

Current Comment Status: **Comment Closed**

8437885	Planning - Plan Formulation	Feasibility Study	n/a	n/a	n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

Review Concern: Principles and Guidelines accounts – unclear documentation of how the alternatives work with the accounts.
Basis for Concern: the report (table 3-10) briefly document the alternatives as they relate to the P&G accounts. NED, RED, OSE, and EQ are stated to be included but EQ is missing from the table (it is discussed in the last paragraph, so either add to table or remove from table text). Additionally, there is no description of what the accounts are and why they are important and how they are to be used in the comparison of alternatives.
Significance: low
Recommended Action: Include additional information on what the accounts are, why we consider them in our planning process.

Submitted By: Katie Opsahl (651-290-5259). Submitted On: Mar 08 2020

1-0 Evaluation **Concurred**

Section 3.4.2 was updated to include definitions and descriptions of each of the four P&G accounts.

We also added an additional criteria called environmental effects, which considered impacts of each alternative on natural and cultural resources. This criteria (and sub-criteria) were then referenced in tables 3-4 and 3-10 as representing the EQ account. Thus, EQ is now given more consideration and appropriately referenced and considered throughout the evaluation and comparison process.

Submitted By: Eric Merriam (412-395-7185) Submitted On: Mar 12 2020

1-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: Katie Opsahl (651-290-5259) Submitted On: Mar 20 2020

Current Comment Status: **Comment Closed**

8437887	Planning - Plan Formulation	Feasibility Study	n/a	n/a	n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

Review Concern: TSP – the following is an overall general comment as it relates to the TSP. 1. Are the relocations mandatory or voluntary? (it should be explicitly stated within the report). 2. Where will residents/business relocate? Is there empty land outside the 1% AEP that they could be relocated to or will they have to move outside of the community? (the report doesn't clearly tell the story of if there is enough suitable land for these structures to remain in the community or not, it describes the area as having steep slopes). 3. Does the sponsor have the capability to acquire lands/use eminent domain if necessary? (there is no capability statement in the REP); 4. How many structures are included in the Plan (it is stated in other section but not called out early, or when the BCR, benefits are being discussed); 5. What rate of participation is assumed and how was that number factored into the BCR and net benefits?
Basis for Concern: Clear documentation of what the TSP is, ensuring public ad decision makers have full information.
Significance: medium
Recommended Action: Section 4.1.1. – needs to be more robust, it is only one paragraph and is being recommended for implementation. Expand the discussion to more completely tell the story of what the plan is (consider the points above as to how to expand this section).

Submitted By: Katie Opsahl (651-290-5259). Submitted On: Mar 08 2020

1-0 Evaluation **Concurred**

Thanks for this comment. I agree that the description was lacking. I revised section 4.1.1 based on the recommendations provided in the comment. The description now clearly states:

1- that there are 57 structures included in the relocation

2- that the relocation is mandatory and that the sponsor will use eminent domain to acquire properties if necessary
3- that all residents and businesses will be relocated to comparable existing properties either within or outside of the community from which they were relocated.
4- I also go into a detail regarding the requirements for comparable housing, as well as the benefits (e.g., relocation costs, paying differences in property costs, etc.) provided to the displaced individuals.

I also went through the report and included the number of structures being relocated in all other relevant sections throughout the report (e.g., description of benefits, etc.).

Submitted By: Eric Merriam (412-395-7185) Submitted On: Mar 12 2020

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Katie Opsahl (651-290-5259) Submitted On: Mar 20 2020
Current Comment Status: **Comment Closed**

8437888	Planning - Plan Formulation	Feasibility Study	n/a	n/a	n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

Review Concern: No discussion on how the alternative meet or don't meet the planning objectives.
Basis for Concern: Report needs to clearly document how well each alternative meets or doesn't meet the defined planning objectives, which is the backbone of why federal action is being considered.
Significance: low
Recommended Action: Consider adding a subsection (ex: alternatives ability to meet planning objectives) within the 3.4 Alternative Evaluation and Comparison section, that documents how the alternatives meet or don't meet the planning objectives.

Submitted By: Katie Opsahl (651-290-5259). Submitted On: Mar 08 2020

1-0 Evaluation **Concurred**
We agree and included a new section titled '3.4.3 Ability to Meet Planning Objectives' that describes how each alternative meets both planning objectives. In this section we note that all four alternatives would meet both objectives, but that the extent to which they do varies. We then go through and describe that variation.

