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RÍO CULEBRINAS

AGUADILLA-AGUADA, PUERTO RICO

SECTION 205 FLOOD RISK REDUCTION

CONTINUING AUTHORITIES PROGRAM (CAP)

CONVERSION REPORT

Date: XX, XXXXXX, 2019

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Executive Summary

Background: The purpose of this report is to reaffirm the economic justification, environmental acceptability and engineering feasibility of the plan previously identified in the Rio Culebrinas Detailed Project Report and Environmental Assessment completed in 2004. There has been no construction on the approved project todate.

Study Location: The study area is located on the north west end of the Island of Puerto Rico. The project is located along the Caño Madre Vieja tributary of the Rio Culebrinas. The Rio Culebrinas flows from the higher elevations to the east of the project to the ocean just west of the project location. The Caño Madre Vieja is a small streamlet within the flood plain of the Rio Culebrinas. The Caño Madre Vieja splits off of the Rio Culebrinas and meanders through the large flood plain in the coastal area. The Caño Madre Vieja, associated flood plain, and wetlands lie between the municipality of Aguadilla and Aguada before meeting the ocean.

Authorization

- Section 205 of the 1948 Flood Control Act.
- Bipartisan Budget Act of 2018 (Public Law 115-123)
- Section 209 of the Flood Control Act of 1966 (Public Law 89-789)

Project Changes: There are no proposed changes to the previously authorized Continuing Authorities Project (CAP) NED plan; Construction of two flood risk management levees and associated flow way channel. One levee will be constructed on each side of the Caño Madre Vieja flood plain adjacent to the two municipalities. A short section of flow way channel will be constructed in the flood plain to direct the Caño Madre Vieja flow across the shortest path through the flood plain. Ancillary work includes historical documentation and mitigation, wetland impact mitigation, and utility relocation.

Project Costs and Benefits: The updated Certified Project Cost for the Rio Culebrinas project is $24,404,000. When the cost is compared to the benefits determined in the 2004 study the BCR is 1.54. Due to the projected total project cost being above $20 M the project could not proceed as a CAP program project. The impacts from the flooding caused by Hurricane Maria in 2017 from the Caño Madre Veija flooding the adjacent municipalities lead to the Rio Culebrinas Detailed Project Report and Environmental Assessment being included in the 2018 Public Law 115-123 authorization to be converted to a specifically authorized project through the USACE Investigations account.

Compliance with USACE Quality Control Standards: The Rio Culebbrinas project is fully compliant with current USACE Quality Control Standards

Recommendation: It is recommended that the rio Culibrinas flood risk management project should be approved and proceed to the Preconstruction, Engineering and Design Phase.

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1 STUDY OVERVIEW

The purpose of this report is to reaffirm the economic justification, environmental acceptability and engineering feasibility of the plan previously identified in the Rio Culebrinas Detailed Project Report and Environmental Assessment (See Attachment A) completed in 2004. See Appendix A This is an expedited review of the previously approved plan without additional plan formulation, hence this is not a stand-alone report but instead a supplement to the previous 2004 Continuing Authorities Program (CAP) Feasibility Report. The sponsor requested the construction effort be delayed until the biding climate improved. In 2015 the project was reanlized and updated to current, 2015, costs. See Appendix B. At that time the project was suspended due to project costs exceeding the Continuing Project Authorities funding limits. Due to the impact of HurricanesMaria in 2017 and sponsor request, the project was selected in the Supplemental Appropriations Bill, P.L. 115-123, to be converted to a specifically authorized project through the Investigations account.

1.1 Study Location, Purpose and Need

The Rio Culebrinas originates in the western part of the central mountain range of Puerto Rico, approximately 130 kilometers(km [80.8 miles]) west of the City of St. Juan (Figure 1-1: Project Location). The Rio Culebrinas flows in a westerly direction through the areas of San Sebastian, Moca, Aguadilla, and Aguada where the river discharges into the Aguadilla Bay in the Mona Passage on the northwestern coast of Puerto Rico. Tributaries of the Rio Culebrinas include the Caňo Madre Vieja, Rio Guatemala, Rio Caňo, Rio Sonador, and Quebrada Grande.

The total length of the Rio Culebrinas channel is approximately 43.94 km (27.3 miles). The Caño Madre Vieja, a 2.09 km (1.3 miles) long tributary of Rio Culebrinas, is an old river outlet that flows across the study area and discharges into the Aguadilla Bay. This small intermittent stream is the political boundary dividing the municipalities of Aguadilla and Aguada.

The Rio Culebrinas basin includes the municipalities listed above, as well as the communities of Lares, San Sebastian, and Moca. The basin has a total drainage area of approximately 266.8 km^2 (103 square miles) to the mouth of the river, and is bordered to the north and east by the Rio Guajataca basin; to the south by the Rio Culebra and Rio Grande de Anasco basins; and to the west by the Aguadilla Bay.

Although flooding can occur at anytime during the year In the Rio Culebrinas basin, it is most frequent during the period of May through December. The large rainfall-driven peak discharges in the basin are generally associated with hurricanes, tropical depressions and tropical waves passing over or near Puerto Rico. Due to the steep slopes in the upper basin, flash floods from intense thunderstorms are a common event affecting this area and can occur anytime during the year.

During the flood season, floodwaters overtopping the Rio Culebrinas and Caňo Madre Vieja pose potential dangers to surrounding residents and are a source of frequent flood damage to properties. The area that is principally flooded within the basin includes the mostly confined, relatively flat Rio Culebrinas floodplain located between the towns of Aguada, Aguadilla , and Moca. Below Highway 115, the 100-year (0.01-exceedence probability) flood event inundates

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over 6.07 km^2 (1,500 acres) of land. The entire community of Espinar in Aguada associated with the Ermita de Espinar which was founded origonally in 1516, located in the middle of the floodplain between Rio Culebrinas and Caňo Madre Vieja, is surrounded by flood water during rain events with a 0.5 exceedence probability (2-yr) and larger. Floodwaters from the Rio Culebrinas and Caňo Madre Vieja inundate all major highways and roads in the Rio Culebrinas floodplain.

The purpose of the Rio Culebrinas Flood Damage Reduction Study was to investigate in detail the frequent flooding and related problems, caused by overflows from Rio Culebrinas into Caňo Madre Vieja, in the southwest portions of Aguadilla and the community of Espinar in Aguada. The study also investigated if the selected flood risk management alternatives could exist without causing adverse impacts to the communities, the environment, the existing infrastructure in the area, and was the most appropriate course of action within federal and Puerto Rico guidelines and regulations. Tangible benefits envisioned from implementing the approved plan and authorized project included inundation reduction benefits, redevelopment benefits, and flood insurance cost savings.

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RIO CULEBRINAS SECTION 205 CONTINUING AUTHORITIES DPRA REFERENCE MAP

Figure 1-1: Project Location

1.2 Authorization and Prior Reports (include costs and benefit)

This study was authorized by Section 205 of the Flood Control Act of 1948 as amended, which states:

The Secretary of the Army is hereby authorized to allot from any appropriations heretofore or hereafter made for flood control, not to exceed $40,000,000 for any one fiscal year, for the construction of small projects for flood control and related purposes not specifically authorized by Congress, which comes within the provisions of Section 1 of the Flood Control Act of June 22, 1936, when in the opinion of the chief of Engineers such work is advisable. The amount allotted under this Section for a project shall be sufficient to complete Federal participation in the project. Not more than $7,000,000 shall be allotted for a project at any single locality. The provisions of local cooperation specified in Section 3 of the Flood Control Act of June 22, 1936, as amended, shall apply. The work shall be complete in itself and not commit the United States to any additional improvements to insure its successful operation, except as may result from the normal procedure applying to projects authorized after submission of preliminary examination and survey reports.

Section 209 of the Flood Control Act of 1966 (Public Law 89-789); Authorized studies for flood control and allied purposes.

> *"The Secretary of the Army is hereby authorized and directed to cause surveys for flood control and allied purposes, including channel and major drainage improvements, and floods aggravated by or due to wind or tidal effects, to be made under the direction of the Chief of Engineers, in drainage areas of the United States and its territorial possessions, which include the localities specifically named in this section. After the regular or formal reports made on any survey authorized by this section are submitted to Congress, no supplemental or additional report or estimate shall be made unless authorized by law except that the Secretary of the Army may cause a review of any examination or survey to be made and a report thereon submitted to Congress, if such review is required by the national defense or by changed physical or economic conditions.*
>
> *Watersheds and streams of Puerto Rico and the Virgin Islands with respect to a framework plan for developing water resources of the region."*

Section 204 of the Flood Control Act of 1970, Public Law 91-611, authorizes the Secretary of the Army, acting though the Chief of Engineers, to prepare 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.

Section 105(a) of the Water Resources Development Act of 1986 (33 U.S.C. 2215(a)), which specifies the cost-sharing requirements generally applicable to feasibility studies, Title IV, Division B of the Bipartisan Budget Act of 2018, Public Law 115- 123, enacted February 9, 2018 (hereinafter "BBA 2018"), authorizes the Government to conduct the Study at full Federal expense to the extent that appropriations provided under the Investigations heading of the BBA 2018 are available and used for such purpose.

