CECW-PC 16 April 2020

MEMORANDUM FOR CECW-LRD (ATTN: Gwyn Jarrett)

SUBJECT: Rio Grande de Manati, Flood Risk Management Study Draft Report Policy and Legal Compliance Review

1. This memorandum transmits the updated project guidance memorandum (PGM) for the subject report dated February 2020. The review covered the draft Integrated Feasibility Report and Environmental Assessment, appendices, and supplemental items. The previous PGM was provided on 31 March 2020. This updated PGM includes additional real estate comments.

2. Questions concerning the USACE policy and legal compliance review should be directed to the review manager, Ray Wimbrough, at 202-761-4056.

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Encl

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Rio Grande de Manati, Ciales, Puerto Rico
Flood Risk Management Study
February 2020

Study Area: The Municipality of Ciales is located on the northern slopes of the Puerto Rican Central Mountain Range, approximately 25 miles southwest of San Juan and has a population of approximately 19,000 (Fig. 1-1). The study area is generally centered on the community of Dos Rios, which sits at the confluence of the Rio Grande de Manati and Rio Cialitos.

Study Authorization: The authority for the Rio Grande de Manati (Ciales), Puerto Rico Feasibility Study is Section 204 of the River and Harbor and Flood Control Acts of 1970 (PL 91-611), which states:

"The Secretary of the Army, acting through the Chief of Engineers, is authorized to cooperate with the Commonwealth of Puerto Rico, political subdivisions thereof, and appropriate agencies and instrumentalities thereof, in the preparation of plans for the development, utilization, and conservation of water and related land resources of drainage basins and coastal areas in the Commonwealth of Puerto Rico, and to submit to Congress reports and recommendations with respect to appropriate participation by the Department of the Army in carrying out such plans…"

"The Secretary of the Army, acting through the Chief of Engineers, shall consider plans to meet the needs of the Commonwealth for protection against floods, wise use of flood plain lands, improvement of navigation facilities, regional water supply, and waste management systems, outdoor recreation facilities, the enhancement and control of water quality, enhancement and conservation of fish and wildlife, beach erosion control, and other measures for environmental enhancement."

Non-Federal Sponsor: The non-federal sponsor for the Rio Grande de Manati (Ciales), Puerto Rico Feasibility Study is the Puerto Rico Department of Natural and Environmental Resources. A Feasibility Cost Sharing Agreement was executed by USACE Jacksonville District on 09 October 2018.

Problems and Opportunities: The following problems have been identified for the study area:

1. Elevated flood risk for structures within the floodplain. There are 149 structures within the study area (i.e., 0.002 AEP floodplain; Fig. 1-2), including private homes, businesses, industrial sites, and public facilities (i.e., sewage treatment plant).

2. Inundation of transportation infrastructure. Several major access and evacuation routes are located within the 0.01- and 0.002-percent AEP floodplains (Fig. 1-2). Inundation of and damage to roadways and bridges increases life safety risk both during (evacuation) and after (recovery) flood events.

The following opportunities were identified in the study area (Note: Some statements may include opportunities associated with a potential erosion control project that is not allowable under the Section 204 authority).

1. Protection of public infrastructure, homes, and businesses from future flood damage. Reducing flood risk through implementation of structural and/or non-structural measures would reduce recurring flood damages to public infrastructure (e.g., roads and bridges) and works (e.g., wastewater treatment plant), homes, and businesses located within the floodplain and floodway throughout the study area.

2. Continuity of transportation during and following flood events. Effectively reducing the extent and/or duration of inundation would help improve access to population centers and associated critical facilities and evacuation from impacted areas during and after future flood events. Such measures could also reduce long-term transportation delays. This is evidenced by the fact that floodwaters associated with Hurricane Maria led to failure of the PR-145 Bridge—the replacement for which is still under construction, impacting transportation 2 years later.

3. Improved life safety within the study area. Reducing transportation stoppages and delays will improve life safety by helping to secure sustained: 1- evacuation routes for at-risk families; access to impacted areas following the recession of flood waters; and 3- access to population centers and associated critical facilities both during and following future flood events. Reducing risks associated with inundation would also improve life safety for residents currently located within the floodplain and floodway.

4. Restoration of natural floodplain areas along the Rio Grande de Manati. Implementation of certain flood risk management measures can result in removal of structures from the floodplain and/or result in greater floodplain connectivity and associated restoration of natural floodplain habitats.

5. Realization of recreational & environmental benefits in areas that will temporarily flood. Potential removal of structures from the floodplain and restoring natural floodplain habitat through various flood risk reduction measures could result in improved recreational opportunities (e.g., wildlife viewing, hiking, improved stream access).

6. Improved community awareness of flood risk. Community outreach and engagement throughout the study and resulting project could improve community awareness of flood risk, resulting in greater long-term community resiliency.

Plan Formulation: The plan formulation strategy consisted of multiple formulation phases and was conducted from a spatial perspective. The study area was divided into four focal areas recognizing that physical boundaries and environmental conditions create distinctive water management issues in each focal area. The PDT first developed and screened a list of management measures that would work to address one or more of the problems and study objectives within each of the four focal reaches. Individual management measures were then combined into a series of 'options' for each focal area. Options for each focal area were then combined into an initial array of system-wide alternative plans. Alternatives were evaluated to

ensure proper functioning and compatibility across focal areas and screened into a final array of viable plans that provided integrated and holistic solutions to flood risk throughout the study area. Alternatives within the final array were compared to one another, enabling selection of the tentatively selected plan. The tentatively selected plan was then optimized to ensure maximal long-term benefits.

Tentatively Selected/Recommended Plan: The main report identifies the TSP as a non-structural plan. Structures within the 0.04 AEP floodplain would be acquired and demolished, and residents would be relocated outside of the floodplain. The 0.04 AEP floodplain was selected to include those structures with the majority of recurring flood damages, as well as those with the greatest life and safety risk during major flood events. Under this alternative, the average inundation depth during the 0.04 AEP event for structures included in the relocation is 15.7 feet. In contrast, the inundation depth for structures within the 0.01 AEP floodplain that are not included in the relocation program is 2.7 feet. Although there is some residual risk to structures not included in the relocation effort, there are other relocation programs these residents can take advantage of to eliminate their risk. Alternative 3 also incorporates a floodwall around the wastewater treatment plant. The TSP also included other project features that cannot be recommended due to lack of authority.

Project Costs: The total project first cost is $15,673,000, with a benefit-cost ratio of 1.5:1.

Draft *Integrated Feasibility Report/Environmental Assessment Environmental Impact Statement* – Policy and Legal Review Comments on the Draft Report and the Project Guidance Memorandum (PGM) – Revised APR 2020

PLAN FORMULATION

1. Lack of Study Authority for Bank Erosion

Concern: The draft report frames a problem in the area as "flood induced bank failure." This manufactured term misrepresents the existing conditions in the project area by improperly attempting to link bank erosion to flood risk management. While erosion is a problem in the area and may have occurred in greater magnitude due to higher flows during tropical events, it is in no way caused by the flooding (inundation) problem that is occurring in a different area.

The Corps does not have authority under Section 204 of the Flood Control Act of 1970 to study or recommend a solution to bank erosion. The Section 204 authority that was cited only allows for the investigation of "beach erosion," and when considering that the location of the project is in the inner, mountainous terrain of the island, beach erosion is not applicable. The last paragraph on page 39 of the report indicates that HQUSACE gave permission to study bank stabilization and bridge scouring; however, this statement is erroneous and no permission was given by HQUSACE to study activities outside of authority. The study team may identify problems in the area that may or may not include areas within Corps authority to study; however, funding should not have been expended to perform any analysis of erosion control or bank stabilization. Although there are instances where erosion control may be necessary to support features of a flood risk management project (typically to stabilize measures such as earthen levees that could be subject to erosion), the erosion occurring at the site is a separate problem.
The report can recommend that a Section 14 study be conducted outside of the current feasibility study.

Using CAP authority to implement a specifically authorized element skirts 902 authority (Section 902 of the Water Resources Development Act (WRDA) 1986, EP 1105-2-58). Also it should be noted that EP 1105-2-58, Section 7.c. states "Likewise, large or complex projects where the likely cost of the solution will be beyond the scope of CAP will not be pursued under CAP."

There are also several unsigned memoranda that are included in Appendix F, particularly a memorandum that is unsigned by the HQUSACE Chief, Planning and Policy, that do not seem to accurately characterize conclusions and direction that was provided to the Pittsburgh District.

Basis of Concern: Lack of authority to study and expend funding for the analysis of erosion control under Section 204 of the Rivers and Harbors and Flood Control Acts of 1970.

Significance of Concern: *High, as the report contains formulation and costs for a Section 14 project that has been included as part of a specifically-authorized study. Additionally, the improper inclusion of erosion control as part of the study scope may have affected formulation*

for parts of the study that are allowable under Section 204.

Action needed to resolve the concern: All analysis of erosion control shall be removed from the feasibility report and from the plan recommendation, particularly the mention of any "combined plan." The district will also ensure that removal of erosion control from the plan formulation, evaluation, and comparison in no way affects the quality or integrity of the actual flood risk management analysis. Additionally, the Future Without Project Condition should be modified as appropriate to address issues associated with protection of roadways/evacuation routes that are the responsibility of a separate agency. Remove all of the unsigned internal memoranda that have been included in Appendix F. The memoranda include conclusions that were never agreed to by the vertical team and should not be included in a public document.

Response: The PDT has coordinated the following response with the MSC, including Mr. Durrett, who agree that it accurately captures prior discussions with, and direction provided by, the vertical team.

The assertion that the Section 204 authority only allows for the investigation of 'beach erosion,' and that the Corps does not have authority under Section 204 of the Flood Control Act of 1970 to study or recommend a solution to bank erosion is inconsistent with guidance provided to the PDT by the District, Division, and Headquarters Offices of Counsel. The Section 204 authority certainly includes 'beach erosion', however, it also includes the phrase 'protection against floods', present within the same section of the authority. The Flood Control Act of 1970, in its entirety, uses the phrase 'protection against floods' once, while the phrase "flood control" is used 17 times. The PDT, OC and MSC review team believe that if Section 204 was enacted to be strictly for 'flood control', they would have used that phrase instead of 'protection against floods'.

