



DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS
WASHINGTON, D.C. 20314-1000

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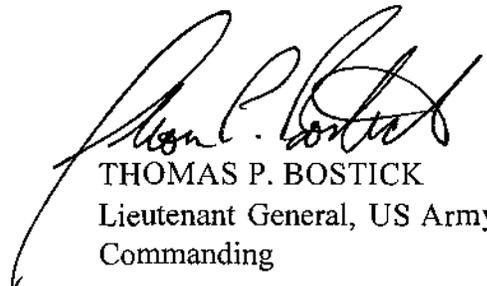
AUL 16 2013

MEMORANDUM FOR ASSISTANT SECRETARY OF THE ARMY (CIVIL WORKS)
108 ARMY PENTAGON, WASHINGTON, DC 20310-0108

SUBJECT: Walton County Hurricane and Storm Damage Reduction Study, Walton
County, FL - Final USACE Response to Independent External Peer Review

1. An Independent External Peer Review (IEPR) was conducted for the subject project in accordance with Section 2034 of the Water Resources Development Act of 2007, EC 1165-2-209, and the Office of Management and Budget's Final Information Quality Bulletin for Peer Review (2004).
2. The IEPR was conducted by Battelle Memorial Institute. The IEPR panel consisted of five panel members with technical expertise in coastal design/construction; cost engineering; civil works planning; National Environmental Policy Act (NEPA)/biology; coastal engineering; and, economics.
3. The final written responses to the IEPR are hereby approved. The enclosed document contains the final written responses of the Chief of Engineers to the issues raised and the recommendations contained in the IEPR report. The IEPR Report and the USACE responses have been coordinated with the vertical team and will be posted on the internet, as required in EC 1165-2-209.
4. If you have any questions on this matter, please contact me or have a member of your staff contact Ms. Stacey Brown, Deputy Chief, South Atlantic Division Regional Integration Team, at (202) 761-4106.

Encl


THOMAS P. BOSTICK
Lieutenant General, US Army
Commanding

**WALTON COUNTY, FLORIDA HURRICANE AND STORM
DAMAGE REDUCTION PROJECT**

FEASIBILITY REPORT AND ENVIRONMENTAL ASSESSMENT

FINAL

**U.S. Army Corps of Engineers Response to
Independent External Peer Review
June 2013**

An Independent External Peer Review (IEPR) was conducted for the subject project in accordance with Section 2034 of the Water Resources Development Act of 2007, EC 1165-2-209, and the Office of Management and Budget's *Final Information Quality Bulletin for Peer Review* (2004).

The goal of the U.S. Army Corps of Engineers (USACE) Civil Works program is to always provide the most scientifically sound and sustainable water resource solutions for the nation. The USACE review processes are essential to ensuring project safety and quality of the products USACE provides to the American people. Battelle Memorial Institute (Battelle), a non-profit science and technology organization with experience in establishing and administering peer review panels for USACE, was engaged to conduct the IEPR of the Walton County Florida Hurricane and Storm Damage Reduction General Investigations Study Report.

The Battelle IEPR panel reviewed the Draft Final Report and the Draft Environmental Analysis (EA), as well as supporting documentation. The Final IEPR Battelle Report was issued in August 2012.

Overall, 18 comments were identified and documented. Of the 18 comments, 9 were identified as having high significance, 8 had medium significance, and 1 had low significance. The following discussions present the USACE Final Response to the 18 comments.

'High': Describes a fundamental problem with the project that could affect the recommendation or justification of the project.

'Medium': Affects the completeness or understanding of the reports/project

'Low': Affects the technical quality of the reports but will not affect the recommendation of the project."

1. IEPR Comment - *High Significance*: The results of the economic analysis are reported as point estimates and do not include a thorough assessment of risk and uncertainty as required by ER 1105-2-101.

USACE Response: Adopted

Action Taken: Tabular Presentations with mean and standard deviation of Expected Annual Damages, Net Benefits and the Benefit Cost Ratio (BCR) for the National Economic Development (NED) plan and the Tentatively Selected Plan (TSP) has been added in Table B-47A. Storm damage reduction studies adopt a life cycle approach and probabilistic analysis (and display) of benefits and costs.