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The Bipartisan Budget Act of 2018 (Public Law 115-123), Divison B, Subdivision 1, Title IV provides authority for this CAP Conversion Feasibility Report Study; Title IV of the Bipartisan Budget Act of 2018 states:

> *"For an additional amount for " Investigations" for necessary expenses related to the completion, or initiation and completion, of flood and storm damage reduction, including shore protection, studies which are currently authorized or which are authorized after the date of enactment of this subdivision, to reduce risk from future floods and hurricanes, at full Federal expense, $135,000,000, to remain available until expended: Provided, That of such amount, not less than $75,000,000 is available for such studies in States and insular areas that were impacted by Hurricanes Harvey, Irma, and Maria: Provided further, That funds made available under this heading shall be for high-priority studies of projects in States and insular areas with more than one flood-related major disaster declared pursuant to the Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. 5121 et seq.) in calendar years 2014, 2015, 2016, or 2017: Provided further, That such amount is designated by the Congress as being for an emergency requirement pursuant to section 251 (b)(2)(A)(i) of the Balanced Budget and Emergency Deficit Control Act of 1985: Provided further, That the Assistant Secretary of the Army for Civil Works shall provide a monthly report to the Committees on Appropriations of the House of Representatives and the Senate detailing the allocation and obligation of these funds, including new studies selected to be initiated using funds provided under this heading, beginning not later than 60 days after the enactment of this subdivision."*

The approved project plan is detailed in the 2004 Rio Culebrinas Aguadilla-Aguada, Puerto Rico Final Detailed Project Report and Environmental Assessment (2004 DPR/EA). After approval of the 2004 DPR/EA, the Municipality of Aguadilla requested that plans and specifications be placed on hold until local development plans within the project's vicinity were considered by the Municipality. In 2013 the Municipality confirmed that future land uses within the project area would not affect this project and confirmed their commitment to completing the project.

The Draft 2015 Detailed Project Report (DPR) Addendum was developed as an update to the 2004 DPR/EA; providing updated project information and confirming the previous analysis of alternatives and impacts, including:

- an updated cost and benefit analysis
- refinements to the 2004 DPR/EA levee design to meet current U.S. Army Corps of Engineers (USACE) design/construction standards
- an updated Finding of No Significant Impact based on the levee design refinements (refer to Draft 2015 DPR Addendum Appendicies)

On 16 March 2016 a project termination memo on the Draft 2015 DPR Addendum from Jerry T. Murphy, Deputy District Engineer, was issused to the Commader, South Atlantic Division based on:

- the determination that the non-Federal costs for project completion may exceed the required cost sharing percentage for CAP authorities
- the local non-federal sponsor's desire to expand the scope of the project to include the PR-115 highway in the project

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- an expanded scope would be required to be evaluated to ensure project completeness and to meet the local sponsor's needs
- an expanded project scope would exceed CAP programmatic spending limits

1.3 Project Design

The 2004 DPR/EA approved project plan was also identified as the the National Economic Development (NED) Plan and provides flood risk management for the southwestern section of the Municipality of Aguadilla and for the community of Espinar in Aguada against the 100-year (0.01 exceedence probability) flood event. This plan is still the recommended plan for the addendum report. The economically justified project provides flood risk management for over 3,300 families. Completions of all components of the approved plan are necessary to achieve full project benefits. These components are described below and depicted in Figure 1-2: 2004 DPR/EA Approved Featues and Figure 1-3: 2004 DPR/EA Approved Features Preliminary Design.

- Two evees (Aguadilla and Espinar) with a total length of approximately 3.03 km (2.05 miles)
- A 60-meter (196.85 feet) long cutoff channel for the Caňo Madre Vieja to connect two meanders of the stream where the Aguadilla Levee will interrupt it (4 meters [13.12 feet] deep by 43.2 meters [141.73 feet] wide)
- Drainage structures
- Interior drainage channels
- Three paved roadway ramps across the levees
- A borrow area located in Aguada
- Mitigation
- OMRR&R will be the resonsibility of the Non Federal Sponsor

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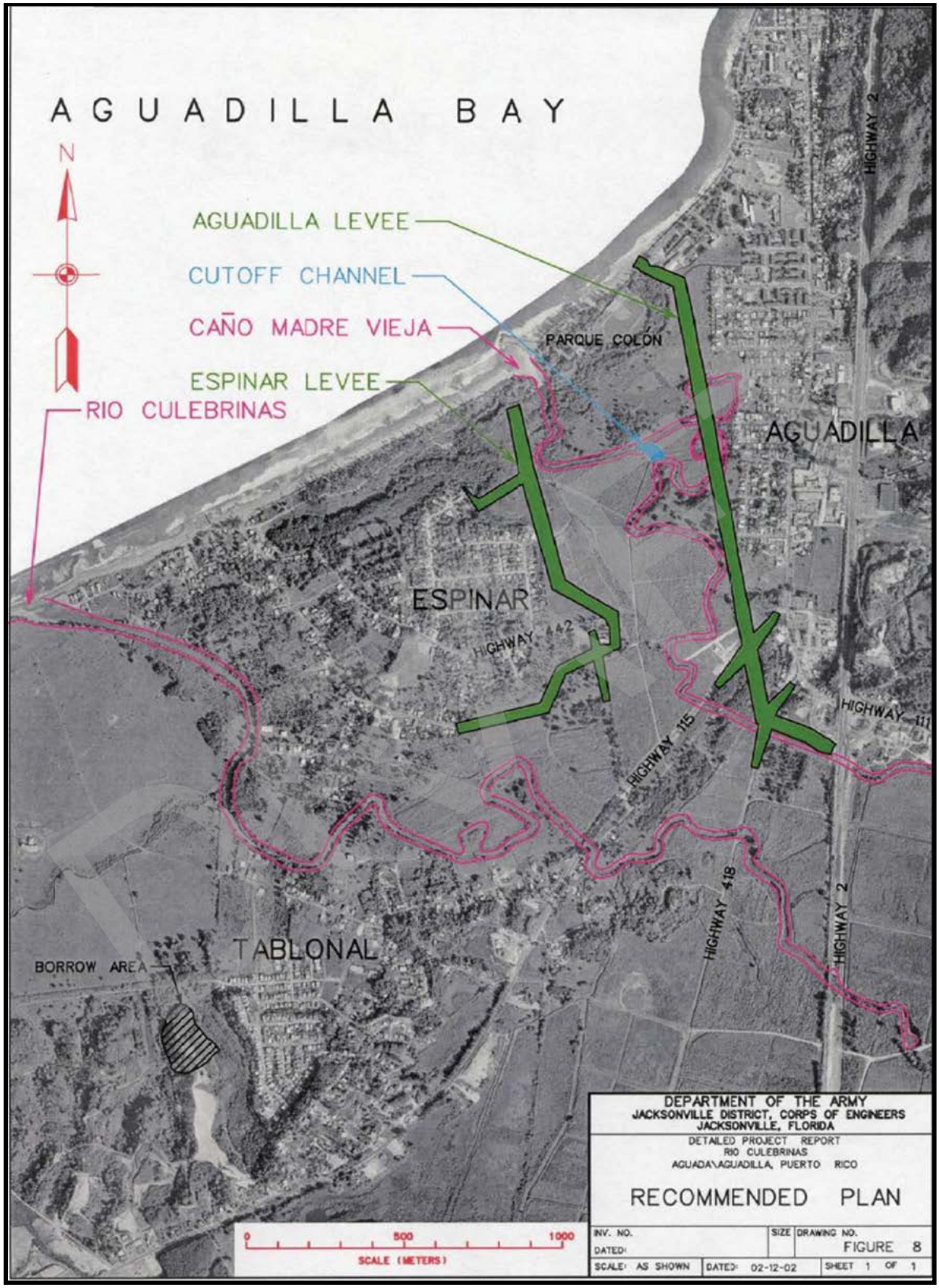

