Public Information Meeting
Rahway River Basin, New Jersey
Flood Risk Management Feasibility Study

U.S. Army Corps of Engineers, New York District
New Jersey Department of Environmental Protection
11 & 12 January 2017

“The views, opinions and findings contained in this report are those of the authors(s) and should not be construed as an official Department of the Army position, policy or decision, unless so designated by other official documentation.”
Rahway River Basin Flood Risk Management Feasibility Study
Public Information Meeting Outline

- Study Authority & Background
- Flooding Impacts & Study Area
- Alternative Formulation Process
- Alternatives Description & Analysis
- Tentatively Selected Plan
- Study Schedule
- Public Review Period
- Contact Information
The Rahway River Study was authorized in a resolution of the Committee on Transportation and Infrastructure of the U.S. House of Representatives. The Rahway River Basin resolution was dated 24 March 1998, which states:

“Resolved by the Committee on Transportation and Infrastructure of the United States House of Representatives, That, the Secretary of the Army review the report of the Chief of Engineers on the Rahway River, New Jersey, published as House Document 67, 89th Congress, and other pertinent reports to determine whether any modifications of the recommendations contained therein are advisable at the present time, in the interest of water resources development, including flood control, environmental restoration and protection and other related purposes.”
Rahway River Basin Flood Risk Management Feasibility Study

Background

- 1999: Completion of a Reconnaissance Report recommending a feasibility study to develop flood risk management alternatives within the Rahway River Basin.

- 2002: Feasibility Study Cost Share Agreement (FCSA) executed between the USACE and New Jersey Department of Environmental Protection (NJDEP) as the Non-federal sponsor.

- 2006: Completion of an Initial Screening Report identifying Cranford Township and a portion of the City of Rahway along Robinson’s Branch having greatest potential for Federal Interest.

- 2011: Study Area expanded to areas upstream of Cranford Township as a result of Tropical Storm Irene.

- 2014: Separate Tidal Study Area initiated as a result of Hurricane Sandy.
The Rahway River Basin occupies approximately 15 percent of Essex County, 35 percent of Union County, and 10 percent of Middlesex County. The basin is 83.3 square miles (53,300 acres) in area and is roughly crescent-shaped.

The Rahway River consists of the mainstem Rahway River and four branches. The West Branch flows south from West Orange through South Mountain Reservation and downtown Millburn. The East Branch also originates in West Orange and Montclair and travels through South Orange and Maplewood.

The tidal influence on the Rahway River extends roughly 5 miles from the Arthur Kill into the City of Rahway.
The water resources problem to be solved is damages resulting from fluvial flooding caused by overbanking of the Rahway River and its tributaries during storm events.

Storms have caused repeated damage in the study area. Flooding is compounded by storm water runoff, bridge openings and channel capacity.

There exists an opportunity to reduce the damages from fluvial flooding that occurs in the study area through implementation of one or more flood risk management measures.

Recent storms that caused significant to major damage in the basin include Tropical Storm Floyd (1999), the April 2007 nor’easter and Tropical Storm Irene.
Rahway River Basin Flood Risk Management Feasibility Study

Flood Risk Management (FRM)

- No Flood Risk Management project can eliminate the risk of flooding. Given a long enough period of time, most projects will experience an event that is larger than the event which they were designed.

- Flood Risk Management projects can only reduce the frequency and/or severity of flooding and provide additional time to respond.

- Physical features are only a single component of a flood risk management approach. Insurance, zoning and an Emergency Action Plan (EAP) are some other important aspects of Flood Risk Management.

- Communication of accurate and timely information about the risk of living in a flood prone area is critical and best implemented at the local level.

- Flood safety is a shared responsibility and a collaborative approach is required to effectively manage the risk of flooding and to save lives. (Corps, FEMA, State, County, Local Gov., Emergency Personnel, Residents)
Rahway River Basin Flood Risk Management Feasibility Study
USACE Formulation Process

- Formulate Flood Risk Management (FRM) Alternatives
- Evaluate Alternatives
  - Plans are screened for completeness, effectiveness, efficiency, and acceptability.
  - Compare reduced damages of proposed alternatives against without project conditions to determine benefits.
  - Perform initial evaluation of Environmental Impacts.
  - Compare benefits to costs for each alternative. To be economically justified a plan must have a Benefit-to-Cost Ratio (BCR) greater than one.
Determine Tentatively Selected Plan (TSP)
  - The Alternative that maximizes net benefits relative to other alternatives is identified as the Tentatively Selected Plan (TSP).
  - The non-Federal sponsor can request a Locally Preferred Plan (LPP).
  - A TSP or a LPP must have a BCR > 1.

