Final Supplemental Environmental Assessment

Slidell City Barn Pump Station Drainage Improvements

St Tammany Parish, Louisiana

Hazard Mitigation Grant Program

Project Number 1603-0321

September 2018

FEMA

U.S. Department of Homeland Security
Federal Emergency Management Agency, Region VI
Louisiana Recovery Office
Baton Rouge, Louisiana

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ABFE	Advisory Base Flood Elevation
BEPA	Bald and Golden Eagle Protection Act
BFE	Base Flood Elevation
BMP	Best Management Practices
CAA	Clean Air Act
CATEX	Categorical Exclusions
CBPS	City Barn Pumping Station
CBRA	Coastal Barrier Resource Act
CBRS	Coastal Barrier Resources System
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
cfs	cubic feet per second
City	City of Slidell, the applicant
CUP	Coastal Use Permit
CWA	Clean Water Act
cy	cubic yards
CZMA	Coastal Zone Management Act
dB	decibels
DFIRM	Digital Flood Insurance Rate Map
DHS	Department of Homeland Security
DNL	Day/Night average Noise Level
EA	Environmental Assessment
ECD	Erosion Control Device
EHP	Environmental and Historic Preservation
EIS	Environmental Impact Statement
EL	Elevation
E.O.	Executive Order
EPA	Environmental Protection Agency
ESA	Endangered Species Act; Environmental Site Assessment
FEMA	Federal Emergency Management Agency
FIS	Flood Insurance Rate Study
FONSI	Finding of No Significant Impact
FPPA	Farmland Protection Policy Act
FWCA	Fish and Wildlife Coordination Act
gpm	gallons per minute
GOHSEP	Louisiana Governor’s Office of Homeland Security and Emergency Preparedness
H and H	Hydrologic and Hydraulic Study and Report
HDCA	H. Davis Cole & Associates, LLC. Engineering
HMGP	Hazard Mitigation Grant Program
HP	Historic Preservation

HSDRRS	Hurricane and Storm Drainage Risk Reduction System
HWY	Highway
LAC	Louisiana Administrative Code
LDEQ	Louisiana Department of Environmental Quality
LDNR	Louisiana Department of Natural Resources
LDWF	Louisiana Department of Wildlife and Fisheries
LESO	Louisiana Ecological Studies Office
LNHP	Louisiana Natural Heritage Program
LPDES	Louisiana Pollutant Discharge Elimination System
LSB	Louisiana State Brownfield
MBTA	Migratory Bird Treaty Act
NAAQS	National Ambient Air Quality Standards
NBEM	National Bald Eagle Management
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NGVD	National Geodetic Vertical Datum
NHPA	National Historic Preservation Act
NLAA	Not Likely to Adversely Affect
NMFS	National Marine Fisheries Service
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Services
NRHP	National Registry of Historic Places
NWI	National Wetlands Inventory
OCM	Office of Coastal Management
OPA	Otherwise Protected Area
OSHA	Occupational Safety and Health Act
PCE	Programmatic Categorical Exclusion
PEA	Programmatic Environmental Assesment
PGP	Programmatic General Permit
PL	Public Law
RCRA	Resource Conservation and Recovery Act
REC	Record of Environmental Consideration
RHA	Rivers and Harbors Act
SDWA	Safe Drinking Water Act
SEA	Supplemental Environmental Assessment
SHPO	State Historic Preservation Office/Officer
SOV	Solicitation of Views
SPOC	Single-Point-of-Contact
THPO	Tribal Historic Preservation Officer
TSCA	Toxic Substance Control Act
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
WSE	Water Surface Elevation

1.0 INTRODUCTION

1.1 Project Authority

Hurricane Katrina, a Category 4 hurricane with a storm surge above normal high tide levels, moved across the Louisiana, Mississippi, Alabama and Florida Gulf Coasts on August 24, 2005. Maximum sustained winds at landfall were estimated at 140 miles per hour. On August 29, 2005, President George W. Bush declared a major disaster for the State of Louisiana and signed a disaster declaration authorizing the Department of Homeland Security's (DHS) Federal Emergency Management Agency (FEMA) to provide federal assistance in designated areas of Louisiana (Hurricane Katrina, DR-1603-LA). FEMA is administering this disaster assistance pursuant to the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), Public Law (PL) 93-288, as amended. Section 404 of the Stafford Act authorizes FEMA's Hazard Mitigation Program (HMGP) to provide funds to states and local governments to implement long-term hazard mitigation measures after a major disaster declaration. Through the Governor's Office of Homeland Security and Emergency Preparedness (GOHSEP), the applicant, the City of Slidell, which will simply be referred to as "City" throughout this document, applied for funding under FEMA's HMGP to reduce localized flooding during and afterstorm events within the area of the city of Slidell (Slidell).

This Draft Supplemental Environmental Assessment (SEA) is being prepared in accordance with the FEMA Instruction 108-1-1 and the DHS Instruction 023-01-001-01, pursuant to Section 102 of the National Environmental Policy Act of 1969 (NEPA), as implemented by the regulations promulgated by the President's Council on Environmental Quality (CEQ) (40 Code of Federal Regulations [CFR] Parts 1500-1508). The draft SEA evaluates the potential impacts of the proposed action. This draft SEA supplements the existing Environmental Assessment (EA) dated January 2017. These assessments evaluate the grant proposal's potential impacts on the physical and human environment. This draft SEA is also used to document compliance with other applicable federal laws and executive orders (E.O.), including the Clean Water Act (CWA), the Clean Air Act (CAA), the Endangered Species Act (ESA), the National Historic Preservation Act (NHPA), E.O. 11988 (Floodplains), E.O. 11990 (Wetlands), and E.O. 12898 (Environmental Justice). The results of this draft SEA will be used to make a decision whether to initiate preparation of an Environmental Impact Statement (EIS) or to prepare a Finding of No Significant Impact (FONSI).

1.2 Project Background and Location

St. Tammany Parish is located in Southeastern Louisiana, and measures approximately 854 square miles, bordered to the east by Pearl River and the state of Mississippi, to the west by the Tchefuncte River and Tangipahoa Parish, to the south by Lake Pontchartrain, and to the north by Washington Parish. Slidell is located in the southeastern part of St. Tammany Parish, and is termed the Northshore area because it is approximately three (3) miles from the north shore of Lake Pontchartrain. Slidell is the parish's largest municipality with approximately 27,526 people according to 2013 Census figures. It has three (3) major interstates, I-10, I-12, and I-59, which form a "cross roads" in the city. Slidell is approximately 30 miles northeast from New Orleans, Louisiana and 82 miles east from Baton Rouge, Louisiana. Figure 1 below displays St. Tammany Parish and the city of Slidell, within the state of Louisiana.

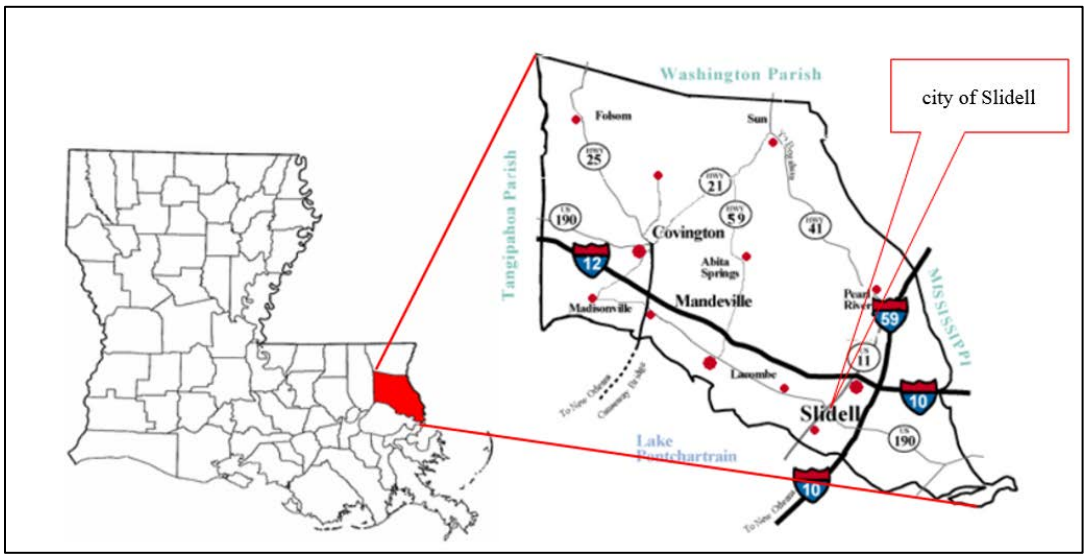

Figure 1. St. Tammany Parish and Slidell, within the State of Louisiana.

Per the applicant's Hydrologic and Hydraulic Study and Report (H and H) dated April 2016, and their updated H and H Report signed and stamped April 27, 2018, the existing City Barn Pumping Station (CBPS) site is located along the U.S. 11 (Front Street) Highway Route. This is at the end of Bayou Lane, and is within the city servitude, at the eastern edge of the Southern Railroad right-of-way. The western edge of the existing City Barn structure is within the Bayou Patassat. Bayou Patassat consists of two (2) major reaches and drains from East to West, reaching its confluence with Bayou Bonfouca (alternatively referred to as the W-13) at the City Barn. The confluence of the two (2) bayous is controlled by the City Barn floodgate facility.

Bayou Patassat extends eastward from Bayou Bonfouca approximately 800 linear feet before passing under Front Street (U.S. 11), then runs approximately 1,000 linear feet through the Olde Town portion of Slidell. The Bayou splits into two (2) branches just west of Carey Street near Glynn H. Brock Elementary School.

The upper branch extends northeast passing through several blocks ending at 10th Street just south of Fremaux Avenue near the W-14 Canal. The lower branch extends south-southeast passing through Greenwood Cemetery before turning more easterly and intersecting Seargent Alfred Drive (3rd Street). The length of Bayou Patassat from the City Barn Pump Station and where it crosses U.S. 11 is approximately 950 feet.

Once crossing under U.S. 11 the Bayou Patassat continues on for approximately 850 feet until splitting off into 1) the northern reach with a length of approximately 4,200 feet and ending at the W-14 canal, and 2) the southern reach with a length of approximately 2,200 feet and ending at 3rd Street (Sgt. Alfred Drive). Generally, Bayou Patassat in the area of City Barn measures approximately 40 feet wide at the top of the bank, and varies in depth from 4 to 10 feet. Figure 2 below displays the existing City Barn location, and the surrounding Bayou Patassat and Bayou Bonfouca Drainages.

Figure 2. City Barn Location and the Bayou Patassat and Bayou Bonfouca Drainages.

The banks on both sides of the Bayou Patassat are a mixture of open easements, which appear to be maintained by the City, along with various municipal, residential and commercial properties.

Based upon a review of the topographic and boundary survey prepared by All South Consulting Engineers, the southern bank of the Bayou Patassat is within property not owned by the City, although some relief is provided by way of servitudes granted to the City. The Bayou Bonfouca bank is generally steep, in some places exceeding a 3:1 (horizontal to vertical) slope. The drainage widens and deepens in the vicinity of the drainage pump station.

The City previously coordinated with the U.S. Army Corps of Engineers (USACE) for upgrades to the CBPS. The City applied for a joint permit application # P20120393 to install mechanical bar screen cleaner assemblies on May 31, 2012. The USACE responded in a letter dated June 18, 2012 stating no permit would be required for the work on the existing pump station. The City received a Coastal Use Permit (CUP) # 20120958 dated March 11, 2015. The previous CUP was for installation of a 4th drainage pump and excavation for a new sump, connected to a new 54-inch diameter by 42-foot long pipe excavated through 288 square feet of the pre-existing levee, for an outfall into Bayou Bonfouca. In addition, on the existing pump station a new 20 foot by 28

foot pre-cast concrete work deck extension elevated above the floodplain was installed, along with new sheet pile, and 491 cubic yards (cy) of the southern bank of Bayou Patassat was excavated. The project also included temporary dewatering to allow for the construction of the new sump.

The City applied for additional upgrades to the CBPS in a joint application submitted to both the Louisiana Department of Natural Resources (LDNR) #P20160522 and the USACE #20120958 on June 14, 2016.

FEMA-EHP previously assessed several proposals for upgrades and improvements to the CBPS to mitigate against future flood events under NEPA Categorical Exclusions (CATEX) in accordance with 44 CFR Part 10.8(d)(2)(III) "Studies that involve no commitment of resources other than manpower and associated funding", (XV) “Repair replace, restore, retrofit, upgrade to current codes and standards, or replace a facility“, (XVI) “Improvements to existing facilities and the construction of small scale hazard mitigation measures”, and the Region VI Programmatic Categorical Exclusion (PCE) "Restoration and/or Improvement of Internal and/or External Facilities Systems and Components", dated August 1, 2010. In addition, one (1) EA was completed on January 2017.

The previous Records of Environmental Considerations (REC), EA, mitigation proposals, and scopes of work on the CBPS are listed in chronological order below:

- 11/5/2009 –CATEX (XVI) REC for straightening of a small section of Bayou Patassat.

- 5/15/2013 –CATEX (III, XV, XVI, and PCE) REC for City Barn new pump station walkway, installation of new bar screen cleaner and new concrete slab deck, consolidation of five (5) other drainage project sites [two (2) of them became the EAs for “Markham-Peachtree” and “Eastwood” Neighborhoods]. This REC also authorized funding of Phase I studies, which resulted in a certified H and H Study, dated June 14, 2014.

- 6/26/2015 – CATEX (XV, XVI) REC was for installation of a fourth (4th) pump at the pumping station, installing additional sheet piling in an existing flood erosion area, extended bar screen support structure, installation of new mechanical bar screen cleaner, miscellaneous channel improvements including excavation of a portion of Bayou Patassat, construction of a bobcat storage deck and loading dock for debris removal, and demolition of existing Waskey access bridge.

- 12/18/15 CATEX (III) REC covered additional Phase I funding for more studies and designs to increase drainage capacity to the CBPS. H and H Studies analyzed alternatives including additional excavation of Bayou Patassat for water storage, and additional sheet piling, and reconstruction of reconfigured bridge.

- 1/29/16 EA covered all the work originally approved in the previous 6/26/15 REC and additional excavation and re-contouring of the upstream bend in Bayou Patassat. The applicant had not started work and requested a change in scope of work that resulted in a NEPA determination from the CATEX to the EA.

2.0 PURPOSE AND NEED

Slidell remains at high risk of water inundation from various sources, including flooding, hurricanes, tropical storms, and thunderstorms. The purpose of the HMGP is to reduce the loss of life and property due to natural disasters and to enable mitigation measures to be implemented during the recovery from a disaster. As documented by Slidell Public Works Department, during the major storms of 1995-2005 and later Hurricane Isaac in 2012 flood damage occurred to residences, commercial and retail industry, streets, utilities and infrastructure surrounding the City Barn Pump Station. Flood protection is needed in this area of Slidell. Per the H and H Studies, this area presents several environmental challenges: the history of chronic flooding, subsidence, and degraded infrastructure. These issues affect both residences and businesses in the area, with negative and sustained impacts on travel along major and minor roads. Given the project's location within Slidell, the surrounding drainage system also suffers added pressure from the heavily developed industrial, commercial, and residential neighborhoods shunting stormwater and overwhelming the drainage system.

As discussed above, the HMGP previously provided funds to add and upgrade existing pumps and bar screen cleaners and to excavate and straighten a portion of Bayou Patassat to increase the water detention and pumping capacity of the City Barn pumping station. According to the four (4) H and H studies, upgrade work on the pumps would help reduce flooding at the site and surrounding areas during storm events.

The purpose of this proposal is to further reduce flooding in Slidell, provide additional capacity to the pumping station, ensure adequate services are provided to residents, and structures are protected during local flooding events and disasters.

3.0 ALTERNATIVES

NEPA requires Federal agencies to consider the effects of a proposed action and any reasonable alternatives on the human and natural environment. Therefore, a key step in the environmental assessment process is to identify a range of reasonable alternatives to be studied in detail in the draft SEA. This step is commonly referred to as an alternatives development and screening process. The purpose is to identify reasonable alternatives to the proposed action to allow for meaningful subsequent comparison of how these alternatives may affect the human and natural environment. This section describes alternatives proposed and considered in addressing the purpose and need.

3.1 Alternative 1 – No Action Alternative.

Although funds to upgrade the CBPS have been approved, the surrounding area still experiences flooding during tropical systems and local heavy storm events. Additionally, the pump station is not operating at full capacity. The No Action Alternative would result in no additional upgrades to the CBPS or increases to pumping capacity. If any of the existing pumps at the City Barn failed to pump water or did not pump enough water during a flood event, this would result in continued hazardous conditions for not only the residents of Slidell, but also businesses and emergency responders who utilize the roadways and live in this area.

3.2 Alternative 2 (Preferred Alternative) – City Barn Pump Station Construction of New Fuel Storage Area, Upgraded Pump and Replaced Drainage Outfall Through the Levee, and Modifications of the Sump Area.

Figure 3. Aerial Photo of Proposed CBPS Project. Google Earth 2018

The specific location for the CBPS proposed improvements would be at approximate Latitude 30.273494 Longitude -89.788233, shown on the Aerial Figure 3. The proposed improvements and upgrades at the existing CBPS would include:

-Construction of a new diesel fuel storage facility to house a 2,000 gallon diesel storage tank, to ensure efficient continuous operation of the City Barn pumps when needed during flooding.

-A new pre-cast concrete work platform on the pump station, from which to safely perform upgrades and maintenance.

-Excavation for removal of the existing 67 cubic feet per second (cfs) pump and its replacement with a 133 cfs pump. The replacement pump would increase the City Barn pumping capacity by 66 gallons per minute (gpm), to an overall capacity of 641 cfs, which would ensure efficient operation during flooding.

-Installation of sheet piling for temporary dewatering within the inlet channel, to install a new drainage pump sump. Modifications of the sump area would allow for greater drawdown to better facilitate regular maintenance.

-Removal of the existing 36-inch outfall in the levee and installation of a new 48-inch outfall pipe. The new outfall pipe would be constructed in the same footprint as the existing outfall pipe for the existing pump. The larger drainage outfall through the levee would be needed to accommodate the new larger pump.

It is important to note that no excavation of Bayou Patassat or Bonfouca would be undertaken outside of the footprint of the existing drainage pumping station sump and outfall area, and no bank stabilization would be completed as a part of this project.

Figure 4 below shows a plan view drawing of the location of the proposed CBPS project sites.

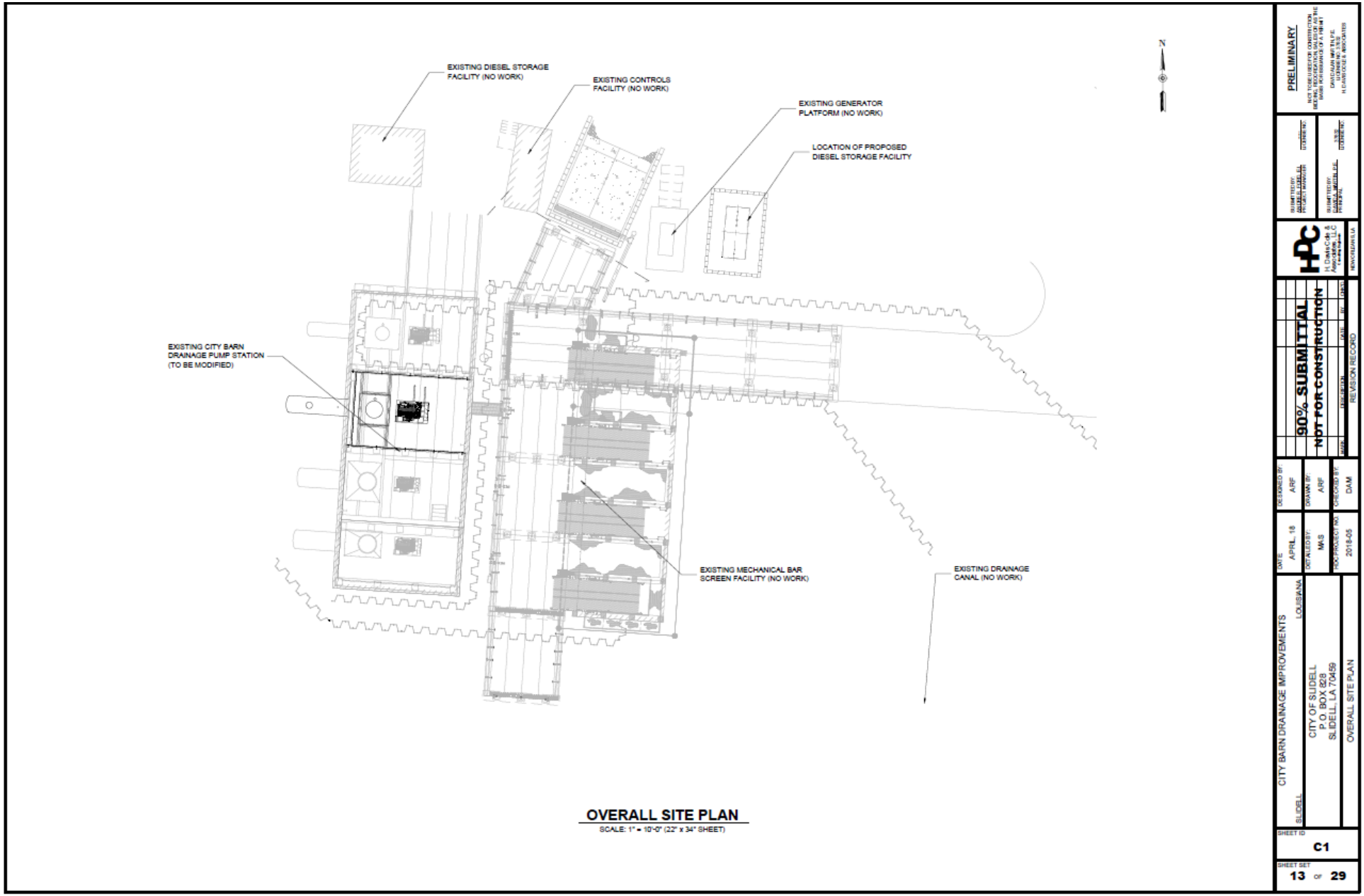

Figure 4. Plan View Drawing of Proposed CBPS Project Site.

The applicant anticipates that the construction sequence would involve modifications of the sump area first, construction of the auxiliary fuel storage area second, and removal and replacement of the drainage pump last. The existing drainage pump station deck would not be removed for this project, and all access would need to be made underneath the pumping station or through existing access grating on the station. The dimensions of the existing pump station structure, fuel storage facility, existing generator platform, and controls and safe house facility would remain unchanged. All construction access and staging would be via existing site roadways and work areas. An overall site plan, excavation plan, structural plan, and utility plan was included in the 90% design submittal (See Appendix B).

The cross section drawings of the modifications to the pump, sump, and outfall area are depicted below on Figure 5.

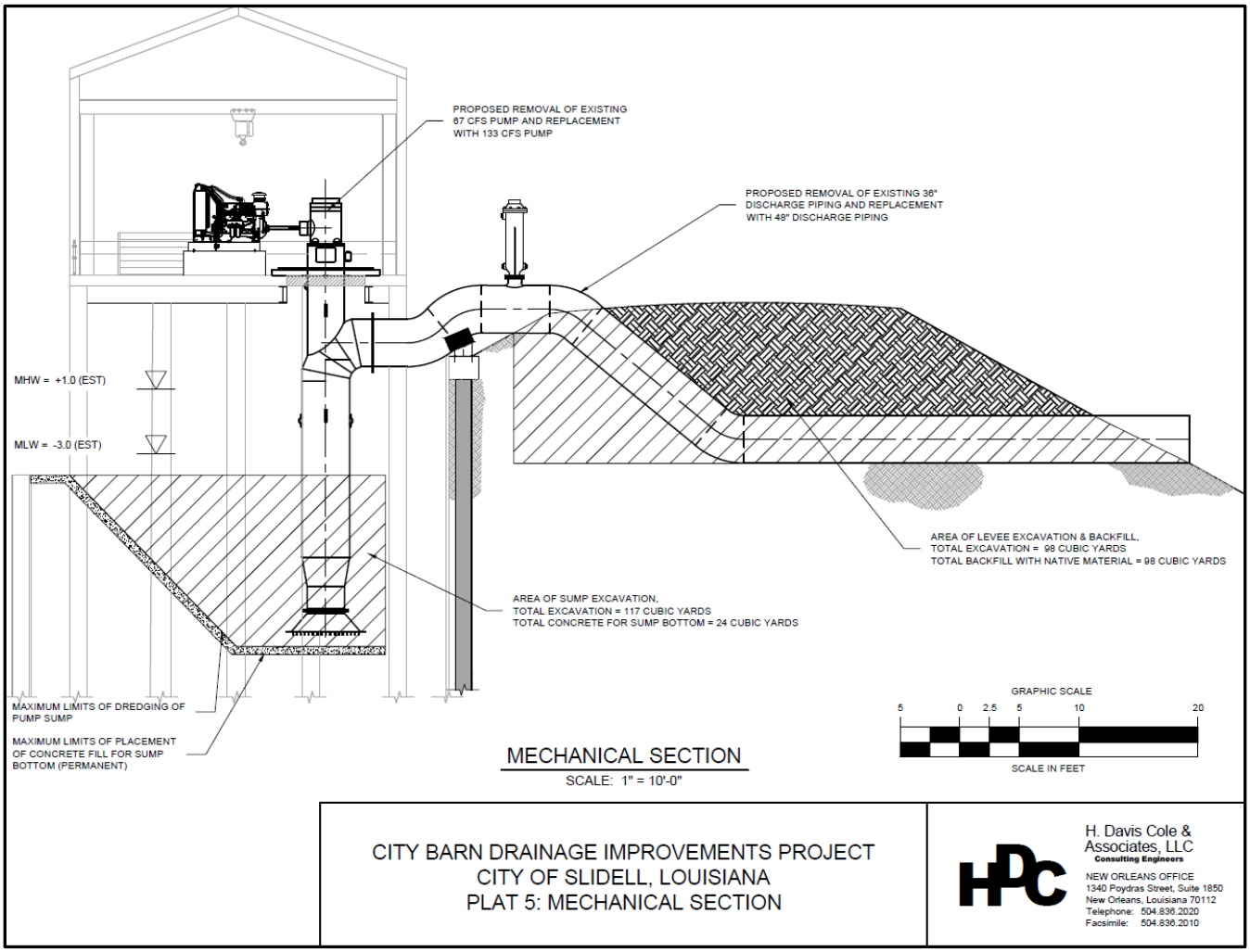

Figure 5. Cross Section Drawings of the City Barn Modifications to the Pump, Sump, and Outfall Area.

3.3 Considered Alternative –Replace an Existing Pump with a 200cfs Pump and Construct a Larger Retention Basin in Bayou Patassat at the CBPS

This alternative proposes to increase the pumping capacity of the pump station and the capacity of water retention in Bayou Patassat. For this alternative, the applicant would replace an existing 67cfs pump with a 200 cfs pump and install a 75 liner feet by 54-inch diameter steel pipe that would discharge through the existing levee and into Bayou Bonfouca. To increase the retention area of the existing basin of Bayou Patassat at City Barn Pump Station, the applicant would excavate about 92,000 cy of material from the basin of Bayou Patassat property. This would provide approximately five (5) additional acres in stormwater detention (Figure 6). According to a soil analysis conducted by the applicant's contractor, 361 liner feet of sheet pile would be added to the steep slope section adjacent to Textron on the bank opposite the CBPS. This bank would fail without the protection of the sheet pile. This alternative meets the purpose and need and is carried forward and evaluated throughout the document.

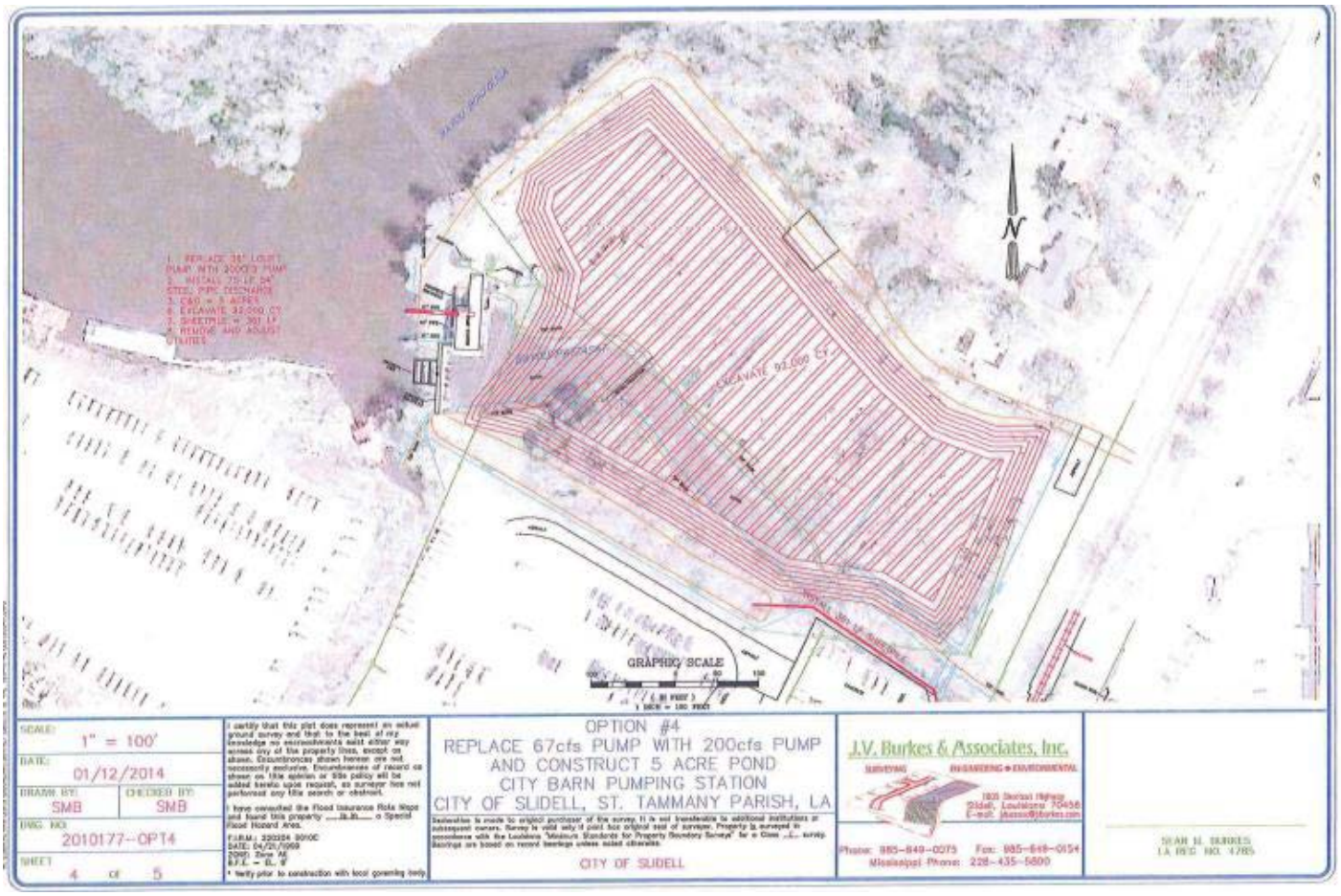

Figure 6. Proposed Site Layout of the Considered Alternative Exhibiting Placement of Outfall Pipe, 200 cfs Pump, Sheet Pile, Excavation area for Five (5) Acre Basin.

3.4 Dismissed Alternatives – Bank Stabilization, Larger Detention Ponds on Private Property Upstream, and a Gravity Outfall.

According to the applicant's engineer, in the development of the project, many alternatives that would have armored the bank of Bayou Bonfouca, and/or created a larger detention basin for

storm water upstream of the pumping station on other private property with a gravity outfall were explored.

The available land for construction of the proposed detention ponds was researched, and this alternative was dismissed due to cost and logistics to acquire and reconfigure any new property. The effort would exceed any benefit toward meeting the purpose and need.

The alternative for construction of a static, flood control structure was also considered that would eliminate the need for pumps by allowing flood waters to flow to Bayou Bonfouca via gravity. This alternative was deemed not feasible due to the fact that tidal influences would seasonally inhibit adequate gravity flow through such a structure. Additionally, an outfall was considered over the existing gravity flow control structure. Because the gravity flow control structure is an operational feature, clearances for access of personnel and equipment would be required. This would require the discharge pipe to go over the gravity control structure at a height appropriate for equipment to pass through. Due to the additional complexity of construction and logistics for crossing the levee at the gravity control structure, this alternative was also dismissed.

4.0 AFFECTED ENVIRONMENT AND IMPACTS

4.1 Impact Summary

The following matrix summarizes the results of the environmental review process (Tables 1 and 2).

FEMA EHP consulted with resource agencies by sending a Solicitation of Views (SOV) on March 30, 2018 with 65% drawings, with a follow up SOV sent April 11, 2018 with 90% construction drawings. The responses from the resource agencies are discussed in Table 1, and copies of the correspondence are provided in Appendix C, External Agency Correspondence.

FEMA EHP has reviewed and assessed whether or not there are potential impacts to the proposed alternative and a considered alternative. The No Action Alternative is used as a baseline analysis for analyzing impacts to the proposed action and alternatives. Potential environmental impacts that were found to be negligible do not get further evaluated. Resource areas with the potential for impacts of minor, moderate, or major intensity are further developed in the subsequent sections.

The No Action Alternative would result in the risk of continued flooding at the project sites from low frequency and major storm events. FEMA has previously funded five (5) flood mitigation proposals for the CBPS, four (4) were for construction activities to detain water until the water could be pumped into Bayou Bonfouca and upgrades to the station to protect it from damage. However, the pumping station does not have the capacity to quickly remove the incoming stormwater from Bayou Patassat and into Bayou Bonfouca.

The No Action Alternative would mean no additional upgrades to the CBPS capacity or increases in the water storage capacity in Bayou Patassat would be undertaken. This would result in continued hazardous conditions for not only the residents of Slidell, but also businesses and emergency responders who utilize the roadways and live in this area.

Definitions of impact intensity are described as:

Negligible: The resource area (e.g., geology) would either not be affected, changes would be non-detectable, or if detected, would have effects that would be slight and local. Impacts would be well below regulatory standards, as applicable. Effects to Cultural Resources would be either non-existent, i.e., a building is less than 50 years old and/or no known archeological sites are present on the site, or the project is determined not likely to affect and State Historic Preservation Officer (SHPO)/Tribal Historic Preservation Officer (THPO) concurs. No mitigation is needed.

Minor: Changes to the resource would be measurable, although the changes would be small and localized. Impacts would be within or below regulatory standards, as applicable. Mitigation measures would reduce any potential adverse effects. Effects to Cultural Resources are not likely, i.e., building is at least 50 years old and/or known archeological sites are near the project area, but special conditions/mitigation are sufficient to maintain the "not likely to affect determination."

Moderate: Changes to the resource would be measurable and have both localized and regional scale impacts. Impacts would be within or below regulatory standards, but historical conditions would be altered on a short-term basis. Mitigation measures would be necessary to reduce any potential adverse effects. Effects to Cultural Resources are likely, i.e., building is 50 years old and/or known archeological sites are in the project area. Impacts would have at least local and possibly regional scale impacts.

Major: Changes would be readily measurable and would have substantial consequences on a local and regional level. Impacts would exceed regulatory standards. Mitigation measures to offset the adverse effects would be required to reduce impacts, although long-term changes to the resource would be expected. Effects to Cultural Resources are likely, i.e., building is at least 50 years old and/or known archeological sites are in the project area. Impacts would have substantial consequences on a local and regional level.

Table 1. Affected Environment and Environmental Consequences Matrix:
Preferred Alternative: CBPS Construction of New Fuel Storage Area, Upgraded Pump and Replaced Drainage Outfall Through the Levee, and Modifications of the Sump Area.

Resource Area	Impact	Impact Summary	Agency Coordination / Permits	Mitigation/Conditions
Geology and Soils	Negligible	The Farmland Protection Policy Act (FPPA: PL 97-98, §§ 1539-1549; 7 U.S.C. 4201, *et seq.*) was enacted in 1981 and is intended to minimize the impact federal actions may have on the unnecessary and irreversible conversion of farmland to non-agricultural uses. It assures that, to the extent possible, federal programs and policies are administered to be compatible with state and local farmland protection policies and programs. Projects are subject to FPPA requirements if they may irreversibly convert farmland (directly or indirectly) to nonagricultural use and are completed by a federal agency or with assistance from a federal agency. Per review of the National Resources Conservation Services (NRCS) Web Soil Survey, the soils located on the proposed project area are predominantly composed of Myatt Fine Sandy Loam and Stough Fine Sandy Loam. These soils are generally frequently flooded and poorly drained, runoff time is long since the slope is nearly level, and the water table is usually high for long periods of time which generally occurs in the winter and spring. These soils are not considered Prime and Unique Farmland and therefore, are exempt from review under the FPPA. Potential for short-term localized increase in soil erosion during construction.	NRCS Web Soil Survey was accessed on 5/10/18 at: http://websoilsury.nrcs.usda.gov confirmed soils on the site are within an urban area and exempt.	Implement construction Best Management Practices (BMPs); install silt fences/straw bales to reduce sedimentation. Area soils would be covered and/or wetted during construction. If fill is stored on site as part of unit installation or removal, the contractor would be required to appropriately cover it. See also Section 6.0 Conditions and Mitigation Measures.
Hydrology and Floodplains (Executive Order 11988)	Minor	E.O. 11988 (Floodplain Management) requires Federal agencies to avoid direct or indirect support or development within the 100-year floodplain whenever there is a practicable alternative. FEMA's regulations for complying with E.O. 11988 are found at 44 CFR Part 9. Slidell enrolled in the National Flood Insurance Program (NFIP) on 12/16/1980. Per Preliminary Digital Flood Insurance Rate Map (DFIRM) Panel Number 22103C0495F, dated 4/30/08, project is located in Zone "AE (EL 11)", areas with in the 100-year flood, Base Flood Elevations (BFE) determined. Per St. Tammany Parish Advisory Base Flood Elevation (ABFE) Map LA-MM40, dated 01/18/06, project is located in an "AE EL 10" Zone. See also Section 4.2 Hydrology and Floodplains, and 8-step process in Appendix E.	Preliminary DFIRM Panels; 22103C0495F dated 4/30/08, St. Tammany Parish ABFE Map LA-MM40, dated 01/18/06	The applicant is required to coordinate with the local floodplain administrator regarding floodplain permit(s) prior to the start of any activities. New construction must be compliant with current codes and standards. Per 44 CFR 9.11(d)(6), no project should be built to a floodplain management standard that is less protective than what the community has adopted in local ordinances through their participation in the NFIP. All coordination pertaining to these activities and applicant compliance with any conditions should be documented and copies forwarded to the state and FEMA for inclusion in the permanent project files. See also Section 6.0 Conditions and Mitigation Measures.

Resource Area	Impact	Impact Summary	Agency Coordination / Permits	Mitigation/Conditions
Wetlands (Executive Order 11990)	Negligible	E.O. 11990, Protection of Wetlands, directs Federal agencies to minimize the destruction, loss, or degradation of wetlands and to preserve and enhance the values of wetlands for federally funded projects. FEMA regulations for complying with E.O. 11990 are found at 44 CFR Part 9, Floodplain Management and Protection of Wetlands. U.S. Fish and Wildlife Service (USFWS) - National Wetlands Inventory (NWI) map queried on 5/10/2018 at https://www.fws.gov/wetlands/Data/Mapper.html shows there are mapped riverine features including Bayou Patassat and Bayou Bonfouca present; however, no wetlands are present on the proposed project areas. See Section 4.3 for further discussion of impacts.	A SOV was prepared and sent to the USACE and the Environmental Protection Agency (EPA) on March 30, 2018 with 65% drawings, with a follow up SOV sent on April 11, 2018 with 90% drawings. The applicant submitted a Revised joint permit application to both LDNR and USACE on March 12, 2018. On March 12, 2018 the USACE determined that the scope of work proposed is similar in scope to the existing Department of the Army Authorization MVN 2012-0958-EII. The Programmatic General Permit (PGP), Category 1 authorization is valid through February 19, 2021. Since the project fits the parameters of the active PGP I authorization, it may be accomplished under that authorization. To date the EPA has not responded to the SOV therefore, based on EPA's previous 7/7/16 no objections determination, FEMA-Environmental & Historic Preservation (EHP) Departmemy assumes EPA does not object to the updated proposal. See Appendix C External Agency Correspondence.	Applicant must comply with all conditions listed in the USACE PGP (MVN 2012-0958-Ell) issued on October 17, 2016, and CUP (P20150247 Revised) issued May 21, 2018 which are found in Appendix C External Agency Correspondence. See also Section 6.0 Conditions and Mitigation Measures.

Resource Area	Impact	Impact Summary	Agency Coordination / Permits	Mitigation/Conditions
Surface Water and Water Quality	Minor	USACE regulates the discharge of dredged or fill material into waters of the U.S., including wetlands, pursuant to §§ 401 and 404 of the CWA. Section 402 of the CWA, entitled National Pollutant Discharge Elimination System (NPDES), authorizes and sets forth standards for state administered permitting programs regulating the discharge of pollutants into navigable waters within the state's jurisdiction. The USACE also regulates the building of structures in waters of the U.S. pursuant to §§ 9 and 10 of the Rivers and Harbors Act (RHA). Although there is potential for short-term localized increase in sedimentation during construction, the project as proposed would not have significant long term impacts to water quality. See Section 4.4 for further discussion of impacts.	A SOV was prepared and sent to the USACE, the EPA and the Louisiana Department of Environmental Quality (LDEQ) by the FEMA on March 30, 2018 with 65% drawings, with a follow up SOV sent on April 11, 2018 with 90% drawings. LDEQ responded in an email dated May 3, 2018 with no objections. To date the EPA has not responded to the SOV therefore, based on EPA's previous 7/7/16 no objections determination, FEMA-EHP assumes EPA does not object to the updated project. The applicant submitted a Revised joint permit application to both LDNR and USACE on March 12, 2018. On March 12, 2018 the USACE determined that the scope of work proposed is similar in scope to existing Department of the Army Authorization MVN 2012-0958-EII. The PGP, Category 1 authorization is valid through February 19, 2021. Since the project fits the parameters of the active PGP I authorization, it may be accomplished under that authorization. See Appendix C External Agency Correspondence.	Applicant must comply with all the USACE PGP (MVN 2012-0958-Ell) issued on October 17, 2016 which are found in Appendix C External Agency Correspondence. If the project results in a discharge to waters of the state, submittal of a Louisiana Pollutant Discharge Elimination System (LPDES) application may be necessary. If the project results in a discharge of wastewater to an existing wastewater treatment system, that wastewater treatment system may need to modify its LPDES permit before accepting the additional wastewater. All precautions should be observed to control nonpoint source pollution from construction activities. LDEQ has stormwater general permits for construction areas equal to or greater than one (1) acre. It is recommended that you contact the LDEQ Water Permits Division at (225) 219-9371 to determine if your proposed project requires a permit. If the project will include a sanitary wastewater treatment facility, a Sewage Sludge and Biosolids Use or Disposal Permit is required. An application or Notice of Intent will be required if the sludge management practice includes preparing biosolids for land application or preparing sewage sludge to be hauled to a landfill. Additional information may be obtained on the LDEQ website at http://www.deq.louisiana.gov/portal/tabid/2296/Default.aspx or by contacting the LDEQ Water Permits Division at (225) 219- 9371. Please be advised that water softeners generate wastewaters that may require special limitations depending on local water quality considerations. Therefore if your water system improvements include water softeners, you are advised to contact the LDEQ Water Permits to determine if special water quality-based limitations will be necessary If any solid or hazardous wastes, or soils and/or groundwater contaminated with hazardous constituents are encountered during the project, notification to LDEQ's Single-Point-of-Contact (SPOC) at (225) 219-3640 is required. Additionally, precautions should be taken to protect workers from these hazardous constituents. See also Section 6.0 Conditions and Mitigation Measures.
Groundwater	Negligible	The Safe Drinking Water Act (SDWA) was originally passed by Congress in 1974 to protect public health by regulating the nation's public drinking water supply. The Southern Hills Aquifer is the source of 90 percent of St. Tammany Parish's water. The project as proposed is not expected to affect any groundwater.	A SOV was prepared and sent to the LDEQ by the FEMA on March 30, 2018 with 65% drawings, with a follow up SOV sent on April 11, 2018 with 90% drawings. LDEQ responded in an email dated May 3, 2018 stating the agency had no objections based on the information provided in the SOV submittal. See Appendix C External Agency Correspondence.	The contractor must observe all precautions to protect the groundwater of the region. Erosion Control Devices (ECDs) such as silt fencing, hay bales, sediment traps, etc. must be used and maintained extensively to prevent any potential direct or indirect adverse impacts to nearby waterways. See also Section 6.0 Conditions and Mitigation Measures.

Resource Area	Impact	Impact Summary	Agency Coordination / Permits	Mitigation/Conditions
Wild and Scenic River	Negligible	The Wild and Scenic Rivers Act (Act), (P. L. 90-543 as amended: 16 U.S.C. 1271-1287) established a method for providing federal protection for certain free-flowing rivers, preserving them and their immediate environments for the use and enjoyment of present and future generations. There are no Wild and Scenic Rivers in the project vicinity.	National Wild and Scenic Rivers http://www.rivers.gov/louisiana.php queried on 5/10/18.	
Coastal Resources	Minor	The Coastal Zone Management Act of 1972 (CZMA) encourages the management of coastal zone areas and provides grants to be used in maintaining coastal zone areas. It is intended to ensure that federal activities are consistent with state programs for the protection and, where possible, enhancement of the nation's coastal zones. The project site is located within the Louisiana Coastal Zone and would require a CUP. See Section 4.5 for further discussion. The USFWS regulates federal funding in Coastal Barrier Resource System (CBRS) units under the Coastal Barrier Resources Act (CBRA). This Act protects undeveloped coastal barriers and related areas (*i.e.*, Otherwise Protected Areas [OPAs]) by prohibiting direct or indirect Federal funding of projects that support development in these areas. The project is not located within the CBRS. See Section 4.5 for further discussion.	The applicant submitted a Revised joint permit application to both LDNR and USACE on March 12, 2018. The LDNR Office of Coastal Management (OCM) issued the Revised CUP (P20150247 Revised) on May 21, 2018. See Appendix C External Agency Correspondence.	Applicant must comply with all conditions listed in the CUP (P20150247 Revised) issued May 21, 2018 which are found in Appendix C External Agency Correspondence. The expiration date of this revised permit is five (5) years from the date of the signature of the Secretary or his designee on the original permit which was September 9, 2015. If the Coastal Use is not completed within this five (5) year period, an extension may be granted pursuant to the requirements contained in the Rules and Procedures for Coastal Use Permits (Louisiana Administrative Code (LAC) 43:I.723(D)) The applicant shall comply with all conditions of the required permit. All coordination pertaining to these activities and applicant compliance with any conditions should be documented and copies forwarded to the state and FEMA for inclusion in the permanent project file. See also Section 6.0 Conditions and Mitigation Measures.
Air Quality	Negligible	The CAA requires the State of Louisiana to adopt ambient air quality standards to protect the public from potentially harmful amounts of pollutants. The LDEQ has designated areas meeting the state's ambient air quality standards by their monitoring and modeling program efforts. During construction, there is potential for a short-term localized increase in vehicle emissions and dust particles. St. Tammany Parish is classified as attainment under the National Ambient Air Quality Standards (NAAQS) and has no general conformity determination obligations. Overall impacts to air quality would be short-term and localized.	A SOV was prepared and sent to the LDEQ by the FEMA on March 30, 2018 with 65% drawings, with a follow up SOV sent on April 11, 2018 with 90% drawings. LDEQ responded in an email dated May 3, 2018 stating the agency had no objections based on the information provided in the SOV submittal. See Appendix C External Agency Correspondence.	Any renovation or remodeling must comply with LAC 33:III.Chapter 28, Lead-Based Paint Activities; LAC 33:III.Chapter 27, Asbestos-Containing Materials in Schools and State Buildings (includes all training and accreditation); and LAC 33:III.5151, Emission Standard for Asbestos for any renovations or demolitions. Vehicle operation times would be kept to a minimum. Area soils must be covered and/or wetted during construction to minimize dust. See also Section 6.0 Conditions and Mitigation Measures.

Resource Area	Impact	Impact Summary	Agency Coordination / Permits	Mitigation/Conditions
Vegetation and Wildlife	Negligible	The Fish and Wildlife Coordination Act (FWCA) provides the basic authority for the USFWS involvement in evaluating impacts to fish and wildlife from proposed water resource development projects. It requires that fish and wildlife resources receive equal consideration to other project features. It also requires Federal agencies that construct, license or permit water resource development projects to first consult with the Service (and the National Marine Fisheries Service [NMFS] in some instances) and State fish and wildlife agency regarding the impacts on fish and wildlife resources and measures to mitigate these impacts. The site is heavily pre-disturbed, in a developed urban area. No impacts to vegetation and wildlife are anticipated. Louisiana Department of Wildlife and Fisheries (LDWF) SOV response letter dated April 19, 2018 states after careful review of their database, no impacts to rare, threatened, or endangered species or critical habitats within Louisiana's boundary are anticipated for the proposed project. No state or federal parks, wildlife refuges or scenic streams are known at the specified site within Louisiana's boundaries.	A SOV was prepared and sent to the LDWF by the FEMA on March 30, 2018 with 65% drawings, with a follow up SOV sent on April 11, 2018 with 90% drawings. LDWF responded in an email dated April 19, 2018 stating no impacts to rare, threatened, or endangered species or critical habitats are anticipated for the proposed project. See Appendix C External Agency Correspondence.	Extreme care must be taken during the construction process through the appropriate use and maintenance of BMPs. If at any time Heritage tracked species are encountered within the project area, please contact the Louisiana Natural Heritage Program (LNHP) Data Manager at 225-765-2643. See also Section 6.0 Conditions and Mitigation Measures.

Resource Area	Impact	Impact Summary	Agency Coordination / Permits	Mitigation/Conditions
Threatened and Endangered Species (Endangered Species Act Section 7)	Negligible	The Endangered Species Act (ESA) of 1973 prohibits the taking of listed, threatened, and endangered species unless specifically authorized by permit from the USFWS or the NMFS. Under provisions of section 7(a)(2) of the Endangered Species Act, a Federal agency that carries out, permits, licenses, funds, or otherwise authorizes activities that may affect a listed species must consult with the Fish and Wildlife Service to ensure that its actions are not likely to jeopardize the continued existence of any listed species. Per USFWS self-screening website, USFWS generated a "no affect" determination for the West Indiana Manatee and Red Cockaded Woodpecker; and a "may affect, not likely to adversely affect" (NLAA) determination for the gopher tortoise. The NLAA determination is defined as effects on listed species are expected to be discountable, insignificant, or completely beneficial. Beneficial effects are contemporaneous positive effects without any adverse effects to the species. Insignificant effects relate to the size of the impact and should never reach the scale where take occurs. Discountable effects are those extremely unlikely to occur. Based on best judgment, a person would not: (1) be able to meaningfully measure, detect, or evaluate insignificant effects; or (2) expect discountable effects to occur. If the Federal agency determines that the action is not likely to adversely affect listed species (e.g., the effects are beneficial, insignificant, or discountable), and the Service agrees with that determination, the Service provides concurrence in writing and no further consultation is required. However, based on FEMA-EHP's review of the site, and close coordination with USFWS, FEMA has determined there are no rare, threatened, or endangered species present in the project impact area. No impacts to rare, threatened, or endangered species or critical habitats are anticipated for the proposed project. No state or Federal parks, wildlife refuges, or wildlife management areas are known at the site. In addition, LDWF responded to the SOV stating no impacts to rare, threatened, or endangered species or critical habitats are anticipated for the proposed project. Therefore, FEMA determines there to be a no effect for the gopher tortoise.	As previously directed by USFWS, FEMA utilized the self-screening website at http://www.fws.gov/lafayette/pdc/default.aspx on 5/10/18. A SOV was prepared and sent to the LDWF by the FEMA on March 30, 2018 with 65% drawings, with a follow up SOV sent on April 11, 2018 with 90% drawings. FEMA consulted with USFWS via conference call on 6/27/18. LDWF responded in an email dated April 19, 2018 stating no impacts to rare, threatened, or endangered species or critical habitats are anticipated for the proposed project. See Appendix C External Agency Correspondence.	Any changes to the scope or location of the proposed project or if the project has not been initiated one (1) year from the date of the USFWS no effect concurrence with the solicitation of views (May 21, 2018), the applicant is responsible for notifying FEMA for further coordination with USFWS. See also Section 6.0 Conditions and Mitigation Measures.