Key considerations incorporated into the analysis are: (a) the erosion damage function (with special emphasis on structure values and land values); (b) the stage-damage function (with special emphasis on structure first floor elevation, content and structure values); (c) the wave-damage function by structure class (d) storm-related parameters such as peak wave height and period storm duration, peak surge elevation, and timing with respect to tidal phasing; (e) wave height above the dune; (f) wave penetration; (g) the shoreline retreat or eroded volume; and, (h) the natural post-storm recovery. Although results for these parameters are reported as point estimates (most likely outcome), these key elements have risk components that are incorporated into the model.

2. IEPR Comment - *High Significance*: The methods used to calculate structure and content values, as well as sensitivity tests related to these values, are not consistent with USACE guidelines; in addition, technical details regarding the economic analysis are not provided.

This comment had six recommendations, five of which were adopted and one of which was not adopted.

USACE Response: Adopted

Action Taken: Section 4.4 of Appendix B was revised to include additional discussion on the evaluation of the trends in building values for the period beginning in year 2000 to date. The final report was updated to fiscal year 2012 prices.

Section 4.4 of Appendix B was revised to include the description and discussions used to calculate depreciated replacement costs for all structures and a comparison between these estimated costs and the appraised building values. .

The point estimate of Depreciated Replacement Cost (DRC) for structures was used as an estimate of the most likely structure value in the Beach- \hat{x} model simulations. An assumed triangular distribution of of this point estimate is represented by a low, middle and high value. The low and high values were defined as ten percent below and above the expected (middle) value. Tax Assessor land values were used by the Mobile District's Real Estate Appraisal Division to obtain a range estimate of the near shore value of land to use in the economic

analysis to measure the land loss prevention benefit. The mid-point of this range of near shore land value per square foot by reach was multiplied by the reach erosion or accretion value for that reach as estimated from the Monte carol simulation runs. The summary statistics have been added in Section 3.2.11 of the Main Report and 4.4 of Appendix B. The mean, standard deviation, minimum, and maximum values for the erosion mean are also displayed by reach.

Information from the Real Estate Division's sample determinations is used to explain and justify the content and structure values. Section 4.4. Appendix B was revised to explain and support the appropriate standard deviations used in the analysis A survey of literature from real estate and property insurers and under-writers trade associations and area insurers themselves were canvassed to determine the structure to content ratio for the economic evaluation. The Institute for Water Resources' (IWR) report *Coastal Storm Damage Relationships Based on Expert Opinion Elicitation* (IWR, 2002) was used in the determination of the damage functions. An explanation of the damage functions is included in Section 5.2.1 of Appendix B.

USACE Response: Not Adopted:

The re-estimating of the analysis of alternatives, benefit-cost results and uncertainty parameters recommended by the panel was not conducted as the previous recommended resolutions did not result in changes to the parameters used in the analysis. The analysis, as presented at the stated report price level in a probabilistic manner using risk variables wherever appropriate, is technically sound and consistent with ER 1105-2-100. The recommended plan has been updated to the current price for the final report.

3. IEPR Comment - *High Significance*: Risks associated with wind and flood damage from previous storm events are not provided and the relative magnitudes of these risks are not addressed in the report.

USACE Response: Adopted

Action Taken: Information about wind and water damage from prior storms in the study area was incorporated into the Recent Storm History in Appendix A with reference made in the Main Report, Section 6.4.1, Residual Risks.

Recognition of FEMA and County maintained websites with FEMA flood zones mapping was incorporated into the Main Report, Section 6.4.1 and in the Residual Risks and the Storm Surge section of Appendix A.

Wind damage risks were discussed as part of the residual risks associated with the project for different storm events in the Recent Storm History section in Appendix A, Section I with reference made and further discussion incorporated in the Main Report, Section 6.4.1, Residual Risks.

4. IEPR Comment - *High Significance*: The decision criteria for selecting the NED plan and TSP are not provided and it could not be determined how incremental analysis was used in the evaluation of alternatives.