Submitted By: Eric Merriam (412-395-7185) Submitted On: Mar 12 2020

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Katie Opsahl (651-290-5259) Submitted On: Mar 20 2020
Current Comment Status: **Comment Closed**

8437890	Planning - Plan Formulation	Feasibility Study	n/a	n/a	n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

Overall well written report, editorial comments have been provided outside of DrChecks for consideration.

Submitted By: Katie Opsahl (651-290-5259). Submitted On: Mar 08 2020

1-0 Evaluation **Concurred**

Thank you very much for your review. It has been extremely helpful. I am incorporating all suggested edits provided outside of DrChecks and will separately email the reviewer with a response to comments document.

Submitted By: Eric Merriam (412-395-7185) Submitted On: Mar 20 2020

1-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: Katie Opsahl (651-290-5259) Submitted On: Mar 20 2020

Current Comment Status: **Comment Closed**

8442712	Hydrology	Engineering Appendix	n/a	n/a	n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

Comment: Unclear application of sea level change to downstream boundary. The Engineering Appendix, Attachment 3, Section 2.3 describes the approach taken to account for future sea level change at the river mouth impacting water surface elevations at the project site. It states that a NOAA 100-year extreme water level was combined with the USACE High sea level scenario in the year 2070 and a tidal condition assuming Mean Higher High Water to yield a downstream boundary condition of 4 feet. However, these components do not sum to 4 feet, as Figure 4 demonstrates. Summing these three components should yield a total water level of 2.49 + 2.68 + 0.81 = 5.98 feet.

Basis of concern: Possible understatement of impacts of sea level change.

Significance of concern: Moderate

Action needed to resolve concern: Explain how the 4 foot water level was derived from the three components mentioned. Also, in accordance with ER 1110-2-8160, please specify the vertical datum used for this analysis in the text (presumably PRVD02).

Submitted By: William Veatch (504-862-2858). Submitted On: Mar 10 2020

1-0 Evaluation **Concurred**

The wording in this section will be revised to better clarify. Initially, the low, intermediate, and high values for the base year (0.15 ft, 0.22 ft, and 0.44 ft, respectively) were each combined with the EWL (2.49 ft) and MHHW (0.81 ft). These scenarios for the base year are estimated to range from 3.45 ft to 3.74 ft. Then, the low, intermediate, and high values for the 2070 scenario (0.42 ft, 0.96 ft, and 2.68 ft) were analyzed, yielding totals of 3.72 ft to 5.98 ft. Although the base year scenarios were initially analyzed, ultimately the most conservative value from the 2070 scenarios (5.98 ft) was the highest downstream boundary condition used for this analysis, and water surface elevations were compared with the existing conditions hydraulic model. There were no differences in water surface elevations in the study area as a result of updating this downstream boundary condition.

The datum (PRVD02) will be specified in the report.

Submitted By: Christina Urbanczyk (4123957202) Submitted On: Mar 16 2020

1-1 Backcheck Recommendation **Open Comment**

Excellent news, please provide updated language for review and closeout.

Submitted By: William Veatch (504-862-2858) Submitted On: Mar 31 2020

2-0 Evaluation **Concurred**

After receiving additional policy review comments, the PDT has decided to base the project lifespan off of 100-yr, rather than 50-yr. Thus, the sea level rise analysis was revised, and the following language will be added to the report:
"The summation of the sea level change (SLC), high tide for each of the three scenarios (low, intermediate and high, as determined from the Sea Level Change Calculator), and the NOAA 100 yr (i.e. 1% AEP) estimated extreme water level (EWL) was used to estimate downstream boundary conditions for the base year and year 2120 (100-year project lifespan). Initially, the low, intermediate, and high values for the base year (0.15 ft, 0.22 ft, and 0.44 ft, respectively) were each combined with the EWL (2.49 ft) and MHHW (0.81 ft). These scenarios for the base year are estimated to range from 3.45 ft to 3.74 ft. Then, the low, intermediate, and high values for the 2120 scenario (0.69 ft, 2.15 ft, and 6.77 ft) were analyzed, yielding totals of 3.99 ft to 10.07 ft. Although the base year scenarios were initially analyzed, ultimately the most conservative value from the 2120 scenarios (10.07 ft) was the highest downstream boundary condition used for the analysis and was compared with the MHHW initially incorporated in the existing conditions hydraulic model. There was no increase in water surface elevation in the study area extents for the future without- and with- project conditions."