Figure 1-2: 2004 DPR/EA Approved Featues

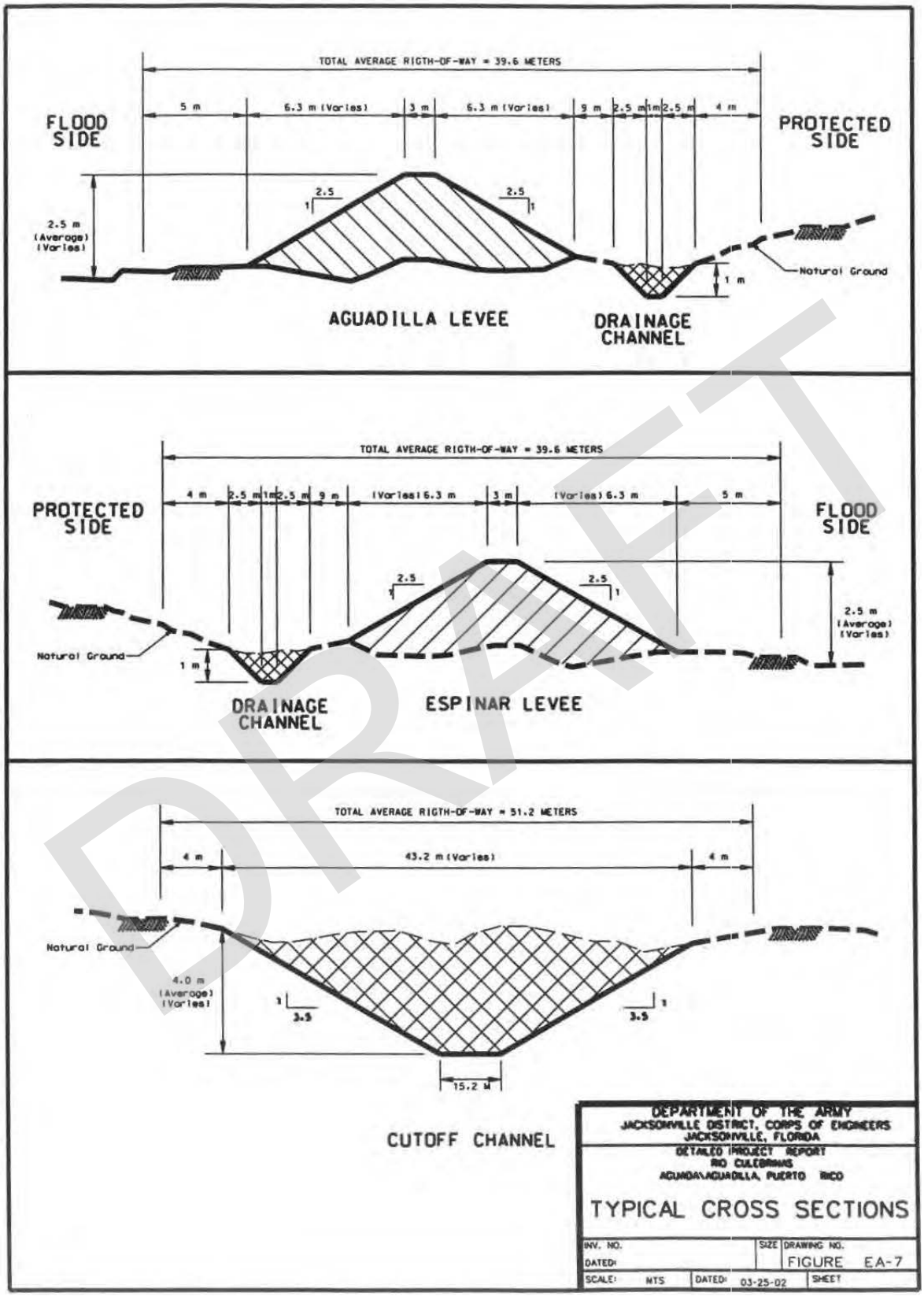

Figure 1-3: 2004 DPR/EA Approved Features Preliminary Design

The Aguadilla Levee would begin at high ground near Highway 2 and extend towards the north for approximately 1.8 km (1.12 miles) to end at high ground near Yumet Avenue. The Espinar levee would begin at high ground on the southern end of the Espinar Community, extend to the east and then to the north for approximately 1.5 km (0.93 miles), and end at the boundary of CBRS Unit PR-75 (south of the existing mouth of Caňo Madre Vieja). Both levees would have an average height of 2.5 meters (8.20 feet), 2.5 to 1 side slopes, and a levee crest of 3 meters (9.84 feet). See Figure 1-3: 2004 DPR/EA Approved Features Preliminary Design for the existing design features.

The interior drainage facilities consist of a 1 meter (3.28 feet) deep and 7 meter (22.97 feet) wide drainage channel along the protected side of each levee. These drainage facilities include the construction of a two-way drainage structure near the north end of the Espinar Levee; three one-way drainage structures along the Aguadilla Levee; and drainage channels to reconnect isolated sections of Caňo Madre Vieja, providing 0.04 Km^2 (8.6 acres) of additional open water.

The construction of the 100-year levees, interior drainage facilities, and cutoff channel would require approximately 84,101 cubic meters (110,000 cubic yards) of fill. Approximately 24,466 cubic meters (32,000 cubic yards) would come from the excavation of the cut-off and interior drainage channels, while the rest of the fill would come from a commercial borrow site at the Tablonal Quarry.

1.4 Construction Status

There has been no construction effort started on the Rio Culebrinas Project since its' approval.

2 OVERVIEW OF CHANGED CONDITIONS FROM AUTHORIZATION

Since the completion of the 2004 DPR/EA, there have not been any changes in overall project scope or purpose. There have, however, been changes to the project with respect to costs, benefits, and current engineering practices. The objectives and scope of the project remain the same as when the project was originally proposed as documented in the 2004 DPR/EA.

There have been no changes to the local cooperation agreement between the Department of the Army and the Municipality of Aguadilla. The Municipality of Aguadilla's fiscal contribution minimum of thirty five percent (35%) of the total project cost remained the same through the development of the Draft 2015 DPR Addendum and Termination Memo. However, Public Law 115-123 provides that all repair, rehabilitation, study, design, and construction of USACE projects in Puerto Rico and the United States Virgin Islands (USVI), using the Bipartisan Budget Act of 2018 Construction funds, shall be conducted at full federal expense.

The authorized project's overall objective is to provide flood risk management components for Aguadilla and the community of Espinar in Aguada. The main flood risk management components resulting from the study include two levee segments designed for a 100-year flood event. There have been no changes to the project location or general cofiguration due to incroachment or environmental concerns. However, minor engineering design changes due to changes in design regulations will need to be made durring final project engineering design. Design changes will include: the use of concrete (instead of metal) culverts, revisions to the levee

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side slopes to meet current USACE levee design guidance criteria (side slopes of 3 horizontal to 1 vertical), and armoring for the cutoff channel. All other design criteria as described in the 2004 DPR/EA remain the same. OMRR&R will remain the resonsibility of the Non Federal Sponsor.

2.1 Socioeconomic conditions (population, structure inventory, real estate)

The population centers within the study area are: Aguadilla, Aguada, and Espinar (which is unincorporated and part of the Aguada municipality). According to 2017 Census estimates , the populations of Aguadilla and Aguada are 53,164 and 38,118*, respectively (*including approximately 1,400 people in Espinar). 2017 is the most recent year for which the US Census Bureau has population estimates in Puerto Rico. Development within the study area is primary residential in nature, with nearly 800 residential properties (both single family homes and multi-family residences) subject to flooding. There are also approximately 100 commercial properties (including retail stores, restaurants, pharmacies, business/service offices, and gas stations) as well as 24 public properties. Notable properties in the study area include a police department, a US Army reserve station, a senior center, and a historic church (the Ermita de Espinar).

The primary economic activity in Aguadilla is manufacturing, including rubber, textiles, plastics, and other products. Most manufacturing facilities in Aguadilla are located in one of two major industrial parks, the San Antonio Technological Park or the Camaseyes Industrial Park. Other important economic activities in Aguadilla include tourism and service industries, healthcare, retail, and commercial fishing. One of Puerto Rico's most important airports, the Rafael Hernandez international airport, is located near the city. The primary economic activities in Aguada are tourism, agriculture and agricultural processing, light manufacturing, commercial fishing, services, and retail. Both cities have a mixed income socioeconomic profile, with some affluent households but also relatively high unemployment (greater than 10% in both cities).

The socioeconomic conditions have not changed dramatically since 2004. Economic growth and population growth have been relatively static over the past 15 years. In fact, as with the overall economy of Puerto Rico itself, the total population and economic output of each city actually decreased somewhat between 2000 and 2017 (the last year of available data). This was due in part to the major economic recession experienced by the island that began in 2008.

2.1.1 Population

Aguadilla and Aguada experienced steady population growth from 1980 to 2000. The total combined population of the two municipalities increased from 86,173 in 1980 to 106,811 in 2000, approximately a 19% increase. However the population actually decreased slightly from 2000 to 2010 (see **figure 1**), due primarily to emigration to the mainland United States during the Great Recession. The combined population declined from 106,811 in 2000 to 102,810 in 2010 (approximately a 4% decrease).