USACE Response: Adopted

Action Taken: Tabular Presentations with mean and standard deviation of Expected Annual Damages, Net Benefits and the BCR for the NED plan and the TSP has been added in Table B-47A of Appendix B, Economic Investigations.

The criteria used to arrive at the NED plan was greatest net benefits. That final optimized plan was arrived at through a two phase optimization process that evaluated and optimized a range of added berm widths and then held the optimized berm width constant as added dune widths were optimized. Once the optimization process was completed, then a constructible alternative was selected and evaluated. The MiniMin alternative is not directly comparable to the NED plan because it was not evaluated for constructability, or optimized on added dune width and subsequently the constructible MiniMin plan would have to be re-evaluated in BeachFx with the resultant GENESIS output of planform rates for each reach to evaluate how the project performs with the project features in place.

5. IEPR Comment - *High Significance*: Conflicting with and without project benefit information is presented throughout the project documents and raises concerns about the alternatives selected using the benefit-cost analysis.

USACE Response: Adopted

Action Taken: Without project hurricane and storm damages to structure and content by reach per iteration are provided in Table B-47B in Appendix B, Economic Investigations. Neither the existing condition berm height nor the existing condition with project dune height are changed by any project alternative; the inundation in both with and without condition remains relatively unchanged. Damages from individual storms events are problematic and too detailed and provide no value added to their presentation. The engineering-economic model simulations uses a historical storm set sampled based on probability of a storm occurring not by storm frequency.

Without project storm damage by damage category type was provided in Table B-14A in Appendix B.

Section 11, Appendix B, Economic Investigations displays the remaining without project damages remaining with the project in place. This is shown to demonstrate the fact that the project will not completely eliminate the measured without project condition damages which are mainly erosion damages. A breakdown of damages by type for different storm events is not possible since the evaluation is driven by the probability of a storm occurring and the particular storm selected (sampled) and is not a frequency based evaluation. Attributes for the Residual risk values presented in Table B-47 of Appendix B were described by reach.

6. IEPR Comment - High Significance: The uncertainties associated with many of the engineering calculations are not presented and do not appear to be carried through the analyses.

USACE Response: Adopted

Action Taken: Discussion of the uncertainties in the beach fill volume calculations were added to the Main Report, Section 6.4.6. How these uncertainties impact project costs are included in Appendix A, Section 2, Cost Engineering.

Discussion on general uncertainties in the sediment budget transport and volumes was added in Appendix A, Section 1, Hydraulic Considerations. Uncertainty associated with the future storm climatology as the main driver of uncertainty related to beach evolution was highlighted in the Main Report, Section 6.4.

Discussion of general uncertainties in GENESIS shoreline change estimates was added in Appendix A, Section 1, Hydraulic Considerations and uncertainty associated with the future storm climatology as the main driver of uncertainty related to beach evolution was highlighted in Section 6.4 of the Main Report.

Discussion of using simplified beach profiles were added to the report in Appendix A, Section 1, Hydraulic Considerations.

7. IEPR Comment - High Significance: The borrow area is a major project feature, but its physical and environmental aspects have not been thoroughly described or quantified to understand how this feature will function.

USACE Response: Adopted

Action Taken: More detailed discussion of the environmental effects of the borrow area including pertinent references was added to the EA and reflected in the Main Report, Section 3.4.1.10. Additional information was added to the Main Report in sections 4.4.5 Borrow Source Alternatives as well as 6.4.6 Risk and Uncertainty in Borrow Material. Figures of the borrow area have also been added to Appendix A.

The Main Report was updated to convey the relevance of the Clean Water Act (CWA) in sections 3.4.1 Environmental Considerations and 3.4.1.6 Water Quality. These sections also discuss the necessary actions to be taken during Preconstruction, Engineering, and Design (PED) phase and if contaminants are found during construction.

Environmental information relative to borrow area impacts was added to the Main Report sections 3.4.1.6 and 3.4.1.10. Additionally, more detailed discussions with reference to the

cultural resources survey was added to the EA for the selected borrow area. This information was summarized in the Main Report, Section 3.4.1.5.

