2021 FLOOD SUMMIT

We want to know your thoughts on the concepts presented and how it might impact local commerce, recreation, and your quality of life.

Please email comments or questions to floodsummit@cityofmandeville.com.

Please let us know your thoughts by December 10, 2021.

Kyle Associates, LLC

NEEL-SCHAFFER
Solutions you can build upon

WAGGONNER & BALL

TBS T. BAKER SMITH
A CENTURY OF SOLUTIONS

Kyle Associates, LLC

FLOOD SUMMIT SYNOPSIS

Flood Sources and Mitigation Concepts

The cause of widespread flooding in the City of Mandeville come from 2 primary sources – tidal/storm surge inundation and excessive rainfall in a very short time period. Consequently, there are two different directions from which solutions to mitigate these events can originate. But its best to separate these two conditions into large scale and small-scale events.

LARGE SCALE EVENTS

The conditions that have the greatest, and most widespread impact on the old Mandeville area is flooding caused by water rise in Lake Pontchartrain. This could be the result of a hurricane event or simply a continuous and stiff southeast wind event. Lake water enters the stormwater system and Bayou Castine from the lake side until road overtopping and structure flooding begins to occur. Excessive rainfall exacerbates the situation, but the water level in the lake is what is determining the ultimate water level on the ground.

Mechanical solutions to prevent this type of flooding involve blocking the lake surge through levees, flood walls, and flood gates. Although this solution is indeed affective, it is also costly and unsightly. To maintain the visual landscape that Mandeville prides itself on, an integral landscape program would have to be included in these structures to provide an aesthetic that is acceptable to the community. The reality, however, is this effort is working to screen significant infrastructure – albeit affective from a flood mitigation effort, it still does not have the best visual aspects.

An alternate approach to large scale flood mitigation is to prevent, or slow down, the storm surge from reaching Mandeville – hopefully to the point where the maximum water level that would occur without mitigation is never reached during the storm event. In simple terms, the intent is to hinder or deter the storm surge some distance away from Mandeville – before it can reach the City. Examples of this could be berms or a levee system in the Rigolets and East New Orleans parish where the

coastal wetlands allow storm surge to freely enter the lake once the marsh level is overtopped. Closer to the City, berms off the coast of Mandeville could be constructed much like natural barrier islands have formed off the coast of Louisiana and Mississippi. Depending on the extent of the new "Mandeville Barrier Islands", storm surge directly impacting the city could be hindered, thus reducing the maximum water level reached. Additionally, these islands would have a tremendous affect on wave action, further reducing the force of surge on structure and infrastructure.

SMALL SCALE EVENT MITIGATION

For the City of Mandeville, the small-scale events generally consist of flooding due to intense and/or long duration steady rainfall. This can be rainfall within the City limits, but significant watersheds in the parish drain through tributaries that pass through the City limits which could also cause flooding issues. Typically, a system of retention and/or detention infrastructure is used in the area to prevent excessive storm water from entering the tributaries at a faster rate than the waterway can handle without flooding. With these facilities, the bigger the better, and most of which are best done by the city while considering the entire drainage basin.

