2 Project Background

In order to address the need for increased resiliency within the Superstorm Sandy-affected region, the United States Department of Housing and Urban Design (HUD) launched the Rebuild by Design (RBD) competition in 2013 inviting communities to craft pioneering resiliency solutions. During the course of this competition, a comprehensive urban water strategy was developed for the Hoboken, Jersey City and Weehawken area that included hard infrastructure and soft landscape for coastal defense (Resist); policy recommendations, guidelines, and urban infrastructure to slow storm water runoff (Delay); green and grey infrastructure improvements to allow for greater storage of excess rainwater (Store); and water pumps and alternative routes to support drainage (Discharge). The Hudson River RBD (RBDH) proposal was selected in the first round of RBD grants and HUD has awarded $230 million to the State of New Jersey for the "Hudson River Project: Resist, Delay, Store, Discharge" (the Project). HUD assigned New Jersey Department of Community Affairs (DCA) as a grantee for the $230 million Community Development Block Grant-Disaster Recovery (CDBG-DR) funds. The State of New Jersey retained Dewberry Engineers (Dewberry) to carry out a feasibility study and perform an Environmental Impact Statement (EIS) that involves development and evaluation of "Resist" and "DSD" components as part of the RBDH project.

The Project Study Area as shown in Figure 2-1 encompasses the City of Hoboken and includes the southern portion of the Township of Weehawken and the northern portion of Jersey City. The Study Area has the following approximate boundaries: the portion of the Hudson River which encompasses piers within the Study Area to the east; Baldwin Avenue (in Weehawken) to the north; the Palisades to the west; and 18th Street, Washington Boulevard and 14th Street (in Jersey City) to the south.

2.1 Modeling Objectives

One of the main goals of the RBDH project is to obtain levee accreditation from Federal Emergency Management Agency (FEMA) for the proposed "Resist" structure. Upon receiving levee accreditation from FEMA, the communities within the study area will receive reductions in flood insurance premiums. The FEMA levee accreditation process requires adherence to the regulations stated in 44 CFR 65.10 which are based on the best available 100-year (1% annual chance) FEMA flood data. Hence, the modeling portion of this study uses the latest and best available flood data published by FEMA for Hudson County (FEMA, 2013).

The main objectives to perform modeling for the RBDH project as part of this report task are as follows –

- Use the best available FEMA coastal stillwater elevation data to evaluate the pathways for coastal storm surge to enter into the study area

- Evaluate the effectiveness of the proposed "Resist" alternatives developed as part of the Task 5 – Feasibility Report and provide recommendations that would maximize flood risk reduction benefits for the study area
- Identify potential areas to receive residual flood impacts with the proposed "Resist" alternative
- Use the best available North Hudson Sewerage Authority (NHSA) data to evaluate and identify flooding areas for various combinations of rainfall and tidal events
- Evaluate the effectiveness of all the proposed "DSD" alternatives developed as part of the Task 5 – Feasibility Report to estimate areas that would receive flood risk reduction benefits during rainfall flood events

In order to meet the above main objectives of this task, Dewberry performed the following main subtasks -

- Developed a coastal hydrodynamic model using Danish Hydraulic Institute's (DHI) MIKE 21 model to evaluate coastal storm surge flooding effects with and without "Resist" alternatives
- Developed an integrated stormwater and coastal model using DHI's MIKE URBAN model and MIKE FLOOD module to evaluate rainfall induced flooding effects with and without "DSD" alternatives
- Evaluated potential residual flooding impacts of the "Resist" alternatives per NJDEP land use regulations and New Jersey Flood Hazard Control Act

The coastal hydrodynamic and rainfall modeling storm scenarios for the combined "Resist" and "DSD" alternatives used in this analysis meet permit requirements from state and federal agencies. The level of model developed for this study is at a feasibility level with adequate detail to demonstrate the effectiveness of the proposed strategies and provide a rough estimate of potential residual flooding risk. The models developed from this feasibility study should not be used "as-is" for other applications such forecasting and others. Additionally, the stormwater model developed for this project does not include any water quality and ecology components and does not address any water quality concerns associated Combined Sewer Overflow (CSO). The stormwater model developed as part of the feasibility study demonstrates the effectiveness of DSD components to reduce flooding from rainfall runoff only. It should be noted the Design Flood Elevation (DFE) calculations for the proposed "Resist" alternatives are part of the Task 5- Feasibility Assessment report.

Figure 2-1. Map showing Project Study Area Boundary