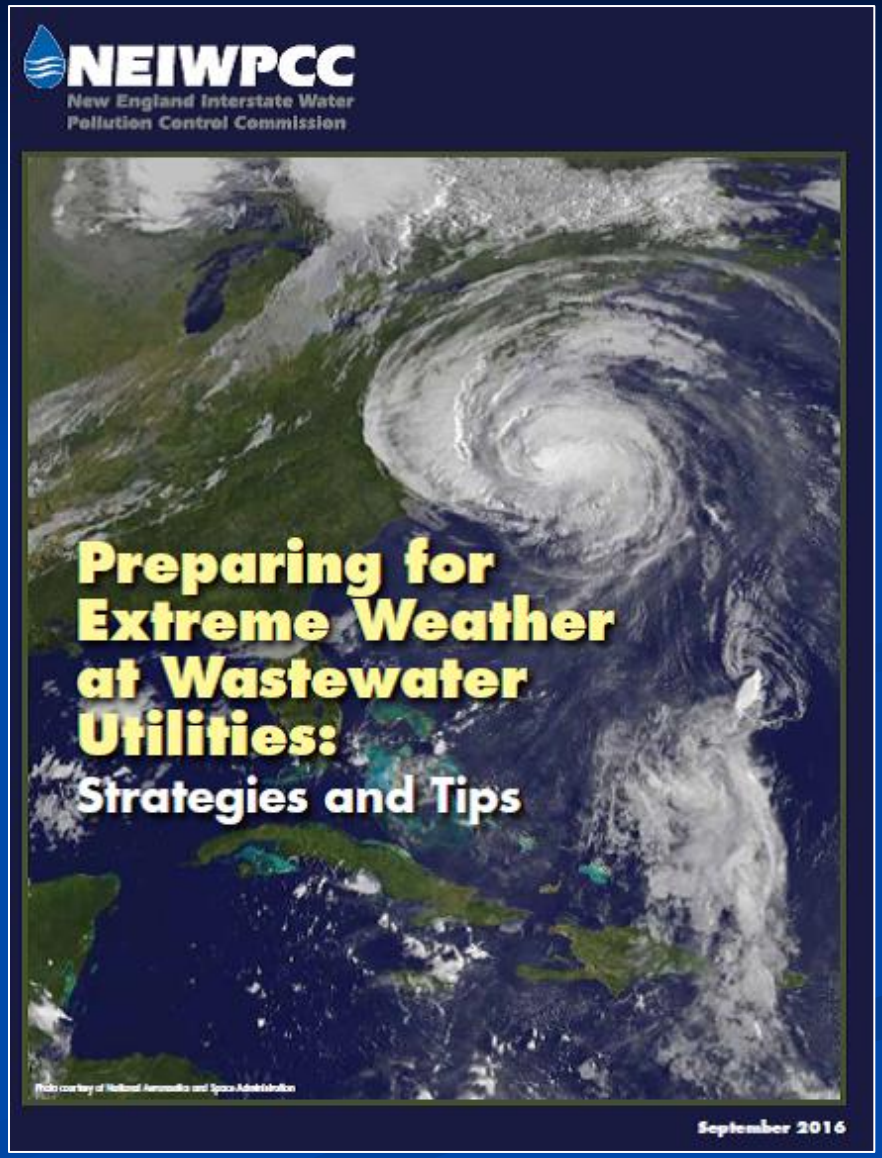
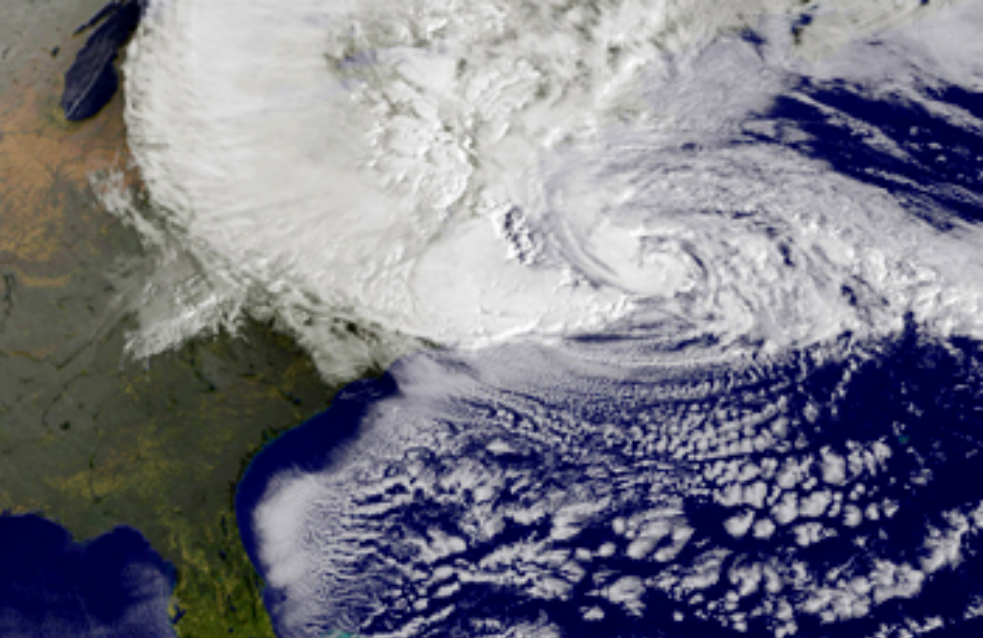
NEIWPCC