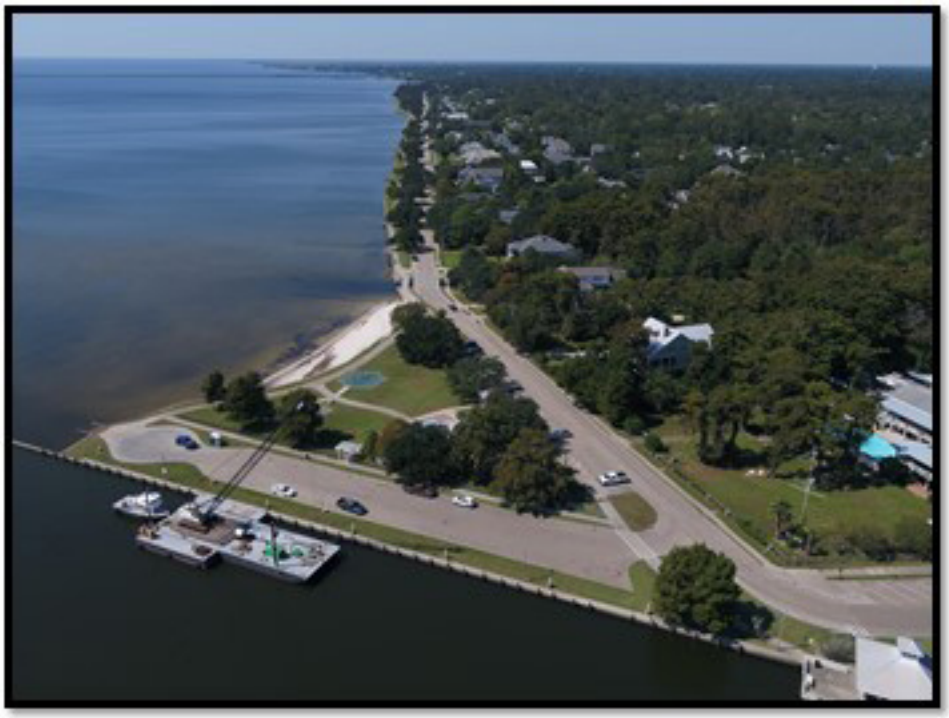
However, on a smaller scale, environmental retention systems such as bioswales and rain gardens have a tremendous affect on overall storm water runoff. These types of projects can be as small as a residential swale leading to a tributary or as large as the entire drainage system of a city street being used to slow down the infiltration of storm water into the system. As this flooding mitigation effort is on a smaller scale than the infrastructure discussed previously, rain gardens and bioswales are easy and inexpensive to construct, and in numbers can have a significant affect of mitigating urban runoff at the smaller drainage basin level.

In addition to the flood mitigation characteristics of these features, they are also very good at performing a "first flush" environmental cleaning of storm water runoff. The plant materials that constitute rain gardens and bioswales act as filters for rainwater running off of streets, buildings, and other developed surfaces. The challenge to having success using these as flood mitigation infrastructure is to have implemented a quantity high enough to have a real affect on the overall storm water volume. Regardless, both bioswales and raingardens are functional as well as an aesthetically pleasing feature in the landscape.

For more information or comment, email: fkyle@kyleassociates.net

INTRODUCTION

The Mandeville Lakefront is the jewel of Old Mandeville with majestic oaks, open park-like atmosphere, walking paths, benches, and grassy areas. This area offers an array of beneficial uses for people and nature. The Mandeville Lakefront Vision and Resilience Plan will demonstrate an organized vision for the Mandeville Lakefront to enhance public use both landside and waterside; add natural shoreline habitat; improve water quality and biodiversity; and increase the resilience of the Mandeville Seawall system.



Mandeville Lakefront Area

MANDEVILLE LAKEFRONT VISION AND RESILIENCE PLAN

The Mandeville Lakefront Vision and Resilience plan will provide the following elements:

- The *Lakefront Flood Risk Reduction Planning and Design* will address frequent flooding along the Mandeville Lakefront. The work will develop a plan of action to mitigate frequent flooding events along the lakefront. The Plan will develop Storm Risk Reduction Project(s) with the primary goal of Reducing Nuisance Flooding.
- The *Coastal and Shoreline Resiliency Planning and Design* will assess habitat conditions and water quality along the lakefront shoreline, determine strategies for mitigating water quality issues, and develop opportunities for enhancing the marine ecosystem environments while increasing public interaction with a more natural habitat.
- The *Lakefront Utilization Planning and Design* will assess the utilization of the lakefront, determine existing public usage, and develop an inclusive plan of action for future utilization of the lakefront. The utilization phase will also consider both access from the water and land sides.

NEEL-SCHAFFER, INC.

Neel-Schaffer is a multi-disciplined engineering, planning, and construction management firm that was founded in 1983. With almost 500 employees and 38 offices in 9 states, Neel-Schaffer has extensive experience and capabilities in a variety of disciplines including Coastal and Water Resources Engineering, Urban Planning, and Traffic and Transportation Engineering disciplines. These diverse capabilities allow us to deliver innovative solutions utilizing state-of-the-art practices to improve flooding risks, water quality issues, and replace aging drainage infrastructure in the communities we serve.

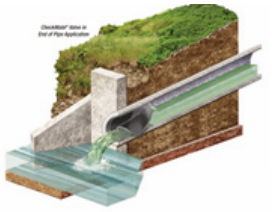
Neel-Schaffer opened its Mandeville office in 2006. With 15 years of service to the Northshore community, Senior Neel-Schaffer staff have completed numerous drainage, coastal protection, transportation, and other civil design projects throughout Mandeville and St. Tammany Parish. Our multi-disciplined approach and local insight can provide a holistic blend of experiences and services for the Mandeville Lakefront Vision and Resilience efforts.