Optimize & Select a Plan
  - The TSP size that maximizes net benefits relative to other TSP sizes is identified as the National Economic Development Plan, or NED Plan.

Establish the Recommended Plan – NED Plan, LPP or other.

No action would be recommended if all alternatives have a BCR < 1.

Project Cost must be shared (Fed & Non-Fed sponsor).
Rahway River Basin Flood Risk Management Feasibility Study

Project Area

Rahway River Flood Risk Management Study
Project Area
Essex, Middlesex, and Union Counties, New Jersey

Extent of Project Focus Areas
New Jersey Municipal Boundaries
New Jersey County Boundaries
Rivers
Reservoirs
Rahway River Basin Flood Risk Management Feasibility Study
Alternatives Overview

- No Action
- Cranford/Upstream Alternative 1: Lenape Park Detention Basin & Channel Modifications
- Cranford/Upstream Alternative 2: Lenape Park Detention Basin and Nomahegan Park Levees Modifications and Channel Modifications
- Cranford/Upstream Alternative 3: Channel Modifications and Deepening Orange Reservoir
- Cranford/Upstream Alternative 4: Channel Modifications and Orange Reservoir Outlet Modification
- Cranford/Upstream Alternative 4a: Small Channel Modification and Orange Reservoir Outlet Modification w/ Replacement
- Cranford/Upstream Alternative 5: Channel Modification with South Mountain Reservoir (dry detention basin)
Rahway River Basin Flood Risk Management Feasibility Study

Alternatives Overview (continued)

- **Cranford/Upstream Alternative 6**: South Mountain Reservoir Standalone
- **Cranford/Upstream Alternative 7a & 7b**: Nonstructural 10-yr and 100-yr Plan
- **Cranford/Upstream Alternative 8**: Lenape Park Detention Basin and Orange Reservoir Outlet Modifications
- **Cranford/Upstream Alternative 9**: Lenape Park Detention Basin, Orange Reservoir Outlet Modifications and Channel Modifications

- **Robinson’s Branch Alternative 1**: Levees/floodwalls and Channel Modifications
- **Robinson’s Branch Alternative 2a & 2b**: Nonstructural 10% and 1% Plan
- **Robinson’s Branch - Modification of Middlesex Reservoir**
<table>
<thead>
<tr>
<th>Alternative*</th>
<th>Flood Damages</th>
<th>Annual Benefits</th>
<th>First Cost</th>
<th>Annual Cost</th>
<th>Net Benefits</th>
<th>BCR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Without-Project</td>
<td>With-Project</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cranford/Upstream Alternative 4a: Small Channel Modification and Orange Reservoir Outlet Modification w/ Replacement</td>
<td>$9,773,600</td>
<td>$6,070,300</td>
<td>$3,703,300</td>
<td>$69,570,000</td>
<td>$3,177,200</td>
<td>$526,100</td>
</tr>
<tr>
<td>Cranford/Upstream Alternative 6: South Mountain Detention Basin (relocation, road and bridge modification)</td>
<td>$9,773,600</td>
<td>$4,172,600</td>
<td>$5,601,000</td>
<td>$118,576,200</td>
<td>$5,285,900</td>
<td>$315,100</td>
</tr>
<tr>
<td>Cranford/Upstream Alternative 7a: Nonstructural 10-yr Floodplain</td>
<td>$9,773,600</td>
<td>$8,783,300</td>
<td>$990,300</td>
<td>$19,447,800</td>
<td>$935,300</td>
<td>$55,000</td>
</tr>
<tr>
<td>Robinson’s Branch Alternative 2a: Nonstructural 10-yr Floodplain</td>
<td>$2,695,800</td>
<td>$1,339,900</td>
<td>$1,355,900</td>
<td>$10,221,900</td>
<td>$411,000</td>
<td>$944,900</td>
</tr>
<tr>
<td>Robinson’s Branch Alternative 2b: Nonstructural 100-yr Floodplain</td>
<td>$2,695,800</td>
<td>$633,200</td>
<td>$2,062,600</td>
<td>$39,452,200</td>
<td>$1,646,800</td>
<td>$415,800</td>
</tr>
</tbody>
</table>

*Cranford/Alternatives 1,2,3,4,5,7b,8,9 & Robinson’s Branch Alternative 1 had BCR’s less than 1.0 and are thus not economically justified. They can be seen on a poster board.
The alternative that maximized net benefits for each independent reach was selected as an element of the Tentatively Selected Plan (TSP). Alternative 4a (Channel Work and New Outlet at Orange Reservoir) for Cranford and the upstream detention areas was combined with Alternative 2a (Nonstructural - 10% annual chance exceedance floodplain) for the Robinson’s Branch to form the TSP.

