A Collaborative Approach to Facility Floodplain Mitigation

June 5, 2014

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The Facility

- Wilton, Connecticut
- 29 acres
- 280,000 square feet
- 800+ employees
- Manufacturing of microchip lithography systems
FEMA SFHAs
Flooding Issues

- Norwalk River had flooded the site in the past
- River came close to flooding facility on number of occasions
- Basement pump had failed, flooding basement
- Only a matter of time before it happens again!
Formula for Success

- Insurers
- Consultants
- ASML
- Regulatory Agencies
- Neighbors
Identify Potential Flooding Sources

- **Groundwater**
  - Pump failure

- **Norwalk River**
  - Overtops banks

- **West Pond**
  - Culvert plugging
  - Embankment breach

- **On-Site Storm Drains**
  - Pipe blockages
  - Inlet blockages
Selecting the Level of Protection

■ 1% Annual Chance Protection Not Enough
  – Sensitive Equipment
  – Loss of Productivity
  – Financial Exposure of Flooding
  – Disruption to Supply Chain

■ Insurers Requested
  – 2 Feet of Freeboard Along River
  – Regrading Parking Lot to Increase Pitch Away From Building
  – Draining the West Pond
Mitigation Strategy Evaluation Metrics

- Flood reduction benefit
- Permitting timelines
- Construction Cost
- Facility downtime / disruption
- **Evaluated 10 different improvement alternatives**

<table>
<thead>
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<th>Alternative</th>
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<tbody>
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<td>Raise site bridges 2’</td>
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<td>Raise site bridges 4’</td>
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<tr>
<td>Remove pedestrian bridge</td>
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<tr>
<td>Remove pedestrian bridge, demolish portion of bldg.</td>
<td>✓</td>
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<tr>
<td>Remove pedestrian bridge, demolish portion of bldg., widen channel</td>
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<td>Move abutments on existing driveway bridge</td>
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<td>Replace pedestrian bridge and widen channel</td>
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<tr>
<td>Replace driveway bridge</td>
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<tr>
<td>Remove ped. bridge, demolish portion of bldg., widen channel, new driveway bridge</td>
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Selected Mitigation Strategy

- Demolish Portion Of Building
- Remove Exist. Pedestrian Bridge
- Widen Channel
- Cantilever New Walkway
1% Chance WSEL Reduction

↓ 4.68 feet

↓ 1.23 feet

Upstream neighborhood
What about downstream impacts?

- Analyzed downstream impacts to verify no adverse impact
Approval Agencies

■ Meet with approval agencies

- Town of Wilton DPW
- Town of Wilton Inland Wetlands
- CTDEEP Fisheries
- US Fish & Wildlife Service
- CTDEEP Inland Water Resources Division
- US Army Corps of Engineers
Approval Agencies

- Meet early in process
- Identify concerns upfront
- Partnership for success
- Collaboration takes time!
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<th>Approval Details</th>
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<td>Feb. 05</td>
<td>Applications Submitted to Regulatory Agencies</td>
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<td>May 15</td>
<td>CTDEEP 401 Water Quality Certification</td>
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<tr>
<td>June 04</td>
<td>USACOE CT PGP Approval</td>
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<tr>
<td>Aug. 08</td>
<td>Town of Wilton Inland Wetlands Permit</td>
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</table>
West Pond

- Walked site, found two outlets
- Risk assessment assuming pond and spillway plugged
  - 8 different scenarios
- Consideration of other risks
  - Embankment failure
  - Power transmission company modifications
West Pond

- Mitigation strategies limited
- Primary concern was railroad’s maintenance
- Met onsite with Metro North and CTDOT
- ASML wanted easement to maintain pond culvert
- Force account for additional maintenance
Project Timeline

2009
- Study Authorized

2010
- Study Completed

2011
- Internal Review

2012
- Alternate Selected

2013
- Permitting
- Final Design

2014
- Bid
- Construction
Key Takeaways

- Involve stakeholders
- Identify synergies and trade-offs
- Meet early with approval agencies
- Set appropriate level of risk
- Look beyond the FIRM to identify risks
- Collaboration takes time!
Questions?

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