DEMONSTRATED SOLUTIONS

Presented below are a sample of Neel-Schaffer's efforts and concepts across the Gulf Coast that can begin to provide the City of Mandeville a glimpse of solutions that can help to develop a more resilient community and mitigate the increased stress of flooding. The Neel-Schaffer team will help the community to develop solutions allowing the City of Mandeville to adapt to changing conditions and withstand future hazardous events such as hurricanes, coastal storms, and flooding.

LAKEFRONT FLOOD RISK REDUCTION

Neel-Schaffer is working with communities to enhance public use areas and develop a blend of function, art, and nature into the projects. These projects include examples providing flood risk reduction with gravity drainage solutions. Examples of these efforts include the following:



Example of gravity drainage with backflow prevention (Source: Tideflex Technologies)

Marsh Creation and Restoration

Kingwood Regional Drainage Study, Engineering and Design – Houston, TX

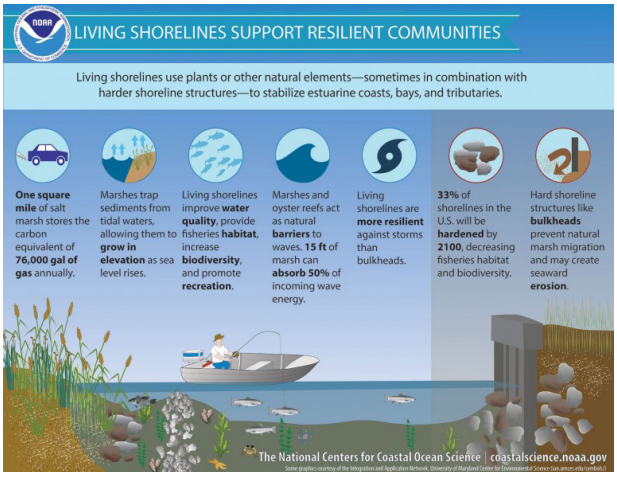
Neel-Schaffer is providing drainage and hydraulic modeling, engineering, and design services for the Harris County Flood Control District for flood risk reduction for the Kingwood Region, Texas. This project demonstrates the ability to provide gravity drainage improvements through water control structures. The project is also demonstrating the ability to provide channel conveyance improvements while incorporating the natural stream design to maintain the environmental habitat of the urban area.

Calcasieu-Sabine Large-Scale Marsh Creation and Hydrologic Restoration Project – Cameron Parish, LA

Neel-Schaffer is providing program management, hydrologic and hydraulic modeling, design integration and implementation services for Louisiana's Coastal Protection and Restoration Authority for the Calcasieu-Sabine Hydrologic Restoration project in Cameron Parish, LA. This project's goal is to provide marsh restoration and flood stress reduction for the Cameron Creole Watershed utilizing drainage structures on the lake rim of Lake Calcasieu. These gravity drainage structures can improve drainage and provide backflow prevention employing inline check valves, gates, and other structures.

COASTAL AND SHORELINE RESILIENCY

Neel-Schaffer is actively providing for coastal engineering and shoreline restoration and resiliency services for communities across South Louisiana. Examples of these efforts include the following:



Living Shorelines Support Resilient Communities (Source: NOAA)

Living Shoreline Approaches

Living shorelines maintain continuity of the natural land-water interface and reduce erosion while providing habitat value and enhancing coastal resilience. Living shorelines can also be successfully used on sheltered coasts to dampen wave energy and reduce erosion (Swann, 2008).

University Lakes Flood Risk Reduction and Restoration - Baton Rouge, LA

Neel-Schaffer is providing engineering and design services for the restoration, dredging and flood risk reduction of the six lakes surrounding the LSU campus. This project demonstrates the ability to provide restoration, public recreation, flood risk reduction, and water quality improvements in a highly urbanized area. The project demonstrates potential solutions for the Mandeville lakefront as it encounters similar challenges on resilience and flood risk reduction.

