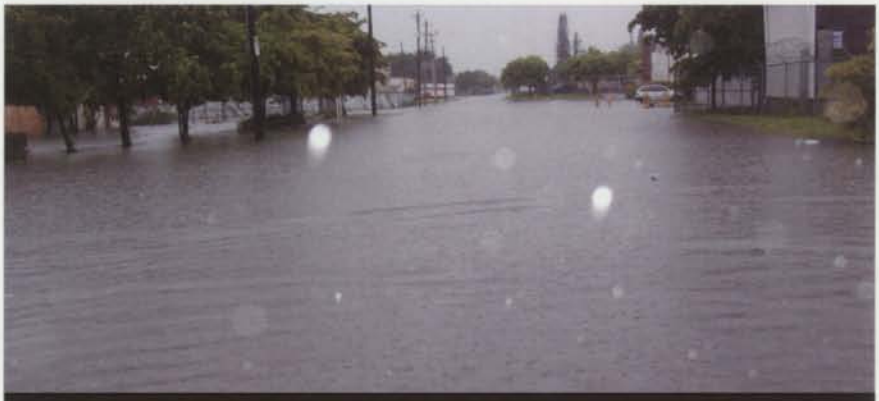
AMERICAN CITY & COUNTY

Water Infrastructure SPECIAL SECTION

When water, water is everywhere

Florida city maps out a 20-year plan to tackle $41 million in stormwater system improvements

During Hurricane Irene in October 1999 and a tropical weather system one year later, more than 200 residences and entire sections of Opa-locka, Fla., were under water, resulting in millions of dollars in damages. Such flooding conditions have been chronic for the small community in Miami-Dade County. To improve stormwater drainage, the city has crafted a 20-year construction and maintenance plan, and is using GIS to prioritize millions of dollars in improvements.



Following tropical storms and hurricanes, the streets of Opa-locka, Fla., fill with stormwater as a result of the city's inadequate drainage system.

Opa-locka's existing stormwater system consists of a number of facilities, such as french drains and storm sewers, that were built independently rather than as part of an integrated stormwater network. The city has drainage canals, but the sewers and drains were not designed to convey stormwater runoff into them.

Following the 2000 tropical storm, the Countywide Flood Management Task Force was created. The task force recommended that Opa-locka develop a comprehensive Flood Mitigation Strategy (FMS) that would define how to minimize risk to lives and property from floods. In August 2002, the city hired consultants to develop the FMS and a Master Surface Water Management Plan to identify chronic flooding conditions in the city and to propose improvements.

The city had very little information about its stormwater facilities, so the consultant inventoried and assessed all the stormwater structures and streets using GIS. Additionally, detailed hydrologic, hydraulic and water quality models were developed to assess existing conditions and evaluate the impact of alternative improvements.

Once all analyses were completed, the team identified more than 90 improvement projects, including a new secondary and primary stormwater system for large portions of the city. If all projects were built today, they would cost an estimated $41 million.

Because those projects will be implemented over the next 15 to 20 years, the city ranked them using four criteria: potential environmental benefits and water quality treatment, community acceptance, flood protection effectiveness, and cost vs. benefit. After the 90 proposed FMS projects were ranked, they were further grouped into high, medium and low priority. The city anticipates that, by tapping grants and other outside funding sources, $10 million can be invested in stormwater improvements over the next five years, which would address the 38 projects listed as high and medium priority.

The projects include constructing approximately 82,000 linear feet of french drain and 14,000 linear feet of storm sewer. Approximately 12,500 linear feet of existing french drain will be cleaned and refurbished.

The city decided to better maintain inlets, catch basins, swales, storm drains and exfiltration trenches to reduce flooding and improve water quality. Although the city needed to schedule and track maintenance, it did not have a computerized system to help ensure maintenance was performed. As a result, the consultant developed a GIS-based Stormwater Maintenance Scheduling System to track and schedule daily maintenance. It also allows the city to plan future inspections and maintenance and to allocate work crews, equipment and materials.

Using its GIS applications, Opa-locka has taken significant steps toward solving chronic flooding and water quality issues. The city has begun implementing its long-term capital improvement plan, and staff are using the Stormwater Maintenance Scheduling System to better maintain the existing system. ACC

— Moris Cabezas, water resources technical manager for the Tampa office of PBS&J, and Amir Shafi, interim director of the Opa-locka Public Works and Utilities Department.