Resource Area	Impact	Impact Summary	Agency Coordination / Permits	Mitigation/Conditions
Other Federally Protected Species	Negligible	The Migratory Bird Treaty Act (MBTA) of 1918 (16 U.S.C. 703-712) prohibits pursuing; hunting; taking; capturing; killing; attempting to take, capture, or kill; possessing; offering for sale; selling; offering to purchase; purchasing; delivering for shipment; shipping; causing to be shipped; delivering for transportation; transporting; causing to be transported; carrying or causing to be carried by any means whatever; receiving for shipment, transportation, or carriage; or exporting; at any time or in any manner, any migratory bird or any part, nest, or egg of any such bird, that is included on the list of protected bird species, unless otherwise permitted by regulation, (General Provisions; Revised List of Migratory Birds 2013). The USFWS is responsible for enforcing the provisions of this Act. The Bald and Golden Eagle Protection Act (BEPA) (16 USC 668-668c), enacted in 1940, prohibits anyone, without a permit issued by the Secretary of the Interior, from taking bald eagles, including their parts, nests, or eggs with the term “take” meaning to pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb. The Mississippi River Flyway hosts the world’s largest bird migration. Approximately 70% of migratory waterfowl in the U.S. use the flyway. The project area may provide nesting habitat for the bald eagle (*Haliaeetus leucocephalus*) which was officially removed from the List of T & E Species as of August 8, 2007. However, the bald eagle remains protected under the BGEPA (54 Stat. 250, as amended, 16 U.S.C. 668a-d) and the MBTA (40 Stat. 755, as amended; 16 U.S.C. 703 et seq.). LDWF has not collected comprehensive bald eagle survey data since 2008, and new active, inactive, or alternate nests may have been constructed within the proposed project area since that time. In southern Louisiana parishes, eagles typically nest in mature trees (e.g., baldcypress, sycamore, willow, etc.) near fresh to intermediate marshes or open water. Bald eagles may also nest in mature pine trees near large lakes in central and northern Louisiana. Per USFWS self-screening website, USFWS concluded that Migratory Bird Conservation Recommendations be included as conditions to the project.	As previously directed by USFWS, FEMA utilized the self-screening website at http://www.fws.gov/lafayette/pdc/default.aspx on 5/10/18. A SOV was prepared and sent to the LDWF by the FEMA on March 30, 2018 with 65% drawings, with a follow up SOV sent on April 11, 2018 with 90% drawings. LDWF responded in an email dated April 19, 2018 stating no impacts to rare, threatened, or endangered species or critical habitats are anticipated for the proposed project. Per USFWS self-screening website, USFWS concluded that Migratory Bird Conservation Recommendations be included as conditions to the project. See Appendix C External Agency Correspondence.	During the project impact analysis process developers should identify project-related impacts to migratory birds and the conservation measures that will be used to mitigate them. For additional Migratory Bird Conservation recommendations, guidance and tools to help reduce impacts to birds and their habitats please visit the Louisiana Ecological Services Office (LESO) webpage: https://www.fws.gov/lafayette/Migratory _Birds/MigBird.html and the Service's Migratory Bird Program Webpage (https://www.fws.gov/birds/bird-enthusiasts/threats-tobirds/collisions/communication-towers.php). The applicant must review the National Bald Eagle Management (NBEM) Guidelines is available at: http://www.fws.gov/migratorybirds/pdf/management/nationalbaldeaglenanagementguidelines.pdf to minimize potential project impacts to bald eagles, particularly where such impacts may constitute "disturbance," which is prohibited by the BGEPA If a bald eagle nest occurs or is discovered within 660 feet of the proposed project area, then USFWS requires an evaluation to be performed to determine whether the project is likely to disturb nesting bald eagles. The applicant is required to conduct the evaluation on-line at: https://www.fws.gov/southeast/our-services/eagle-technical-assistance. Following completion of the evaluation, that website will provide a determination of whether additional consultation is necessary. All coordination pertaining to these activities should be documented and copies forwarded to the state and FEMA as part of the permanent project files USFWS recommends that a qualified biologist inspect the proposed work site for the presence of undocumented nesting colonies during the nesting season because some waterbird colonies may change locations year-to-year. To minimize disturbance to colonial nesting birds please refer to the colonial nesting waterbird guidance on the LESO Web page https://www.fws.gov/lafayette/Migratory _Birds/MigBird.html. See also Section 6.0 Conditions and Mitigation Measures.

Resource Area	Impact	Impact Summary	Agency Coordination / Permits	Mitigation/Conditions
Cultural Resources (National Historic Preservation Act (NHPA), Section 106)	Negligible	The consideration of impacts to historic and cultural resources is mandated under Section 101(b) 4 of the NEPA as implemented by 40 CFR Part 1501-1508. Section 106 of the NHPA requires Federal agencies to take into account their effects on historic properties (i.e. historic and cultural resources, including American Indian Cultural Sites) and allow the Advisory Council on Historic Preservation an opportunity to comment. Additionally, it is policy of the Federal government to consult with Indian Tribal Governments and a Government-to-Government basis as required in Executive orders 13175. FEMA has chosen to address potential impacts to historic properties through the "Section 106 consultation process" of NHPA as implemented through 36 CFR Part 800. A total of five (5) extant structures were recorded within the property; the Automotive Maintenance Center, the Lunchroom Building, the Surplus Oil Building, the Carpentry Shop, and the Pump Station Shed. FEMA determined that none of these buildings were eligible for the National Register of Historic Places (NRHP), nor were they located within a NRHP listed or eligible district. Based on FEMA's review of existing documentation, data regarding archaeological sites provided by SHPO, historic maps, site visits and previous Section 106 consultations, FEMA determined that the City Barn Pump Station Facility is unlikely to contain NRHP eligible archaeological resources as the facility is largely comprised of modern man-made berm, is a heavily utilized industrial area, and/or does not contain archaeological deposits. Based on the aforementioned identification and evaluation, FEMA determined that there are no historic properties within the project area. In order to fulfill its responsibilities under Section 106 of the NHPA, FEMA initiated consultation on this project in 2015, in accordance with the "Programmatic Agreement Among the Federal Emergency Management Agency, the Louisiana State Historic Preservation Officer, the Governor's Office of Homeland Security and Emergency Preparedness, and Participating Tribes" executed on August 17, 2009, as amended (LA Statewide PA). The LA Statewide PA was created to streamline the Section 106 review process. The current proposal was reviewed in accordance with Stipulation III.A of the new LA Statewide PA, executed on December 21, 2016, as amended. This stipulation allows FEMA to approve previously reviewed projects if the determination still applies.	FEMA submitted a finding of No Historic Properties Affected to the LA SHPO and the affected tribes (the Alabama-Coushatta Tribe of Texas, the Choctaw Nation of Oklahoma, Coushatta Tribe of Louisiana, the Jena Band of Choctaw Indians, the Mississippi Band of Choctaw Indians, and the Tunica-Biloxi Tribe of Louisiana) on May 18, 2015 for a 30-day consultation period. SHPO concurrence was received on May 21, 2015. On June 19, 2015, the Choctaw Nation of Oklahoma submitted a written response concurring with the determination. The remaining Tribes did not respond within the regulatory timeframes; therefore, in accordance with Stipulation II.C.4 of the 2016 Louisiana Statewide PA and 36 CFR part 800.5(c)1, FEMA may proceed with funding the undertaking assuming concurrence. However, because the investigations were not exhaustive, the applicant must comply with the NHPA conditions set forth in this SEA.	If human bone or unmarked grave(s) are present within the project area, compliance with the LA Unmarked Human Burial Sites Preservation Act (R.S. 8:671 et seq.) is required. The applicant shall notify the law enforcement agency of the jurisdiction where the remains are located within 24 hours of the discovery. The applicant shall also notify FEMA and the LA Division of Archaeology at 225-342-8170 within 72 hours of the discovery. (LA Unmarked Human Burial Sites Preservation Act) If during the course of work, archaeological artifacts (prehistoric or historic) are discovered, the applicant shall stop work in the vicinity of the discovery and take all reasonable measures to avoid or minimize harm to the finds. The applicant shall inform their, GOSHEP State Applicant Liaison and Hazard Mitigation Assistance contacts at FEMA, who would in turn contact FEMA Historic Preservation (HP) staff. The applicant would not proceed with work until FEMA HP completes consultation with the SHPO, and others as appropriate (Inadvertent Discovery Clause). See also Section 6.0 Conditions and Mitigation Measures.

Resource Area	Impact	Impact Summary	Agency Coordination / Permits	Mitigation/Conditions
Environmental Justice (Executive Order 12898)/Socioeconomics	Negligible	E.O. 12898, entitled "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," was signed on February 11, 1994. The E.O. directs federal agencies to make achieving environmental justice part of their missions by identifying and addressing, as appropriate, disproportionately high adverse human health, environmental, economic, and social effects of its programs, policies and activities on minority or low-income populations. According to the 2010 U.S. Census Demographic Profile of Slidell, LA: the total population is 27,068 with 76% White, 17% Black, 6.3% Hispanic, and 1.6% Asian. The median household income is $48,122 and 12.5% of the population is below poverty level. The proposed project would reduce flooding in the area, thus providing a benefit to all populations in the area.	U.S. Census Bureau, American Fact Finder, Data for Slidell in St Tammany Parish, Louisiana accessed 5/10/18.	
Resource Conservation and Recovery Act (RCRA)	Negligible	The objectives of the RCRA are to protect human health and the environment from the potential hazards of waste disposal, to conserve energy and natural resources, to reduce the amount of waste generated, and to ensure that wastes are managed in an environmentally sound manner. RCRA regulates the management of solid waste (e.g., garbage), hazardous waste, and underground storage tanks holding petroleum products or certain chemicals. Project involves excavation of soil and existing bridge bents and/or piping. All debris would be disposed of at a permitted landfill.	A SOV was prepared and sent to the LDEQ by the FEMA on March 30, 2018 with 65% drawings, with a follow up SOV sent on April 11, 2018 with 90% drawings. LDEQ responded in an email dated May 3, 2018 stating the agency had no objections based on the information provided in the SOV submittal. See Appendix C External Agency Correspondence.	Applicant must take any necessary steps to obtain and/or update all necessary approvals and environmental permits regarding this proposed project. Unusable equipment, debris and material shall be disposed of in an approved manner and location. The applicant shall handle, manage, and dispose of petroleum products, hazardous materials and/or toxic waste in accordance with all local, state and Federal agency requirements. All coordination pertaining to these activities should be documented and copies forwarded to the state and FEMA as part of the permanent project files. All debris would be disposed of at a permitted landfill. Any renovation or remodeling must comply with LAC 33:III.Chapter 28, Lead-Based Paint Activities; LAC 33:III.Chapter 27, Asbestos-Containing Materials in Schools and State Buildings (includes all training and accreditation); and LAC 33:III.5151, Emission Standard for Asbestos for any renovations or demolitions. If any solid or hazardous wastes, or soils and/or groundwater contaminated with hazardous constituents are encountered during the project, notification to LDEQ's SPOC at (225) 219-3640 is required. Additionally, precautions should be taken to protect workers from these hazardous constituents. See also Section 6.0 Conditions and Mitigation Measures.
Noise	Negligible	Noise is commonly defined as unwanted or unwelcome sound, and most commonly measured in decibels (dB) on the A-weighted scale, which is the scale most similar to the range of sounds that the human ear can hear. Sound is federally regulated by the Noise Control Act of 1972, which charges the EPA with preparing guidelines for acceptable ambient noise levels. EPA guidelines, and those of many other federal agencies, state that outdoor sound levels in excess of 55 dB day-night average noise level (DNL) are "normally unacceptable" for noise-sensitive land uses including residences, schools, or hospitals. During the construction period there would be a short-term increase in noise levels.	Slidell Code of Ordinances, in Chapter 13 - ENVIRONMENT [1], ARTICLE I. - IN GENERAL, Sec. 13-1. - Noise. This Code of Ordinance is found online at the Slidell's website: https://www.municode.com/library/la/slidell/codes/code_of_ordinances?nodeId=11576	Mitigation and abatement measures would be required to reduce the noise levels to a range that would be considered acceptable. The applicant must comply with the local noise ordinance. Slidell Ordinance for dB limits is as follows: Industrial at all times 85 dB Commercial 7:00 a.m. to 10:00 p.m. 75 dB, and 10:00 p.m. to 7:00 a.m. 65 dB Residential 7:00 a.m. to 10:00 p.m. 70 dB, and 10:00 p.m. to 7:00 a.m. 65 dB Two-family or multifamily/intra-dwelling 7:00 a.m. to 10:00 p.m. 60 dB and 10:00 p.m. to 7:00 a.m. 50 dB See also Section 6.0 Conditions and Mitigation Measures.

Resource Area	Impact	Impact Summary	Agency Coordination / Permits	Mitigation/Conditions
Public Safety and Access	Negligible	Congress passed the Occupational and Safety Health Act (OSHA) to ensure worker and workplace safety. The goal was to make sure employers provide their workers a place of employment free from recognized hazards to safety and health, such as exposure to toxic chemicals, excessive noise levels, mechanical dangers, heat or cold stress, or unsanitary conditions. During construction heavy equipment would be located in a non-populated area on city owned property with limited access to personnel. Impacts to public safety and security would be minimized with mitigation measures, including following OSHA regulations.		The contractor must place fencing around the work area perimeters to protect nearby residents from vehicular traffic. To minimize worker and public health and safety risks from project construction and closure, all construction and closure work must be done using qualified personnel trained in the proper use of construction equipment, including all appropriate safety precautions. Additionally, all activities must be conducted in a safe manner in accordance with the standards specified in OSHA regulations and the USACE safety manual. The contractor must post appropriate signage and fencing to minimize potential adverse public safety concerns. See also Section 6.0 Conditions and Mitigation Measures.
Traffic and Transportation	Negligible	The area is not accessible to the public. Truck and equipment traffic volumes along the access to the U.S. 11 (Front Street) Highway Route would increase temporarily during work activities.		Appropriate signage and barriers should be in place prior to construction activities in order to alert pedestrians and motorists of project activities and traffic pattern changes. The contractor must implement traffic control measures, as necessary. See also Section 6.0 Conditions and Mitigation Measures.

Hazardous Materials and Toxic Wastes	Negligible	The management of hazardous materials is regulated under various federal and state environmental and transportation laws and regulations, including the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA); the Toxic Substances Control Act of 1976 (TSCA); the Emergency Planning and Community Right-to-Know Act; the Hazardous Materials Transportation Act; and the Louisiana Voluntary Investigation and Remedial Action statute. The purpose of the regulatory requirements set forth under these laws is to ensure the protection of human health and the environment through proper management (identification, use, storage, treatment, transport, and disposal) of these materials. Some of these laws provide for the investigation and cleanup of sites already contaminated by releases of hazardous materials, wastes, or substances. Per NEPAssist database search, there are no active Louisiana State Brownfield (LSB), Superfund, hazardous waste (RCRA), or Toxic Release Inventory sites located within 0.5 mile of the sites. However, there is one (1) Superfund site, the American Creosote Works, Inc. operated American Creosote Works Plant, within 0.75 miles of the site. The Bayou Bonfouca (American Creosote) site covers 55 acres in Slidell, Louisiana. In 1970, after creosote spilled from tanks during a fire, the site was abandoned. The creosote spill, as well as pre-environmental regulation standard plant operation practices and methods of waste disposal, significantly contaminated sediments in Bayou Bonfouca and the surrounding area. In July 2016, the USEPA performed a five-year follow-on review of the site. According to the report produced by the USEPA, the site's current mitigation efforts consist of remedial actions including groundwater extraction and on-site treatment and the capping of waste material remaining on site. A portion of the site is currently being used by the City of Slidell Department of Public Works and a portion is being used by the City of Slidell Parks and Recreation Department for the Heritage Park, which is a public park with pavilions, accessible walking trails, a boat ramp, and views of Bayou Bonfouca. There are no known exposures to contaminated sediment, soil, or groundwater. Current institutional controls restrict altering elements of the remedy and disturbing or removing soil or groundwater on the site parcel. The LDEQ now maintains the site's ground water pump and treat system and performs routine groundwater monitoring. Today, the efforts of site owners, LDEQ, EPA, and the City have restored over a mile of the Bayou for aquatic life and recreational and public reuse. Following cleanup, operation and maintenance activities and groundwater treatment and monitoring are ongoing. Based on results of the current and previous five-year reports, the remedial actions discussed above are considered by the EPA to be "short-term protective" only.	A SOV was prepared and sent to the LDEQ by the FEMA on March 30, 2018 with 65% drawings, with a follow up SOV sent on April 11, 2018 with 90% drawings. LDEQ responded in an email dated May 3, 2018 stating the agency had no objections based on the information provided in the SOV submittal. NEPAssist-EPA website http://nepassisttool.epa.gov/nepassist/entry.aspx. referenced 5/10/18 See Appendix C External Agency Correspondence.	If hazardous materials are unexpectedly encountered in the project area during the proposed construction operations, appropriate measures for the proper assessment, remediation, management and disposal of the contamination would be initiated in accordance with applicable federal, state, and local regulations. The contractor would be required to take appropriate measures to prevent, minimize, and control the spill of hazardous materials in the construction area. Any renovation or remodeling must comply with LAC 33:III.Chapter 28, Lead-Based Paint Activities; LAC 33:III.Chapter 27, Asbestos-Containing Materials in Schools and State Buildings (includes all training and accreditation); and LAC 33:III.5151, Emission Standard for Asbestos for any renovations or demolitions If any solid or hazardous wastes, or soils and/or groundwater contaminated with hazardous constituents are encountered during the project, notification to LDEQ's SPOC at 225-219-3640 is required. Additionally, precautions should be taken to protect workers from these hazardous constituents. The LDNR Office of Conservation should be contacted at 225-342-5540 if any unregistered wells of any type are encountered during construction work. For pipelines and other underground hazards, Louisiana One Call should be contacted at 800-272-3020 prior to commencing operations. See also Section 6.0 Conditions and Mitigation Measures.

Resource Area	Impact	Impact Summary	Agency Coordination / Permits	Mitigation/Conditions
		Additional actions will be required for the remedy to be protective over the long-term. Although, work occurs within portions of Bayou Bonfouca and Bayou Pattasat, none of the proposed improvements would occur within the footprint of the Bayou Bonfouca site. Per the LDEQ response dated May 3, 2018, the agency has no objections based on the information provided in the SOV submittal. However, conditions were included in the LDEQ response.		

Table 2. Affected Environment and Environmental Consequences Matrix:
Considered Alternative: Replace an Existing Pump a with a 200cfs Pump, and Construct a Larger Retention Basin in Bayou Patassat at the CBPS.

Resource Area	Impact	Impact Summary	Agency Coordination / Permits	Mitigation/Conditions
Geology and Soils	Negligible	The FPPA: P.L. 97-98, §§ 1539-1549; 7 U.S.C. 4201, *et seq*.) was enacted in 1981 and is intended to minimize the impact federal actions may have on the unnecessary and irreversible conversion of farmland to non-agricultural uses. It assures that, to the extent possible, federal programs and policies are administered to be compatible with state and local farmland protection policies and programs. Projects are subject to FPPA requirements if they may irreversibly convert farmland (directly or indirectly) to nonagricultural use and are completed by a federal agency or with assistance from a federal agency. Per review of the NRCS Web Soil Survey, the soils located on the proposed project area are predominantly composed of Myatt Fine Sandy Loam and Stough Fine Sandy Loam. These soils are generally frequently flooded and poorly drained, runoff time is long since the slope is nearly level, and the water table is usually high for long periods of time which generally occurs in the winter and spring. These soils are not considered Prime and Unique Farmland and therefore, exempt from review under the FPPA. Potential for short-term localized increase in soil erosion during construction.	NRCS Web Soil Survey at: http://websoilsurvey.nrcs.usda.gov/ Would see also Appendix C External Agency Correspondence.	Implement construction BMPs; install silt fences/straw bales to reduce sedimentation. Area soils would be covered and/or wetted during construction. If fill is stored on site as part of unit installation or removal, the contractor would be required to appropriately cover it.
Hydrology and Floodplains (Executive Order 11988)	Minor	E.O. 11988 (Floodplain Management) requires Federal agencies to avoid direct or indirect support or development within the 100-year floodplain whenever there is a practicable alternative. FEMA's regulations for complying with E.O. 11988 are found at 44 CFR Part 9. Slidell enrolled in the NFIP on 12/16/1980. Per Preliminary DFIRM Panel Number 22103C0495F, dated 4/30/08, project is located in Zone "AE (EL 11)", areas with in the 100-year flood, BFE determined. Per St. Tammany Parish ABFE Map LA-MM40, dated 01/18/06, project is located in an "AE EL 10" Zone. See Section 4.2 Hydrology and Floodplains, and 8-step process in Appendix E.	Preliminary DFIRM Panels; 22103C0495F dated 4/30/08, St. Tammany Parish ABFE Map LA-MM40, dated 01/18/06	The applicant is required to coordinate with the local floodplain administrator regarding floodplain permit(s) prior to the start of any activities. New construction must be compliant with current codes and standards. Per 44 CFR 9.11(d)(6), no project should be built to a floodplain management standard that is less protective than what the community has adopted in local ordinances through their participation in the NFIP. All coordination pertaining to these activities and applicant compliance with any conditions should be documented and copies forwarded to the state and FEMA for inclusion in the permanent project files.
Wetlands (Executive Order 11990)	Minor	E.O. 11990, Protection of Wetlands, directs Federal agencies to minimize the destruction, loss, or degradation of wetlands and to preserve and enhance the values of wetlands for federally funded projects. FEMA regulations for complying with E.O. 11990 are found at 44 CFR Part 9, Floodplain Management and Protection of Wetlands. USFWS - NWI map queried on 5/10/18 at https://www.fws.gov/wetlands/Data/Mapper.html shows there are mapped riverine features including Bayou Patassat and Bayou Bonfouca present; see Section 4.3 for further discussion.	The applicant would need to submit a joint permit application to both LDNR and USACE.	.

Resource Area	Impact	Impact Summary	Agency Coordination / Permits	Mitigation/Conditions
Surface Water and Water Quality	Minor	USACE regulates the discharge of dredged or fill material into waters of the U.S., including wetlands, pursuant to §§ 401 and 404 of the CWA. Section 402 of the CWA, entitled NPDES, authorizes and sets forth standards for state administered permitting programs regulating the discharge of pollutants into navigable waters within the state's jurisdiction. The USACE also regulates the building of structures in waters of the U.S. pursuant to §§ 9 and 10 of the RHA. Although there is potential for short-term localized increase in sedimentation during construction, the project as proposed would not have significant long term impacts to water quality. See Section 4.3 for further discussion.	The applicant would need to submit a joint permit application to both LDNR and USACE.	.
Groundwater	Negligible	The SDWA was originally passed by Congress in 1974 to protect public health by regulating the nation's public drinking water supply. The Southern Hills Aquifer is the source of 90 percent of St. Tammany Parish's water. The alternative project as proposed would not be expected to affect any groundwater.	A SOV would be prepared and sent to the LDEQ and EPA by FEMA.	The contractor must observe all precautions to protect the groundwater of the region.
Wild and Scenic River	Negligible	The Wild and Scenic Rivers Act, (P. L. 90-543 as amended: 16 U.S.C. 1271-1287) established a method for providing federal protection for certain free-flowing rivers, preserving them and their immediate environments for the use and enjoyment of present and future generations. There are no Wild and Scenic Rivers in the project vicinity.	National Wild and Scenic Rivers http://www.rivers.gov/louisiana.php queried, 5/10/18	
Coastal Resources	Minor	The CZMA encourages the management of coastal zone areas and provides grants to be used in maintaining coastal zone areas. It is intended to ensure that federal activities are consistent with state programs for the protection and, where, possible, enhancement of the nation's coastal zones. The project site is located within the Louisiana Coastal Zone and may require a CUP. See Section 4.4 for further discussion. The USFWS regulates federal funding in CBRS units under the CBRA. This Act protects undeveloped coastal barriers and related areas (*i.e.*, OPAs) by prohibiting direct or indirect Federal funding of projects that support development in these areas. The alternative project is not located within the CBRS.	The applicant would need to submit a joint permit application to both LDNR and USACE.	The applicant is responsible for coordinating with and obtaining any required permit(s) from the LDNR Coastal Management Division prior to initiating work. Projects may be coordinated by contacting LDNR at 1-800-267-4019. All coordination activities should be documented and copies forwarded to GOHSEP and FEMA for inclusion in the permanent project files.
Air Quality	Negligible	The CAA requires the State of Louisiana to adopt ambient air quality standards to protect the public from potentially harmful amounts of pollutants. The LDEQ has designated areas meeting the state's ambient air quality standards by their monitoring and modeling program efforts. During construction, there is potential for a short-term localized increase in vehicle emissions and dust particles. St. Tammany Parish is classified as attainment under the NAAQS and has no general conformity determination obligations. Overall impacts to air quality would be short-term and localized.	A SOV would be prepared and sent to the LDEQ by FEMA.	Vehicle operation times would be kept to a minimum. Area soils must be covered and/or wetted during construction to minimize dust.

Resource Area	Impact	Impact Summary	Agency Coordination / Permits	Mitigation/Conditions
Vegetation and Wildlife	Negligible	The FWCA provides the basic authority for the USFWS involvement in evaluating impacts to fish and wildlife from proposed water resource development projects. It requires that fish and wildlife resources receive equal consideration to other project features. It also requires Federal agencies that construct, license or permit water resource development projects to first consult with the Service (and the NMFS in some instances) and State fish and wildlife agency regarding the impacts on fish and wildlife resources and measures to mitigate these impacts. The site is heavily pre-disturbed, in a developed urban area. No impacts to vegetation and wildlife are anticipated.	A SOV would be prepared and sent to the LDWF by FEMA.	Extreme care must be taken during the construction process through the appropriate use and maintenance of BMPs. If at any time Heritage tracked species are encountered within the project area, the applicant would be required to contact the LNHP Data Manager at 225-765-2643.
Threatened and Endangered Species (Endangered Species Act Section 7)	Negligible	The ESA of 1973 prohibits the taking of listed, threatened, and endangered species unless specifically authorized by permit from the USFWS or the NMFS. No rare, threatened, or endangered species are present on the site. No impacts to rare, threatened, or endangered species or critical habitats are anticipated for the alternative proposed project. No state or Federal parks, wildlife refuges, or wildlife management areas are known at the site. However, should this alternative become the preferred action, FEMA-EHP would incorporate any comments USFWS and LDWF have about the project.	As previously directed by USFWS, FEMA EHP would utilize the self-screening website at http://www.fws.gov/lafayette/pdc/default.aspx to get a self-determination for the proposed project In addition, a SOV would be sent to LDWF.	

Resource Area	Impact	Impact Summary	Agency Coordination / Permits	Mitigation/Conditions
Other Federally Protected Species	Negligible	The Migratory Bird Treaty Act (MBTA) of 1918 (16 U.S.C. 703-712) prohibits pursuing; hunting; taking; capturing; killing; attempting to take, capture, or kill; possessing; offering for sale; selling; offering to purchase; purchasing; delivering for shipment; shipping; causing to be shipped; delivering for transportation; transporting; causing to be transported; carrying or causing to be carried by any means whatever; receiving for shipment, transportation, or carriage; or exporting; at any time or in any manner, any migratory bird or any part, nest, or egg of any such bird, that is included on the list of protected bird species, unless otherwise permitted by regulation, (General Provisions; Revised List of Migratory Birds 2013). The USFWS is responsible for enforcing the provisions of this Act. The BEPA (16 USC 668-668c), enacted in 1940, prohibits anyone, without a permit issued by the Secretary of the Interior, from taking bald eagles, including their parts, nests, or eggs with the term “take” meaning to pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb. The Mississippi River Flyway hosts the world’s largest bird migration. Approximately 70% of migratory waterfowl in the U.S. use the flyway. The project area may provide nesting habitat for the bald eagle (*Haliaeetus leucocephalus*) which was officially removed from the List of T & E Species as of August 8, 2007. However, the bald eagle remains protected under the BGEPA (54 Stat. 250, as amended, 16 U.S.C. 668a-d) and the MBTA (40 Stat. 755, as amended; 16 U.S.C. 703 et seq.). LDWF has not collected comprehensive bald eagle survey data since 2008, and new active, inactive, or alternate nests may have been constructed within the proposed project area since that time. In southern Louisiana parishes, eagles typically nest in mature trees (e.g., baldcypress, sycamore, willow, etc.) near fresh to intermediate marshes or open water. Bald eagles may also nest in mature pine trees near large lakes in central and northern Louisiana. Per USFWS self-screening website, USFWS concluded that Migratory Bird Conservation Recommendations be included as conditions to the project.	As previously directed by USFWS, FEMA-EHP would utilize the self-screening website at http://www.fws.gov/lafayette/pdc/default.aspx to get a self-determination for the proposed project In addition, a SOV would be sent to LDWF.	During the project impact analysis process developers should identify project-related impacts to migratory birds and the conservation measures that will be used to mitigate them. For additional Migratory Bird Conservation recommendations, guidance and tools to help reduce impacts to birds and their habitats please visit the LESO webpage: https://www.fws.gov/lafayette/Migratory _Birds/MigBird.html and the Service's Migratory Bird Program Webpage (https://www.fws.gov/birds/bird-enthusiasts/threats-tobirds/collisions/communication-towers.php). The applicant must review the NBEM Guidelines is available at: http://www.fws.gov/migratorybirds/pdf/management/nationalbaldeaglenanagementguidelines.pdf to minimize potential project impacts to bald eagles, particularly where such impacts may constitute "disturbance," which is prohibited by the BGEPA If a bald eagle nest occurs or is discovered within 660 feet of the proposed project area, then USFWS requires an evaluation to be performed to determine whether the project is likely to disturb nesting bald eagles. The applicant is required to conduct the evaluation on-line at: https://www.fws.gov/southeast/our-services/eagle-technical-assistance. Following completion of the evaluation, that website will provide a determination of whether additional consultation is necessary. All coordination pertaining to these activities should be documented and copies forwarded to the state and FEMA as part of the permanent project files USFWS recommends that a qualified biologist inspect the proposed work site for the presence of undocumented nesting colonies during the nesting season because some waterbird colonies may change locations year-to-year. To minimize disturbance to colonial nesting birds please refer to the colonial nesting waterbird guidance on the LESO Web page https://www.fws.gov/lafayette/Migratory _Birds/MigBird.html. See also Section 6.0 Conditions and Mitigation Measures..

Resource Area	Impact	Impact Summary	Agency Coordination / Permits	Mitigation/Conditions
Cultural Resources (National Historic Preservation Act Section 106)	Negligible	A review of this alternative indicates the expansion of the Archaeological Area of Potential Effects and therefore would likely require additional consultation and potentially an additional archaeological survey to identify any presently un-recorded historic resources and has some potential to adversely affect historic properties, FEMA would follow its Section 106 review procedures outlined earlier in this document if this proposed action is submitted to FEMA for funding consideration. Any additional conditions or requirements would be documented at that time.		If human bone or unmarked grave(s) are present within the project area, compliance with the Louisiana Unmarked Human Burial Sites Preservation Act (R.S. 8:671 et seq.) is required. The applicant shall notify the law enforcement agency of the jurisdiction where the remains are located within 24 hours of the discovery. The applicant shall also notify FEMA and the Louisiana Division of Archaeology at 225-342-8170 within 72 hours of the discovery. (Louisiana Unmarked Human Burial Sites Preservation Act). If during the course of work, archaeological artifacts (prehistoric or historic) are discovered, the applicant shall stop work in the vicinity of the discovery and take all reasonable measures to avoid or minimize harm to the finds. The applicant shall inform their, GOSHEP State Applicant Liaison and Hazard Mitigation Assistance contacts at FEMA, who would in turn contact FEMA HP staff. The applicant would not proceed with work until FEMA HP completes consultation with the SHPO, and others as appropriate (Inadvertent Discovery Clause).
Environmental Justice (Executive Order 12898)/Socioeconomics	Negligible	E.O. 12898, entitled "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," was signed on February 11, 1994. The E.O. directs federal agencies to make achieving environmental justice part of their missions by identifying and addressing, as appropriate, disproportionately high adverse human health, environmental, economic, and social effects of its programs, policies and activities on minority or low-income populations. According to the 2010 U.S. Census Demographic Profile of Slidell, LA: the total population is 27,068 with 76% White, 17% Black, 6.3% Hispanic, and 1.6% Asian. The median household income is $48,122 and 12.5% of the population is below poverty level. The proposed project would reduce flooding in the area, thus providing a benefit to all populations in the area.	U.S. Census Bureau, American Fact Finder, Data for Slidell in St Tammany Parish, Louisiana accessed on 5/10/18.	
Resource Conservation and Recovery Act (RCRA)	Negligible	The objectives of the RCRA are to protect human health and the environment from the potential hazards of waste disposal, to conserve energy and natural resources, to reduce the amount of waste generated, and to ensure that wastes are managed in an environmentally sound manner. RCRA regulates the management of solid waste (e.g., garbage), hazardous waste, and underground storage tanks holding petroleum products or certain chemicals. Project would involve excavation of soil and debris would be disposed of at a permitted landfill.	A SOV would be prepared and sent to the LDEQ and EPA by FEMA.	Applicant must take any necessary steps to obtain and/or update all necessary approvals and environmental permits regarding this proposed project. Unusable equipment, debris and material shall be disposed of in an approved manner and location. The applicant shall handle, manage, and dispose of petroleum products, hazardous materials and/or toxic waste in accordance with all local, state and Federal agency requirements. All coordination pertaining to these activities should be documented and copies forwarded to the state and FEMA as part of the permanent project files. All debris would be disposed of at a permitted landfill.

Resource Area	Impact	Impact Summary	Agency Coordination / Permits	Mitigation/Conditions
Noise	Negligible	Noise is commonly defined as unwanted or unwelcome sound, and most commonly measured in dB on the A-weighted scale, which is the scale most similar to the range of sounds that the human ear can hear. Sound is federally regulated by the Noise Control Act of 1972, which charges the EPA with preparing guidelines for acceptable ambient noise levels. EPA guidelines, and those of many other federal agencies, state that outdoor sound levels in excess of 55 dB DNL are "normally unacceptable" for noise-sensitive land uses including residences, schools, or hospitals. During the construction period there would be a short-term increase in noise levels.	Slidell Code of Ordinances, in Chapter 13 - ENVIRONMENT [1], ARTICLE I. - IN GENERAL, Sec. 13-1. - Noise- this Code of Ordinance is found online at the Slidell's website: https://www.municode.com/library/la/slidell/codes/code_of_ordinances?nodeId=11576	Mitigation and abatement measures would be required to reduce the noise levels to a range that would be considered acceptable. The applicant must comply with the local ordinance. Slidell Ordinance for dB limits is as follows: Industrial At all times 85 dB Commercial 7:00 a.m. to 10:00 p.m. 75 dB, and 10:00 p.m. to 7:00 a.m. 65 dB Residential 7:00 a.m. to 10:00 p.m. 70 dB, and 10:00 p.m. to 7:00 a.m. 65 dB Two-family or multifamily/intra-dwelling 7:00 a.m. to 10:00 p.m. 60 dB and 10:00 p.m. to 7:00 a.m. 50 dB
Public Safety and Access	Negligible	Congress passed the OSHA to ensure worker and workplace safety. The goal was to make sure employers provide their workers a place of employment free from recognized hazards to safety and health, such as exposure to toxic chemicals, excessive noise levels, mechanical dangers, heat or cold stress, or unsanitary conditions. During construction heavy equipment would be located in a populated area. Impacts to public safety and security would be minimized with mitigation measures, including following OSHA regulations.		The contractor must place fencing around the work area perimeters to protect nearby residents from vehicular traffic. To minimize worker and public health and safety risks from project construction and closure, all construction and closure work must be done using qualified personnel trained in the proper use of construction equipment, including all appropriate safety precautions. Additionally, all activities must be conducted in a safe manner in accordance with the standards specified in OSHA regulations and the USACE safety manual. The contractor must post appropriate signage and fencing to minimize potential adverse public safety concerns.
Traffic and Transportation	Negligible	The area is not accessible to the public. Truck and equipment traffic volumes along the access to the U.S. 11 (Front Street) Highway Route would increase temporarily during work activities.		Appropriate signage and barriers should be in place prior to construction activities in order to alert pedestrians and motorists of project activities and traffic pattern changes. The contractor must implement traffic control measures, as necessary.

Resource Area	Impact	Impact Summary	Agency Coordination / Permits	Mitigation/Conditions
Hazardous Materials and Toxic Wastes	Negligible	The management of hazardous materials is regulated under various federal and state environmental and transportation laws and regulations, including the CERCLA; the TSCA; the Emergency Planning and Community Right-to-Know Act; the Hazardous Materials Transportation Act; and the Louisiana Voluntary Investigation and Remedial Action statute. The purpose of the regulatory requirements set forth under these laws is to ensure the protection of human health and the environment through proper management (identification, use, storage, treatment, transport, and disposal) of these materials. Some of these laws provide for the investigation and cleanup of sites already contaminated by releases of hazardous materials, wastes, or substances. Per NEPAssist database search, there are no LSB, Superfund, hazardous waste (RCRA), or Toxic Release Inventory sites located within 0.5 mile of the sites. However, there is one (1) Superfund site, the American Creosote Works, Inc. operated American Creosote Works Plant, within 0.75 miles of the site. Although, work occurs within portions of Bayou Bonfouca and Bayou Pattasat, none of the proposed improvements would occur within the footprint of the Bayou Bonfouca site. However, should this alternative become the preferred action, FEMA-EHP would incorporate any comments and conditions EPA and LDEQ have about the project.	NEPAssist-EPA website http://nepassisttool.epa.gov/nepassist/entry.aspx referenced 7/7/2016	If hazardous materials are unexpectedly encountered in the project area during the proposed construction operations, appropriate measures for the proper assessment, remediation, management and disposal of the contamination would be initiated in accordance with applicable federal, state, and local regulations. The contractor would be required to take appropriate measures to prevent, minimize, and control the spill of hazardous materials in the construction area. If any solid or hazardous wastes, or soils and/or groundwater contaminated with hazardous constituents are encountered during the project, notification to LDEQ's SPOC at 225-219-3640 is required. Additionally, precautions should be taken to protect workers from these hazardous constituents. The LDNR Office of Conservation should be contacted at 225-342-5540 if any unregistered wells of any type are encountered during construction work. For pipelines and other underground hazards, Louisiana One Call should be contacted at 800-272-3020 prior to commencing operations.

4.2 Hydrology and Floodplains

Executive Order (E.O.) 11988 (Floodplain Management) requires federal agencies to avoid direct or indirect support of development within the 100-year floodplain whenever there is a practicable alternative. A floodplain is defined as the lowland and relatively flat areas adjoining inland and coastal waters, including at a minimum that area subject to a one (1) percent or greater chance of flooding in any given year. FEMA complies with E.O. 11988 through 44 CFR Part 9. FEMA uses Flood Insurance Rate Maps created by the NFIP, as the best available flood data.

The City enrolled in the NFIP on 12/16/1980. Per Preliminary DFIRM Panel Number 22103C0495F, dated 4/30/08, project area is located in Zone "AE (EL 11)", areas with in the 100-year flood, BFE determined. Per St. Tammany Parish ABFE Map LA-MM40, dated 01/18/06, project area is located in an "AE EL 10" Zone.

Most structures within the entire basin were built prior to the first FEMA Flood Insurance Rate Maps, which were initialized November 16, 1973. These subdivisions include Town of Slidell (1903), Prevost Addition (1907), Dittmar Addition (1927), Robert Addition (1927), Terrace Park (1928), Spanish Trail Highlands (1931), Greenwood Cemetery (prior to 1936), Cousin Addition(before 1936), Park Place (1954), Lincoln Park (1959), and Pine Park Place (1962).

Four (4) previous and separate, certified Hydrologic and Hydraulic (H and H) Studies have been completed for the City Barn Pump Station, including:

- City Barn Pump Station Channel Improvements (Bayou Patassat) Drainage Study- Burkes & Associates, Inc., Engineer stamped by Sean M. Burkes, dated 6/12/2012.
- Bayou Patassat (City Barn) Drainage Study Addendum #1 for the city of Slidell, by J.V. Burkes & Associates, Inc., Engineer stamped by Sean M. Burkes, dated 6/14/ 2014.
- Hydrologic and Hydraulic Study for City Barn Drainage Improvements, city of Slidell, LA Dept. of Engineering Project No. 100-118, HDCA Project No. 2014-10 (Phase II), by H. Davis Cole & Associates, LLC, Engineering (HDCA) Stamped by Howard Davis Cole, 4/12/2016.
- Hydrologic and Hydraulic Study for City Barn Drainage Improvements, Removal and Replacement of 67 cfs Drainage Pump and its replacement with a 133 cfs pump, City of Slidell, LA Dept. of Engineering Project No. 100-118, HDCA Project No. 2018-05 (Phase III), by H. Davis Cole & Associates, LLC, Engineering Stamped by David Alan Martin, 4/27/2018.

Per these studies, generally the water surface elevation (WSE) in Bayou Bonfouca is higher than the WSE in Bayou Patassat. This means that stormwater must be forced from Bayou Patassat by pumping into Bayou Bonfouca. Flows from Bayou Patassat's entrance into Bayou Bonfouca are controlled by two (2) outfalls at the existing City Barn Pump Station: one (1) is gravity fed through a mechanical gate that can be closed off during tropical storm events, and the second outfall is currently connected to three (3) pumps. During rain events, the City Barn Pumping Station is designated to lower water levels throughout central Slidell. The maximum total pumping capacity for this station is 260,000 gpm, or 575 cfs from the Bayou Patassat and the south side of U.S. 11 (Front Street) into Bayou Bonfouca. This is the primary means of removing rain and flood water in the surrounding area.

The existing pump dimensions and flow capacity at City Barn Pump Station are shown in Table 3 below.

Table 3. Existing Pump Dimensions and Flows in gpm and cfs at City Barn.

Description	**Flow in gallons per minute (gpm)**	**Flow in cubic feet per second (cfs)**
36-inch Lolift Pump	30,000 gpm	67 cfs
48-inch Vertical Axial Flow	60,000 gpm	134 cfs
Diesel – powered vertical turbine mixed flow drainage pump	Approx. 80,000 gpm	175 cfs
54-inch by 54-inch Vertical Axial Flow	90,000 gpm	200 cfs

Under existing conditions, HDCA modeled the maximum WSE for Bayou Patassat drainage basin and Tables 4 through 7 (below) illustrate the average WSE for the Phase I, Phase II, and Phase III projects for the 10, 25, 50 and 100-year storm events. These tables are compared against the previous existing conditions models for validation.

Table 4. HDCA Existing Conditions Average Maximum WSE (in feet) for a 10-Year Flood Event.

Average Maximum WSE, Previous Existing Conditions Model	Average Maximum WSE, HDCA Existing Conditions Model	Average WSE Elevation after Installation of 175 cfs Pump (City Project 100-118A "Phase I")	Average WSE Elevation after Installation of 4th Mechanical Bar Screen (City Project 100-118A "Phase II")	Average WSE Elevation after Removal of 67 cfs Pump and Replacement with 133 cfs Pump (City Project 100- 118B "Phase III")
6.21	6.19	5.69	5.69	5.67

Analysis of the modeling data indicates that the proposed increase in capacity of CBPS from 575 cfs to 641 cfs would reduce the average peak WSE in the basin by 0.02 feet (0.24 inches) for a 10-year storm event. Overall, modeling data indicates that the entire suite of improvements yields a total reduction of 0.54 feet (6.48 inches) in the average peak WSE in the basin for a 10-year storm event.

Table 5. Existing Conditions Average Maximum WSE (in feet) for a 25-Year Flood Event.

Average Maximum WSE, Previous Existing Conditions Model	Average Maximum WSE, HDCA Existing Conditions Model	Average WSE Elevation after Installation of 175 cfs Pump (City Project 100-118A "Phase I")	Average WSE Elevation after Installation of 4th Mechanical Bar Screen (City Project 100-118A "Phase II")	Average WSE Elevation after Removal of 67 cfs Pump and Replacement with 133 cfs Pump (City Project 100- 118B "Phase III")
6.70	6.69	6.16	6.17	6.04

Analysis of the modeling data indicates that the proposed increase in capacity of CBPS from 575 cfs to 641 cfs would reduce the average peak WSE in the basin by 0.13 feet (1.56 inches) for a 25-year storm event. Overall, modeling data indicates that the entire suite of improvements yields a total reduction of 0.66 foot (7.92 inches) in the average peak WSE in the basin for a 25-year storm event.

Table 6. Existing Conditions Average Maximum WSE (in feet) for a 50-Year Flood Event.

Average Maximum WSE, Previous Existing Conditions Model	Average Maximum WSE, HDCA Existing Conditions Model	Average WSE Elevation after Installation of 175 cfs Pump (City Project 100-118A "Phase I")	Average WSE Elevation after Installation of 4th Mechanical Bar Screen (City Project 100-118A "Phase II")	Average WSE Elevation after Removal of 67 cfs Pump and Replacement with 133 cfs Pump (City Project 100- 118B "Phase III")
6.94	6.93	6.38	6.39	6.27

Analysis of the modeling data indicates that the proposed increase in capacity of CBPS from 575 cfs to 641 cfs would reduce the average peak WSE in the basin by 0.12-foot (1.44 inches) for a 50-year storm event. Overall, modeling data indicates that the entire suite of improvements yields a total reduction of 0.67 feet (8.04 inches) in the average peak WSE in the basin for a 50-year storm event.

Table 7. Existing Conditions Average Maximum WSE (in feet) for a 100-Year Flood Event.

Average Maximum WSE, Previous Existing Conditions Model	Average Maximum WSE, HDCA Existing Conditions Model	Average WSE Elevation after Installation of 175 cfs Pump (City Project 100-118A "Phase I")	Average WSE Elevation after Installation of 4th Mechanical Bar Screen (City Project 100-118A "Phase II")	Average WSE Elevation after Removal of 67 cfs Pump and Replacement with 133 cfs Pump (City Project 100- 118B "Phase III")
7.38	7.36	6.82	6.81	6.59

Analysis of the modeling data indicates that the proposed increase in capacity of the CBPS from 575 cfs to 641 cfs would reduce the average peak WSE in the basin by 0.22-foot (2.64-inches) for a 100-year storm event. Overall, modeling data indicates that the entire suite of improvements yields a total reduction of 0.79 feet (9.48 inches) in the average peak WSE in the basin for a 100-year storm event.

Based on flow contribution data for Bayou Vincent that is presented in the Flood Insurance Study (FIS) for the City of Slidell, Louisiana dated April 21, 1999, Bayou Bonfouca experiences the following flow rates during the indicated rainfall events. The FIS did not provide discharge data to reflect additional flow contribution from Bayou Bonfouca upstream of Bayou Vincent; therefore, the flow rates summarized in Table 8 should be considered minimum values that may be significantly less than actual flow rates.

Table 8. Bayou Bonfouca Discharge (cfs) and WSE (feet).

Storm Event Interval	**Discharge Contributed by Bayou Vincent (cfs)**	**Elevation, in feet above National Geodetic Vertical Datum (feet NGVD) From FEMA FIS Profile**
10 Year	5500	5
50 Year	6700	8
100 Year	7700	9
500 Year	9600	10

E.O. 11988 requires federal agencies proposing activities in a 100-year floodplain to consider alternatives and avoid adverse effects and incompatible development in the floodplain. If no practicable

alternative exists to implementing an action in the floodplain, the action must be designed to minimize potential harm to or within the floodplain. A notice must be publicly circulated explaining the action and the reasons for implementing an action in a floodplain.

When evaluating actions in the floodplain, FEMA utilizes the decision process described in 44 CFR Part 9, referred to as the 8-Step Process. The 8-Step Process ensures that the action is consistent with E.O. 11988.

No Action Alternative: Previous HMGP projects at this site have aimed to protect the existing pumps, increase water retention within Bayou Patassat and increase pumping capacity.

Although these activities have helped retain water and pump it to Bayou Bonfouca more effectively while protecting the existing pumps, the discussion above demonstrates the area still experiences flooding during a 10-year event. Per the prior H and H Studies, the Bayou Patassat basin has an estimated 2000 residences within the basin.

The No Action Alternative would result in continued flooding at the project sites from low frequency storm events. This would result in hazardous conditions for not only the residents of Slidell, but also businesses and emergency responders who utilize the roadways and live in this area.

Preferred Alternative: The proposed action would improve drainage at the City Barn Pump Station, resulting in a decrease of maximum WSE throughout the drainage basin.

All of the previous H and H studies recommend upgrading pumps at the CBPS to protect the watershed area against storm events. The proposed upgrade of the fourth pump and increasing the flow capacity of the CBPS would decrease the extent of flooding in the entire basin. Further, the inclusion of a larger outfall pipe connected to the upgraded fourth pump would help drain the area more quickly and the inclusion of the new fuel storage tank area would help the CBPS run more continuously and drain floodwaters in the area more efficiently.

Using the proposed conditions in the previous H and H Studies, HDCA modeled the maximum WSE for Bayou Patassat drainage basin for the 10-, 25-, 50-, and 100-year events. These elevations and the difference between the existing maximum WSE and the proposed WSE are shown in Table 9.

Table 9. HDCA Proposed Conditions Average Maximum WSE (feet) and Total Change (feet) from Existing Maximum WSE.

Storm Event Interval	WSE (feet)	Total Change (feet)
10 Year	5.69	0.50
25 Year	6.17	0.52
50 Year	6.39	0.54
100 Year	6.81	0.55

This pump station is the primary means of removing water from the south side of U.S. 11 (Front Street) to Bayou Bonfouca. HDCA modeled in the previous H and H Studies the increased WSE as a result of the increased pumping capacity, the results are shown in Table 10. Based on the results, the increase of

discharge into Bayou Bonfouca is not expected to result in a more than nominal increase in the WSE downstream of the station.

Table 10. Bayou Bonfouca Change in WSE, HDCA H and H Report, April 2016.

Storm Return Interval	FIS Discharge (cfs) (Note 1)	Elevation, NGVD (From FEMA FIS Profile)	Additional Flow (cfs)	Total Flow (cfs)	Estimated Elevation w/ Additional Flow (Note 2)	Estimated Total Change (Inches) (Note 3)
10-Year	5500	5	175	5675	5.40	4.80
50-Year	6700	8	175	6875	8.30	3.60
100 -Year	7700	9	175	7875	9.15	1.80
500-Year	9600	10	175	9775	10.15	1.80

Notes: *1) Discharge in cubic feet per second (cfs) from FIS Study, City of Slidell, Louisiana, April 21, 1999. 2) Estimate from synthesized stage – discharge curve based on FIS Study Discharges. 3) Calculated as change in elevation in feet multiplied by 12 inches per foot. 4) Change in elevation less than 0.1 foot, reported as 0.1 foot.*

The data above demonstrates the proposed improvement would result in the maximum WSE decreasing at least one-half (0.5) of a foot through the entire Bayou Patassat Drainage Basin during a 10- to 100-year storm events. In addition, the hydraulic benefits would enhance the efficiency and service life of the pumping station.

As cited in the Updated H and H report by H. Davis Cole & Associates, LLC (HDCA), dated April 27, 2018, analysis of the modeling data indicates that the proposed improvements would have small effects on the peak WSE within Bayou Bonfouca downstream of the drainage pump station due to the influence of Lake Pontchartrain. Results indicate that the increase in WSE would be small (on the order of 0.01- to 0.08-foot) near the pumping station outfall.

The applicant is required to coordinate with the local floodplain administrator regarding floodplain permit(s) prior to the start of any activities. New construction must be compliant with current codes and standards.

Per 44 CFR 9.11(d)(6), no project should be built to a floodplain management standard that is less protective than what the community has adopted in local ordinances through their participation in the NFIP.

All coordination pertaining to these activities and applicant compliance with any conditions should be documented and copies forwarded to the state and FEMA for inclusion in the permanent project files.

Considered Alternative: This alternative involves the excavation of a five (5) acre pond on the City owned property adjacent to the existing pump station. The applicant would have to relocate office and storage buildings to make room for a detention basin of this size on the site.

Per Bayou Patassat (City Barn) Drainage Study Addendum #1 for the city of Slidell, by J.V. Burkes & Associates, Inc., Engineer stamped by Sean M. Burkes, dated 6/14/ 2014, including an additional 133

cfs pumping capacity, and increasing the storage in the basin, the WSE lower to 5.6 feet for the 10-year event and to seven (7) feet in the basin for the 100-year event. According to the model the pump contributes to a drop in the WSE four (4) to five (5) inches, while the pond drops the WSE approximately 1.5 inches.

Per 44 CFR 9.11(d)(6), no project should be built to a floodplain management standard that is less protective than what the community has adopted in local ordinances through their participation in the NFIP.

All coordination pertaining to these activities and applicant compliance with any conditions should be documented and copies forwarded to the state and FEMA for inclusion in the permanent project files

4.3 Wetlands and Waters of the United States

E.O. 11990, Protection of Wetlands, directs Federal agencies to minimize the destruction, loss, or degradation of wetlands and to preserve and enhance the values of wetlands for federally funded projects. FEMA regulations for complying with E.O. 11990 are found at 44 CFR Part 9, Floodplain Management and Protection of Wetlands.

Wetlands are defined as those areas that that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.

Jurisdictional wetland determinations are regulated by the USACE pursuant to the CWA. Executive Order 11990, Protection of Wetlands, also directs federal agencies to take actions to minimize the destruction, loss, or degradation of wetlands.

The USFWS - NWI map queried on 5/10/2018 at https://www.fws.gov/wetlands/Data/Mapper.html shows there are mapped riverine features including Bayou Patassat and Bayou Bonfouca present; however, no wetlands are present on the proposed project areas. Per the site visit on March 17, 2015, no wetlands were present in the right-of-way. The USACE regulates the discharge of dredged or fill materials into waters of the U.S. including wetlands, pursuant to Section 404 of the CWA.

No Action Alternative:

The applicant has coordinated with USACE for all previous HMGP projects and secured any necessary permits. Implementation of the no action alternative would not further impact wetlands or other waters of the U.S. and would not require any further CWA Section 404 permit.

Preferred Alternative:

For the preferred alternative, no wetlands are on the immediate project site; however, downstream wetlands exist in the Bayou Bonfouca. These wetlands may experience slight inundation during pumping from the City Barn Pump Station during flood events, but it is not expected to be more than background flooding during these events, due to the large size of this Bayou and the large watershed it drains.