Submitted By: Christina Urbanczyk (4123957202) Submitted On: Apr 07 2020

2-1 Backcheck Recommendation **Close Comment**

Excellent job

Submitted By: William Veatch (504-862-2858) Submitted On: Apr 16 2020

Current Comment Status: **Comment Closed**

8442769	Hydrology	Feasibility Study	n/a	n/a	n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

Comment: Sea level analysis does not extend to end of project life because project life is unspecified. Figure 2-1 in the main report indicates that the life cycle of this project is longer than the 50-year period of economic analysis, but nowhere does the report specify what the project's intended lifespan is.

Basis of concern: Potential performance vulnerability to sea level change

Significance of concern: Moderate

Action needed to resolve concern: Per ER 1100-2-8162, analysis of sea level change must extend to the end of the intended project life, which is assumed to be 100 years for major infrastructure per ER 1110-2-8159 unless otherwise specified. The report should specify how long the project is intended to perform, and the analyses of sea level change should extend to that year. A simple approach could be to use the USACE High sea level scenario in the year 2120 (100 year project life) plus MHHW and the NOAA 1% AEP EWL as the downstream boundary condition for the analysis described in section 2.3 of the Engineering Appendix. If this coastal water level (~10 feet) still has no effect on water levels at the site (quite possible given the steep slope of this river, with water surface elevations of ~100 feet only 16 miles upstream of the coast), this would resolve this comment as well as comment 8442712.

Submitted By: William Veatch (504-862-2858). Submitted On: Mar 10 2020

1-0 Evaluation **For Information Only**

The planning horizon for the project is anticipated to be 50-yr, which will be clarified in the report. Regardless, updating the water level to approximately 10 feet still does not impact water surface elevations at the project site

Submitted By: Christina Urbanczyk (4123957202) Submitted On: Mar 16 2020

1-1 Backcheck Recommendation **Open Comment**

Please note that the project lifespan is often different from the economic planning horizon (which is nearly always 50 years except for multipurpose reservoirs). Some USACE projects like large dams could reasonably perform for centuries, while small ecosystem restoration projects may only serve for a few years. The project lifespan should be specified in the report.

The fact that a downstream boundary of 10 feet still doesn't affect the project is good news. This should be mentioned in the report, assuming the project life is indeed 100 years.

Submitted By: William Veatch (504-862-2858) Submitted On: Mar 31 2020

2-0 Evaluation **Concurred**

As mentioned in the comment response to comment 8442712, the project lifespan was updated to 100-yr. The sea level rise analysis was revised, and the text was updated as mentioned in the comment response to reflect that revision.

Submitted By: Christina Urbanczyk (4123957202) Submitted On: Apr 07 2020

2-1 Backcheck Recommendation **Close Comment**

Great. If a 10 foot downstream boundary has no impact, then there is no concern for future project performance degradation due to sea level change.

Submitted By: William Veatch (504-862-2858) Submitted On: Apr 16 2020

Current Comment Status: **Comment Closed**

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Enclosure 5

Statement of Completion of Agency Technical Review

COMPLETION STATEMENT OF AGENCY TECHNICAL REVIEW

The Agency Technical Review (ATR) has been completed for the Rio Grande de Manati Flood Risk Management Study, Ciales, Puerto Rico Draft Integrated Feasibility Report & Environmental Assessment, Pittsburgh District.

The ATR was conducted as defined in the project's Review Plan to comply with the requirements of EC 1165-2-217, 20 February 2018, Water Resources Policies and Authorities, CIVIL WORKS REVIEW.

During the ATR, compliance with established policy principles and procedures, utilizing justified and valid assumptions, was verified. This included review of: assumptions, methods, procedures, and material used in analyses, alternatives evaluated, the appropriateness of data used and level obtained, and reasonableness of the results, including whether the product meets the customer's needs consistent with law and existing US Army Corps of Engineers policy.

The ATR team assessed the District Quality Control (DQC) documentation and determined that the DQC activities employed appear to have been appropriate and adequate.

All comments resulting from the ATR have been resolved and all comments have been closed in DrChecks.

OPSAHL.KATHERINE.M.1392668663 Digitally signed by OPSAHL.KATHERINE.M.1392668663 Date: 2020.05.19 12:00:55 -05'00'

Katie Opsahl
ATR Team Leader
CEMVP-PDF

Date

PORTER.ELLIOTT.1366851204 Digitally signed by PORTER.ELLIOTT.1366851204 Date: 2020.05.22 06:12:11 -04'00'

Elliott Porter, PM
Project Manager
CELRP-PM-EF

Date

THAUT.ERIC.WILLIAM.1231631824 Digitally signed by THAUT.ERIC.WILLIAM.1231631824 Date: 2020.05.19 16:45:58 -07'00'

Eric Thaut
Deputy Director of the FRM-PCX
CESPD-PDP

Date