LAKEFRONT UTILIZATION

Neel-Schaffer is actively providing flood risk planning, engineering, and design for several communities. These projects include examples of solutions that can achieve public utilization and recreational improvements while utilizing streetscape enhancement, pervious pavement, and other green infrastructure methods. Examples of these efforts include the following:

Pelican Park Improvements - The Grove

Pelican Park – The Groves

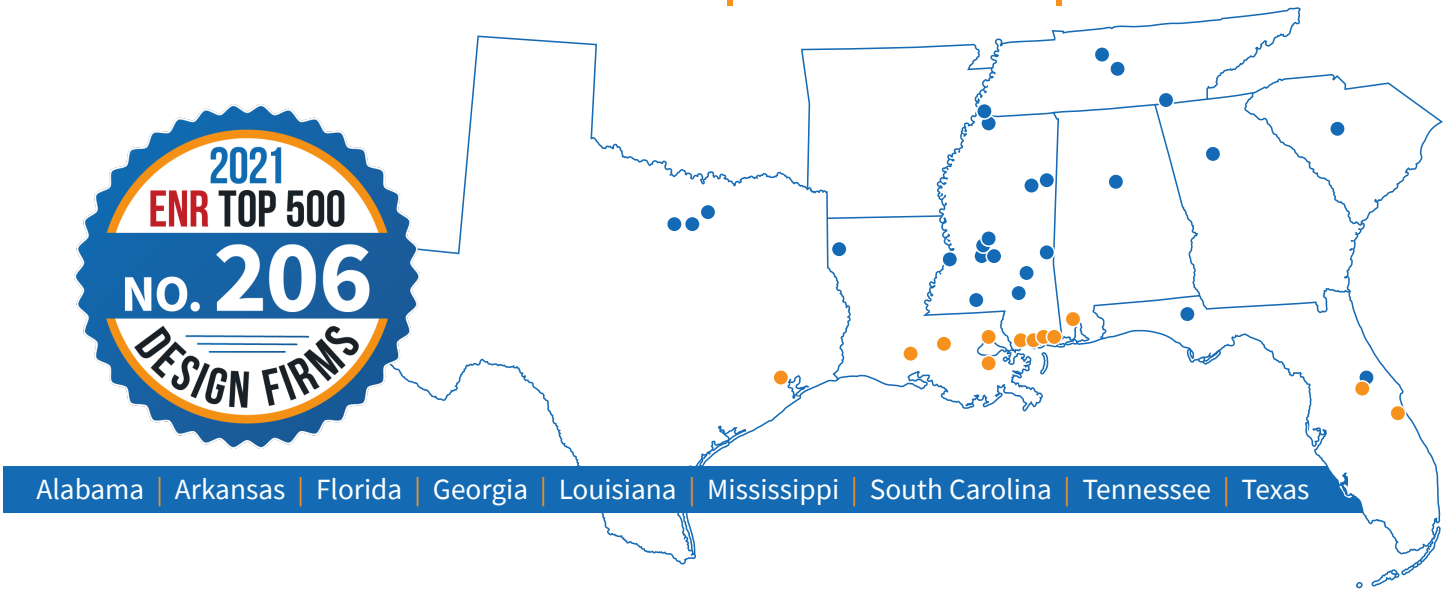
Neel-Schaffer provided Pelican Park with engineering and design services for the conversion Green Field 5 to a fitness area including a walking path through Oak Tree Grove and the addition of a water feature. This project also demonstrates the ability to provide recreational amenities such as fitness equipment.

Fondren Streetscape – Jackson, MS

Neel-Schaffer provided engineering and design for a streetscape project to update 5 city blocks to develop pedestrian and bicycle friendly areas. This project also accelerated design to address routine flooding of Rainbow Grocery. The project included new wider sidewalks, bike paths, landscaping along with inclusion of public art exhibits throughout the site.

Neel-Schaffer is proud to serve the communities in which we live and work, including the City of Mandeville. More information about Our Story, Projects and Capabilities can be found our website at www.neel-schaffer.com.

12 Coastal Locations | 38 Offices | 9 States



Alabama | Arkansas | Florida | Georgia | Louisiana | Mississippi | South Carolina | Tennessee | Texas

Flood Protection Solutions
Mandeville Flood Summit

OUR SOLUTIONS

T. Baker Smith (TBS) leverages a suite of professional services to solve the most arduous drainage and flood control challenges for our clients. Headquartered in Houma, LA since 1913 with office locations across southern Louisiana and Texas, TBS is intimately aware of the apprehension and destruction flood events have on our clients, our neighbors, and our families. As a Gulf Coast leader in providing innovative and sustainable solutions, we serve as a trusted advisor to our clients, listening and ensuring their concerns are captured in our flood mitigation designs.