A SOV was prepared and sent to the USACE, and the EPA by FEMA on March 30, 2018 with 65% drawings. A follow up SOV sent on April 11, 2018 with 90% drawings. The applicant submitted a revised joint permit application to both LDNR and USACE on March 12, 2018. On March 12, 2018, USACE determined that the scope of work proposed is similar in scope to existing Department of the Army Authorization MVN 2012-0958-EII permit. The PGP, Category 1 authorization is valid through February 19, 2021. Since the project fits the parameters of the active PGP I authorization, it may be accomplished under that authorization. If this work cannot be completed prior to February 19, 2021, a new permit application and drawings must be submitted 4-6 months prior to that expiration date to allow for a re-evaluation of the proposed/on-going work. All terms and conditions of the existing authorization must be adhered to during construction (See Permit MVN 2012-0958-EII in Appendix C).

See Section 6.0 Conditions and Mitigation Measures.

Considered Alternative:

This alternative would impact the entire five (5) acre City Barn Pump Station property, with excavation of a proposed five (5) acre detention basin. Impacts here would be similar to those found in the proposed alternative. As mentioned above, no wetlands were present in the area of the proposed pond; however, there may be slight inundation to Bayou Bonfouca during pumping activities. The applicant would be required to submit a joint permit application to the USACE, and coordinate with LDEQ and the EPA for review of potential effects. The applicant would be responsible for complying with all conditions of the required permits.

4.4 Surface Water and Water Quality

USACE regulates the discharge of dredged or fill material into waters of the U.S., including wetlands, pursuant to §§ 401 and 404 of the CWA. Section 402 of the CWA, entitled NPDES, authorizes and sets forth standards for state administered permitting programs regulating the discharge of pollutants into navigable waters within the state's jurisdiction. The USACE also regulates the building of structures in waters of the U.S. pursuant to §§ 9 and 10 of the RHA.

Bayou Patassat and Bayou Bonfouca are both waters of the U.S. and are subject to USACE regulation.

No Action Alternative:

The applicant has coordinated with USACE for all previous HMGP projects and secured any necessary permits. Implementation of the no action alternative would not result in additional impacts surface water. Water quality would continue to experience contamination from flood events. This would occur when businesses and homes were inundated and gasoline, oil, chemicals, cleaners, solvents, etc. were spilled.

Preferred Alternative:

Although there is potential for short-term localized increase in sedimentation during construction, the project as proposed would not have significant long term impacts to water quality. A SOV was prepared and sent to USACE, EPA and LDEQ by FEMA on March 30, 2018 with 65% drawings, with a follow up SOV sent on April 11, 2018 with 90% drawings.

LDEQ responded in an email dated May 3, 2018 with no objections. The Applicant must comply with all conditions listed in the LDEQ email which are summarized below and found in Section 6.0 Conditions and Mitigation Measures. See also Appendix C External Agency Correspondence.

The applicant submitted a revised joint permit application to both LDNR and USACE on March 12, 2018. On March 12, 2018,USACE determined that the scope of work proposed is similar in scope to existing Department of the Army Authorization MVN 2012-0958-EII. The PGP, Category 1 authorization is valid through February 19, 2021. Since the project fits the parameters of the active PGP I authorization, it may be accomplished under that authorization. If this work cannot be completed prior to February 19, 2021, a new permit application and drawings must be submitted 4-6 months prior to that expiration date to allow for a re-evaluation of the proposed/on-going work. All terms and conditions of the existing authorization must be adhered to during construction (See Permit MVN 2012-0958-EII in Appendix C).

The applicant must ensure to comply with conditions in Section 6.

Considered Alternative:

The considered alternative would impact the entire five (5) acre City Barn Pump Station property, with excavation of a proposed five (5) acre retention basin. During construction erosion control measures would be needed to prevent sedimentation, and BMPs would be needed to prevent spills or contaminants entering the waterways. The applicant would be required to submit a joint permit application to the USACE, and FEMA- EHP would coordinate with LDEQ and the EPA for any required permits. The applicant would be required to comply with all conditions set forth by the regulatory agencies.

4.5 Coastal Resources

The CZMA encourages the management of coastal zone areas and provides grants to be used in maintaining coastal zone areas. It is intended to ensure that federal activities are consistent with state programs for the protection and, where possible, enhancement of the nation’s coastal zones. The project site is located within the Louisiana Coastal Zone and would require a CUP.

The USFWS regulates federal funding in CBRS units under the CBRA. This Act protects undeveloped coastal barriers and related areas (i.e., OPAs) by prohibiting direct or indirect Federal funding of projects that support development in these areas. The project is not located within the CBRS.

No Action Alternative:

Implementation of the no action alternative would not impact coastal resources. The applicant has obtained all necessary permits for previous HMGP projects.

Preferred Alternative:

The applicant submitted a revised joint permit application to the LDNR on March 12, 2018. The OCM issued the Revised CUP (P20150247 Revised) on May 21, 2018.

The expiration date of this revised permit is five (5) years from the date of the signature of the Secretary or his designee on the original permit which was September 9, 2015. If the Coastal Use is not completed

within this five (5) year period, an extension may be granted pursuant to the requirements contained in the Rules and Procedures for Coastal Use Permits (LAC 43:I.723(D))

The applicant shall comply with all conditions of the required permit. All coordination pertaining to these activities and applicant compliance with any conditions should be documented and copies forwarded to the state and FEMA for inclusion in the permanent project file. See Section 6.0 Conditions and Mitigation Measures. A copy of the CUP is found in Appendix C External Agency Correspondence.

Considered Alternative:

The considered alternative would impact the entire five (5) acre City Barn Pump Station property, with excavation of a proposed five (5) acre retention basin. The applicant is responsible for coordinating with and obtaining any required permit(s) from the LDNR Coastal Management Division prior to initiating work. Projects may be coordinated by contacting LDNR at 1-800-267-4019. All coordination activities should be documented and copies forwarded to GOHSEP and FEMA for inclusion in the permanent project files.

5.0 CUMULATIVE IMPACTS

CEQ regulations state that the cumulative impact of a project represents the "impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time" (40 C.F.R. § 1508.7).

In its comprehensive guidance on cumulative impacts analysis under NEPA, CEQ notes that "the range of actions that must be considered includes not only the project proposal, but all connected and similar actions that could contribute to cumulative effects" (Regulations for Implementing the Procedural Provisions of the NEPA 2005).

The term, "similar actions," may be defined as "reasonably foreseeable or proposed agency actions [having] similarities that provide a basis for evaluating the environmental consequences together, such as common timing or geography" (40 CFR § 1508.25[a][3]).

Not all potential issues identified during cumulative effects scoping need be included in a draft SEA. Because some effects may be irrelevant or inconsequential to decisions about the proposed action and alternatives, the focus of the cumulative effects analysis should be narrowed to important issues of national, regional, or local significance.

To assist agencies in this narrowing process, CEQ (2007) provides a list of several basic questions to be considered, including: (1) Is the proposed action one of several similar past, present, or future actions in the same geographic area; (2) Do other activities (governmental or private) in the region have environmental effects similar to those of the proposed action?; (3) Have any recent or ongoing NEPA analyses of similar or nearby actions identified important adverse or beneficial cumulative effect issues?; and (4) Has the impact been historically significant, such that the importance of the resource is defined by past loss, past gain, or investments to restore resources?

It is normally insufficient when conducting a cumulative effects analysis to merely analyze effects within the immediate area of the proposed action. Geographic boundaries should be expanded for cumulative effects analysis and conducted on the scale of human communities, landscapes, watersheds, or airsheds. Temporal frames should be extended to encompass additional effects on the resources, ecosystems, and human communities of concern.

A useful concept in determining appropriate geographic boundaries for a cumulative effects analysis is the project impact zone, that is, the area (and resources within that area) that could be affected by the proposed action. The area appropriate for analysis of cumulative effects will, in most instances, be a larger geographic area occupied by resources outside of the project impact zone (CEQ 2007).

FEMA has determined a one (1) mile radius buffer from the center of the proposed location constitutes an appropriate project impact zone for this cumulative impacts analysis. In accordance with NEPA, and to the extent reasonable and practical, this draft SEA considered the combined effects of the Preferred Action alternative and other actions undertaken by FEMA, as well as actions by other public and private entities, that affect the environmental resources the proposed action also would affect, and occur within the considered geographic area and temporal frame(s).

Specifically, a range of past, present, and reasonably foreseeable future actions undertaken by FEMA within the designated geographic boundary area were reviewed: (1) for similarities such as scope of work, common timing and geography; (2) to determine environmental effects similar to those of the proposed action, if any; and (3) to identify the potential for cumulative impacts.

As part of the cumulative effects analysis, FEMA also reviewed known past, present, and reasonably foreseeable future projects of federal agencies and other parties identified within the designated geographic boundary.

These reviews were performed in order to assess the effects of proposed, completed, and ongoing activities and to determine whether the incremental impact of the current proposed action, when combined with the effects of other past, present, and reasonably foreseeable future projects, are cumulatively considerable or significant.

Within St. Tammany Parish, over 1,300 FEMA program-funded emergency protective measures, repair projects and hazard mitigation projects that have occurred, are occurring, or are reasonably foreseen to occur to buildings, recreational and educational facilities, public utilities, and waterways from August 2005 through July 2018.

Table 11 and Figure 7 focus on FEMA-funded undertakings within a one (1) mile radius of the proposed project location, include one (1) project site cleared with an EA. The study area extends into zip codes 70460 and 70458, with over three-quarters of the project sites clustered inside 70458 within a half mile of the proposed project location.

FEMA-funded undertakings for the study area total 105 project sites and are divided into nine (9) categories: HMGP Acquisition (1%), HMGP Elevation (1%), HMGP Other/Not Specified (2.9%), PA Protective Measures (18%), PA Roads & Bridges (8.6%), PA Water Control Facilities (1%), PA Public Utilities (1%), PA Public Buildings (64.8%), and PA Recreational or Other (1.9%) (Table 11).

All FEMA-funded actions are subjected to various levels of environmental review as a requirement for the receipt of federal funding. An applicant's failure to comply with any required environmental permitting or other condition is a grant violation, which can result in the loss of federal assistance, including funding.

Table 11. Data Results for FEMA-Funded Projects within the St. Tammany Parish Study Area by Disaster/Type.

Standard Project Review	***Grand Total***	***Percent of Project Sites by type***	***DR-1603***	***DR-1607***	***DR-1786***	***DR-4080***	***DR-4263***
HMGP (5)							
HMGP – Acquisition	1	1.0%	1	0	0	0	0
HMGP – Elevation	1	1.0%	1	0	0	0	0
HMGP - Other/Not Specified	3	2.9%	2	0	1	0	0
PA (100)							
PA - B - Protective Measures	19	18.1%	15	1	0	2	1
PA - C - Roads & Bridges	9	8.6%	9	0	0	0	0
PA - D - Water Control Facilities	1	1.0%	1	0	0	0	0
PA - E - Public Buildings	68	64.8%	59	0	0	9	0
PA - F - Public Utilities	1	1.0%	1	0	0	0	0
PA - G - Recreational or Other	2	1.9%	2	0	0	0	0
Total	*105*		*91*	*1*	*1*	*11*	*1*
Environmental Assessment	***Grand Total***	***Percent of Project Sites by type***	***1603***	***1607***	***1786***	***4080***	***4263***
PA - E - Public Buildings	1	1.0%	1	0	0	0	0
Total	*1*		*1*	*0*	*0*	*0*	*0*

FEMA drafted a Programmatic Environmental Assessment (PEA) for the City of Slidell Road and Utility Consolidated Improved Project, St. Tammany Parish, LA July 2017 that would provide FEMA Public Assistance funding to repair, improve, and replace damage to roads, drainage and subsurface utilities resulting from Hurricane Katrina located within neighborhoods of the city of Slidell. The FONSI, signed on September 13, 2017, is FEMA's finding that the preferred action will not have a significant effect on the human and natural environment. Additional NEPA documents providing greater detail will follow this PEA once the plans and specifications for individual project proposal are developed beyond the preliminary design stage. At that time, site and project-specific information would be reviewed for all projects in order for FEMA to appropriately take into consideration the potential for cumulative impacts on the various resource areas discussed in the PEA. Expected impacts to the CBPS project as a result of the projects proposed in the PEA are anticipated to be negligible.

Each of the projects either aims to restore or improve the function of pre-existing infrastructure within an urban setting or proposes redevelopment consistent with current zoning requirements, with minimal

impacts to the natural and human environment. Additionally, any adverse effects to similar resources would be minimal and temporary. Implementing BMPs which are incorporated into the PEA document are expected to limit both individual and cumulative impacts. Mitigation measures to reduce impacts would be conditions of the project. These facilities would be constructed in localized areas, and the construction impacts is typically short-term and temporary for each individual site.

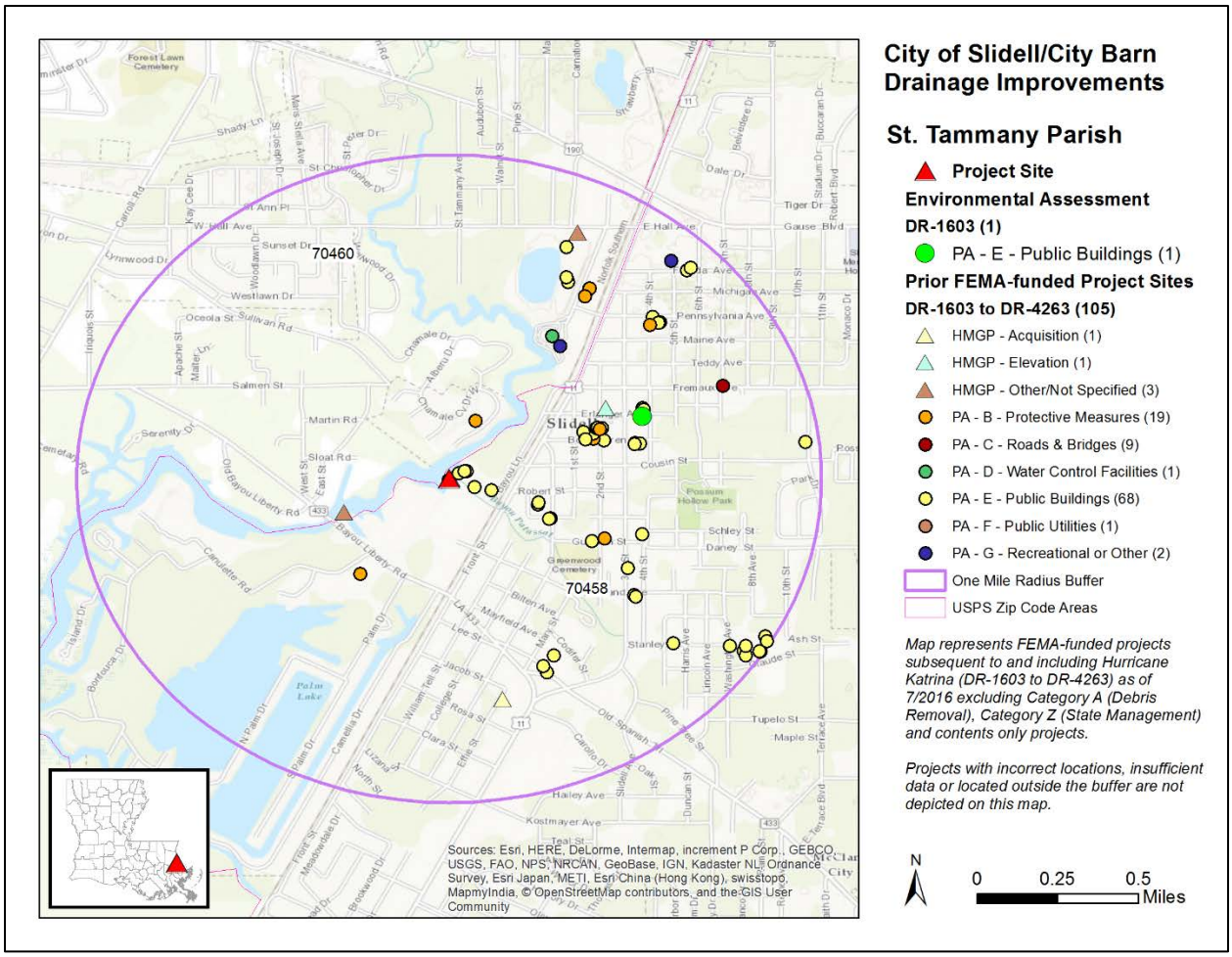

Figure 7. Cumulative Impacts Map within Project Zip Codes within St Tammany Parish.

After the devastation of the 2005 hurricane season, USACE, Mississippi Valley Division, New Orleans District was tasked with the planning, design, and construction of a 350-mile system of levees, floodwalls, surge barriers, and pump stations to "increase public safety and enable the physical and economic recovery of the area to occur through the reduction of storm damage risk to residences, businesses, and other infrastructure from hurricanes (100-year storm events) and other high-water events within the Greater New Orleans Metropolitan Area."

Referred to as the Greater New Orleans Hurricane and Storm Damage Risk Reduction System (HSDRRS), it is one of the largest civil works projects ever undertaken, at an estimated cost of $14 billion (Department of the Army, 2013). Figure 8 below shows the major drainage features associated with the HSDRRS infrastructure projects within St. Tammany Parish.

These projects are located to the north and east of the CBPS, and include W-14 channel enlargements, bridge replacement, pump station improvements, detention ponds, and levees.

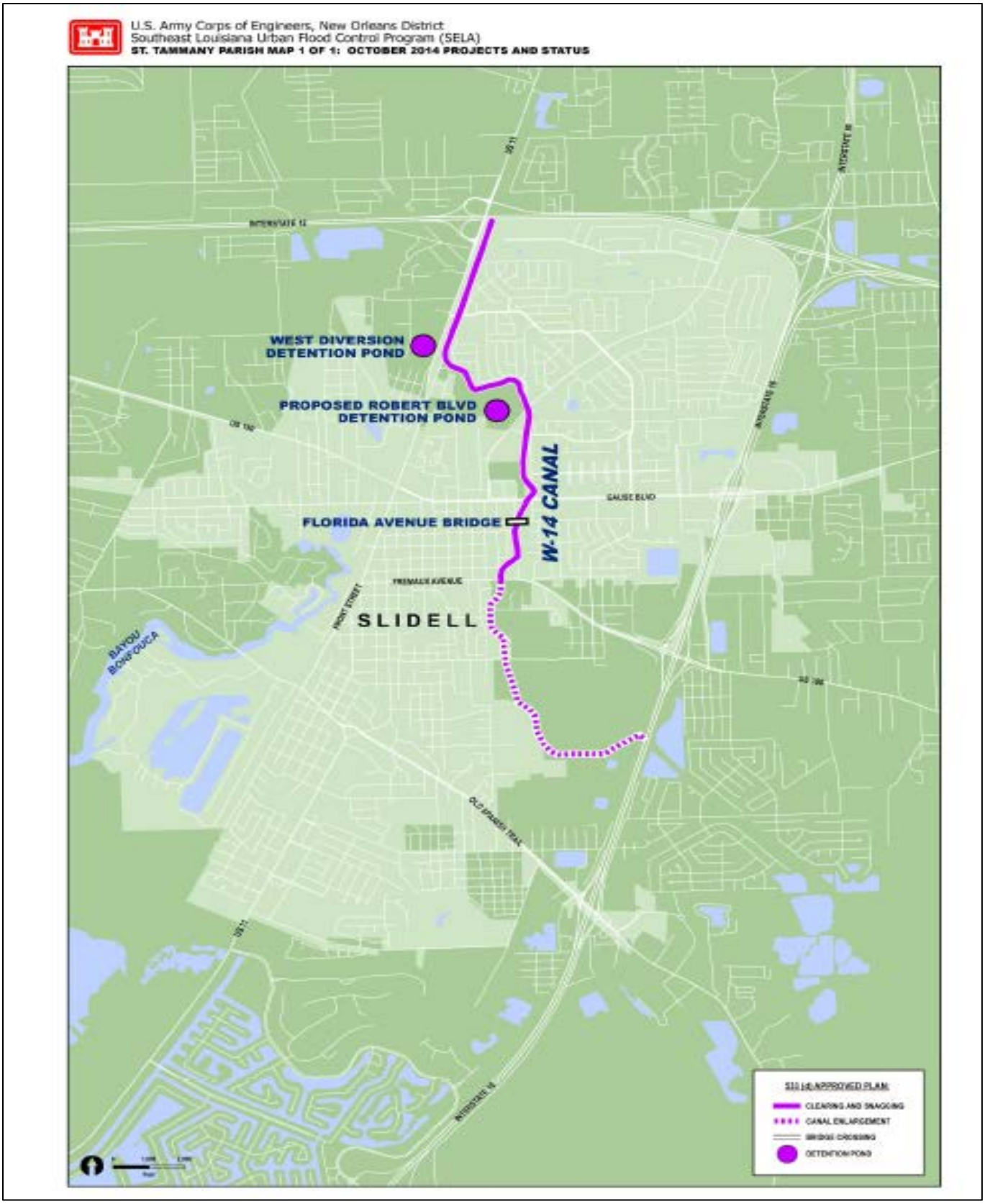

Figure 8. Major Drainage Features Associated with the HSDRRS infrastructure projects within St. Tammany Parish.

All these watercourses flow into Bayou Patassat and through the CBPS into Bayou Bonfouca Drainage. Except during major river flooding events, these watercourses serve to remove excess water from the local area more efficiently, providing a positive cumulative benefit to residents and businesses.

Table 12 lists and briefly describes known present, past, and reasonably foreseeable infrastructure and recovery improvement projects, including activities identified by FEMA that may have the potential for cumulative impacts when combined with the effects of the present proposed action. Table 12 also identifies the potential for cumulative impacts when combined with the effects of the proposed action and the rationale for that assessment.

Table 12. Other Agency Projects that May Have the Potential to Contribute to Cumulative Impacts.

Project Name / Status	Lead Agency	Location	Description	Cumulative Impacts	Rationale
Southeast Louisiana/St. Tammany Parish, W-14 Canal Drainage Improvements	USACE	Portion of W-14 Main Diversion Canal drainage basin that lies within Slidell	The project includes improving approximately 4.1 miles of the existing W-14 Canal by widening the existing canal and lowering its existing invert elevation to improve flood flow capacity, excavating two (2) new detention ponds with overflow weirs, expanding an existing pond, installing culverts, replacing three (3) bridges, and constructing a new pump station. Project began in 2010.	Less than significant.	Expected impacts to resources would be significantly different from those expected to be affected by the proposed action and alternatives, and overall are expected to be beneficial. Furthermore, any adverse effects to similar resources would be minimal and temporary.
Slidell Ring Levee	Coastal Protection Restoration Authority (CPRA)	Slidell	Construction of a ring levee to an elevation of 16.0 feet around Slidell for hurricane storm surge risk reduction. Project features include approximately 20,000 feet of earthen levee and 16,000 feet of concrete T-wall. Project implementation is expected to occur between 2012-2013.	Less than significant	Expected impacts to resources would be significantly different from those expected to be affected by the proposed action and alternatives, and overall are expected to be beneficial. Furthermore, any adverse effects to similar resources would be minimal and temporary.

Project Name / Status	Lead Agency	Location	Description	Cumulative Impacts	Rationale
Lake Pontchartrain Barrier	Coastal Protection Restoration Authority (CPRA)	New Orleans landbridge to Interstate 59 north of Slidell	Planning, engineering and design to construct a levee to an elevation of 24.5 feet across the mouth of Lake Pontchartrain from the New Orleans Landbridge to Interstate 59 north of Slidell for hurricane storm surge risk reduction. Project implementation is expected to occur between 2012-2013.	Less than significant	Expected impacts to resources would be significantly different from those expected to be affected by the proposed action and alternatives, and overall are expected to be beneficial. Furthermore, any adverse effects to similar resources would be minimal and temporary.
Bayou Bonfouca Marsh Creation	Louisiana Coastal Wetlands Conservation and Restoration Task Force	Pontchartrain Basin (area where Bayou Bonfouca and Lake Pontchartrain connect)	The primary goal of the project was to create 533 acres and nourish 42 acres of low salinity brackish marsh in open water areas adjacent to Bayou Bonfouca with sediment pumped from Lake Pontchartrain. Phase 1 began in 2011.	No impacts	Affected resources are significantly different from those in proposed action and alternatives, and overall expected to be beneficial investment to resources.

As identified in Tables 11 and 12 and Figures 7 and 8, the cumulative effect of these present, past, and reasonably foreseeable future actions is not anticipated to result in a significant impact to any resource. Each of the projects either aims to restore or improve the function of pre-existing infrastructure within an urban setting or proposes redevelopment consistent with current zoning requirements, with minimal impacts to the natural and human environment.

6.0 CONDITIONS AND MITIGATION MEASURES

The following conditions must be met as part of the implementation of the project. All coordination pertaining to these activities and applicant compliance with any conditions should be documented and copies forwarded to the state and FEMA for inclusion in the permanent project files. Failure to comply with these conditions may jeopardize federal funds.

- Implement construction BMPs; install silt fences/straw bales to reduce sedimentation. Area soils would be covered and/or wetted during construction. If fill is stored on site as part of unit installation or removal, the contractor would be required to appropriately cover it.
- The applicant is required to coordinate with the local floodplain administrator regarding floodplain permit(s) prior to the start of any activities. New construction must be compliant with current codes and standards.

- Per 44 CFR 9.11(d)(6), no project should be built to a floodplain management standard that is less protective than what the community has adopted in local ordinances through their participation in the NFIP.

- Take any necessary steps to obtain and/or update all necessary approvals and environmental permits regarding this proposed project.

- If the project results in a discharge to waters of the state, submittal of a LPDES application may be necessary.

- If the project results in a discharge of wastewater to an existing wastewater treatment system, that wastewater treatment system may need to modify its LPDES permit before accepting the additional wastewater.

- All precautions should be observed to control nonpoint source pollution from construction activities. LDEQ has stormwater general permits for construction areas equal to or greater than one (1) acre. It is recommended that you contact the LDEQ Water Permits Division at (225) 219-9371 to determine if your proposed project requires a permit.

- If the project will include a sanitary wastewater treatment facility, a Sewage Sludge and Biosolids Use or Disposal Permit is required. An application or Notice of Intent will be required if the sludge management practice includes preparing biosolids for land application or preparing sewage sludge to be hauled to a landfill. Additional information may be obtained on the LDEQ website at http://www.deq.louisiana.gov/portal/tabid/2296/Default.aspx or by contacting the LDEQ Water Permits Division at (225) 219- 9371.

- All precautions should be observed to protect the groundwater of the region.

- Be advised that water softeners generate wastewaters that may require special limitations depending on local water quality considerations. Therefore if your water system improvements include water softeners, you are advised to contact the LDEQ Water Permits to determine if special water quality-based limitations will be necessary.

- Any renovation or remodeling must comply with LAC 33:III.Chapter 28, Lead-Based Paint Activities; LAC 33:III.Chapter 27, Asbestos-Containing Materials in Schools and State Buildings (includes all training and accreditation); and LAC 33:III.5151, Emission Standard for Asbestos for any renovations or demolitions.

- If any solid or hazardous wastes, or soils and/or groundwater contaminated with hazardous constituents are encountered during the project, notification to LDEQ's SPOC at (225) 219-3640 is required. Additionally, precautions should be taken to protect workers from these hazardous constituents.

- ECDs such as silt fencing, hay bales, sediment traps, etc. must be used and maintained extensively to prevent any potential direct or indirect adverse impacts to nearby waterways.

- Applicant must comply with all conditions listed in the CUP (P20150247 Revised) issued May 21, 2018 which are found in Appendix C External Agency Correspondence. The expiration date

of this revised permit is five (5) years from the date of the signature of the Secretary or his designee on the original permit which was September 9, 2015. If the Coastal Use is not completed within this five (5) year period, an extension may be granted pursuant to the requirements contained in the Rules and Procedures for CUPs (LAC 43:I.723(D))

- Vehicle operation times would be kept to a minimum. Area soils must be covered and/or wetted during construction to minimize dust.

- If at any time Heritage tracked species are encountered within the project area, please contact the LNHP Data Manager at 225-765-2643.

- Any changes to the scope or location of the proposed project or if the project has not been initiated one (1) year from the date of the solicitation of views (03/30/18), the applicant is responsible for notifying FEMA for further coordination with USFWS.

- If human bone or unmarked grave(s) are present within the project area, compliance with the Louisiana Unmarked Human Burial Sites Preservation Act (R.S. 8:671 et seq.) is required. The applicant shall notify the law enforcement agency of the jurisdiction where the remains are located within 24 hours of the discovery. The applicant shall also notify FEMA and the Louisiana Division of Archaeology at 225-342-8170 within 72 hours of the discovery. (Louisiana Unmarked Human Burial Sites Preservation Act)

- If during the course of work, archaeological artifacts (prehistoric or historic) are discovered, the applicant shall stop work in the vicinity of the discovery and take all reasonable measures to avoid or minimize harm to the finds. The applicant shall inform their, GOSHEP State Applicant Liaison and Hazard Mitigation Assistance contacts at FEMA, who will in turn contact FEMA HP staff. The applicant will not proceed with work until FEMA HP completes consultation with the SHPO, and others as appropriate (Inadvertent Discovery Clause).

- Unusable equipment, debris and material shall be disposed of in an approved manner and location. The applicant shall handle, manage, and dispose of petroleum products, hazardous materials and/or toxic waste in accordance with all local, state and Federal agency requirements. All coordination pertaining to these activities should be documented and copies forwarded to the state and FEMA as part of the permanent project files.

- Mitigation and abatement measures will be required to reduce the noise levels to a range that would be considered acceptable. The applicant must comply with the local ordinance. Slidell Ordinance for dB limits is as follows:

Industrial At all times:	85 dB
Commercial 7:00 a.m. to 10:00 p.m.:	75 dB
Commercial 10:00 p.m. to 7:00 a.m.:	65 dB
Residential 7:00 a.m. to 10:00 p.m.:	70 dB
Residential 10:00 p.m. to 7:00 a.m.:	65 dB
Two-family or multifamily/intra-dwelling 7:00 a.m. to 10:00 p.m.:	60 dB
Two-family or multi-family dwelling 10:00 p.m. to 7:00 a.m.:	50 dB

- The contractor must post appropriate signage and fencing to minimize potential adverse public safety concerns. Appropriate signage, fencing, barriers, and traffic control measures should be in place prior to construction activities in order to alert pedestrians and motorists of project activities and traffic pattern changes.

- To minimize worker and public health and safety risks from project construction and closure, all construction and closure work must be done using qualified personnel trained in the proper use of construction equipment, including all appropriate safety precautions. Additionally, all activities must be conducted in a safe manner in accordance with the standards specified in OSHA regulations and the USACE safety manual.

- If hazardous materials are unexpectedly encountered in the project area during the proposed construction operations, appropriate measures for the proper assessment, remediation, management and disposal of the contamination would be initiated in accordance with applicable federal, state, and local regulations. The contractor would be required to take appropriate measures to prevent, minimize, and control the spill of hazardous materials in the construction area.

- The LDNR Office of Conservation should be contacted at 225-342-5540 if any unregistered wells of any type are encountered during construction work. For pipelines and other underground hazards, Louisiana One Call should be contacted at 800-272-3020 prior to commencing operations.

- Applicant must comply with all conditions listed in the USACE Programmatic General Permit (MVN 2012-0958-Ell) issued on October 17, 2016.

- During the project impact analysis process developers should identify project-related impacts to migratory birds and the conservation measures that will be used to mitigate them. For additional Migratory Bird Conservation recommendations, guidance and tools to help reduce impacts to birds and their habitats please visit the LESO webpage: https://www.fws.gov/lafayette/Migratory_Birds/MigBird.html and the Service's Migratory Bird Program Webpage (https://www.fws.gov/birds/bird-enthusiasts/threats-tobirds/collisions/communication-towers.php).

- The applicant must review the NBEM Guidelines is available at: http://www.fws.gov/migratorybirds/pdf/management/nationalbaldeaglenanagementguidelines.pdf to minimize potential project impacts to bald eagles, particularly where such impacts may constitute "disturbance," which is prohibited by the BGEPA.

- If a bald eagle nest occurs or is discovered within 660 feet of the proposed project area, then USFWS requires an evaluation to be performed to determine whether the project is likely to disturb nesting bald eagles. The applicant is required to conduct the evaluation on-line at: https://www.fws.gov/southeast/our-services/eagle-technical-assistance. Following completion of the evaluation, that website will provide a determination of whether additional consultation is necessary. All coordination pertaining to these activities should be documented and copies forwarded to the state and FEMA as part of the permanent project files

- USFWS recommends that a qualified biologist inspect the proposed work site for the presence of undocumented nesting colonies during the nesting season because some waterbird colonies may change locations year-to-year. To minimize disturbance to colonial nesting birds please refer to the colonial nesting waterbird guidance on the LESO Web page https://www.fws.gov/lafayette/Migratory _Birds/MigBird.html.

7.0 AGENCY COORDINATION AND PUBLIC INVOLVEMENT

7.1 Agency Coordination

As part of the development of this draft SEA, federal, state and local agencies were contacted. All initial SOV letters and the respective responses from these agencies are included in Appendix C External Agency Correspondence.

- Louisiana Department of Environmental Quality (LDEQ)
- Louisiana Department of Natural Resources (LDNR)
- Louisiana Department of Wildlife and Fisheries (LDWF)
- Louisiana State Historic Preservation Officer (SHPO)
- Environmental Protection Agency (EPA)
- U.S. Department of Agriculture - Natural Resources Conservation Service (NRCS)
- U.S. Fish and Wildlife Service (USFWS)
- U.S. Army Corps of Engineers (USACE)

7.2 Public Involvement

A public notice was published in the Advocate-New Orleans edition for 5 days, Wednesday July 11, 2018 through Tuesday, July 15, 2018, and also in the paper of record –the St. Tammany Farmer on Wednesday, July 18, 2018. There was a thirty (30) day comment period, beginning on Wednesday July 11, 2018 and concluding on Friday, August 10, 2018 at 4 p.m. A copy of the Public Notice is attached in Appendix E.

The draft SEA and draft FONSI was made available at the St Tammany Parish Library, Slidell Branch, at 555 Robert Blvd, Slidell, LA 70458 – Mondays through Thursdays 9:00am to 8:00pm; Fridays and Saturdays 9:00am to 5:00pm. The documents can also be downloaded from FEMA's website at http://www.fema.gov/resource-document-library.

Comments may be mailed to: DEPARTMENT OF HOMELAND SECURITY-FEMA EHP-City Barn Drainage Improvements, 1500 MAIN STREET, BATON ROUGE, LOUISIANA 70802. Comments may be emailed to: fema-noma@fema.dhs.gov or faxed to: 225-346-5848. Verbal comments will be accepted or recorded at 225-267-2962.

No comments were received during the comment period.

8.0 CONCLUSION

Construction of the proposed improvements at the proposed location was analyzed based on the studies, consultations, and reviews undertaken as reported in this draft SEA. The findings of this draft SEA conclude that the proposed action at the proposed site would result in no significant adverse impacts to geology, groundwater, biological resources, floodplains, public health and safety, hazardous materials, socioeconomic resources, environmental justice, or cultural resources.

During project construction, short-term impacts to soils, surface water, transportation, air quality, and noise are anticipated and conditions have been incorporated to mitigate and minimize the effects. Project short-term adverse impacts would be mitigated using BMPs, such as silt fences, proper vehicle and equipment maintenance, and appropriate signage.

No long-term adverse impacts are anticipated from the proposed project. Therefore, FEMA presently finds the proposed action meets the requirements for a FONSI under NEPA and the preparation of an EIS will not be required.

If new information was received that indicates there may be significant adverse effects, then FEMA would revise the findings and issue a second public notice, for additional comments. However, there are no changes, and the draft SEA has become the Final SEA.

Based upon the studies and consultations undertaken in this draft SEA, and given the precautionary and mitigating measures, there does not appear to be any significant environmental impacts associated with the proposed Slidell City Barn Pump Station Drainage Improvements Project.

Although the considered alternative shows a decrease in flooding, the involved excavation of a five (5) acre pond on the City owned property did not result in a significant difference in lowering the WSE when compared to the proposed project. This alternative was dismissed due to the cost verses benefit of the project when compared to the proposed alternative.

9.0 REFERENCES

Bayou Patassat (City Barn) Drainage Study Addendum #1 for the city of Slidell, by J.V. Burkes & Associates, Inc., Engineer stamped by Sean M. Burkes, dated 6/14/2014

City Barn Pump Station Channel Improvements (Bayou Patassat) Drainage Study- Burkes & Associates, Inc., Engineer stamped by Sean M. Burkes, dated 6/12/2012

H. Davis Cole & Associates, LLC. Hydrologic and Hydraulic Study: City Barn Drainage Improvements Project, Slidell, Louisiana. April, 2016

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USACE, Mississippi Valley Division, New Orleans District Greater New Orleans Hurricane and Storm Damage Risk Reduction System (HSDRRS), [Online] Available: http://www.mvn.usace.army.mil/Missions/HSDRRS/SELA/

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U.S. Fish and Wildlife Service. Endangered species data. [Online] Available: http://www.fws.gov/lafayette/pdc/default.aspx accessed on 7/7/16

10.0 LIST OF PREPARERS

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Jill Kelly, Environmental Protection Specialist, Federal Emergency Management Agency, Louisiana Recovery Office

Robert E. Leslie, Jr., PE, Hydraulic Civil Engineer, Federal Emergency Management Agency, Louisiana Recovery Office

Appendix A
Site Photographs

City of Slidell City Barn Pump Station Drainage Improvement

City Barn Location and the Bayou Patassat and Bayou Bonfouca Drainages

Series of Photos Taken During Site Visit on March 17, 2015

Looking west at Bayou Bonfouca. Note the earthen levee dam between the pump station and Bayou Bonfouca. City of Slidell flows from Bayou Patassat are pumped into Bayou Bonfouca, which flows into Lake Ponchartrain.

Looking west at Bayou Bonfouca while crossing the levee. Note the outfall pipe under the surface of the water.

Looking north from the levee at Bayou Patassat, at the sheet pile and bar screen and ramp on the pump station.

<u>Series of Photos Taken During Site Visit on May 25, 2016</u>

Bayou Pattasat taken from access ramp to bar screen mechanism facing southeast showing the northern bank line with the sheet metal piling retaining wall on the left, the southern bank line on the right, the access ramp on the left in the foreground, and the bar screen mechanism in the foreground on the right.

Overview of pumping station area.

Bar screen mechanism and access ramp with roof covering pumping station in background.

Appendix B
90% Design Drawings

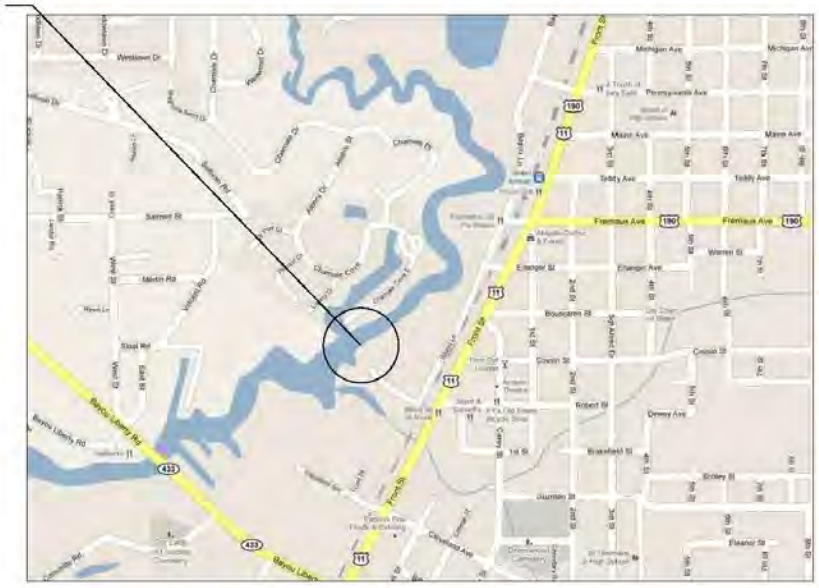
CITY BARN DRAINAGE IMPROVEMENTS PROJECT - PHASE III
CITY OF SLIDELL, LOUISIANA
CITY OF SLIDELL PROJECT NO: 100-118
BID NO: ##-####
GOHSEP PROJECT NO: 1603n-100-0043
HDCA PROJECT NO. 2018-05

H. Davis Cole & Associates, LLC
Consulting Engineers

NEW ORLEANS OFFICE
1340 Poydras Street, Suite 1850
New Orleans, Louisiana 70112
Telephone: 504.836.2020
Facsimile: 504.836.2010

Website: www.hdaviscole.com
Email: info@hdaviscole.com

PROJECT LOCATION



PROJECT AREA

PROJECT LOCATION

PROJECT AERIAL

NOTE TO REVIEWERS

THIS 90% SUBMITTAL MAY NOT EXPLICITLY CONTAIN ALL DETAILS. THESE ITEMS WILL BE REFLECTED IN FUTURE SUBMITTALS.

PRELIMINARY

NOT TO BE USED FOR CONSTRUCTION, BIDDING, RECORDATION, SALES OR AS THE BASIS FOR ISSUANCE OF A PERMIT
DAVID ALAN MARTIN, P.E.
LICENSE NO. 37832
H. DAVIS COLE & ASSOCIATES, LLC.

PREPARED FOR

MAYOR
HON. FREDDY DRENNAN

CITY ENGINEER
BLAINE CLANCY, P.E.

DIRECTOR OF PUBLIC OPERATIONS
GENE SWANN

PROGRAM MANAGER
STUART CONSULTING GROUP
MR. TONY BROCATO, JR.

CITY COUNCIL

L. LANDON CUSIMANO	AT-LARGE
KIM HARBISON	AT-LARGE
GLYNN PICHON	DISTRICT A
SAM ABNEY	DISTRICT B
WARREN CROCKETT	DISTRICT C
VAL VANNEY, JR.	DISTRICT D
SAM CARUSO	DISTRICT E
JAY NEWCOMB	DISTRICT F
BILL BORCHERT	DISTRICT G

CITY OF SLIDELL
DEPARTMENT OF ENGINEERING/
DEPARTMENT OF PUBLIC OPERATIONS
P.O. BOX 828
SLIDELL, LA 70459

APPROXIMATE PROJECT SITE GPS COORDINATES
30° 16' 24.615" N
89° 47' 17.701" W

90% DESIGN SUBMITTAL
NOT FOR CONSTRUCTION

APPROVED:
THE CITY OF SLIDELL

BLAINE CLANCY, P.E. — DATE
CITY ENGINEER

RECOMMENDED FOR APPROVAL BY:
H. DAVIS COLE & ASSOCIATES, LLC

DAVID A. MARTIN, P.E. — 37832 LICENSE No. — DATE
PROJECT MANAGER

LIST OF DRAWINGS

COVER SHEET

CO-1	COVER SHEET

GENERAL

G1	LIST OF DRAWINGS
G2	GENERAL NOTES & PROJECT CONTACTS
G3	GENERAL NOTES & SPECIFICATIONS
G4	DRAWING STANDARDS & SYMBOLS
G5	ABBREVIATIONS
G6	PIPING SCHEDULE
G7	PROJECT OVERVIEW MAP

DEMOLITION

01-D1	PUMP STATION DEMOLITION PLAN
01-D2	PUMP STATION DEMOLITION ELEVATION
01-D3	PUMP STATION DEMOLITION SECTION
01-D4	DEMOLITION PHOTOS

CIVIL

C1	OVERALL SITE PLAN
C2	CIVIL DETAILS
01-C1	EXCAVATION PLAN AND SECTION

MECHANICAL

M1	EQUIPMENT DATA TABLES
M2	MECHANICAL DETAILS
01-M1	PUMP STATION MECHANICAL PLAN
01-M2	PUMP STATION MECHANICAL ELEVATION
01-M3	PUMP STATION MECHANICAL SECTION

STRUCTURAL

S1	STRUCTURAL DETAILS
01-S1	PUMP STATION STRUCTURAL PLAN
01-S2	PUMP STATION STRUCTURAL ELEVATION AND SECTION
01-S3	CATWALK STRUCTURAL PLAN
01-S4	CATWALK STRUCTURAL SECTIONS
02-S1	DIESEL STORAGE FACILITY PLAN, ELEVATION, & SECTION

ELECTRICAL

E1	ELECTRICAL SITE PLAN
E2	MAIN POWER ONE LINE DIAGRAM
E3	EXISTING & PROPOSED PUMP STATION P&ID

SUPPLEMENTAL

- TOPOGRAPHIC SURVEY PREPARED BY BFM CORPORATION, INC., MARCH 2011
- TOPOGRAPHIC SURVEY PREPARED BY ALL SOUTH CONSULTING ENGINEERS, LLC, MARCH 2016

PROJECT AREA INDEX (FOR SHEET IDENTIFICATION)

01 - PUMP STATION

02 - DIESEL STORAGE FACILITY

PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION BIDDING, RECORDATION, SALES OR AS THE BASIS FOR ISSUANCE OF A PERMIT
DAVID ALAN MARTIN, P.E. LICENSE NO. 37952 H. DAVIS COLE & ASSOCIATES

SUBMITTED BY: ANDREW T. FORD, E.I. PROJECT MANAGER — LICENSE NO.

SUBMITTED BY: DAVID A. MARTIN, P.E. PRINCIPAL — 37952 LICENSE NO.

H. Davis Cole & Associates, LLC — NEW ORLEANS, LA

90% SUBMITTAL
NOT FOR CONSTRUCTION

MARK	DESCRIPTION	DATE	BY	CHKD

REVISION RECORD

DESIGNED BY: ARF
DRAWN BY: ARF
CHECKED BY: DAM
DATE: APRIL 18
DETAILED BY: MAS
HDC PROJECT NO: 2018-05

CITY BARN DRAINAGE IMPROVEMENTS
SLIDELL LOUISIANA

CITY OF SLIDELL
P.O. BOX 828
SLIDELL, LA 70459

LIST OF DRAWINGS

SHEET ID: G1

SHEET SET: 2 OF 29

GENERAL

1) THESE NOTES AND SPECIFICATIONS ARE GENERAL AND APPLY TO THE ENTIRE PROJECT UNLESS THERE ARE SPECIFIC INDICATIONS OTHERWISE. NOTES AND SPECIFICATIONS ARE CONTINUED THROUGHOUT THE PLANS.

2) THE CONTRACTOR SHALL NOTIFY THE ENGINEER OF CONSTRUCTION A MINIMUM OF ONE WEEK PRIOR TO THE BEGINNING OF CONSTRUCTION. THE CONTRACTOR SHALL NOTIFY THE ENGINEER AT THE CONCLUSION OF CONSTRUCTION TO ALLOW FOR INSPECTION OF THE PROJECT.

3) IN THE EVENT OF DISCREPANCIES, CONFLICTS, OR OMISSIONS, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER AND OBTAIN WRITTEN INSTRUCTIONS FROM THE ENGINEER PRIOR TO PROCEEDING WITH AFFECTED WORK.

4) THE CONTRACTOR SHALL HAVE THE COMPLETE AND SOLE RESPONSIBILITY FOR THE JOB SITE INCLUDING THE SAFETY OF PERSONS, PROPERTY, AND ADJACENT IMPROVEMENTS. ANY INSPECTION BY THE ENGINEER WILL BE SOLELY TO DETERMINE COMPLIANCE WITH THE PLANS AND SPECIFICATIONS AND WILL NOT INCLUDE ANY REVIEW OF THE ADEQUACY OF THE CONTRACTOR'S SAFETY MEASURES.

5) THESE DRAWINGS ARE SCALED FOR PRODUCTION ON 22" X 34" MEDIA (ANSI - D SHEET SIZE). PRINTS ON OTHER SIZED MEDIA SHALL BE SCALED ACCORDINGLY.

6) THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROVISION OF ALL TEMPORARY UTILITIES HE DEEMS NECESSARY FOR THE PROPER EXECUTION OF THE WORK IN THE MOST EFFICIENT MANNER PRACTICAL. THE COST OF PROVISION OF THESE TEMPORARY UTILITIES SHALL BE BORNE BY THE CONTRACTOR AND SHALL BE INCLUDED IN THE PRICE OF THE WORK.

7) TEMPORARY UTILITIES SHALL BE OF NEW OR USED MATERIALS AND EQUIPMENT, WHICH ARE IN SUBSTANTIALLY UNDAMAGED CONDITION AND WITHOUT SIGNIFICANT DETERIORATION AND WHICH ARE RECOGNIZED IN THE CONSTRUCTION INDUSTRY, BY COMPLIANCE WITH APPROPRIATE STANDARDS, AS BEING SUITABLE FOR INTENDED USE IN EACH CASE. WHERE A PORTION OF TEMPORARY UTILITY IS PROVIDED BY UTILITY COMPANY, THE CONTRACTOR SHALL PROVIDE THE REMAINING PORTION WITH MATCHING AND COMPATIBLE MATERIALS AND EQUIPMENT AND SHALL COMPLY WITH RECOMMENDATIONS OF UTILITY COMPANY.

8) POWER: THE CONTRACTOR SHALL PROVIDE POWER REQUIRED FOR ITS OPERATIONS UNDER THE CONTRACT, AND SHALL PROVIDE AND MAINTAIN ALL TEMPORARY POWER LINES REQUIRED TO PERFORM THE WORK IN A SAFE AND SATISFACTORY MANNER.

9) TEMPORARY POWER DISTRIBUTION: THE CONTRACTOR SHALL PROVIDE A WEATHERPROOF, GROUNDED, TEMPORARY POWER DISTRIBUTION SYSTEM SUFFICIENT FOR PERFORMANCE OF ENTIRE WORK OF PROJECT, INCLUDING TEMPORARY ELECTRICAL HEATING WHERE INDICATED, OPERATION OF TEST EQUIPMENT AND TEST OPERATION OF BUILDING EQUIPMENT AND SYSTEMS WHICH CANNOT BE DELAYED UNTIL PERMANENT POWER CONNECTIONS ARE OPERABLE. TEMPORARY OPERATION OF OTHER TEMPORARY FACILITIES, INCLUDING PERMANENT EQUIPMENT AND SYSTEMS WHICH MUST BE PLACED IN OPERATION PRIOR TO USE OF PERMANENT POWER CONNECTIONS (PUMPS, HVAC EQUIPMENT, ELEVATORS, AND SIMILAR EQUIPMENT), AND POWER FOR TEMPORARY OPERATION OF EXISTING FACILITIES (IF ANY) AT THE SITE DURING CHANGE-OVER TO NEW PERMANENT POWER SYSTEM. PROVIDE CIRCUITS OF ADEQUATE SIZE AND PROPER POWER CHARACTERISTICS FOR EACH USE; RUN CIRCUIT WIRING GENERALLY OVERHEAD, AND RISE VERTICALLY IN LOCATIONS WHERE IT WILL BE LEAST EXPOSED TO POSSIBLE DAMAGE FROM CONSTRUCTION OPERATIONS AND WILL RESULT IN MINIMAL INTERFERENCE WITH PERFORMANCE OF THE WORK; PROVIDE RIGID STEEL CONDUIT OR EQUIVALENT RACEWAYS FOR WIRING WHICH MUST BE EXPOSED ON GRADE, FLOORS, DECKS, OR OTHER EXPOSURES TO DAMAGE OR ABUSE. WIRING FOR TEMPORARY ELECTRIC LIGHT AND POWER SHALL BE PROPERLY INSTALLED AND MAINTAINED AND SHALL BE SECURELY FASTENED IN PLACE. ELECTRICAL FACILITIES SHALL CONFORM TO THE REQUIREMENTS OF SUBPART K OF THE OSHA SAFETY AND HEALTH STANDARDS FOR CONSTRUCTION.

10) CONSTRUCTION LIGHTING: WORK CONDUCTED AT NIGHT OR UNDER CONDITIONS OF DEFICIENT DAYLIGHT SHALL BE SUITABLY LIGHTED TO INSURE PROPER WORK AND TO AFFORD ADEQUATE FACILITIES FOR INSPECTION AND SAFE WORKING CONDITIONS.

11) TEMPORARY LIGHTING: THE CONTRACTOR SHALL PROVIDE A GENERAL, WEATHERPROOF, GROUNDED TEMPORARY LIGHTING SYSTEM IN EVERY AREA OF CONSTRUCTION WORK, AS SOON AS OVERHEAD FLOOR/ROOF DECK STRUCTURE HAS BEEN INSTALLED TO PROVIDE SUFFICIENT ILLUMINATION FOR SAFE WORK AND TRAFFIC CONDITIONS. RUN CIRCUIT WIRING GENERALLY OVERHEAD, AND RISE VERTICALLY IN LOCATIONS WHERE IT WILL BE LEAST EXPOSED TO POSSIBLE DAMAGE FROM CONSTRUCTION OPERATIONS ON GRADE, FLOORS, DECKS, OR OTHER AREAS OF POSSIBLE DAMAGE OR ABUSE.

12) THE CONTRACTOR SHALL PROVIDE AN ADEQUATE SUPPLY OF WATER OF A QUALITY SUITABLE FOR ALL DOMESTIC AND CONSTRUCTION PURPOSES. THE CONTRACTOR SHALL NOT MAKE CONNECTION TO OR DRAW WATER FROM ANY FIRE HYDRANT OR PIPELINE WITHOUT FIRST OBTAINING PERMISSION OF THE AUTHORITY HAVING JURISDICTION OVER THE USE OF SAID FIRE HYDRANT OR PIPELINE AND FROM THE AGENCY OWNING THE AFFECTED WATER SYSTEM. FOR EACH SUCH CONNECTION MADE, THE CONTRACTOR SHALL FIRST ATTACH TO THE FIRE HYDRANT OR PIPELINE A VALVE AND A METER, IF REQUIRED BY THE SAID AUTHORITY, OF A SIZE AND TYPE ACCEPTABLE TO SAID AUTHORITY AND AGENCY. THE CONTRACTOR SHALL PAY ALL PERMIT AND WATER CHARGES.