Action to be taken: Detailed drawings and maps, including cross sections, transportation routes, and replenishment rates will be covered during the PED Phase of the project.

8. IEPR Comment - *High Significance*: The implications of the 2010 Deepwater Horizon oil spill, and the potential impacts to the project, if contaminants are found, are not fully discussed.

USACE Response: Adopted

Action Taken: A discussion and summary of the borrow site inspection and its findings have been added to the Main Report and EA. During the PED phase, required steps to be taken if Poly Aromatic Hydrocarbons (PAH's) are suspected and what to do if PAH's above Practical Quantitative Limits (PQL's) are detected will be added in the contract language.

As outlined in the inspection report, the risk and uncertainty surrounding the potential for contaminants have been significantly diminished. As stated above, required steps to be taken if PAH's are suspected and what to do if PAH's above PQL's are detected will be included within the PED Phase.

9. IEPR Comment - *High Significance*: The engineering and environmental data presented may not be representative of more recent conditions within the project area.

USACE Response: Adopted

Action Taken: The report was updated to include a comparison of the reported data to recent data under the Sediment Budget for Walton County and Destin in Appendix A, Section 1. Specifically, major differences between the baseline datasets used in the analysis and the more recent information and possible implications of these changes on the analysis, alternative selection, and costs were incorporated.

The report included a statement in the Main Report, Section 6.7 concerning components of the analysis that need to be revisited during the PED phase.

10. IEPR Comment – *Medium Significance*: The statistical analyses are not consistent with contemporary methods, and the details of the extreme value statistical analysis are not provided.

USACE Response: Adopted

Action Taken: Discussion of uncertainty added by using the historical storm sample only was added in Sections 6.4.3 and 6.4.4 of the Main Report. The Beach-*fx* analysis is aimed at developing a plausible storm suite that characterizes the storm climatology at the project site. No effort was made to define or characterize an extreme event; rather, the effort was to characterize the expected storm climatology and aimed to include expected storms with return periods from 5 to on the order of 100 years.

The plausible storm suite developed was based on the available historical storm record which spanned approximately 119 years (1886 to 2005). The historical storm record was expanded by a factor of 16 by combining the historical storm surge hydrographs with statistically representative astronomical tides. The analysis included varying sequencing of the historic storm suite and water levels. The distribution and sequencing of storms in Beach-*fx* is based on the probabilities determined by the historic record with an applied Poisson distribution to determine the number of storms of each type that will occur in a given hurricane season. The report was updated to include discussion and justify the adequacy of the historical storm sample to represent all plausible future events in Section 6.4.4 of the Main Report.

Details of the historical storm sample selection were added to the Main Report, Section 3.1.4 and in the Storm Induced Beach Profile Change and the Beach-*fx* Monte Carlo Simulation Models sections of Appendix A, Section 1 including peaks-over-threshold selection value, time period considered, storm rate of occurrence. Quantitative information regarding parameter ranges represented (e.g., surge, wave heights, etc.) is documented in Attachment 1-A, Appendix A, Section 1.

Discussion of the details of how storm event sequences for Beach-*fx* were developed, including how storms in the parent population were weighted, what statistical distributions were used or assumed, and how the population was resampled was added in Sections 3.1.4 and 6.4.3 of the Main Report and the Beach-*fx* Monte Carlo Simulation Models section of Appendix A, Section 1.

Discussion on how the number of lifecycle realizations was optimized was added to Section 5.3.2.1 of the Main Report and Section 8.8.1 of Appendix B.

The report added documentation that the same storm sequences and realizations through use of a seed file were used to evaluate all alternatives was added to section Beach-*fx* Model Future With Project Conditions section of Appendix A, Section 1.

Statistical reliability of the seasonal storm probabilities, specifically how many historical storms are used to inform each seasonal grouping and comment on the impact of very small samples on the statistical reliability of the results was incorporated in Sections 3.1.2 and 6.4.4 of the Main Report.

11. IEPR Comment – *Medium Significance*: The Panel could not determine how inundation was included within the Beach-*fx* analysis, or if full inundation occurred for any of the SBEACH-simulated storm conditions.