The PDT first brought this to the attention of the District's Office of Counsel, who on May 28, 2019, sent correspondence to the PDT that stated in part:

"As we discussed last week, I have reviewed Public Law 91-611, specifically Section 204 of the Flood Control Act of 1970, which is being utilized as the authority for the Rio Grande de Manati (Ciales), Puerto Rico Feasibility Study. It is my opinion that Section 204 authorizes the Chief of Engineers to cooperate with the Commonwealth of Puerto Rico and its political subdivision in the preparation of plans that offer "protection against floods" and that the phrase "protection against floods" contained in Section 204 is broad enough to include both flood risk management measures as well as stream bank protection measures provided that there is a reasonable degree of certainty by our technical branch the measures to be studied would provide a not-insignificant amount of protection against future flood events."

Further correspondence from HQUSACE's Office of Counsel, dated December 9, 2019, sent to Division and District Offices of Counsel noted that:

"As promised, I discussed this issue with others in HQ counsel and we do not believe this is something counsel can or should resolve. Rather, it is ultimately a policy determination that

would require review and approval by HQUSACE planning, policy and programs and ultimately at the ASA(CW) level. …"

Discussions with HQUSACE planning and policy staff indicate that the Corps 'flood control' mission does not include bank stabilization, and a broader application would have significant ramifications long term for the Corps' flood risk management program, given the "possibility for a nationwide expansion in the range of riverine areas impacted by bank destabilization."

Then finally, on April 3, 2020, which was 4 days after the issuance of the Policy and Guidance Memorandum, Division Office of Counsel sent an email to the LRD Chief of Planning and Policy that stated in part:

"As I recall, the vertical OC team (after much debate) finally concurred that the language of Section 204 could be interpreted to include erosion control, so legal authority existed. However, HQ and LRD OC advised the PDT that a policy waiver would be needed. The PDT did not concur with our assessment. Since it is Planning policy that was being interpreted, the PDT decided to elevate the issue directly to Ms. Brown and Wes Coleman."

It is clear from the alignment of the District, Division, and Headquarters' Offices of Counsel that the PDT has the legal authority, under Section 204 of the Flood Control Act of 1970, to study flood induced bank failure as it relates to protection from floods as a part of the Rio Grande de Manati feasibility study. The issue becomes implementing the recommendations, which is why the District suggested one Chief's Report with two recommendations—implementation of the traditional flood risk management measures under the Section 204 authority, and implementation of the traditional stream bank erosion measures under a separately authorized project.

With respect to the assertion that the memoranda included in Appendix F that are unsigned by the HQUSACE Chief, Planning and Policy do not accurately characterize conclusions and direction that was provided to the Pittsburgh District, the Pittsburgh District was never provided with opposing conclusions or direction. That memorandum, a Memorandum for Record of the Interim Progress Review call held January 9, 2020, was initially sent to Headquarters, USACE on January 24, 2020, followed up with the draft caveat language sent February 5, 2020, and finally receiving comments on the draft caveat language only from a Senior Policy Reviewer of the Office of Water Project Review on February 21, 2020. The PDT received no comments or guidance stemming from the Interim Progress Review call held January 9, 2020, and in fact, to this date, has not received any definitive policy guidance, conclusions, or direction regarding the inclusion of bank stabilization in the report.

The PDT and LRD continually sought guidance from the VT throughout the study process to answer two primary questions:

(1) If the erosion problem warrants USACE involvement, what is the path to implementation?
(2) If it does not, how can we identify and explain the policy or precedent prohibiting USACE involvement to the public?

It was never the intent of the PDT to disregard direction provided by the vertical team. To the contrary, previous direction provided by all levels of the vertical team was to include bank

stabilization in the draft feasibility report, which the PDT followed in good faith. The PDT absolutely wants to come to a resolution on this issue that is agreed upon by the entire vertical team. Until a decision is made and agreed upon by the entire vertical team, the PDT feels it would be premature and contrary to prior direction to initiate removal of all work conducted related to bank stabilization. The PDT has removed Appendix F from the report per comment #25 in this memorandum.

Updated Response: An IPR was held on 6 May 2020 with the vertical team in order to come to resolution on the policy and authority issue. That meeting resulted in PDT and vertical team alignment on the following path forward for addressing this comment.

Large-scale bank failure and bridge scour will be identified as a problem and retained in the report up through the description of existing and future without project conditions. Following the description of the problems and existing and future without project conditions, the report will include language stating that although these problems have been identified, neither the study authority nor USACE policy allow the study, recommendation, or implementation of measures designed to address bank stabilization or bridge scour within the context of flood risk management. Bank failure and bridge scour will then be completely removed from the plan formulation process, including development of management measures and alternatives, alternative evaluation and comparison, and recommended plan. However, the team will discuss residual risks to life and safety and uncertainty associated with bank failure and bridge scour within the evaluation/comparison of alternatives and within the discussion of the recommended plan because the inability to address scour could impact benefits realized by all alternatives (e.g., reducing inundation of roads to improve continuity of transportation would have less of a benefit if transportation routes were lost due to bank failure).

During the Agency Decision Milestone (ADM) meeting held on 8 May 2020, Mr. Durrett noted the importance of including the information developed during the study process regarding bank stabilization and bridge scour for the purposes of transparency. It was decided during the ADM that information on stability and scour measures developed during the study would be included, to some extent, in an appendix to the final report. This appendix will not make a recommendation for implementation. Rather, it will provide preliminary information developed as part of the initial study effort. It will also provide caveat language that states the information included in the appendix was not finalized and has not having undergone review. As discussed during the ADM meeting, the PDT will work with the vertical team to determine the appropriate level of detail for information provided in the report. A draft of the appendix will be provided to the vertical team for review prior to submission of the final report.

2. Constraints

Concern: Page 9. “Local site conditions” are not considered a constraint. The geology of the area could be altered or infrastructure could be removed. Although this may occur at great cost and would not likely be justified, it does not make it a project constraint.

Basis of Concern: Per ER 1105-2-100, Section 2-3.a.(5): “Constraints are restrictions that limit

the planning process."

Significance of Concern: *Low, as it is unlikely that any reasonable alternatives were eliminated.*

Action needed to resolve the concern: Remove "local site conditions" as a constraint.

Response: "Local site conditions" was removed from the constraints section and was placed under the planning considerations section.

3. Screening of Alternatives

Concern: Section 1.4.3., page 9. Reasonable alternatives should not be avoided due to preliminary assessments of O&M costs unless it can be demonstrated that these would cause a plan to not be cost effective. Formulation should not be limited by initial costs that are rejected by a local sponsor.

Basis of Concern: ER 1105-2-100 indicates the following: "Steps in the procedures may be abbreviated by reducing the extent of the analysis and amount of data collected where greater accuracy or detail is clearly not justified by the cost of the plan components being analyzed. The steps abbreviated and the reason for abbreviation shall be documented in the planning reports. Planners can pursue the use of alternative procedures when these would provide a more accurate estimate of benefits. The use of alternative procedures and the consideration of new benefit categories, including the procedures to be used to estimate them, require advance approval from HQUSACE (CECW-P)."

Significance of Concern: *Medium, as reasonable alternatives could have potentially been eliminated before sufficient evaluation and comparison of plans.*

Action needed to resolve the concern: Fully document why the O&M costs or initial alternative costs would not be cost effective and why alternatives should be eliminated before additional analysis, or carry those alternatives forward into policy compliant evaluation and comparison.

Response: The 'Economic Conditions' heading that referenced O&M was removed from Section 1.4.3 Constraints. Uncertainty surrounding the sponsor's capacity to conduct ongoing O&M is an important consideration. Therefore, it was included in the discussion of uncertainty in the Section 3.4.5. Residual Risk & Uncertainty that was added to the report per subsequent comments.

4. Existing Conditions

Concern: The existing conditions barely describe the flooding that is occurring in the study area. Most of the information is related to bank erosion. There is also a substantial amount of unnecessary information such as four pages of soils descriptions, descriptions of prehistoric resources, etc.

Basis of Concern: ER 1105-2-100, Section 2-3.b.: "The second step of the planning process is to develop an inventory and forecast of critical resources (physical, demographic, economic, social, etc.) relevant to the problems and opportunities under consideration in the planning area. This information is used to further define and characterize the problems and opportunities. A quantitative and qualitative description of these resources is made, for both current and future conditions, and is used to define existing and future without-project conditions. Existing conditions are those at the time the study is conducted…Gathering information about historic and existing conditions requires an inventory."

Significance of Concern: *Medium, as the report does not adequately characterize flooding problems that may be occurring.*

Action needed to resolve the concern: Adequately define the existing conditions, removing extraneous and unnecessary information. Remove information related to erosion control, which USACE does not authority to study per Section 204.

Response: The presentation of the existing conditions will be reorganized to more directly detail existing and future flood risks within the study area. This reorganization will result in presentation of 'Hydrology and Inundation Risk' in the beginning of both sections. This section will incorporate information on: frequency and magnitude of flooding, number and types of structures with elevated flood risk, inundation of roads, and description of life and safety concerns (i.e., loss of access/egress routes, isolation of communities). This updated format will be carried throughout all other relevant sections of the report that follow the same format (2.2 Existing Conditions, 2.3 Forecasted Setting, 3.5 Environmental Effects, and 5.1 Environmental Effects of Recommended Plan).

Many of the sections included in the existing and Future Without Project (FWOP) descriptions were deemed necessary for the Environmental Assessment. However, extensive descriptions of prehistoric and historic resources were removed per the reviewer's recommendation. Detailed information on soils and flood-induced bank failure will currently be retained per the response to comment #1.

Updated Response: The description of existing and FWOP conditions will be updated per the original response. As discussed during the IPR held on 6 May and subsequently during the ADM meeting held 8 May, the description of bank failure will be retained within the description of existing and FWOP project conditions as it has important implications for life safety within the study area and could impact realized benefits of the alternative plans. However, the team will reduce the information contained in these sections to include only that which is necessary to convey the existing state of eroding banks. Toward this end, detailed data on soils will be removed, and existing resources/documents will be cited.

5. Off Channel Storage

Concern: Page 40. What is "off channel storage?" This measure is mentioned as a nature based

feature that would create storage in the floodplain, but isn't described at all.

