

BACKGROUND

The path to living with water

The Greater New Orleans Urban Water Plan is a resiliency planning study to develop sustainable strategies for managing the water resources of St. Bernard and the east banks of Jefferson and Orleans Parishes. The project addresses three basic issues: flooding caused by heavy rainfall, subsidence caused by the pumping of stormwater, and the misuse of our water resources.

In 2010, the State of Louisiana's Office of Community Development Disaster Recovery Unit funded Greater New Orleans, Inc. (GNO, Inc.) to develop a Comprehensive, Integrated and Sustainable Water Management Strategy for the east banks of Orleans and Jefferson Parishes and St. Bernard Parish using federal Community Development Block Grant - Disaster Recovery funds from the Department of Housing and Urban Development.

The study was developed over the course of two years by Waggonner & Ball Architects and a team of Dutch and American water management experts.

The outcome is the Greater New Orleans Urban Water Plan, a vision for long-term urban water management in the 21st century, and effectively the first regional urban water plan of its kind in the United States. The Urban Water Plan provides a roadmap for better management of flood and subsidence threats, while creating economic value and enhancing quality of life.

GNO, Inc. is the regional economic development organization, serving to coordinate, consolidate, and catalyze economic development activity in Southeast Louisiana. The GNO, Inc. mission is to create jobs and wealth in the Greater New Orleans community. The GNO, Inc. vision is for the Greater New Orleans region to fulfill its potential as one of the best places in the country to grow a company and raise a family.

GNO, Inc. supports a multi-faceted approach, including advocating for federal, state and regional policies and

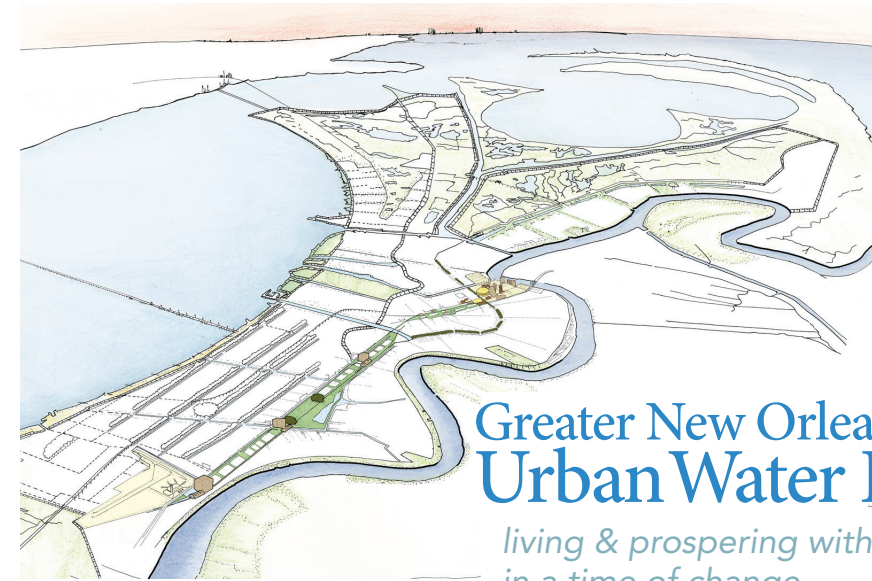
programs, to mitigate the effects of stormwater on the region's safety, quality of life and economic vitality. Moreover, GNO, Inc. is working with government, industry, economic development and education partners to nurture and grow a vibrant Emerging Environmental industry sector that will create jobs and revenues locally while addressing environmental challenges in the region and nation.

Waggonner & Ball Architects is a broad-based architectural and planning firm with 30 years of experience on a wide variety of architectural and planning projects. The firm is deeply invested in New Orleans' future as one of the nation's most resilient cities.

Following Hurricane Katrina, Waggonner & Ball developed the Recovery Framework for St. Bernard Parish, the most devastated portion of the Greater New Orleans region, and four of the thirteen planning districts in the Unified New Orleans Plan. The firm's water-planning work began shortly after Hurricane Katrina, with David Waggonner's trip to the Netherlands in early 2006 as part of a delegation led by U.S. Senator Mary Landrieu.

After seeing first-hand the value of the Dutch approach to stormwater management and climate adaptation, Waggonner & Ball initiated a series of Dutch Dialogues workshops, co-sponsored by the Royal Netherlands Embassy and the American Planning Association.

These collective efforts and extended interactions between Dutch and American architects, engineers, urban designers, landscape architects, city planners and soils/hydrology experts, and their Louisiana and American counterparts, grew from the participants' unwavering belief that the Greater New Orleans region can survive, prosper and grow only with a fundamentally different approach to urban water management.



Whether it flows from a residential rooftop or curb gutters of a ten-acre suburban parking lot, how we deal with excess rainwater has profound effects on daily life in Greater New Orleans, often in unexpected ways.