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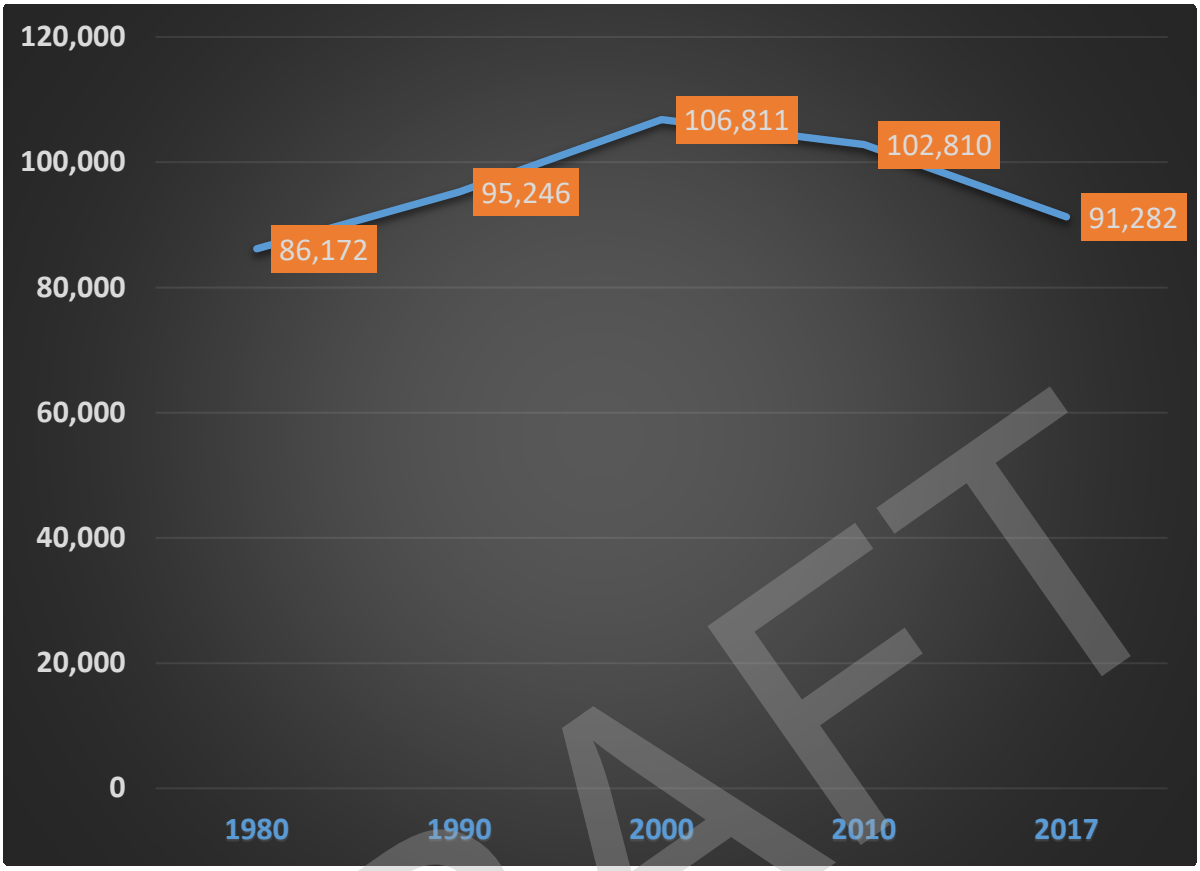

Figure 2-1: Total Combined population for Aquadilla and Aquada over Time

Since the 2004 Rio Culebrinas DPR/EA, the population of the study area has continued to decrease. This partly due to lingering effects of the economic recession. In the short term, this trend is expected to accelerate due the massive damage cuased by Hurricane Maria (2018 data are not yet available). However, in the medium and longer term the popualtion of this area is expected to stabilize and begin growing again. Durring the site investigations for this review it was estimated that approximately 90% of the residences within the area impacted by the flooding post hurricane Marina were still or being reoccupied.

2.1.2 Employment

In the 2004 DPR/EA, the total combined unemployment rate for Aguadilla and Aguada was estimated to be 14.7%. The most recent available employment data for this area are provided by the United States Bureau of Labor Statistics (BLS). According to the BLS, the unemployment rate for the Aguadilla-Isabel-San Sebastian metropolitan statistical area (which includes Aguadilla and Aguada) was 15.1% in October 2017, up slightly from 15.0% in May of 2013. Therefore, the overall employment situation has not changed significantly since 2004. This area still has a much higher unemployment rate than the national average (3.5%) and the Puerto Rico average (11.4%).

Also, the employment profile of the study area has not changed significantly since 2004. In the 2004 DPR/EA, the largest sectors of employment were manufacturing, services (including financial services and retail), government activities (including schools and law enforcement), and

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trade/transportation related industries (including utilities). These sectors continue to be by far the largest sectors, as defined by number of employed persons.

2.1.3 Infrastructure

The 2004 DPR/EA noted key infrastructure in the study area, including:

- The Aguadilla Wastewater Treatment Facility
- An Electric Power Transmission facility and eight substations
- Several major roads and highways, including highway PR-2, 110, and 115.
- Second largest airport in Puerto Rico, the Rafael Hernandez International airport

All of the noted infrastructure is still located in the study area. No major infrastructure improvements have occurred since 2004.

2.1.4 Tourism

The 2004 DPR/EA noted key tourism and recreational opportunities that are vital to the region's economy. Most importantly, numerous high quality beaches are located in Puerto Rico's northwestern coastal region. These include the *Crashboat*, *Gas Chambers*, and *Wilderness* beaches- all areas well known for world class surfing opportunities. Also, it should be noted that the Desecho Island National Wildlife Refuge is less than 25 miles from Puerto Rico's northwestern coast. This island is world famous for scuba diving, though only with permission from the U.S. Fish and Wildlife Service.

All of the tourism opportunities noted in the 2004 DPR/EA are still available in 2018. Tourism is still considered a vital part of the region's economy.

2.2 Engineering conditions (weather conditions)

The climate in this area is characteristically tropical. The annual temperature in this region varies from a mean low of approximately 21 °C to a mean high of approximately 26°C. The annual precipitation for the region varies from a mean low of 115 to a mean high of 205 centimeters (45 to 81 inches). The annual pattern of rainfall in the basin is such that the wettest period of the year is the hurricane season, which occurs in the latter part of the summer and the early part of fall.

Since the year 1900, there have been at least 38 damaging floods in the Rio Culebrinas Basin. The largest flood of record occurred on September 16, 1975. This flood had an estimated recurrence interval of approximately 50-100 years. The discharge associated with this flood was estimated at 1,954 cubic meters per second (cms), or 69,004.9 cubic feet per second (cfs). The stages just downstream of PR Hwy 2 were 7.2 meters (23.6 feet) mean sea level (msl), for about 3.2 meters (10.5 feet) of water depth.

The National Weather Service (NWS) operates a number of rain gages in Puerto Rico. The NWS Technical Paper No. 42 (TP-42) shows generalized estimates of the Probable Maximum Precipitation (PMP) and rainfall depth-frequency data for Puerto Rico and the US Virgin Islands. Contained in the report are iso-pluvial maps of precipitation contours for selected frequencies. The maps indicate rainfall increases toward the central mountain region of Puerto Rico. Point

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rainfalls representing Rio Culebrinas basin were obtained from TP-42 and are listed in Table A-2 of the 2015 DRAFT DPR Addendum Appendix B.

The Standard Project Storm (SPS) is defined as the most severe flood-producing rainfall depth-area-duration relationship and the iso-hyetal pattern of any storm that is considered reasonably characteristic of the region. The Standard Project Flood is the runoff and flooding caused by the SPS.

The PMP is defined as the greatest depth of precipitation for a given duration that is physically possible over a given size storm area at a particular geographical location at a certain time of the year. The SPS was assumed to be 50 percent of the PMP, as per EM 1110-2-1411.

Climate change review requirements for USACE projects changed in 2018. New data has revealed that the average rainfall for the 100 year 24 hour storm has increased from 9.8 inches (Detailed Project Report) to 11.70 inches (Atlas14). These changes along with the new rainfall data table will require reanalysis durring Project Engineering and Design (PED).

2.3 Environmental/Cultural Conditions

2.3.1 Environmental Conditions

Pursuant to the National Environmental Policy Act of 1969, as amended, USACEassessed the effects of the proposed action in the June 2004 Environmental Assessment (EA) for the Rio Culebrinas Section 205 Flood Risk Reduction Continuing Authorities Program (CAP) Study at Aguada and Aguadilla in Puerto Rico. The 2019 EA updates the 2004 EA analysis and adopts the 2004 EA, by reference, where the information is valid and applicable.

Few changes in the environmental conditions of the project area have occurred since the project authorization in 2004. The 2004 project did not include mitigation; however, due to engineering design requirement changes, the Draft 2015 DPR Addendum identified that the project will directly affect approximately 10.25 acres of mostly degraded wetlands. A mitigation plan was developed that proposes to create wetlands in the project vicinity. Since a portion of the excavation would be in existing wetlands to ensure hydrologic connection, the total net creation of wetlands would be 11.69 acres. Pursuant to the Endangered Species Act of 1983 (16 U.S.C. §1531 et seq.), coordination with National Marine Fisheries Service and U.S. Fish and Wildlife Service ongoing. Construction activities may affect, but are not likely to adversely affect, the Puerto Rican boa (*Epicrates inornatis*). Standard protection measures for the boa will be implemented to protect any boas that may be in the area..

2.3.2 Cultural Conditions

A cultural resources survey of the proposed levee alignment was conducted in 1999. As a result of this survey, two archaeological sites eligible for the NRHP (Culebrinas Site 1 and the Iglesia de Espinar archaeological site) were identified within the proposed Espinar Levee footprint. Since the 1999 archaeological investigation, the study area has been heavily disturbed. Aerial photography of the study area indicates that the both Culebrinas Site 1 and the Iglesia de Espinar archaeological site have been severely impacted by ground disturbing activities. Additional Phase I cultural resources surveys are necessary at these locations to verify the presence of intact deposits at Culebrinas Site 1 and the Iglesia de Espinar archaeological site. USACE is currently

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unable to identify and evaluate cultural resources and determine effects of the Recommended Plan on historic properties. Pursuant to 54 U.S.C. 306108 § 800.14, USACE is conducting a phased identification and evaluation of historic properties and executing a Programmatic Agreement with the Puerto Rico State Historic Preservation Officer and Advisory Council on Historic Preservation.