Basis of Concern: Per ER 1105-2-100, Section 2-3: "The Corps planning process follows the six- step process defined in the P&G. This process is a structured approach to problem solving which provides a rational framework for sound decision making. The six-step process shall be used for all planning studies conducted by the Corps of Engineers… Corps decision making is generally based on the accomplishment and documentation of all of these steps."

Significance of Concern: *Low, as the lack of documentation is unlikely to affect plan selection.*

Action needed to resolve the concern: Fully document all management measures and any evaluation that was performed.

Response: The definition of off-channel storage in Table 3-1 was bolstered and now reads:

"Off-channel storage (which may be part of the floodplain, including wetlands or marshes) would temporarily store water diverted from the river channel. Off-channel storage could be implemented throughout the watershed, including within the study area, to reduce the magnitude of flooding."

Table 3-2 discusses the evaluation of off-channel storage and ultimately notes that this measure was removed from further consideration because:

"Steep mountainous topography throughout the watershed limits floodplain area available for off-channel water storage, rendering this measure ineffective."

Updated Response: Per the discussion had during the IPR held on 6 May 2020, this text will be updated to explicitly state that this measure represents 'detention areas'. The measure will be re-named to 'off-channel detention', and the description text will be updated to read:

"Off-channel detention areas (which may be part of the floodplain, including wetlands or marshes) would temporarily store water diverted from the river channel. Off-channel detention could be implemented throughout the watershed, including within the study area, to reduce the magnitude of flooding."

6. Screening of Measures

Concern: Page 39. The screening of measures is inconsistent with USACE policy. For an alternative to be effective, it does not need to meet all of the planning objectives. Second, acceptability is improperly defined. The P&G Criteria do not necessitate consistency with local planning efforts under the definition of acceptability. Third, it seems that measures were eliminated by cost without conducting any type of cost-benefit analysis, and without any costs cited in the report. The relative ranking of costs, without any type of preliminary benefit assessment for plan comparison, should not be used to subjectively eliminate potential alternatives from consideration.

Basis of Concern: The P&G Criteria are defined in ER 1105-2-100, Section 2-3(c)(2).

Significance of Concern: *Medium, as improper use of the P&G Criteria could lead to a flawed formulation analysis.*

Action needed to resolve the concern: Revise the screening of measures to fully comply with policy and correctly use the P&G Criteria.

Response: The screening of management measures was revised to be compliant with the P&G. Measures are now screened based on the 4 criteria (completeness, effectiveness, efficiency, and acceptability). The criteria definitions were revised to match those provided in the P&G. Descriptions of the screening were expanded within Table 3-2 to provide a more thorough screening justification that addresses all four criteria.

Cost is no longer used as a screening tool. A cost benefit analysis was not completed at this stage of the planning process, so no measures were screened based solely on a relative assessment of cost. Anticipated cost effectiveness of each measure is qualitatively described with respect to the efficiency criteria. Criteria are no longer numerically scored in an effort to eliminate additional subjectivity.

7. Life Safety

Concern: There is no assessment of life safety risk per ER 1105-2-101.

Basis of Concern: ER 1105-2-101, Section 8.a. indicates the following: "All flood risk management studies will adopt the risk framework as described herein. The risk framework approach and results of a risk assessment will be documented in the principal decision document. The types of documents involved include but are not limited to: feasibility reports, general and limited reevaluation reports, and project modification impact reports including water control manuals that reallocate storage requiring reauthorization, and design documentation reports."

Significance of Concern: High, as overall engineering performance, life loss, and economic and environmental consequences cannot be adequately address without the necessary analysis.

Action needed to resolve the concern: Comply with ER 1105-2-101 and perform and document all necessary analyses.

Response: Discussion regarding the lack of HEC-LifeSim/consequence modeling has been added to various sections of the economics appendix. Additionally, estimated Population at Risk (PAR) numbers have been added to each alternative.

A HEC-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 most greatly reduces life safety risk based on the estimated inundation. Running a HEC-LifeSim model would only confirm this, so there was no need to build the model. Finally, 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 added to the report.

8. Residual Risk

Concern: There is no analysis of residual risk for the proposed project.

Basis of Concern: Per ER 1105-2-100, Section E-18.c.(2): "There is no minimum level of performance or protection or size required for Corps projects. The smaller in size or the lower the level of performance however, the higher the residual risk. Residual risk must therefore be carefully analyzed and communicated."

Significance of Concern: *High, as significant residual risk may lead to the selection of a different plan or termination of the study if there is no viable solution.*

Action needed to resolve the concern: Fully characterize and quantify residual risk to the extent practicable. Factor the results into the plan evaluation and comparison with appropriate conclusions on the selection of a plan.

Response: A new section was included under the evaluation and comparison titled 3.4.5 Risk & Uncertainty. This section includes subsections that describe residual risk (3.4.5.1), residual risk due to climate change (3.4.5.2), and uncertainty (3.4.5.3) for each alternative. Alternatives are then summarized and compared based on their current and future residual risk and uncertainty in section 3.4.5.4 Risk & Uncertainty Summary & Comparison. A discussion of risk and uncertainty was also included in Section 3.6 Tentatively Selected Plan that notes the selected plan has the least amount of uncertainty with respect to current and future residual risk as all risk is completely removed for structures included in the non-structural relocation.

9. Upstream Reservoir

Concern: Page 56. Alternative 5. Upstream Reservoir. The main report should document why the upstream reservoir was removed rather than reference a Memorandum from the Record.

Basis of Concern: Per ER 1105-2-100, Section 2-3: "The Corps planning process follows the six- step process defined in the P&G. This process is a structured approach to problem solving which provides a rational framework for sound decision making. The six-step process shall be used for all planning studies conducted by the Corps of Engineers… Corps decision making is generally based on the accomplishment and documentation of all of these steps."

Significance of Concern: *Low, as it is unlikely that a reservoir features would be selected due to*

high costs.

Action needed to resolve the concern: Document the analysis in the main report.

Response: The reservoir was screened out using the P&G screening criteria. This section was updated to capture those discussions and now only mentions vertical team concurrence. 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."

10. Formulation Process

Concern: The alternative formulation process in the report is flawed due to a subjective and unbalanced analysis that inappropriately ranks and compares unequal criteria. Although scoring within criteria at times may help demonstrate advantages and disadvantages, combining scores of unequal criteria and then comparing them is misleading and does not accurately portray project performance. For example, life safety should not be comparable to local preference for a certain plan.

Additionally, why was the project area divided into focal areas, then reassembled? It doesn't seem necessary and adds confusion to the report. Table 3-3 includes costs and benefits for erosion control, which is not allowable under the Section 204 authority for the study. It is unclear if erosion control was factored into all of the evaluation criteria or subcriteria. The effectiveness criterion should be a measure of how well each alternative meets the objectives. The future flood risk subcriterion discusses "increases in extreme precipitation" that "would decrease the level of protection provided by the project." Where is this analysis in the report and how does it comply with current climate guidance? This subcriterion doesn't seem to be based on any engineering analysis.

There also appears to be multiple factors leading to double counting. Flood damage reduced are within both the effectiveness category and likely are in the NED benefit within the efficiency category, so combining the score means these benefits are being double counted. Since both local and regional benefits would be included in national benefits and local would be within the

region, then this is likely double counting.

Basis of Concern: ER 1105-2-100, Exhibit G-1 indicates the following: "The feasibility report will document that all reasonable alternatives for addressing the identified problems, including non-structural measures and measures beyond the authority of the Corps to implement, have been systematically formulated and evaluated in accordance with the P&G." Additionally, ER 1105-2-100, Section 2-3 indicates: "The Corps planning process follows the six-step process defined in the P&G. This process is a structured approach to problem solving which provides a rational framework for sound decision making. The six-step process shall be used for all planning studies conducted by the Corps of Engineers… Corps decision making is generally based on the accomplishment and documentation of all of these steps."

Significance of Concern: *High, as the selected plan cannot be justified based on the flawed analysis.*

Action needed to resolve the concern: Fully explain the formulation process in a logical and sequential manner. Revise the flawed analysis and separate the P&G Criteria from the Four Accounts. Include only objective analyses that can be supported by adequate scientific and engineering evaluations that have undergone DQC and ATR. Remove erosion control from all cost and benefit analyses.

Response: Section 3.4 Alternative Evaluation & Comparison was completely restructured. There are now separate sections that evaluate and compare based on the P&G Accounts (Section 3.4.2 in the revised document) and the P&G Criteria (Section 3.4.3). Each of the accounts and criteria have their own sub-sections within which the alternatives are evaluated. Definitions were updated to ensure they match those provided in the P&G and all discussions that extend beyond those definitions have been removed. A summary and comparison table was included at the end of each of these sections that does not include the original comparative analyses. Rather, it provides a more general color-coded system that is based solely on the results of technical analyses and denotes positive effects (green); neutral or no effects (yellow); and negative effects (red). Thus, all concerns regarding scoring subjectivity and combining/double-counting have been addressed.

The future flood risk sub-criteria was removed. This criteria was meant to capture residual risks associated with climate change. In response to this and subsequent comments (#12 Risk & Uncertainty and #16 Residual Risk Due to Climate Change), an expanded discussion of residual and future risks and uncertainty was incorporated into a completely separate section titled 3.4.5 Risks and Uncertainty, which includes separate discussions on residual risk (3.4.5.1), residual risk due to climate change (3.4.5.2), and uncertainty (3.4.5.3), as well as a summary and comparison of risk and uncertainty across alternatives (3.4.5.4).

At this point, cost benefit analyses associated with stream bank stabilization have been retained per the response to comment #1. Stream bank protection measures were included in the evaluation of the accounts and criteria. Through the re-organizing and re-writing of this section, however, the contribution of the stream bank stabilization and more classic FRM components to the overall evaluation of alternatives is easily discernable.

The decision to break the study area up into focal areas was established at the beginning of the study in order to characterize the different risks and factors controlling those risks throughout the study area. This decision was agreed upon by the vertical team during the AMM milestone meeting and was subsequently presented during the TSP milestone meeting. Although it adds an additional step and level of complexity to the plan formulation process, removing this detail from the report would result in an inaccurate characterization of the process and work that was completed. The section describing the focal areas was re-worked to make this a more defined step in the write-up of planning process. Specifically, the descriptions of each focal area were incorporated into in the text of the document (as opposed to within the original Fig. 3-1). The map of the focal areas was also enlarged to ensure the problems in each focal area were clearly identified and interpretable.