Our project experience includes more than 75 drainage studies for local municipalities, resulting in numerous flood mitigation projects to reduce flood risk to residents of coastal Louisiana and Texas. Flood mitigation projects include drainage improvements, forced drainage systems, levees, and water control structures. TBS has designed 23 pump stations across southern Louisiana and one in Galveston, Texas. Some of these pump stations were constructed almost 50 years ago and are still in operation today.

Our comprehensive flood protection solutions include:

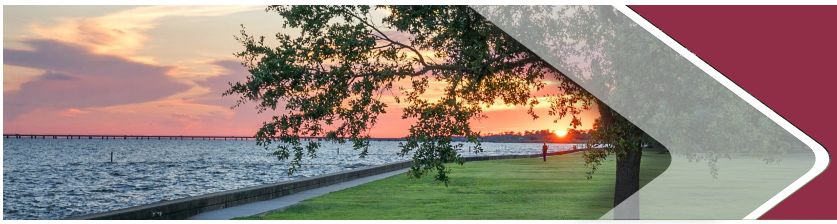
+ Drainage Impact Studies
+ Levee Alignment & Feasibility Studies
+ Pump Stations
+ Hydrologic & Hydraulic Modeling
+ Drainage Improvements
+ Backwater Control Structure Design
+ Levee Design & Armoring
+ Storm Surge & Wave Action Modeling

OUR UNDERSTANDING

A Message from Brian Moldaner, PE, MBA, Northshore Engineering Lead Professional

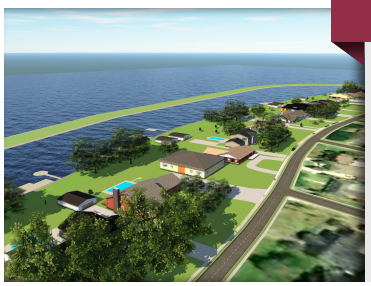
Brian Moldaner, PE, MBA
985.302.0730
Brian.Moldaner@tbsmith.com

Lakeshore Drive is home to scenic walking paths, playgrounds, restaurants, and historic homes—attractions for Mandeville's citizens and tourists. We understand that the Lakeshore Drive region is Mandeville's greatest asset and that providing an innovative and sustainable flood control solution is imperative for current and future residents and economic growth. I was born and raised in Jefferson Parish and displaced after Hurricane Katrina. This unfortunate circumstance brought me to Houma, LA and TBS, a firm rich in drainage and flood mitigation solutions. My passion for engineering and serving my community grew substantially. As Engineering Lead Professional of the Greater New Orleans and Northshore regions, I have 10 years of proven experience in leading large, complex, multi-disciplined projects to successful outcomes, including directing and managing large-scale drainage analyses and planning efforts focused on flood reduction. I understand the apprehension and despair that comes before and after major flood events, and I have dedicated my career to working with local municipalities and the public to provide integrated engineering solutions to solve drainage challenges and provide peace of mind.



Flood Protection Solutions
Mandeville Flood Summit

OUR PROJECT EXPERIENCE



Lakeside Flood Protection

The Lakeside Flood Protection Project is the final segment of flood protection that will give Morgan City's levee system the FEMA accreditation needed to keep flood insurance at manageable prices for its residents. The project consists of a floodwall along the lakefront of Lake Palourde in Lakeside Subdivision, a floodgate on Walnut Canal, a breakwater in Lake Palourde and associated scour protection, drainage improvements, and levee/floodwall tie-ins and transitions. The project will be designed to meet the requirements of FEMA for levee accreditation and will ultimately be part of a Conditional Letter of Map Revision (CLOMR) that will be submitted to FEMA to update the effective Flood Insurance Rate Maps (FIRMs). The project demonstrates TBS' ability to design flood protection that incorporates a floodwall, floodgate, and breakwaters all in one project while being sensitive to aesthetics for the surrounding neighborhood.

Morgan City Drainage Improvements

The City of Morgan City, along with support from Drainage District No. 2, St. Mary Parish Government, and St. Mary Levee District, propose to reconstruct and elevate this forced drainage system to provide protection from the 1% annual storm and ultimately provide FEMA-accredited levee protection system for the residents of Morgan City. TBS provided a preliminary project report to identify the most cost-effective alignments and features for an accredited levee system surrounding Morgan City. The first two phases of this project include approximately seven miles of levee reconstruction from the East Atchafalaya Basin Protection Levee to the Syracuseville Levee, which ties into the existing railroad tracks in Morgan City. TBS is currently designing the levee improvements necessary for FEMA accreditation.

