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# SUSTAINABLE INFRASTRUCTURE

SHERWOOD DESIGN ENGINEERS is a site civil engineering practice committed to the optimal integration of ecology, infrastructure, and design. We specialize in water management strategies, green building design, and urban planning. We document site infrastructure as well as master plan engineering solutions at a campus, neighborhood, and district scale. Important to our engineering practice is our ability to span building and landscape. Our recommendations minimize the consumption of all site resources— carbon, energy, water, and waste. Sherwood works collaboratively with project teams to find ways to maximize efficiencies through an integrated and ecological approach that results in high performance buildings and landscapes recognized for function as well as aesthetics and user experience.





February 18th, 2020



Patti Wallace, Purchasing Director,  
Sewerage and Water Board of New Orleans  
625 St. Joseph Street, Room 131  
New Orleans, Louisiana 70165

RE: Sewerage & Water Board of New Orleans (SWBNO) - Integrated Master Planning RFI

Dear Patti Wallace,

Sherwood Design Engineers (Sherwood) is pleased to submit our proposal to Sewerage and Water Board of New Orleans for the Integrated Master Planning RFI. We are a civil, environmental and water resource engineering firm with local and national experience in master planning and implementation. Sherwood has progressed some of the region's most performative projects from planning to implementation, including NOMA Sculpture Garden Expansion and Mirabeau Gardens in New Orleans. Our HUD and FEMA experience dates back to our involvement in the New Orleans Water Plan and throughout the country, we have worked on projects for HUD Rebuild by Design and the HUD National Disaster Resilience program. This work has provided Sherwood with the skills to lead unique projects like this from goal setting and concept iteration to final construction documentation and implementation. Our practice as forward-thinking, big picture thinkers will provide this project with national expertise, local understanding and solid experience in resilience and stormwater master planning and execution.

Our Team brings the following experiences to this project:

- Civil and Environmental Engineering Expertise with a reputation as integrated water infrastructure leaders.
- A Proven Design Team that can deliver a master plan that anticipates design feasibility and constructability, creating a foundation for a seamless design, permit, entitlement and construction effort.
- Leaders in Resiliency who co-optimize infrastructure to serve multiple purposes, generating a single strategy to solve for flooding while mitigating against subsidence and delivering a system that will enhance local ecology and connectivity to nature.
- Client Satisfaction that includes references from leading institutions and a practice built on long-term relationships with our partners and repeat clients.
- Proprietary Design Tools that include integrated water balance models, urban design metrics, design tools, and preliminary probable cost models.

We look forward to the opportunity to participate in the RFI process and attending any future workshops. We believe our firm can provide fresh and thoughtful insights to this integrated master plan.

Sincerely,

A handwritten signature in blue ink, appearing to read "Jim Remlin", is displayed on a light yellow rectangular background.

Jim Remlin Project Manager / Main Point of Contact  
Sherwood Design Engineers  
1000 Marietta Street, Suite 238  
Atlanta, GA 30318  
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# QUESTIONS

## **QUESTION 1: WHAT WILL BE NEW ORLEANS' BIGGEST STORMWATER/DRAINAGE CHALLENGES IN 50 YEARS AND WHAT IS THE BEST APPROACH TO INTEGRATED, LONG-RANGE PLANNING TO ADDRESS THOSE CHALLENGES?**

If in fifty years New Orleans has not built the beginnings of a nature based solution to handling stormwater that takes into account critical infrastructure, existing topography and associated climate change factors, then the City will have an almost insurmountable drainage challenge to overcome. Pumps and pipe infrastructure in place today currently do not have the capacity to withstand today's large storms and the likelihood of these storms increasing in intensity and duration are high. Continuing to make infrastructure improvements that increase pump and pipe capacity will not position the City to manage future storm events and, instead, will be the source of its downfall. New Orleans right now has an opportunity to grow and build smarter by utilizing the past decades' lessons and cautionary tales. If it does so, instead of having challenges in fifty years, New Orleans will have a plan steeped in science, engineering and nature.