Updated Response: Changes will be made per the original response; however, stability and scour measures will be completely removed from the plan formulation process, including the development, evaluation, and comparison of alternatives per comment #1.

11. Four Accounts

Concern: The report lacks an adequate analysis of the Four Accounts. The Four Accounts are not subcriteria of the P&G Criteria, as is indicated in Table 3-10, page 67.

Basis of Concern: ER 1105-2-100, Section 2-3.d.(3) indicates the following:
"(3) Four accounts are established in the P&G to facilitate the evaluation and display of effects of alternative plans.
(a)The national economic development account displays changes in the economic value of the national output of goods and services. The environmental quality account displays non-monetary effects on ecological, cultural, and aesthetic resources including the positive and adverse effects of ecosystem restoration plans.
(b) The regional economic development account displays changes in the distribution of regional economic activity (e.g., income and employment).
(c)The other social effects account displays plan effects on social aspects such as community impacts, health and safety, displacement, energy conservation and others.
(4) Display of the national economic development and environmental quality accounts is required. Display of the regional economic development and other social effects accounts is discretionary."

Significance of Concern: *High, as until a policy compliant analysis that fully characterizes the Four Account is conducted, the selected plan cannot be justified.*

Action needed to resolve the concern: Conduct a policy compliant analysis of the alternatives, fully exploring the NED, EQ, RED, and OSE accounts as necessary to differentiate between alternatives. Refrain from any subjective ranking analysis that is not vetted through the vertical team.

Response: Section 3.4 Alternative Evaluation & Comparison was completely restructured and includes a section dedicated to evaluating and comparing alternatives based on the P&G Accounts (Section 3.4.2 in the revised document). This section starts by defining and describing the accounts using language found in the P&G. Each account then has its own sub-section within which the alternatives are evaluated. A summary and comparison table (Table 3-4 in the revised manuscript) is now provided that compares the alternatives based on the accounts and provides a general color-coded system that is based solely on the results of technical analyses and denotes positive effects (green); neutral or no effects (yellow); and negative effects (red). Thus, all concerns regarding ranking and subjectivity have been addressed.

12. Risk and Uncertainty

Concern: There is no analysis of risk and uncertainty between alternatives nor is there an assessment of risk and uncertainty for the selected plan.

Basis of Concern: 2-3.g.: "The P&G state that planners shall characterize, to the extent possible, the different degrees of risk and uncertainty inherent in water resources planning and to describe them clearly so decisions can be based on the best available information. Risk-based analysis is defined as an approach to evaluation and decision making that explicitly, and to the extent practical, analytically incorporates considerations of risk and uncertainty. Risk-based analysis shall be used to compare plans in terms of the likelihood and variability of their physical performance, economic success and residual risks. A risk-based approach to water resources planning captures and quantifies the extent of risk and uncertainty in the various planning and design components of an investment project. The total effect of risk and uncertainty on the project's design and viability can be examined and conscious decisions made reflecting an explicit trade-off between risk and costs." Additionally, ER1105-2-101, Section 8.a. states: "The risk framework approach and results of a risk assessment will be documented in the principal decision document. The types of documents involved include but are not limited to: feasibility reports …"

Significance of Concern: *High, as risk and uncertainty should be central to any analysis per the referenced guidance and recent Director's Policy Memoranda and referenced guidance.*

Action needed to resolve the concern: Fully address risk and uncertainty both between alternatives and for the selected plan.

Response: A new section was included under the evaluation and comparison section titled 3.4.5 Risk & Uncertainty. This section includes subsections that describe residual risk (3.4.5.1), residual risk due to climate change (3.4.5.2), and uncertainty (3.4.5.3) for each alternative. Alternatives are then summarized and compared based on their current and future residual risk and uncertainty in section 3.4.5.4 Risk & Uncertainty Summary & Comparison. Section 3.6 Tentatively Selected Plan also briefly discusses how risk and uncertainty were used during selection of the tentatively selected plan.

A sub-section under the recommended plan titled Section 4.7 Risk & Uncertainty was also

added to discuss risk of the selected plan. This section separately discusses residual risk, residual risk due to climate change, and uncertainty for the non-structural relocations (4.7.1) and stability and scour (4.7.2) measures. At this time, discussions of stability and scour measures were retained per the response to comment #1.

Updated Response: Changes will be implemented per the original response, with the exception that there will be no discussion of risk and uncertainty associated with the stability and scour measures, as these measures will be completely removed from the plan formulation process per the revised response to comment #1. However, removal of bank stabilization and bridge scour will alter the residual risk and uncertainty associated with each alternative. For example, channelization will still provide some protection against bank failure and bridge scour, reducing life safety risks associated with these identified problems; however, all other alternatives will have residual risk to life safety associated with bank/bridge failure. Additionally, there is greater uncertainty associated with life safety benefits resulting from a reduction in roadway inundation because those benefits would largely be negated if a bridge or road would fail as a result of bank/bridge failure. The description of residual risk and uncertainty will be updated for each alternative and for the recommended plan to capture these changes.

13. Consistency of Report

Concern: The selected plan cannot be confirmed due to numerous issues, including the inappropriate inclusion of cost/benefit tables for a Section 14 CAP study. The maps and tables in the report are of poor quality and are insufficient to support the documentation. For instance, the map on page 38 of the report is too small to distinguish "at-risk structures." Roads and bridges are named in the text but are not noted on the map. The land cover map provided on page 25 is outdated as it is nearly 20 years old and there have likely been changes. For structural alternatives 1 and 2, why do the maps contain the same buyout structures as Alternative 3, the non-structural alternative? It's confusing as to whether they are part of the plans or not. Where are the alternative costs in Table 3-3? Given that the structural alternatives seem to include unnecessary nonstructural features, it is important to provide the costs and details of what was included. These should be included in the main report.

Basis of Concern: Per ER 1105-2-100, Section 2-3: "The Corps planning process follows the six- step process defined in the P&G. This process is a structured approach to problem solving which provides a rational framework for sound decision making. The six-step process shall be used for all planning studies conducted by the Corps of Engineers… Corps decision making is generally based on the accomplishment and documentation of all of these steps."

Significance of Concern: *Medium, as the composition and cost of the alternatives could be brought into question.*

Action needed to resolve the concern: Revise the report to ensure quality of maps and corresponding sections. Ensure that alternative descriptions throughout the report are consistent, and that all cost and benefit calculations include the correct number and type of features. Remove costs and benefits for a Section 14 CAP project.

Response: All analyses associated with the stability and scour measures are currently being retained per the response to comment #1. However, several steps were taken to address the referenced inconsistencies in the report. First, the maps for structural alternatives 1 and 2 were fixed/updated to no longer include the non-structural relocations. The description of all alternatives is now consistent throughout the document.

In addition, the referenced map on page 38 of the original document was completely revised. The descriptions of each focal area were pulled out of the figure and included in the text. The map and planning process were then separated and included as two separate figures. The map is now large enough to distinguish at-risk structures and shows the roadways referenced in the report. The land cover map will also be updated to utilize a more recent dataset.

Table 3-3 was updated to include total project costs and benefits, as well as annualized results. The costs provided in Table 3-3 now accurately reflect the measures presented in the description of each alternative, including the figures.

Updated Response: In addition to those changes described under the initial response, bank stabilization and bridge scour measures will be removed from the evaluation and comparison of alternatives, including the cost benefit analysis, per the decisions made during the IPR held on 6 May 2020. This change will be consistently captured in all figures and tables throughout the report.

CLIMATE

14. Project Lifetime

Concern: Main Report, Executive Summary- Section 1. The executive summary states that the objectives are to reduce flood risk over the next 50-years. The project lifetime (not to be confused with the period of analysis) should be up to 100-years with uncertainty of environmental factors over that horizon clearly articulated.

Basis of Concern: ER 1110-2-8159 and ER 1105-2-100 compliance- completeness and acceptability of the project/alternative

Significance of Concern: *High, could potentially impact whether sea level rise needs to be taken into consideration or not.*

Action Needed to Resolve the Concern: Please clarify the difference between the period of analysis versus the project lifetime. Please confirm that uncertainty associated with environmental factors like climate change and sea level change have been considered over the entirety of the project lifetime. If the proposed project lifetime has indeed been reduced to 50-years please provide justification as to why.

Response: The objectives seek to reduce flood risks during the period of analysis, which is 50

years. 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 relevant sections of 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."

The distinction between the period of analysis and project life was also further distinguished within the main report under section 2.1 Planning Horizon, which now states:

"The period of economic analysis represents the time frame used when forecasting and quantifying benefits associated with the future with- and without-project conditions. The period of economic analysis for flood risk management projects is 50 years. The assumed project life is 100 years (Fig. 2-1)."

Fig. 2-1 also now clearly defines the 100 year project life and 50-year planning horizon.

15. References

Concern: Main Report, Executive Summary- Section 2, Section 2.3.1, 2.3.3.1, Section 7. The main report does an adequate job summarizing key trends from the literature review and the results of trend analysis/Nonstationarity Detection for observed, peak streamflows. ECB 2018-14 is included in the Reference Section of the main report. The ECB and the climate assessment need to be cross-referenced in the text. Please provide reference to ETL 1110-2-3 (Nonstationarity Detection Guidance).

Basis of Concern: ECB 2018-14, ETL 1110-2-3 compliance- completeness

Significance of Concern: *Low, this concern impacts only the quality and completeness of documentation.*

Action Needed to Resolve the Concern: An in-text citation should be added to ECB 2018-14 and a cross-reference to the climate assessment carried out in support of this study should be added to the text. An in-text citation and an entry to the reference section should be added for ETL 1110-2-3.

Response: The following reference for ETL 1100-2-3 was added to the reference section:

United States Army Corps of Engineers (USAC). 2017. Guidance for Detection of Nonstationarities in Annual Maximum Discharges, ETL 1100-2-3, USACE, Washington, DC.

The text in Section 2.3.3.1 was also updated to include an in-text citation for ECB 2018-14 (USACE, 2018) and a cross reference to the full climate assessment provided in the Engineering Appendix. This text now reads:

"A climate change assessment was conducted per USACE policy and guidance (USACE, 2018). Results of the climate assessment are summarized here. Detailed results of the climate assessment can be found in Appendix A, Attachment 3.