USACE Response: Adopted

Action Taken: A detailed discussion of how ADCIRC flood elevations are used to determine inundation extent and flow depths throughout the study area was added to the Main Report, Section 3.3.7 and the Beach-*fx* Damage Calculations section of Appendix A, Section 1.

Documentation of the implications of flood elevation on the SBEACH analysis and how maximum flood elevations compare to the dune heights, and how often the dunes are fully inundated was added to the SBEACH Model Limitations and Assumptions section of Appendix A, Section 1.

Additional discussion of implications in terms of uncertainty introduced by model limitation was added in the SBEACH Model Limitations and Assumptions section of Appendix A, Section 1.

12. IEPR Comment – *Medium Significance*: Technical details of the engineering analysis are not provided in the project documents, making it difficult to understand the process of conducting the analysis.

USACE Response: Adopted

Action Taken: Discussion was added to Section 6.4.6 in the Main Report detailing how fill volumes were computed. Discussion regarding the project implications should the available borrow volumes be reduced was included in Section 6.4.6 of the Main Report. Discussion of the berm and dune height selections was added to Section 4.4.2 of the Main Report. Clarification was added to Sections 3.1.3.1, 3.2.5 and 3.2.6 of the Main Report on the delineation of 5 Study reaches, 117 Beach-*fx* model reaches, as well as the determination of representative beach profiles.

More detail and clarity on the specified definition of storm-induced erosion damages used in the Beach-*fx* model application was added to Section 3.3.11 of the Main Report.

Additional information was added to Section 4.3.1 of the Main Report regarding how the screening measures were evaluated and to note that the evaluation process was qualitative.

Additional discussion on the rationale for selecting a 25-ft increment for optimizing berm width was added to Section 3.1.4.1 of the Main Report.

The Main Report, Section 6.4.2 was expanded and appropriate reference added to more detailed information contained in the appendices concerning the calculations for relative sea-level rise.

13. IEPR Comment – *Medium Significance*: Technical details regarding the Beach-*fx* model and implementation are not provided in the project documents, making it difficult to understand the process for conducting the modeling.

USACE Response: Adopted

Action Taken: The Main Report, Section 3.3.10 was revised to be consistent with the prior statements in the report that dune width and not height is used as a trigger for emergency nourishment.

The Main Report, Section 3.1.2 was expanded to include discussion on how long-term shoreline recession, short-term shoreline recovery, and permanent structure losses are incorporated into the Walton County Beach-*fx* analysis.

Discussion was added to the Main Report, Section 3.1.5.2 and Appendix A, Section 1, Hydraulic Considerations, Beach-*fx* Monte Carlo Simulation Model section on which GENESIS results were used in Beach-*fx* and clarification added on how these results were used within the Walton County Beach-*fx* lifecycle framework.

Discussion was added to the Main Report, Section 3.5.2 and Appendix A, Section 1, Hydraulic Considerations, Beach-*fx* Monte Carlo Simulation Model section on how post-recovery is quantified and implemented.

Discussion on sediment factors that may limit the validity of the assumptions made for the Beach-*fx* application was added to Section 3.1.4.1 of the Main Report.

More detailed information concerning the look-up tables and the process of profile selection was added to the report under the Shoreline Response Database (SRD) in Appendix A, Section 1, as well as Section 3.1.4, Storm Set, of the Main Report

14. IEPR Comment – *Medium Significance*: The potential impacts of sea-level rise and climate change on flooding damages and environmental conditions do not appear to have been considered or accounted for in the uncertainty analysis.

USACE Response: Adopted

Action Taken: The description of the uncertainty analysis was updated in the sea level rise section of Appendix A and Main Report, Section 6.4.2, Risk and Uncertainty in Relative Sea Level Rise Assumptions to highlight potential implications of sea level rise on flooding and environmental conditions.

Appendix A and Main Report, Section 6.4.2, Risk and Uncertainty in Relative Sea Level Rise Assumptions were updated to describe the potential impact of sea-level rise on flooding and flood-related damages. This included discussion of uncertainties and any biases.