Extreme Weather in the Forecast: Is Your Facility Prepared?



Updating Design Guidelines for Storm Resiliency

NEIWPCC




HURRICANE
SANDY

Storm Resiliency Guide Development

- After Hurricane Sandy in 2012, NEIWPCC's member states requested we revisit our design criteria
  - Need to make WWTPs more resilient to storm events
- Major areas to address – elevation of critical components and coastal facilities
- Resiliency takes commitment – not a quick fix, long term planning is needed

GREENFIELD, MA

GREENFIELD, MA

WARWICK, RI

Two Pronged Approach

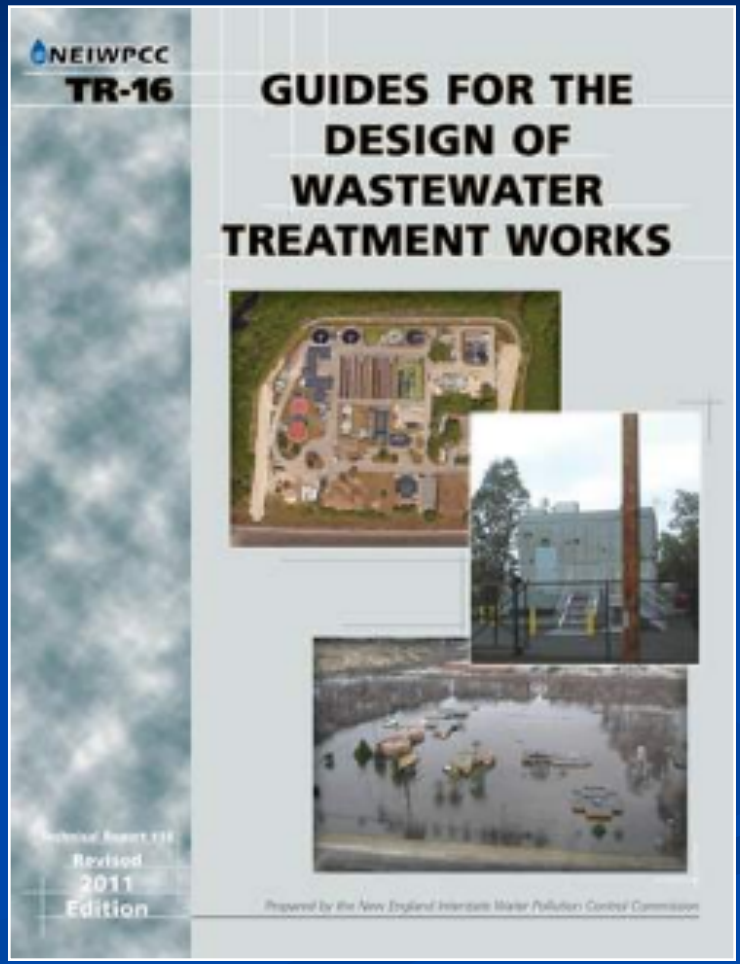
- Design Considerations
  - Technical
  - Included in the revision to the 2011 TR16 Guide
  - Finalized first and distributed

- Supplemental Resiliency Guide
  - Less technical and more procedural
  - Lessons learned, strategies, and tips
  - Available resources, programs, etc.
  - Standalone document being worked into training programs