As we know through experience, the management of stormwater in New Orleans is complex. The existing system relies heavily on pumps and canals that are not sufficient to handle high intensity stormwater events. As has been witnessed over the last few years, a system that is reliant on powered infrastructure is not capable of properly handling these demands. In addition, New Orleans is sinking. Settlement is occurring due to the almost constant pumping that is required to keep New Orleans dry. This tells us that infrastructure improvements, while helpful in the short-term, will not win the day for New Orleans. As an added layer, it will be important for the City to keep in mind the socioeconomic effects of current and future flooding in order ensure decisions are evaluated on a human scale, and history is respected resulting in a positive change for all.

The best approach to ensuring that New Orleans is addressing these problems now and not in fifty years is to start with data, follow with implementation and finish with balance. First, it is our belief that gathering more and better data will help to guide and make future decisions. There are several data topics that would be important but the most paramount is understanding more clearly the critical infrastructure pieces that exist today. By

understanding the City's carrying capacity from an infrastructure perspective, we will be able to pinpoint where, when and what will happen if progress is not made and will start dialogue around what that progress should be. The City of New Orleans is unique in the sense that it is one of the only cities whose stormwater system is so important, so unnatural and so complicated. Rather than this being a negative, though it presents a huge opportunity to ensure this system is state of the art, and future forward and understanding its infrastructure first is key.

Additionally, Sherwood understands that below grade water is just as important as surface flows. The settlement that New Orleans experiences is a result of the manmade infrastructure that is in charge of managing the surface flooding. The pumps and pipe network of New Orleans act both as stormwater discharge relief and as groundwater stabilization pumps. This is a delicate balance that will need to be a priority in order for New Orleans to find success in the next fifty years. There will need to be a delicate balance between managing groundwater rise, stormwater discharge and acceptable flooding. One of the keys to understanding how closely these systems are connected will be through gathering data and understanding the science behind how groundwater is changing and how it will be affected by stormwater proposals of the future. This data will be instrumental in developing a stormwater system that is actually responding to the unique landscape that is New Orleans.

As mentioned earlier, the other key factor to be understanding and considering is not only what is implemented but where new projects are needed and how they can be beneficial to improving the socioeconomics of that area. We would be remiss if we did not couple improvements with human scale considerations. These considerations should include history, wellness, food supply, healthcare and emergency evacuation to name a few. New Orleans is a city that thrives on tradition and this is something that no plan for the future can create but rather it can only be lost. It will be important to ensure that this is never lost but only grows because it is vigorously protected.

Followed by thorough data collecting, evaluation and testing it will then and maybe now (as in today) be time for New Orleans to start implementing these changes. Implementation begins first through education and second by action. The City should lean in to teaching and listening to its constituents. This will help to grow awareness of problems but also stronger support for future progress. This type of engagement will also help to build networks in New Orleans that are multi-faceted. It will be important to continue to consider how stormwater, other utilities and circulation patterns can work together. The product should be something that provides the City and its people with benefits that far exceed stormwater flood reduction but also provides connectivity, community and nature.

In fifty years, with data, science, engineering and nature combined the City of New Orleans will ideally be balancing nature and engineering to optimize system performance. In fifty years, the focus should be less about creating and more about calibrating, advancing and balancing a system that has in place controls that will allow for climate change, sea level rise and resilience while protecting all that makes New Orleans the national treasure it is.

## **QUESTION 2: WHAT WILL BE NEW ORLEANS' BIGGEST WASTEWATER/SEWERAGE CHALLENGES IN 50 YEARS AND WHAT IS THE BEST APPROACH TO INTEGRATED, LONG-RANGE PLANNING TO ADDRESS THOSE CHALLENGES?**

As a major urban coastal center there are serious issues facing New Orleans' wastewater systems now and in the coming decades, including aged infrastructure, sea level rise, emerging contaminants and diseases, complex socio-economic factors and tough urban planning decisions.

