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**Subject: Application of Flood Risk Reduction Standard for Sandy Rebuilding Projects**

**Applicability:** Guidance

1. Purpose: This ECB provides information on how to apply the April 2013 Flood Risk Reduction Standard (FRRS) for Sandy Rebuilding Projects receiving federal funds for construction under the Sandy supplemental (Public Law 113-2).
2. Objective: The objective of the FRRS is to improve the resilience and sustainability of USACE-funded vertical construction infrastructure and nonstructural mitigation in the Sandy recovery area to extreme weather events, sea level rise and other impacts of climate change in a manner consistent with other Federally-funded Sandy recovery projects. This ECB outlines a procedure to establish applicability, determine best available base flood elevation (BFE), and calculate the minimum flood risk reduction elevation required. An accompanying web tool (<http://www.corpsclimate.us/ccaafrrsSandy.cfm>) is provided to facilitate this process. For technical assistance, please contact Mark Huber, CE-AGC-GSA, 571-216-0365, [Mark.W.Huber@usace.army.mil](mailto:Mark.W.Huber@usace.army.mil) or Randall Behm, CENWO-ED-HB, 402-995-2322, [Randall.L.Behm@usace.army.mil](mailto:Randall.L.Behm@usace.army.mil).
3. Background: The Hurricane Sandy Rebuilding Task Force (TF) announced on 4 April 2013 that all Sandy-related rebuilding projects funded by Public Law 113-2 must meet a single uniform flood risk reduction standard (FRRS) of one foot above the best available and most recent base flood elevation (BFE) information provided by the Federal Emergency Management Agency (FEMA). The base flood is an event that has a one percent chance of occurrence in any given year (commonly known as a 100-year flood). The BFE is used in the National Flood Insurance Program to specify the minimum level of flooding to be regulated by a community in its floodplain management regulations. The FRRS applies to advisory BFEs, preliminary work maps, or published BFEs on Flood Insurance Rate Maps, whichever provides the best available and most recent BFEs. The FRRS takes into account the increased risk to the region from extreme weather events, sea level rise and other impacts of climate change; is informed by the best science and best practices, including assessments taken following Hurricane Sandy; and brings the Federal standard into alignment with many state and local standards already in place. State and local governments in the Sandy recovery area have been encouraged to review their local conditions and needs and, where appropriate, build to an even higher standard when planning critical infrastructure projects and/or where future conditions indicate higher risk. Where Federal, state and local standards exceed this standard, Federal agencies will be guided by the higher standard. The FRRS applies to USACE vertical infrastructure and nonstructural flood proofing projects located in the Sandy recovery area as described by the guidelines presented in this ECB.

4. Future expansion: The FRRS is a consistent minimum standard applicable to Sandy-related USACE vertical infrastructure and nonstructural retrofitting projects that are supported by Federal funding under Public Law 113-2. The FRRS does not supersede current USACE guidance for incorporating the direct and indirect physical effects of projected future sea-level change across the project life cycle in managing, planning, engineering, designing, constructing, operating, and maintaining USACE projects and systems of projects. At this time, the FRRS does not extend beyond the Sandy-affected area as described by the guidelines presented in Appendix A. The FRRS may be expanded to other areas of the United States in the future.

5. References:

- a. Public law 113-2, “Disaster Relief Appropriations Act, 2013.”  
<http://www.gpo.gov/fdsys/pkg/PLAW-113publ2/pdf/PLAW-113publ2.pdf>
- b. Executive Order 11988 “Floodplain Management.”  
<http://water.epa.gov/lawsregs/guidance/wetlands/eo11988.cfm>
- c. Presidential Policy Directive 21, “Critical Infrastructure Security and Resilience,”  
<http://www.whitehouse.gov/the-press-office/2013/02/12/presidential-policy-directive-critical-infrastructure-security-and-resil>
- d. Hurricane Sandy Rebuilding Task Force Flood Risk Reduction Standard, 4 April 2013.  
<http://portal.hud.gov/hudportal/HUD?src=/sandyrebuilding/FRRS>.
- e. ER 500-1-1, “Emergency Employment of Army and Other Resources – Civil Emergency Management Program [PL84-99 RIP].”  
[http://www.publications.usace.army.mil/Portals/76/Publications/EngineerRegulations/ER\\_500-1-1.pdf](http://www.publications.usace.army.mil/Portals/76/Publications/EngineerRegulations/ER_500-1-1.pdf)
- f. ER 1100-2-8162, “Incorporating Sea Level Change in Civil Works Programs.”
- g. ER 1105-2-100, “Planning Guidance Notebook.”  
[http://www.publications.usace.army.mil/Portals/76/Publications/EngineerRegulations/ER\\_1105-2-100.pdf](http://www.publications.usace.army.mil/Portals/76/Publications/EngineerRegulations/ER_1105-2-100.pdf)
- h. ER 1165-2-26, “Implementation of Executive Order 11988 on Flood Plain Management.”  
[http://www.publications.usace.army.mil/Portals/76/Publications/EngineerRegulations/ER\\_1165-2-26.pdf](http://www.publications.usace.army.mil/Portals/76/Publications/EngineerRegulations/ER_1165-2-26.pdf)
- i. EP 1165-2-314, “Flood Proofing.”  
[http://www.publications.usace.army.mil/Portals/76/Publications/EngineerPamphlets/EP\\_1165-2-314.pdf](http://www.publications.usace.army.mil/Portals/76/Publications/EngineerPamphlets/EP_1165-2-314.pdf)
- j. ECB 2013-27, “Use of Non-NOAA Tide Gauge Records for Computing Relative Sea Level Change.” [http://www.corpsclimate.us/docs/ecb\\_2013\\_27.pdf](http://www.corpsclimate.us/docs/ecb_2013_27.pdf)