CAUTION
CHLORINE
AREA

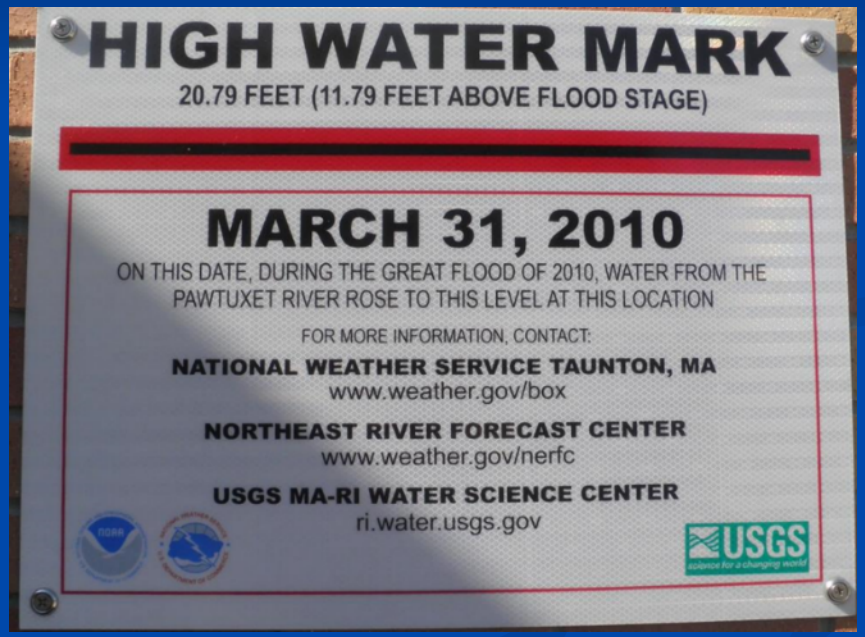
TR16 Design Guide

- NEIWPCC's most referenced and requested document – Technical Report #16
- A guidance document for design and review plans for wastewater treatment plants
- Commonly used by consultants, state agencies, and municipalities
- Last updated in 2011
- Revised in 2016 for Storm Resiliency



Key Concepts in TR16 Revision

- Critical equipment
- Backup power supply
- Flood elevation design considerations
- Level of protection for new and existing equipment



Knight Street Pump Station, Warwick, RI

Bellows St. Pump Station, Warwick, RI

Storm Resiliency Supplement

- In the last decade - many significant extreme weather events in the northeast!
  - What have we learned?
  - What can we share?

The New Normal

- Frequency and significance of storms are increasing
  - Rain/flooding
  - Hurricanes
  - Ice Storms
  - Tornadoes
- More frequent and extended power losses
- WWTPs and pump stations in flood-prone areas
- Aging infrastructure – susceptible to failure

Areas to Address

- Incorporate improved design considerations
  - Elevation of critical components
  - Pump stations
  - Waterproofing electrical components
  - Fuel delivery
- Include the important lessons learned from facilities that have been impacted by events
- Provide background information on programs that are available and links to access the information