13) THE CONTRACTOR SHALL MAKE ITS OWN INVESTIGATION OF THE CONDITION OF AVAILABLE PUBLIC AND PRIVATE ROADS AND OF CLEARANCES, RESTRICTIONS, BRIDGE LOAD LIMITS, AND OTHER LIMITATIONS AFFECTING TRANSPORTATION AND INGRESS AND EGRESS TO THE SITE OF THE WORK. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO CONSTRUCT AND MAINTAIN ANY HAUL ROADS REQUIRED FOR ITS CONSTRUCTION OPERATIONS.

14) WHEREVER NECESSARY, TO MAINTAIN VEHICULAR CROSSINGS, THE CONTRACTOR SHALL PROVIDE SUITABLE TEMPORARY BRIDGES OR STEEL PLATES OVER UNFILLED EXCAVATIONS, EXCEPT IN SUCH CASES AS THE CONTRACTOR SHALL SECURE THE WRITTEN CONSENT OF THE RESPONSIBLE INDIVIDUALS OR AUTHORITIES TO OMIT SUCH TEMPORARY BRIDGES OR STEEL PLATES, WHICH WRITTEN CONSENT SHALL BE DELIVERED TO THE ENGINEER PRIOR TO EXCAVATION. ALL SUCH BRIDGES OR STEEL PLATES SHALL BE MAINTAINED IN SERVICE UNTIL ACCESS IS PROVIDED ACROSS THE BACKFILLED EXCAVATION. TEMPORARY BRIDGES OR STEEL PLATES FOR STREET AND HIGHWAY CROSSING SHALL CONFORM TO THE REQUIREMENTS OF THE AUTHORITY HAVING JURISDICTION IN EACH CASE, AND THE CONTRACTOR SHALL ADOPT DESIGNS FURNISHED BY SAID AUTHORITY FOR SUCH BRIDGES OR STEEL PLATES, OR SHALL SUBMIT DESIGNS TO SAID AUTHORITY FOR APPROVAL, AS MAY BE REQUIRED.

15) THE CONTRACTOR SHALL MAKE ITS OWN ARRANGEMENTS FOR ANY NECESSARY OFF-SITE STORAGE OR SHOP AREAS NECESSARY FOR THE PROPER EXECUTION OF THE WORK.

16) THE CONTRACTOR SHALL PROTECT ALL EXISTING UTILITIES AND IMPROVEMENTS NOT DESIGNATED FOR REMOVAL AND SHALL RESTORE DAMAGED OR TEMPORARILY RELOCATED UTILITIES AND IMPROVEMENTS TO A CONDITION EQUAL TO OR BETTER THAN PRIOR TO SUCH DAMAGE OR TEMPORARY RELOCATION.

17) THE CONTRACTOR'S OPERATIONS ADJACENT TO PROPERTIES OF RAILWAY AND UTILITY COMPANIES OR ADJACENT TO OTHER PROPERTY, DAMAGE TO WHICH MIGHT RESULT IN CONSIDERABLE EXPENSE, LOSS OR INCONVENIENCE, SHALL NOT COMMENCE UNTIL AFTER ALL ARRANGEMENTS NECESSARY FOR THE PROTECTION THEREOF HAVE BEEN MADE.

18) THE CONTRACTOR SHALL COOPERATE WITH OWNERS OF UTILITY LINES IN THEIR REMOVAL AND REARRANGEMENT, IN ORDER THAT THESE OPERATIONS MAY PROGRESS IN A REASONABLE MANNER, THAT DUPLICATION OF REARRANGEMENT WORK MAY BE MINIMIZED AND THAT SERVICES RENDERED BY THOSE PARTIES WILL NOT BE UNNECESSARILY INTERRUPTED.

19) IN THE EVENT OF INTERRUPTION OF UTILITY SERVICES DUE TO ACCIDENTAL BREAKAGE OR BEING EXPOSED OR UNSUPPORTED, THE CONTRACTOR SHALL PROMPTLY NOTIFY THE PROPER AUTHORITY AND SHALL COOPERATE WITH SUCH AUTHORITY IN RESTORATION OF SERVICE. IF UTILITY SERVICE IS INTERRUPTED, CONTINUOUS COOPERATION WILL BE REQUIRED UNTIL SERVICE IS RESTORED. NO WORK SHALL BE UNDERTAKEN AROUND FIRE HYDRANTS UNTIL PROVISIONS FOR CONTINUED SERVICE HAVE BEEN APPROVED BY THE LOCAL FIRE AUTHORITY.

20) THE CONTRACTOR SHALL ESTABLISH AND MAINTAIN AN EFFECTIVE QUALITY CONTROL PROCESS. THE QUALITY CONTROL PROCESS SHALL CONSIST OF PLANS, PROCEDURES, AND ORGANIZATION NECESSARY TO PROVIDE MATERIALS, EQUIPMENT, WORKMANSHIP, FABRICATION, CONSTRUCTION AND OPERATIONS WHICH COMPLY WITH THE CONTRACT REQUIREMENTS. THE PROCESS SHALL COVER CONSTRUCTION OPERATIONS BOTH ONSITE AND OFFSITE, AND SHALL BE KEYED TO THE PROPOSED CONSTRUCTION SEQUENCE.

21) THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF THE SITE, AND ALL WORK, MATERIALS, EQUIPMENT AND EXISTING FACILITIES THEREON, AGAINST THEFT, VANDALS, AND OTHER UNAUTHORIZED PERSONS.

22) NO CLAIM SHALL BE MADE AGAINST OWNER BY REASON OF ANY ACT OF AN EMPLOYEE OR TRESPASSER, AND CONTRACTOR SHALL MAKE GOOD ALL DAMAGE TO OWNER'S PROPERTY RESULTING FROM HIS FAILURE TO PROVIDE SECURITY MEASURES AS SPECIFIED.

23) SECURITY MEASURES SHALL BE AT LEAST EQUAL TO THOSE USUALLY PROVIDED TO PROTECT THE EXISTING FACILITIES DURING NORMAL OPERATION, BUT SHALL ALSO INCLUDE SUCH ADDITIONAL SECURITY FENCING, BARRICADES, LIGHTING, WATCHMAN SERVICES AND OTHER MEASURES AS REQUIRED TO PROTECT THE SITE.

24) THE CONTRACTOR SHALL PROMPTLY REMOVE FROM THE VICINITY OF THE COMPLETED WORK, ALL RUBBISH, UNUSED MATERIALS, CONCRETE FORMS, CONSTRUCTION EQUIPMENT, AND TEMPORARY STRUCTURES AND FACILITIES USED DURING CONSTRUCTION. FINAL ACCEPTANCE OF THE WORK BY THE OWNER WILL BE WITHHELD UNTIL THE CONTRACTOR HAS SATISFACTORILY PERFORMED THE FINAL CLEANUP OF THE SITE.

PROJECT LAYOUT

1) THE CONTRACTOR SHALL BE RESPONSIBLE FOR LAYING OUT THE WORK AND VERIFYING ALL MEASUREMENTS PRIOR TO AND DURING THE ENTIRE PERIOD OF CONSTRUCTION. MEASUREMENTS SHALL BE CONTINUOUSLY VERIFIED.

2) THE MEASUREMENTS, EQUIPMENT ARRANGEMENTS, LINES, AND GRADES SHOWN ON THE PLANS MAY BE VARIED SLIGHTLY BY THE ENGINEER IN THE FIELD IF CONDITIONS JUSTIFY SUCH A VARIATION.

UTILITIES

1) IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY LOCATION AND DEPTH OF ALL EXISTING UTILITIES BEFORE STARTING CONSTRUCTION.

2) THE CONTRACTOR SHALL BE RESPONSIBLE FOR DAMAGE TO EXISTING UTILITIES WHICH OCCURS DURING CONSTRUCTION AND SHALL IMMEDIATELY REPORT ANY DAMAGE TO THE AFFECTED UTILITY OWNERS. ALL REPAIRS OF THE DAMAGED UTILITIES SHALL BE REPAIRED IN ACCORDANCE WITH THE INSTRUCTIONS OF THE AFFECTED UTILITY AND ALL COSTS ASSOCIATED THEREWITH SHALL BE BORNE BY THE CONTRACTOR.

METALS

1) THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND SHALL MAKE ANY FIELD MEASUREMENTS NECESSARY AND SHALL BE FULLY RESPONSIBLE FOR ACCURACY AND LAYOUT OF WORK. THE CONTRACTOR SHALL REVIEW THE DRAWINGS, AND ANY DISCREPANCIES SHALL BE REPORTED TO THE ENGINEER FOR CLARIFICATION PRIOR TO STARTING FABRICATION.

2) UNLESS OTHERWISE INDICATED, FABRICATED STEEL METALWORK WHICH WILL BE USED IN A CORROSIVE ENVIRONMENT AND/OR WILL BE SUBMERGED IN WATER/WASTEWATER SHALL BE COATED AS SPECIFIED OR AS INDICATED AND SHALL NOT BE GALVANIZED PRIOR TO COATING. OTHER MISCELLANEOUS STEEL METALWORK SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION.

3) UNLESS OTHERWISE INDICATED, STAINLESS STEEL METALWORK AND BOLTS SHALL BE OF TYPE 316 STAINLESS STEEL. WHERE ANAEROBIC CONDITIONS ARE NOTED, TYPE 304 STAINLESS STEEL SHALL BE USED.

4) UNLESS OTHERWISE INDICATED, ALUMINUM METALWORK SHALL BE OF ALLOY 6061-T6. ALUMINUM IN CONTACT WITH CONCRETE, MASONRY, WOOD, POROUS MATERIALS, OR DISSIMILAR METALS SHALL HAVE CONTACT SURFACES COATED IN ACCORDANCE WITH SECTION 09800.

5) UNLESS OTHERWISE INDICATED, IRON CASTINGS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A 48, CLASS 50B OR BETTER.

6) STRUCTURAL STEEL SHALL COMPLY WITH THE TABLE BELOW:

WIDE FLANGE SHAPES	ASTM A 992
OTHER SHAPES, PLATES, BARS	ASTM A 36
PIPE, PIPE COLUMNS BOLLARDS	ASTM A 53, TYPE E OR S, GRADE B STANDARD WEIGHT UNLESS NOTED OTHERWISE
HSS	ASTM 500 GRADE B

7) UNLESS OTHERWISE INDICATED, BOLTS, ANCHOR BOLTS, WASHERS, AND NUTS SHALL BE STEEL AS INDICATED. THREADS ON GALVANIZED BOLTS AND NUTS SHALL BE FORMED WITH SUITABLE TAPS AND DIES SUCH THAT THEY RETAIN THEIR NORMAL CLEARANCE AFTER HOT-DIP GALVANIZING. EXCEPT AS OTHERWISE INDICATED, STEEL FOR BOLT MATERIAL, ANCHOR BOLTS, AND CAP SCREWS SHALL BE IN ACCORDANCE WITH THE FOLLOWING:

- STRUCTURAL CONNECTIONS: ASTM A 307, GRADE A OR B, HOT-DIP GALVANIZED.
- ANCHOR BOLTS: ASTM A 307, GRADE A OR B, OR ASTM A 36, HOT-DIP GALVANIZED.
- HIGH STRENGTH BOLTS WHERE INDICATED: ASTM A 325.
- PIPE AND EQUIPMENT FLANGE BOLTS: ASTM A 193, GRADE B-7.

8) BOLTS, NUTS, AND WASHERS IN THE LOCATIONS LISTED BELOW SHALL BE STAINLESS STEEL AS INDICATED.
- BURIED LOCATIONS.
- SUBMERGED LOCATIONS.
- LOCATIONS SUBJECT TO SEASONAL OR OCCASIONAL FLOODING.
- INSIDE HYDRAULIC STRUCTURES BELOW THE TOP OF THE STRUCTURE.
- INSIDE TRENCHES, CONTAINMENT WALLS, AND CURBED AREAS.
- LOCATIONS INDICATED BY THE CONTRACT DOCUMENTS OR DESIGNATED BY THE ENGINEER TO BE PROVIDED WITH STAINLESS STEEL BOLTS.

9) UNLESS OTHERWISE INDICATED, STAINLESS STEEL BOLTS, ANCHOR BOLTS, NUTS, AND WASHERS SHALL BE TYPE 316 STAINLESS STEEL, CLASS 2, CONFORMING TO ASTM A 193 FOR BOLTS AND TO ASTM A 194 FOR NUTS. THREADS ON STAINLESS STEEL BOLTS SHALL BE PROTECTED WITH AN ANTI-SEIZE LUBRICANT SUITABLE FOR SUBMERGED STAINLESS STEEL BOLTS, TO MEET GOVERNMENT SPECIFICATION MIL-A-907E. BURIED BOLTS IN POORLY DRAINED SOIL SHALL BE COATED THE SAME AS THE BURIED PIPE. ANTI - SEIZE LUBRICANT SHALL BE CLASSIFIED AS ACCEPTABLE FOR POTABLE WATER USE BY THE NSF.

10) BOLT AND NUT MATERIAL SHALL BE FREE-CUTTING STEEL.

11) NUTS SHALL BE CAPABLE OF DEVELOPING THE FULL STRENGTH OF THE BOLTS. THREADS SHALL BE COARSE THREAD SERIES CONFORMING TO THE REQUIREMENTS OF THE AMERICAN STANDARD FOR SCREW THREADS. BOLTS AND CAP SCREWS SHALL HAVE HEXAGON HEADS AND NUTS SHALL BE HEAVY HEXAGON SERIES.

2) BOLTS AND NUTS SHALL BE INSTALLED WITH WASHERS FABRICATED OF MATERIAL MATCHING THE BASE MATERIAL OF BOLTS, EXCEPT THAT HARDENED WASHERS FOR HIGH STRENGTH BOLTS SHALL CONFORM TO THE REQUIREMENTS OF THE AISC SPECIFICATION. LOCK WASHERS FABRICATED OF MATERIAL MATCHING THE BOLTS SHALL BE INSTALLED WHERE INDICATED.

13) THE LENGTH OF EACH BOLT SHALL BE SUCH THAT THE BOLT EXTENDS AT LEAST 1/8-INCH BEYOND THE OUTSIDE FACE OF THE NUT BEFORE TIGHTENING, EXCEPT FOR ANCHOR BOLTS, WHICH SHALL BE FLUSH WITH THE FACE OF THE NUT BEFORE TIGHTENING.

14) ADHESIVE ANCHORS AND RODS: UNLESS OTHERWISE INDICATED, DRILLED CONCRETE OR MASONRY ANCHORS SHALL BE ADHESIVE ANCHOR AND ROD SYSTEMS AS SPECIFIED BELOW.

A. ANCHORS AND RODS SHALL EMPLOY AN INJECTABLE ADHESIVE. ADHESIVE SHALL BE FURNISHED IN SIDE-BY-SIDE REFILL PACKETS THAT KEEP COMPONENTS SEPARATE PRIOR TO INSTALLATION. SIDE - BY - SIDE REFILL PACKETS SHALL ACCEPT STATIC MIXING NOZZLES WHICH THOROUGHLY COMBINES COMPONENTS AND ALLOWS INJECTION DIRECTLY INTO DRILLED HOLE. ONLY INJECTION TOOLS AND STATIC MIXING NOZZLES AS RECOMMENDED BY MANUFACTURER SHALL BE USED. MANUFACTURER'S RECOMMENDED INSTRUCTIONS SHALL BE FOLLOWED. INJECTION ADHESIVE SHALL BE HILTI - HY 500 MAX - SD OR EQUAL.

B. ANCHOR RODS SHALL BE FURNISHED WITH CHAMFERED ENDS SO THAT EITHER END WILL ACCEPT A NUT AND WASHER. ALTERNATIVELY, ANCHOR RODS SHALL BE FURNISHED WITH AT 45 DEGREE CHISEL END ON ONE END TO ALLOW FOR EASY INSERTION INTO AN ADHESIVE - FILLED HOLE. ANCHOR RODS SHALL BE MANUFACTURED TO MEET ISO 898 CLASS 5.8, ASTM A193 GRADE B7 (HIGH STRENGTH CARBON STEEL ANCHOR). ANCHOR RODS SHALL BE HILTI HAS RODS OR EQUAL.

15) EXPANDING-TYPE ANCHORS IF INDICATED OR PERMITTED, SHALL BE GALVANIZED STEEL EXPANSION TYPE ITW RAMSET/REDHEAD "TRUBOLT" ANCHORS; MCCULLOCK INDUSTRIES "KWICK-BOLT," OR EQUAL. LEAD CAULKING ANCHORS WILL NOT BE PERMITTED. SIZE SHALL BE AS INDICATED. EMBEDMENT DEPTH SHALL BE AS THE MANUFACTURER RECOMMENDS FOR THE LOAD TO BE SUPPORTED. EXPANSION TYPE ANCHORS THAT ARE TO BE EMBEDDED IN GROUT MAY BE STEEL. NON-EMBEDDED BURIED OR SUBMERGED ANCHORS SHALL BE STAINLESS STEEL.

UTILITY DIRECTORY

BELOW GROUND PROTECTION CENTER
(LA. ONE CALL) 811

ENTERGY 1-800-622-6537

CITY OF SLIDELL
DEPARTMENT OF ENGINEERING ..... (985) 646-4270

CITY OF SLIDELL DEPARTMENT
OF PUBLIC OPERATIONS ..... (985) 646-4258

CONTRACTOR SHALL CONTACT EACH AGENCY AND COMPANY RELATIVE TO THE EXACT LOCATION OF ITS UNDERGROUND INSTALLATION PRIOR TO ANY RELIANCE UPON THE ACCURACY OF SUCH LOCATION SHOWN. AT LEAST 72 HOURS PRIOR TO EXCAVATING, THE CONTRACTOR SHALL CALL LOUISIANA ONE CALL TO MARK THE UTILITIES THROUGH THE CONSTRUCTION AREA. EXISTING UTILITIES SHALL BE MARKED WITH SPRAY PAINT OR STAKES IN THE FIELD PRIOR TO EXCAVATION.

PROJECT CONTACTS

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PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION BIDDING RECORDATION, SALES OR AS THE BASIS FOR ISSUANCE OF A PERMIT
DAVID ALAN MARTIN, P.E. LICENSE NO. 33002
H. DAVIS COLE & ASSOCIATES, LLC

SUBMITTED BY: ANDRE R. FORD, E.I. PROJECT MANAGER — LICENSE NO.
SUBMITTED BY: DAVID A. MARTIN, P.E. PRINCIPAL — 33002 LICENSE NO.

H. Davis Cole & Associates, LLC — NEW ORLEANS, LA

90% SUBMITTAL
NOT FOR CONSTRUCTION

MARK	DESCRIPTION	DATE	BY	CHKD

REVISION RECORD

DESIGNED BY: ARF
DRAWN BY: ARF
CHECKED BY: DAM
DATE: APRIL 18
DETAILED BY: MAS
HDC PROJECT NO: 2018-05

CITY BARN DRAINAGE IMPROVEMENTS
SLIDELL LOUISIANA

CITY OF SLIDELL
P.O. BOX 828
SLIDELL, LA 70459

GENERAL NOTES AND SPECIFICATIONS

SHEET ID: G2

SHEET SET: 3 OF 29

METALS CON'T.

16) POWER-DRIVEN PINS FOR INSTALLATION IN CONCRETE OR STEEL SHALL BE HEAT-TREATED STEEL ALLOY. IF THE PINS ARE NOT INHERENTLY SUFFICIENTLY CORROSION-RESISTANT FOR THE CONDITIONS TO WHICH THEY WILL BE EXPOSED, THEY SHALL BE PROTECTED IN AN ACCEPTABLE MANNER. PINS SHALL HAVE CAPPED OR THREADED HEADS CAPABLE OF TRANSMITTING THE LOADS THE SHANKS ARE REQUIRED TO SUPPORT. PINS THAT ARE CONNECTED TO STEEL SHALL HAVE LONGITUDINAL SERRATIONS AROUND THE CIRCUMFERENCE OF THE SHANK. POWER-DRIVEN PINS SHALL BE INSTALLED BY A CRAFTSPERSON CERTIFIED BY THE MANUFACTURER AS BEING QUALIFIED TO INSTALL THE MANUFACTURER'S PINS. PINS SHALL BE DRIVEN IN ONE INITIAL MOVEMENT BY AN INSTANTANEOUS FORCE THAT HAS BEEN CAREFULLY SELECTED TO ATTAIN THE REQUIRED PENETRATION. DRIVEN PINS SHALL CONFORM TO THE FOLLOWING REQUIREMENTS WHERE "D" = PIN'S SHANK DIAMETER.

MATERIAL PENETRATED BY PIN	MATERIAL MINIMUM THICKNESS	PIN SHANK PENETRATION IN SUPPORTING MATERIAL	MINIMUM SPACE FROM PIN'S CL TO EDGE OF PENETRATED MATERIAL	MINIMUM PIN SPACING
CONCRETE	16D	6D MINIMUM	14D	20D
STEEL	¼"	STEEL THICKNESS	4D	7D

17) IMPACT ANCHORS SHALL BE AN EXPANSION TYPE ANCHOR IN WHICH A NAIL TYPE PIN IS DRIVEN TO PRODUCE THE EXPANSIVE FORCE. THE PIN SHALL HAVE A ZINC SLEEVE WITH A MUSHROOM STYLE HEAD AND STAINLESS STEEL NAIL PIN. ANCHORS SHALL BE METAL HIT ANCHORS, MANUFACTURED BY HILTI, INC., RAWL ZAMAC NAILIN, MANUFACTURED BY THE RAWLPLUG COMPANY; OR EQUAL.

18) STRUCTURAL STEEL SHALL BE FABRICATED IN ACCORDANCE WITH THE DRAWINGS, AISC SPECIFICATIONS, AND AS SHOWN ON THE SHOP DRAWINGS. MATERIALS SHALL BE PROPERLY MARKED AND MATCH MARKED FOR FIELD ASSEMBLY. WHERE FINISHING IS REQUIRED, ASSEMBLY SHALL BE COMPLETED INCLUDING BOLTING AND WELDING OF UNITS, BEFORE START OF FINISHING OPERATIONS. SHOP AND FIELD CONNECTIONS SHALL BE BOLTED OR WELDED AS INDICATED. ALL CONNECTIONS SHALL DEVELOP FULL STRENGTH OF MEMBERS JOINED AND SHALL CONFORM TO AISC STANDARD CONNECTIONS. UNLESS OTHERWISE INDICATED, WELDS SHALL CONFORM TO AISC LRFD SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS.

19) WELDING SHALL BE BY THE METAL-ARC METHOD OR GAS-SHIELDED ARC METHOD AS DESCRIBED IN THE AMERICAN WELDING SOCIETY'S "WELDING HANDBOOK" AS SUPPLEMENTED BY OTHER PERTINENT STANDARDS OF THE AWS. QUALIFICATION OF WELDERS SHALL BE IN ACCORDANCE WITH THE AWS STANDARDS GOVERNING SAME. IN ASSEMBLY AND DURING WELDING, THE COMPONENT PARTS SHALL BE ADEQUATELY CLAMPED, SUPPORTED, AND RESTRAINED TO MINIMIZE DISTORTION AND FOR CONTROL OF DIMENSIONS. WELD REINFORCEMENT SHALL BE AS INDICATED BY THE AWS CODE. UPON COMPLETION OF WELDING, WELD SPLATTER, FLUX, SLAG, AND BURRS LEFT BY ATTACHMENTS SHALL BE REMOVED. WELDS SHALL BE REPAIRED TO PRODUCE A WORKMANLIKE APPEARANCE, WITH UNIFORM WELD CONTOURS AND DIMENSIONS. SHARP CORNERS OF MATERIAL THAT IS TO BE PAINTED OR COATED SHALL BE GROUND TO A MINIMUM OF 1/32-INCH ON THE FLAT.

20) STRUCTURAL STEEL PLATES SHAPES, BARS, AND FABRICATED ASSEMBLIES REQUIRED TO BE GALVANIZED SHALL, AFTER THE STEEL HAS BEEN THOROUGHLY CLEANED OF RUST AND SCALE, BE GALVANIZED IN ACCORDANCE WITH THE REQUIREMENTS OF ASTM A 123. ANY GALVANIZED PART THAT BECOMES WARPED DURING THE GALVANIZING OPERATION SHALL BE STRAIGHTENED. BOLTS, ANCHOR BOLTS, NUTS, AND SIMILAR THREADED FASTENERS, AFTER BEING PROPERLY CLEANED, SHALL BE GALVANIZED IN ACCORDANCE WITH THE REQUIREMENTS OF ASTM A 153. FIELD REPAIRS TO DAMAGED GALVANIZING SHALL BE MADE BY PREPARING THE SURFACE AND APPLYING A COATING. SURFACE PREPARATION SHALL CONSIST OF REMOVING OIL, GREASE, SOIL, AND SOLUBLE MATERIAL BY CLEANING WITH WATER AND DETERGENT (SSPC SP1) FOLLOWED BY BRUSH OFF BLAST CLEANING (SSPC SP7), OVER AN AREA EXTENDING AT LEAST 4-INCHES INTO THE UNDAMAGED AREA. COATING SHALL BE APPLIED TO AT LEAST 3-MILS DRY FILM THICKNESS. USE ZINC-CLAD XI BY SHERWIN-WILLIAMS, GALVAX BY ALVIN PRODUCTS, OR GALVITE BY ZRC WORLDWIDE.

21) DRILLED ANCHORS AND REINFORCING BARS SHALL BE INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS. HOLES SHALL BE ROUGHENED WITH A BRUSH ON A POWER DRILL, CLEANED AND DRY. DRILLED ANCHORS SHALL NOT BE INSTALLED UNTIL THE CONCRETE HAS REACHED THE REQUIRED 28-DAY COMPRESSIVE STRENGTH. ADHESIVE ANCHORS SHALL NOT BE LOADED UNTIL THE ADHESIVE HAS REACHED ITS INDICATED STRENGTH IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.

STRUCTURAL CONCRETE AND REINFORCEMENT

1) UNLESS NOTED OTHERWISE OR SPECIFIED OTHERWISE, ALL STRUCTURAL CONCRETE SHALL BE CAST IN PLACE AND SHALL, WHEN MOLDED AND CURED IN ACCORDANCE WITH DOTD TR 226 AND TESTED IN ACCORDANCE WITH DOTD TR 230, SHALL SHOW A MINIMUM COMPRESSIVE STRENGTH NOT LESS THAN 4,000 PSI AT 28 DAYS. IF HDCA TECHNICAL SPECIFICATION SECTION 03901 IS NOT INCLUDED IN THE CONTRACT DOCUMENTS, CONCRETE SHALL BE CLASS AA CONCRETE PER THE LATEST EDITION OF THE MASTER PROPORTION TABLE FOR PORTLAND CEMENT CONCRETE AS PROMULGATED BY THE LOUISIANA STANDARD SPECIFICATION FOR ROADS AND BRIDGES. REINFORCING STEEL FOR CONCRETE SHALL COMPLY WITH THE FOLLOWING UNLESS OTHERWISE SPECIFIED.

2) REINFORCING STEEL USED IN STRUCTURES SHALL BE GRADE 60. BARS SMALLER THAN NO. 3 NEED NOT BE DEFORMED. ALL DEFORMED BARS SHALL COMPLY WITH ITEMS 1, 2, OR 3 BELOW. SIZE W 5 WIRE COMPLYING WITH ITEM 4 BELOW MAY BE USED IN LIEU OF BARS SMALLER THAN NO. 3. BILLET-STEEL DEFORMED AND PLAIN BARS SHALL COMPLY WITH ASTM 615 AND SHALL BE PRODUCED AT A MILL LISTED ON THE LDOTD AML (FORMERLY QPL 71). RAIL-STEEL AND AXLE-STEEL DEFORMED AND PLAIN BARS SHALL COMPLY WITH ASTM A 996. COLD-DRAWN STEEL WIRE SHALL COMPLY WITH ASTM A 1064 WITH THE FOLLOWING AMENDMENT: FOR MATERIAL TESTING OVER 110,000 PSI TENSILE STRENGTH IN HIGH STRENGTH APPLICATIONS SUCH AS SPIRALS AND TIES, THE 25 PERCENT MINIMUM REDUCTION IN AREA SHALL BE REDUCED 5 PERCENT FOR EACH 10,000 PSI INCREMENT OF TENSILE STRENGTH EXCEEDING 110,000 PSI. WELDED STEEL WIRE FABRIC SHALL CONFORM TO ASTM A 1064. EPOXY COATED REINFORCING STEEL AND PATCHING MATERIALS SHALL COMPLY WITH AASHTO M 284 AND SHALL BE LISTED ON THE LDOTD AML (FORMERLY QPL 51).

3) TOLERANCES IN PLACING REINFORCING SHALL BE:

   ± ⅜" FOR MEMBERS WITH THICKNESS </= 8"

   ± ½" FOR MEMBERS WITH THICKNESS > 8"

4) CONCRETE COVER SHALL BE AS FOLLOWS:

   FOR CONCRETE PLACED AGAINST EARTH ---------- 3"

   FOR SURFACES IN CONTACT WITH WATER---------- 2½"

   FOR FORMED SURFACES IN CONTACT WITH EARTH---------- 2"

   FOR UNDERSIDE OF SLABS OVER WATER, BEAMS,

   AND COLUMNS NOT IN CONTACT WITH WATER OR EARTH --- 2"

   FOR ALL OTHER SURFACES---------- 2"

5) WALLS AND SLABS WITH A SINGLE LAYER OF REINFORCEMENT SHALL HAVE THAT REINFORCEMENT CENTERED, UNLESS NOTED OTHERWISE.

6) ALL JOINT SURFACES SHALL BE ROUGH AND THOROUGHLY CLEANED.

7) DOWELS, PIPES, WATERSTOPS, AND OTHER EMBEDDED MATERIALS SHALL BE HELD SECURELY IN POSITION WHILE CONCRETE IS BEING PLACED.

8) REINFORCING BARS AND ACCESSORIES SHALL NOT BE IN CONTACT WITH ANY PIPE, PIPE FLANGE, METAL CONDUIT, OR OTHER METAL PARTS EMBEDDED IN CONCRETE. A MINIMUM OF 2 INCHES CLEARANCE SHALL BE PROVIDED IN ALL CASES.

9) ALL ITEMS EMBEDDED IN CONCRETE SHALL BE PLACED ON CENTER AT LEAST 4 TIMES THEIR OUTSIDE DIMENSION. THE OUTSIDE DIMENSION SHALL NOT EXCEED ONE THIRD OF THE MEMBER THICKNESS.

10) SLABS WITH SLOPING SURFACES SHALL HAVE THE INDICATED SLAB THICKNESS MAINTAINED AS THE MINIMUM. SLAB BOTTOMS CAN EITHER SLOPE WITH THE TOP SURFACE OR BE LEVEL. REINFORCEMENT IN SLAB WITH SLOPING SURFACES SHALL BE PLACED AT THE REQUIRED CLEARANCE FROM THE SLAB SURFACE.

11) ASIDE FROM NORMAL ACCESSORIES USED TO HOLD REINFORCING BARS FIRMLY IN POSITION, THE FOLLOWING SHALL BE ADDED WHERE TWO CURTAINS OF REINFORCEMENT ARE REQUIRED:

A. IN SLABS, #4 RISER OR Z SHAPE SPACER BARS AT 36 INCHES O.C MAXIMUM EACH WAY TO SUPPORT TOP BARS.

B. IN WALLS, #3 U OR Z SHAPE SPACERS AT 72 INCHES O.C. MAXIMUM EACH WAY

12) VERTICAL REINFORCEMENT FOR CONCRETE OR MASONRY SHALL BE SPLICED WITH DOWEL BARS OF THE SAME SIZE AND SPACING FROM THE FOUNDATION USING A STANDARD SPLICE LENGTH. HORIZONTAL CORNER BARS, WITH FULL TENSION LAPS, MATCHING CONTINUOUS BAR SIZE AND SPACING SHALL BE PROVIDED.

13) SEALANT SHALL BE PLACED AT THE TOP OF ALL JOINTS RECEIVING EXPANSION JOINT FILLER. SEALANT DEPTH SHALL NOT EXCEED JOINT FILLER THICKNESS.

14) ALL EXPOSED CONCRETE CORNERS SHALL HAVE A ¾" CHAMFER.

15) FABRICATIONS AND PLACING OF REINFORCING BARS SHALL CONFORM TO THE MANUAL OF STANDARDS PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES, ACI 315, LATEST EDITION.

16) ALL LAP SPLICES SHALL BE A MINIMUM OF 40 BARS DIAMETER UNLESS OTHERWISE NOTED. SPLICES SHALL BE STAGGERED SUCH THAT NOT MORE THAN 50% ARE SPLICED WITHIN THE LAP LENGTH.

17) SLAB SHALL BE GIVEN A SMOOTH TROWEL FINISH.

18) CONCRETE SHALL BE PLACED PER THE REQUIREMENTS OF ACI 350 (HOT WEATHER CONCRETE PLACEMENT) AND ACI 308 (COLD WEATHER CONCRETE PLACEMENT.)

19) CONCRETE SHALL BE CURED AND TESTED PER REQUIREMENTS OF ACI 318, LATEST EDITION.

20) CALCIUM CHLORIDE AND/OR CHLORIDE CONTAINING ADMIXTURES SHALL NOT BE USED.

21) CONTRACTOR SHALL SUBMIT MIX DESIGN INCLUDING PROPORTIONS OF ALL COMPONENTS FOR REVIEW.

GROUT

1) UNLESS NOTED OTHERWISE, GROUT SHALL BE NON - SHRINK GROUT HAVING A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 5000 PSI WHEN MIXED AT A FLUID CONSISTENCY. NON NON-SHRINK GROUT SHALL MEET THE REQUIREMENTS OF ASTM C 1107, GRADE B OR C, WHEN MIXED TO FLUID, FLOWABLE, AND PLASTIC CONSISTENCIES. NON-SHRINK GROUT SHALL BE MASTERFLOW 713 PLUS BY MBT-CHEMREX; FIVE STAR GROUT BY FIVE STAR PRODUCTS; SIKAGROUT 212 BY SIKA CORPORATION; PREMIER BY L&M CONSTRUCTION CHEMICALS; HIGH-FLOW GROUT BY EUCLID CHEMICAL COMPANY; CG 200 PC BY HILTI, OR EQUAL.

2) WHERE INDICATED, EPOXY GROUT SHALL BE UTILIZED. EPOXY GROUT SHALL BE A FLOWABLE, NON-SHRINK, 100 PERCENT SOLIDS SYSTEM. THE EPOXY GROUT SYSTEM SHALL HAVE 3 COMPONENTS: RESIN, HARDENER, AND SPECIALLY BLENDED AGGREGATE. EACH PREMEASURED AND PREPACKAGED. THE RESIN COMPONENT SHALL NOT CONTAIN ANY NON-REACTIVE DILUENTS. RESINS CONTAINING BUTYL GLYCIDYL ETHER (BGE) OR OTHER HIGHLY VOLATILE AND HAZARDOUS REACTIVE DILUENTS ARE NOT ACCEPTABLE. VARIATION OF COMPONENT RATIOS IS NOT PERMITTED UNLESS SPECIFICALLY RECOMMENDED BY THE MANUFACTURER MANUFACTURER'S INSTRUCTIONS SHALL BE PRINTED ON EACH CONTAINER IN WHICH THE MATERIALS ARE PACKAGED. NON-SHRINK EPOXY GROUT SHALL BE FIVE STAR DP EPOXY GROUT BY FIVE STAR PRODUCTS, INC.: MASTERFLOW 648 CP PLUS BY MBT-CHEMREX; SIKADUR 42 GROUT-PAK BY SIKA CORPORATION; OR EQUAL.

EARTHWORK

1) THE CONTRACTOR SHALL PERFORM EARTHWORK INDICATED AND REQUIRED FOR CONSTRUCTION OF THE WORK, COMPLETE AND IN PLACE, IN ACCORDANCE WITH THE CONTRACT DOCUMENTS. EXCEPT WHEN SPECIFICALLY PROVIDED TO THE CONTRARY, EXCAVATION SHALL INCLUDE THE REMOVAL OF MATERIALS, INCLUDING OBSTRUCTIONS THAT WOULD INTERFERE WITH THE PROPER EXECUTION AND COMPLETION OF THE WORK. THE REMOVAL OF SUCH MATERIALS SHALL CONFORM TO THE LINES AND GRADES INDICATED OR ORDERED. UNLESS OTHERWISE INDICATED, THE ENTIRE SITE SHALL BE STRIPPED OF VEGETATION AND DEBRIS AND SHALL BE GRUBBED, AND SUCH MATERIAL SHALL BE REMOVED FROM THE SITE PRIOR TO PERFORMING ANY EXCAVATION OR PLACING ANY FILL.

2) THE CONTRACTOR SHALL FURNISH, PLACE, AND MAINTAIN SUPPORTS AND SHORING THAT MAY BE REQUIRED FOR THE SIDES OF EXCAVATIONS. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE STABILITY AND SAFETY OF ALL EXCAVATIONS. EXCAVATIONS SHALL BE SLOPED OR OTHERWISE SUPPORTED IN A SAFE MANNER IN ACCORDANCE WITH APPLICABLE STATE SAFETY REQUIREMENTS AND THE REQUIREMENTS OF OSHA SAFETY AND HEALTH STANDARDS FOR CONSTRUCTION (29CFR1926)

3) THE CONTRACTOR SHALL SUBMIT AN EXCAVATION PLAN, DETAILING METHODS OF BRACING, SHEETING, AND/OR SHORING OF ALL EXCAVATIONS. THIS PLAN SHALL BE PREPARED UNDER THE SUPERVISION OF A LICENSED PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF LOUISIANA, AND SHALL BE SEALED BY SUCH.

4) THE CONTRACTOR SHALL REMOVE AND EXCLUDE WATER, INCLUDING STORMWATER, GROUNDWATER, IRRIGATION WATER, AND WASTEWATER, FROM EXCAVATIONS. DEWATERING WELLS, WELL-POINTS, SUMP PUMPS, OR OTHER MEANS SHALL BE USED TO REMOVE WATER AND CONTINUOUSLY MAINTAIN GROUNDWATER AT A LEVEL AT LEAST 2 FEET BELOW THE BOTTOM OF EXCAVATIONS BEFORE THE EXCAVATION WORK BEGINS AT EACH LOCATION. WATER SHALL BE REMOVED AND EXCLUDED UNTIL BACKFILLING IS COMPLETE AND FIELD SOILS TESTING HAS BEEN COMPLETED.

5) THE CONTRACTOR SHALL SUBMIT A DEWATERING PLAN, DETAILING METHODS OF DEWATERING ALL EXCAVATIONS.

6) SOILS WHICH DO NOT MEET LIQUID LIMIT OR PLASTICITY INDEX REQUIREMENTS SHALL NOT BE BLENDED TO REDUCE LIQUID LIMIT OR PLASTICITY INDEX. SOILS MAY BE TREATED WITH LIME TO REDUCE PLASTICITY INDEX ONLY WITH THE APPROVAL OF THE ENGINEER.

7) USABLE SOILS SHALL HAVE A MAXIMUM PI OF 25 AND A MAXIMUM ORGANIC CONTENT OF 5 PERCENT. SOILS WITH A SILT CONTENT OF 50 PERCENT OR GREATER AND ALSO A PI OF 10 OR LESS WILL NOT BE ALLOWED.

8) UNLESS NOTED OR SPECIFIED OTHERWISE, GEOTEXTILE FABRIC SHALL BE GEOTEXTILE CLASS A LISTED ON THE LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT APPROVED MATERIALS LIST.

9) GRANULAR MATERIAL SHALL BE MATERIAL SHALL BE MISSISSIPPI RIVER "PUMPED SAND", DOTD CLASSIFICATION OF A-4 OR BETTER HAVING A MAXIMUM LIQUID LIMIT OF 25 AND A MAXIMUM PLASTICITY INDEX OF 6. ALL SANDS SHALL BE FREE OF TRASH, WEEDS, LUMPS, HUMUS, PIECES OF WOOD OR ANY OTHER DELETERIOUS MATERIAL. GRANULAR MATERIAL SHALL HAVE A GROUP INDEX NUMBER NOT TO EXCEED 6. MATERIALS SHALL BE PLACED, PROPERLY SHAPED AND UNIFORMLY COMPACTED BY APPROVED METHODS TO A MINIMUM OF 95 PERCENT OF MAXIMUM DRY DENSITY. MAXIMUM DRY DENSITY WILL BE DETERMINED IN ACCORDANCE WITH DOTD TR 415 OR TR 418 AND IN-PLACE DENSITY WILL BE DETERMINED IN ACCORDANCE WITH DOTD TR 401. GRANULAR MATERIALS SHALL NOT BE DISPLACED DURING SUBSEQUENT OPERATIONS.

10) BEDDING MATERIAL SHALL BE CRUSHED LIMESTONE FOR PIPE BEDDING SHALL BE #57 STONE AS INDICATED BELOW. BEDDING MATERIAL SHALL BE FREE OF SOIL, ROOTS, DEBRIS, DELETERIOUS MATERIALS, OR OTHER RUBBISH. THE LIMESTONE SHALL BE WRAPPED WITH GEOTEXTILE FABRIC AS INDICATED ON THE DRAWINGS OR AS SPECIFIED. CRUSHED CONCRETE OR OTHER ALTERNATE BEDDING MATERIALS WILL NOT BE ACCEPTED. STONE SHALL BE SUPPLIED FROM A SOURCE LISTED ON THE LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT APPROVED MATERIALS LIST (QPL 2). GEOTEXTILE FABRIC SHALL BE PLACED IN ACCORDANCE WITH PLAN DETAILS PRIOR TO PLACING BEDDING MATERIAL. CARE SHALL BE TAKEN TO PREVENT DAMAGE TO GEOTEXTILE FABRIC DURING PLACEMENT OF BEDDING MATERIAL. MATERIALS SHALL BE PLACED IN LIFTS, SHAPED, AND UNIFORMLY COMPACTED TO 75 PERCENT OF RELATIVE DENSITY.

11) WHERE AREAS ARE INDICATED TO BE OVER-EXCAVATED, EXCAVATION SHALL BE TO THE DEPTH INDICATED, AND BACKFILL SHALL BE INSTALLED TO THE GRADE INDICATED. WHEN ORDERED TO OVER-EXCAVATE AREAS DEEPER AND/OR WIDER THAN REQUIRED BY THE CONTRACT DOCUMENTS, THE CONTRACTOR SHALL OVER-EXCAVATE TO THE DIMENSIONS ORDERED AND BACKFILL TO THE INDICATED GRADE. ANY OVER-EXCAVATION CARRIED BELOW THE GRADE ORDERED OR INDICATED SHALL BE BACKFILLED AND COMPACTED TO THE REQUIRED GRADE WITH GRANULAR MATERIAL OR NON - PLASTIC EMBANKMENT AS PART OF THE WORK.

12) UNLESS OTHERWISE INDICATED, EXCESS EXCAVATED MATERIAL SHALL BE THE PROPERTY OF THE CONTRACTOR. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REMOVAL AND DISPOSAL OF EXCESS EXCAVATED MATERIAL. MATERIAL SHALL BE DISPOSED OF AT AN APPROVED ON-SITE DISPOSAL AREA IF APPROVED BY THE OWNER OR OFF-SITE AT A LOCATION ARRANGED BY THE CONTRACTOR IN ACCORDANCE WITH LAWS AND REGULATIONS REGARDING DISPOSAL OF SUCH MATERIAL.

PIPING

1) REFER TO THE PIPING SCHEDULE FOR SPECIFIC REQUIREMENTS.

2) THE DRAWINGS DEFINE THE GENERAL LAYOUT, CONFIGURATION, ROUTING, METHOD OF SUPPORT, PIPE SIZE, AND PIPE TYPE. THE DRAWINGS ARE NOT PIPE CONSTRUCTION OR FABRICATION DRAWINGS. WHERE PIPE SUPPORTS AND SPACING ARE INDICATED ON THE DRAWINGS AND ARE REFERENCED TO A STANDARD DETAIL, THE CONTRACTOR SHALL USE THAT DETAIL. WHERE PIPE SUPPORTS ARE NOT INDICATED ON THE DRAWINGS, IT IS THE CONTRACTOR'S RESPONSIBILITY TO DEVELOP THE DETAILS NECESSARY TO DESIGN AND CONSTRUCT MECHANICAL PIPING SYSTEMS TO ACCOMMODATE THE SPECIFIC EQUIPMENT PROVIDED, AND TO PROVIDE SPACERS, ADAPTERS, AND CONNECTORS FOR A COMPLETE AND FUNCTIONAL SYSTEM.

3) WELDING SHALL BE DONE BY SKILLED WELDERS AND WELDING OPERATORS WHO HAVE ADEQUATE EXPERIENCE IN THE METHODS AND MATERIALS TO BE USED. WELDERS SHALL BE QUALIFIED UNDER THE PROVISIONS OF AWS D1.1 OR THE ASME BOILER AND PRESSURE VESSEL CODE, SECTION 9, BY AN INDEPENDENT LOCAL, APPROVED TESTING AGENCY NOT MORE THAN 6 MONTHS PRIOR TO COMMENCING WORK ON THE PIPING. MACHINES AND ELECTRODES SIMILAR TO THOSE USED IN THE WORK SHALL BE USED IN QUALIFICATION TESTS. QUALIFICATION TESTING OF WELDERS AND MATERIALS USED DURING TESTING IS PART OF THE WORK.

4) FLANGES SHALL HAVE FLAT FACES AND SHALL BE ATTACHED WITH BOLT HOLES STRADDLING THE VERTICAL AXIS OF THE PIPE UNLESS OTHERWISE INDICATED. ATTACHMENT OF THE FLANGES TO THE PIPE SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AWWA C207. FLANGE FACES SHALL BE PERPENDICULAR TO THE AXIS OF THE ADJOINING PIPE. FLANGES FOR MISCELLANEOUS SMALL DIAMETER PIPES SHALL BE IN ACCORDANCE WITH THE STANDARDS INDICATED FOR THESE PIPES.

5) BLIND FLANGES SHALL BE IN ACCORDANCE WITH AWWA C207, OR AS INDICATED FOR MISCELLANEOUS SMALL PIPES. BLIND FLANGES FOR PIPE SIZES 12-INCHES AND GREATER SHALL BE PROVIDED WITH LIFTING EYES IN THE FORM OF WELDED OR SCREWED EYE BOLTS.

6) ALL-THREAD STUDS SHALL BE USED ON VALVE FLANGE CONNECTIONS WHERE SPACE RESTRICTIONS PRECLUDE THE USE OF REGULAR BOLTS.

7) WHERE INDICATED AND WHERE REQUIRED TO PREVENT FLOW OF WATER OR AIR, THE PASSAGES OF PIPING THROUGH WALL SLEEVES AND CORED OPENINGS SHALL BE SEALED WITH MODULAR INTERLOCKING LINK MECHANICAL CLOSURES. INDIVIDUAL LINKS SHALL BE CONSTRUCTED OF EPDM RUBBER, BE SUITABLE FOR TEMPERATURES BETWEEN MINUS 40 AND PLUS 250 DEGREES F, AND BE SHAPED TO FILL THE ANNULAR SPACE BETWEEN THE OUTSIDE OF THE PIPE AND THE INSIDE OF THE WALL SLEEVE OR CORED OPENING. LINKS SHALL BE ASSEMBLED WITH TYPE 316 STAINLESS STEEL BOLTS AND NUTS TO FORM A CONTINUOUS RUBBER BELT AROUND THE PIPE. PRESSURE PLATES UNDER EACH BOLT AND NUT SHALL BE FABRICATED OF A CORROSION-RESISTANT COMPOSITE MATERIAL. AFTER THE SEAL ASSEMBLY IS POSITIONED IN THE SLEEVE, TIGHTEN THE BOLTS AGAINST THE PRESSURE PLATES TO EXPAND THE RUBBER LINKS AND FORM THE WATERTIGHT SEAL. SIZING AND INSTALLATION OF SLEEVES AND ASSEMBLIES SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION BIDDING RECORDATION, SALES OR AS THE BASIS FOR ISSUANCE OF A PERMIT

SUBMITTED BY: ARMEE K. DAVIS, PE, PROJECT MANAGER — LICENSE NO.

SUBMITTED BY: DAVID A. MARTIN, P.E. PRINCIPAL — LICENSE NO. 37002

H. Davis Cole & Associates, LLC
Civil & Environmental Consultants
NEW ORLEANS, LA

90% SUBMITTAL
NOT FOR CONSTRUCTION

MARK	DESCRIPTION	DATE	BY	CHKD

REVISION RECORD

DESIGNED BY: ARF
DRAWN BY: ARF
CHECKED BY: DAM
DATE: APRIL 18
DETAILED BY: MAS
HDC PROJECT NO: 2018-05

CITY BARN DRAINAGE IMPROVEMENTS
SLIDELL LOUISIANA

CITY OF SLIDELL
P. O. BOX 828
SLIDELL, LA 70459

GENERAL NOTES AND SPECIFICATIONS

SHEET ID: G3

SHEET SET: 4 OF 29

CONCRETE (PLAN AND SECTION)
GROUT OR SAND (PLAN OR SECTION)
BRICK (PLAN AND SECTION)
CMU (PLAN AND SECTION)
STEEL/ METAL/ FRP (SMALL SCALE SECTION)
STEEL/ GRATING/ FRP (SMALL SCALE SECTION)
CHECKERPLATE (SECTION)
GRATING (PLAN)
GRATING OR SOLID FRP GRATING (SECTION)
SAFETY GRATING (PLAN)
SAFETY GRATING (PLAN)
SAFETY GRATING (PLAN)
WOOD (ELEVATION OR PLAN)
LUMBER (NOMINAL)
LUMBER (TRIMMED)
GLULAM (SECTION)
GLULAM (ELEVATION)
PLYWOOD (SMALL SCALE)
STRUCTURE OR FACILITY
EXISTING STRUCTURE OR FACILITY
FUTURE STRUCTURE OR FACILITY
OPENING
SPAN ARROW
EARTH/ GRADE
GRAVEL/ LIMESTONE/ AGGREGATE BASE
CENTERLINE
CL — CENTERLINE
PL — PROPERTY LINE
R/W — RIGHT OF WAY
ESMT — EASEMENT
TEMP ESMT — TEMPORTRY EASEMENT
G — UTILITY LINE (SEE DIRECTORY BELOW)
G — GAS LINE (SIZE NOTED WHERE LARGER THAN 3")
HP GAS — HIGH PRESSURE GAS
2" W — WATER LINE (SIZE INDICATED)
TEL — UNDERGROUND TELEPHONE
HVAC — HIGH VOLTAGE AC POWER LINE
24" SS — SANITARY SEWER (SIZE INDICATED)
OHW — OVERHEAD WIRES
24" SD — STORM DRAIN (SIZE INDICATED)
FOC — FIBER OPTIC CABLE
COMM — COMMUNICATION CABLE
FENCE (NEW)
FENCE (EXISTING)
WATER COURSE
TRAIL OF DIRT ROAD
125 — MAJOR CONTOUR LINE (NEW)
125 — MAJOR CONTOUR LINE (NEW)
125 — MAJOR CONTOUR LINE (NEW)

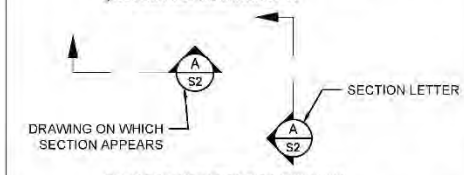
SUPPLY OR OUTSIDE AIR DUCT (FIRST DIMENSION, DUCT WIDTH)
EXHAUST OR RETURN AIR DUCT (FIRST DIMESION, DUCT WIDTH)
SIZE / CFM — CEILING SUPPLY DIFFUSER (SIZE IN INCHES)
SIZE / CFM — CEILING RETURN OR EXHAUST AIR GRILLE OR REGISTER (SIZE IN INCHES, WIDTH X HEIGHT)
SIZE / CFM — EXHAUST OR AIR GRILLE OR REGISTER (SIZE IN INCHES, WIDTH X HEIGHT)
SIZE / CFM — SUPPLY GRILLE OR REGISTER (SIZE IN INCHES, WIDTH X HEIGHT)
AIR TURNING VANES IN DUCT
DD — DEFLECTING DAMPER
FHC — FIRE HOSE CABINET
FE — FIRE EXTINGUISHER
UNIT HEATER
BALL VALVE
DIAPHRAGM VALVE
CHECK VALVE
PRESSURE RELEASE VALVE
BACK PRESSURE VALVE
M / P — MOTOR OPERATOR FOR VALVE (M = ELECTRIC / P = PNEUMATIC)
T — TEMPERATURE CONTROL VALVE
S — SOLENOID VALVE
MULTIPORT VALVE - 3WAYS
MULTIPORT VALVE - 4WAYS
FLOAT OPERATED VALVE
NEEDLE VALVE
PRESSURE RELIEF VALVE
ANGLE VALVE
HOSE BIBB (H/B)
INJECTOR OR EDUCTOR
AIR VACUUM AND AIR RELEASE ASSEMBLY
PIPE ANCHOR
POWER POLE
PIPELINE (CIVIL SHEETS) 24" Ø AND LARGER
PIPELINE (CIVIL SHEETS) 12" Ø TO 20" Ø
PIPELINE (CIVIL SHEETS) 10" Ø AND SMALLER
FLOW — FLOW DIRECTION
VEGETATION

ISOLATION VAULT & MAJOR BLOWOFF VAULT (IN PLAN)
T — CATHODIC TEST STATION (IN PROFILE)
T — CATHODIC TEST STATION (IN PROFILE)
TYPES:
CTS CORROSION TEST STATION
CATS CASING TEST STATION
IJTS INSULATING JOINT TEST STATION
FPTS FOREIGN PIPELINE TEST STATION
CSTS CURRENT SPAN TEST STATION
FH — FIRE HYDRANT
MANHOLE
PCOTG — PRESSURE CLEANOUT TO GRADE
CTOG / CTOG — CLEANOUT TO GRADE
REDUCER OR INCREASER (PROVIDED SIZE)
ETS — ELECTROLYSIS TEST STATION
WCO / WCO — WALL CLEANOUT
FCO / FCO — FLOOR CLEANOUT
HUB DRAIN
FLOOR DRAIN
FLOOR SINK
CHANGE IN PIPING MATERIAL
BACKWATER VALVE
BACKFLOW PREVENTER
STOP GATE
SLIDE GATE
SLUICE GATE
GATE VALVE, BURIED WITH VALVE BOX
BUTTERFLY VALVE, BURIED WITH VALVE BOX
ECCENTRIC PLUG VALVE, BURIED VALVE BOX
LUBRICATED PLUG VALVE, BURIED WITH VALVE BOX
GATE VALVE
BUTTERFLY VALVE OR DAMPER
ECCENTRIC PLUG VALVE
LUBRICATED PLUG VALVE
GLOBE VALVE
B — BUBLE LEVEL CONTROL
CENTRIFUGAL OR TURBINE PUMP OR FAN
METERING PUMP

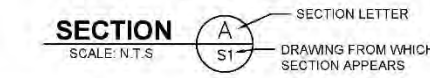
PROGRESSIVE CAVITY, POSITIVE DISPLACEMENT PUMP
PROGRESSIVE CAVITY, POSITIVE DISPLACEMENT PUMP
G — PRESSURE GAUGE
G — PRESSURE GAUGE WITH DIAPHRAGM SEAL
S — PRESSURE SWITCH
S — PRESSURE SWITCH WITH DIAPHRAGM SEAL
FLANGED FITTING
MECHANICAL - TYPE FITTING (GROOVED)
SCREWED, WELDED, SOCKET-WELD, BELL & SPIGOT OR HUBLESS FITTING
SLEEVE TYPE COUPLING
FLANGED ADAPTER - SET SCREW TYPE
MECHANICAL - TYPE COUPLING
FLEXIBLE COUPLING
UNION
QUICK DISCONNECT COUPLING
CAPPED END OR PLUGGED END
BLIND FLANGE
REDUCER OR INCREASER
STRAINER OR 45° WYE
DRAIN
FLOW TUBE
MM — MAGNETIC METER
DM — DENSITY METER
PM — PROPELLER METER
UM — ULTRASONIC METER
ORIFACE PLATE FLANGES
ROTAMETER
T — CONDENSATE TRAP
PIPE SUPPORT ON PLAN
PULSATION DAMPENER
EXPANSION CHAMBER WITH RUPTURE DISC
RUPTURE DISC
FG — FLOW SIGHT GLASS

SECTION IDENTIFICATION

1) SECTION CUT ON DRAWING "S1"

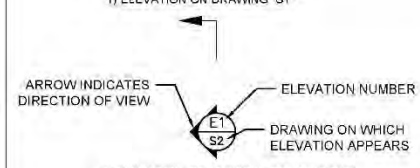


2) SECTION IDENTIFIED IN DRAWING "S2"

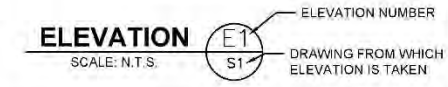


ELEVATION IDENTIFICATION

1) ELEVATION ON DRAWING "S1"

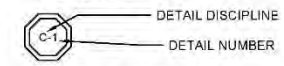


2) ELEVATION IDENTIFIED IN DRAWING "S2"



DETAIL IDENITIFICATION

(SEE DETAIL SHEETS)



DETAIL DISCIPLINES

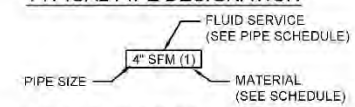
C- CIVIL	I- INSTRUMENTAL
M- MECHANICAL	E- ELECTRICAL
S- STRUCTURAL	P- PLUMBING
D- DEMOLITION	SD- SPECIAL DETAILS

NOTE:
IF PLAN AND SECTION ELEVATION OR DETAIL ARE SHOWN ON THE SAME DRAWING, DRAWING NUMBER MAY BE REPLACED BY A LINE. SPECIAL DETAILS WILL BE IDENTIFIED ALPHABETICALLY (SD-M-A, SD-M-B, ETC.)

