

Airport Subsurface Drainage and Drainage Pump Station

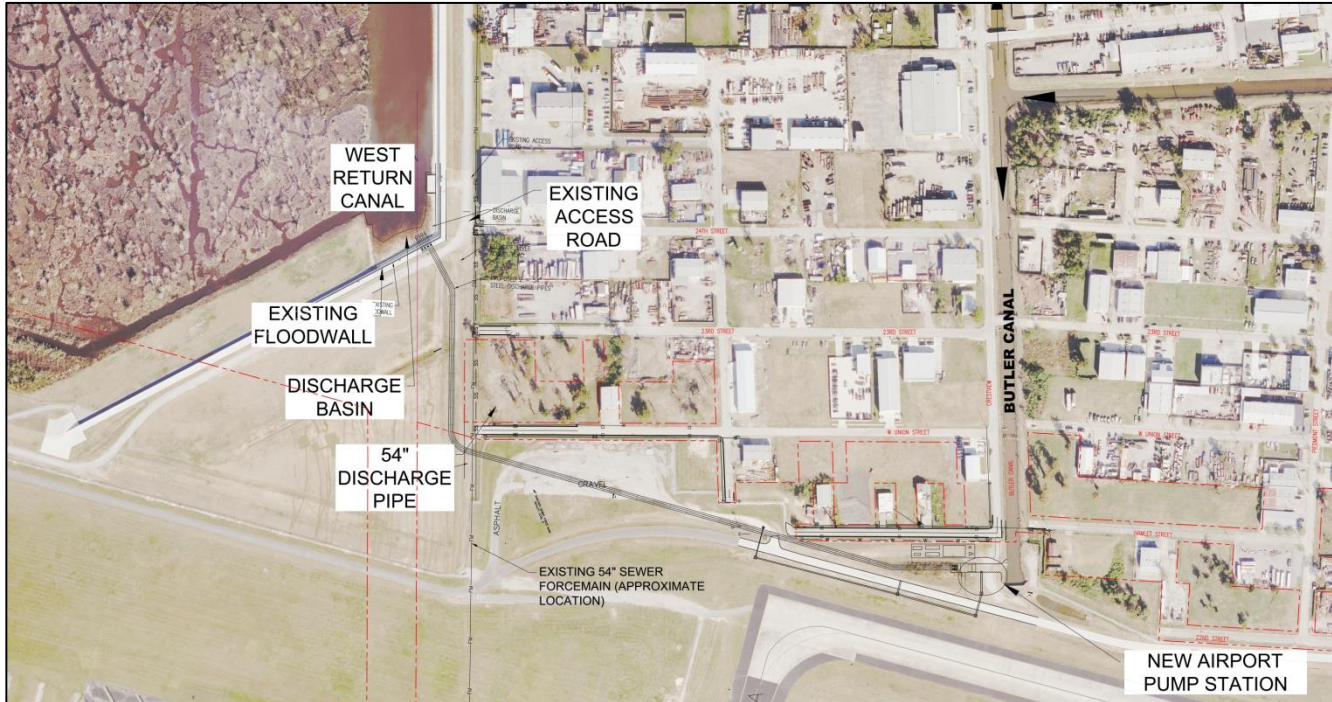
Louis Armstrong New Orleans International Airport
Kenner/New Orleans, LA

Estimated – 2018
\$31,300,000 Pump Station
\$11,300,000 Landside Drainage

Owner New Orleans Aviation Board

Reference Iftikhar Ahmad, Director of Aviation, 504-303-7560

Walter Krygowski, Deputy Director and Chief Operations Officer, 504-303-7551, walterk@flymsy.com



MSMM is providing complete design services for a new 600 cfs stormwater drainage pump station and for all landside drainage as part of constructing a new airport terminal in the New Orleans International airport. The pump station will add 600 cfs of capacity to Jefferson Parish east bank's current capacity of 19,935 cfs, and MSMM is proud to be the sole entity to envision, assess and design this important addition to the region's flood protection abilities. The \$45 million of drainage mitigation being designed by MSMM is a part of the highly anticipated \$826 million of airport improvements to be completed in time for the city's tricentennial anniversary in 2018. While working under extremely compressed schedule, MSMM successfully delivered on a true multi-disciplinary effort spanning civil, structural, electrical, mechanical and environmental engineering, hydraulic modeling (HEC-HMS and HEC-RAS), architectural services, cost estimating, environmental permitting, drafting (CAD, Civil 3D, REVIT, GIS), and agency coordination (COE, CPRA, EJLD, SLFPA-E, LDNR, Entergy, City of New Orleans, City of Kenner, and Jefferson Parish). The station was designed to contain four 150 cfs pumps, each being 44" 8312 LMA TEFC Vertical Pump w/ 800 HP Driver @ 394 RPM.