Historic trends in instantaneous annual peak flow at the U.S. Geological Survey gauge number 50035000 were assessed using the USACE Nonstationarity Detection (NSD) Tool (USACE, 2017)…"

16. Residual Risk due to Climate Change

Concern: Main Report, Executive Summary- Section 2, Section 2.3.3.1. Residual Risk Due to Climate Change is referenced, but not tied back to the impact on key project futures.

Basis of Concern: ECB 2018-14 completeness

Significance of Concern: *Medium, because residual risk due to climate change does not appear to have been assessed qualitatively as required it could impact the decision making process.*

Action Needed to Resolve the Concern: It is stated that, "Despite this uncertainty, projected future increases in extreme storm events will likely increase flood risk," and that "future changes in flood risk are qualitatively considered when evaluating and comparing alternative plans." Please include a more detailed description of how this has been addressed/considered in the project planning process and provide information related how this risk is projected to impact the study area/project features etc. The local study partners should be informed of what they can expect.

Response: A new section was included under the evaluation and comparison titled 3.4.5 Risk & Uncertainty. This section includes a subsection that describes residual risk due to climate change (3.4.5.2). This section describes how increases in the magnitude and frequency of extreme storm and flood events could impact the performance and residual risk of each alternative. Section 3.6. Tentatively Selected Plan now briefly describes how the selected alternative has the least uncertainty regarding future risk, which reads:

"Although Alternative 3 does not reduce risks associated with inundation of roadways and there would be residual current and increased future risk for at-risk structures outside of the 0.04 AEP

floodplain, Alternative 3 has the least amount of uncertainty regarding current and future residual risk and sustained benefits (see section 3.4.5). All current and future risk for structures relocated under Alternative 3 will be completely and indefinitely removed."

Finally, a sub-section (Section 4.7 Risk & Uncertainty) was included under the description of the recommended plan. This section includes a discussion of "Residual Risk Due to Climate Change", which reads:

"Increases in extreme precipitation projected to occur throughout 100-year project life would increase residual risk associated with inundation of structures not included in the relocation. Similarly, the frequency with which roadways become inundated could increase, elevating life and safety risk for individuals both within and outside of the project area that depend on inundated roads for evacuation and access too critical facilities. Ample warning times and associated evacuation notices associated with the most extreme flood events (i.e., hurricane-induced floods) lessens life and safety risk to some extent. The frequency and extent to which the wastewater treatment plant is inundated could also increase, resulting in elevated residual risk to environmental resources and public health. Potential risks to project features are included in Table 4-7.

Table 4-7. Climate risks identified for measures included in the recommended plan.

Feature	**Trigger**	**Hazard**	**Harm**	**Qualitative Likelihood**
Non-Structural Relocations	Increased magnitude and frequency of large storm and flood events.	Future flood volumes and velocities may be larger and more frequent than present.	Increased inundation risk for structures outside of the 0.04 AEP floodplain not included in the project.	Likely
Stability & Scour Measures				
Riprap Bank Stabilization	Increased magnitude and frequency of large storm and flood events.	Future flood volumes and velocities may be larger and more frequent than present.	Flood waters may remain on features longer and with greater frequency and velocity, potentially resulting in greater damage.	Likely
Bridge Scour Protection	Increased magnitude and frequency of large storm and flood events.	Future flood volumes and velocities may be larger than present.	Flood waters may remain on features longer and with greater frequency and velocity, potentially resulting in greater damage.	Likely

Increases in extreme precipitation projected to occur throughout the 100-year project life would increase residual risk associated with loss of key transportation infrastructure due to flood-induced bank failure and scour (Table 4-7). Increased water volume and velocities could result in greater damage, potentially increasing probability of failure and/or increased OMRR&R requirements."

At this time, discussions of stability and scour measures have been retained per the response to comment #1.

Updated Response: All changes outlined in the initial response will be implemented, with the exception of describing residual risk and uncertainty associated with the stability and scour measures originally included in the recommended plan. As discussed during the IPR held on 6 May 2020, stability and scour measures will be removed from the plan formulation process and recommended plan. As previously mentioned, however, removal of the stability and scour measures from the recommended plan will increase life safety risks associated with potential future loss of transportation infrastructure due to flood-induced bank failure. Increases in the magnitude and frequency of future flood events could increase the risk of bank/bridge failure. This change in residual risk and uncertainty associated with the removal of bank stabilization and bridge scour from the planning process (Section 3.4.5) will be captured in the evaluation and comparison of alternative plans, as well as within the description of the recommended plan (Section 4.7).

17. Sea Level Rise Assessment

Concern: Main Report, Section 2.2.4.1. The text in the main report is not clear with regards to whether a sea level rise assessment was or was not carried out; the Engineering Appendix indicates that an assessment was carried out to ensure that sea level rise was not a factor in the study area.

Basis of Concern: ECB 2018-14 (Attachment B), ER 1100-2-8162 and ETL 1100-2-1 compliance clarification

Significance of Concern: *Low, this concern impacts only the quality and completeness of documentation.*

Action Needed to Resolve the Concern: In Section 2.2.4.1 of the main report, it states that: "Given the distance from the North Atlantic Ocean, hydrology within the study area is not influenced by tidal processes." Please provide more detail and add reference to relevant guidance and to the Engineering Appendix. Summarize how it was determined that the hydrology of the study area is not impacted by tidal processes (now or in the future).

Response: Section 2.2.4.1 was updated based on the results of the updated sea level rise analysis to further justify the statement that current hydrology and inundation risk is not influenced by tidal processes. This section now reads:

"An assessment of potential tidal influences on inundation within the study area was conducted by combining the current low, intermediate, and high high-tide scenarios (as determined by the Sea Level Change calculator), the NOAA 0.01 AEP estimated extreme water level, and mean higher high water to estimate the downstream boundary condition. This boundary condition was then input into the hydraulic model, which indicated sea level has no influence on water surface elevations within the study area (see Appendix A for a detailed description of this analysis)."

Consistent with the revised sea level rise analysis, the following language was added to Section 2.3.3.1 of the main report, which details future hydrology and inundation risk:

"A sea level rise analysis was conducted per USACE policy and guidance (USACE, 2013 and USACE, 2014). The most conservative boundary condition projected for the end of the 100 year project life was 10.07 feet. These represents the highest downstream boundary condition used for the analysis and was compared with the mean higher high water 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 project condition under the most conservative scenario. Therefore, sea level rise was not considered further in the plan formulation process (see Appendix A, Engineering for a detailed description of this analysis)."

18. Technical Accuracy

Concern: Main Report, Section 2.3.3.1 and Appendix A- Engineering. Not all of the twelve tests applied by the Nonstationarity Detection tool use a p-value to detect statistical significance.

Basis of Concern: ETL 1110-2-3, Technical Accuracy

Significance of Concern: *Low, this concern impacts only the quality and completeness of documentation.*

Action Needed to Resolve the Concern: Please modify the following sentence accordingly, "The Nonstationarity Detection Tool Failed to detect significant (p=0.05) nonstationarities."

Response: The text in section 2.3.3.1 was updated to read:

"Historic trends in instantaneous annual peak flow at the U.S. Geological Survey gauge number 50035000 were assessed using the USACE Nonstationarity Detection (NSD) Tool (USACE, 2017). The NSD Tool failed to detect a significant increasing or decreasing trends in observed historic annual peak flow. The NSD Tool also failed to detect significant nonstationarities—changes in the statistical characteristics of the hydrologic time series."

The engineering appendix will also be updated to state:

"The NSD Tool also failed to detect significant nonstationarities—changes in the statistical characteristics of the hydrologic time series"

19. Climate Assessment

Concern: Appendix A. Engineering, Section 1.2.3. Appendix A- Engineering Attachment 3 – Hydrologic and Hydraulic (H&H) Information. Section 1.2.3 of Appendix A should summarize the output from the ECB 2018-14 Climate Assessment. A summary related to the sea level change assessment is already included.

Basis of Concern: ECB 2018-14, completeness.

Significance of Concern: *Low, this concern impacts only the quality and completeness of documentation.*

Action Needed to Resolve the Concern: Please add a summary of the climate assessment, an in-text citation should be added to ECB 2018-14 & ETL 1110-2-3, and a cross-reference to the climate assessment carried out in support of this study should be added to the text.

Response: The following text will be added to Section 1.2.3 of the Engineering Appendix, Attachment 3:

"As referenced in ECB 2018-14, more extreme seasonal conditions of rainfall and runoff and altered snow volume and melt have been observed in some regions. As a result, the assumptions of stationary climatic baselines and a fixed range of natural variability as captured in the historical hydrologic record are no longer appropriate for long-term project planning in some locations. Therefore, qualitative and quantitative analyses have been conducted and are presented in in Appendix A, in compliance with ECB 2018-14 & ETL 1110-2-3."

20. Discussion of Local Trends

Concern: Section 2.1, Engineering Attachment 3. Because the CHAT tool and the VA tool are unavailable for the Caribbean Region it would be beneficial to include more text/detail within the literature review conducted at a regional scale. ECB 2018-14 also requires that trends at a local scale be discussed. Local trends in sea level, extreme storms and temperature are discussed to a limited degree, but it would be beneficial to add more information if possible.

Basis of Concern: ECB 2018-14, Completeness.

Significance of Concern: *Low, this concern impacts only the quality and completeness of documentation.*

Action Needed to Resolve the Concern: Currently, the trends below are briefly discussed. This likely meets the bare minimum requirements to be within policy compliance, but if there are any resources available it would be beneficial to expand on this information (both at a regional and local scale) to provide more context.

Discussion of Regional Trends (Caribbean Region; HUC 02 Scale)

- Discussion of projected trends in temperature
- Within the text it is unclear whether trends discussed in precipitation and streamflow relate to projected or observed trends.
- Figure 2 offers a summary of trends in observed and projected hydrometerological variables for the Caribbean Region

Discussion of Local Trends (Specific to Puerto Rico)

- Only local, observed trends in temperatures (sea & air), occurrence of tropical storms and hurricanes and sea level change are discussed.
- Only, local, projected trends in sea level are discussed.

