A Risk-Based Approach to Prepare Utility and Campus Infrastructure for Storms Ahead: Considerations of a Proactive Utility

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Background/Objectives. The intensity of recent hurricane seasons and sea level rise projections highlight the need for utilities and campuses to understand the vulnerability of their existing facilities and identify what flood mitigation measures would protect their facilities based on future flood risk. The identification of risk becomes particularly important when owners have multiple buildings on a site, and when they have multiple facilities that need protecting.

One such utility that is undertaking this effort is the Hampton Roads Sanitation District (HRSD), a regional wastewater authority that serves a population of 1.7 million people living in 20 cities and counties in southeastern Virginia. HRSD's service area covers 3,125 square miles and is primarily a coastal area of the country that is expected to experience increased flooding impacts due to climate change.

This presentation will discuss a methodology which allows a multi-disciplinary team to evaluate multiple buildings and assets to provide a utility with site-specific risk profiles for each flood-exposed facility in the portfolio.

Approach/Activities. The presentation will outline considerations for determining a facility's flood risk. This includes a strategy for collecting and documenting assets during a site visit or plan review. The data collected are used to create a probabilistic flood depth damage function based on asset value, elevations, and modeled flood elevations due to climate change to understand the current facility risk. Multiple flood mitigation options can be assessed for operational, technical, and financial feasibility. The risk profiles are updated based on a proposed flood mitigation strategy to compare the effectiveness of multiple mitigation measures based on cost and risk reduction. This is done for each facility in the portfolio and can be done among buildings on the same campus. This provides the capability to prioritize the order in which flood mitigation measures should be implemented based on flood risk.

HRSD's risk-based climate change planning process aims to address the next 80 years of climate change impacts on their wastewater infrastructure. This is done through monetizing flood risk due to climate change to enable HRSD to make risk-based decisions associated with the implementation of climate resilient flood mitigation measures at their facilities, using a dynamic, adaptive, decision-making process.

Results/Lessons Learned. The results of this study monetize the risk of current and future flooding compared to the cost of implementing resilient flood mitigation measures to enable HRSD to make risk-based decisions for prioritizing capital improvement expenditures. Example findings will be presented to demonstrate how this approach was used at HRSD and may be used for other utilities or campuses.