2.4 Impacts of Maria

Maria first made landfall near the southeastern town of Yabucoa and traveled north west across the island. The powerful Category 4 storm plowed across the island with sustained winds of 155 mph, uprooting trees, downing weather stations and cell towers, and ripping wooden and tin roofs off homes. Electricity was cut off to 100 percent of the island, and access to clean water and food became limited for most.

Heavy rains and flash floods brought on by the storm exacerbated widespread devastation, turning streets into rivers full of debris. In some areas, floodwaters were waist-high, more than 30 inches deep, and often sewage-ridden.

Hurricane Maria was the worst storm to hit Puerto Rico in over 80 years, and arrived only two weeks after Hurricane Irma passed just north of the island, and left 1 million people without power.

Large portions of Aguadilla and Aguada were inundated by the overburdened Rio Culebrinas and Caño Madre Vieja flood plains. See Figure 2-5: Caño Madre Veija Flooding Post Hurricane Maria 2017. However, the areas impacted appear to be at 90% reoccupancy in the areas impacted by the flood waters associaed with the post Maria flooding..

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Figure 2-2: Caño Madre Veija Flooding Post Hurricane Maria 2017 (20 September 2017)

3 VALIDATION OF AUTHORIZED/MODIFIED PROJECT

After approval of the 2004 DPR/EA, the Municipality of Aguadilla (the non-federal sponsor) requested that plans and specifications be placed on hold until additional development plans within the project's vicinity were considered. In 2013 the Municipality confirmed that future land uses within the project area would not affect this project and confirmed their commitment to completing the project.

The Draft 2015 DPR Addendum was to serve as an update to the 2004 DPR/EA; providing updated project information and confirming the previous analysis of alternatives and impacts, including:

- An updated cost and benefit analysis
- Refinements to the 2004 levee design to meet current USACE design/construction standards
- Implementation of a mitigation plan to offset wetland impacts
- An updated Finding of No Significant Impact based on the levee design refinements

3.1 Updated Design

The Draft 2015 DPR Addendum, which serves as the basis for this 2018 Culebrinas Feasibilily DPR Addendum made changes to the proposed Espinar and Aguadilla levees, as well as the Caňo Madre Vieja Cutoff Channel, to meet the new design standards. See Figure 3-1: 2015 Draft DPR Addendum Design Changes. The changes require an approximate increase in total project acreage from 0.176 square kilometers (43.47 acres) to 0.187 square kilometers (46.17 acres):

<u>Levees</u>

- An additional 2.45 meters (8.45 feet) of right-of-way due to slope requirement changes from 2.5:1 to 3:1 resulting in an average levee right-of-way of 36.05 meters (118.27 feet) instead of 33.6 meters (110.24 feet)
- The additional right-of-way for the levees resulted in an increase in lands required from approximately 0.14 square kilometers (42 acres) to approximately 0.17 square kilometers (44 acres)

Channel Improvement Easement for the Caňo Madre Vieja Cutoff Channel

- An additional 6.0 meters (19.68 feet) of new channel width from approximately 57.2 meters (187.66 feet) instead of 51.2 meters (167.98 feet) as originally designed
- The additional right-of-way for the Caňo Madre Vieja cutoff channel resulted in an increase from approximately 0.005 square kilometers (1.3 acres) to 0.008 square kilometers (2 acres) of land to be acquired

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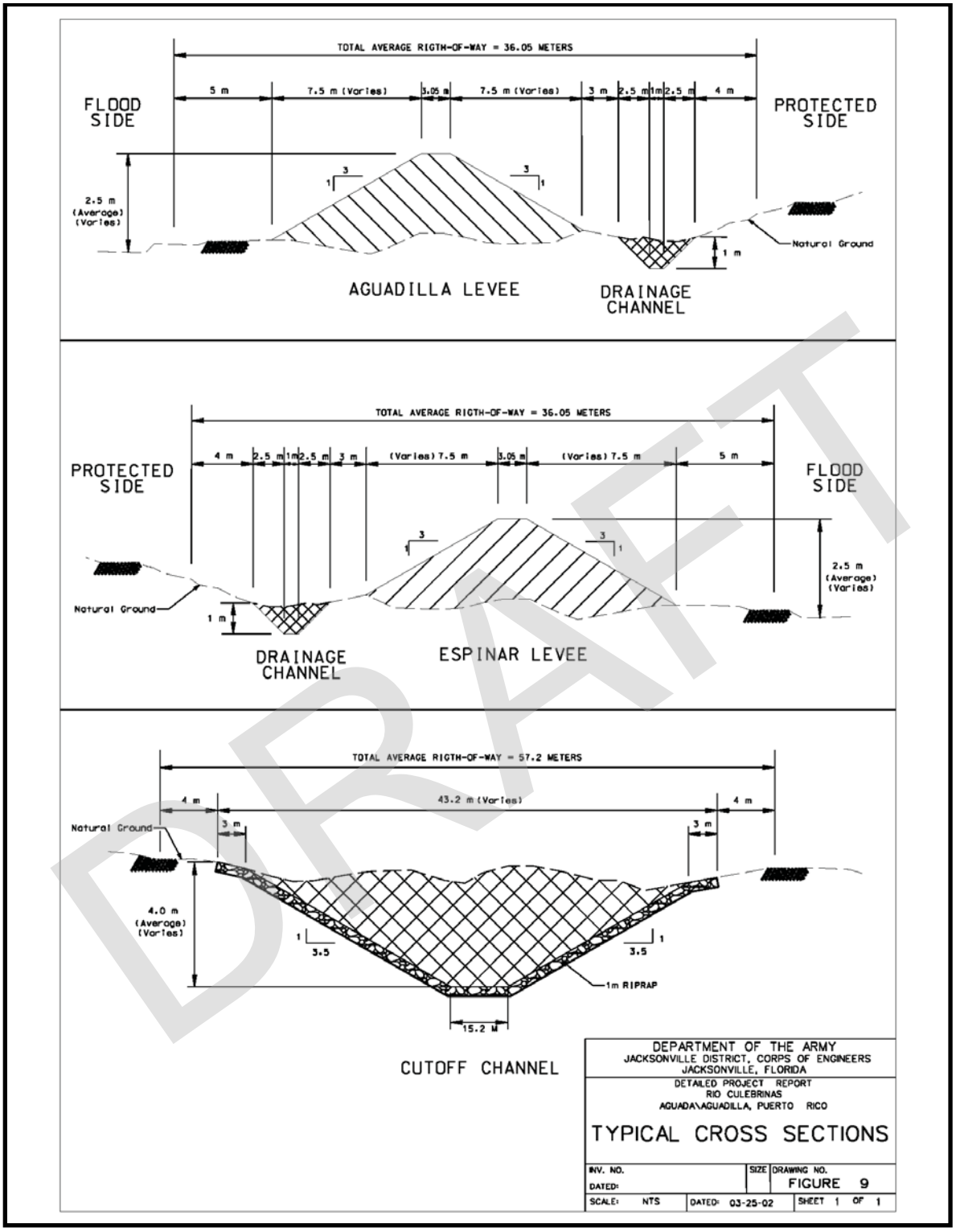

Figure 3-1: 2015 Draft DPR Addendum Design Changes

In addition the following mitigation areas have been added to the updated project.

Mitigation

The 2004 DPR/EA did not include a detailed wetland delineation or any compensatory mitigation. See Figure 3-2: Location of Wetlands Impacted by Proposed Draft 2015 DPR Addendum Project Design Modifications. It was determined that the new levee design requirements would impact additional wetlands and that a mitigation plan would be implemented to offset wetland impacts. Curent mitigation requirement changes would involve real estate and possibly the cost of excavation and disposal if the material is not suitable for levee construction.

- Freshwater mitigation area 0.44 square kilometers (10.83 acres)
- Tidal mitigation area 0.003 square kilometers (0.86 acres)

The mitigation presented in the 2015 Draft DPR Addendum is tentative and will be refined in coordination with the resource agencies. Based on the wetland delineation using the National Wetlands Inventory and the 100% hydric soil unit, no wetlands would be directly impacted by the cutoff channel. See Figure 3-3: Draft 2015 DPR Addendum Location of Mitigation/Excavation Sites Due To Project Design Impacts.