14th Street Drainage Improvements & Pump Station

The 14th Street Drainage Improvement Project is the first of a series of infrastructure projects aimed to mitigate coastal and stormwater flooding. The modernizing of the City of Galveston drainage design criteria called for a sizeable investment in drainage-related projects which included federal and state grants. The project included gravity system improvements and the installation of a 600 cfs pump station to consolidate the 14th, 15th, and 16th Street outfalls while reducing the maximum water surface elevations across the entire project focus area. TBS was responsible for proper development of H&H Model Boundary Conditions and an understanding of the overall drainage patterns on the island; enhancement of the resulting gravity drainage improvement design through analyzing multiple alternatives to provide an optimum BCR value; utility provider engagement throughout the entire project duration; frequent stakeholder and agency coordination; and adherence to an aggressive schedule to ensure an efficient funding approval process. TBS collaborated with the team's local architect to design a pump station suitable for the project site.

Terrebonne Living Shoreline

TBS provided coastal engineering services for the design and permitting of the Terrebonne Oyster Bed Surge Protection System Project. Services included collecting survey, environmental, and habitat data along the approximate 3.5 miles of shoreline of the proposed project. Shoreline protection for the Project is located at two sites. Site 1 is approximately 1-mile-long across the north bank of Lake Chien, and Site 2 is approximately 2.5 miles along the northern bank of Lake Tambour. TBS utilized this data to analyze coastal processes, prepare engineering plans, and provide supporting environmental documents and permit applications for the project.

LOCATIONS

Covington, Louisiana..... 985.302.0730
Metairie, Louisiana..... 504.323.3460
Lafayette, Louisiana..... 337.735.2800
Baton Rouge, Louisiana..... 225.744.2100
Thibodaux, Louisiana..... 985.446.7970
Houston, Texas..... 281.240.0113
San Antonio, Texas..... 210.892.4700
Corpus Christi, Texas..... 361.334.5719
Galveston, Texas.....409.220.1669

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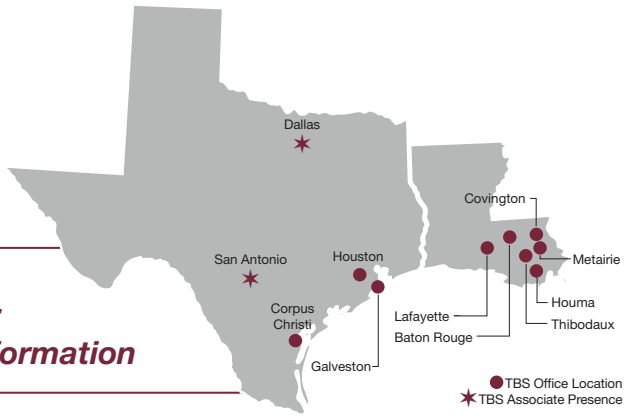
Scan for more information



WAGGONNER & BALL

ARCHITECTURE / ENVIRONMENT

LOCATION
NEW ORLEANS, LOUISIANA

FOUNDED / STAFF
1970 / 25

SERVICES
URBAN DESIGN
RESILIENCE PLANNING
STORMWATER MANAGEMENT
VISUAL COMMUNICATION
COLLABORATIVE VISIONING
INSTITUTIONAL ARCHITECTURE
HISTORIC PRESERVATION
ADAPTIVE REUSE

RECOGNITION
99 DESIGN & CONSTRUCTION AWARDS

We seek solutions to the most challenging spatial problems of our changing world.

Waggonner & Ball is located where the Mississippi River meets the Gulf of Mexico. We are an international, multidisciplinary design practice specializing in adaptation planning, resilient landscapes, institutional architecture, and historic preservation. We partner with leading design and engineering firms around the globe to create designs that are ambitious yet actionable. Utilizing a workshop-based design process, our collaborative approach synthesizes knowledge and experience from diverse stakeholders. No matter where we work, we draw on the local in response to global trends.

We plan across scales: buildings to landscapes, cities to watersheds. Our Living With Water® approach to planning and community engagement has catalyzed resilience efforts in cities across the U.S. and abroad. We see ourselves as stewards of built and natural environments from past to future.

Our architectural practice prioritizes education and preservation, and we seek mission-driven institutional clients. We develop interiors that complement structure and landscape. More fundamental than style, our work emphasizes beauty and performance over time.