Response: The text will be updated to the following:

"An August 2016 report conducted by the United States Environmental Protection Agency (US EPA) on climate change for Puerto Rico summarizes impacts of a changing climate for Puerto Rico. The report states that the Commonwealth has warmed by more than one degree (F) since the mid-20th century, and the surrounding waters have warmed by nearly two degrees since 1901. Furthermore, the ocean has been rising every 15 years by approximately one inch, and tropical storms and hurricanes have become more intense during the past 20 years (EPA, 2016). USACE has developed concise reports summarizing observed and projected climate and hydrological patterns, at a hydrologic unit code (HUC2) watershed scale. A June 2015 by USACE literature review report focused on the Caribbean Region summarizes several studies which have projected future changes in hydrometeorology. The document indicates that it is projected that air temperature will increase through the country over the next century. Specifically, projected temperature increases for the Caribbean are projected to be slightly below the global average by 2.5 to 4°C by 2100, but slightly above the tropical average. Projected temperature increases are expected to be significant by late century at all locations. Projections for Puerto Rico show an increase of as little as 0.02°C per year through 2050 and as much as 2-5°C by the year 2100 (PRCCC, 2013).

The USACE literature review (2015) indicate that -12% more precipitation is falling in Puerto Rico now as compared with the first half of the 20th century, and that the precipitation is concentrated in larger events.

Regionally within the island, there are indications that the southern region of Puerto Rico has experienced positive trends in annual rainfall while the western and a portion of the northern region showed decreases. In order to simulate future climate change, global climate models (GCMs) need to accurately represent observed climate. There is uncertainty in the magnitude of precipitation changes in the Caribbean, though a majority of GCMs show future decreases in precipitation are likely. Model projections range from -78 to -10%, and current evidence suggests drier conditions are more likely than wetter for Puerto Rico, a contrast to the global precipitation signal. Specifically the PRCCC analysis found that past and future trends are similar, a decrease of rainfall of -0.0012 to -0.0032 mm/day/yr, are projected to continue through 2050 (PRCCC, 2013).

There is limited information with regards to the effects of climate change on streamflow trends and hydrologic conditions within the Caribbean Region. There is no clear consensus on projected streamflow trends in the Caribbean Region. The Puerto Rico Climate Change Council (PRCCC) also prepared a report assessing the social-ecological vulnerabilities in a changing climate. The report indicates that surface temperatures and sea levels are increasing for the island. It was likely that mean sea level rise will contribute to upward trends in extreme coastal high water levels in the future (PRCCC, 2013).

Figure 2 summarizes observed and projected trends for a variety of variables that were reviewed (USACE, 2015)."

21. Data Gap in Period of Record

Concern: Section 2.2.2, Engineering Attachment 3. There is a substantial data gap in the period of record used to carry out the nonstationarity assessment. A continuous period of record should be used when applying the nonstationarity detection tool. A reference and in-text reference should be added to: ETL 1110-2-3: Guidance for Detection of Nonstationarities in Annual Maximum Discharges (April 2017).

Basis of Concern: ETL 1110-2-3, Technical Accuracy.

Significance of Concern: *Low, this concern impacts only the quality of analysis and is not anticipated to change the conclusions being made.*

Action Needed to Resolve the Concern: Apply the Nonstationarity Detection tool to the continuous portion of the period of record only and update Figure 2 and Figure 3. Indicate what period of record is used within the text and which portion of the period of record was excluded due to a data gap, along with what data is missing. Include a reference to ETL 1110-2-3.

Response: The USACE Nonstationarity Detection Tool was used to analyze changes to the maximum annual flow at the Rio Grande de Manati at Ciales, PR gage (USGS gage 50035000). The tool did not detect nonstationarity at the gage during the period of record from 1949 through 2018, although it should be noted that the gage has a short period of missing data in the 1950's. Even when the analysis start year was updated to exclude the period of partially missing data in the 1950's, no change points were detected. The figures will be updated in the report and the corresponding text will be updated to:

"The Nonstationarity Detection Tool did not detect nonstationarity in the maximum annual flow at the Rio Grande de Manati at Ciales, PR gage (USGS gage 50035000) during the period of record from 1958 through 2018. There was missing data from 1953 through 1958, so this period of data was neglected from the analysis, in correspondence with guidance from ETL 1110-2-3."

22. Documentation of Compliance with Guidance

Concern: Section 2.3, Engineering Attachment 3. A brief discussion of Sea Level Rise and how it was considered is discussed in Section 2.3 of the write-up. Additional documentation should be added in brief (given the lack of impacts) to indicate that all the requirements within ER 1100-2-8162 and ETL 1100-2-1 have been met.

Basis of Concern: ER 1100-2-8162 and ETL 1100-2-1, compliance/completeness/technical accuracy.

Significance of Concern: *Medium, because the documentation related to sea level change is brief and it is difficult to determine whether or not the analysis is policy compliant with ER 1100-2- 8162 and ETL 1100-2-1.*

Action Needed to Resolve the Concern: More information needs to be added to the sea level rise portion of the write-up. Several items currently missing from the sea level change assessment are as follows:

- A discussion of datum compliance;
- Hydraulic Model results;
- Enough description to ensure that total water levels are computed appropriately; and,
- It is difficult to differentiate between the NOAA EWL and USACE high scenario in Figure 4.

Response: The following text will be added:

"Based on the PRVD02 datum, 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, as the study area is outside of tidal influence. Therefore, additional analysis with regards to incorporating sea level rise was not completed."

23. Adequate Description of Qualitative Assessment

Concern: Section 2, Engineering Attachment 3. "The TSP should include a brief discussion of the residual risks resulting from changed climate conditions. It should also include a table with rows for each major measure or feature (including nonstructural measures) and columns that describe the trigger event (climate variable that causes the risk), the resulting hazard (resulting dangerous environmental condition, the harms (potential damage to the project or changed projected output), and a qualitative assessment of likelihood and uncertainty of this harm (ECB 2018-14)."

Basis of Concern: ECB 2018-14, Completeness/decision making.

Significance of Concern: *Medium, because residual risk due to climate change does not appear to have been assessed qualitatively as required it could impact the decision making process.*

Action Needed to Resolve the Concern: Please include the required table (see example Table B-1 Attachment B of ECB 2018-14).

Response: The following table will be included in the report:

Feature/Measure	Trigger	Hazard	Harm	Qualitative Likelihood
Non-Structural Relocations	Increased magnitude and frequency of large storm and flood events.	Future flood volumes and velocities may be larger than present.	Increased inundation risk for structures outside of the 0.04 AEP floodplain not included in the project.	Likely
Stability & Scour Measures				
Riprap Bank Stabilization	Increased magnitude and frequency of large storm and flood events.	Future flood volumes and velocities may be larger than present.	Flood waters may remain on bank stabilization features longer and with greater frequency and velocity. This could result in greater, more frequent damage.	Likely
Bridge Scour Protection	Increased magnitude and frequency of large storm and flood events.	Future flood volumes and velocities may be larger than present.	Flood waters may remain on scour protection features longer and with greater frequency and velocity. This could result in greater, more frequent damage.	Likely

Updated Response: Table will be updated to remove the future climate considerations for the stability and scour measures. These measures will be removed from the recommended plan per the updated response to comment #1.

24. Climate Effects on Hydrology

Concern: Section 2, Engineering Attachment 3. The climate assessment analysis and outputs need to be evaluated in the context of the study it is being generated for and the results of the assessment need to be incorporated into the decision making process/ evaluation of alternatives.

Basis of Concern: ECB 2018-14, completeness/decision making.

Significance of Concern: *Medium, because residual risk due to climate change does not appear to have been assessed qualitatively as required it could impact the decision making process.*

Action Needed to Resolve the Concern: To be policy compliant, the climate assessment needs to answer the following questions:

"How will proposed project features or operations impact the hydrology of the study area and how climate will change impact the hydrology of the study area, and address the

interrelationships?"

Include a more detailed description of how residual risk has been addressed/considered in the project planning process and provide information related how this risk is projected to impact the study area/project features etc. The local study partners should be informed of what they can expect.

Response: The engineering appendix will cross reference the main report text to document how the climate assessment was used to inform the planning process. The main report now incorporates the following discussions that utilize the output of the climate assessment:

- A new section was included under the evaluation and comparison titled 3.4.5 Risk & Uncertainty. This section includes a subsection that describes residual risk due to climate change (3.4.5.2). This section describes how increases in the magnitude and frequency of extreme storm and flood events could impact the performance and residual risk of each alternative.

- Section 3.6. Tentatively Selected Plan briefly describes how the selected alternative has the least uncertainty regarding future risk, which now reads:

  "Although Alternative 3 does not reduce risks associated with inundation of roadways and there would be residual current and increased future risk for at-risk structures outside of the 0.04 AEP floodplain, Alternative 3 has the least amount of uncertainty regarding future residual risk and sustained benefits (see section 3.4.5). All current and future risk for structures relocated under Alternative 3 will be completely and indefinitely removed."

- A new sub-section titled Section 4.7 Risk & Uncertainty was also included under the recommended plan. In this section includes a discussion of "Residual Risk Due to Climate Change" that details residual risk due to climate change and how climate change may impact project performance. This section includes the table referenced in Comment #23.

COUNSEL

25. Appropriateness

Concern: In Section 3.2.2, bottom of page 39, statements related to Office of Counsel (not "council") advice and vertical team coordination are included in the report. Appendix F includes documents discussing legal advice and detailing the Corps' internal deliberations marked "NOT FOR PUBLIC RELEASE". Why has this information been included; who is the intended audience? Advice from OC is confidential and legally privileged; consultation with OC should not be mentioned in a public document. Appendix F documents are referenced several times in the public portion of the report yet they are not available for public review because they are internal deliberations of the agency and exempt from FOIA. This approach undermines public transparency.

Basis of Concern: Inappropriate Material Included in the Report

Significance of Concern: *High.*

Recommendation: Please remove reference to consultation with OC and vertical team communications from the text of the report; all references to Appendix F documentation in the text, and Appendix F from the draft IFR. Please amend text as appropriate to fully inform the public. For instance, Alternative 5 is discussed in the report and Appendix F documents are referenced as containing the explanation of why Alternative 5 was removed from consideration. I suggest that the PDT either summarize the reasons why Alternative 5 was removed for the public or remove the reference to Alternative 5 (Upstream Reservoir) from the report.