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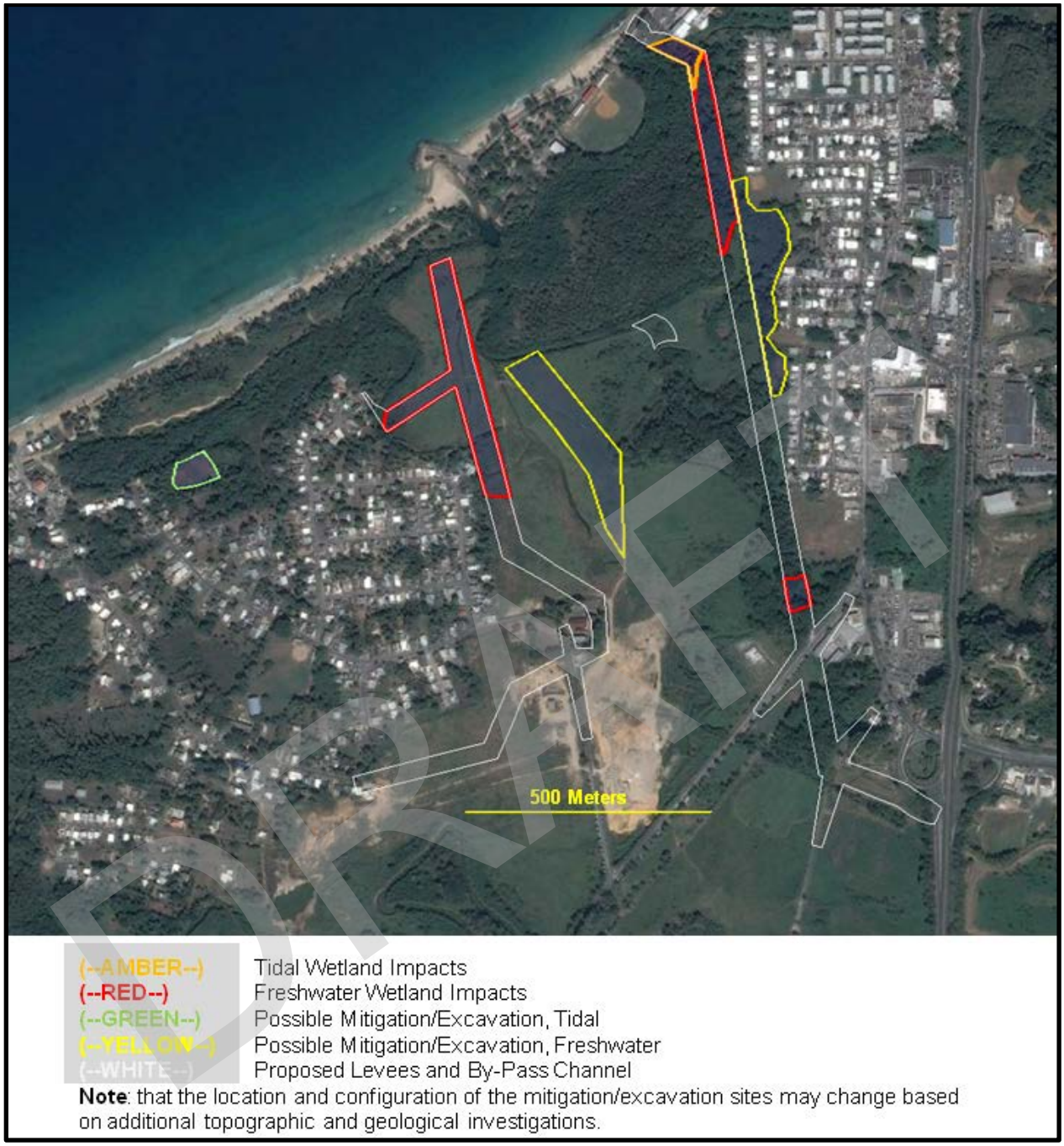

Figure 3-2: Location of Wetlands Impacted by Proposed Draft 2015 DPR Addendum Project Design Modifications

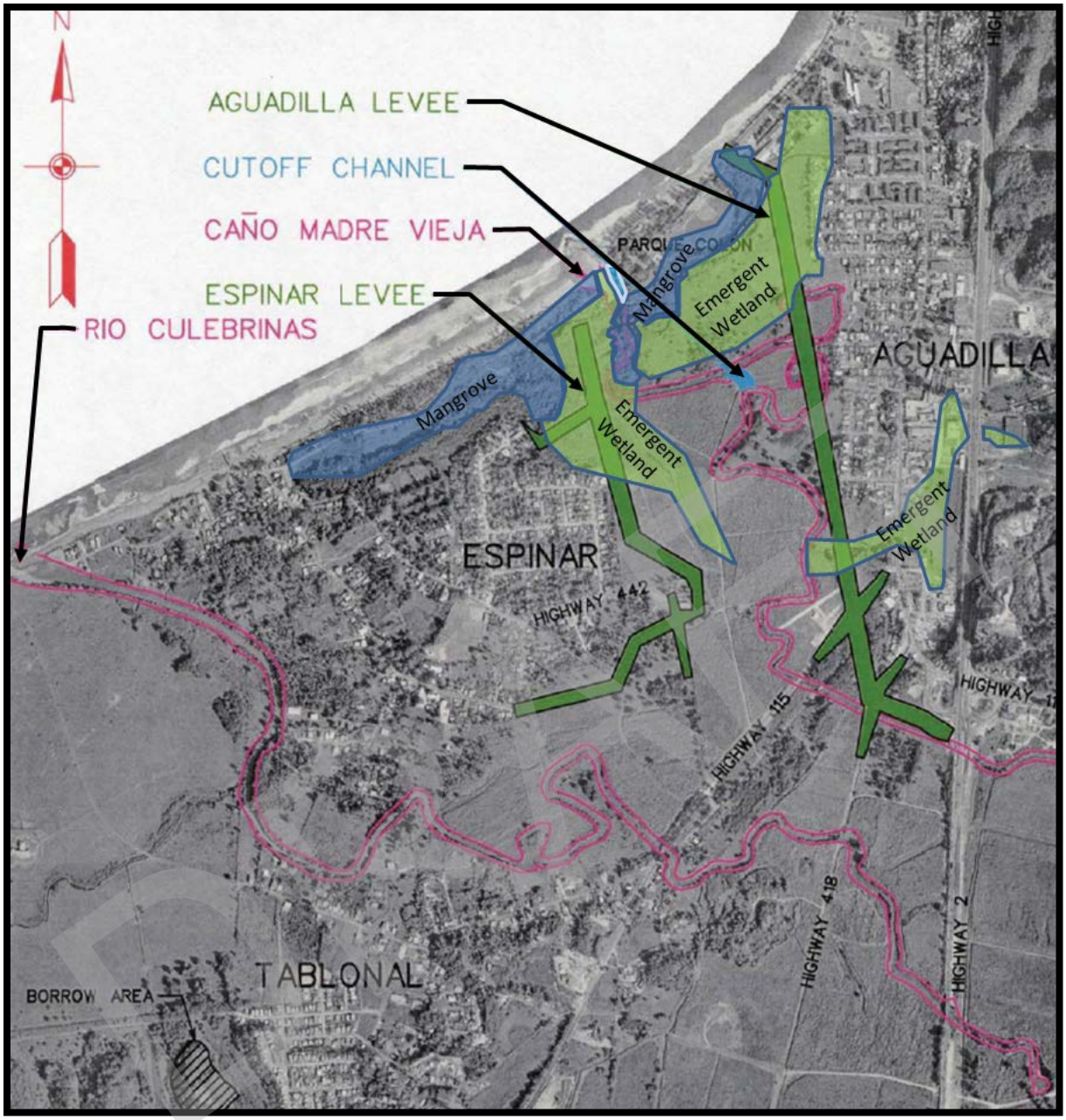

Figure 3-3: Draft 2015 DPR Addendum Location of Mitigation/Excavation Sites Due To Project Design Impacts

All other design criteria as described in the 2004 DPR/EA remained the same in the Draft 2015 DPR Addendum and this Conversion Report.

Hydrology/Hydraulic Analyses

The hydrologic investigations and hydraulic designs were originally completed in the 2004 Rio Culebrinas FinalDPR/EA. In 2014, the hydrology and hydraulics analyses were revisited to update the Detailed Project Report (DPR) with the defined objective to update costs and not reformulation nor updating of design criteria and data, meaning no changes in assumptions were

made in the updated analyses. The revisited analyses were verified as acceptable for task purpose and resulted in confirmation that the benefits of the project are likely similar to what was originally quantified and communicated in the 2004 Report.

The PED level hydrology and hydraulic analyses to be performed will include all of the following with the intent of verifying adequacy of original feature designs, and investigating and matching cost efficiencies to the desired level of performance using state-of-the-art computing tools. All USACE Regulations, Policies and Community of Practice standards will be adhered to with proper Quality Control reviews accordingly:

(1) Update the project rainfall depths with NOAA Atlas 14 (based on H&H updates to other Puerto Rico projects, NOAA Atlas 14 rainfall depths are significantly different from previous rainfall calculations) and re-model the drainage basin using CoP approved computing software (HEC-HMS) to determine design flow rates. Previous model used, HEC-1, while a good model, it has been replaced by the preferred HEC-HMS model. The period of return frequency floods to be included are the 2-year, 5-year, 10-year, 25-year, 50-year, 100-year and Standard Project Flood (SPF). The different frequencies are used to identify risk and make risk informed decisions with respect to final levee heights and other features. The SPF is used to identify residual risk as the project is to provide the 100-year flood damage reduction capability. LiDAR data collected to date will be used for the project's basin analysis.

(2) Update the hydraulic routing of flood flows through the floodplain(s) using CoP approved computing software (1D/2D HEC-RAS). Previous model used, 1-dimensional UNET, has demonstrated a trend requiring higher levees than necessary. Because of the split floodplain (common inflow, two outlets to the sea) and road features crossing the same, a 2-dimensional routing model will be used to ensure flood flows through the separate outlets are properly accounted for resulting in optimal levee heights for cost efficiency. Hydrographic survey, if found, was last collected in 1995 (23 years ago). Because of the floodplain extent and aggradation of sediment over the years, a new hydrographic survey will be required. All hydraulic control and conveyance features will be verified for cost efficiency and performance adequacy or new criteria will be developed to ensure proper feature hydraulic design.