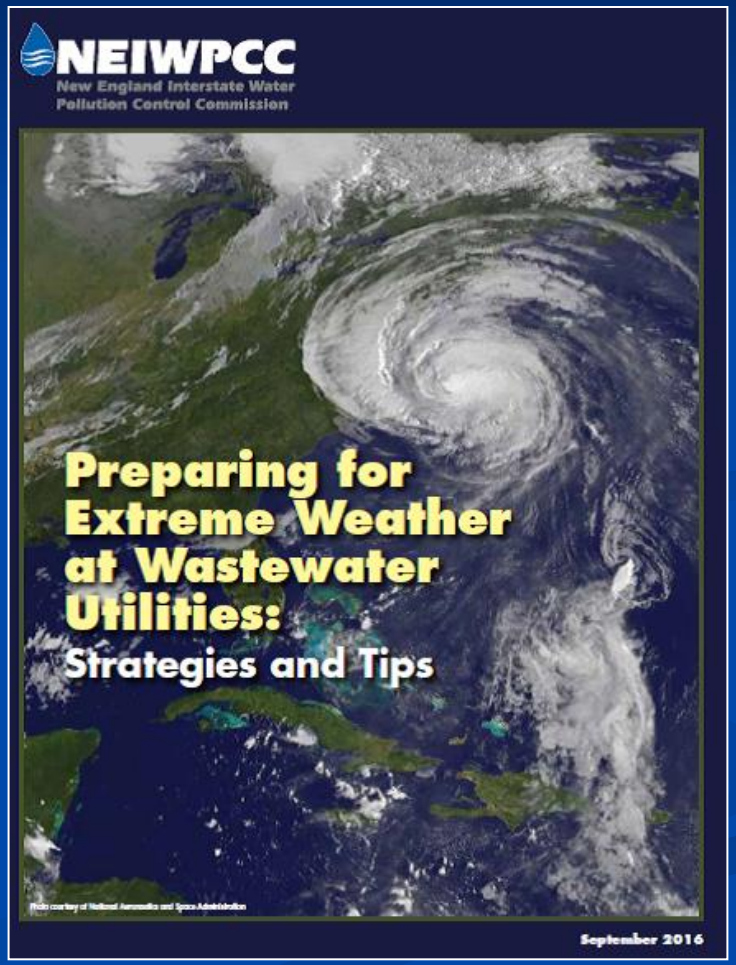

West Warwick, RI

Storm Resiliency Guide Development

- NEIWPCC saw an opportunity to compile and share experiences from facilities impacted by recent extreme weather events
- Not intended to be a "Encyclopedia of Resilience"
- Practical tips and advice collected from regional survey of operators
- References to numerous federal programs and tool kits
- Grouped by timeliness of implementation

Overview of Guide

- Planning
- Preparation
- Action & Implementation
- Restoration
- Financing Restoration & Improvement
- Appendix A: References/ Additional Information



Planning

- Planning for extreme weather events begins long before there is a storm in the forecast

- Extreme weather scenarios and impacts should be incorporated into all long term planning activities, such as:
  - Asset Management Plans
  - Wet Weather Operating Plans
  - Hazard Mitigation Plans
  - Emergency Operating and Response Plans
  - Capital-Improvement Plans

Planning

- Communication
- Development of Emergency Plans and Procedures
- Training Staff
- Vulnerability Assessments

Lessons from Others/ Retrofit Efforts

- We installed a tide-flex valve to limit river backflow, along with a system to discharge above ground.
- We installed a sealed lid on the pump station and relocated critical components to higher ground.
- We added generators to pump stations that do not have them.
- We evaluated locations and elevated programmable logic controller components, electrical components, mechanical systems, and underground electrical wires above flood levels as much as possible to minimize damage and continue plant and collection system operations.
- We moved critical components in vulnerable pumping stations from below grade to grade, and electrical controls above grade if possible.
- We evaluated raising pump-station control panels or build stations that either are sump pumps or self-prime so that flooding a deep dry pit is not a concern. Also, think about hardening at the vulnerable pump stations, installation of water tight doors and manhole covers, additional standby power at pump stations, or any flood-proofing measures.

Preparation

- Once extreme weather event is in the forecast, there are a number of preparation steps that can take place, such as:
  - Moving materials from low-lying areas
  - Being ready to operate off of the power grid

Preparation

- Coordinate with All Staff Members
- Emergency Generators
- Dispersal of Equipment and Materials
- Fuel for Emergency Operations
- Additional Resources

Action & Implementation

- In the midst of an extreme weather event and immediately following, there are a number of potential disruptions that must be considered:
  - Staffing
  - Power
  - Emergency Communication
  - More Information/ Resources

Restoration

- Once the storm has passed, it is very important to return to normal operation as soon as possible
- There may be unforeseen storm-related consequences
  - Access to Facilities
  - Treatment Processes
  - Improving for Next Time
  - Additional Resources

Financing Restoration & Improvement

- Once damage from a storm has been assessed, repair and replacement of equipment may begin. There are various methods to finance:
  - FEMA Public Assistance Grant Program
  - FEMA Hazard Mitigation Grant Program
  - EPA Hazard Mitigation for Natural Disasters
  - USDA Rural Development Emergency Community Water Assistance Grants
  - EPA Drinking Water State Revolving Fund
  - EPA Clean Water State Revolving Fund
  - HUD Community Development Block Grants

Appendix A:

References & Additional Resources

- U.S. EPA Preparedness, Response and Recovery Resources
- Federal Emergency Management Agency
- Water/Wastewater Agency Response Network
- Hazard Mitigation Planning
- Asset Management Plans
- Wet Weather Operating Plan
- Emergency Response Plans
- National Incident Management System
- Emergency Power Facility Assessment Tool