Currently, the City's wastewater collection system is aged and experiencing many problems due to old and failing sewers, and the reliance on over eight (80) sewage pump stations. The City's two major wastewater treatment systems are centralized energy intensive activated sludge plants that will continue to cost the City tremendous resources to operate. The topography and hydrology of the City present serious challenges as it relates to both sea level rise and severe climate or storms, unreliable energy supply, which will continue to stress these already fragile systems.

The City will need to look at new ways to manage wastewater and the related infrastructure higher up in the sewersheds moving away from a large centralized system to smaller decentralized district scale systems. A key strategy will be to reduce the need for this aged infrastructure by recycling and reusing wastewater in close proximity to where it is generated and bringing it back into the economy as a vital resource, rather than treating it as a waste management strategy. This will require the City to adopt a more forward thinking and aggressive water recycling program.

Adopting district scale utilities will provide an opportunity for more flexible, lower cost, and creative funding models that can use public-private partnerships (P3) fund both innovative and critical water reuse projects that respond to needs of the City as it transforms over the next 50 years. District scale solutions are more adaptable and scalable to localized conditions and can respond to changes in a more agile way, as compared to larger centralized systems. District scale systems can utilize more innovative, lower energy, compact treatment works that are more resilient than larger centralized systems, because they are less prone to upsets and overflows during extreme storms and are easier to keep online during electrical power outages with smaller localized backup power facilities. Adopting a city-wide water recycling program will reduce the nutrient loads to the Gulf, provide the city with an alternative water supply that can be used to green the city and reduce other significant issues such as temperature rise due heat island effects.

As the City evolves over the next several decades serious urban planning choices will be made including rezoning of areas that will be impacted by sea level rise, the need for higher density development to address housing needs, and institutional, commercial, and industrial areas to support economic growth. These renewed urban areas will provide opportunities for district and decentralized infrastructure that can replace and reduce demands on the older centralized systems.

New Orleans, like all major urban areas world-wide, will be facing continuous and growing public health threats due to both emerging contaminants, new diseases and drug resistant strains of bacteria. Urban wastewater systems are and will continue to be a major conduit for these pollutants and a major challenge to the City will be the surveillance and effective treatment of them. Ideally the strategy will be to put in place effective source control measures and education that does not allow these pollutants to be released to the environment in the first place. Much of these issues will fall on the City's pretreatment program that in turn will need to work with the local health care providers, hospitals and clinics to assure that there are good source control and pretreatment systems in place to remove these pollutants at hot spots throughout the City.

Tackling these complex and expensive infrastructure and public health issues will require a serious paradigm shift from the current wastewater management strategy to a resource recovery and water reuse strategy. Adopting this approach will require putting in place a progressive alternative water supply program, embracing serious and ongoing public outreach and education programs, developing strong public and private partnerships, and making creative and tough urban planning decisions that reflect the diverse socio-economic make up of the city's demographics and potential.

**LOCATION**

New Orleans, Louisiana

**CLIENT**

Greater New Orleans, Inc.

**DESIGN PARTNERS**

Waggoner & Ball Architects

**STATUS**

Services Completed 2014

**PROJECT TYPE**

Eco-District/Master Planning

**SHERWOOD ROLE**

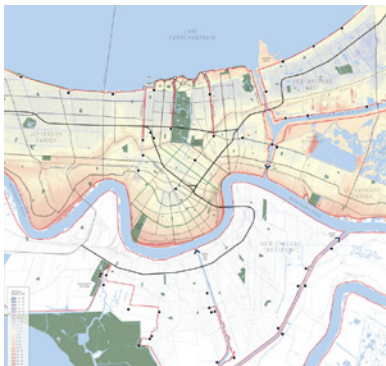
Climate Change  
& Sea Level Rise

## GREATER NEW ORLEANS URBAN WATER PLAN



*A rendering of the outfall canals of Macball London Avenue and a graphical cross section of the canal.*