This method is predicated upon the fact that the Cranford and upstream detention areas are geographically separate from the Robinson’s Branch. The Cranford versus Robinson’s Branch alternatives can thus be viewed as separate elements of the same plan.

Nonstructural elements will be examined to account for residual risk at Cranford during optimization.
Rahway River Basin Flood Risk Management Feasibility Study
Tentatively Selected Plan - Cranford

- Description:
  - New outlet 2- 36" pipes at Orange Reservoir, with manual operation.
  - Approximately 8,930 ft of trapezoidal channel modifications throughout the Rahway River in Cranford Township.
  - Utility relocation.

- This alternative is likely to contain the 4% annual chance exceedance flood in Cranford Township. The flow detention capacity of the Orange Reservoir will mitigate the increase in downstream flow caused by deepening and widening the channel.
### Rahway River Basin Flood Risk Management Feasibility Study
#### Cranford/Upstream Alternative 4a

#### Water Surface Elevation Level Reductions

<table>
<thead>
<tr>
<th>Town</th>
<th>Location</th>
<th>Alt 4a Flood Risk Reduction (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>4% (25-yr)</td>
</tr>
<tr>
<td>Millburn</td>
<td>Millburn Ave.</td>
<td>2.0</td>
</tr>
<tr>
<td>Millburn</td>
<td>West-East Branch confluence</td>
<td>1.6</td>
</tr>
<tr>
<td>Springfield/Union</td>
<td>Morris Ave. Bridge</td>
<td>2.0</td>
</tr>
<tr>
<td>Springfield/Union</td>
<td>Upstream of Route 22</td>
<td>1.9</td>
</tr>
<tr>
<td>Kenilworth</td>
<td>Kenilworth Area</td>
<td>0.5</td>
</tr>
<tr>
<td>Cranford</td>
<td>Riverside Dr. (Footbridge)</td>
<td>1.5</td>
</tr>
<tr>
<td>Cranford</td>
<td>McConnell Park</td>
<td>1.1</td>
</tr>
<tr>
<td>Cranford</td>
<td>Hansel Dam Park - Casino Brook Area</td>
<td>0.9</td>
</tr>
<tr>
<td>Cranford</td>
<td>From Union Ave. to North Ave. Bridge</td>
<td>0.6</td>
</tr>
<tr>
<td>Cranford</td>
<td>Just downstream of Lincoln Ave. Bridge</td>
<td>0.3</td>
</tr>
</tbody>
</table>
Rahway River Basin Flood Risk Management Feasibility Study — Without & With Project Inundation Mapping (25-Year Floodplain) —
Rahway River Basin Flood Risk Management Feasibility Study

Typical Channel Improvement (Clearing)

E. Branch of the Rahway River, South Orange

Similar to clearing before construction
Rahway River Basin Flood Risk Management Feasibility Study

Typical Channel Construction Method

E. Branch of the Rahway River, South Orange
Rahway River Basin Flood Risk Management Feasibility Study

Typical Channel Improvement

E. Branch of the Rahway River, South Orange

Trapezoid Channel with heavy overgrowth.
Rahway River Basin Flood Risk Management Feasibility Study

Typical Channel Improvement w/ Riprap

Yonkers, NJ
Rahway River Basin Flood Risk Management Feasibility Study

Typical Channel Improvement

E. Branch of the Rahway River, South Orange
Rahway River Basin Flood Risk Management Feasibility Study

Typical Channel Improvement

E. Branch of the Rahway River, South Orange
Rahway River Basin Flood Risk Management Feasibility Study
Environmental Compliance on TSP

- Tree and shrub cutting restriction from 15 March through 31 July to protect migratory birds.
- Tree cutting restriction from 1 April through 30 September to protect Federally endangered and threatened bat species.
- Re-establishment of riparian zone within channel improvement footprint with native vegetation.
- Maintaining natural channel bottom and creation of pool/riffle complexes within the channel improvement footprint.
- Collection and relocation of fish within the Orange Reservoir prior to drawdown for dam replacement.
- Historic property surveys and documentation in coordination with New Jersey Office of State Historic Preservation and others.
Rahway River Basin Flood Risk Management Feasibility Study
Tentatively Selected Plan-Robinson’s Branch

- **Description**: Nonstructural measures were selected for structures within the 10% annual chance exceedance (10-yr event) floodplain in the Robinson’s Branch area.

- Measures examined include dry and wet floodproofing, ring walls, elevation and buyouts.

- All structures will be treated to an elevation equivalent to the 1% annual chance exceedance event.

- Potential Environmental Considerations: Individual structures that are individually eligible for the NRHP or contributing to Historic Districts.
Rahway River Basin Flood Risk Management Feasibility Study
Tentatively Selected Plan-Robinson’s Branch

- Number of structures and types of nonstructural treatments in 10% annual chance exceedance floodplain.