(3) Sea Level Rise will be investigated through model sensitivity analyses, e.g. varying downstream boundary conditions (sea) to determine potential impacts on design features effectiveness and change in levee height risks/level of flood damage reduction over time.

(4) Results from hydrology and hydraulic analyses will be used to make NEPA updates, minimally a Finding of No Significant Impacts (FONSI), as period from last update will have surpassed five years. Expected project benefits will be verified and or updated with project costs. Lastly, new flood maps will be redrawn for the region for the populace's knowledge and future use.

ER 1110-2-1405 Hydraulic Design for Local Flood Protection Projects

EM 1110-2-1413 Hydrologic Analysis of Interior Areas

3.2 Economic Update (Level 1 update)

In accordance with the relevant guidance document, CWPM 12-001, a Level 1 Economic Update requires a qualitative assessment of existing conditions and key benefit assumptions. The

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objective of this assessment is to confirm the continued existence of the structures that the Federal project was designed to protect, and to confirm that the assumptions made in the original study continue to be realistic.

3.2.1 Scope of Project

The scope of the project has not changed since the last approved report (2004 DPR/EA). No major changes have occurred. The project area remains the same. The purpose of the project remains the same. The project will be implemented as designed in the 2004 DPR/EA and Draft 2015 DPR Addendum.

3.2.2 Economic Benefit Assumptions

The primary project benefits were derived through reduction of flood damage to structures in the study area, including residential, commercial, and public structures. Incidental additional benefits of the project include employment benefits and flood insurance overhead reduction benefits. The purpose of this section is to demonstrate that the benefit assumptions made in the 2004 DPR/EA are still valid.

3.2.2.1 Inventory of Property Subject to Flooding

In the 2004 DPR/EA, property subject to flooding was grouped into six land use categories: residential, commercial, public, non-profit organization facilities, utilities, and road (highways and streets). The residential structures primarily consisted of small single family houses built of reinforced concrete. More than 90% of residential structures in the floodplain are subject to damage by the 100 year rainfall induced flood. This continues to be the case. The study also identified 95 commercial structures subject to flooding, including: service offices, retail outlets, eating/drinking establishments, auto dealers, hardware stores, and one warehouse. The study identified 24 public structures (owned by the Commonwealth of Puerto Rico), 7 non-profit structures (churches, private schools, etc.), and utilities in the form of 18 electric substations. These structures were all located in or near Aguadilla. Finally, the study identified approximately seven miles of roads and highways subject to flooding. This continues to be the case; no new roads have been added the study area and all existing roads have been maintained. For modeling purposes, the study area was divided into three damage reaches, summarized in **table 1**.

Table 1: Rio Culebrinas Economic Reaches

Reach	Description of Reach
1	Espinar Ward of Aguada; primarily low income residential community
2	Residential Public Housing development in Aguadilla
3	Southern portion of Aguadilla; a mix of residential, commercial, public, and utility structures

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In all three of these reaches, the inventory of property subject to flooding has not changed significantly since 2004. As noted in Section 1, both the population and the economy of this region has been largely static. The reaches have experienced neither significant growth and development, nor condemnation or changes in land use. Aerial imagery of three Reaches demonstrates that the number and distribution of structures is generally the same.

Figure 3-4 Aerial imagery of Reach 1 in 2004 and 2018

Figure 3-5 Aerial imagery of Reach 2 in 2004 and 2018

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Figure 3-6 Aerial imagery of Reach 3 in 2004 and 2018

Because no major changes have occurred in the study area, it is reasonable to assume that the inventory of property subject to flooding is comparable to the 2004 assessment.

3.2.2.2 Inundation Reduction Benefits

In addition to the inventory of property subject to flooding, the inundation reduction benefits in 2004 DPR/EA depend on a number of key assumptions. The first is the relationship between structure values and content values. Content values in the 2004 study were based on comparative analyses of similar flood risk management studies in Puerto Rico. According to p. E-4 in the 2004 Economic Appendix, "Experience in other studies has shown that content values do not vary significantly in Puerto Rico for similar types of developments and socioeconomic conditions". There is no evidence to suggest that the content values would have changed over time in this area. Therefore, the content-to-structure value ratios developed in 2004 are assumed to be reasonable.

Another critical set of assumptions concern the relationship between flood depth and damage. According to p. E-12 in the 2004 Economics Appendix,

> "Depth-damage relationships for the residential, commercial, and public land uses developed for the Rio Puerto Nuevo Survey Report (Jacksonville District, 1984) were utilized to estimate flood damages for existing development. These damage curves were developed using historical data on flood damages throughout the island."

Based on existing Puerto Rico data, a different depth-damage curve was developed for each type of property: residential, public, and non-profit. Seven different depth-damage curves were developed for commercial properties because commercial construction types vary considerably

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in the floodplain. Each category of commercial property has its own unique characteristics. Thus each category had its own estimated content-to-structure value ratio and its own depth-damage relationship. The different commercial categories are summarized in **Table 2**. More information (including graphical displays of each different curve) is provided in the Economics Appendix of the 2004 DPR/EA.

Table 2: Categories of Commercial Structures

Category	Description
1	General services and retail
2	Professional and Personal Services
3	Eating and Drinking establishments
4	Auto Dealers
5	Hardware stores and building materials
6	Financial institutions and real estate offices
7	Warehouses

*Note: only commercial categories relevant to the Rio Culebrinas study area are presented here.

Though the original Rio Puerto Nuevo study was completed in 1984, these curves still represent the best available information about the relationship between depth and damage in Puerto Rico. Construction methods and ground conditions are somewhat different in Puerto Rico than in mainland North America. These curves are site specific and are more appropriate than generic depth-damage curves developed by IWR (which might be used in a study in the mainland United States). Also, because Rio Culebrinas is a CAP, a detailed new depth-damage study is beyond the scope of the current effort.

3.2.2.3 Employment Benefits

For some USACE construction projects, the employment of underutilized labor resources is a valid category of NED benefits. The basis for considering this benefit is contained in ER 11 05-2-100 (April 2000):

> "Benefits from use of otherwise unemployed or underemployed labor resources may be recognized as a project benefit if the area has substantial and persistent unemployment at the time the plan is submitted for authorization and for appropriations to begin construction. Substantial and persistent unemployment exists in an area when: The current rate of unemployment, as determined by the appropriate annual statistics for the most recent 12 consecutive months, is 6 percent or more and has averaged at least 6 percent for the qualifying time periods. The annual average rate of unemployment has been at least: (a) 50 percent above the national average for three of the preceding four calendar years, or (b) 75 percent above the national average for two of the preceding three calendar years, or (c) 100 percent above the national average for one of the preceding two calendar years."

In the 2004 DPR/EA, the 2002 national average unemployment rate was reported at 5.8%, while the 2002 average unemployment rate for Puerto Rico was reportedly 12.3%. In other words, the

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unemployment rate for Puerto Rico was more than 100% above the national average for at least one of the preceding two calendar years. Therefore, use of underemployed labor resources was a valid NED benefit category.

As of 2014, this criterion is still met. The most recent available unemployment data from the BLS (February 2015) shows that the national average unemployment rate is 5.5%, while the average for Puerto Rico is 13.6%. In other words, the current unemployment rate for Puerto Rico is more than 100% above the national average. The 2004 report described unemployment as "as one of the main socioeconomic problems in Puerto Rico." This clearly continues to be the case. Therefore, use of underemployed labor resources is a valid NED benefit category.

3.2.3 Reduction in Flood Insurance Overhead

ER 11 05-2-100 also defines the reduction in flood insurance overhead costs as a valid category of NED benefits. Specifically, when occupants of the previously floodable land are no longer required to purchase flood insurance for projects providing 100 year or higher level of protection, it is appropriate to claim as a benefit the expense of servicing these policies and a pro-rata share of FEMA's administrative costs. In other words, in the with project condition, it will be much less costly to administer FEMA's flood insurance program that it would have been in the without project condition. This is a valid source of NED benefits.

The 2004 DPR/EA calculated flood insurance benefits using annual administration costs provided in Economic Guidance Memorandum 03-03. The costs were estimated to be $133 per policy (in 2003 dollars). Given that the BCR is being updated by deflating current costs to the price level of the approved benefits, this figure is still appropriate for benefit calculations.

A Level 1 Reaffirmation report assumes that the previously computed benefits are still valid. New project cost estimates are deflated to the price level of the benefits, and a new Benefit to Cost Ratio (BCR) is calculated. For this type of report, no new modeling or plan formulation is required; rather the BCR of the project is updated based on the best available cost information.

3.3 Cost Update

Development of the project's current cost estimate is in accordance with the current USACE guidance. Total project cost estimate in FY19 dollars (including all contingencies) is $24,404,000. **Error! Reference source not found.** below summarizes the project's current costs.