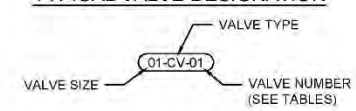
EQUIPMENT, PIPING & VALVE IDENTIFICATION

TYPICAL EQUIPMENT DESIGNATION

TYPICAL PIPE DESIGNATION



TYPICAL VALVE DESIGNATION



VALVE TYPES
CV - CHECK VALVE
PV - PLUG VALVE
GV - GATE VALVE
BV - BUTTERFLY VALVE
ARV - AIR RELEASE VALVE

EQUIPMENT/ VALVE AREAS
01- CITY BAR DPS
02- DIESEL STORAGE FACILITY

PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION, BIDDING, RECORDATION, SALES OR AS THE BASIS FOR ISSUANCE OF A PERMIT
DAVID ALAN MARTIN, P.E.
LICENSE NO. 37002
H. DAVIS COLE & ASSOCIATES

SUBMITTED BY: ANDRE P. CONTI II, PROJECT MANAGER, LICENSE NO.
SUBMITTED BY: DAVID A. MARTIN, P.E., PRINCIPAL, LICENSE NO. 37002

HDC
H. Davis Cole & Associates, LLC
NEW ORLEANS, LA

90% SUBMITTAL
NOT FOR CONSTRUCTION

MARK	DESCRIPTION	DATE	BY	CHKD
	REVISION RECORD			

DESIGNED BY: ARF
DRAWN BY: ARF
CHECKED BY: DAM
DATE: APRIL, 18
DETAILED BY: MAS
HDC PROJECT NO: 2018-05

CITY BARN DRAINAGE IMPROVEMENTS
SLIDELL LOUISIANA

CITY OF SLIDELL
P.O. BOX 828
SLIDELL, LA 70459

DRAWINGS STANDARDS & SYMBOLS

SHEET ID: G4
SHEET SET: 5 OF 29

A	AIR
A/C	AIR CONDITIONING
AASHO	AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS
AB	ANCHOR BOLTS
ABAN	ABANDON
ABAND	ABANDONED
ABBR	ABBREVIATION
ABS	ABSOLUTE TEMPERATURE
AC	ACTIVATED CARBON/ ASPHALTIC CONCRETE/ ALTERNATE CURRENT
ACI	AMERICAN CONCRETE INSTITUTION
ACOUS	ACOUSTIC/ ACOUSTICAL
ACP	ASBESTOS CEMENT PIPE/ ASPHALTIC CONCRETE PAVEMENT
ADD	ADDITION
ADH	ADHESIVE
ADJ	ADJUSTABLE
AER	AERATION
AFF	ABOVE FINISHED FLOOR
AFTS	AIR FLOW TEST STATION
AISC	AMERICAN INSTITUTION OF STEEL CONSTRUCTION
ALT	ALTERNATIVE
ALUM	ALUMINUM
AMB	AMBIENT
ANSI	AMERICAN NATIONAL STANDARDS INSTITUTE
API	AMERICAN PETROLEUM INSTITUTE
APPD	APPROVED
APPROX	APPROXIMATE
APPURTS	APPURTENANCES
ARCH	ARCHITECTURE
AREA	AMERICAN RAILWAY ENGINEERING ASSOCIATION
ASME	AMERICAN SOCIETY OF MECHANICAL ENGINEERS
ASPH	ASPHALT
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS
AT	ACOUSTICAL TILE
ATM	ATMOSPHERE
AV/RV	AIR VACUUM AND AIR RELEASE VACUUM
AVE	AVENUE
AWPA	AMERICAN WOOD PRESERVERS ASSOCIATION
AWS	AMERICAN WELDING SOCIETY
AWWA	AMERICAN WATER WORKS ASSOCIATION
B&S	BELL AND SPIGOT
B/W	BACK OF WALL/ BACK OF WALK
BC	BEGIN CURVE/ BOLT CIRCLE/ BETWEEN CENTERS
BCR	BEGIN CURB RETURN
BD	BOARD
BDRY	BOUNDARY
BF	BLIND FLANGE/ BOTTOM OF FOOTING
BFP	BACK FLOW PREVENTER
BHP	BRAKE HORSEPOWER
BLDG	BUILDING
BLK	BLACK/ BLOCK
BLKG	BLOCKING
BLVD	BOULEVARD
BM	BEAM/ BENCHMARK
BO	BLOW-OFF ASSEMBLY
BOD	BIOCHEMICAL OXYGEN DEMAND
BOP	BOTTOM OF PIPE
BOT	BOTTOM
BPV	BACK PRESSURE VALVE
BRK	BRICK/ BREAK
BSMT	BASEMENT
BT	BOLT
BTU	BRITISH THERMAL UNIT
BV	BUTTERFLY VALVE
BVC	BEGIN VERTICAL CURVE
BWV	BACK WATER VALVE
C	CENTIGRADE/ CHANNEL/ CEMENT
C&G	CURB AND GUTTER
CAB	CABINET/ CRUSHED AGGREGATE BASE
CAP	CAPACITY
CATS	CASING TEST STATION
CB	CATCH BASIN/ CHALK BOARD/ CURB
CC	CLOSED CIRCUIT TV/ CENTER TO CENTER
CD	CEILING DIFFUSER
CEM	CEMENT
CF	CURB FACE OR CUBIC FEET
CFH	CUBIC FEET PER HOUR
CFM	CUBIC FEET PER MINUTE
CFS	CUBIC FEET PER SECOND
CHEM	CHEMICAL
CHG	CHANGE
CHKD	CHECKED
CI	CAST IRON
CIP	CAST IRON PIPE/ CAST IN PLACE
CIPP	CAST IN PLACE PIPE
CJ	CONSTRUCTION JOINT
CL	CHLORINE GAS/ CHLORINATOR/ CENTERLINE
CLF	CHAIN LINK FENCE
CLG	CEILING
CLOS	CLOSET
CLR	CLEAR/ CLEARANCE
CM	CENTIMETER
CMB	CRUSHED MISCELLANEOUS BASE
CMC	CEMENT MORTAR-COATED
CML	CEMENT MORTAR-LINED
CML&C	CEMENT LINED AND COATED
CMP	CORRUGATED METAL PIPE
CMU	CONCRETE MASONRY UNIT
CO	CLEANOUT
COL	COLUMN
COMP	COMPRESSOR
CONC	CONCRETE/ CONCENTRIC
COND	CONDENSER/ CONDENSATE
CONN	CONNECTION
CONST	CONSTRUCT/ CONSTRUCTION
CONT	CONTINUED/ CONTINUOUS
CONTR	CONTRACTOR
COORD	COORDINATE
COR	CORNER
COTG	CLEANOUT TO GRADE
CPLG	COUPLING
CPVG	CHLORINATED POLYVINYL CHLORIDE
CS	CAUSTIC SODA/ CAST STEEL
CSP	CORRUGATED STEEL PIPE
CSTS	CURRENT SPAN TEST STATION
CT	CERAMIC TILE
CTR	CENTER
CTS	CORROSION TEST STATION
CTSK	COUNTERSUNK
CU	COPPER/ CUBIC
CULV	CULVERT
CV	CHECK VALVE
CY	CUBIC YARD
CYL	CYLINDER
d	PENNY
DAD	DOUBLE ACTING DOOR
DAFT	DISSOLVED AIR FLOATATION THICKENER
DB	DIRECT BURY
DBL	DOUBLE
DC	DIRECT CURRENT
DEG	DEGREE
DET	DUCTILE IRON
DF	DRINKING FOUNTAIN/ DOUGLAS FIR
DH	DOUBLE HUNG
DI	DUCTILE IRON
DIA	DIAMETER
DIAG	DIAGONAL
DIAPH	DIAPHRAGM
DIFF	DIFFUSER/ DIFFERENTIAL
DIP	DUCTILE IRON PIPE
DIR	DIRECTION
DISCH	DISCHARGE
DISP	DISPENSER
DL	DEAD LOAD
DMH	DROP MANHOLE
DN	DOWN
DO	DISSOLVED OXYGEN/ DITTO
DPW	DEPT. OF PUBLIC WORKS
DR	DOOR/ DRAIN
DS	DRENCH SHOWER AND EYE WASH
DT	DRAIN TILE
DWG	DRAWING
DWLS	DOWELS
DWY	DRIVEWAY
E	EAST
E/O	EAST OF
EA	EACH
EB	EXPANSION BOLT OR ANCHOR
EC	END CURVE
ECC	ECCENTRIC
ECR	END CURB RETURN
EF	EACH FACE/ EXHAUST FAN
EFF	EFFLUENT
EG	EXHAUST GRADE/ EDGE OF GUTTER/ EXHAUST GRILLE
EGL	ENERGY GRADE LINE
EL	ELEVATION
ELEC	ELECTRICAL/ ELECTRONIC
ENI	EDGE NAILING
ENCL	ENCLOSURE
ENG	ENGINE
ENGR	ENGINEER
ENT	ENTRANCE
EP	EDGE OF PAVEMENT
EPT	ETHYLENE PROPYLENE
EQ	EQUAL
EQUIP	EQUIPMENT
ESMT	EASEMENT
ETB	EMULSION TREATED BASE
ETC	ET CETERA
EVAP	EVAPORATOR
EVC	END VERTICAL CURVE
EW	EACH WAY/ EYE WASH
EX	EXISTING
EXC	EXCAVATION
EXH	EXHAUST
EX-HY	EXTRA HEAVY
EXIST	EXISTING
EXP	EXPANSION
EXT	EXTERIOR/ EXTENSION
EXTR	EXTRUDE
F	FAHRENHEIT/ FINISH
F TO F	FACE TO FACE
F&C	FRAME AND COVER
F&I	FURNISH AND INSTALL
FA	FOUL AIR
FAB	FABRICATE/ FABRICATION
FAI	FRESH AIR INTAKE
FB	FLAT BAR/ FLOOR BEAM/ FIELD BOOK
FCO	FLOOR CLEANOUT
FD	FLOOR DRAIN
FDR	FEEDER
FE	FIRE EXTINGUISHER/ FINAL EFFLUENT
FEM	FEMALE (PIPE THREAD)
FF	FLAT FACE/ FAR FACE/ FINISHED FLOOR
FG	FINISHED GRADE
FH	FIRE HYDRANT/ FLAT HEAD
FIG	FIGURE
FIN	FINISHED
FIX	FIXTURE
FL	FLOWLINE/ FLOOR
FLEX	FLEXIBLE
FLG	FLANGED/ FLOORING
FLGD	FLANGED
FLOCC	FLOCCULATOR/ FLOCCULATION
FLR	FLOOR
FLSG	FLASHING
FM	FACTORY MUTUAL (LAB APPROVED)/ FORCE MAIN
FMH	FLEXIBLE METAL HOSE
FN	FIELD NAILING
FND	FOUNDATION
FOC	FACE TO CONCRETE/ FIBER OPTIC CABLE
FOM	FACE OF MASONRY
FOS	FACE OF STUD
FOW	FACE OF WALL
FPC	FLEXIBLE PIPE COUPLING
FPM	FEET PER MINUTE
FPS	FEET PER SECOND
FPTS	FOREIGN PIPE TEST STATION
FR	FRAME
FRP	FIBERGLASS REINFORCED PLASTIC
FS	FIBERGLASS SURFACE/ FARSIDE/ FLOOR SINK/ FORGED STEEL/ FROTH SPRAY
FT	FEET/ FOOT
FTG	FOOTING
FUR	FURRING
FUT	FUTURE
FV	FIELD VERIFY
FWD	FORWARD
G	GAS
GA	GAGE/ GAUGE
GAL	GALLON
GALV	GALVANIZED
GANC	GUY ANCHOR
GB	GRADE BREAK
GEN	GENERAL/ GENERATOR
GFA	GROOVED FLANGE ADAPTER
GI	GALVANIZED IRON
GIP	GALVANIZED IRON PIPE
GL	GLASS/ GROUND LINE/ GRADE LINE
GLB	GLUE LAMINATED BEAM
GLV	GLOBE VALVE
GM	GAS METER
GP	GUY POLE
GPD	GALLONS PER DAY
GPH	GALLONS PER HOUR
GPM	GALLONS HER MINUTE
GR	GRADE
GRD	GRADE/ GROUND
GRTG	GRATING
GSP	GALVANIZED STEEL PIPE
GV	GATE VALVE
GYP	GYPSUM
H	HIGH/ HEIGHT
H&V	HEATING AND VENTILATING
H/B	HOSE BIBB
HC	HOUSE CONNECTION
HDR	HEADER
HDW	HARDWARE
HDWL	HEADWALL
HEX	HEXAGONAL
Hg	MERCURY
HGL	HYDRAULIC GRADE LINE
HGR	HANGER
HM	HOLLOW METAL
HORZ	HORIZONTAL
HP	HIGH POINT/ HORSE POWER/ HIGH PRESSURE
HPG	HIGH PRESSURE GAS
HR	HEAT RETURN/ HOUR
HTG	HEATING
HTR	HEATER
HV	HORIZONTAL AND VERTICAL CONTROL POINT
HVAC	HEATING, VENTILATION AND AIR CONDITION/ HIGH VOLTAGE AC POWER LINE
HW	HOT WATER/ HEADWORK
HWD	HARDWOOD
HWL	HIGH WATER LEVEL
HWO	HAND WHEEL OPERATED
HYD	HYDRAULIC/ HYDRANT
I&O	INSIDE AND OUTSIDE
ID	INSIDE DIAMETER
IF	INSIDE FACE
IJTS	INSULATING JOINT TEST STATION
IN	INCH
INCL	INCLUDE/ INCLUDING
INFL	INFLUENT
INSL	INSULATION
INSP	INSPECTION
INST	INSTRUMENT
INT	INTERIOR
IP	IRON PIE
IPS	IRON PIPE SIZE
IRRG	IRRIGATION
JAN	JANITOR
JT	JOINT
K	KELVIN/ KILO/ KARAT
KG	KILOGRAM
KM	KILOMETER
KV	KILOVOLT
KW	KILOWATT
KWH	KILOWATT HOUR
L	LITER/ LENGTH/ ANGLE
LAB	LABORATORY
LAM	LAMINATED
LAT	LATERAL
LAV	LAVATORY
LB	POUND
LCP	LOCAL CONTROL PANEL
LD	LOCAL DEPRESSION
LDG	LANDING
LDOTD	LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT
LF	LINEAR FEET
LG	LENGTH/ LONG
LH	LAMP HOLE/ LEFT HAND
LL	LIVE LOAD
LLH	LONG LEG HORIZONTAL
LLV	LONG LEG VERTICAL
LOC	LOCATION
LOL	LAYOUT LINE
LONG	LONGITUDINAL
LP	LOW POINT/ LOW PRESSURE/ LAMP POST
LSSRB	LOUISIANA STANDARD SPECIFICATION FOR ROADS AND BRIDGES
LT	LEFT/ LIGHT
LTS	LIME TREATED SOIL
LW	LOW WATER
LWL	LOW WATER LEVEL
LWR	LOWER
M	METER/ MALE (PIPE THREAD)
MACH	MACHINE
MAG	MAGNETIC
MAINT	MAINTENANCE
MAN	MANUAL
MAS	MASONRY
MATL	MATERIAL
MAX	MAXIMUM
MB	MAIL BOX/ MACHINE BOLT
MCC	MOTOR CONTROL CENTER
MCR	MIDDLE OF CURB RETURN
MEAS	MEASURE
MECH	MECHANICAL
MED	MEDIUM
MEMB	MEMBER
MFRD	MANUFACTURED
MGD	MILLION GALLONS PER DAY
MH	MANHOLE
MHT	MEAN HIGH TIDE
MHW	MEAN HIGH WATER
MI	MALLEABLE IRON/ MILE
MICRON	1/ 1,000,000TH METER
MIL	MILITARY/ 1/1,000TH INCH
MIN	MINIMUM/ MINUTE
MIR	MIRROR
MISC	MISCELLANEOUS
MK	MARK
MLW	MEAN LOW WATER
mm	MILLIMETER
MO	MOTOR OPERATED/ MASONRY OPENING
MOD	MODEL/ MODIFICATION
MON	MONUMENT/ MONITOR
MOR	MORTAR
MS	MOP SINK
MSL	MEAN SEA LEVEL
MTC	MECHANICAL-TYPE COUPLING
MTD	MOUNTED
MTG	MOUNTING
MTL	METAL
MTR	MOTOR
N	NORTH
NaOCl	SODIUM HYPOCHLORITE
NaOH	SODIUM HYDROXIDE (CAUSTIC SODA)
NBS	NATION BUREAU OF STANDARDS
NC	NORMALLY CLOSED
NEC	NATIONAL ELECTRIC CODE
NEMA	NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION
NF	NEAR FACE
NFPA	NATION FIRE PROTECTION ASSOCIATION
NG	NATION GRADE/ NATURAL GAS
NIC	NOT IN CONTRACT
NO	NORMALLY OPEN
NOM	NOMINAL
NPS	NOMINAL PIPE SIZE
NPT	NATIONAL PIPE THREAD
NRCP	NON-REINFORCED CONCRETE PIPE
NRS	NON-RAISING STEM
NS	NEAR SIDE
NTS	NOT TO SCALE
OBJ	OBJECT
OC	ON CENTER/ OVER-CROSSING
OD	OUTSIDE DIAMETER/ OVERALL DIMENSION
OE	OUTER EDGE
OF	OVERFLOW/ OUTSIDE FACE
OFD	OVERFLOW DRAIN
OFF	OFFICE
OH	OVERHEAD
OPER	OPERATOR/ OPERATING
OPNG	OPENING
OPP	OPPOSITE
ORIG	ORIGINAL
OS&Y	OUTSIDE SCREW & YORK
OSA	OUTSIDE AIR
OSHA	OCCUPATIONAL SAFETY & HEALTH ADMINISTRATION
OWG	OIL, WATER, GAS
OZ	OUNCE
P	POLE/ PAGE/ PIPE
P/S	POLE AND SHELF
PA	PLANTING AREA
PART	PARTITION
PAVMT	PAVEMENT
PB	POLYBUTYLENE/ PULL BOX
PC	POINT OF CURVATURE/ PRIMARY CLARIFIER/ PORTLAND CEMENT
PCC	PORTLAND CEMENT CONCRETE/ POINT OF COMPOUND CURVE
PCCP	PRE-STRESSED CONCRETE CYLINDER PIPE
PCOTG	PRESSURE CLEANOUT TO GRADE
PCVC	POINT OF COMPOUND VERTICAL CURVE
PE	POLYETHYLENE/ PLANT EFFLUENT/ POLYELECTROLYTE POLYMER
PG	PRESSURE GAUGE
pH	HYDROGEN ION CONCENTRATION
PI	PLANT INFLUENT/ POINT OF INTERSECTION
PK	PARKING
PL	PLATE/ PROPERTY LINE/ PLACE
PLAS	PLASTER/ PLASTIC
PLT	PLANT
PLWD	PLYWOOD
PM	PRESSED METAL
PNEU	PNEUMATIC
PNL	PANEL
POB	POINT OF BEGINNING
POC	POINT OF CONNECTION
POT	POINT OF TANGENT
PP	POWER POLE/ POLYPROPYLENE
PPD	POUNDS PER DAY
PPH	POUNDS PER HOUR
PPM	POUNDS PER MINUTE
PR	PAIR
PRC	POINTS OF REVERSE CURVE
PRCT	PRECAST/ PERCENT
PREFAB	PREFABRICATED
PRESS	PRESSURE
PROF	PROFILE
PRV	PRESSURE REGULATING, RELIEF, OR REDUCING VALVE
PRVC	POINT OF REVERSE VERTICAL CURVE
PS	PRESSURE SWITCH
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
PSIA	POUNDS PER SQUARE INCH ABSOLUTE
PSIG	POUNDS PER SQUARE INCH GAUGE
PT	POINT OF TANGENCY/ PAINT/ PRESSURE TREATED
PTFE	POLYTETRAFLUOROETHYLENE (TEFLON)
PV	PLUG VALVE
PVC	POLYVINYL CHLORIDE/ POLYVINYL CONDUIT (PIPE)
PVDF	POLYVINYLIDENE FLUORIDE (KYNAR)
QT	QUARRY TILE
QTY	QUANTITY
QUAD	QUADRANGLE/ QUADRANT
R	RADIUS/ RISER/ RATE OF SLOPE
R&O	ROCK AND OIL
R/W	RIGHT OF WAY
RAC	RECYCLED ASPHALT CONCRETE
RAG	RETURN AIR GRILLE
RAP	RECLAIMED ASPHALT PAVEMENT
RAS	RETURN ACTIVATED SLUDGE
RC	REINFORCED CONCRETE
RCP	REINFORCED CONCRETE PIPE
RD	ROAD/ ROOF DRAIN/ ROUND
RED	REDUCER/ REDUCING
REF	REFERENCE/ REFER/ REFRIGERATOR
REG	REGULATING
REINF	REINFORCE/ REINFORCED
REQD	REQUIRED
RESIL	RESILIENT
RET	RETAINING/ RETURN
REV	REVISION
RF	ROOF/ RAISED FOUNDATION/ ROUGH FACE
RFG	ROOFING
RGE	REGISTERED GEOTECHNICAL ENGINEER
RH	REDHEAD/ RIGHT HAND
RM	ROOM
RO	ROUGH OPENING
RPM	REVOLUTIONS PER MINUTE
RR	RAILROAD
RS	RAISING STEAM
RSL	RAW SLUDGE
RT	RIGHT
RTP	REINFORCED THERMOSETTING PLASTIC
RW	REDWOOD
RWL	RAINWATER LEADER
S	SOUTH/ SCUM/ SINK/ SECOND/ SLOPE/ SAND
S/O	SOUTH OF
SA	SAMPLE
SAN	SANITARY
SBR	STYRENE BUTADIENE (RUBBER)
SC	SPACE CHEMICAL/ SECONDARY CLARIFIER
SCCP	STEEL CYLINDER CONCRETE PIPE
SCD	SCREWED
SCFM	STANDARD CUBIC FEET PER MINUTE
SCH	SCHEDULE
SD	STORM DRAIN
SDR	STANDARD THERMOPLASTIC PIPE DIMENSION RATIO
SEC	SECONDARY/ SECTION
SER	SERIES
SETT	SETTING
SF	SQUARE FOOT
SH	SHOWER
SHELV	SHELVING
SHT	SHEET
SHTG	SHEATHING/ SHEETING
SIM	SIMILAR
SL	SLUDGE
SLDG	SLIDING
SLG	SLUICE GATE
SOG	SLAB ON GRADE
SOLN	SOLUTION
SP	STATIC PRESSURE
SPEC	SPECIFICATION
SPK	SPIKE
SQ	SQUARE
SST	STAINLESS STEEL
SSB	SELECT SUB-BASE
SSPWC	STANDARD SPECIFICATION FOR PUBLIC WORKS CONSTRUCTION
SSU	SECONDS SAYBOLT UNIVERSAL
ST	STREET/ STATE
STA	STATION
STC	SLEEVE-TYPE COUPLING
STD	STANDARD
STK	STAKE
STL	STEEL
STM	STEAM
STR	STRAIGHT/ STRUCTURAL
SUCT	SUCTION
SV	SOLENOID VALVE
SW	SIDEWALK
SWD	SIDEWALK DRAIN
SWGR	SWITCHGEAR
SWR	SIDEWALL REGISTER
SY	SQUARE YARD
SYM	SYMMETRICAL/ SYMBOL
SYS	SYSTEM
T	THERMOSTAT/ TREAD OF STAIR/ TANGENT/ TOP
T&B	TOP AND BOTTOM
T&G	TONGUE AND GROOVE
TAN	TANGENT
TB	TACK BOARD
TBE	THREAD BOTH ENDS
TBM	TEMPORARY BENCH MARK
TC	TOP OF CURB
TCV	TEMPERATURE CONTROL VALVE
TEL	TELEPHONE
TEMP	TEMPERATURE/ TEMPORARY
TF	TOP OF FOOTING
TH	TEST HOLE
THK	THICK/ THICKNESS
THR	THRESHOLD
THR'D	THREADED
TK	TANK/TACK
TL	TRAVERSE LINE
TOC	TOP OF CONCRETE
TOE	THREAD ONE END
TOL	TOILET
TOM	TOP OF MASONRY
TOP	TOP OF PIPE
TOPO	TOPOGRAPHIC
TOS	TOP OF STEEL
TOW	TOP OF WALL
TP	TELEPHONE POLE
TR	TRACT
TRANS	TRANSMITTER/ TRANSITION/ TRANSMISSION
TS	TRAFFIC SIGNAL
TSB	TOP SET BASE
TSC	TRAFFIC SIGNAL CONDUIT
TV	THERMOSTATIC VALVE/ TELEVISION
TW	THERMOMETER WELL/ TRAVELED WAY
TYP	TYPICAL
UB	UNION BONNET
UBC	UNIFORM BUILDING CODE
UC	UNDER-CROSSING
UG	UNDERGROUND
UGC	UNDERGROUND CONDUIT
UH	UNIT HEATER
UL	UNDERWRITER'S LABORATORIES
UNO	UNLESS NOTED OTHERWISE
UOI	UNLESS OTHERWISE INDICATED
UR	URINAL
USA	UNDERGROUND SERVICE ALERT
USGS	UNITED STATES GEOLOGICAL SURVEY
V	VALVE/ VERTICAL/ VENT/ VOLT/ VOLUME
VAC	VACUUM
VAR	VARIES/ VARIABLE
VB	VALVE BOX
VC	VERTICAL CURVE
VCP	VITRIFIED CLAY PIPE
VERT	VERTICAL
VOL	VOLUME
VPI	VERTICAL POINT OF INSERTION
VTC	VENT TO CEILING
VTR	VENT THROUGH ROOF
VWC	VINYL WALL COVERING
VWM	VERIFY WITH MANUFACTURER
W	WEST/ WASTE/ WIDTH/ WIDE FLANGE
W/	WITH
W/O	WEST OF/ WITHOUT
WC	WATER COLUMN/ WATER CLOSET
WCO	WALL CLEANOUT
WD	WOOD
WDW	WINDOW
WH	WATER HEATER/ WALL HEATER
WI	WROUGHT IRON
WM	WATER METER
WOG	WATER, OIL OR GAS
WP	WATERPROOFING/ WORKING PRESSURE/ WEAK POINT
WPJ	WEAKEN PLANE JOINT
WS	WATER SURFACE
WSTP	WATER STOP
WT	WEIGHT
WWF	WELDED WIRE FABRIC
WWP	WATER WORKING PRESSURE
WWTP	WASTE WATER TREATMENT PLANT
XCONN	CROSS CONNECTION
XS	EXTRA STRONG
XSEC	CROSS SECTION
XSS	DOUBLE EXTRA STRONG
YD	YARD
YR	YEAR
Z	ZERO/ ZONE
ZN	ZINC
#	POUND
&	AND
@	AT

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H. DAVIS COLE & ASSOCIATES

SUBMITTED BY: ANDREW C. FOOD, E.I. PROJECT MANAGER — LICENSE NO.

APPROVED BY: DAVID A. MARTIN, P.E. PRINCIPAL — 37302 LICENSE NO.

H. Davis Cole & Associates, LLC — NEW ORLEANS, LA

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MARK	DESCRIPTION	DATE	BY	CHKD

REVISION RECORD

DESIGNED BY: ARF
DRAWN BY: ARF
CHECKED BY: DAM
DATE: APRIL 18
DETAILED BY: MAS
HDC PROJECT NO.: 2018-05

CITY BARN DRAINAGE IMPROVEMENTS
SLIDELL, LOUISIANA

CITY OF SLIDELL
P.O. BOX 828
SLIDELL, LA 70459

ABBREVIATIONS

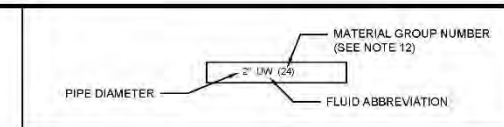
SHEET ID: G5

SHEET SET: 6 OF 29

	FUNCTION	PIPING MATERIALS (SEE SCHEDULE AT RIGHT)				FIELD TEST REQUIREMENTS (SEE NOTE AND NOTE 4)			PIPE COLOR (EXPOSED PIPE)	PIPE MARKER (EXPOSED PIPE)	LETTER COLOR (EXPOSED PIPE)
		EXPOSED PIPING (SEE NOTE 14)		BURIED PIPING (SEE NOTE 13)		MINIMUM TEST PRESSURE PSI	TEST MEDIUM	LEAKAGE ALLOWANCE (SEE NOTE 2)			
	THIS LIST INCLUDES SOME LINES NOT USED IN THE PROJECT	2" DIA AND SMALLER	2½" DIA AND LARGER	2" DIA AND SMALLER	2½" DIA AND LARGER						
A	AERATION	1,16,18	5,11,16,18	1,16,18	5,11,16,18	25	AIR	(A)(D)	NOTE 17	BLUE	WHITE
AW	AERATED WATER	16	11	16	11,32	25	AIR	(A)(D)	AQUA	BLUE	WHITE
BD	BOTTOM DRAIN	--	26	--	26	50	WATER	(A)	NOTE 17	GREEN	WHITE
BP	BYPASS	--	8	--	8	25	WATER	(A)	NOTE 17	GREEN	WHITE
BW	FILTER BACKWASH	--	8	--	8	75	WATER	(A)	NOTE 17	GREEN	WHITE
C	CONDENSATE	29*	29*	29*	29*	125	WATER	(A)	NOTE 17	YELLOW	BLACK
CAW	CHANNEL AGITATION WATER	16	16	16	16	25	WATER	(A)	NOTE 17	YELLOW	BLACK
CD	CHEMICAL DRAIN AND VENT	13,17,23	13,17,23	13,17,23	13,17,23	NOTE 7	--	--	NOTE 17	YELLOW	BLACK
CL	CHLORINE (GAS OR LIQUID STATE)	10	--	10	--	300	DRY AIR	(A)(D)	YELLOW	YELLOW	BLACK
CLS	CHLORINE SOLLUTION	16	16	16	16	125	WATER	(A)	YELLOW	YELLOW	BLACK
CLV	CHLORINE GAS UNDER VACUUM	16	16	16	16	15 IN Hg	VACUUM	(A)(E)	YELLOW	YELLOW	BLACK
CN	CENTRATE	--	26	--	26	50	WATER	(A)	NOTE 17	GREEN	WHITE
CS	CAUSTIC SODA	6	6	6	6	125	WATER	(A)	YELLOW	YELLOW	BLACK
CSL	CIRCULATED SLUDGE	--	30	--	30	50	WATER	(A)	BROWN	YELLOW	BLACK
CV	CHLORINATOR VENT AND DETECTION LINE	16	16	16	16	NOTE 8	--	--	YELLOW	YELLOW	BLACK
DCS	DEFOAMING CHEMICAL SOLUTION	16	16	16	16	125	WATER	(A)	NOTE 17	GREEN	WHITE
DN	DECANT	--	26	--	26	50	WATER	(A)	NOTE 17	GREEN	WHITE
DSL	DIGESTED SLUDGE	--	30	--	30	50	WATER	(A)	BROWN	YELLOW	BLACK
DW	DEMINERALIZED WATER	16,18	16,18	16,18	16,18	125	WATER	(A)	NOTE 17	GREEN	WHITE
EE	ENGINE EXHAUST	14*	14*	14	14	NOTE 8	--	--	NOTE 17	YELLOW	BLACK
EWR	ENGINE COOLING WATER RETURN	1*	1*	1	1	125	WATER	(A)	NOTE 17	GREEN	WHITE
EWS	ENGINE COOLING WATER SUPPLY	1*	1*	1	1	125	WATER	(A)	NOTE 17	GREEN	WHITE
F	FROTH	30	30	30	30	50	WATER	(A)	NOTE 17	YELLOW	BLACK
FA	FOUL AIR	--	16	--	16	10	AIR	(A)(D)	NOTE 17	YELLOW	BLACK
FAW	FILTERED AIR WASH	16	11	16	11,32	25	AIR	(A)(D)	NOTE 17		
FE	FINAL EFFLUENT	--	6	--	8	50	WATER	(A)	NOTE 17	GREEN	WHITE
FW	FINISHED WATER	16	11	16	11,32	25	WATER	(A)	BLUE	BLUE	WHITE
FLW	FILTERED WATER	16	11	16	11,32	25	WATER	(A)	AQUA	AQUA	WHITE
FM	FORCE MAIN	--	8,26	--	8,26	125	WATER	(A)	NOTE 17	YELLOW	BLACK
FOR	FUEL OIL RETURN	9	9	9	9	125	AIR	(A)(D)	NOTE 17	YELLOW	BLACK
FOS	FUEL OIL SUPPLY	9	9	9	9	125	AIR	(A)(D)	NOTE 17	YELLOW	BLACK
FS	FROTH SPRAY	2	2	2	2	125	WATER	(A)	NOTE 17	GREEN	WHITE
FSP	FIRE PROTECTION SPRINKLER SYSTEM	NOTE 10	NOTE 10	NOTE 10	NOTE 10	NOTE 9	WATER	--	RED	RED	WHITE
G	GRIT	--	26	--	26	50	WATER	(A)	BROWN	YELLOW	BLACK
H	HYPOCHLORITE	16	16	16	16	125	WATER	(A)	NOTE 17		
HR	HEATING WATER RETURN	1*	1*	1*	1*	125	WATER	(A)	NOTE 17	YELLOW	BLACK
HS	HEATING WATER SUPPLY	1*	1*	1*	1*	125	WATER	(A)	NOTE 17	YELLOW	BLACK
HWR	DOMESTIC HOT WATER RETURN	24*	2*	24*	2*	125	WATER	(A)	NOTE 17	YELLOW	BLACK
HWS	DOMESTIC HOT WATER SUPPLY	24*	2*	24*	2*	125	WATER	(A)	NOTE 17	YELLOW	BLACK
IA	INSTRUMENT AIR	24	2	24	2	125	AIR	(A)(D)	GREEN	BLUE	WHITE
IE	INTERMEDIATE EFFLUENT	--	6	--	6,26	50	WATER	6(A)28(B)	NOTE 17	GREEN	WHITE
LA	LIQUID ALUM	16	16	16	16	125	WATER	(A)	ORANGE	YELLOW	BLACK
LO	LUBE OIL	9	9	9	9	125	AIR	(A)(D)	RED	YELLOW	BLACK
LPG	LIQUEFIED PETROLEUM GAS	3	3	3	3	NOTE 7	AIR	--	RED	YELLOW	BLACK
LS	LIME SLURRY	NOTE 15	NOTE 15	NOTE 15	NOTE 15	NOTE 8	--	--	LIGHT GREEN	YELLOW	BLACK
LSP	LANDSCAPING SPRINKLER SYSTEM	2,16	2,16	2,16	2,16	NOTE 7	--	--	NOTE 17	GREEN	WHITE
ML	MIXED LIQUOR	2	2,8,26,28	2	2,8,26 28	50	WATER	2,3,26(A) 28(B)	BROWN	YELLOW	BLACK
MG	NATURAL GAS	9	9	9	9	NOTE 7	AIR	--	RED	YELLOW	BLACK
OF	OVERFLOW	--	6	--	8	25	WATER	2,8(A)12,28(B) 22(C)	NOTE 17	GREEN	WHITE
PA	PLANT AIR	7	7	7	7	300	AIR	(A)	GREEN	BLUE	WHITE
PD	PLANT DRAIN	2	8,12	2	8,12,22,28	NOTE 8	WATER	(A)	NOTE 17	GREEN	WHITE
PEA	POLYMER - ANIONIC	16	16	16	16	125	WATER	(A)	GREEN	GREEN	WHITE
PEC	POLYMER - CATIONIC	16	16	16	16	125	WATER	(A)	GREEN	GREEN	WHITE
PEF	PRIMARY EFFLUENT	--	8,26	--	6,26	25	WATER	(B)	NOTE 17	YELLOW	BLACK
PEN	POLYMER - NONIONIC	16	16	16	16	125	WATER	(A)	GREEN	GREEN	WHITE
PI	PLANT INFLUENT	--	21,26	--	21,26	NOTE 8	WATER	(B)	NOTE 17	YELLOW	BLACK
PO	PLANT OVERFLOW	2	6	2	8,26	NOTE 8	WATER	2,8(A) 28(B)	NOTE 17	GREEN	WHITE
PTW	PRE-TREATED WATER	16	11	16	11,32	25	WATER	(A)	AQUA		
PW	POTABLE WATER	2,24	2	2,24	2,11,19	125	WATER	2,11,24(A) 19(B)	BLUE	GREEN	WHITE
RAS	RETURN ACTIVATED SLUDGE	--	26	--	26	50	WATER	(A)	BROWN	YELLOW	BLACK
REW	RECLAIMED WATER	--	6	--	8	75	WATER	(A)	PURPLE	PURPLE	WHITE
RSL	RAW SLUDGE	--	30	--	30	50	WATER	(A)	BROWN	YELLOW	BLACK
RW	RAW WATER	2	6	2	8,26	125	WATER	2,8(A) 28(B)	GREEN	GREEN	WHITE
RWL	RAINWATER LEADER	4,12	4,12	12	12	NOTE 7	--	--	NOTE 17	GREEN	WHITE
S	SCUM	--	30	--	26	50	WATER	(A)	NOTE 17	YELLOW	BLACK
SA	SAMPLE LINE (SEE LIST AT RIGHT)	16,18,24	--	16,18,24	--	125	WATER	(A)	NOTE 17	YELLOW	BLACK
SC	SPARE CHEMICAL	16	16	16	16	125	WATER	(A)	NOTE 17	YELLOW	BLACK
SD	SANITARY DRAIN AND VENT	4,12	12	12	12,21	NOTE 7	--	--	BLACK	YELLOW	BLACK
SDR	STORM DRAIN	--	8	--	22,28	NOTE 8	WATER	8,(A)28(B)22(C)	BLACK	GREEN	WHITE
SE	SECONDARY EFFLUENT	--	8,26	--	8,26	50	WATER	(A)	NOTE 17	YELLOW	BLACK
SF	SLUDGE FILTRATE	--	26	--	26	50	WATER	(A)	BROWN	YELLOW	BLACK
SG	SLUDGE GAS	31	31	31	31	15	AIR	(A)(D)	BROWN	YELLOW	BLACK
SI	SODIUM SILICATE	6,16	6,16	6,16	6,16	125	WATER	(A)	NOTE 17	YELLOW	BLACK
SN	SUPERNATANT	--	26	--	26	50	WATER	(A)	NOTE 17	YELLOW	BLACK
SO	SULFUR DIOXIDE (GAS OR LIQUID STATE)	10	--	10	--	300	DRY AIR	(A)(D)	NOTE 17	YELLOW	BLACK
SOA	SULFURIC ACID	25	25	--	--	125	AIR	(A)(D)	YELLOW	RED	BLACK
SOS	SULFUR DIOXIDE SOLUTION	16	16	16	16	125	WATER	(A)	LIGHT GREEN	YELLOW	BLACK
SOV	SULFUR DIOXIDE GAS UNDER VACUUM	16	16	16	16	15 IN Hg	VACUUM	(A)(E)	LIGHT GREEN	YELLOW	BLACK
SPD	SUMP PUMP DISCHARGE	2	26	2	26	50	WATER	(A)	NOTE 17	GREEN	WHITE
SS	SANITARY SEWER	--	12	--	12,21	NOTE 7	[illegible]	--	BLACK	YELLOW	BLACK
ST	STEAM (LOW PRESSURE TO 10 PSI)	29*	29*	29*	29*	125	WATER	(A)	NOTE 17	YELLOW	BLACK
SU	STRUCTURE UNDERDRAIN	--	--	--	20	NO	TEST	REQUIRED	NOTE 17	GREEN	WHITE
SUC	STRUCTURE UNDERDRAIN COLLECTOR	--	12	--	12,21	NOTE 6	WATER	(C)	NOTE 17	GREEN	WHITE
SW	FILTER SURFACE WASHWATER	14,16,18	8,14,15,16, 18	2,16,18	2,8,15,16, 18	125	WATER	(A)	NOTE 17	GREEN	WHITE
TPR	THICKENER PRESSURIZED RECYCLE	--	26	--	26	50	WATER	(A)	NOTE 17	NOTE 17	NOTE 17
TS	THICKENER SUBNATANT	--	26	--	26	50	WATER	(A)	NOTE 17	NOTE 17	NOTE 17
TSL	THICKENED SLUDGE	--	30	--	30	50	WATER	(A)	BROWN	YELLOW	BLACK
TSO	THICKENER SUBNATANT OVERFLOW	--	26	--	26	50	WATER	(A)	NOTE 17	YELLOW	BLACK
UW	UTILITY WATER (NON-POTABLE WATER)	2,24	2,11	2,24	2,11,19	125	WATER	2,11,24(A) 19(B)	PURPLE	YELLOW	BLACK
V	VACUUM	24	2	24	2	15 IN Hg	VACUUM	(A)(E)	NOTE 17	BLUE	WHITE
WAS	WASTE ACTIVATED SLUDGE	--	26	--	26	50	WATER	(A)	BROWN	YELLOW	BLACK
WLO	WASTE LUBE OIL	9	9	9	9	50	AIR	(A)(D)	RED	YELLOW	BLACK
WW	FILTER WASTE WASHWATER	--	8	--	8	NOTE 6	WATER	(A)	NOTE17	YELLOW	BLACK

PIPING MATERIAL SCHEDULE (SEE NOTE 14)

GROUP No.	PIPING (SEE NOTE 13)	FITTINGS
1	STEEL, ASTM A53, SCH 40, BLACK WELDED	2 1/2" AND SMALLER, MALLEABLE IRON, ANSI B16.3, THREADED, BANDED, BLACK, 15 PSI OR STEEL, ANSI B16.9, BUTT-WELDED. 3"AND LARGER, CAST IRON, ANSI B16.1, 125 PSI FLGD OR MECH CPLG.
2	STEEL, ASTM A53, SCH 40, BLACK WELDED, GALVANIZED	2 1/2" AND SMALLER, MALLEABLE IRON, ANSI B16.3, THREADED, BANDED, GALVANIZED 150 PSI. 3" AND LARGER, CAST IRON, ANSI B16.1, 125 PSI FLGD OR MECH CPLG
3	STEEL, ASTM A106 OR A53, SCH 80, SEAMLESS, BLACK	FORGED STEEL, ANSI B16.11, SOCKET WELDED OR THREADED, BLACK, 2000 PSI. OR STEEL, ANSI B16.9, BUTT-WELDED, SCH 80
4	SAME AS GROUP 1	CAST IRON, ASNI B16.12, THREADED, DRAINAGE PATTERN
5	WELDED STEEL, AWWA C200, UNLINED	WELDED STEEL, FABRICATED, AWWA C200, UNLINED
6	STEEL, ASTM A106, OR A53, SCH 40, SEAMLESS, BLACK	STEEL, ANSI B16.9, BUTT-WELDED; CAST IRON, ANSI B16.1, 125 PSI, FLGD. FORGED STEEL, SOCKET WELDED. ANSI B16.11, 2000 PSI OR STEEL, ANSI B16.5. 150 PSI FLGD
7	SAME AS GROUP NO. 2.	MALLEABLE IRON, ANSI B16.3, THREADED, BANDED, GALVANIZED, 300 PSI
8	WELDED STEEL, AWWA C200	WELDED STEEL, AWWA C200, FABRICATED
9	SAME AS GROUP NO. 1	2 1/2" AND SMALLER, MALLEABLE IRON, ANSI B16.3, THREADED, BANDED, BLACK, 150 PSI. 3" AND LARGER, STEEL, ANSI B16.9, BUTT-WELDED
10	SAME AS GROUP NO. 3	1 1/4" AND SMALLER, FORGED STEEL, ANSI B16.11, THREADED OR SOCKET WELDED, BLACK, 3000 PSI, WITH FLGD AMMONIA UNIONS; 1 1/2" AND LARGER, STEEL, ANSI B16.9, BUTT-WELDED OR FLGD, SCH 80
11	DUCTILE IRON, ANSI A21.51, (AWWA C151), 150 PSI, BELL AND SPIGOT, MECH JTS. MECH CPLG, OR 125 PSI FLGD (TYPICAL SERVICE- WATER LINES)	DUCTILE IRON OR CAST IRON, ANSI A21.10, OR AWWA C110, BELL AND SPIGOT, MECH CPLG, FLGD OR MECH JTS. 250 PSI, (PRESSURE RATING)12" AND SMALLER 150 PSI. (PRESSURE RATING)14" AND LARGER, WITH 125 PSI ANSI B16.1 FLANGES
12	CAST IRON SOIL, ANSI/ASTM A-74, SERVICE WEIGHT, BELL AND SPIGOT OR HUBLESS. AT THE OPTION OF THE CONTRACTOR,. DUCTILE IRON (GROUP NO.11) MAY BE SUBSTITUTED	CAST IRON SOIL, ANSI/ASTM A-74, SERVICE WEIGHT, BELL AND SPIGOT OR HUBLESS. AT THE OPTION OF THE CONTRACTOR, DUCTILE IRON (GROUP NO.11) MAY BE SUBSTITUTED
13	CORROSION RESISTANT (HIGH SILICON CONTENT) CAST IRON, SERVICE WEIGHT, BELL AND SPIGOT OR HUBLESS	CORROSION RESISTANT (HIGH SILICON CONTENT) CAST IRON, SERVICE WEIGHT, BELL AND SPIGOT OR HUBLESS
14	STAINLESS STEEL, TYPE 316, ASTM A 312, SCH 40S	STAINLESS STEEL, TYPE 316 ANSI B16.3, SCREWED, 150 PSI ANSI B16.9, BUTT-WELDED, SCH 40S, OR 150 PSI FLGD
15	STAINLESS STEEL, TYPE 316, ASTM A 312, SCH 10S	STAINLESS STEEL, TYPE 316 ANSI B16.9 BUTT-WELDED SCH 150 PSI FLGD
16	POLYVINYL CHLORIDE, SCH 80, NORMAL IMPACT, ASTM D1785	POLYVINYL CHLORIDE, SCH 80, NORMAL IMPACT, SOCKET SOLVENT WELD JTS, ASTM D2467
17	POLYPROPYLENE, ASTM D2146, SCH 40, WITH HEAT FUSED JTS	POLYPROPYLENE, SCH 40, DRAINAGE TYPE WITH HEAT FUSED SOCKET JTS
18	FIBERGLASS REINFORCED PLASTIC, ASTM D2996, FILAMENT-WOUND, SOCKET AND SPIGOT ENDS, ADHESIVE BONDED. SEE SPECIFICATION 15860	FIBERGLASS REINFORCED PLASTIC, FILAMENT-WOUND, SOCKET ENDS, ADHESIVE BONDED, OR FIBERGLASS FLGD
19	POLYVINYL CHLORIDE PRESSURE PIPE ASTM D2241 WITH BELL AND SPIGOT JTS	CAST IRON, 150 PSI. FOR POLYVINYL CHLORIDE PIPE, AWWA C110 CEMENT MORTAR LINED, AWWA C104
20	VITRIFIED CLAY, PERFORATED, ASTM C 700 EXTRA STRENGTH, FLEXIBLE COMPRESSION JTS FOR BELL AND SPIGOT PIPE OR PLAIN END WITH MECH COMPRESSION JTS	VITRIFIED CLAY, ASTM C700, FLEXIBLE JTS FOR BELL AND SPIGOT PIPE OR PLAIN END WITH MECH COMPRESSION JTS
21	VITRIFIED CLAY, ASTM C700, EXTRA STRENGTH, FLEXIBLE COMPRESSION JTS FOR BELL AND SPIGOT PIPE OR PLAIN END WITH MECH COMPRESSION JTS	VITRIFIED CLAY, ASTM C700, FLEXIBLE JTS FOR BELL AND SPIGOT PIPE OR PLAIN END WITH MECH COMPRESSION JTS
22	REINFORCED CONCRETE, ASTM C76, T&G JTS. (TYPICAL SERVICE-CULVERTS)	SAME AS GROUP NO. 8
23	TEMPERED GLASS (ARMORED WHERE BURIED) ANSI/ASTM C599	TEMPERED GLASS DRAINAGE TYPE WITH COMPRESSION COUPLING & TEFLON JTS, ANSI/ASTM C599
24	COPPER, ASTM B88, TYPE K, SOFT TEMPERED WHERE BURIED, HARD TEMPERED WHERE EXPOSED	EXISTING
25	STEEL, ASTM A106 OR A53, SCH 40, SEAMLESS, BLACK. SARAN OR POLYPROPYLENE-LINED	STEEL, ANSI B16.5. 150 PSI FLGD, SARAN OR POLYPROPYLENE-LINED
26	SAME AS GROUP NO. 11 (TYPICAL SERVICE-SLUDGE AND SEWAGE LINES)	SAME AS GROUP NO. 11
27	POLYVINYL CHLORIDE GRAVITY SEWER PIPE, ASTM D3034, BELL AND SPIGOT	POLYVINYL CHLORIDE, ANSI/ASTM D3034, BELL AND/OR SPIGOT
28	REINFORCED CONCRETE, AWWA C302, CLASS-SEE DRAWINGS. (TYPICAL SERVICE-PRESSURE PIPELINES)	SAME AS GROUP NO. 8
29	SAME AS GROUP NO 1	2" AND SMALLER, MALLEABLE IRON, ANSI B16.3, THREADED, BANDED, BLACK, 150 PSI. 2 1/2" AND LARGER, STEEL ANSI B16.9, BUTT-WELDED
30	SAME AS GROUP NO. 11, GLASS-LINED OR STEEL ASTM A53, SCH 40, GLASS LINED	SAME AS GROUP NO. 11, GLASS-LINED OR STEEL, ANSI B16.9, SCH 40, GROOVED WITH MECH CPLG, GLASS-LINED
31	2-2/1" AND SMALLER, STEEL, ASTM A106 OR A53, SCH 80, SEAMLESS, BLACK. 3" AND LARGER DUCTILE IRON, ANSI A21.51 (AWWA C151), OR CAST IRON ANSI A21.6 OR 21.8 MECH CPLG OR 125 PSI FLGD	2½" AND SMALLER, FORGED STEEL. ANSI B16.11, SOCKET WELDED OR THREADED, BLACK 2000 PSI. OR STEEL ANSI B16.9 BUTT-WELDED SCH 80 3" AND LARGER, DUCTILE IRON OR CAST IRON, ANSI A21.20 AWWA C110, MECH COUPLING OR 125 PSI FLGD
32	12" AND SMALLER, AWWA C-900 WITH RESTRAINED JOINTS, DR 18. 14" AND LARGER, AWWA C-905 WITH RESTRAINED JOINTS, DR 25	SAME AS GROUP NO. 11
33	HIGH DENSITY POLYETHYLENE, DUCTILE IRON PIPE (DIPS), DR 11 AWWA C-906, FUSION BUTT WELDED JOINTS AND FULLY RESTRAINED FITINGS	SAME AS GROUP NO. 11
34	POLYETHYLENE SERVICE TUBE, PE 4710, COPPER TUBE SIZE ASTM D2737, PRESSURE CLASS 250, DR9	--
35	CHLORINATED POLYVINYL CHLORIDE PRESSURE PIPE, ASTM F441, SCHEDULE 40 WITH SOLVENT WELDED JOINTS PER ASTM F493, SCREWED OR FLANGED JOINTS	SOLVENT WELDED: ASTM F439, SCHEDULE 80, THREADED FITTINGS: ASTM F437, SCHEDULE 80, FLANGED FITTINGS: ANSI / ASME B16.5
36	REINFORCED CONCRETE PIPE ARCH, LDOTD AML, ASTM C506 AS MODIFIED, RUBBER GASKETED JOINTS	--
37	PLASTIC DRAINAGE PIPE, RIBBED POLYVINYL CHLORIDE DRAINAGE PIPE, ASTM F794 OR F949 SERIES 46 WITH UV INHIBITORS, RUBBER GASKETED JOINTS	--
38	BITUMINOUS COATED CORRUGATED STEEL PIPE AND PIPE ARCH, AASHTO M196, RUBBER GASKETED JOINTS WITH COUPLING BANDS	--
39	CORRUGATED ALUMINUM PIPE AND PIPE ARCH PER AASHTO M196, RUBBER GASKETED JOINTS WITH COUPLING BANDS	--
40	REINFORCED PRECAST CONCRETE BOX CULVERT PER STRUCTURAL CONCRETE SPECIFICATIONS	--



GENERAL NOTE:
ALTHOUGH SEVERAL PIPE MATERIALS ARE SHOWN THAT MAY BE USED FOR A GIVEN FUNCTION, ONLY THE CALLED PIPING MATERIAL SHOWN ON THE CONSTRUCTION DRAWINGS & SPECIFICATIONS SHALL BE USED. THE CONTRACTOR DOES NOT HAVE THE OPTION TO USE A DIFFERENT MATERIAL.

