VAMC FLOODWALL PROTECTION PROJECT
Superstorm Sandy 2012
VAMC Floodwall Protection Project

1. Sandy makes landfall
2. Design implications for protecting a facility deemed to be ‘critical’
3. Methods for communicating and documenting risk
Rehoboth Beach, DE
60 miles south of landfall

Brick, New Jersey (before)
60 miles north of landfall

Brick, New Jersey (after)

New York City
VAMC Flooding

VAMC Loading Docks

VAMC Shop Building
VAMC Damages

- Outpatient clinic on ground floor
- Morgue
- Chapel
- Warehouse
- Sterile Processing
- Domestic Water pumps
- Hot water pumps
- Fire pumps
- Emergency generators
- Normal power and emergency power switch gear
- MRI

[Image of damaged interior of VAMC]
Modeling
Floodgate Design

- FloodBreak
- Bouyancy Activated
- Simplicity of Design

Lourdes Hospital – Binghamton, New York
Utility Conflicts
Aesthetics
Aesthetics
Additional Flood Measures

- Splash pads
- Backup power & switchgear
- Mechanical equipment
- Operational changes
Part 2: What is a Critical Facility?

- Executive Order 11988

Critical actions include, but are not limited to, those which create or extend the useful life of structures or facilities:

...Such as hospitals and nursing homes, and housing for the elderly, which are likely to contain occupants who may not be sufficiently mobile to avoid the loss of life or injury during flood and storm events
Bellevue Hospital
NYU's Langone Medical Center
VA Medical Center

- Canceled Outpatient Visits
- Transferred 132 patients
- Skeleton Crew
- Floodfighting
Part 3. Communicating and Documenting Risk

- Criteria Document
- Wall Height and Alignment Presentation
- Design Documentation Report
Part 3. Communicating and Documenting Risk

Criteria Document
- Get early client buy-in
- Budget
- Documentation
- Guide for design team
- Add on to DDR
Part 3. Communicating and Documenting Risk

Height and Alignment Presentation

- Advise the client
- Refine criteria with the client
- Guide for design team
- Documentation
- Add on to DDR
Wave Height and Freeboard

Wave Runup: 0.0 to 6.2 Feet

Sound Surge Still Water Elevation (SWE) from FEMA: 0.0 to 2.7 Feet

Sea Level Rise? 1 ft min

Total Freeboard 2 ft min

VA HOSPITAL FLOODWALL
East 23rd Street, New York, New York
Design to 500-year Water Level

<table>
<thead>
<tr>
<th>Return Period, yr</th>
<th>SWE, ft (Manhattan Datum) (from FEMA)</th>
<th>Total Freeboard</th>
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<tr>
<td></td>
<td>2007</td>
<td>2013</td>
</tr>
<tr>
<td>10</td>
<td>4.5</td>
<td>5.1</td>
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<tr>
<td>50</td>
<td>6.1</td>
<td>8.1</td>
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<tr>
<td>100</td>
<td>6.9</td>
<td>9.4</td>
</tr>
<tr>
<td>500</td>
<td>9.1</td>
<td>12.5</td>
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</tbody>
</table>

Max Protection Elevation (east side) = 12.5 + 9.2 = 21.7 feet
Max wall height = 21.7 – 4.5 = 17.2 feet +/- above grade
<table>
<thead>
<tr>
<th></th>
<th>DSWE</th>
<th>+ Wv. (2.0 ft 100-yr)</th>
<th>+Wv.+ SR *</th>
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<tbody>
<tr>
<td><strong>100-Year</strong></td>
<td>9.4</td>
<td>11.4</td>
<td>13.4</td>
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<tr>
<td><strong>500-Year</strong></td>
<td>12.5</td>
<td>14.8</td>
<td>16.8</td>
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</tbody>
</table>

* Assuming additional 2 ft sea level rise

**VA HOSPITAL FLOODWALL**
East 23rd Street, New York, New York
Part 3. Communicating and Documenting Risk

Design Document Report (DDR)
- Documentation
- Transparency
- Identify residual risks
- Make recommendations for EDC
Conclusion

1. Sandy makes landfall
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3. Methods for communicating and documenting risk