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Table 3: Rio Culebrinas Current Costs

Relocations	$859,000
Roads, Railroads, and Bridges	$2,628,000
Channels and Canals	$918,000
Levees and Floodwalls	$2,167,000
Floodway Diversion Structures	$6,326,000
Fish and Wildlife Facilities	$2,361,000
Total Construction Cost	**$15,259,000**
Lands and Damages	$4,922,000
PED	$2,697,000
Construction Management	$1,526,000
Total Non-construction Cost	**$9,145,000**
Total Project Cost	**$24,404,000**

*Estimate in FY19 price levels, provided by certified cost report dated 12-3-18

3.4 Updated BCR and Net Benefits

In a Level 1 Economic Update, the Benefit-Cost Ratio (BCR) is computed by comparing the current annual costs to previously estimated benefits. Using this method the total updated BCR at the FY15 water resources discount rate (3.375%) is 1.81. At the Office of Management and Budget (OMB) interest rate (7.0%) the BCR is 0.98. The BCR and net benefits are summarized in Table 4. As noted in Section 3.1, construction has not yet begun on the project. Therefore, the remaining benefit remaining cost ratio is not applicable.

Table 4: Rio Culebrinas Updated BCR with incidental benefits*

Total First Cost	**$24,404,000**
IDC	$931,583
Total Investment Cost	$25,335,583
Average Annual Investment Cost	$663,836
Annual O&M	$24,000
Total AAEQ Cost	$687,836
AAEQ Benefits	$1,058,500
BCR	**1.54**
Net Benefits	**$370,664**

*Incidental Benefits include Recreation, Employment benefits, and flood insurance overhead reduction benefits

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Table 5: Rio Culebrinas Updated BCR without incidental benefits*

Total First Cost	**$24,404,000**
IDC	$931,583
Total Investment Cost	$25,335,583
Average Annual Investment Cost	$663,836
Annual O&M	$24,000
Total AAEQ Cost	$687,836
AAEQ Benefits	$1,011,200
BCR	**1.47**
Net Benefits	**$323,364**

Notes:

1.) Cost Estimate based certified FY19 TPCS and construction schedule dated 12/3/18
2.) Costs deflated to price level of benefits (FY2004) using March 2018 CWCIS, feature code 15 (floodway control and diversion structures)
3.) Annual Costs amortized over a 50 year period of analysis at the FY19 discount rate (2.875%)
4.) Total Project BCR and RBRCR are the same because construction has not initiated on this project

Since the original report in 2004, the estimated cost of the project has increased significantly (from $4.7 million to $24.4 million). Even accounting for inflation, the real costs of the project has increased over time. Because a level 1 Economic Update takes the current cost and deflates it to the price level of the estimated benefits, the BCR has therefore decreased over time. A summary of the changing costs, BCR, and net benefits is provided in Table 6.

Table 6: Rio Culebrinas Cost and BCR Comparison Over Time

	2004	**2015**	**2018**
Total First Cost	**$4,741,400**	**$16,971,000**	**$24,404,000**
IDC	$111,100	$405,510	$931,583
Investment Cost	$4,862,500	$17,376,510	$25,335,583
Average Annual Investment Cost	$303,100	$531,960	$663,836
Annual OMRR&R	$15,000	$21,700	$24,000
Total AAEQ Cost	$318,100	$594,583	$1,093,965
Total AAEQ Cost *	$318,100	$553,707	$687,836
AAEQ Benefits (04 Price Level)	$1,058,500	$1,058,500	$1,058,500
BCR	**3.33**	**1.91**	**1.54**
Net Benefits	**$740,400**	**$504,793**	**$370,664**

* adjusted to price level of benefits, FY04

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3.5 Real Estate Update

3.5.1 2015 Draft DPR Addendum

The Draft 2015 DPR Addendum detailed required design changes to the proposed Espinar and Aguadilla levees, as well as the Caňo Madre Vieja Cutoff Channel, to meet the new design standards at that time. The newer standards require an approximate increase in total project acreage from 0.176 km^2 (43.47 acres) to 0.187 km^2 (46.17 acres):

Levees

- An additional 2.45 meters (8.45 feet) levee width resulting in an average levee width of 36.05 meters (118.27 feet) instead of 33.6 meters (110.24 feet)
- The additional width for the levees resulted in an increase in lands required from approximately 0.17 km^2 (42 acres) to approximately 0.18 km^2 (44 acres)

Channel Improvement Easement for the Caňo Madre Vieja Cutoff Channel

- An additional 6.0 meters (19.68 feet) of new channel width from approximately 57.2 meters (187.66 feet) instead of 51.2 meters (167.98 feet) as originally designed
- The additional width for the Caňo Madre Vieja cutoff channel resulted in an increase from approximately 0.005 km^2 (1.3 acres) to 0.008 km^2 (2 acres) of land to be acquired

In addition the following mitigation areas have been added to the updated project.

Mitigation

- Freshwater mitigation area 0.44 km^2 (10.83 acres)
- Tidal mitigation area 0.003 km^2 (0.86 acres)

Realestate Costs

The Draft 2015 DPR Addendum updated the Real Estate costs from the 2004 Approved report to:

Total Land and Damages:	$1,486,200	
Total Acquisition/Admin. Costs:	$1,096,000	
Public Law 91-646 Payments	$2,300,000	
Total Real Estate Costs:		**$4,882,200**
Contingency* (30% Rounded)		$1,464,660
TOTAL PROJECT REAL ESTATE COST		**$6,346,860**

USACE will work with the Non Federal Sponsor to ensure compliance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (42 U.S.C. §4601 et seq.). The project will comply with this Act. The Real Estate cost updted in the 2015 DPR Addendum report have been reviewed and are expected to be accurate for the current Real estate costs associated thith this 2018 Bipartisian Act Conversion Report.

3.5.2 CAP Conversion Report Update

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A review was conducted on the real estate costs associated with the Approved 2004 DPR and contained in the Draft 2015 DPR addendum. The costs associated with real estate acquisition and the associated price levels found in Puerto Rico are well documented in various on going approved USACE projects. The recent Puerto Rico real estate acquasitions and associated realestate acquisition costs with other USACE projects provide confidence in the cost estimates utilized in developing the real estate acquisition estimates for the current certified project costs. See Appendix C.

4 RISK AND UNCERTAINTY

Site conditions and other characteristics detailed in the 2004 Rio Culebrinas DPR have remained fairly consistant over the ensuing years. The Draft 2015 Rio Culebrinas DPR Addendum saw little change in site conditions and provided updated reviews of the design for the then current design critera. The risk and uncertainty to the project completion has been reduced by the review and design modifications completed durring the development of the Draft 2015 DPR Addendum, Appendix B. This expedited review of the project suggests that changes in watershed hydraulics review due to the new ECB 2018 14 (Guidance for Incorporating Climat Change Impacts to Inland Hydrology), and design standards and practices that have changed over time are potential risks that can be addressed when this project is moved into the design phase for eventual authorization and construction. See the attached Rio Culebrinas Risk Register (Attachment D).

5 RISK AND UNCERTAINTY

This report conversion addendum is prepared in accordance with the Rio Culebrinas Project Management Plan, ER 1105-2-100, Planning Guidance, and will undergo feasibility phase reviews in accordance with EC 1165-2-214. These reviews include District Quality Control, Agency Technical Review, and Mission Subordinate Command reviews of the project report and design. Since there are no changes proposed to the project design for this previously authorized project, a request for exclusion from completing a Type I Independent External Peer Review was submitted on November 16, 2018.

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6 IMPLEMENTATION STRATEGY/RECOMMENDATIONS

The overall objective of the authorized plan is to provide flood risk management components for Aguadilla and Aguada, Puerto Rico. Flooding from the Rio Culebrinas is a major problem threatening life, property, and economic development in the project area. The updated project is economically justified and necessary to provide flood risk management along the Rio Culebrinas. Providing flood risk reduction components for the 100-year rainfall induced flood event by constructing levees and channels along the Rio Culebrinas will protect over 3,300 families. Although there have been some changes in the Rio Culebrinas Flood Damage Reduction Project with respect to costs, benefits, current engineering practices, and mitigation, the objectives and scope of the project remain the same as when the project was originally proposed under the authority of Section 205 of the 1948 Flood Control Act, as amended and full environmental compliance will be achieved prior to construction.

It is recommended that the recommendatins contained in the approved 2014 DPR and the Draft 2015 Rio culibrinas DPR Addendum be be afirmed. It is recommended that modifications to the Rio Culebrinas Flood Damage Reduction Project, described , including design changes in levee side slopes of 3:1 instead of 2.5:1, the use of concrete culverts instead of metal culverts, and the construction of the proposed wetland mitigation area be approved at a total Federal cost of $27.265M (FY19 price level) and proceed to the Preconstruction, Engineering and Design Phase.

Furthermore, the project is in compliance with NEPA and USACE regulation ER-200-2-2 for implementing NEPA on Civil Works actions. Coordination with the resource agencies concering the revised project footprint will be conducted and included in the Finding of No Significant Impact that will be completed for this project. Finally, this 2019 CAP Conversion Addendum will require approval at the MSC and approval of the associated Chief's Report for appropriations in order to initiate the Design and Implementation phase of the project.

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Andrew D. Kelly, Jr.
Colonel, U.S. Army
District Commander