k. USACE National Flood Proofing Committee,  
<http://www.usace.army.mil/Missions/CivilWorks/ProjectPlanning/nfpc.aspx>

l. Additional information on nonstructural policies may be found in the Water Resources Development Act of 1974, the Water Resources Development Act of 1996, and the Water Resources Development Act of 1999.

6. Guidance: All USACE Sandy-related vertical construction infrastructure and nonstructural mitigation projects funded by Public Law 113-2 should access the web tool provided at <http://www.corpsclimate.us/ccaafrrsSandy.cfm> and assess the following:

- a. Establish whether the project is located within or outside the applicable geographic area of the Sandy recovery area containing projects funded by Public Law 113-2;
- b. Establish whether the project is funded by Public Law 113-2;
- c. Determine best available base flood elevation (BFE) for the project location and the nearest long-term tide gauge with acceptable record length;
- d. Add one foot to the BFE to determine the minimum FRRS elevation.
- e. Identify whether the applicable local minimum flood risk reduction standard is more restrictive (i.e., higher) than the minimum FRRS of one foot plus BFE. If so, add the local FRRS to the BFE to obtain the local FRRS elevation;
- f. The most restrictive (highest) elevation in steps d and e will be the required minimum elevation of the first floor of vertical infrastructure and for rebuilding or incorporating nonstructural retrofits to existing structures.

7. The point of contact for this ECB is Dr. Kate White, P.E., Senior Lead, Global and Climate Change, USACE-IWR, 603-646-4187, email: Kathleen.D.White@usace.army.mil.

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## APPENDIX: INSTRUCTIONS FOR ESTABLISHING APPLICABILITY OF FRRS

1. Computation of FRRS elevation required for USACE Sandy-related rebuilding or retrofitting projects that are vertical construction infrastructure and nonstructural mitigation and funded by Public Law 113-2 should follow these steps:

- a. Is the project located within the designated Sandy recovery area? If yes, continue on to 1b. If no, the FRRS does not apply.
- b. Is the project funded by funded by Public Law 113-2? If yes, continue on to 1c. If no, the FRRS does not apply.
- c. Is the project considered vertical construction infrastructure or nonstructural mitigation? If yes, continue on to 1d. If no, the FRRS does not apply.
- d. Using the web tool at (<http://www.corpsclimate.us/ccaafrrsSandy.cfm>), locate the project site and identify the BFE.
- e. The minimum FRRS is 1.0 ft plus the BFE. To determine the local FRRS, the appropriate state, county and municipal officials shall be consulted to determine whether a more restrictive standard exists. Enter the local FRRS in the table.
- f. Click on the “Calculate” button to calculate the most restrictive (highest) elevation of the BFE plus minimum FRRS or the BFE plus local FRRS.

2. Example: Assume that a vertical construction infrastructure or nonstructural mitigation project funded by Public Law 113-2 is located at the intersection of Rte 35 and Johnson Road in Mantoloking, NJ.