Greater New Orleans is a major city, port and industrial zone bathed in subtropical climate. Due to our proximity to the Gulf of Mexico, we average more rain than any other coastal city of similar or larger size. Our metro region averages 60 inches of rain per year.

In simple terms, that means that in a normal year, our region sees nearly 5 feet of water fall from the sky. And since our boundaries are surrounded by levee walls, that immense amount of incoming water must be removed from our roofs, yards, streets, parking lots and especially low-lying neighborhoods.

This goal of dealing with rainfall and runoff is currently achieved using an interconnected network of gutters, canals, underground catch basins and high-powered hydraulic pumps.

The system can't always provide enough drainage to keep up with our frequent and impressive rainstorms. The pumps become overwhelmed, and excess water flows to low spots in neighborhoods

and roadways then sits until it can gradually make its way through the system.

This accumulated runoff causes tremendous problems – traffic slowdowns, overflowing gutters, and public transit interruptions, to name a few – and significant property damage and flooding, business interruption, and repetitive loss in low-lying areas.

More importantly, the current system causes deep structural damage that's a lot less obvious to the casual observer.

On a geologic level, our single-purpose pumping system alters the composition of the land beneath our feet. The constant pumping cycle causes organic soils – those composed of long-decayed cypress swamps – to dry out, collapse and lose elevation in a process known as subsidence.

Subsidence fractures water mains, causes sinkholes in neighborhood streets, and creates the region's all-too-common uneven and often broken roadways.

Our plan, the Greater New Orleans Urban Water Plan (the Urban Water Plan) directly addresses the problems with our current water management system in an innovative way that will enhance quality of life and reduce street flooding, potholes, and damaged

infrastructure from subsidence.

The Urban Water Plan works in tandem with other water management and hurricane and flood protection systems such as wetlands, which serve as the region's first line of defense, and the levee flood protection system, the second line of defense, to create a third line of defense by managing water internally.

The Urban Water Plan uses a four-pronged approach:

- Delaying stormwater by using bio-retention and infiltration strategies
- Storing stormwater in the landscape longer by retrofitting canals and finding space for new canals and ponds
- Using storm water to enhance and connect neighborhoods
- Draining storm water through existing and upgraded infrastructure when necessary

Implementing an integrated water management strategy makes sense not only from a practical level, but also from an economic level.

It is estimated that implementation of this plan will save more than \$10.8 billion in avoidable flooding, subsidence, and insurance costs over the next 50 years. While implementing the Urban Water Plan is estimated to cost \$6.2 billion and generate an economic impact of up to \$11.3 billion. Implementation of the Urban Water Plan will also increase property values and retain and attract businesses to the region.

Not only are we protecting our environment, economy, and tax base, we have a unique opportunity to become leaders in innovative water management. This activity will allow us to export our technology to other regions and drive our GDP.



Kingdom of the Netherlands

Waggonner & Ball Architects



GREATER NEW ORLEANS
INC
REGIONAL ECONOMIC DEVELOPMENT

DEMONSTRATION PROJECTS

Bringing the plan to life

The Greater New Orleans Urban Water Plan proposes implementing seven proposed demonstration projects that will not only reduce the region's flooding and subsidence issues but will serve as an immediate value-added prospect to the region's quality of life and economic prosperity.

Implementation of these projects will further serve as proof of concept that the Urban Water Plan is viable and sustainable.

These projects flow through the Greater New Orleans region – in Orleans, Jefferson and St. Bernard Parishes.

MIRABEAU WATER GARDEN



The Mirabeau Water Garden is a privately-owned 25 acre suburban site in Orleans Parish. The project plans include capturing water from the drainage system, treating the water and storing it for instructional and recreational use.

CANAL STREET CANAL



A small neighborhood canal in Old Metairie with a manually operated gate which can be closed, allowing water levels and infiltration scenarios in this isolated system to be tested. This renovation seeks to increase water storage capacity and groundwater recharge, improving its aesthetic quality and transforming the corridor into a neighborhood asset and amenity.

LAKEVIEW FLOATING STREETS



The Lakeview area in Orleans Parish suffers severely from subsidence issues which has led to damaged buildings and homes and severely damaged, pot-holed streets. The project plans envision a comprehensive street design for underground storm water storage to balance groundwater levels and stabilize critical infrastructure.

LAFITTE BLUEWAY



Encompasses a two-mile linear park called the Lafitte Greenway and includes a dilapidated canal in the Mid-City area of Orleans Parish. The project plans encompass developing a circulating waterway that will recharge the system and provide storm water storage for surrounding neighborhoods.

ELMWOOD FIELDS AND WATER LANES



This area of Jefferson Parish is primarily an industrial business park with large paved parking lots and little vegetation. The project plan is to mitigate runoff from this highly paved commercial center by implementing vegetative bioswales, permeable paving, tree planting, and installing green roof tops to soak up excess water and create value for the district and surrounding neighborhoods.