Table of Available Programs

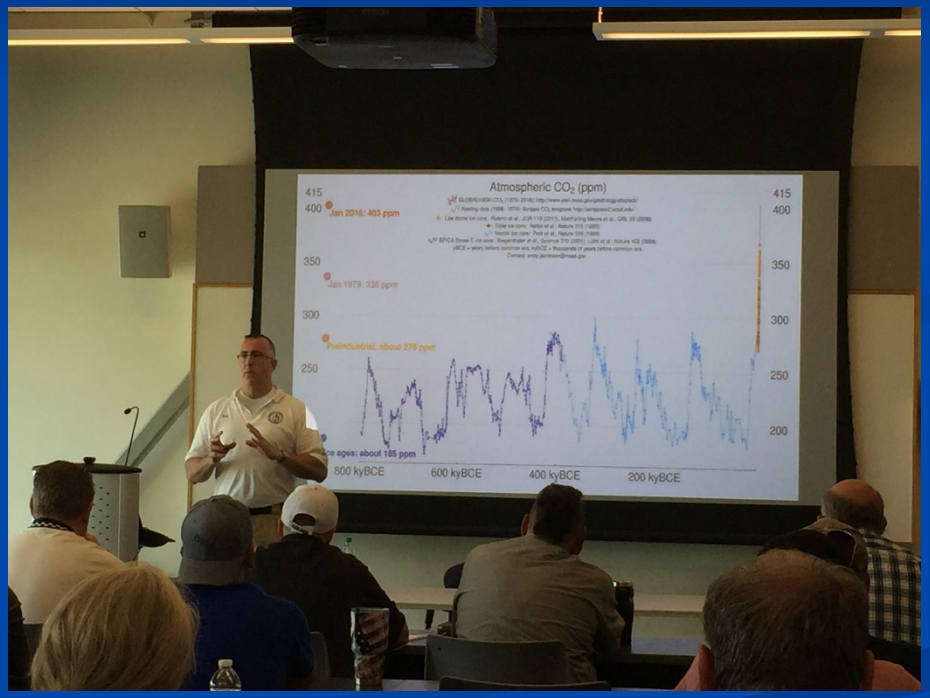
	Join	Develop	Learn, practice	Use before an incident	Use during an emergency	Use to maintain or restore operations
Wastewater Agency Response Network	✔					✔
Hazard Mitigation Plan		✔		✔		
National Incident Management System, including the Incident Command System			✔		✔	✔
Wet Weather Operating Plan		✔		✔		✔
Emergency Response Plan		✔	✔		✔	
Asset Management Plan		✔				✔
US Army Corps of Engineers Emergency Power Facility Assessment Tool	✔				✔	

Bay Park, Long Island, NY

Bay Park, Long Island, NY

Trainings

- Portsmouth, New Hampshire
  - May 2nd, 2017
  - Regional Training for NH & ME operators
- Providence, Rhode Island
  - June 28th, 2017
  - Regional training for both RI & MA operators



Next Steps

- More concentrated training – day long trainings focusing on key elements of document:
  - Planning
  - Preparation
  - Action and implementation
  - Restoration
  - Financing Improvements

Contact Information

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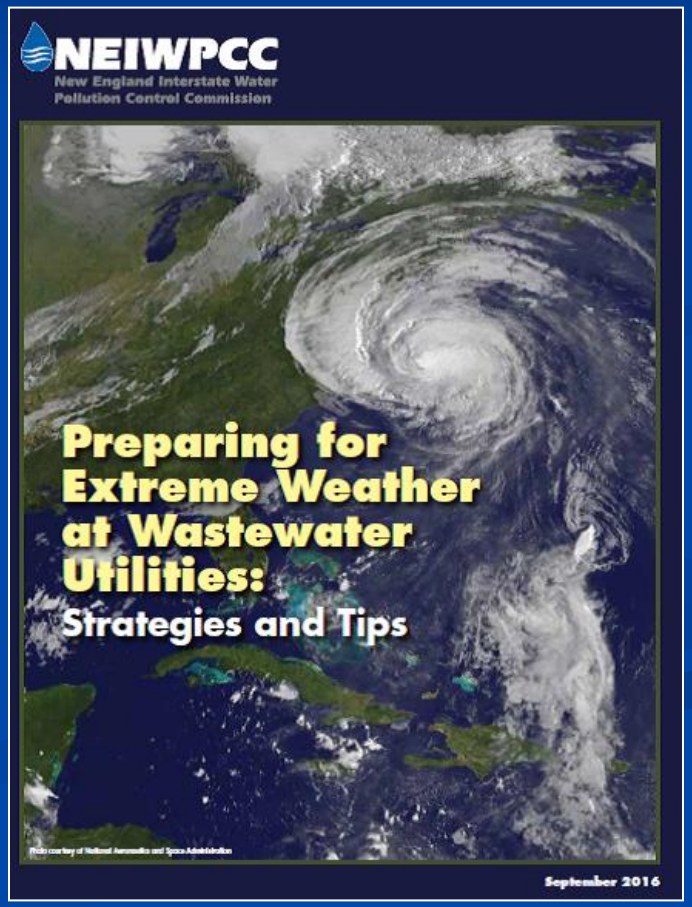
Free for download at:

http://neiwpcc.org/tr16guides.asp

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STORMY
WEATHER
AHEAD