- a. The project is within the designated Sandy recovery area.
- b. The project funded by funded by Public Law 113-2.
- c. In this example, the project is considered vertical construction infrastructure or nonstructural mitigation.
- d. Using the tool, the project site is shown in Figure A-1. The BFE for a project at this location is elevation 8 ft NAVD88. Enter the BFE elevation in the web tool table.
- e. In this example, the applicable local minimum standard (as of November 2013) would be the State of New Jersey’s Flood Control Hazard Act Rules (N.J.A.C 7:13) which state that “The lowest floor of the building is reconstructed or elevated to at least one foot above the flood hazard area design flood elevation.” Therefore, the local FRRS is 1.0 ft above the BFE, the same as the minimum FRRS. Enter the local FRRS of 1.0 ft in the web tool and click on the “Calculate” button to calculate the most restrictive elevation, which is 8.0 ft NAVD88 for this example (See Figure A-2).

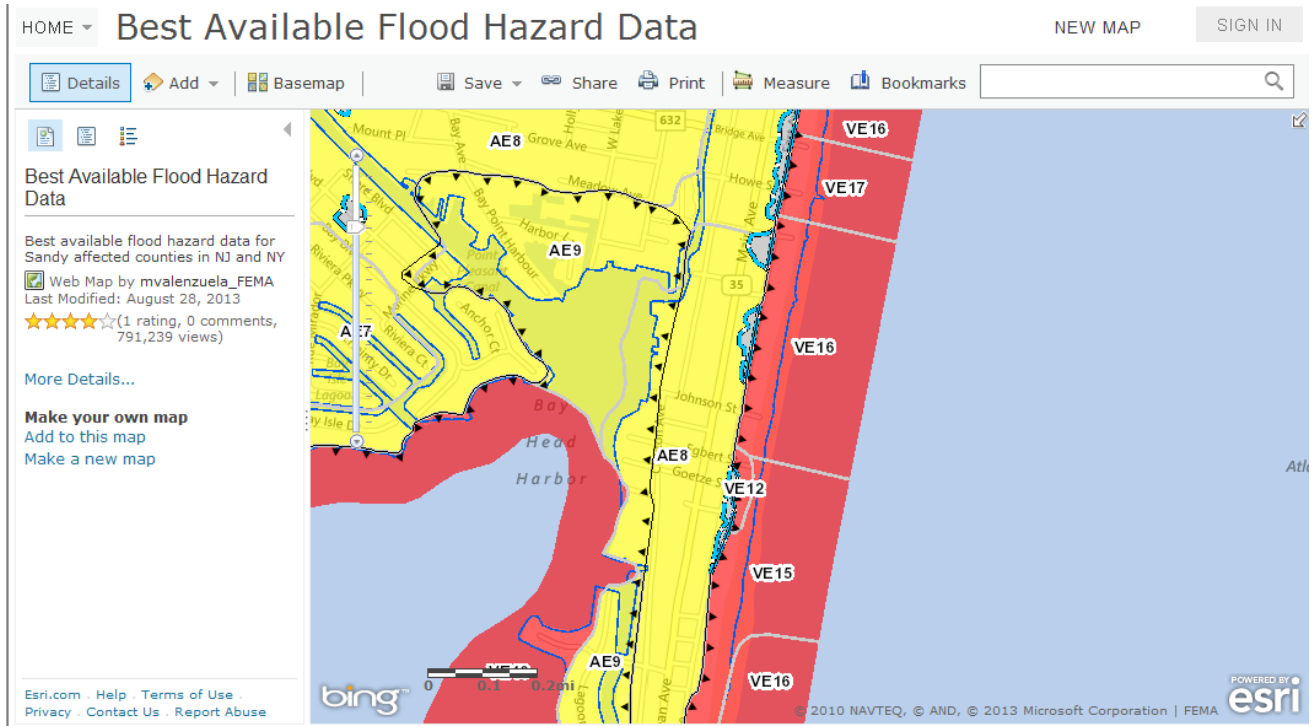


Figure A-1. Example best available FEMA mapping for a New Jersey location in the Sandy recovery area<sup>1</sup> obtained from the web tool (<http://www.corpsclimate.us/ccaafrrsSandy.cfm>).

### Compute Minimum Elevation

Enter Base Flood Elevation (ft NAVD88): ( <a href="#">from web tool</a> )	<input type="text" value="8.0"/>
Minimum FRRS (ft):	<input type="text" value="1.0"/>
Enter local FRRS (ft):	<input type="text" value="1.0"/>
	<input type="button" value="Calculate"/>
Minimum Elevation (ft NAVD88)	<input type="text" value="9.0"/>

Figure A-2. Web tool output for example.

<sup>1</sup> See <http://fema.maps.arcgis.com/home/webmap/viewer.html?webmap=2f0a884bfb434d76af8c15c26541a545>