NOTE 1
PROPRIETARY NAMES HAVE BEEN QUOTED FOR IDENTIFICATION PURPOSES ONLY. SUBSTITUTIONS WILL BE PERMITTED SUBJECT TO PROVISIONS OF THE SPECIFICATIONS. IF VALUES ARE NOT SPECIFIED IN SPECIFICATIONS: FOLLOW THE SCHEDULE.

NOTE 2
LEAKAGE ALLOWANCE IS A FOLLOWS:
(A) PIPES SO DESIGNATED SHALL SHOW ZERO LEAKAGE.

(B) PIPES SO DESIGNATED SHALL SHOW ZERO LEAKAGE FOR UNBURIED PIPE & NOT MORE THAN 0.02 GALLONS PER HOUR PER INCH DIAMETER PER 100' OF BURIED PIPE.

(C) PIPES SO DESIGNATED SHALL NOT SHOW LEAKAGE OF MORE THAN 0.15 GALLON PER HOUR PER INCH OF DIAMETER PER 100' OF BURIED PIPE.

(D) PIPES SO DESIGNATED SHALL NOT SHOW A LOSS OF PRESSURE OF MORE THAN 5%.

(E) PIPES SO DESIGNATED SHALL NOT SHOW A LOSS OF VACUUM MORE THAT 4" MERCURY COLUMN.

NOTE 9
FOR FIELD TEST PROCEDURES AND ADDITIONAL TEST REQUIREMENTS, SEE PIPING SECTION OF SPECS.

NOTE 4
ANY DEVIATION FOR THE PIPING MATERIALS OR FIELD TEST REQUIREMENTS, SHOWN WILL BE NOTED IN THE SPECIFICATIONS OR ON THE DRAWINGS.

NOTE 5
PIPING GROUP NUMBER SHOWN THUS __ SHALL BE INSTALLED. SEE PIPING SECTION OF SPECIFICATIONS FOR INSULATING MATERIALS.

NOTE 6
STATIC WATER TEST WITH SURFACE 6' ABOVE HIGH POINT OF PIPE.

NOTE 7
INSPECTION & TESTING SHALL BE IN ACCORDANCE WITH APPLICABLE PLUMBING CODE.

NOTE 8
NO APPARENT LEAKS UNDER NORMAL OPERATING CONDITIONS.

NOTE 9
INSPECTION & TESTING SHALL BE IN ACCORDANCE WITH APPLICABLE NFPA STANDARDS.

NOTE 10
PIPING MATERIALS SHALL BE IN ACCORDANCE WITH NFPA STANDARDS.

NOTE 11
VALVES 8" & LARGER SEE VALVE SCH FOR SPECIAL VALVES SEE SPECS

NOTE 12
CHANGE IN PIPING MATERIAL GROUP NUMBERS IS INDICATED THUS: →◆

NOTE 13
FOR PIPING LINING AND COATING, SEE SPECIFICATIONS

NOTE 14
EXPOSED PIPING SHALL BE PAINTED IN ACCORDANCE WITH SPECIFICATIONS. COLORS TO BE SELECTED BY ENGINEER.

NOTE 15
PIPING MATERIAL SHALL BE NON-ABRASIVE FLEXIBLE RUBBER HOSE & QUICK CONNECTION CPLG WITH GROUP No. 1 AT EQUIPMENT.

NOTE 16
VALVES 2½" AND SMALLER MAY HAVE SCREWED ENDS. VALVES 3" AND LARGER SHALL HAVE FLGD ENDS UNLESS OTHERWISE INDICATED.

NOTE 17
PIPE COLOR AS DIRECTED BY OWNER OR ENGINEER.

PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION, BIDDING, RECORDATION, SALES OR AS THE BASIS FOR ISSUANCE OF A PERMIT
DAVID ALAN MARTIN, P.E.
LICENSE NO. 37652
H. DAVIS COLE & ASSOCIATES

SUBMITTED BY: ANDREW C. FOGG, E.I. PROJECT MANAGER
LICENSE NO.
SUBMITTED BY: DAVID A. MARTIN, P.E. PRINCIPAL
LICENSE NO. 37652

H. Davis Cole & Associates, LLC
NEW ORLEANS, LA

90% SUBMITTAL
NOT FOR CONSTRUCTION

MARK	DESCRIPTION	DATE	BY	CHKD
	REVISION RECORD			

DESIGNED BY: ARF
DRAWN BY: ARF
CHECKED BY: DAM
DATE: APRIL 18
DET'AILED BY: MAS
HDC PROJECT NO: 2018-05

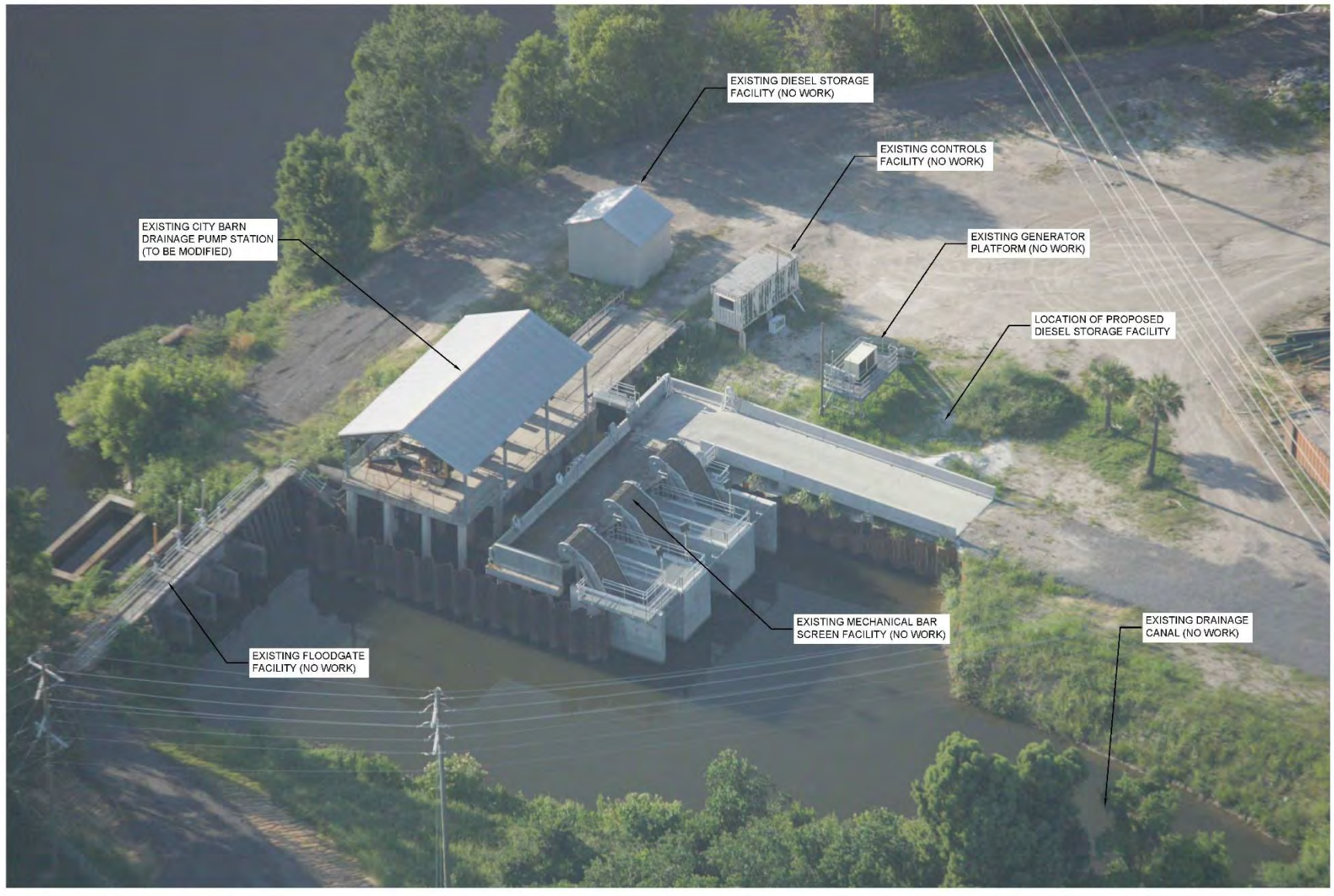
CITY BARN DRAINAGE IMPROVEMENTS
SLIDELL LOUISIANA

CITY OF SLIDELL
P.O. BOX 828
SLIDELL, LA 70459

PIPING SCHEDULE

SHEET ID: G6

SHEET SET: 7 OF 29



PROJECT OVERVIEW MAP

SCALE: N.T.S.

NOTES:
1. AERIAL PHOTOGRAPH DATED JULY 2014.
2. AERIAL PHOTOGRAPH FOR REFERENCE ONLY. SEE DRAWINGS FOR FURTHER GEOMETRIC LAYOUT.

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DAVID ALAN MARTIN, P.E.
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SUBMITTED BY: DAVID A. MARTIN, P.E. PRINCIPAL — 37652 LICENSE NO.

H. Davis Cole & Associates, LLC Consulting Engineers — NEW ORLEANS, LA

90% SUBMITTAL
NOT FOR CONSTRUCTION

MARK	DESCRIPTION	DATE	BY	CHKD
2	REVISION RECORD			

DESIGNED BY: ARF
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HDC PROJECT NO.: 2018-05

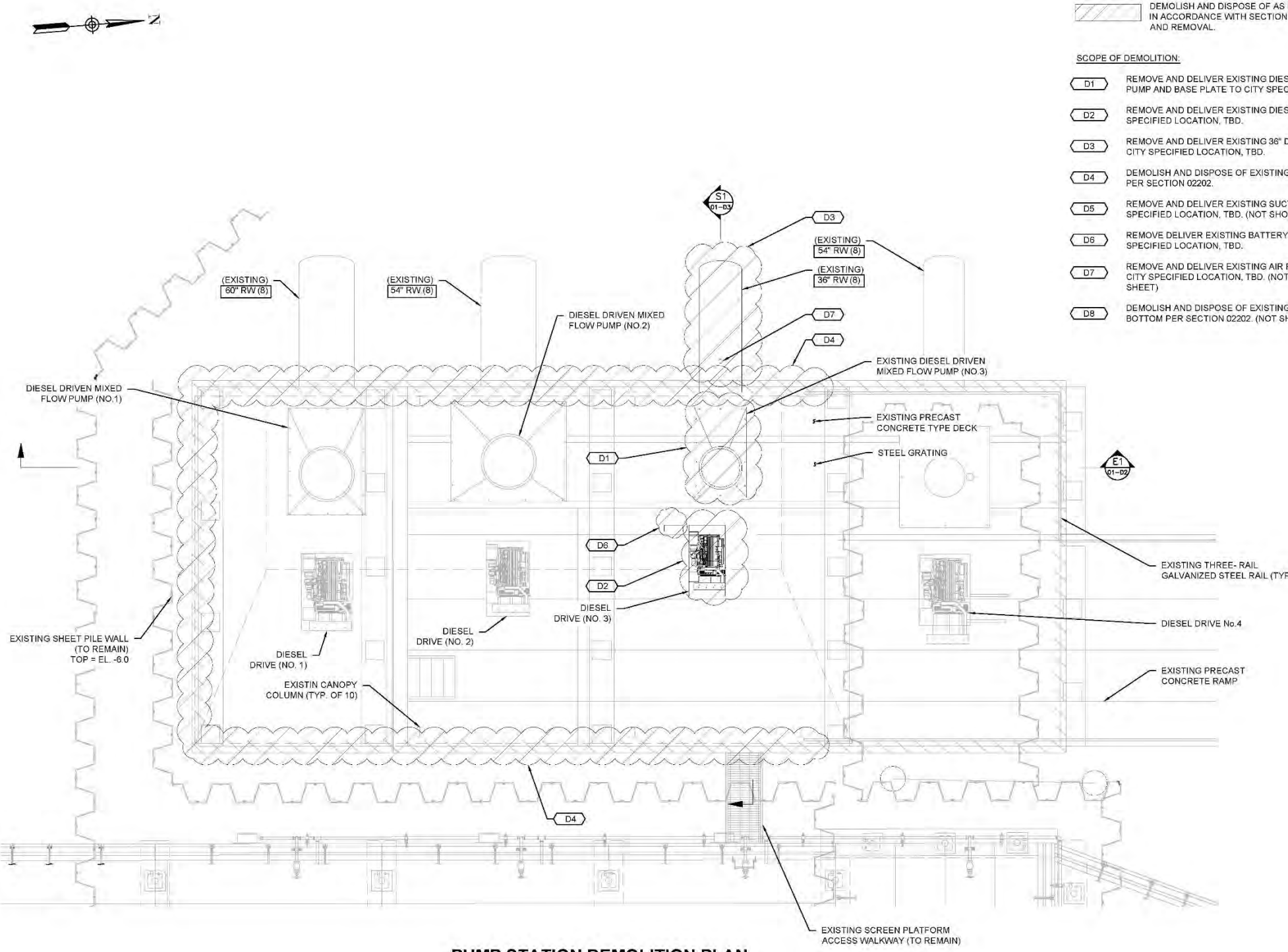
CITY BARN DRAINAGE IMPROVEMENTS
SLIDELL LOUISIANA

CITY OF SLIDELL
P.O. BOX 828
SLIDELL, LA 70459

PROJECT OVERVIEW MAP

SHEET ID: G7

SHEET SET: 8 OF 29



PUMP STATION DEMOLITION PLAN

SCALE: 1/4" = 1'-0" (22" x 34" SHEET)

LEGEND:

DEMOLISH AND DISPOSE OF AS INDICATED BELOW AND IN ACCORDANCE WITH SECTION 02202 - DEMOLITION AND REMOVAL.

SCOPE OF DEMOLITION:

- D1 — REMOVE AND DELIVER EXISTING DIESEL DRIVEN FLOW PUMP AND BASE PLATE TO CITY SPECIFIED LOCATION, TBD.
- D2 — REMOVE AND DELIVER EXISTING DIESEL DRIVE #3 TO CITY SPECIFIED LOCATION, TBD.
- D3 — REMOVE AND DELIVER EXISTING 36" DISCHARGE PIPING TO CITY SPECIFIED LOCATION, TBD.
- D4 — DEMOLISH AND DISPOSE OF EXISTING CHAIN LINK FENCE PER SECTION 02202.
- D5 — REMOVE AND DELIVER EXISTING SUCTION PIPING TO CITY SPECIFIED LOCATION, TBD. (NOT SHOWN ON THIS SHEET)
- D6 — REMOVE DELIVER EXISTING BATTERY TENDER TO CITY SPECIFIED LOCATION, TBD.
- D7 — REMOVE AND DELIVER EXISTING AIR RELEASE VALVE TO CITY SPECIFIED LOCATION, TBD. (NOT SHOWN ON THIS SHEET)
- D8 — DEMOLISH AND DISPOSE OF EXISTING CONCRETE SUMP BOTTOM PER SECTION 02202. (NOT SHOWN ON THIS SHEET)

PRELIMINARY

NOT TO BE USED FOR CONSTRUCTION, BIDDING, RECORDATION, SALES OR AS THE BASIS FOR ISSUANCE OF A PERMIT

DAVID ALAN MARTIN, P.E.
LICENSE NO. 37002
H. DAVIS COLE & ASSOCIATES

SUBMITTED BY:
ANDREW P. CONTI, E.I.
PROJECT MANAGER
LICENSE NO.

SUBMITTED BY:
DAVID A. MARTIN, P.E.
PRINCIPAL
37002
LICENSE NO.

H. Davis Cole & Associates, L.L.C.
Consulting Engineers
NEW ORLEANS, LA

90% SUBMITTAL
NOT FOR CONSTRUCTION

MARK	DESCRIPTION	DATE	BY	CHKD
	REVISION RECORD			

DESIGNED BY: ARF
DRAWN BY: ARF
CHECKED BY: DAM
DATE: APRIL, 18
DETAILED BY: MAS
HDC PROJECT NO: 2018-05

CITY BARN DRAINAGE IMPROVEMENTS
SLIDELL LOUISIANA

CITY OF SLIDELL
P.O. BOX 828
SLIDELL, LA 70459

PUMP STATION DEMOLITION PLAN

SHEET ID: 01-D1

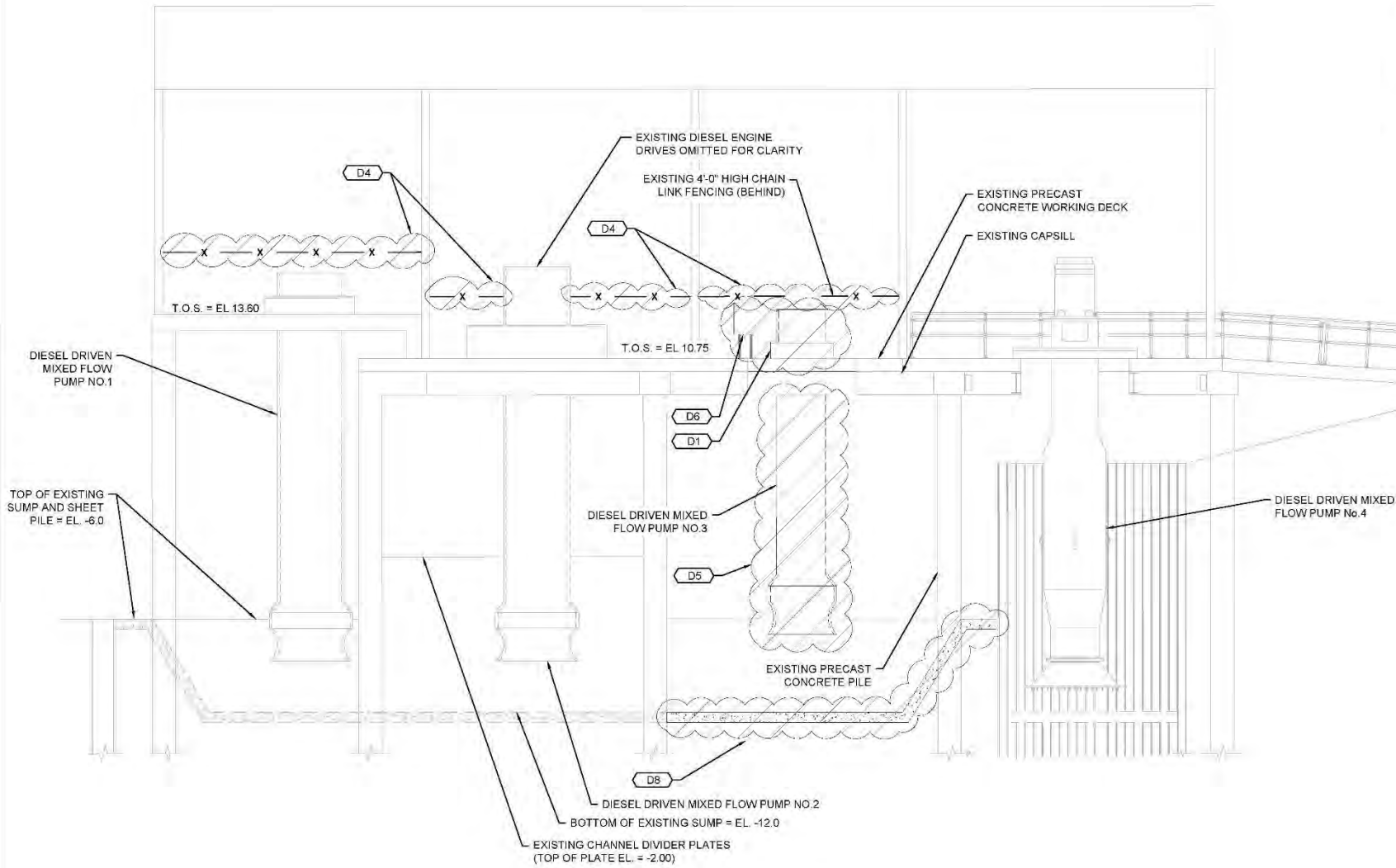
SHEET SET: 9 OF 29

LEGEND:

DEMOLISH AND DISPOSE OF AS INDICATED BELOW AND IN ACCORDANCE WITH SECTION 02202 - DEMOLITION AND REMOVAL.

SCOPE OF DEMOLITION:

- D1 REMOVE AND DELIVER EXISTING DIESEL DRIVEN FLOW PUMP AND BASE PLATE TO CITY SPECIFIED LOCATION, TBD.
- D2 REMOVE AND DELIVER EXISTING DIESEL DRIVE #3 TO CITY SPECIFIED LOCATION, TBD. (NOT SHOWN ON THIS SHEET)
- D3 REMOVE AND DELIVER EXISTING 36" DISCHARGE PIPING TO CITY SPECIFIED LOCATION, TBD. (NOT SHOWN ON THIS SHEET)
- D4 DEMOLISH AND DISPOSE OF EXISTING CHAIN LINK FENCE PER SECTION 02202.
- D5 REMOVE AND DELIVER EXISTING SUCTION PIPING TO CITY SPECIFIED LOCATION, TBD.
- D6 REMOVE DELIVER EXISTING BATTERY TENDER TO CITY SPECIFIED LOCATION, TBD.
- D7 REMOVE AND DELIVER EXISTING AIR RELEASE VALVE TO CITY SPECIFIED LOCATION, TBD. (NOT SHOWN ON THIS SHEET)
- D8 DEMOLISH AND DISPOSE OF EXISTING CONCRETE SUMP BOTTOM PER SECTION 02202.



PUMP STATION DEMOLITION ELEVATION

SCALE: 1/4" = 1'-0" (22" x 34" SHEET)

E1 / 01-D1

PRELIMINARY

NOT TO BE USED FOR CONSTRUCTION BIDDING, RECORDATION, SALES OR AS THE BASIS FOR ISSUANCE OF A PERMIT

DAVID ALAN MARTIN, P.E. LICENSE NO. 37952 H. DAVIS COLE & ASSOCIATES

SUBMITTED BY: ANDREA D. FORD, E.I. PROJECT MANAGER — LICENSE NO.

SUBMITTED BY: DAVID A. MARTIN, P.E. PRINCIPAL — 37952 LICENSE NO.

H. Davis Cole & Associates, LLC — NEW ORLEANS, LA

90% SUBMITTAL — NOT FOR CONSTRUCTION

MARK	DESCRIPTION	DATE	BY	CHKD

REVISION RECORD

DESIGNED BY: ARF | DRAWN BY: ARF | CHECKED BY: DAM

DATE: APRIL 18 | DETAILED BY: MAS | HDC PROJECT NO: 2018-05

CITY BARN DRAINAGE IMPROVEMENTS — SLIDELL, LOUISIANA

CITY OF SLIDELL
P.O. BOX 828
SLIDELL, LA 70459

PUMP STATION DEMOLITION ELEVATION

SHEET ID: 01-D2

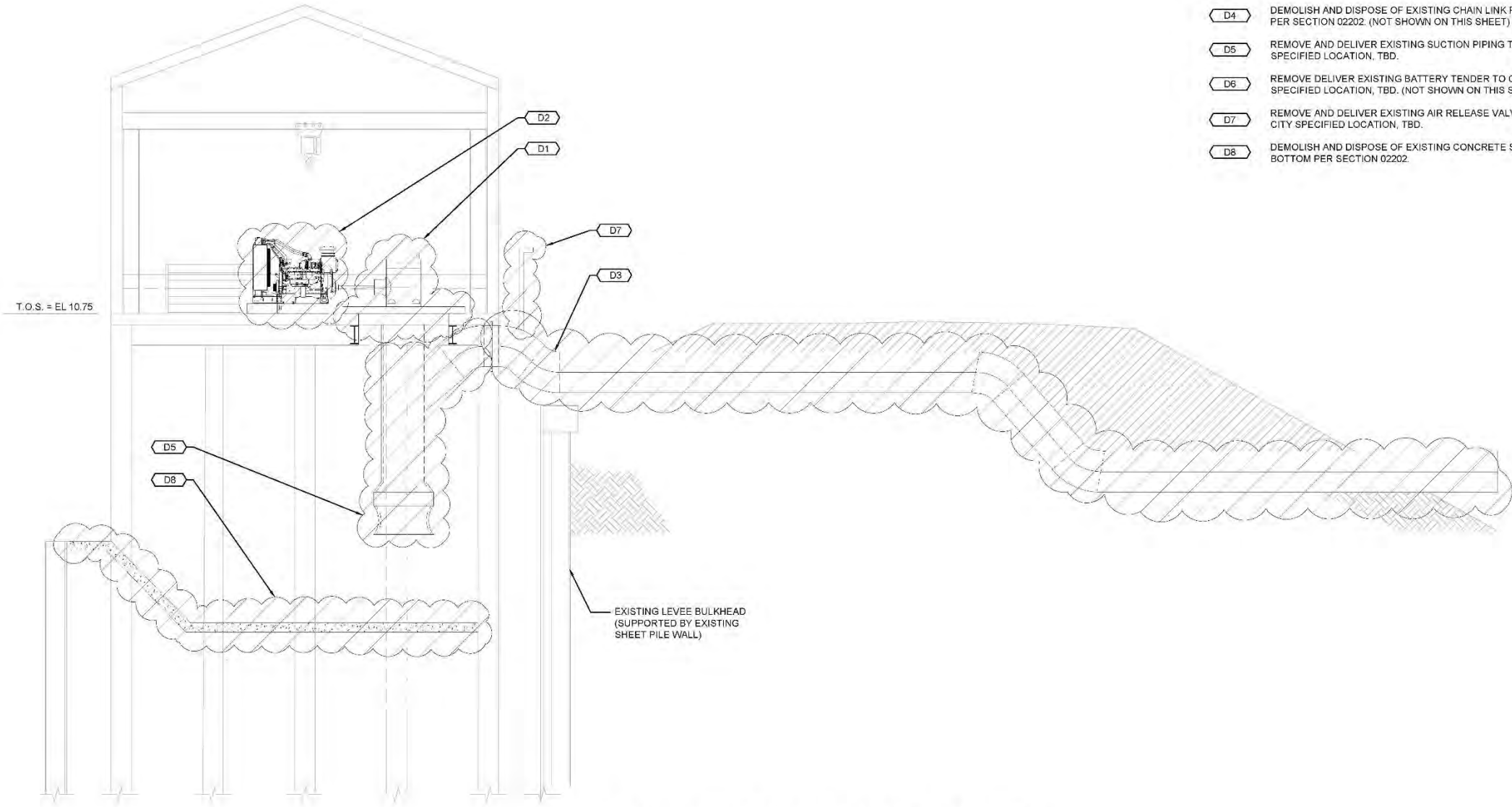
SHEET SET: 10 OF 29

LEGEND:

DEMOLISH AND DISPOSE OF AS INDICATED BELOW AND IN ACCORDANCE WITH SECTION 02202 - DEMOLITION AND REMOVAL.

SCOPE OF DEMOLITION:

- D1 REMOVE AND DELIVER EXISTING DIESEL DRIVEN FLOW PUMP AND BASE PLATE TO CITY SPECIFIED LOCATION, TBD.
- D2 REMOVE AND DELIVER EXISTING DIESEL DRIVE #3 TO CITY SPECIFIED LOCATION, TBD.
- D3 REMOVE AND DELIVER EXISTING 36" DISCHARGE PIPING TO CITY SPECIFIED LOCATION, TBD.
- D4 DEMOLISH AND DISPOSE OF EXISTING CHAIN LINK FENCE PER SECTION 02202. (NOT SHOWN ON THIS SHEET)
- D5 REMOVE AND DELIVER EXISTING SUCTION PIPING TO CITY SPECIFIED LOCATION, TBD.
- D6 REMOVE DELIVER EXISTING BATTERY TENDER TO CITY SPECIFIED LOCATION, TBD. (NOT SHOWN ON THIS SHEET)
- D7 REMOVE AND DELIVER EXISTING AIR RELEASE VALVE TO CITY SPECIFIED LOCATION, TBD.
- D8 DEMOLISH AND DISPOSE OF EXISTING CONCRETE SUMP BOTTOM PER SECTION 02202.



PUMP STATION DEMOLITION SECTION S1 (01–D1)

SCALE: 1/4" = 1'-0" (22" x 34" SHEET)

PRELIMINARY

NOT TO BE USED FOR CONSTRUCTION, BIDDING, RECORDATION, SALES OR AS THE BASIS FOR ISSUANCE OF A PERMIT

DAVID ALAN MARTIN, P.E. LICENSE NO. 37002 H. DAVIS COLE & ASSOCIATES

SUBMITTED BY: ANDRE R. CONTI E.I. PROJECT MANAGER LICENSE NO.

SUBMITTED BY: DAVID A. MARTIN, P.E. PRINCIPAL 37002 LICENSE NO.

H. Davis Cole & Associates, L.L.C. Consulting Engineers NEW ORLEANS, LA

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HDC PROJECT NO: 2018-05

CITY BARN DRAINAGE IMPROVEMENTS
SLIDELL LOUISIANA

CITY OF SLIDELL
P.O. BOX 828
SLIDELL, LA 70459

PUMP STATION DEMOLITION SECTION

SHEET ID: 01-D3

SHEET SET: 11 OF 29

LEGEND:

DEMOLISH AND DISPOSE OF AS INDICATED BELOW AND IN ACCORDANCE WITH SECTION 02202 - DEMOLITION AND REMOVAL.

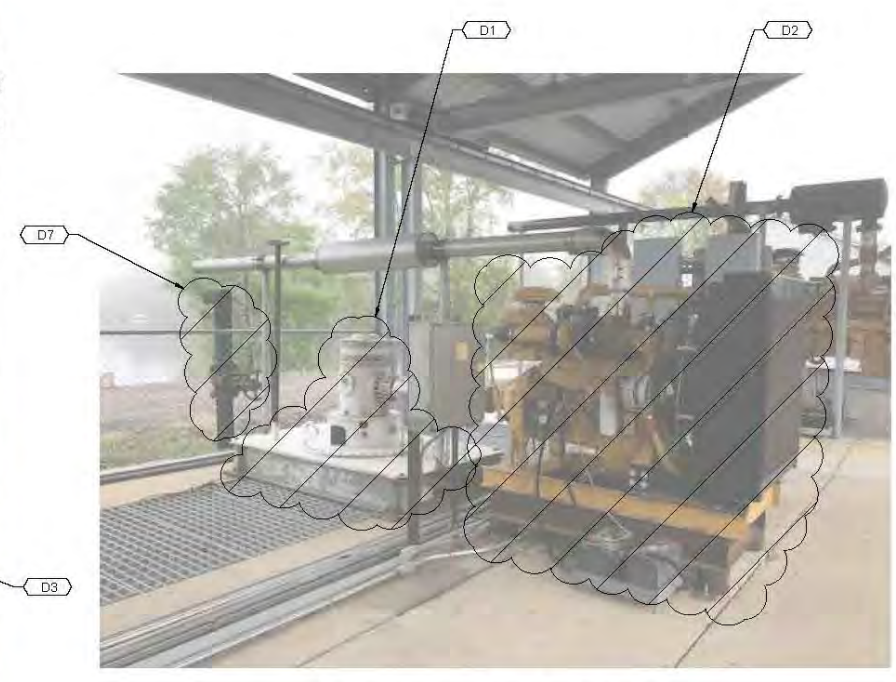
SCOPE OF DEMOLITION:

- D1 REMOVE AND DELIVER EXISTING DIESEL DRIVEN FLOW PUMP AND BASE PLATE TO CITY SPECIFIED LOCATION, TBD.
- D2 REMOVE AND DELIVER EXISTING DIESEL DRIVE #3 TO CITY SPECIFIED LOCATION, TBD.
- D3 REMOVE AND DELIVER EXISTING 36" DISCHARGE PIPING TO CITY SPECIFIED LOCATION, TBD.
- D4 DEMOLISH AND DISPOSE OF EXISTING CHAIN LINK FENCE PER SECTION 02202.
- D5 REMOVE AND DELIVER EXISTING SUCTION PIPING TO CITY SPECIFIED LOCATION, TBD.
- D6 REMOVE DELIVER EXISTING BATTERY TENDER TO CITY SPECIFIED LOCATION, TBD.
- D7 REMOVE AND DELIVER EXISTING AIR RELEASE VALVE TO CITY SPECIFIED LOCATION, TBD.
- D8 DEMOLISH AND DISPOSE OF EXISTING CONCRETE SUMP BOTTOM PER SECTION 02202. (NOT SHOWN ON THIS SHEET)

DEMOLITION PHOTO "D-01"
SCALE: N.T.S.

DEMOLITION PHOTO "D-03"
SCALE: N.T.S.

DEMOLITION PHOTO "D-02"
SCALE: N.T.S.



DEMOLITION PHOTO "D-04"
SCALE: N.T.S.

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DAVID ALAN MARTIN, P.E.
LICENSE NO. 37932
H. DAVIS COLE & ASSOCIATES

SUBMITTED BY: ANDRE R. FORD, E.I. PROJECT MANAGER — LICENSE NO. ----
SUBMITTED BY: DAVID A. MARTIN, P.E. PRINCIPAL — LICENSE NO. 37932

H. Davis Cole & Associates, LLC — NEW ORLEANS, LA

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REVISION RECORD

DESIGNED BY: ARF
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CHECKED BY: DAM
DATE: APRIL, 18
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HDC PROJECT NO.: 2018-05

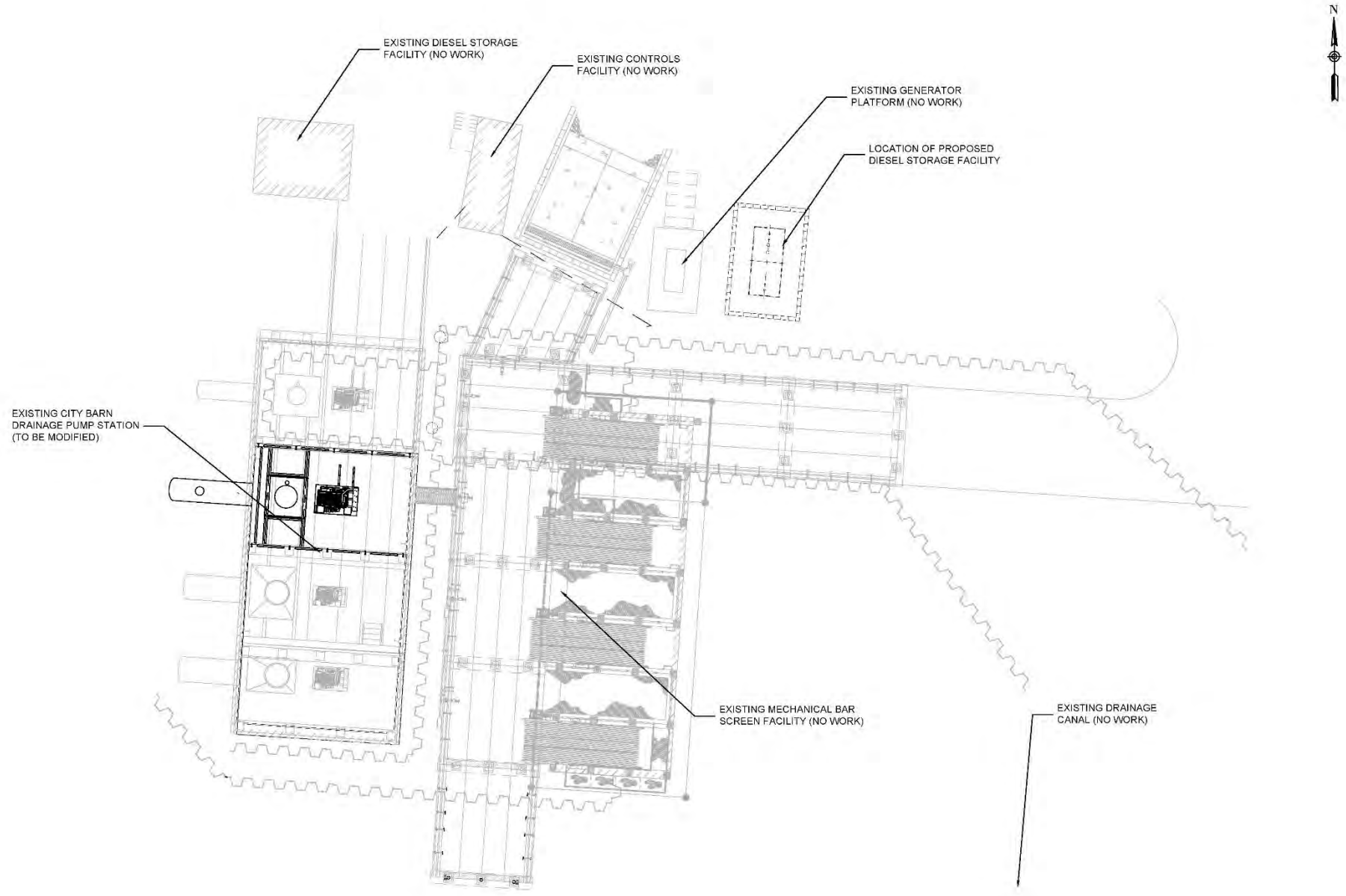
CITY BARN DRAINAGE IMPROVEMENTS
SLIDELL LOUISIANA

CITY OF SLIDELL
P.O. BOX 828
SLIDELL, LA 70459

DEMOLITION PHOTOS

SHEET ID
01-D4

SHEET SET
12 OF **29**



OVERALL SITE PLAN

SCALE: 1" = 10'-0" (22" x 34" SHEET)

PRELIMINARY

NOT TO BE USED FOR CONSTRUCTION, BIDDING, RECORDATION, SALES OR AS THE BASIS FOR ISSUANCE OF A PERMIT

DAVID ALAN MARTIN, P.E.
LICENSE NO. 37502
H. DAVIS COLE & ASSOCIATES

SUBMITTED BY: ANDREW P. CONTI, E.I. PROJECT MANAGER — LICENSE NO.

SUBMITTED BY: DAVID A. MARTIN, P.E. PRINCIPAL — 37502 LICENSE NO.

H. Davis Cole & Associates, LLC — Consulting Engineers — NEW ORLEANS, LA

90% SUBMITTAL

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	REVISION RECORD			

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HDC PROJECT NO.: 2018-05

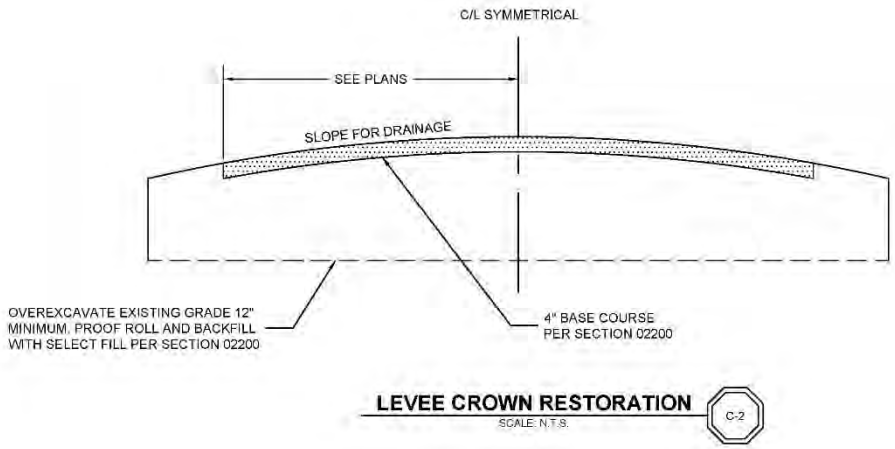
CITY BARN DRAINAGE IMPROVEMENTS
SLIDELL LOUISIANA

CITY OF SLIDELL
P.O. BOX 828
SLIDELL, LA 70459

OVERALL SITE PLAN

SHEET ID: C1

SHEET SET: 13 OF 29



LEVEE CROWN RESTORATION

SCALE: N.T.S.

C-2

PRELIMINARY

NOT TO BE USED FOR CONSTRUCTION, BIDDING, RECORDATION, SALES OR AS THE BASIS FOR ISSUANCE OF A PERMIT

DAVID ALAN MARTIN, P.E.
LICENSE NO. 37952
H. DAVIS COLE & ASSOCIATES

SUBMITTED BY:
ANDREW E. FOOD, E.I.
PROJECT MANAGER

LICENSE NO.

SUBMITTED BY:
DAVID A. MARTIN, P.E.
PRINCIPAL

37952
LICENSE NO.

H. Davis Cole & Associates, LLC
CIVIL & MUNICIPAL ENGINEERS

NEW ORLEANS, LA

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REVISION RECORD

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CHECKED BY: DAM

DATE: APRIL 18
DETAILED BY: MAS
HDC PROJECT NO: 2018-05

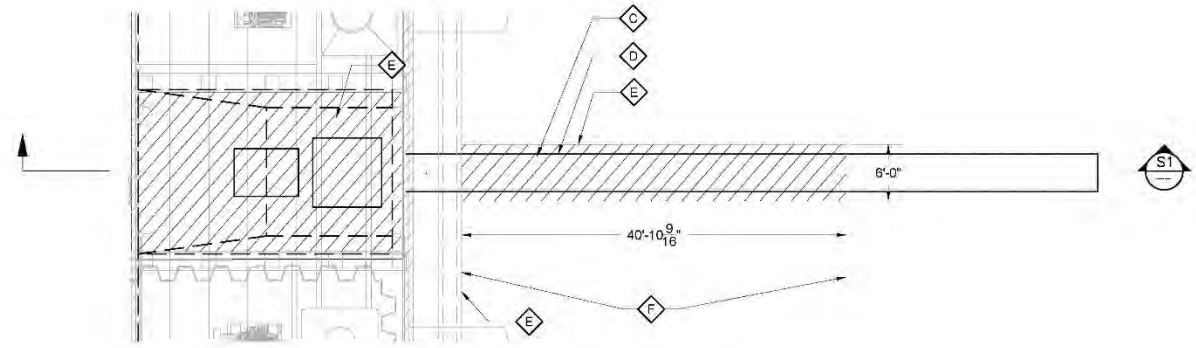
CITY BARN DRAINAGE IMPROVEMENTS
SLIDELL LOUISIANA

CITY OF SLIDELL
P.O. BOX 828
SLIDELL, LA 70459

CIVIL DETAILS

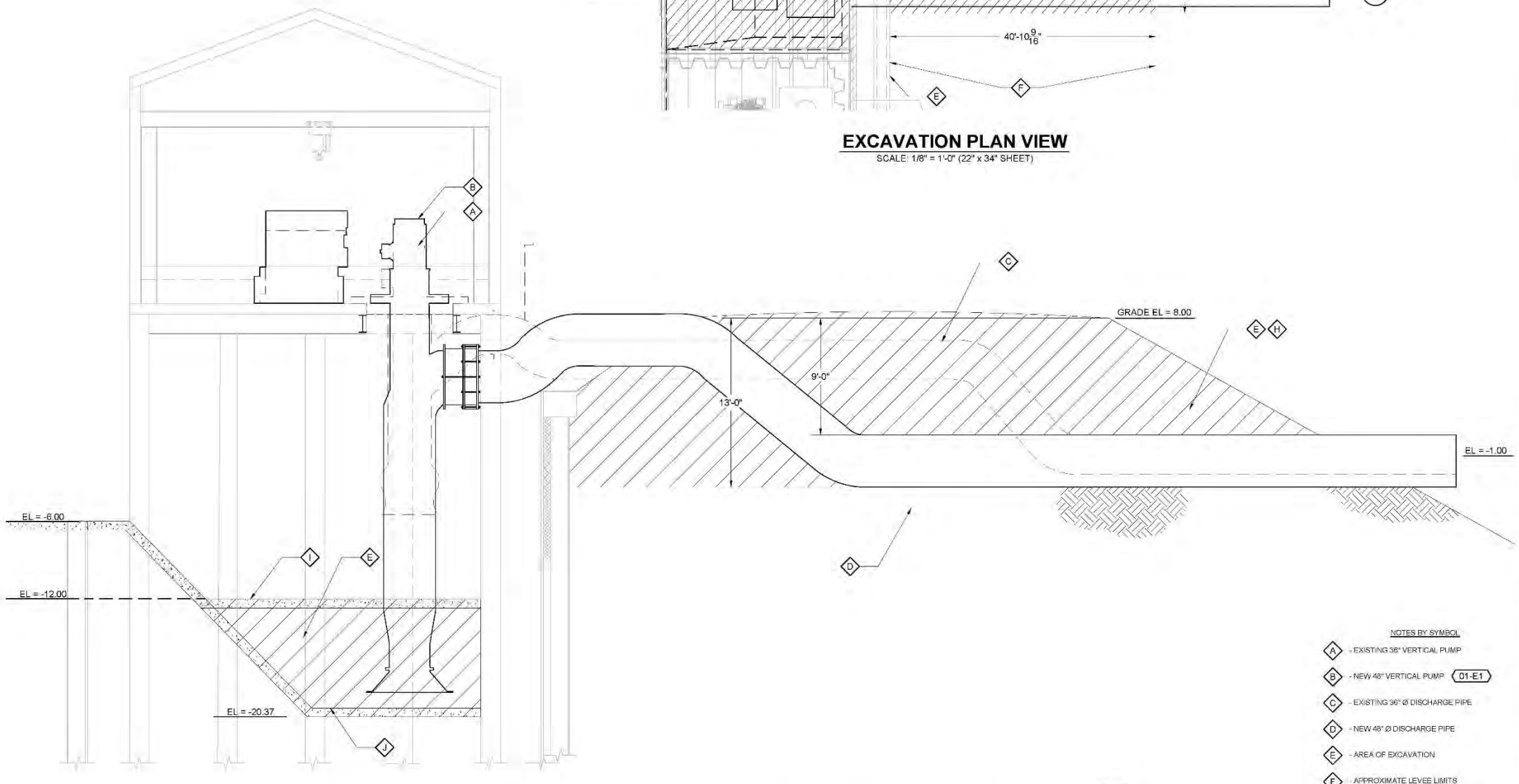
SHEET ID
C2

SHEET SET
14 OF 29



EXCAVATION PLAN VIEW

SCALE: 1/8" = 1'-0" (22" x 34" SHEET)



EXCAVATION SECTION

S1

SCALE: 1/4" = 1'-0" (22" x 34" SHEET)

LEGEND :

- AREA TO BE EXCAVATED
- EXISTING GROUND

NOTES BY SYMBOL

- A - EXISTING 36" VERTICAL PUMP
- B - NEW 48" VERTICAL PUMP (01-E1)
- C - EXISTING 36" Ø DISCHARGE PIPE
- D - NEW 48" Ø DISCHARGE PIPE
- E - AREA OF EXCAVATION
- F - APPROXIMATE LEVEE LIMITS
- G - EDGE OF EXISTING CAPSILL (LEVEE BULKHEAD)
- H - AREA OF BACKFILL
- I - EXISTING SUMP BOTTOM
- J - PROPOSED SUMP BOTTOM

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DAVID ALAN MARTIN, P.E.
LICENSE NO. 37502
H. DAVIS CALE & ASSOCIATES

SUBMITTED BY: ARDIS F. FORD, P.E. PROJECT MANAGER — LICENSE NO.

SUBMITTED BY: DAVID A. MARTIN, P.E. PRINCIPAL — 37502 LICENSE NO.

H. Davis Cole & Associates, L.C. — NEW ORLEANS, LA

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CITY BARN DRAINAGE IMPROVEMENTS
SLIDELL, LOUISIANA

CITY OF SLIDELL
P.O. BOX 828
SLIDELL, LA 70459

EXCAVATION PLAN & SECTION

SHEET ID
01-C1

SHEET SET
15 OF 29

VALVE TABLE

VALVE DESIGNATION	DESCRIPTION	AREA	QUANTITY	DIAMETER	SPECIFICATIONS SECTION
01-ARV-01	COMBINATION AIR RELEASE VALVE	CITY BARN DPS	1	12"	15200

NOTES:

1. SEE SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.

EQUIPMENT TABLE

EQUIPMENT DESIGNATION	DESCRIPTION	AREA	QUANTITY	SPECIFICATIONS SECTION	REMARKS
01-E1	DIESEL DRIVEN MIXED FLOW PUMP	CITY BARN DPS	1	11121	SEE THIS PUMP DATA TABLE, THIS PAGE

PUMP DATA TABLE

(TABLE TO BE POPULATED PRIOR TO NEXT SUBMITTAL)

EQUIPMENT ID	01 - E1
AREA	CITY BARN DPS
QUANTITY REQUIRED	1
PUMP TYPE	DIESEL DRIVEN MIXED FLOW
DUTY	CONTINUOUS
DRIVE	DIESEL
MAX SIZE SPHERES TO PASS, INCHES	TBD
SUMP CLASSIFICATION IN ACCORDANCE WITH NATIONAL ELECTRIC CODE	TBD
POWER SUPPLY	TBD
MAXIMUM SHUTOFF HEAD, FEET	TBD
FLOW CAPACITY, GPM (PER PUMP) PRIMARY OPERATING POINT	TBD
FLOW PUMP HEAD, FEET, PRIMARY OPERATING POINT	TBD
DESIGN FLOW PUMP EFFICIENCY MIN. PERCENT	TBD
FLOW CAPACITY, GPM (PER PUMP) SECONDARY OPERATING POINT	TBD
FLOW PUMP HEAD, FEET, SECONDARY OPERATING POINT	TBD
MINIMUM RUN OUT FLOW PUMP CAPACITY, GPM	TBD
MAX MOTOR SPEED, RPM	TBD
MINIMUM MOTOR SIZE, HP	TBD
SPECIFICATIONS SECTION	11121

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DAVID ALAN MARTIN, P.E. LICENSE NO. 37952 H. DAVIS COLE & ASSOCIATES

SUBMITTED BY: ANDREA E. FOOD, E.I. PROJECT MANAGER — LICENSE NO.