<table>
<thead>
<tr>
<th>Nonstructural Flood Proofing Measure</th>
<th>10% (10-yr) Annual Chance Exceedance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Residential</td>
</tr>
<tr>
<td>Dry Flood proofing</td>
<td>0</td>
</tr>
<tr>
<td>Wet Flood proofing</td>
<td>1</td>
</tr>
<tr>
<td>Barriers</td>
<td>2</td>
</tr>
<tr>
<td>Raise</td>
<td>13</td>
</tr>
<tr>
<td>Buyout</td>
<td>0</td>
</tr>
<tr>
<td>Total of Structures</td>
<td>16</td>
</tr>
</tbody>
</table>
Rahway River Basin Flood Risk Management Feasibility Study
Tentatively Selected Plan-Robinson’s Branch
Rahway River Basin Flood Risk Management Feasibility Study

Typical Non-structural Measures

1. Elevation
2. Relocation
3. Levees and Floodwalls
4. Dry Flood Proofing
5. Wet Flood Proofing
Rahway River Basin Flood Risk Management Feasibility Study

Typical Non-structural Measures

- Structure Elevation
- Wet Floodproofing
- Dry Floodproofing
Rahway River Basin Flood Risk Management Feasibility Study

Typical Non-structural Measures
Rahway River Basin Flood Risk Management Feasibility Study

Typical Non-structural Measures
<table>
<thead>
<tr>
<th></th>
<th>Federal</th>
<th>Non-Federal</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Initial Project Cost</strong></td>
<td>$57,950,100</td>
<td>$31,203,900</td>
<td>$89,154,000</td>
</tr>
<tr>
<td><strong>Real Estate Credit</strong></td>
<td></td>
<td>$3,473,000</td>
<td>$3,473,000</td>
</tr>
<tr>
<td><strong>Cash Contribution</strong></td>
<td></td>
<td>$27,730,900</td>
<td>$27,730,900</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>$57,950,100</td>
<td>$31,203,900</td>
<td>$89,154,000</td>
</tr>
</tbody>
</table>

- As TSP is optimized plan costs and scale are subject to change. The Final Report scheduled for public release in July 2017 will contain optimized costs and scale.
The Final Integrated Report/EIS and Appendices will contain details relating to real estate compensation, based on the optimized plan. Even further refinement of real estate compensation would take place in design and construction.

Affected property owners will be compensated for the fair market value of property for both temporary and permanent easements. Property owners will still own their property.

Nonstructural measures are voluntary on an individual structure by structure basis.

Optimization may change plan size and cost.
<table>
<thead>
<tr>
<th>Milestones</th>
<th>Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Review of DFREIS Begins</td>
<td>9 December 2016</td>
</tr>
<tr>
<td>Public Review of DFREIS Closes</td>
<td>23 January 2017</td>
</tr>
<tr>
<td>Final Report</td>
<td>November 2017</td>
</tr>
<tr>
<td>Chiefs Report (for Congress)</td>
<td>May 2018</td>
</tr>
<tr>
<td>Project Partnership (PPA) Execution</td>
<td>July 2018</td>
</tr>
<tr>
<td>Prepare Plans &amp; RFP</td>
<td>August 2018</td>
</tr>
<tr>
<td>Contract Award</td>
<td>February 2020</td>
</tr>
<tr>
<td>Construction Complete</td>
<td>July 2023</td>
</tr>
</tbody>
</table>
Rahway River Basin Flood Risk Management Feasibility Study
Public Review Period

- All study documents may be found at: www.nan.usace.army.mil/Rahway
- Public Comment Period Closes 23 January 2017
- Comments should be submitted via email to: RahwayRiver@usace.army.mil
- Includes instructions on how to submit comments via email and regular mail.
- Comments can also be submitted via mail to:
  Kimberly Rightler
  U.S. Army Corps of Engineers, New York District
  CENAN-PL-E
  26 Federal Plaza
  New York, NY 10278

Comments provided will become part of the public record for this EIS. Comments submitted will be fully considered during preparation of the final EIS. All written comments, including names and address, will be made a part of the administrative record, available to the public under the Freedom of Information Act (FOIA). The Administrative Record or portions thereof, may be also be posted on a Corps of Engineers internet website.
Study Contacts

- Rifat Salim
  Project Manager
  U.S. Army Corps of Engineer, New York District
  917-790-8215
  rifat.salim@usace.army.mil

- John Moyle, P.E.
  Chief of Dam Safety & Flood Control
  NJ Dept. of Environmental Protection
  609 – 984 - 0859
  John.Moyle@dep.state.nj.us