A general discussion was added to the Main Report on other potential climate change impacts and the growing body of scientific research on the subject in the Main Report, Section 6.4.3, Risk and Uncertainty in the Storm Climate.

The Main Report, Section 6.4.2, Risk and Uncertainty in Relative Sea Level Rise Assumptions, the sea level rise section of Appendix A, Section 1 and the EA were updated to include an analysis and discussion of the effects of sea-level rise on environmental conditions along Walton County beaches.

15. IEPR Comment – *Medium Significance*: Data quantifying the potential environmental impacts and ecosystem benefits of the project are not summarized in the Main Report or Environmental Assessment (EA).

USACE Response: Adopted

Action Taken: The Main Report and EA were closely reviewed and updated to incorporate a higher level of detail and support information from the 2003 Taylor Engineering Report. The report was specifically cited and referenced in the EA. A copy of the 2003 Taylor Engineering report has been included in Appendix A, Section 2.

Section 3.4 of the Main Report was closely reviewed to make sure the appropriate level of technical detail is conveyed from the EA and other supporting documentation. More detailed discussions and citations towards supporting conclusions were incorporated in the appropriate areas of the Main Report, Section 3.4 specifically pertaining to environmental impacts associated with Hurricane Ivan, listed species found in the project area, and compatibility of the borrow material. Additional discussion was also added to the Main Report, Section 3.4.1.9 on the effects of the benthic communities at the borrow site.

16. IEPR Comment – *Medium Significance*: The Environmental Assessment contains unsupported statements and numerous readability issues that impair the Panel’s ability to determine if the analysis of the environment and natural resources are sufficient to support selection of the TSP.

USACE Response: Adopted

Action Taken: The EA was closely reviewed and updated to provide additional support information where appropriate and improve the overall readability of the document.

Recommendations addressed in the EA include the following:

Section 2.0 – Provided updated text to describe the function of Beach-*fx* and how it was implemented for this project.

Section 2.1.2 – Provided updated and additional citations demonstrating the negative effects of using coastal structures as a method of shoreline protection.

Section 2.3 – Added supporting language and citations illustrating the benefits to nesting sea turtles.

Section 4.1 – Provided supporting information as cited in the 2003 Taylor report on the consequences of not constructing the project.

Section 4.3 – Provided additional information and citations supporting the EA's conclusions on the impacts and recovery to the benthic communities at the borrow area.

Section 4.4 – Provided clarification of the design considerations being used for preservation of the coastal dune lake processes.

17. IEPR Comment – *Medium Significance*: Public input and stakeholder engagement in the planning process are not discussed, and the level and resources of local sponsor support is unknown.

USACE Response: Adopted

Action Taken: A summary of the public involvement effort was placed in the Main Report, Section 3.4.1.13, Public Stakeholder Coordination. Sponsor letters of project support and self certification of financial capability to meet cost sharing obligations have been included in Appendix D.

Walton County currently designates a 1% tourist occupancy tax for beach nourishment efforts. The tourist occupancy tax is paid by visitors on any lodging with a duration of less than six months. Currently, the 1% tax collections total approximately \$3 million in revenue each year. In addition, there is a reserve balance in this account of almost seven million dollars as of June 2012. Additional revenues that would be needed would be collected by securing a bond or loan pledged against future tourist occupancy tax collections and state grant sources. Based on current cost expectations, Walton County believes these sources would be sufficient to support the non-Federal share of project costs.

18. IEPR Comment – *Low Significance*: Technical details of the engineering computational modeling are not provided in the project documents, making it difficult to understand the process of conducting the analysis.

USACE Response: Adopted

Action Taken: Information (e.g., citation and summary of prior work [Scheffner et al., 1994]) was provided in the Representation of Astronomical Tides section of Appendix A, Section 1 and the Main Report, Section 3.1.4 Storm Set, such that the use of this study is not ambiguous.

A summary of assumptions was added in the model documentation sections in the engineering Appendix A with key impacts summarized in the Main Report, Section 6.4.4, Uncertainty in Applied Models.

A justification in the project documents for the differences among the baseline data sets used for the various models was incorporated into the External Wave Model section of Appendix A, Section 1, Hydraulic Considerations.