SUBMITTED BY: DAVID A. MARTIN, P.E. PRINCIPAL — LICENSE NO. 37952

H. Davis Cole & Associates, LLC — NEW ORLEANS, LA

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CITY BARN DRAINAGE IMPROVEMENTS — SLIDELL, LOUISIANA

CITY OF SLIDELL
P.O. BOX 828
SLIDELL, LA 70459

EQUIPMENT DATA TABLES

SHEET ID: M1

SHEET SET: 16 OF 29

THIS SHEET TO BE GENERATED PRIOR TO NEXT SUBMITTAL

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(Mass from ISSUANCE OF A PERMIT)

DAVID ALAN MARTIN, P.E.
LICENSE NO. 37002
H. DAVIS COLE & ASSOCIATES

SUBMITTED BY:
ARMEE FORTE, E.I.
PROJECT MANAGER
LICENSE NO.

SUBMITTED BY:
DAVID A. MARTIN, P.E.
PRINCIPAL
37002
LICENSE NO.

H. Davis Cole & Associates, LLC
CIVIL ENGINEERING
NEW ORLEANS, LA

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CITY BARN DRAINAGE IMPROVEMENTS
SLIDELL LOUISIANA

CITY OF SLIDELL
P.O. BOX 828
SLIDELL, LA 70459

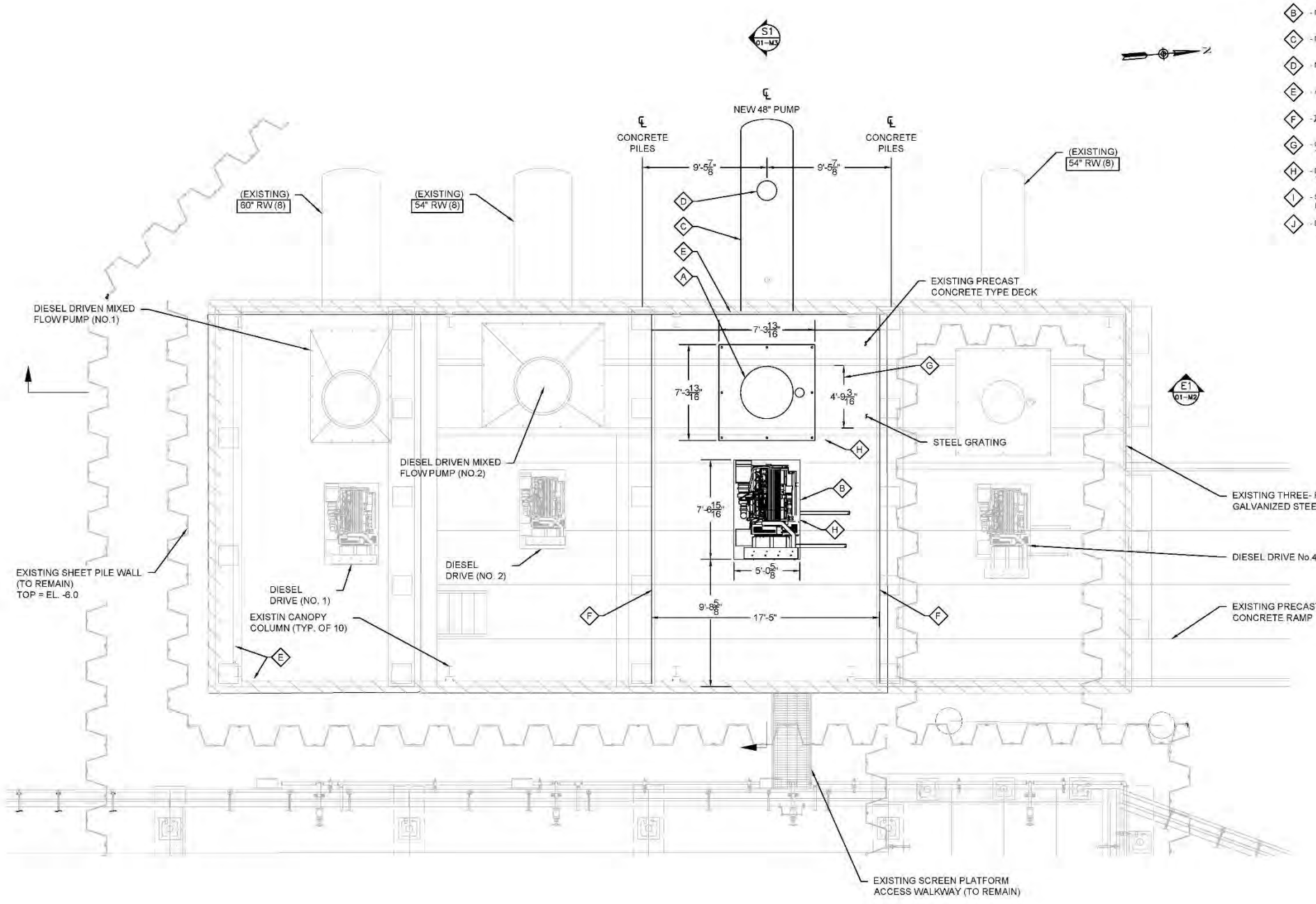
MECHANICAL DETAILS

SHEET ID
M2

SHEET SET
17 OF 29

NOTES BY SYMBOL

- A - NEW 48" VERTICAL PUMP (01-E1)
- B - NEW DIESEL DRIVE UNIT
- C - NEW 48" Ø DISCHARGE PIPE
- D - NEW 12" AIR RELEASE VALVE
- E - ALUMINUM HANDRAIL PER SECTION 05500
- F - ½" SS PLATE PUMP BAY WALLS
- G - CONTRACTOR TO TRIM EXISTING GRATING TO FIT NEW PUMP (IF REQUIRED)
- H - DIMENSIONS ARE PRELIMINARY TO BE VERIFIED PRIOR TO FINAL DESIGN
- I - STRUCTURAL COMPONENTS (NEW) DESCRIBED IN STRUCTURAL SHEETS
- J - DISMANTLING JOINT



PUMP STATION MECHANICAL PLAN

SCALE: 1/4" = 1'-0" (22" x 34" SHEET)

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DAVID ALAN MARTIN, P.E. LICENSE NO. 37502
H. DAVIS COLE & ASSOCIATES

SUBMITTED BY: ARMEE R. KNAGEL, P.E. PROJECT MANAGER LICENSE NO.

SUBMITTED BY: DAVID A. MARTIN, P.E. PRINCIPAL 37502 LICENSE NO.

H. Davis Cole & Associates, LLC Consulting Engineers NEW ORLEANS, LA

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CITY BARN DRAINAGE IMPROVEMENTS
SLIDELL LOUISIANA

CITY OF SLIDELL
P.O. BOX 828
SLIDELL, LA 70459

PUMP STATION MECHANICAL PLAN

SHEET ID: 01-M1
SHEET SET: 18 OF 29

NOTES BY SYMBOL

- A - NEW 48" VERTICAL PUMP (01-E1)
- B - NEW DIESEL DRIVE UNIT
- C - NEW 48" Ø DISCHARGE PIPE
- D - NEW 12" AIR RELEASE VALVE
- E - ALUMINUM HANDRAIL PER SECTION 05500
- F - ½" SS PLATE PUMP BAY WALLS
- G - CONTRACTOR TO TRIM EXISTING GRATING TO FIT NEW PUMP (IF REQUIRED)
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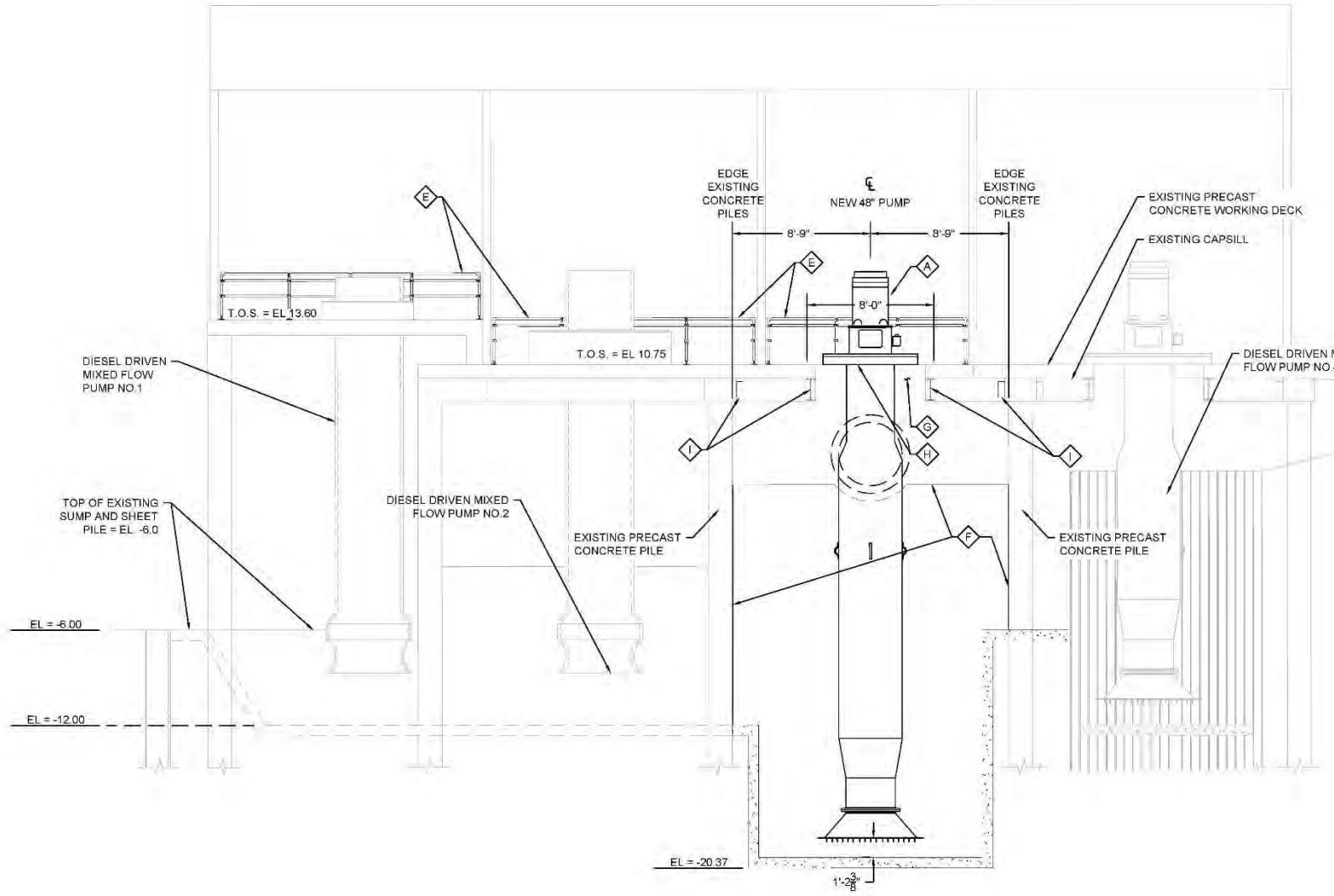
- J - DISMANTLING JOINT



PUMP STATION MECHANICAL ELEVATION (E1 / 01-M1)

SCALE: 1/4" = 1'-0" (22" x 34" SHEET)

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DAVID ALAN MARTIN, P.E. LICENSE NO. 37002 H. DAVIS COLE & ASSOCIATES

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H. Davis Cole & Associates, LLC Consultants — NEW ORLEANS, LA

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CITY BARN DRAINAGE IMPROVEMENTS — SLIDELL, LOUISIANA

CITY OF SLIDELL
P.O. BOX 828
SLIDELL, LA 70459

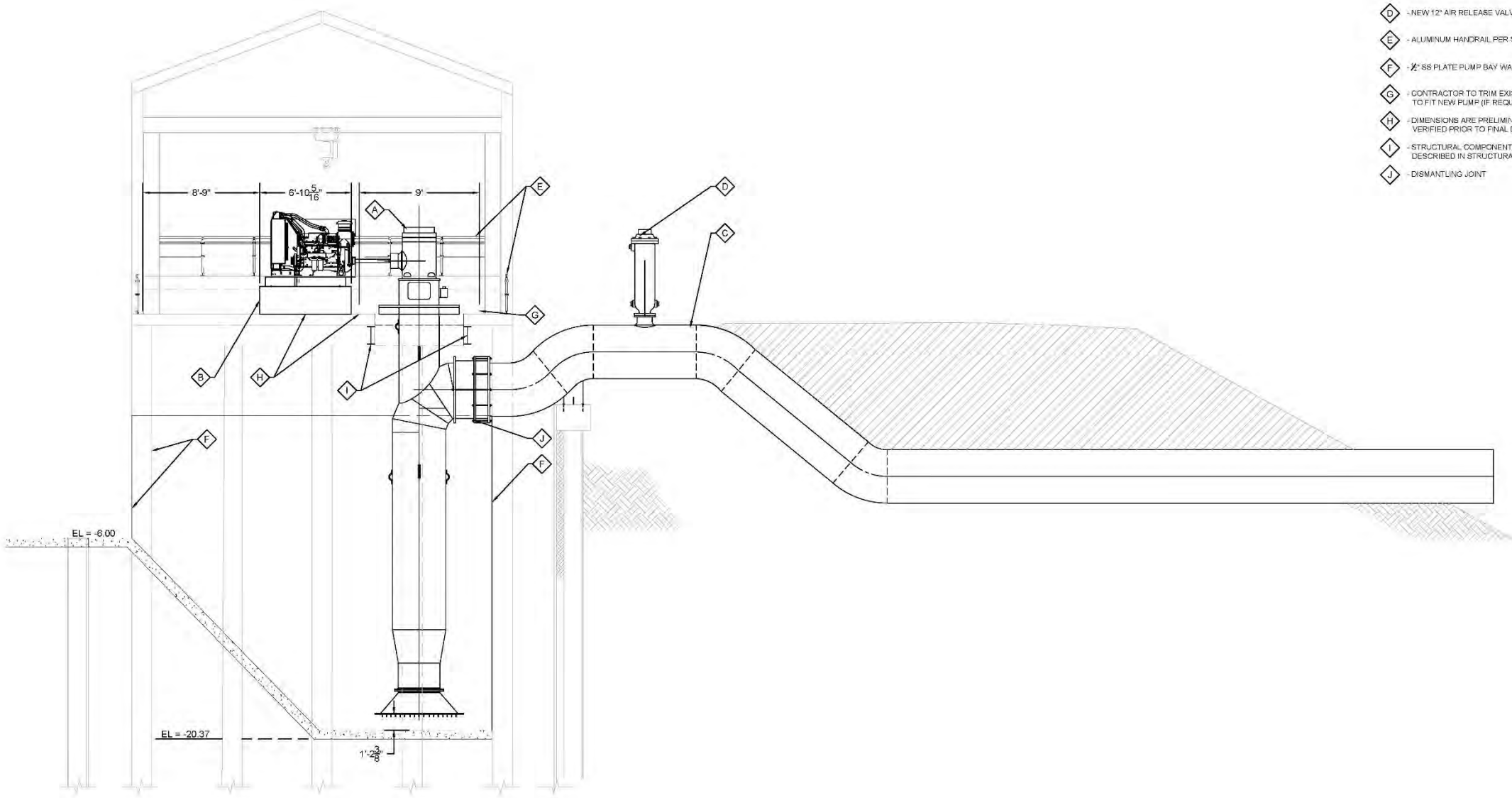
PUMP STATION MECHANICAL ELEVATION

SHEET ID: 01-M2

SHEET SET: 19 OF 29

NOTES BY SYMBOL

- A - NEW 48" VERTICAL PUMP (01-E1)
- B - NEW DIESEL DRIVE UNIT
- C - NEW 48" Ø DISCHARGE PIPE
- D - NEW 12" AIR RELEASE VALVE
- E - ALUMINUM HANDRAIL PER SECTION 05500
- F - ½" SS PLATE PUMP BAY WALLS
- G - CONTRACTOR TO TRIM EXISTING GRATING TO FIT NEW PUMP (IF REQUIRED)
- H - DIMENSIONS ARE PRELIMINARY TO BE VERIFIED PRIOR TO FINAL DESIGN
- I - STRUCTURAL COMPONENTS (NEW) DESCRIBED IN STRUCTURAL SHEETS
- J - DISMANTLING JOINT



PUMP STATION MECHANICAL SECTION

SCALE: 1/4" = 1'-0"

S1 / 01-M1

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DAVID ALAN MARTIN, P.E.
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H. DAVIS COLE & ASSOCIATES

SUBMITTED BY:
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PROJECT MANAGER
LICENSE NO.

SUBMITTED BY:
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37002
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H. Davis Cole & Associates, LLC
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NEW ORLEANS, LA

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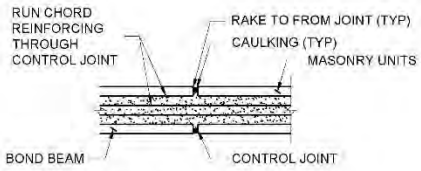
CITY BARN DRAINAGE IMPROVEMENTS
SLIDELL LOUISIANA

CITY OF SLIDELL
P.O. BOX 828
SLIDELL, LA 70459

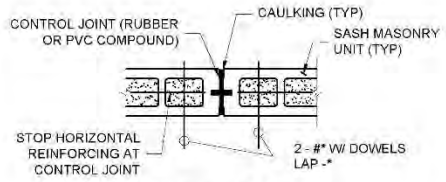
PUMP STATION MECHANICAL SECTION

SHEET ID
01-M3

SHEET SET
20 OF 29

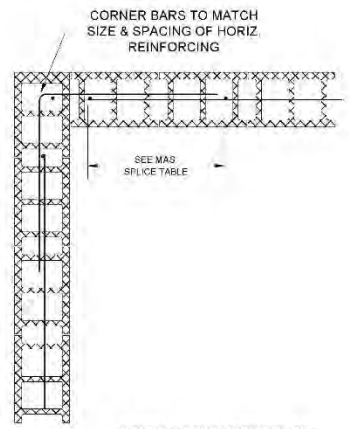


CONTROL JOINT AT BOND BEAM



CONTROL JOINT AT WALL

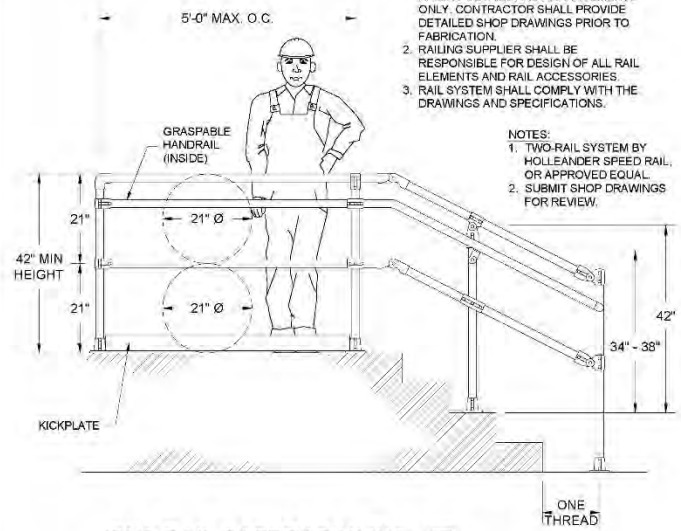
MASONRY CONTROL JOINTS
NOT TO SCALE — S-430



SINGLE LAYER REINFORCING

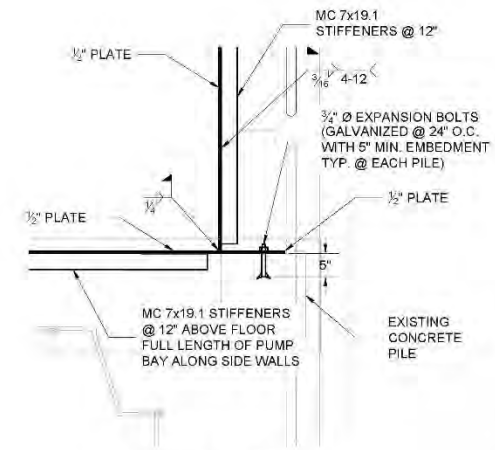
TYPICAL MASONRY WALL REINF. DETAILS
NOT TO SCALE — S-704

NOTES:
1. THIS DRAWING IS A GENERAL ASSEMBLY DRAWING SHOWING TYPICAL RAILING DETAILS AND ARRANGEMENTS ONLY. CONTRACTOR SHALL PROVIDE DETAILED SHOP DRAWINGS PRIOR TO FABRICATION.
2. RAILING SUPPLIER SHALL BE RESPONSIBLE FOR DESIGN OF ALL RAIL ELEMENTS AND RAIL ACCESSORIES.
3. RAIL SYSTEM SHALL COMPLY WITH THE DRAWINGS AND SPECIFICATIONS.

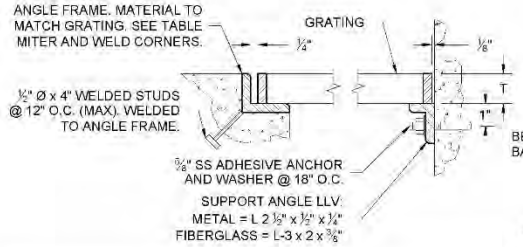


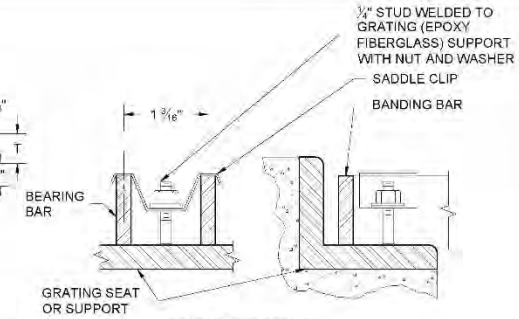
NOTES:
1. TWO-RAIL SYSTEM BY HOLLEANDER SPEED RAIL, OR APPROVED EQUAL.
2. SUBMIT SHOP DRAWINGS FOR REVIEW.

TWO-RAIL SAFETY RAILING
NOT TO SCALE — S-615



DETAIL
SCALE: 3/4" = 1'-0" — 1 / 01-S1

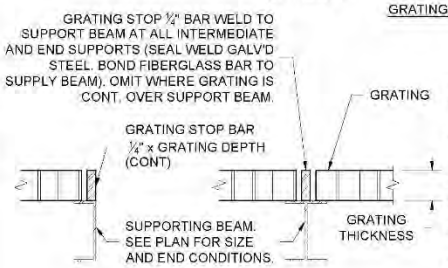




GRATING CLIP DETAIL

GRATING FRAME TABLE SIZED TO MATCH GRATING (FOR FIBERGLASS USE CONTINUOUS PURTRUDED FIBERGLASS SEAT & ANCHOR)	
GRATING DEPTH T	FRAME ANGLE (STEEL)
1"	1 ¾ x 1 ½ x ¼ (1 ¼ x 1 ½ x ¾)
1 ¼"	2 x 1 ½ x ¼ (1 ½ x 1 ½ x ¼)
1 1/2"	1 ¾ x 1 ¾ x ¼
1 ¾"	2 x 2 x ¼
2"	*2 ½ x 2 ½ x ½
2 ¼"	2 ½ x 2 ½ x ¼
2 ½"	3 x 3 x ½

* OR USE 2 ½" X 2 ½" ¼" WITH ½" SHIM PLATE WELDED TO BOTTOM.



GRATING STOP DETAIL

GRATING
NOT TO SCALE — S-501

NOTES:
1. UNLESS INDICATED OTHERWISE, ALL GRATING SHALL BE ALUMINUM.
2. GRATING DEPTH TO BE DETERMINED BY MANUFACTURER AND APPROVED BY ENGINEER (UNO)
3. ALL ENDS AND OPENINGS SHALL BE BANDED.
4. WEIGHT OF GRATING SECTION SHALL NOT EXCEED 80 LBS.
5. METAL BEARING BARS SHALL BE DEPTH T X 3/16" AT 1 3/16" O.C., CROSS BARS SHALL BE AT 4" O.C.
6. PROVIDE A MINIMUM OF 4 PANEL CLIPS PER GRATING PANEL, APPROX. 4" FROM PANEL CORNERS. MAXIMUM CLIP SPACING AT 36" O.C.
7. MATERIALS:
   A. ALUMINUM GRATING - USE ALUMINUM ANGLE SUPPORTS AND STAINLESS STEEL BOLTS AND CLIPS.
   B. GALVANIZED STEEL GRATING - USE STEEL ANGLE SUPPORTS, BOLTS, AND CLIPS. GALVANIZED AFTER FABRICATION.
   C. STAINLESS STEEL GRATING - USE STAINLESS STEEL ANGLE SUPPORTS, BOLTS AND CLIPS.
   D.FIBERGLASS GRATING - USE FIBERGLASS FOR ALL COMPONENTS, EXCEPT DRILLED ANCHORS; ALL CUT EDGES SHALL BE SEALED WITH RESIN. BONDING: USE EPOXY ADHESIVE BONDING AGENT.

PRELIMINARY
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DAVID ALAN MARTIN, P.E. LICENSE NO. 37002 H. DAVIS COLE & ASSOCIATES

SUBMITTED BY: ARMEE T. CONRAD, EI PROJECT MANAGER — LICENSE NO.

SUBMITTED BY: DAVID A. MARTIN, P.E. PRINCIPAL — 37002 LICENSE NO.

H. Davis Cole & Associates, LLC — NEW ORLEANS, LA

90% SUBMITTAL
NOT FOR CONSTRUCTION

MARK	DESCRIPTION	DATE	BY	CHKD
	REVISION RECORD			

DESIGNED BY: ARF
DRAWN BY: ARF
CHECKED BY: DAM
DATE: APRIL, 18
DETAILED BY: MAS
HDC PROJECT NO: 2018-05

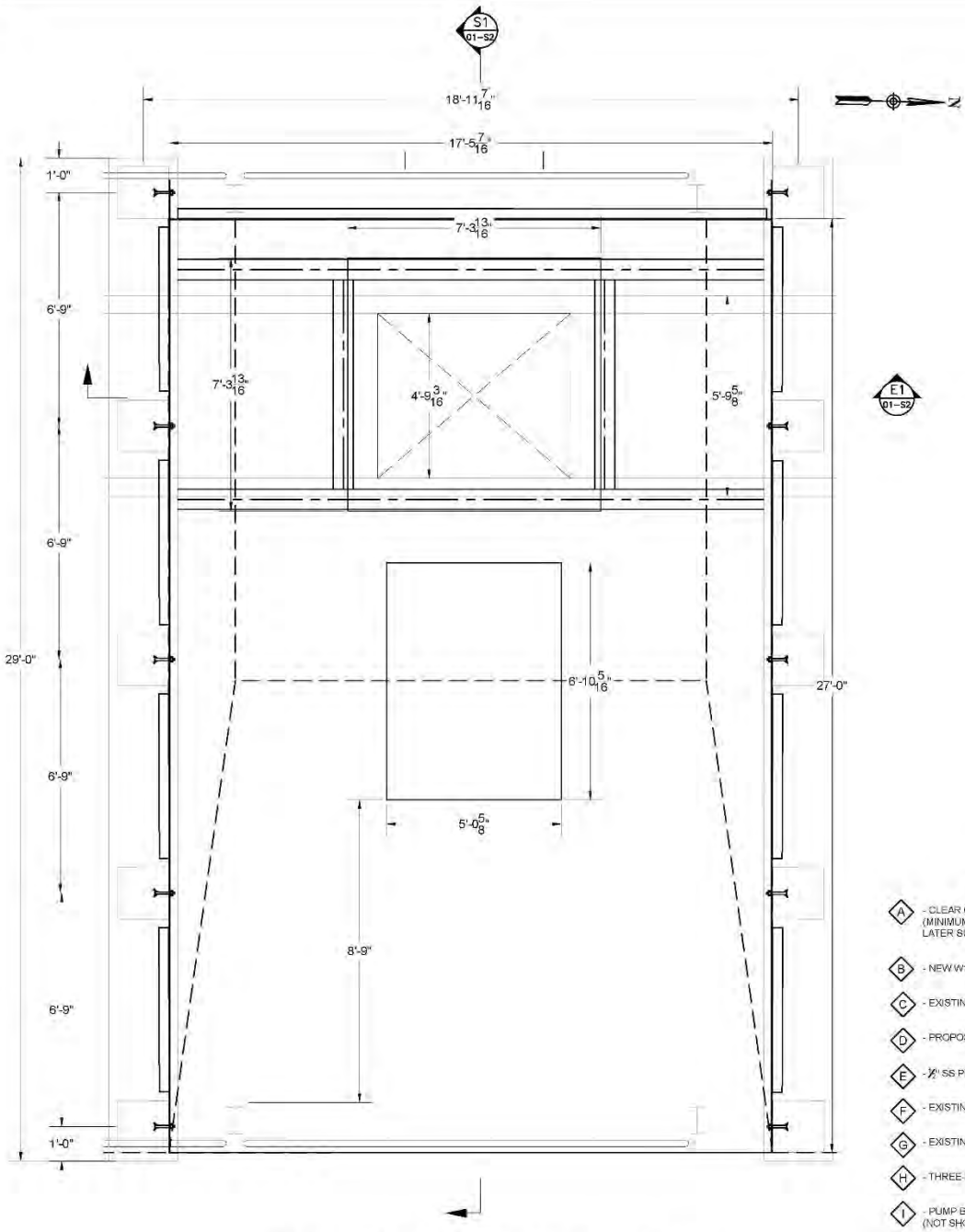
CITY BARN DRAINAGE IMPROVEMENTS
SLIDELL LOUISIANA

CITY OF SLIDELL
P.O. BOX 828
SLIDELL, LA 70459

STRUCTURAL DETAILS

SHEET ID: S1

SHEET SET: 21 OF 29

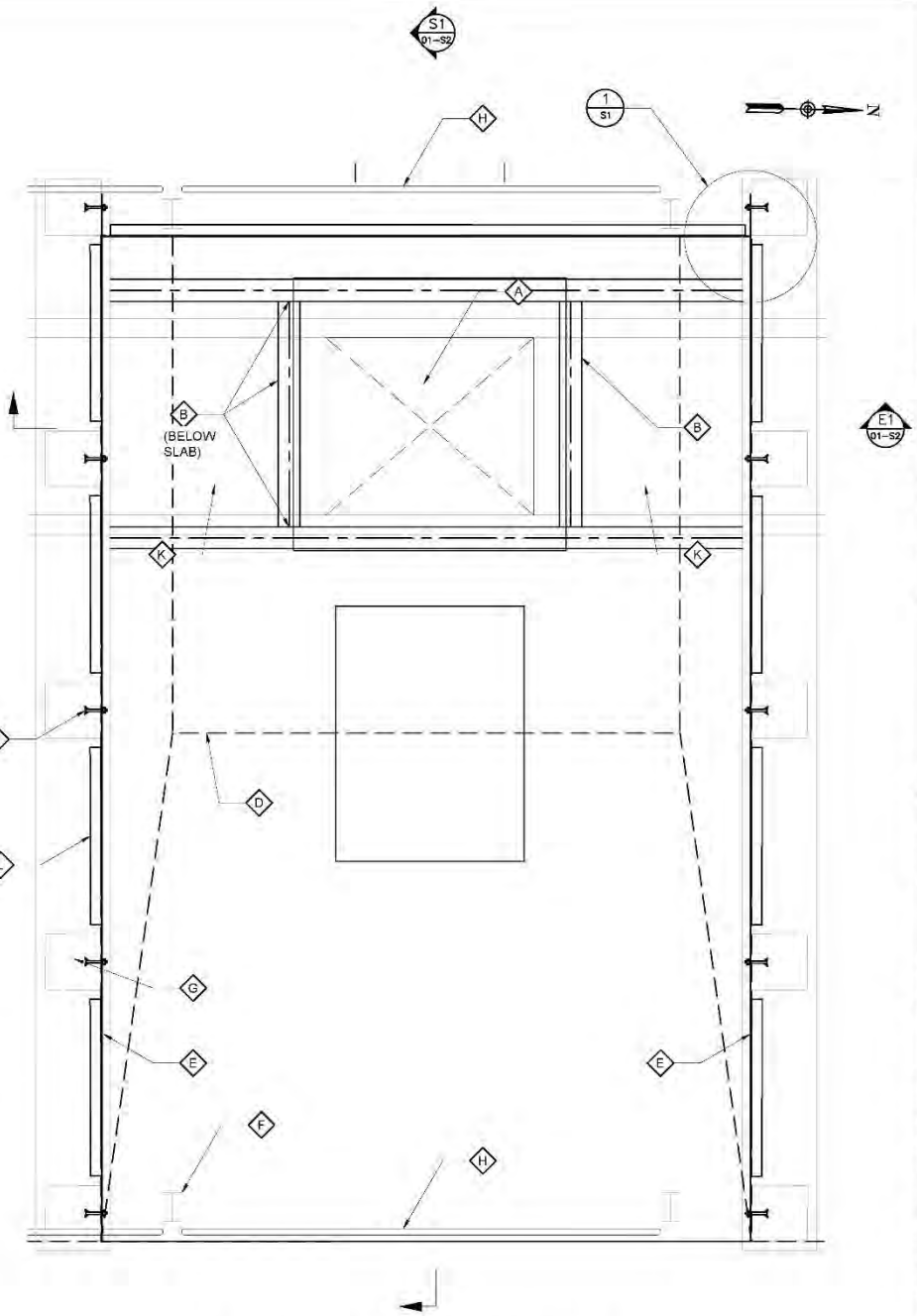


PUMP STATION STRUCTURAL PLAN

SCALE: 1/2" = 1'-0" (22" x 34" SHEET)

NOTES BY SYMBOL

- A - CLEAR OPENING AS PER PUMP MANUFACTURER (MINIMUM DIMENSIONS SHOWN, TO BE VERIFIED IN LATER SUBMITTALS)
- B - NEW W16x40 SUPPORT BEAM
- C - EXISTING SUMP BOTTOM (NOT SHOWN THIS SHEET)
- D - PROPOSED SUMP BOTTOM
- E - ½" SS PLATE PUMP BAY WALLS
- F - EXISTING STRUCTURAL STEEL FRAME
- G - EXISTING PRECAST CONCRETE PILE
- H - THREE-RAIL SAFETY RAILING PER DETAIL S-515
- I - PUMP BASE DESIGN PER PUMP MANUFACTURER (NOT SHOWN THIS SHEET)
- J - EXISTING BRIDGE CRANE(NOT SHOWN THIS SHEET)
- K - EXISTING GRATING TO BE TRIMMED BY CONTRACTOR TO FIT NEW PUMP (IF REQUIRED)
- L - MC 7x19.1 STIFFENERS @ 12" ABOVE FLOOR FULL LENGTH OF PUMP BAY ALONG SIDE WALLS
- M - ¾" Ø EXPANSION BOLTS (GALVANIZED @ 24" O.C. WITH 5" MIN. EMBEDMENT TYP. @ EACH PILE)



PUMP STATION STRUCTURAL PLAN

SCALE: 1/2" = 1'-0" (22" x 34" SHEET)

PRELIMINARY

NOT TO BE USED FOR CONSTRUCTION
BIDDING RECORDATION, SALES OR AS THE BASIS FOR ISSUANCE OF A PERMIT

DAVID ALAN MARTIN, P.E.
LICENSE NO. 37852
H. DAVIS COLE & ASSOCIATES

SUBMITTED BY:
ANDREA FORNEL
PROJECT MANAGER
LICENSE NO.

SUBMITTED BY:
DAVID A. MARTIN, P.E.
PRINCIPAL
37852
LICENSE NO.

HDC
H. Davis Cole & Associates, LLC
CIVIL & MUNICIPAL ENGINEERS
NEW ORLEANS, LA

90% SUBMITTAL
NOT FOR CONSTRUCTION

MARK	DESCRIPTION	DATE	BY	CHKD
	REVISION RECORD			

DESIGNED BY: ARF
DRAWN BY: ARF
CHECKED BY: DAM
DATE: APRIL, 18
DETAILED BY: MAS
HDC PROJECT NO: 2018-05

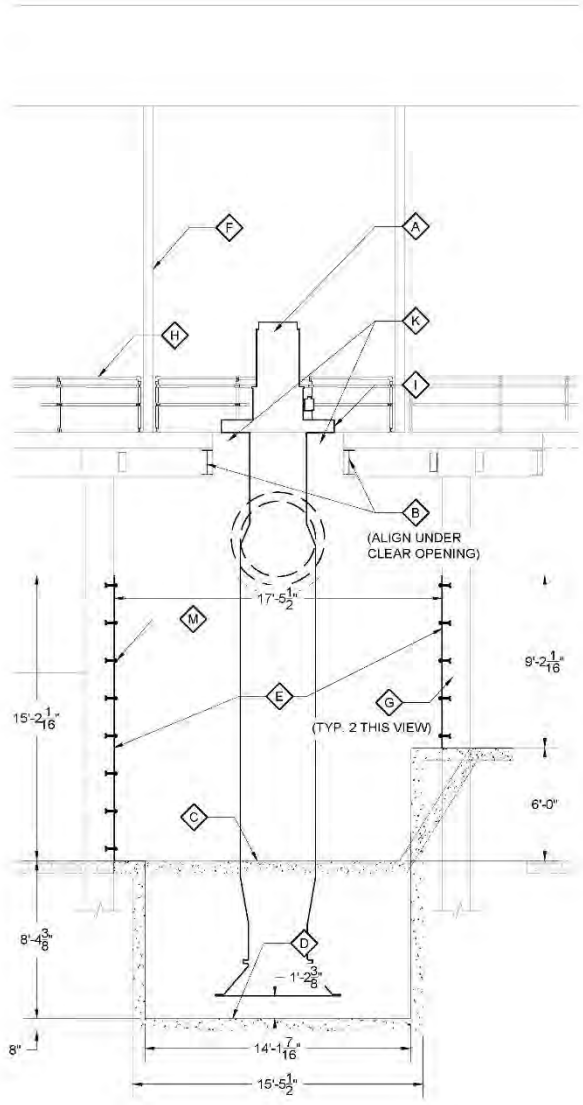
CITY BARN DRAINAGE IMPROVEMENTS
SLIDELL LOUISIANA

CITY OF SLIDELL
P.O. BOX 828
SLIDELL, LA 70459

PUMP STATION STRUCTURAL PLAN, ELEVATION, & SECTION

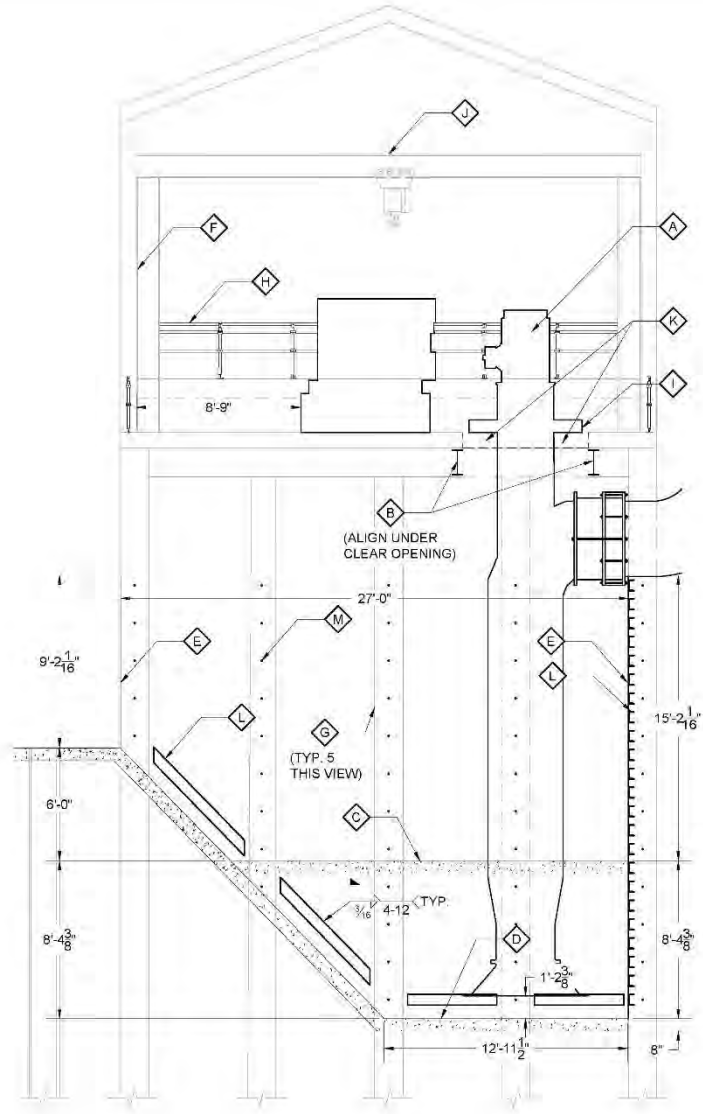
SHEET ID
01-S1

SHEET SET
22 OF **29**



PUMP STATION STRUCTURAL ELEVATION (E1, 01-S1)

SCALE: 1/4" = 1'-0" (22" x 34" SHEET)



PUMP STATION STRUCTURAL SECTION (S1, 01-S1)

SCALE: 1/4" = 1'-0" (22" x 34" SHEET)

NOTES BY SYMBOL

- A - CLEAR OPENING AS PER PUMP MANUFACTURER (MINIMUM DIMENSIONS SHOWN, TO BE VERIFIED IN LATER SUBMITTALS)
- B - NEW W16x40 SUPPORT BEAM
- C - EXISTING SUMP BOTTOM
- D - PROPOSED SUMP BOTTOM
- E - ¼" SS PLATE PUMP BAY WALLS
- F - EXISTING STRUCTURAL STEEL FRAME
- G - EXISTING PRECAST CONCRETE PILE
- H - THREE RAIL SAFETY RAILING PER DETAIL S-515
- I - PUMP BASE DESIGN PER PUMP MANUFACTURER
- J - EXISTING BRIDGE CRANE
- K - EXISTING GRATING TO BE TRIMMED BY CONTRACTOR TO FIT NEW PUMP (IF REQUIRED)
- L - MC 7x19.1 STIFFENERS @ 12" ABOVE FLOOR FULL LENGTH OF PUMP BAY ALONG SIDE WALLS
- M - ¾" Ø EXPANSION BOLTS (GALVANIZED @ 24" O.C. WITH 5" MIN. EMBEDMENT TYP. @ EACH PILE)

PRELIMINARY

NOT TO BE USED FOR CONSTRUCTION BIDDING, RECORDATION, SALES OR AS THE BASIS FOR ISSUANCE OF A PERMIT

DAVID ALAN MARTIN, P.E.
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H. DAVIS COLE & ASSOCIATES

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ANDREA E. FORD, E.I.
PROJECT MANAGER
LICENSE NO.

SUBMITTED BY:
DAVID A. MARTIN, P.E.
PRINCIPAL
37852
LICENSE NO.

H. Davis Cole & Associates, LLC
NEW ORLEANS, LA

90% SUBMITTAL
NOT FOR CONSTRUCTION

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	REVISION RECORD			

DESIGNED BY: ARF
DRAWN BY: ARF
CHECKED BY: DAM
DATE: APRIL 18
DETAILED BY: MAS
HDC PROJECT NO: 2018-05

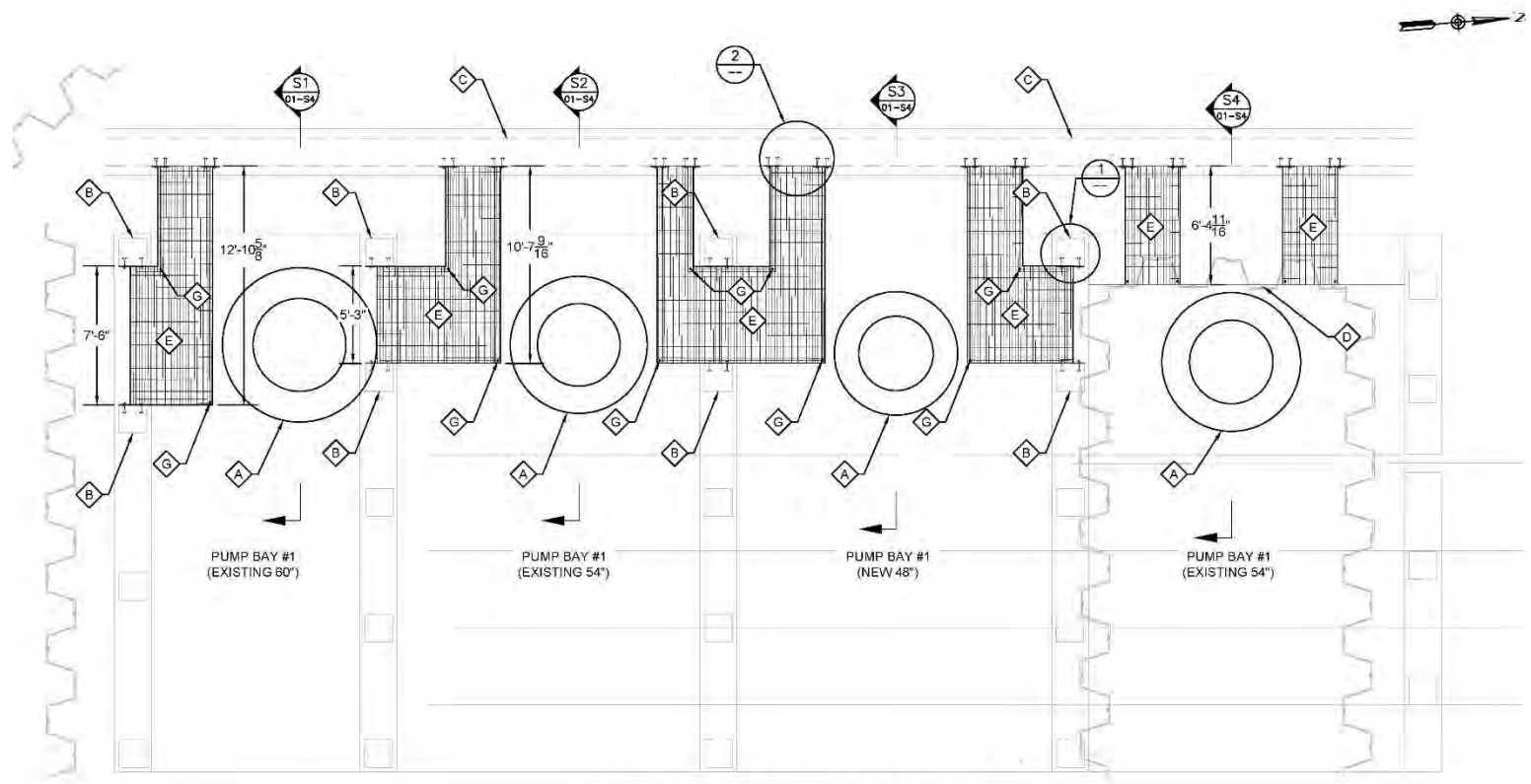
CITY BARN DRAINAGE IMPROVEMENTS
SLIDELL LOUISIANA

CITY OF SLIDELL
P.O. BOX 828
SLIDELL, LA 70459

PUMP STATION STRUCTURAL ELEVATION & SECTION

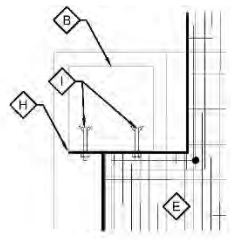
SHEET ID
01-S2

SHEET SET
23 OF **29**



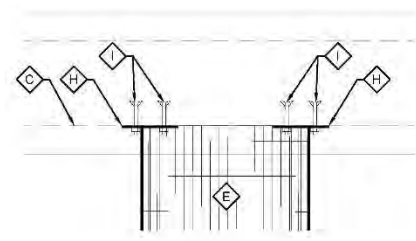
CATWALK STRUCTURAL PLAN

SCALE: 1/4" = 1'-0" (22" x 34" SHEET)



TYP. CONNECTION @ PILE 1/--

SCALE: 3/4" = 1'-0" (22" x 34" SHEET)



TYP. CONNECTION @ EXISTING BULKHEAD 2/--

SCALE: 3/4" = 1'-0" (22" x 34" SHEET)

NOTES BY SYMBOL :

- A - EXISTING PUMP SUCTION BELL (ESTIMATED)
- B - EXISTING PRECAST CONCRETE PILE
- C - EXISTING BULKHEAD
- D - EXISTING SS PLATE PUMP BAY WALL
- E - PROPOSED GRATING (SIZE TBD)
- F - W8x10 CATWALK SUPPORT BEAM (TYPICAL BENEATH PERIMETER OF GRATING) (NOT CALLED OUT FOR CLARITY)
- G - TENSION CABLE (SIZE TBD) CONNECTED TO TOP SLAB
- H - ½" SS PLATE CONNECTED TO EXISTING PILE (WIDTH OF PILE)/BULKHEAD (12" WIDTH)
- I - ½" Ø GALVANIZED EXPANSION BOLTS, 5" MIN. EMBEDMENT TYP. @ EACH PILE
- J - ½" TOE PLATE (TYPICAL ABOVE PERIMETER OF GRATING) (NOT CALLED OUT FOR CLARITY)

PRELIMINARY

NOT TO BE USED FOR CONSTRUCTION, BIDDING, RECORDATION, SALES OR AS THE BASIS FOR ISSUANCE OF A PERMIT

DAVID ALAN MARTIN, P.E.
LICENSE NO. 37502
H. DAVIS COLE & ASSOCIATES

SUBMITTED BY:
ANDRE R. CONTI, E.I.
PROJECT MANAGER
LICENSE NO.

SUBMITTED BY:
DAVID A. MARTIN, P.E.
PRINCIPAL
37502
LICENSE NO.

HDC
H. Davis Cole & Associates, LLC
CONSULTANTS
NEW ORLEANS, LA

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CHECKED BY: DAM
DATE: APRIL, 18
DETAILED BY: MAS
HDC PROJECT NO: 2018-05

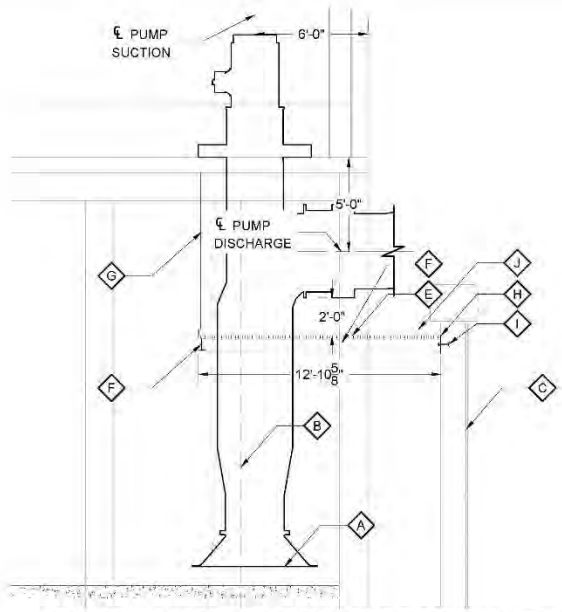
CITY BARN DRAINAGE IMPROVEMENTS
SLIDELL LOUISIANA

CITY OF SLIDELL
P.O. BOX 828
SLIDELL, LA 70459

CATWALK STRUCTURAL PLAN

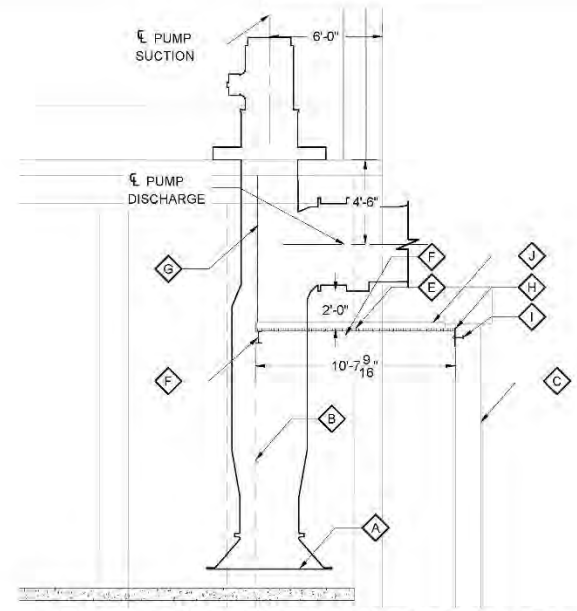
SHEET ID: 01-S3

SHEET SET: 24 OF 29



PUMP #1 (60") CATWALK SECTION (S1)

SCALE: 1/4" = 1'-0" (22" x 34" SHEET)

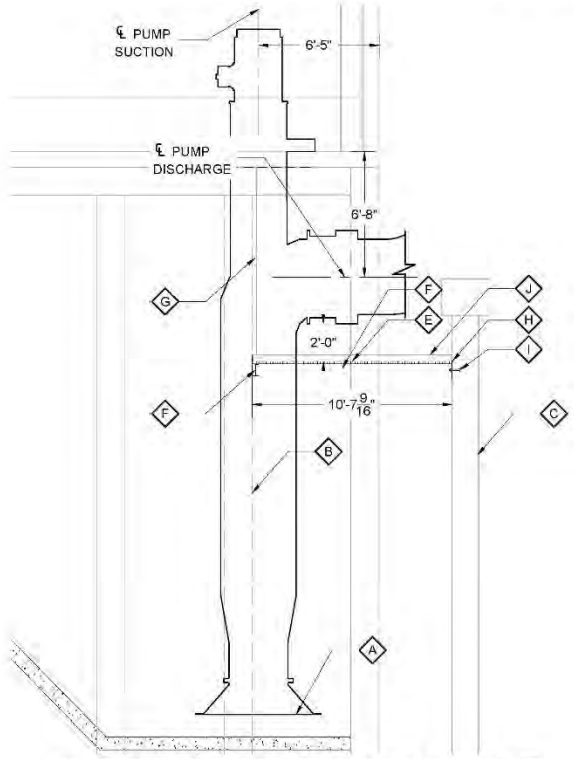


PUMP #2 (54") CATWALK SECTION (S2)

SCALE: 1/4" = 1'-0" (22" x 34" SHEET)

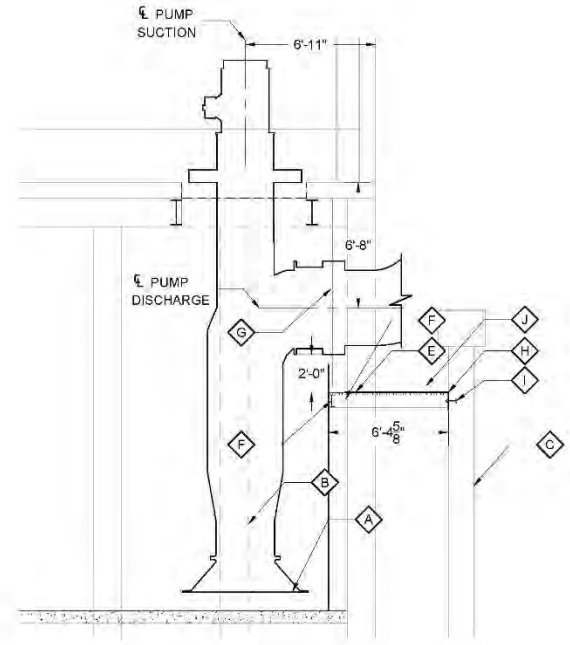
NOTES BY SYMBOL

- A - EXISTING PUMP SUCTION BELL (ESTIMATED)
- B - EXISTING PRECAST CONCRETE PILE
- C - EXISTING BULKHEAD
- D - EXISTING SS PLATE PUMP BAY WALL
- E - PROPOSED GRATING (SIZE TBD)
- F - W8x10 CATWALK SUPPORT BEAM (TYPICAL BENEATH PERIMETER OF GRATING) (NOT CALLED OUT FOR CLARITY)
- G - TENSION CABLE (SIZE TBD) CONNECTED TO TOP SLAB
- H - ½" SS PLATE CONNECTED TO EXISTING PILE (WIDTH OF PILE)/BULKHEAD (12" WIDTH)
- I - ¾" Ø GALVANIZED EXPANSION BOLTS, 5" MIN. EMBEDMENT TYP. @ EACH PILE
- J - ½" TOE PLATE (TYPICAL ABOVE PERIMETER OF GRATING) (NOT CALLED OUT FOR CLARITY)



PUMP #3 (48") CATWALK SECTION (S3)

SCALE: 1/4" = 1'-0" (22" x 34" SHEET)



PUMP #4 (54") CATWALK SECTION (S4)

SCALE: 1/4" = 1'-0" (22" x 34" SHEET)

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DAVID ALAN MARTIN, P.E. LICENSE NO. 37612 H. DAVIS COLE & ASSOCIATES

SUBMITTED BY: MARK F. CODY, E.I. PROJECT MANAGER — LICENSE NO.