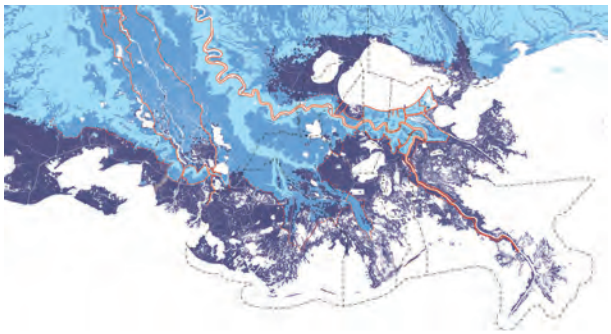
Resilience Funding Outcomes since 2016:

$387 million
CDBG funds awarded for resilience plans (including National Disaster Resilience)

$27 million
HMGP funds awarded for plans & projects

$182 million
FEMA-funded projects constructed or underway

Greater New Orleans Urban Water Plan
National Planning Excellence Award for Environmental Planning, American Planning Association



Louisiana's Strategic Adaptations for Future Environments (LA SAFE)
AIA Louisiana Merit Award

New Orleans U.S. Custom House Restoration
National Trust for Historic Preservation National Preservation Award

POINT OF CONTACT
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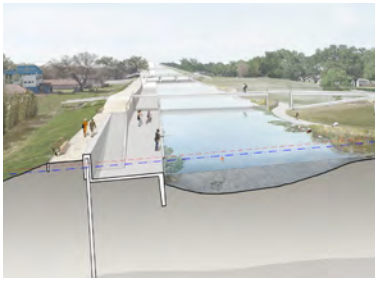
We advance urban water resilience across the U.S.

Our collaborative, design-focused workshop model is replicable yet specific to place.



Dutch Dialogues New Orleans
New Orleans, LA

After Hurricane Katrina, Waggonner & Ball established cooperation with the Dutch National Ministries responsible for infrastructure, water management and spatial planning, facilitated by the Royal Netherlands Embassy. Co-sponsored by the Embassy and the American Planning Association, three workshops were held in New Orleans from 2008 to 2010 to frame and address water challenges through a collaborative and holistic approach that aimed to increase value as well as safety at multiple scales.

Proposals from these workshops started the Greater New Orleans Urban Water Plan and led to $141M in funding for the Gentilly Resilience District.

Dutch Dialogues Charleston
Charleston, SC

Dutch Dialogues Charleston is an effort to co-create a pathway to resilience that reduces flooding while ensuring the city's historic beauty and iconic identity will endure. The effort, completed in 2019, was led by Waggonner & Ball, The Water Institute of the Gulf, and the Royal Netherlands Embassy. Numerous City of Charleston staff, elected officials, academics, researchers and private-sector experts volunteered their time. This effort has led to Waggonner & Ball continuing to work with the City on related studies for land use and storm surge protection.

The final Dutch Dialogues Charleston report, including recommendations, stakeholder engagement results, and more, is available online at *dutchdialoguescharleston.org*.

Living With Water Houston
Houston, TX

Waggonner & Ball, the City of Houston, and partners hosted two Living with Water workshops in 2018 and 2019 as part of Houston's resilience program following Hurricane Harvey. Living With Water Houston brought together local, national, and Dutch experts representing multiple disciplines to solve site-specific water and resilience challenges alongside local governments, state and federal agencies, and community stakeholders.

Key to the Resilient Houston strategy and Living With Water approach is a recognition that actions to reduce risk and increase resilience can be taken at multiple interconnected scales—from the home, to the block, neighborhood, bayou, city, and region.

Dutch Dialogues Virginia
Norfolk, VA & Hampton, VA

In the Hampton Roads region—specifically the cities of Norfolk, Hampton, and Newport News—tidal flooding and storm surge are prime water management challenges. These urban areas also face poor drainage, environmental degradation, vulnerable populations, and a lack of recreational water access. Examining bay, harbor, river, and inland stream conditions, the workshops sought opportunities that increase value and safety at multiple scales: region, city, and neighborhood. Dutch Dialogues Hampton Roads has seeded several initiatives and projects throughout the region, including the HUD National Disaster Resilience (NDR) Ohio Creek Watershed Project, Resilient Hampton, and the first Joint Land Use Study addendum in the US that focused on resilience and adaptation.