Response: The original Appendix F including all documented vertical team communications was removed from the report. All references to the original Appendix F and all reference to consultation with Counsel and the vertical team have been removed from the report, with the exception of very general language regarding vertical team alignment. Changes were made in section 1.2.3 Study Scope; 3.2.2 Management Measure Screening; and the description of Alternative 5 under Section 3.3.3 Summary of Alternatives. As recommended by the reviewer, the explanation as to why Alternative 5 was removed now includes a description of how the alternative was screened using the P&G criteria.

26. Executive Summary

Concern: The purpose of an executive summary is to concisely present key points about a project, namely the purpose/need, selected plan, cost of implementation, and the way forward. The Executive Summary for the IFR presents only the annualized cost of the project rather than the total project cost. It also presents a recommended plan that by USACE policy cannot be implemented under one authority or one cost-sharing scheme. The summary does not concisely state the way forward.

Basis of Concern: Lack of clarity – this is the only part of the document translated into Spanish; it should present a complete and concise summary of conclusions and plans.

Significance of Concern: *Medium.*

Recommendation: Recommend that Executive summary present total project costs for the non-structural recommended plan implemented under separate authority Section 204 FCA as well as the next likely action (i.e., "The next likely action would be for the nonstructural flood risk management measures to be outlined in a Chief's Report, along with a recommendation that the bank stabilization and bridge scour measures be studied in a separate report under CAP Section 14, with the non-federal sponsor responsible for costs above the $5M limit.")

Response: Total project costs for the recommended plan are now presented instead of annual costs in the executive summary.

Summaries of all sections of the report beyond what the reviewer outlined above (purpose/need, selected plan, cost of implementation, and way forward) were included because the executive summary was the only portion of the report translated to Spanish. The study team agrees that the executive summary is critical and will confer with the vertical team regarding the structure of the executive summary included in the final report.

It was the PDT's understanding prior to submission of the report for concurrent review that the quoted language regarding the next likely action accurately reflected the outcome of an IPR held with the vertical team on 9 January. This language was sent to the vertical team for review prior to submission of the report for concurrent review, during which time comments were received and incorporated. At this time, discussions of stability and scour measures were retained per the response to comment #1.

Updated Response: The executive summary will be updated to accurately reflect the removal of the stability and scour measures from the recommended plan. Thus, the executive summary will present the total project costs for the updated recommended plan, which consists of the non-structural relocation of the structures within the 0.04 AEP floodplain. It will also present the next likely path forward – that the recommended plan be outlined in a Chief's Report.

As mentioned in the original response, we will continue to include summaries of all sections of the report, given that the executive summary is the only portion of the report that is translated.

27. Cumulative Impacts Analysis

Concern: Section 1.1 mentions that FEMA is engaged in relocating 110 at risk housing units with the community of Dos Rios, which is within the study area. FEMA's actions should be considered as part of the cumulative impacts analysis, either as a past, current or future action.

Basis of Concern: Sufficiency of cumulative impacts analysis.

Significance of Concern: *Medium.*

Recommendation: The inclusion of FEMA's activities in the cumulative impacts analysis may not affect the conclusion but information in different sections of the report should be consistent.

Response: FEMA actions added to discussion of cumulative impacts analysis, section 5.3.1. This section now includes the following sentence:

"Future actions include the relocation of 110 public housing from the communities of Dos Rios and Alturas de Ciales by FEMA."

28. HTRW

Concern: Section 3.5.5.2 (HTRW) contains the statement: "In addition under this alternative, a

levee is proposed to be placed adjacent to a former gas station with underground storage tanks identified during the Phase I ESA. Disturbance of soil in this area during construction could result in inadvertent discovery of HTRW and impacts could be significant." Per ER 1165-1-132, the term "HTRW" does not include petroleum products, which includes gasoline and diesel fuel.

Basis of Concern: Inaccurate use of "HTRW"

Significance of Concern: *Low.*

Action Needed to Resolve the Concern: Replace HTRW with "petroleum contamination" or explain relation of former gas station to potential presence of "HTRW" as currently defined by the Corps.

Response: The term 'HRTW' was replaced with "petroleum contamination" within the referenced sentence in Section 3.5.5.2, which now reads:

"In addition under this alternative, a levee is proposed to be placed adjacent to a former gas station with underground storage tanks identified during the Phase I Environmental Site Assessment. Disturbance of soil in this area during construction could result in inadvertent discovery of petroleum contamination and impacts could be significant."

29. Acronyms

Concern: p.113 - use of "WOUS" acronym

Basis of Concern: Accuracy

Significance of Concern: *Low.*

Action Needed to Resolve the Concern: Understand that this acronym was previously used by the Corps but recommend use of WOTUS, acronym currently used by the Corps and USEPA for Waters of the United States.

Response: The instances of the acronym WOUS in this section were changed to WOTUS. A subsequent document search for WOUS returned no additional instances throughout the report.

ECONOMICS

30. Price levels

Concern: Benefits are FY 2019 and costs are in FY20.

Basis for Concern: ER 1105-2-100.

Significance of Concern: *Low, it should not affect the alternative.*

Action Need to Resolve the Concern: It's understood that this is a draft report and timing caused the discrepancy. The price level and cost must match before the Chiefs/ Directors report is signed.

Response: Concur; all benefits will be indexed to FY20 price level in the final report.

31. Benefit Categories

Concern: Main Report, 1.4.1.1, 3.4.1 and 3.4.2 and Econ Appendix Section 1.2. Incomplete explanation of benefit categories. While the NED benefit, RED, and OSE benefits are mentioned in the Main Report, these benefits are not related to flood risk or how they relate to the project. The Econ Appendix does not mention NED section until 5.1.5 despite identifying the NED plan as a key objective of flood risk management planning process.

Basis of Concern: Improved communication of methods.

Significance of Concern: *Low.*

Action Needed to Resolve the Concern: Add definition or explanation of NED, RED, and OSE categories for flood risk management. These can be found in the Planning Guidance Notebook.

Response: Section 3.4 Alternative Evaluation & Comparison was completely restructured and now includes a section dedicated to evaluating and comparing alternatives based on the P&G Accounts (Section 3.4.2 in the revised document). This section starts by defining and describing the accounts using language found in the P&G. Each account then has its own sub-section within which the alternatives are evaluated. NED is also now mentioned in the introduction of the FRM section in the Economics Appendix.

32. Expense Rate

Concern: Econ Appendix, 1.3.1.1. What is the source of the allowable automobile expense rate of $0.575? What costs are included within this value (vehicle wear and tear, fuel, etc.)?

Basis of Concern: Informational

Significance of Concern: *Low.*

Action Needed to Resolve the Concern: Please provide and list in document the allowable automobile expense rate.

Response: These values were changes based on ATR and policy review comments. The value now reflects operating costs (variable costs) reported by AAA, which is in FY20 price levels.

The value is now $0.1693 and more documentation was added to the Economics Appendix.

ENVIRONMENTAL

33. Environmental Appendix

Concern: The Environmental Appendix is too large and contains information which can be left out of the Final Report and EA. For example, the 60 plus pages of NRCS soils surveys which appear to be almost a cut and paste of the NRCS soil soils for the area.

Basis of Concern: ER 1105-2-100

Significance of Concern: *Low, documentation and brevity.*

Action Needed to Resolve the Concern: Trim down the Appendix for the final report. Refer to materials such as soil surveys but no need to duplicate them.

Response: The soil survey information was removed from the Environmental Appendix.

34. Section 7 Consultation

Concern: Section 7 ESA concurrence on the Puerto Rican boa is pending.

Basis of Concern: ER 1005-2-100, Appendix C and ESA Section 7

Significance of Concern: *Low, species unlikely to occur in project area or affect plan selection.*

Action Needed to Resolve the Concern: Provide documentation of Letter of Concurrence for final. Give a status at the ADM.

Response: The USFWS Letter of Concurrence was received on 28 February 2020. It will be included in the final report.

35. Section 106

Concern: Cultural resources compliance with Section 106 is pending. Use of Programmatic Agreement will be needed.

Basis of Concern: NHPA Section 106, ACHP regulation at 36 CFR Part 800, ER 1005-2-100, Appendix C.

Significance of Concern: *Medium, related to documentation.*

Action Needed to Resolve the Concern: PA should be executed before final report is signed by the District Commander.

Response: The PA will be executed before the final report is signed.

36. Conversion to CAP Project

Concern: The total project cost, minus the erosion features, appears to make this a CAP project.

Basis of Concern: ER 1105-2-100; Appendix F.

Significance of Concern: *High, impacts the project moving forward.*

Action Need to Resolve the Concern: Discuss at the ADM. Likely path forward is to terminate the FCSA and complete the study using CAP funding under a new FCSA.

Response: There is no minimum cost threshold for a project to be executed under GI. The cost of non-structural relocations is $15.7M, which exceeds $10M limit for CAP. The study team understands this project would need specific authorization under GI and chooses to continue to pursue this implementation pathway.

Updated Response: This comment was discussed during the IPR held on 6 May 2020. During that meeting, the vertical team concurred with continuing to pursue implementation under General Investigations given that the estimated project costs exceed the $10M for implementation under the Continuing Authorities Program.

37. Section 404(b)(1) Analysis

Concern: Section 404 analysis lacks baseline information to complete the compliance determination.

Basis of Concern: CWA Section 404, and Section 401.

Significance of Concern: *Low, can document further in PED, might not need at all depending on final plan. Mitigation unlikely.*

Action Needed to Resolve the Concern: Track this forward to add detail as needed or when needed.

Response: Once the project design is finalized in PED, a CWA compliance determination will be conducted based on the final design and the impacts to waters of the U.S. A wetland delineation will be conducted in PED. A revised 404(b)(1) analysis and mitigation plan will be completed if needed.

38. Fish and Wildlife Coordination Act

Concern: Compliance with F&WCA is pending.

Basis of Concern: F&WCA of 1958, as amended, ER 1105-2-100 Appendix C.

Significance of Concern: *Low.*

Action Needed to Resolve the Concern: Give update to coordination and its impact on planning at the ADM; document for the final report.

