

MIAMI-DADE WATER & SEWER DEPARTMENT

WASTEWATER TREATMENT PLANT UPGRADES

Miami, Florida

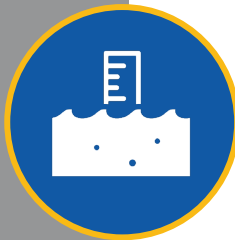


PREPARING FOR RISING SEAS & STORM SURGE



Facing a range of climate-related impacts, including rising seas and storm surge that damage wastewater treatment facilities and drinking water infrastructure, Miami-Dade Water and Sewer Department (WASD) is operationalizing flood design guidelines that incorporate climate change information for its wastewater treatment plants as part of a Capital Improvement Program (CIP). As the largest water and wastewater utility in the Southeastern United States, WASD is overhauling three of its wastewater treatment plants and its system of over 1,000 pump stations to address aging infrastructure, meet regulatory compliance for state-wide ocean outfall legislation and build resiliency to climate change. Upgrades are already underway at the wastewater treatment sites most vulnerable to sea level rise.

CLIMATE CHANGE CHALLENGES



WASD has over a decade of experience designing and hardening assets. Its first actions to build resiliency to sea level rise, storm surge and tide effects took place in 2006 and since 2015 all facilities are required to use hardening and resiliency guidelines. WASD also assesses other climate-related impacts on its operations and infrastructure, including inland flooding due to extreme precipitation and rising groundwater and wind from hurricane events.

CLIMATE-READY DESIGN



Miami-Dade County requires that all county infrastructure projects consider sea level rise and its potential impacts. As a result, WASD now considers climate change information, particularly sea level rise projections, in all of its capital improvement projects. During design upgrades, WASD takes a systematic approach to determine the best design for each asset upgrade. For example, each wastewater treatment plant undergoing upgrades is assessed asset-by-asset using a design flood elevation (DFE) determined through storm surge analysis. WASD found that the cost to build resilience to sea level rise and storm surge was marginal for projects that were already part of the CIP, adding ~5% to the total project cost.

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SPOTLIGHT ON THE SCIENCE

For the three recent wastewater treatment plant upgrades, WASD evaluated sea level rise, storm surge and tide effects to inform the design guidance and DFE. Climate change information available to WASD includes analyses produced both in-house (e.g. groundwater modeling) and by consultants and federal and university partners. For example, a 2015 climate impact assessment included preliminary rainfall and sea level rise projections, storm surge and inundation modeling, and extreme wind speed and sea level rise pressure change analysis. The assessment also included wastewater flow projections, based on population growth, increased groundwater levels from sea level rise and more intense rainfall, and a risk-based cost-benefit analysis of a facility hardening DFE for pump stations and wastewater plants. WASD also uses a unified set of sea level rise projections that was produced by the Southeast Florida Regional Climate Change Compact (SFRCCC) to develop the DFE. With a robust set of climate change information and projections, WASD is able to meet state and county regulatory standards and build climate resiliency.

THE ROLE OF REGULATIONS

Meeting state and county regulatory compliance and building resiliency to climate change were the key drivers of WASD's wastewater treatment plant upgrades. In 2008, a consent decree and state statute on ocean outfall required that WASD update its wastewater infrastructure system. Additionally, in 2014 Miami-Dade County passed regulation that required all county infrastructure projects consider sea level rise projections and potential impacts to ensure that they will function properly for 50-years, or the design life of the project, whichever is greater. Motivated by the need to meet these regulatory requirements and a desire to invest in climate-resilient infrastructure, WASD embraced the opportunity to integrate climate change information in these upgrades. Today, incorporating sea level rise through a DFE is becoming a normal aspect of what engineers do at WASD. WASD also has a dedicated Resiliency Manager who supports these efforts and works closely with the county resilience office to ensure alignment with county policies and practices.



KEY TAKE-AWAYS

WASD's experience incorporating climate change information into design over the past ten-plus years has helped the department identify three lessons learned: 1) Be systematic and use clear definitions and ranking systems when evaluating risk and identifying alternatives; 2) Assess how new designs impact operations and personnel; 3) Track the additional cost per project to build climate resiliency. To ensure this tracking is carried out by contractors and consultants, Requests for Proposals (RFPs) and contracts should include clear language that clearly outlines the need and documents the costs and benefits of alternatives. Overall, these steps can help with decision-making along the way, and support future resiliency investments and priorities.



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