EASTERN WATER WALK



Integrates a vascular system of stormwater collection throughout existing and proposed commercial development with Lake Forest Boulevard operating as the main spine. Adjustments within the boulevard's right-of-way allow for designated bicycle and pedestrian areas, while bioswales on either side of the street turn the area into a major stormwater corridor for the project.

FORTY ARPENT CANAL ZONE



A system-scale outfall canal which forms the northern boundary between St. Bernard parish and the Central Wetlands Unit. This demonstration aims to meet water storage and subsidence control objectives by retrofitting the canals, thereby transforming the area into a productive destination landscape for residents and visitors.

IMPLEMENTATION

High value investments

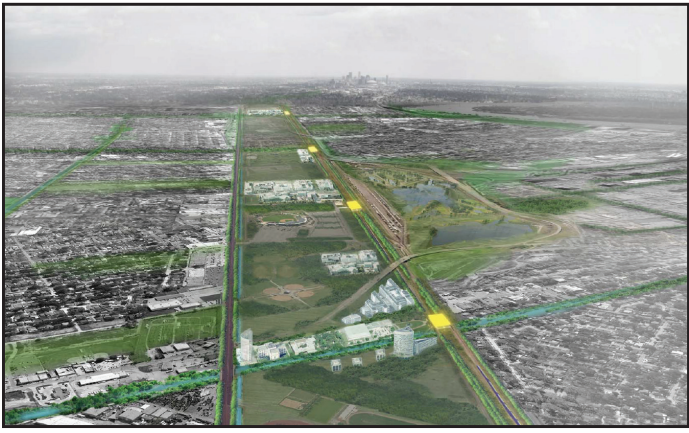
Implementation of the Urban Water Plan will be made possible by the unified support of lawmakers and the policies created by them. Their guidance will shape a comprehensive series of guidelines and policies to fund large portions of the plan and create legal jurisdiction and program authorizations for the projects contained within. Until these new actions are set in place, the laws and structures that exist today will shape the framework of the policies to come.

Demonstration projects in the Greater New Orleans Urban Water Plan and future storm water management projects require financing. According to FEMA, for each dollar invested in mitigation against future losses, there is a savings of four dollars in future benefits. However, securing adequate, sustainable sources of funding for managing water presents a significant challenge for regions across the United States, and financial constraints frequently hinder the implementation of effective programs and practices at the local level.

There are many options for funding, including federal funding, public-private partnerships and storm water utility fees. FEMA's Hazard Mitigation Grant Program (HMGP) provides grants to states and local governments to implement long-term hazard mitigation measures to build resilience against future flooding. Public-private partnerships are extremely important to funding opportunities for maintenance and operations, and are viable sources for up-front funding.

Finally, local stormwater utility fees are another option and may be coupled with stormwater incentives such as credits. Generally, based upon the amount of impervious area on a property, the stormwater utility agency charges the land owner a rate proportional to the amount of actual stormwater run-off the site produces.

The unique nature of this effort and the current budget-challenged environment will require a creative approach and multiple avenues of funding.



\$8 BILLION
REDUCTION IN FLOOD DAMAGES

Impact over 50 years

REDUCED REPETITIVE FLOOD COSTS

Full implementation of the Greater New Orleans Urban Water Plan would fully eliminate flooding from a T5 storm (approximately 6" of rainfall in 24 hours) and substantially reduce the damage and effects of a T10 storm (11.5" in 24 hour period).

\$2.2 BILLION
REDUCTION IN SUBSIDENCE DAMAGE

REDUCED COST OF SINKING LAND/SUBSIDENCE

Similarly, properly maintaining groundwater levels would significantly reduce the subsidence rate and its damaging effects. Estimated damage costs in vulnerable areas are estimated at \$2.2 BILLION.

\$609 MILLION
REDUCTION IN INSURANCE PREMIUMS

LOWER FLOOD INSURANCE PREMIUMS

By addressing the problems associated with sinking land, flood insurance premiums could drop as much as \$609 MILLION through credit given to parishes through the NFIP's Community Rating System (CRS).

\$183 MILLION
ESTIMATED INCREASE IN PROPERTY VALUES

HIGHER PROPERTY VALUES

The Urban Water Plan also enables the safe development of new waterfront property valued at \$183 MILLION.

UP TO \$11.3 BILLION
ESTIMATED ECONOMIC IMPACT FROM PROJECT EXECUTION

REGIONAL ECONOMIC IMPACT

Implementation of the Greater New Orleans Urban Water Plan would spur and support significant activity in supporting industry sectors estimated between \$5.29 - \$11.32 BILLION, supporting 44,040 - 101,790 jobs (direct and indirect, full and part-time).