New Orleans, a vibrant American waterfront city, is actively embracing how to best live with water. In the wake of Hurricane Katrina, urban resiliency is top of mind; water is and will always be part of the city's economic and cultural heritage. Learning how to manage this natural resource—not just in terms of super storms—but in light of New Orleans's heavy annual rainfall and subsidence issues caused by pumping stormwater are critical. "The consequences of the city's current approach to water management, which removes stormwater as fast as possible, are visible in sinking land and broken infrastructure."



Sherwood offered strategic design direction for the Greater New Orleans Urban Water Plan, which outlines an integrated water strategy for the east banks of Orleans and Jefferson Parishes and St. Bernard Parish. The multi-national, multi-disciplinary team believes the new policy standards are world class and set an exemplary bar for municipalities worldwide.



## MIRABEAU WATER GARDEN

### LOCATION

New Orleans, Louisiana

### CLIENT

City of New Orleans

### DESIGN PARTNERS

Waggoner & Ball Architects

### SIZE

25 Acres

### STATUS

Design Phase

### PROJECT TYPE

Sustainable Water Management  
Parks / Open Space



*Above: Mirabeau Water Garden under dry conditions. Below: Site Plan & Mirabeau Water Garden during heavy rain event*

At Mirabeau Water Garden, Sherwood is working closely with the design team to create a functional and aesthetic landscape that incorporates subtle, yet effective, sustainable water management techniques that collect, store, convey and filter the stormwater before being infiltrated back into the soil. The water stored within the park will offset flooding within the watershed while helping to restore the groundwater elevations in an area of the city that has experienced much subsidence over the recent years. This project will revitalize the surrounding neighborhoods by providing a public space for educational and recreational purposes in a vital area while at the same time will reduce flooding and improve the city's stormwater infrastructure system.

**LOCATION**

New Orleans, Louisiana

**CLIENT**

New Orleans Museum of Art

**DESIGN PARTNERS**

Reed Hilderbrand

Lee Ledbetter & Associates

Palminsano

**SIZE**

5 Acres

**STATUS**

Completed 2019

**PROJECT TYPE**

Ecological Design

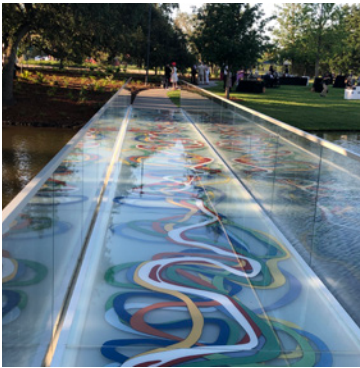
## NOMA SCULPTURE GARDEN EXPANSION



*An bird's eye view of the project site and New Orleans Museum of Art during opening ceremony.*

The Sculpture Garden is an extension of our work on the Greater New Orleans Urban Water Plan where we advised the city on how to live with water. The site is located adjacent to a system of lakes on the southern end of New Orleans' City Park. The runoff from the city tributary to Bayou St John and surrounding areas flows through the site into the intricate network of channels and lakes before eventually out falling into Lake Pontchartrain, making this area of City Park a significant hydraulic corridor for this part of the city.

Sherwood worked with New Orleans Museum of Art and Reed Hilderbrand to implement a low impact development approach that used stormwater best management practices, a floodable site design and enhancement of the visitor experience. The LID stormwater infrastructure features rain gardens and wetlands placed in different areas of the waterfront to cleanse the city water flowing throughout the site before being discharged into the surrounding lakes. The strategically placed natural treatments promote the slowing, storing and re-using water and pumping only when necessary. Water elements were designed to not only manage the inundation of stormwater, but amplify visitor experience and the aesthetic and acoustic qualities of the sculpture garden.







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