Response: The USFWS letter dated 28 February 2020 included comments pursuant to the Fish and Wildlife Coordination Act and the Endangered Species Act. The source of quarry stone will need to be identified during PED. Additional consultation and a site assessment may be required if a new quarry is created or an existing quarry is expanded to provide stone for the project.

COST ENGINEERING

39. Cost Certification

Concern: The project cost estimate nor the Cost Appendix does not include a Cost Certification by the Cost CX.

Basis for the Concern: A project cost certification is required in accordance with Cost Engineering Policy ER 1110-2-1302, Civil Works Cost Engineering.

Significance of the Concern: *There is Low to Moderate risk that the project will be impacted should this activity not be scheduled in accordance with policy requirements. In addition, ATR review of the Cost Estimate could result in unexpected project cost adjustments that could adversely impact the project.*

Action Needed to Resolve the Concern: Recommend the report complete the required Cost Certification and include the Cost Certification from the Cost CX as part of the Cost Appendix.

Response: Cost certification by the Cost MCX will be obtained and included in the final report and cost appendix. The current costs have undergone ATR, which should help expedite the certification process.

REAL ESTATE

40. Sponsor's Capabilities

Concern: No formal documented Assessment of the Sponsor's Capabilities included in the Real

Estate appendix.

Basis of Concern: ER_405-1-12, Chapter 12 requires a Sponsor Capability Assessment prepared and signed by the NFS and Real Estate designee. Sufficient detail regarding staffing, past experience, with special focus on 91-646 relocations, etc. must be provided to justify the conclusion.

Significance of Concern: *Moderate, it is "presumed" that this conversation has evolved; however, the Real Estate planner has not been to the project area & detailed assessment must be included in the Real Estate Plan.*

Action Needed to Resolve the Concern: Real Estate needs to prepare the staff and legal authority review of the Sponsor's capability, and send forward in the next iteration.

Response: LRP coordinated with SAJ and the local sponsor regarding the sponsor capability checklist. The NFS checklist was obtained from the Sponsor and added to the REP. The sponsor has the necessary capabilities to conduct all real estate actions for the recommended plan.

Updated Response: This comment was discussed during the IPR held on 6 May 2018. As mentioned in the original response, LRP has obtained a completed sponsor capability checklist, which will be provided to LRD RE and included in the final report. There were additional concerns regarding who will be completing the acquisitions and relocations required for the recommended plan. The local sponsor, the Puerto Rico Department of Natural and Environmental Resources (DNER), will be conducting the acquisitions and relocations. DNER is the state agency within Puerto Rico that commonly conducts such efforts. USACE will be responsible for reviewing the acquisition and relocation efforts conducted by DNER. Specifically, SAJ will be reviewing the acquisitions and SAM will be reviewing the relocation effort. As discussed during the IPR, the real estate plan will be updated to explicitly state these roles and responsibilities.

41. O&M

Concern: Paragraph 6 in the RE Plan – reference to NFS O&M duties post construction.

Basis of concern: Not relevant to buyout/demolition/removal.

Significance of Concern: *Low.*

Action Needed: Remove reference to O&M on non-structural.

Response: The reference to O&M will be removed from non-structural relocations in paragraph 6.

42. LERRDS Table

Concern: Table labeled "Manati / Ciales Non-Structural Relocations on p. 11 / paragraph 6 (LERRDS) depicts Structural LERRDS. Also, costs are not congruent with narrative viz. number of tracts.

Basis of Concern: Clear discrepancy.

Significance of Concern: *Low.*

Action Needed to Resolve the Concern: Review and revise accordingly.

Response: The table on page 11 reflects LERRDS required for the stability and scour measures. The title for this table will be updated accordingly. The team will ensure that the number of tracks listed in the text and all tables are consistent in the final real estate plan.

43. Cost Estimates

Concern: LERRDS cost estimates not supported by a required appraisal product (gross). Also, the Real Estate Plan references both a 2019 "ROM" estimate of LERRDS AND a 2020 gross appraisal product (see "Reference" paragraph 3). This needs clarification.

Basis of Concern: ER-405-1-12, specifically Chapter 4 (Appraisal) and Chapter 12 (Cost Share Projects) require certain levels of diligence regarding Real Estate planning projects. Also please reference CEMP HQ Real Estate Policy Guidance Letter 31, Jan 11, 2019.

Significance of Concern: *Moderate/Potentially significant (see below).*

Action Needed to Resolve the Concern: Verify with RE Planner and Appraiser which product was used to support cost estimates. If a "ROM" is used, then a policy deviation is needed. Given the fact that the Real Estate Costs are substantially over the 30% threshold for the "ROM" valuation product, AND the BCR on the non-structural is not robust, this will not be an automatic policy waiver. It would be helpful if the LRP Realty planner would send the ROM, and basis for relocation benefit costs. Not certain if SAD or LRD will make this determination; in any event, this will need HQ Chief Appraiser buy-in, unless a gross appraisal can be undertaken. Further discussion needed, given DOD travel prohibitions in place. (Why did we wait to the tail end to consider a gross appraisal?)

Response: The costs used in the current REP were based on a ROM completed by SAS. A gross appraisal was scheduled to be completed during February/March; however, this effort was delayed due to the current COVID-19 situation. SAS is currently conducting a gross appraisal from their home office. Once the Gross Appraisal is completed, the REP will be updated accordingly. The gross appraisal should be completed and costs updated prior to the ADM, which is currently scheduled for May 8. It should be noted that SAS—the team responsible for conducting the ROM and gross appraisal—are conducting all real estate related work for all supplemental projects within Puerto Rico. Therefore, they are well versed in

conducting real estate work within Puerto Rico.

The relocation benefit costs were developed in coordination with LRD economists based on prior relocation work done in LRC. A cost of $25,000 was applied to each residential structure and a cost of $40,000 was used for each commercial/public structure. We have had subsequent conversations with our contacts in SAM, who will be coordinating all USACE-related relocation efforts for this project. They recommended using $31,000 for residential structures and $40,000 for commercial/public structures, which represent the statutory limits. The updated project cost will incorporate these updated relocation benefit costs.

Updated Response: The gross appraisal and associated review were received by SAS. This documentation will be forwarded to LRD RE. The real estate plan will be updated to incorporate the numbers included in the gross appraisal. The real estate plan will also be updated to provide a more thorough description of how costs were developed, including the relocation benefit costs.

44. Federally-Owned Lands

Concern: Paragraph 8, "Federally owned Lands" – none stated; Paragraph 9 – "Non-Federally Owned Lands." Need clarification.

Basis of Concern: Please note that the federally owned lands also needs to include any other federal investments such has FEMA – which are held typically by the local municipality. Also, it appears that DNR (the NFS) is the fee owner on all the river banks with a significant buffer up slope.

Significance of Concern: *Potentially moderate; could impact the LERRDS costs.*

Action Needed to Resolve the Concern: FEMA has done relocation work within this overall area; please confirm that there is no LERRDS needed for structural work that was or is included in any FEMA funded work. Also, please confirm if the NFS owns the LER for the structural measures – if this is funded by supplemental funding, then this should be "0" LERRDS. (Likely this measure will be separated from the study, not yet determined).

Response: None of the LERRDS required for the non-structural relocation included in the recommended plan are included in the FEMA-funded work. The real estate plan will be updated to explicitly state this.

All properties adjacent to the channel that are associated with the stability and scour measures are privately owned. The state does own the channel; however, the extent to which the channel has migrated and changed due to Hurricane Maria will require an updated survey to determine ownership delineation. The maps and tables will be updated when the property is surveyed for the final acquisition maps and appraisals.

45. Facility and Utility Relocations

Concern: Paragraph 21 needs to be re-named "Facility and Utility Relocations." More importantly, the statement that engineering did not provide any information is a non-answer. Also, please remove paragraph 23, "Mitigation." This is should be referenced as an "Induced Flooding" issue, and whether this is a "take" or "mitigation" action. The "induced flooding" was covered early in the REP.

Basis of Concern: *Need to have an estimate of any facility / utility relocations required.*

Significance of Concern: Minimal; I would speculate that there are no facility / relocations required given the project features identified.

Action Needed to Resolve the Concern: Please confirm and revised statement. If there are relocations identified by either Real Estate or E&C, please estimate cost as LERRDS to relocate (E&C provides hard costs). Take out paragraph 23.

Response: The reviewer is correct in that there will be no facility relocations required. Utility relocations will be identified at the PED stage and a realty assessment will be performed then. Following the ATR review, contingency was increased for the recommended plan to account for the potential need to relocate utilities.

Updated Response: This comment was discussed during the IPR held on 6 May 2020. Now that stability and scour measures will be removed from the recommended plan, implementation will not require excavation and, thus, will not require relocation of utilities. The real estate plan will be updated to explicitly state that, due to the nature of the recommended plan being strictly non-structural, there is no anticipated impact to existing utilities.

Paragraph 23 will be removed.

46. Real Estate Acquisition Schedule

Concern: Paragraph 26, "Real Estate Acquisition Schedule," needs clarity. (Not clear if these are incremental or concurrent; also 600 days to order title is obviously a typo.

Basis of Concern: Next to the LERRDS costs, this is a very key element needed in the report; including synching with NFS and PM – need to spend more time on this.

Significance of Concern: *Likely high – has to be accurate, justified and well vetted.*

Action Needed to Resolve the Concern: Revise schedule and schedule a telecom with LRD-RE to discuss.

Response: A similar comment was provided during the ATR review. LRP coordinated with the

Mobile District—the entity responsible for USACE relocation efforts for this project—and has updated the acquisition schedule to 36 months. This new timeline is based on the following information received from SAM:

"Based on my experience, I would estimates 2 closings per month (Acquisition) so at a minimum the timeline should be 28 months. In reference to the relocations, once an offer is made to a displaced owner occupant, the process can take 90 to 120 days to complete. The critical path will be multiple offers to multiple displaced persons. If the market can absorb 5 offers per week with 1 relocation assistance advisors working, we can theoretically offer benefits to 20 families per month. Assuming roughly 57 relocations, we can make all offers in 3 months, depending on the market."

Updated Response: During the IPR held on 6 May 2020, LRD RE remained concerned that the updated 36 month timeline is not realistic given local sponsor capabilities. To address these concerns, LRP will facilitate a call between LRP, LRD, SAJ, and SAM to discuss a realistic timeline for implementation, as well as any other potential real estate concerns.