As part of designing this pump station, MSMM took up and successfully negotiated the challenge of discharging stormwater through a newly built hurricane protection flood wall that is a part of the \$14.5 billion HSDRRS work conducted by the COE subsequent to Hurricane Katrina. As is understandable, the new floodwalls are an extremely crucial part of the storm protection infrastructure of the area, and penetration of that monolith is a very sensitive issue among the various agencies in charge of tending to the structural integrity of the system. MSMM's engineers were up to this challenge. They made the initial contact with COE to obtain preliminary approval on the concept of floodwall penetration by 54" steel discharge pipes (more than 4,000 ft combined run), followed through with detailed structural design calculations, design and drafting, further coordinated with levee authorities and coastal authorities, and eventually secured the highly prized clearances. As of 50% design completion, the structural design alone counted for a third of the 48 sheets of

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pump station plans, involving slab and piles for station, generator, fuel tanks and control building, sheet pile cutoff walls, temporary steel sheet pile TRS system, removal and replacement of floodwall monolith and scour protection, buttress, pipe bents, cofferdam and walers, intake channel and reinforced concrete box culvert, discharge pipe supports, pipe sleeves in floodwall, and discharge basin in West Return Canal.

Another key part of the pump station design involved power, automation, and control/SCADA. Electrical design included 3750 kva transformer, 5 kv Paralleling Switchgear (PSG-1), 2000 kw generator with 500 gallon base tank, 5 kv Motor Control Center (MCC) VFD start with FVNR x 800 HP starters, interior, exterior and emergency lighting, pump Control Panel with level control, 5 kv Load Bank, wiring, conduit, 15,000 gallon above grade diesel fuel tank, and piping for generators.

The landside drainage design effort of MSMM required continuous close coordination with the roadway drainage designers, the terminal designers, and the apron designers. Therefore, MSMM showed extreme flexibility and adaptability to incorporate numerous changes to other designs into MSMM's drainage design via multiple hydraulic modeling exercises, and multiple pipe networking and sizing. More than 5 miles of drainage piping (size range of 15" to 72" diameter), open channels and box culverts were designed by MSMM to route stormwater flow from the terminal to its discharge points.

MSMM also successfully handled the other sensitive issue of operation and control of the pump station. This sensitivity of this subject becomes apparent due to the separate and unique demands of multiple entities – Jefferson Parish, City of Kenner, and the airport. MSMM was able to bring to bear its vast experience with local drainage work, its decades of relationship with local administrations and public works directors, and its intimate knowledge of the forced drainage system of Jefferson Parish to bring consensus among the disparate parties. While allowing the real design work to thus proceed under a common philosophy, this consensus building was extremely important in keeping the project within the comprehensive program wide schedule.

Objectives

- Design brand new 600 cfs stormwater drainage pump station from ground up. The pump station includes intake channel and box culvert, station building and control building, 54" steel discharge pipes, and discharge basin in West Return Canal.
- Ensure acceptable and adequate structural design to allow penetration of floodwall monolith by 54" steel discharge pipes.
- Coordinate with and obtain clearance from jurisdictional authorities such as COE, CPRA, EJLD, SLFPA-E, LDNR, Entergy, City of New Orleans, City of Kenner, and Jefferson Parish.
- Provide complete communication with Jefferson Parish telemetry system via SCADA.
- Provide adequate emergency power via generator and fuel storage.
- Hydraulic modeling (HEC-HMS and HEC-RAS).
- Conduct complete design of landside drainage to route stormwater to discharge locations and pump station.

Work Elements

- Pump station design – civil, electrical, mechanical, ▪ Landside drainage design – civil, environmental,

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architectural, environmental, drafting (CAD, Civil 3D, REVIT, GIS).

- Intake basin, channel, and box culvert
- Pumps and motors (600 cfs, 800 hp)
- Pump station building and foundation
- Formed suction intake
- Motor control center
- Generator and fuel storage
- Discharge pipes and pipe supports
- Penetration of floodwall by discharge pipes, and pipe sleeves
- Removal and reconstruction of floodwall monolith
- Discharge basin
- Valves – butterfly, check, and air release.
- Power, automation, control/SCADA
- Meetings and presentations

drafting (CAD, Civil 3D, REVIT, GIS).

- More than 5 miles of drainage piping (size range of 15” to 72” diameter)
- Open channels
- Box culverts
- Headwalls
- Connection to Butler Canal
- Drainage structures (inlets, manholes, etc.)
- Hydraulic modeling (HEC-HMS and HEC-RAS), report, presentation
- Detailed cost estimates
- Agency coordination
- Coordination with designers of other features of new terminal, surveyors, and geotechnical engineers.
- Permitting
- Prepare construction documents (Plans and Specifications)