SUBMITTED BY: DAVID A. MARTIN, P.E. PRINCIPAL — 37612 LICENSE NO.

H. Davis Cole & Associates, LLC — NEW ORLEANS, LA

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MARK	DESCRIPTION	DATE	BY: CHKD
	REVISION RECORD		

DESIGNED BY: ARF | DRAWN BY: ARF | CHECKED BY: DAM

DATE: APRIL, 18 | DETAILED BY: MAS | HDC PROJECT NO: 2018-05

CITY BARN DRAINAGE IMPROVEMENTS — SLIDELL, LOUISIANA

CITY OF SLIDELL
P.O. BOX 828
SLIDELL, LA 70459

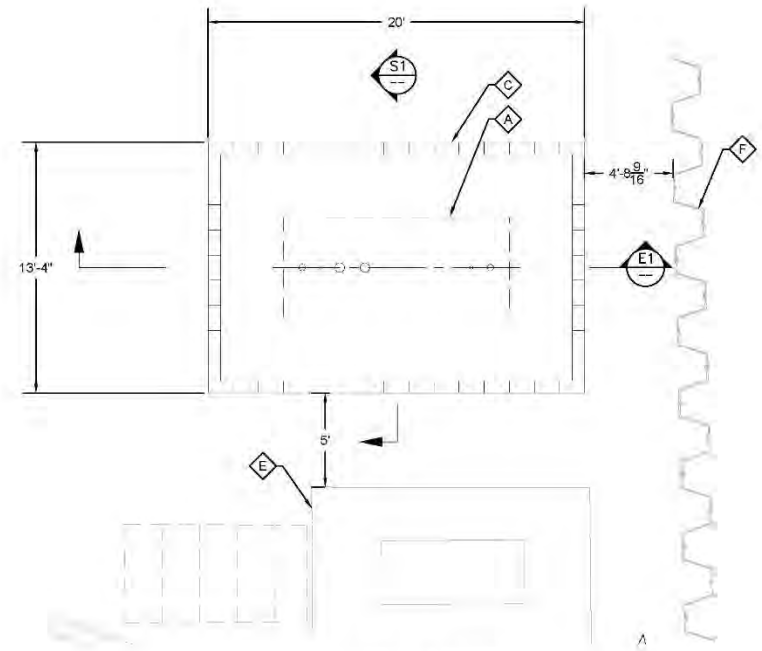
CATWALK STRUCTURAL SECTIONS

SHEET ID: 01-S4

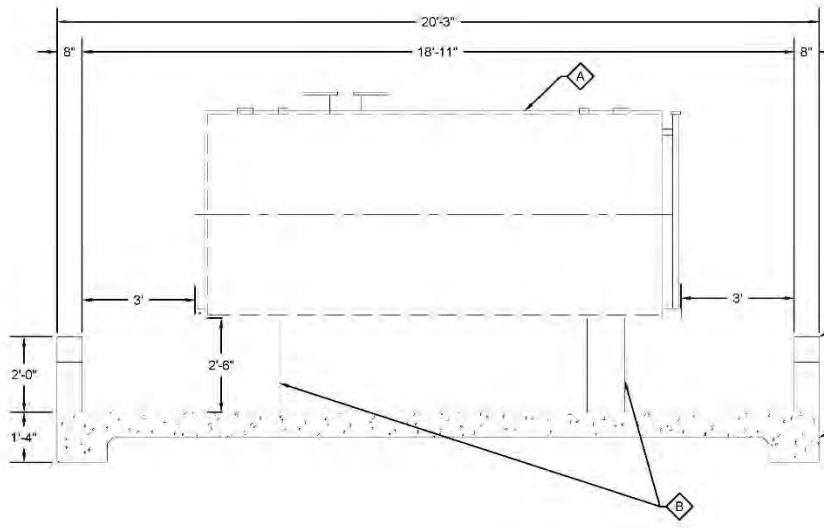
SHEET SET: 25 OF 29

NOTES BY SYMBOL

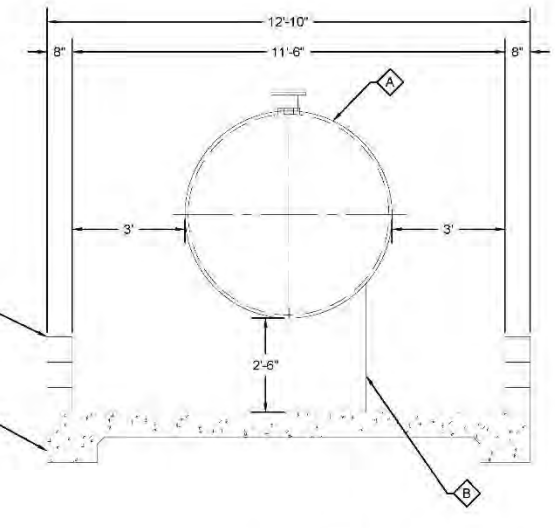
- A - (1) 2,000 GALLON, 5'4" INNER DIAMETER DOUBLE WALL HORIZONTAL DIESEL STORAGE TANK
- B - SUPPORT SADDLES (TYP. 2 PER TANK)
- C - SECONDARY CONTAINMENT WALL COMPOSED OF CONCRETE MASONRY UNITS OR EQUAL
- D - 8" THICK CONCRETE FOUNDATION PER SECTION 03805.
- E - EXISTING GENERATOR PLATFORM
- F - EXISTING SHEET PILE WALL



PLAN VIEW
SCALE: 1/4" = 1'-0" (22" x 34" SHEET)



ELEVATION VIEW E1
SCALE: 1/2" = 1'-0" (22" x 34" SHEET)



SECTION VIEW S1
SCALE: 1/2" = 1'-0" (22" x 34" SHEET)

DIESEL STORAGE FACILITY
SCALE: VARIES

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DAVID ALAN MARTIN, P.E.
LICENSE NO. 37002
H. DAVIS COLE & ASSOCIATES

SUBMITTED BY: ANDRE R. CONTI, E.I. PROJECT MANAGER — LICENSE NO.
SUBMITTED BY: DAVID A. MARTIN, P.E. PRINCIPAL — 37002 LICENSE NO.

H. Davis Cole & Associates, LLC — NEW ORLEANS, LA

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NOT FOR CONSTRUCTION

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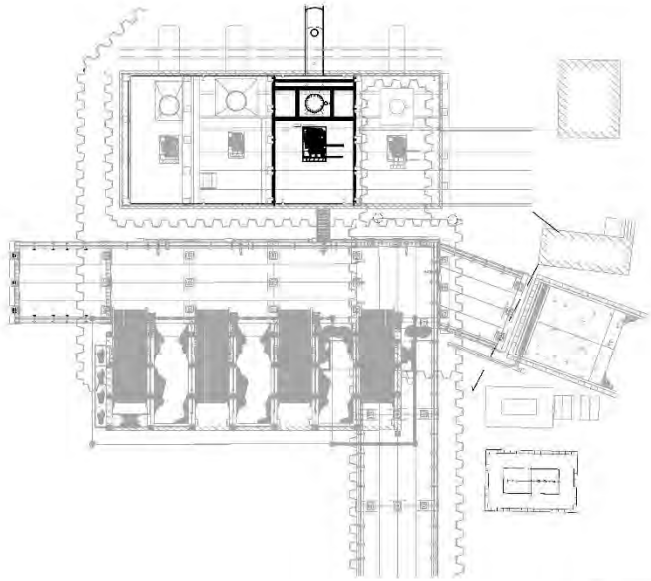
DESIGNED BY: ARF
DRAWN BY: ARF
CHECKED BY: DAM
DATE: APRIL, 18
DETAILED BY: MAS
HDC PROJECT NO: 2018-05

CITY BARN DRAINAGE IMPROVEMENTS
SLIDELL LOUISIANA

CITY OF SLIDELL
P.O. BOX 828
SLIDELL, LA 70459

DIESEL STORAGE FACILITY PLAN, ELEVATION, & SECTION

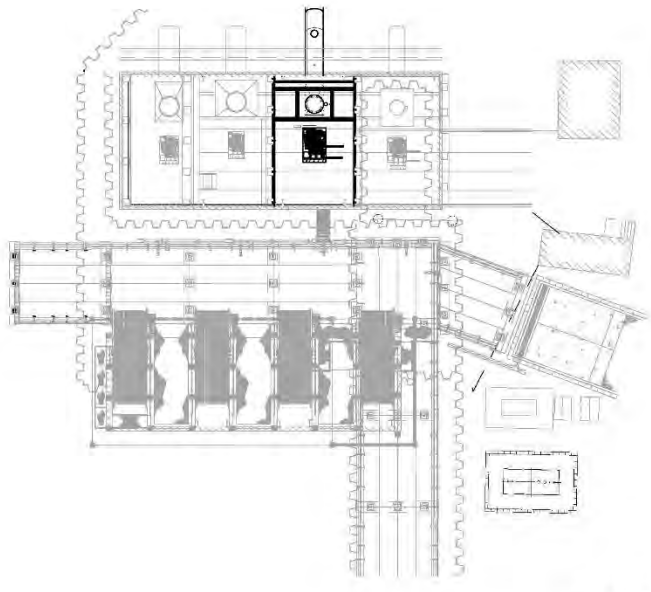
SHEET ID: 02-S1
SHEET SET: 26 OF 29



EXISTING ELECTRICAL SITE PLAN

SCALE: N.T.S.

ELECTRICAL SITE PLAN TO BE UPDATED IN 100% SUBMITTAL



PROPOSED ELECTRICAL SITE PLAN

SCALE: N.T.S.

ELECTRICAL SITE PLAN TO BE UPDATED IN 100% SUBMITTAL

GENERAL NOTES :

1. P&ID IS DIAGRAMMATIC IN NATURE AND IS NOT TO SCALE.
2. SEE ONE LINE POWER DIAGRAM FOR ADDITIONAL REQUIREMENTS AND INFORMATION.

NOTES BY SYMBOL

- (A) - EXISTING DRAINAGE PUMP
- (B) - EXISTING MECHANICAL BAR SCREEN
- (C) - EXISTING WASH WATER PUMP
- (D) - EXISTING LOCAL ENGINE PANEL
- (E) - EXISTING FLOAT CONTROL PANEL
- (F) - EXISTING FLOATS
- (G) - EXISTING MASTER ENGINE PANEL
- (H) - EXISTING BAR SCREEN CONTROL PANEL (SCREENS 1-3)
- (I) - EXISTING BAR SCREEN CONTROL PANEL (SCREEN 4)
- (J) - NEW DRAINAGE PUMP
- (K) - NEW ULTRASONIC LEVEL SYSTEM (PRIMARY)
- (L) - NEW ULTRASONIC LEVEL SYSTEM (SECONDARY)
- (M) - EXISTING FLOATS (RETAINED AS EMERGENCY)

PRELIMINARY

NOT TO BE USED FOR CONSTRUCTION, BIDDING, RECORDATION, SALES OR AS THE BASIS FOR ISSUANCE OF A PERMIT

DAVID ALAN MARTIN, P.E.
LICENSE NO. 37002
H. DAVIS COLE & ASSOCIATES

SUBMITTED BY:
ANDRE P. CONTI E.I.
PROJECT MANAGER
LICENSE NO.

SUBMITTED BY:
DAVID A. MARTIN, P.E.
PRINCIPAL
37002
LICENSE NO.

H. Davis Cole & Associates, LLC
Consulting Engineers
NEW ORLEANS, LA

90% SUBMITTAL
NOT FOR CONSTRUCTION

MARK	DESCRIPTION	DATE	BY	CHKD
	REVISION RECORD			

DESIGNED BY: ARF
DRAWN BY: ARF
CHECKED BY: DAM
DATE: APRIL, 18
DETAILED BY: MAS
HDC PROJECT NO: 2018-05

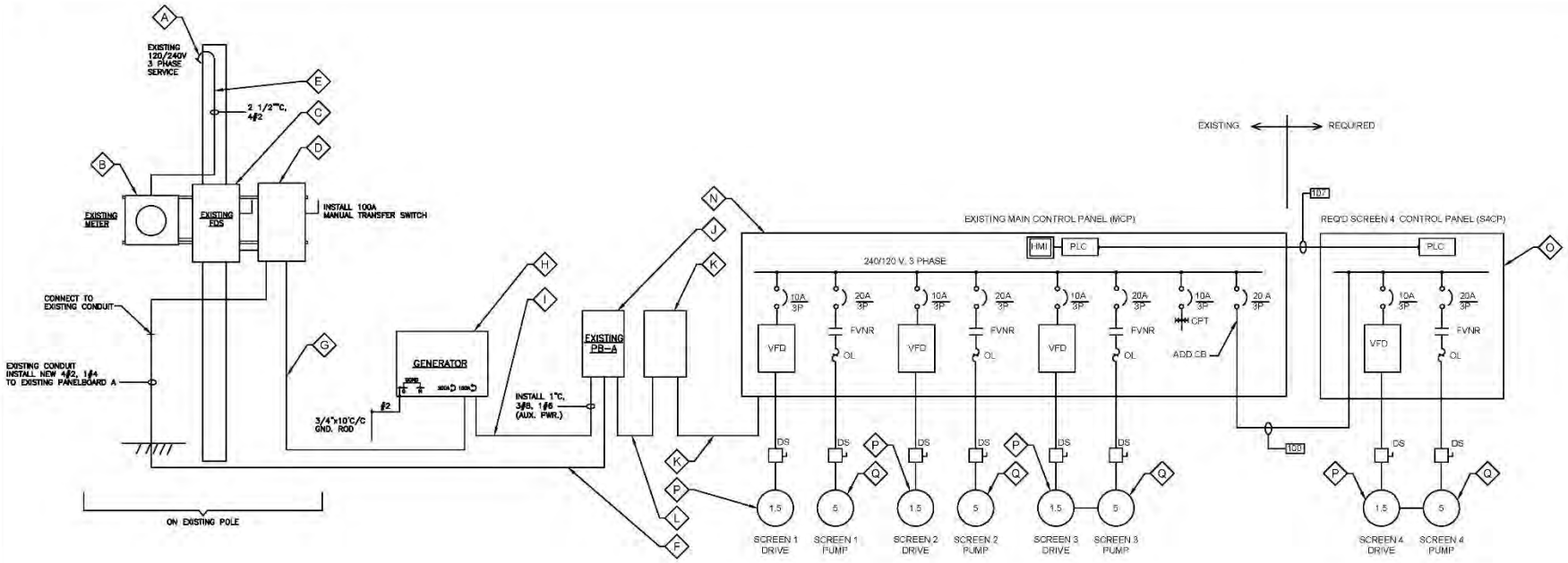
CITY BARN DRAINAGE IMPROVEMENTS
SLIDELL LOUISIANA

CITY OF SLIDELL
P.O. BOX 828
SLIDELL, LA 70459

ELECTRICAL PLAN

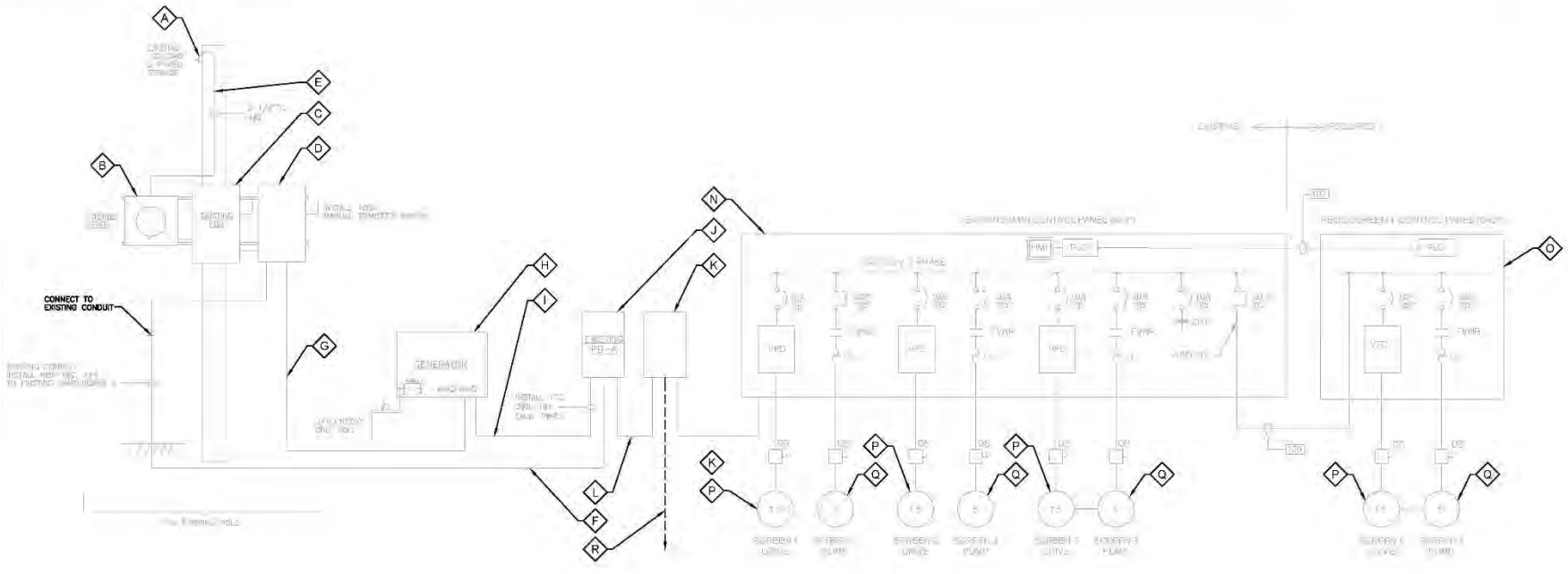
SHEET ID: **E1**

SHEET SET **27** OF **29**



EXISTING MAIN POWER ONE LINE DIAGRAM

SCALE: N.T.S.



PROPOSED MAIN POWER ONE LINE DIAGRAM

SCALE: N.T.S.

GENERAL NOTES

1. ONE LINE DIAGRAMS ARE DIAGRAMMATIC IN NATURE AND ARE NOT TO SCALE.
2. SEE SITE PLAN FOR LOCATIONS OF PANELS AND INSTRUMENTATION.
3. SEE PUMP STATION P&ID'S FOR ADDITIONAL INFORMATION.

NOTES BY SYMBOL

- A - EXISTING 120/240 VOLT 3-PHASE SERVICE
- B - EXISTING METER
- C - EXISTING FUSED DISCONNECT SWITCH
- D - EXISTING 100A MANUAL TRANSFER SWITCH
- E - EXISTING 2 ½" CONDUIT, 4-#2
- F - EXISTING CONDUIT, 4-#2, 1-#4 TO PANEL BOARD "A"
- G - EXISTING 1 ½" CONDUIT, 4-#2, 1-#4 TO DIESEL GENERATOR SET
- H - DIESEL GENERATOR SET
- I - EXISTING 1 ½" CONDUITS, 4-#2, 1-#4
- J - EXISTING PANEL BOARD "A" ON PUMP STATION DECK
- K - EXISTING PANEL BOARD "B" ON PUMP STATION DECK
- L - EXISTING 1 ½" CONDUITS, 4-#2, 1 #4
- M - EXISTING 1 ½" CONDUITS, 4-#2, 1 #4
- N - EXISTING BAR SCREEN AND WASH WATER PUMP CONTROL PANEL (SCREENS 1-3), IN "SAFE HOUSE"
- O - EXISTING BAR SCREEN AND WASH WATER PUMP CONTROL PANEL (SCREEN 1-3), IN "SAFE HOUSE"
- P - SCREEN DRIVE MOTOR (1.5 HP)
- Q - PUMP MOTOR (5 HP)
- R - POWER TO NEW LIGHTING (TBD)

PRELIMINARY

NOT TO BE USED FOR CONSTRUCTION, BIDDING, RECORDATION, SALES OR AS THE BASIS FOR ISSUANCE OF A PERMIT

DAVID ALAN MARTIN, P.E.
LICENSE NO. 37002
H. DAVIS COLE & ASSOCIATES

SUBMITTED BY: ANDRE R. CODY, E.I. PROJECT MANAGER — LICENSE NO.

SUBMITTED BY: DAVID A. MARTIN, P.E. PRINCIPAL — 37002 LICENSE NO.

H. Davis Cole & Associates, LLC — NEW ORLEANS, LA

90% SUBMITTAL
NOT FOR CONSTRUCTION

MARK	DESCRIPTION	DATE	BY	CHKD
	REVISION RECORD			

DESIGNED BY: ARF
DRAWN BY: ARF
CHECKED BY: DAM
DATE: APRIL, 18
DETAILED BY: MAS
HDC PROJECT NO: 2018-05

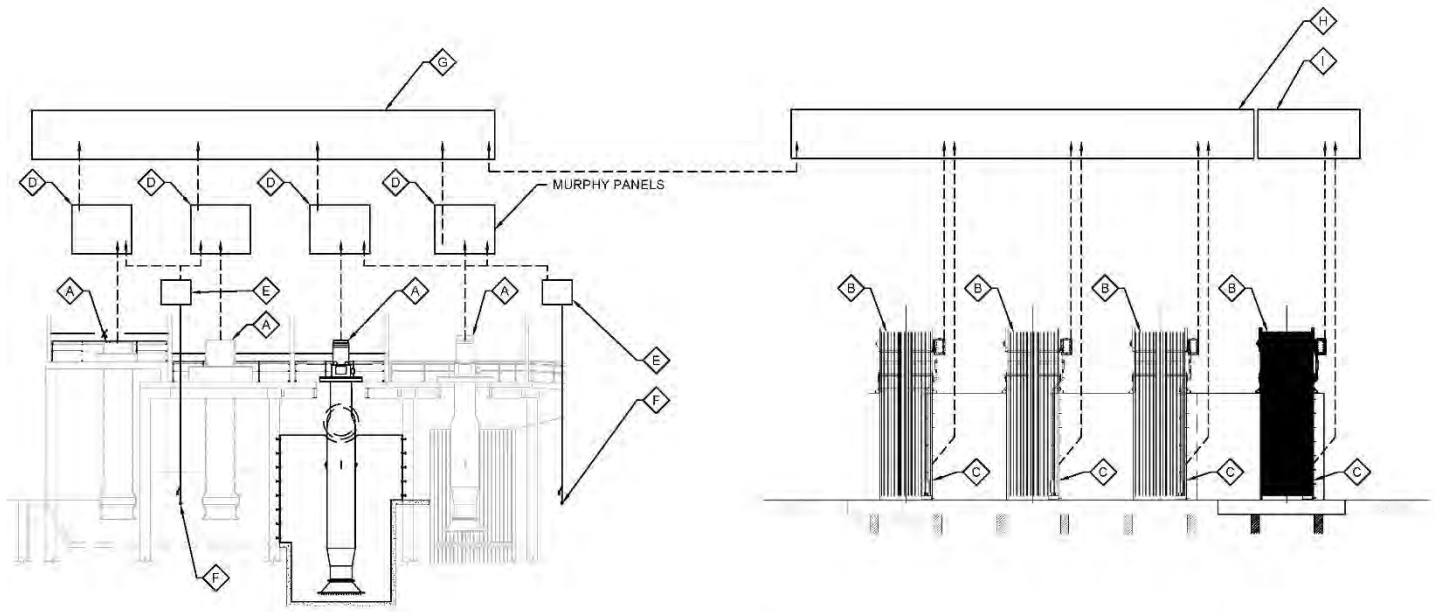
CITY BARN DRAINAGE IMPROVEMENTS
SLIDELL LOUISIANA

CITY OF SLIDELL
P.O. BOX 828
SLIDELL, LA 70459

MAIN POWER ONE LINE DIAGRAM

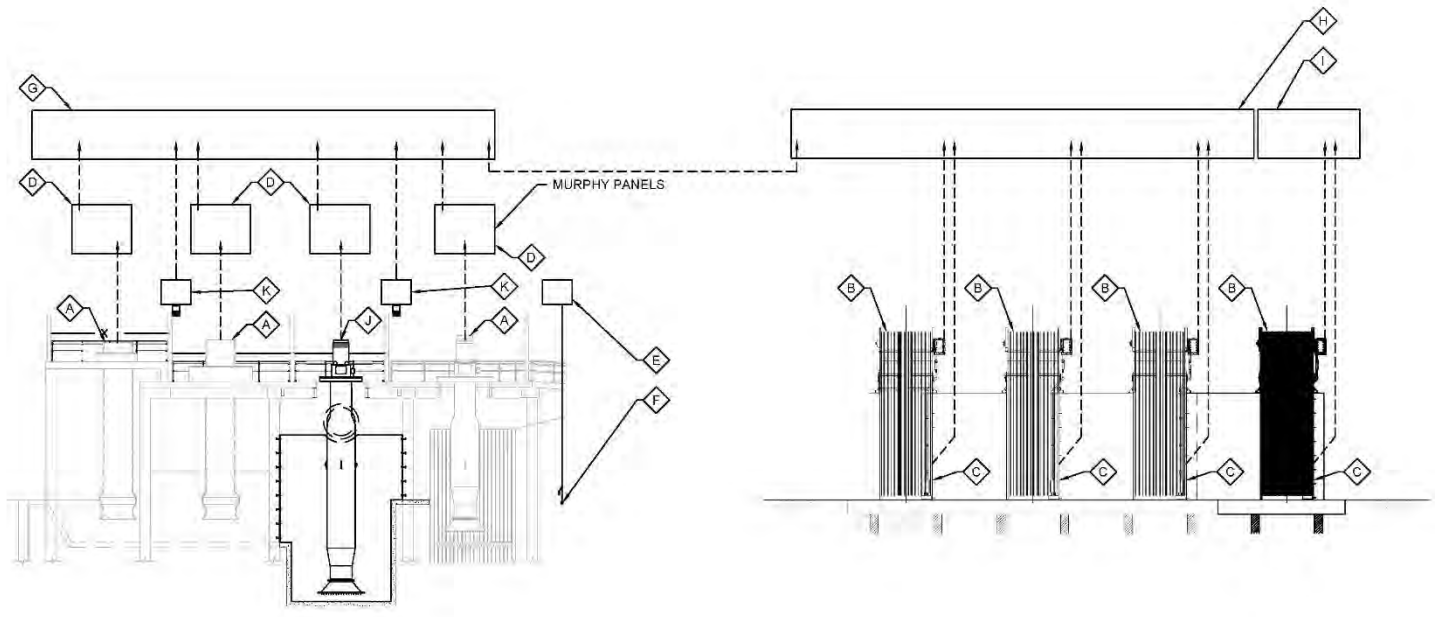
SHEET ID: E2

SHEET SET 28 OF 29



EXISTING PUMP STATION AND BARSCREEN P&ID

SCALE: N.T.S.



PROPOSED MAIN POWER ONE LINE DIAGRAM

SCALE: N.T.S.

GENERAL NOTES

1. P&ID IS DIAGRAMMATIC IN NATURE AND IS NOT TO SCALE.
2. SEE ONE LINE POWER DIAGRAM FOR ADDITIONAL REQUIREMENTS AND INFORMATION.

NOTES BY SYMBOL:

- A - EXISTING DRAINAGE PUMP
- B - EXISTING MECHANICAL BAR SCREEN
- C - EXISTING WASH WATER PUMP
- D - EXISTING LOCAL ENGINE PANEL
- E - EXISTING FLOAT CONTROL PANEL
- F - EXISTING FLOATS
- G - EXISTING MASTER ENGINE PANEL
- H - EXISTING BAR SCREEN CONTROL PANEL (SCREENS 1-3)
- I - EXISTING BAR SCREEN CONTROL PANEL (SCREEN 4)
- J - NEW DRAINAGE PUMP
- K - NEW ULTRASONIC LEVEL SYSTEM (PRIMARY)
- L - NEW ULTRASONIC LEVEL SYSTEM (SECONDARY)
- M - EXISTING FLOATS (RETAINED AS EMERGENCY)

PRELIMINARY

NOT TO BE USED FOR CONSTRUCTION BIDDING, RECORDATION, SALES OR AS THE BASIS FOR ISSUANCE OF A PERMIT

DAVID ALAN MARTIN, P.E.
LICENSE NO. 37852
H. DAVIS COLE & ASSOCIATES

SUBMITTED BY: ANDREA R. FORD, E.I. PROJECT MANAGER — LICENSE NO.

SUBMITTED BY: DAVID A. MARTIN, P.E. PRINCIPAL — 37852 LICENSE NO.

H. Davis Cole & Associates, LLC — NEW ORLEANS, LA

90% SUBMITTAL

NOT FOR CONSTRUCTION

MARK	DESCRIPTION	DATE	BY	CHKD
2	REVISION RECORD			

DESIGNED BY: ARF
DRAWN BY: ARF
CHECKED BY: DAM
DATE: APRIL 18
DETAILED BY: MAS
HDC PROJECT NO: 2018-05

CITY BARN DRAINAGE IMPROVEMENTS
SLIDELL LOUISIANA

CITY OF SLIDELL
P.O. BOX 828
SLIDELL, LA 70459

PUMP STATION AND BAR SCREENS

SHEET ID: E3

SHEET SET: 29 OF 29

Appendix C
External Agency Correspondence

From:	Christoffersen, Merina
To:	martinez.eli@epa.gov; gutierrez.raul@epa.gov; Perovich.gina@epa.gov; amy_trahan@fws.gov; john_savell@fws.gov; cmichon@wlf.la.gov; linda.piper@la.gov
Cc:	Spann, Tiffany
Subject:	FW: Scoping Notification/Solicitation of Views (SOV) for 1603-321 City Barn Proposal, Amendment 7, Phase III
Date:	Wednesday, April 11, 2018 2:35:00 PM
Attachments:	image003.png image004.png City Barn Phase III 90% Design Plans Review Set 2018.04.10.pdf City Barn Phase III 90% Design Specs Review Set 2018.04.10.pdf City Barn Phase III 90% Design Cost Opinion 2018.04.10.pdf image002.png
Importance:	High

Resource Agencies:

Regarding the City of Slidell City Barn proposed additional drainage improvement project shown below, which was sent to you on March 30, 2018. Please see the attached new 90% drawings. FEMA received these updated documents on April 10, 2018, and wanted to ensure they were provided to you for your review. To date, FEMA/EHP has not received a response from your offices regarding this project. Please provide a response to this drainage improvement proposal by April 30, 2018. If further information is needed or if there are any questions/issues, please let us know. Your assistance is greatly appreciated.

U.S. Department of Homeland Security

Federal Emergency Management Agency

FEMA-DR 1603 LA

1500 Main St

Baton Rouge, LA 70802

March 30, 2018

MEMORANDUM TO: See Distribution

SUBJECT: Scoping Notification/Solicitation of Views

To Whom It May Concern:

The Department of Homeland Security's Federal Emergency Management Agency (FEMA) is mandated by the U.S. Congress to administer Federal disaster assistance pursuant to the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), PL 93-288, as amended. FEMA's Hazard Mitigation Grant Program (HMGP) to provide funds to states and local governments to implement long-term hazard mitigation measures after a major disaster declaration. FEMA is considering providing Hazard Mitigation Grant Program funding for the attached project in relation to Hurricanes Katrina and

Rita (FEMA-1603/1607-DR-LA).

The City of Slidell at their City Barn location has proposed an additional drainage improvement project. The purpose of the project is twofold:

1) to provide increased reliability for the drainage pumping station by:
    a. removal of an existing 67 cubic feet per second drainage pump along with its 36-inch discharge piping, and
    b. installation of a new 133 cubic feet per second drainage pump and upgraded 48-inch discharge piping outfall through the levee between Bayou Patasat into Bayou Bonfouca, to mitigate flooding in Old Town, Slidell.
2) to provide increased capacity and function of the pump station with the construction of a new diesel storage facility to house (1) 2,000 gallon diesel storage tank, along with lowering of the pump sump (only in the area beneath the proposed 133 cfs pump).

The proposed project scope of work and the considered alternative is included in the attached 65% Typical Drawings, Response to FEMA's Request for Information, Coastal Use Permit Application and Public Notice, along with the Proposed Schedule and Scope of Work.

Please respond within 30 calendar days of the date of this scoping notification. If our office receives no comments at the close of this period, we will assume that your agency does not object to the project as proposed.

Comments may be emailed to Merina.Christoffersen@fema.dhs.gov or mailed to the attention of Merina Christoffersen, Environmental Department, at the address above.

For questions regarding this matter, please contact Merina Christoffersen, Environmental Specialist, at (504) 491-0621.
Thanks,

Tiffany Spann-Winfield
Deputy Environmental Liaison Officer
Region VI – LRO
(504) 218 - 6800 (bb)
Tiffany.spann@fema.dhs.gov

Distribution: USEPA, USFWS, LDWF, LDEQ

Merina Christoffersen
Environmental Protection Specialist
FEMA Region VI
Louisiana Recovery Office
1500 Main St., Baton Rouge, LA 70802
(504) 491-0621 (iphone)
Merina.christoffersen@fema.dhs.gov

cid:image001.png@01D0CAAF.AC5985A0

Christoffersen, Merina

From:	Christoffersen, Merina
Sent:	Friday, March 30, 2018 2:38 PM
To:	'martinez.eli@epa.gov'; 'gutierrez.raul@epa.gov'; 'Perovich.gina@epa.gov'; 'amy_trahan@fws.gov'; 'john_savell@fws.gov'; cmichon@wlf.la.gov; 'linda.piper@la.gov'
Cc:	Spann, Tiffany
Subject:	FW: Scoping Notification/Solicitation of Views (SOV) for 1603-321 City Barn Proposal, Amendment 7, Phase III
Attachments:	(1) City Barn Phase III 65% Design Review Set 2018.03.28.pdf; (4) City Barn Phase III Schedule 2018.03.02.pdf; (5) City Barn Phase III Response to FEMA EHP RFI 1 2018.03.28.pdf; (7) City Barn Drainage Pump Station CUP Application.pdf; (8) City Barn Phase III DNR_OCM Public Notice 2018.03.15.pdf; (9) City Barn Phase III OCM Comments 2018.03.15.pdf

U.S Department of Homeland Security

Federal Emergency Management

FEMA-DR 1603 LA

1500 Main St.

Baton Rouge, LA 70802

March 30, 2018

MEMORANDUM TO: See Distribution

SUBJECT: Scoping Notification/Solicitation of Views

To Whom It May Concern:

The Department of Homeland Security's Federal Emergency Management Agency (FEMA) is mandated by the U.S. Congress to administer Federal disaster assistance pursuant to the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), PL 93-288, as amended. FEMA's Hazard Mitigation Grant Program (HMGP) to provide funds to states and local governments to implement long-term hazard mitigation measures after a major disaster declaration. FEMA is considering providing Hazard Mitigation Grant Program funding for the attached project in relation to Hurricanes Katrina and Rita (FEMA-1603/1607-DR-LA).

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For questions regarding this matter, please contact Merina Christoffersen, Environmental Specialist, at (504) 491-0621. Thanks,

Tiffany Spann-Winfield
Deputy Environmental Liaison Officer
Region VI – LRO
(504) 218 - 6800 (bb)
Tiffany.spann@fema.dhs.gov

Distribution: USEPA, USFWS, LDWF, LDEQ

Merina Christoffersen
Environmental Protection Specialist
FEMA Region VI
Louisiana Recovery Office
1500 Main St., Baton Rouge, LA 70802
(504) 491-0621 (iphone)
Merina.christoffersen@fema.dhs.gov

FEMA

From:	Trahan, Amy
To:	Christoffersen, Merina
Subject:	Re: [EXTERNAL] FW: Scoping Notification/Solicitation of Views (SOV) for 1603-321 City Barn Proposal, Amendment 7, Phase III
Date:	Monday, May 21, 2018 8:14:25 AM
Attachments:	image001.png image003.png 20180516_FEMA_Slidell City Barn.pdf

---

Merina,

Please see the attached for our concurrence regarding this project. If you need anything further feel free to contact me.

Have a great day!
Amy

Amy Trahan
Fish and Wildlife Biologist
U.S. Fish and Wildlife Service,
Ecological Services
646 Cajundome Blvd., Suite 400
Lafayette, LA 70506
(337) 291-3126 (phone)
(337) 291-3139 (fax)
amy_trahan@fws.gov

On Thu, May 10, 2018 at 9:58 AM, Christoffersen, Merina <Merina.Christoffersen@fema.dhs.gov> wrote:

> Resource Agency:
>
> Regarding the City of Slidell City Barn proposed additional drainage improvement project shown below, which was sent to you on March 30, 2018, and April 11, 2018. Please see the attached new 90% drawings, LADWF No Effect Determination, and the USFWS Online Report. FEMA received these updated documents on April 10, 2018, and wanted to ensure they were provided to you for your review. To date, FEMA/EHP has not received a response from your offices regarding this project. Please provide a response to this drainage improvement proposal by May 20, 2018. If further information is needed or if there are any questions/issues, please let us know. Your assistance is greatly appreciated.

FEMA

U.S. Department of Homeland Security

Federal Emergency Management Agency

FEMA-DR 1603 LA

1500 Main St. Baton Rouge, LA 70802

March 30, 2018

MEMORANDUM TO: See Distribution

SUBJECT: Scoping Notification/Solicitation of Views

To Whom It May Concern:

The Department of Homeland Security's Federal Emergency Management Agency (FEMA) is mandated by the U.S. Congress to administer Federal disaster assistance pursuant to the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), PL 93-288, as amended. FEMA's Hazard Mitigation Grant Program (HMGP) to provide funds to states and local governments to implement long-term hazard mitigation measures after a major disaster declaration. FEMA is considering providing Hazard Mitigation Grant Program funding for the attached project in relation to Hurricanes Katrina and Rita (FEMA-1603/1607-DR-LA).

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Comments may be emailed to Merina.Christoffersen@fema.dhs.gov or mailed to the attention of Merina Christoffersen, Environmental Department, at the address above.

For questions regarding this matter, please contact Merina Christoffersen, Environmental Specialist, at (504) 491-0621.

Thanks,

Tiffany Spann-Winfield

Deputy Environmental Liaison Officer

Region VI – LRO

(504) 218 - 6800 (bb)

Tiffany.spann@fema.dhs.gov

Distribution: USEPA, USFWS, LDWF, LDEQ

Merina Christoffersen

Environmental Protection Specialist

FEMA Region VI

Louisiana Recovery Office

1500 Main St., Baton Rouge, LA 70802

(504) 491-0621 (iphone)

Merina.christoffersen@fema.dhs.gov

Endangered Species Act (ESA) Project Review and Guidance for Other Federal Trust Resources Report

Instructions

Please submit a copy of this report to the Louisiana Ecological Services Office for review at lafayette@fws.gov. Contact our office at (337) 291-3100 for further assistance.

Project Description: As part of ongoing hazard mitigation efforts at the City Barn Drainage Pump Station, the City of Slidell is proposing the installation of a new drainage pump, modifications to the existing pump sump, and the installation of additional fuel storage to further mitigate the hazard of flooding to Old Town in the City of Slidell. The construction of the proposed project can be broadly broken down into three components: removal of the existing 67 CFS pump and its replacement with a 133 CFS pump, modifications of the sump area to allow for greater drawdown to better facilitate regular maintenance, and construction of the new fuel storage area. We anticipate that the construction sequence will involve modifications of the sump area first, construction of the auxiliary fuel storage area second,
and removal and replacement of the drainage pump last. The existing drainage pump station deck will not be removed for this project, and all access will need to be made underneath the pumping station or through existing access grating on the station. The dimensions of the existing pump station structure, fuel storage facility, existing generator platform, and controls and safe house facility will remain unchanged. A new outfall through the levee will be constructed in the same
place as the existing outfall for the existing 67 CFS pump. No bank stabilization will be completed as a part of this project.

Requesting Agency: Federal Emergency Management Agency (FEMA)

Project Coordinates: Latitude: 30.273494 Longitude: -89.788233

Point of Contact: Merina Christoffersen

Address: 1500 Main St

City: Baton Rouge **State:** Louisiana **Zip Code:** 70802

Phone Number 1: 504-491-0621 **Phone Number 2:** _____

Email Address: merina.christoffersen@fema.dhs.gov

Does the proposed action only involve telecommunication structure(s)?

No

Would the proposed action occur entirely within an existing footprint or rights-of-way (ROW)?

Yes

Would the proposed action involve ground disturbance activities?

Yes

Would any portion of the proposed action occur within one of these areas of interest?

No

West Indian Manatee

Does the proposed action fall within the manatee consultation zone, excluding the Mississippi River (see map), and involve in-water activities, with depths of at least 2 feet, during the months of June through November?

Yes

Is the proposed action's footprint entirely on land?

Yes

Conclusion:
We have determined that the proposed action would have no effect on the West Indian Manatee.

MERINA E CHRISTOFFERSEN Digitally signed by MERINA E CHRISTOFFERSEN
Date: 2018.09.07 14:03:48 -05'00'

Project Representative *Date*

Gopher Tortoise

Would the proposed action occur on Latonia, Bassfield, Cahaba, Ruston, Smithdale, Abita, Malbis, Angie, or Prentiss soils (as determined by NRCS Web Soil Survey at https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx)?

No

Conclusion:
We have determined that the proposed action is not likely to adversely affect the Gopher Tortoise.

_____ _____
Project Representative *Date*

Based on the information provided in this report, as well as any pertinent correspondence and documentation saved to the project file at our office (if applicable), the Service concurs with your "not likely to adversely affect" determination for the following species:

Gopher Tortoise

_____ 17 May 19
Louisiana Ecological Services Office *Date*
U.S. Fish and Wildlife Service

Red-cockaded Woodpecker

Would the proposed action involve removal of suitable foraging habitat (pine or pine/hardwood stands in which 50 percent or more of the dominant trees are pines and the dominant pine trees are 30 years of age or older)?

No

Would the proposed action occur within suitable nesting habitat (pine or pine/hardwood stands that contain pines 60 years of age or older)?

No

Conclusion:
We have determined that the proposed action would have no effect on the Red-cockaded Woodpecker.

MERINA E CHRISTOFFERSEN Digitally signed by MERINA E CHRISTOFFERSEN
Date: 2018.09.07 14:05:47 -05'00'

Project Representative *Date*

Section 7 consultation for the proposed action is concluded when you receive signature from this office. To ensure continued compliance with the ESA, reinitiate consultation when:

- new information reveals that the action may affect listed species or designated critical habitat in a manner or to an extent not considered in this consultation
- the action is modified in a manner that causes effects to listed species or designated critical habitat not considered in this consultation
- a new species is listed or critical habitat designated that the action may affect.

Migratory Bird Conservation Recommendations

Bald Eagle

The proposed project area may provide nesting habitat for the bald eagle (*Haliaeetus leucocephalus*), which was officially removed from the List of Endangered and Threatened Species as of August 8, 2007. However, the bald eagle remains protected under the Bald and Golden Eagle Protection Act (BGEPA) (54 Stat. 250, as amended, 16 U.S.C. 668a-d) and theMigratory Bird Treaty Act (MBTA) (40 Stat. 755, as amended; 16 U.S.C. 703 et seq.) The Louisiana Department of Wildlife and Fisheries (LDWF) has not collected comprehensive bald eagle survey data since 2008, and new active, inactive, or alternate nests may have been constructed within the proposed project area since that time.

The Service developed the National Bald Eagle Management (NBEM) Guidelines to provide landowners, land managers, and others with information and recommendations to minimize potential project impacts to bald eagles, particularly where such impacts may constitute "disturbance," which is prohibited by the BGEPA. A copy of the NBEM Guidelines is available at:

http://www.fws.gov/migratorybirds/pdf/management/nationalbaldeaglenanagementguidelines.pdf

In southern Louisiana parishes, eagles typically nest in mature trees (e.g., baldcypress, sycamore, willow, etc.) near fresh to intermediate marshes or open water. Bald eagles may also nest in mature pine trees near large lakes in central and northern Louisiana. If a bald eagle nest occurs or is discovered within 660 feet of the proposed project area, then an evaluation must be performed to determine whether the project is likely to disturb nesting bald eagles. That evaluation may be conducted on-line at: https://www.fws.gov/southeast/our-services/eagle-technical-assistance. Following completion of the evaluation, that website will provide a determination of whether additional consultation is necessary.

Colonial Waterbirds

In accordance with the Migratory Bird Treaty Act of 1918 (as amended), please be advised should the project area be located in or near wetland habitats which may be inhabited by colonial nesting waterbirds and/or seabirds, additional restrictions may be necessary.

Colonies may be present that are not currently listed in the database maintained by the Louisiana Department of Wildlife and Fisheries. That database is updated primarily by (1) monitoring previously known colony sites and (2) augmenting point-to-point surveys with flyovers of adjacent suitable habitat. Although several comprehensive coast-wide surveys have been recently conducted to determine the location of newly-established nesting colonies, we recommend that a qualified biologist inspect the proposed work site for the presence of undocumented nesting colonies during the nesting season because some waterbird colonies may change locations year-to-year. To minimize disturbance to colonial nesting birds please refer to our colonial nesting waterbird guidance on the LESO Webpage https://www.fws.gov/lafayette/Migratory_Birds/MigBird.html.

Additional Migratory Bird Conservation Recommendations

During the project impact analysis process developers should identify project-related impacts to migratory birds and the conservation measures that will be used to mitigate them. For additional Migratory Bird Conservation recommendations, guidance and tools to help reduce impacts to birds and their habitats please visit the LESO webpage https://www.fws.gov/lafayette/Migratory_Birds/MigBird.html and the Service's Migratory Bird Program Webpage (https://www.fws.gov/birds/bird-enthusiasts/threats-to-birds/collisions/communication-towers.php).

From:	Linda (Brown) Piper
To:	Christoffersen, Merina
Cc:	Yasoob Zia
Subject:	DEQ SOV #180412/0485 City Barn Phase III Drainage Improvements Project

Date: Thursday, May 3, 2018 10:34:40 AM

May 3, 2018

Tiffany Spann-Winfield
Deputy Environmental Liaison Officer
FEMA LRO
1500 Main St
Baton Rouge, LA 70802
Merina.Christoffersen@fema.dhs.gov

RE: 180412/0485

City Barn Phase III Drainage Improvements Project
GOHSEP and FEMA Funding
St. Tammany Parish

Dear Ms. Spann-Winfield:

The Department of Environmental Quality (LDEQ), Business and Community Outreach Division has received your request for comments on the above referenced project.

After reviewing your request, the Department has no objections based on the information provided in your submittal. However, for your information, the following general comments have been included. Please be advised that if you should encounter a problem during the implementation of this project, you should immediately notify LDEQ's Single-Point-of-contact (SPOC) at (225) 219-3640.

- Please take any necessary steps to obtain and/or update all necessary approvals and environmental permits regarding this proposed project.
- If your project results in a discharge to waters of the state, submittal of a Louisiana Pollutant Discharge Elimination System (LPDES) application may be necessary.
- If the project results in a discharge of wastewater to an existing wastewater treatment system, that wastewater treatment system may need to modify its LPDES permit before accepting the additional wastewater.
- All precautions should be observed to control nonpoint source pollution from construction activities. LDEQ has stormwater general permits for construction areas equal to or greater than one acre. It is recommended that you contact the LDEQ Water Permits Division at (225) 219-9371 to determine if your proposed project requires a permit.
- If your project will include a sanitary wastewater treatment facility, a Sewage Sludge and Biosolids Use or Disposal Permit is required. An application or Notice of Intent will be required if the sludge management practice includes preparing biosolids for land application or preparing sewage sludge to be hauled to a landfill. Additional information may be obtained on the LDEQ website at http://www.deq.louisiana.gov/portal/tabid/2296/Default.aspx or by contacting the LDEQ Water Permits Division at (225) 219- 9371.
- If any of the proposed work is located in wetlands or other areas subject to the jurisdiction of the U.S. Army Corps of Engineers, you should contact the Corps directly regarding permitting issues. If a Corps permit is required, part of the application process may involve a water quality certification from LDEQ.
- All precautions should be observed to protect the groundwater of the region.
- Please be advised that water softeners generate wastewaters that may require special limitations depending on local water quality considerations. Therefore if your water system improvements include water softeners, you are advised to contact the LDEQ Water Permits to determine if special water quality-based limitations will be necessary.
- Any renovation or remodeling must comply with LAC 33:III.Chapter 28, Lead-Based Paint Activities; LAC 33:III.Chapter 27, Asbestos-Containing Materials in Schools and State Buildings (includes all training and accreditation); and LAC 33:III.5151, Emission Standard for Asbestos for any renovations or demolitions.
- If any solid or hazardous wastes, or soils and/or groundwater contaminated with hazardous constituents are encountered during the project, notification to LDEQ's Single-Point-of-Contact (SPOC) at (225) 219-3640 is required. Additionally, precautions should be taken to protect workers from these hazardous constituents.

Currently, St. Tammany Parish is classified as attainment with the National Ambient Air Quality Standards and has no general conformity determination obligations.

Please send all future requests to my attention. If you have any questions, please feel free to contact me at (225) 219-3954 or by email at linda.piper@la.gov.

Sincerely,

Linda (Brown) Piper

Louisiana Dept. of Environmental Quality
Office of the Secretary
P.O. Box 4301
Baton Rouge, LA 70821-4301
Phone: (225) 219-3954
Fax: (225) 219-3971
Email: linda.piper@la.gov

JOHN BEL EDWARDS
GOVERNOR

State of Louisiana
DEPARTMENT OF WILDLIFE AND FISHERIES
OFFICE OF WILDLIFE

JACK MONTOUCET
SECRETARY

Date	April 19, 2018
Name	Merina Christoffersen
Company	FEMA
Street Address	1500 Main Street
City, State, Zip	Baton Rouge, La 70802
Project	City Barn Drainage Pump Station
Project ID	
Invoice Number	18041904

Personnel of the Coastal & Nongame Resources Division have reviewed the preliminary data for the captioned project. After careful review of our database, no impacts to rare, threatened, or endangered species or critical habitats are anticipated for the proposed project. No state or federal wildlife refuges, wildlife management areas, or scenic streams are known to occur at the specified site within Louisiana's boundaries.

The Louisiana Natural Heritage Program (LNHP) has compiled data on rare, endangered, or otherwise significant plant and animal species, plant communities, and other natural features throughout the state of Louisiana. Heritage reports summarize the existing information known at the time of the request regarding the location in question. The quantity and quality of data collected by the LNHP are dependent on the research and observations of many individuals. In most cases, this information is not the result of comprehensive or site-specific field surveys; many natural areas in Louisiana have not been surveyed. This report does not address the occurrence of wetlands at the site in question. Heritage reports should not be considered final statements on the biological elements or areas being considered, nor should they be substituted for on-site surveys required for environmental assessments. LNHP requires that this office be acknowledged in all reports as the source of all data provided here. If at any time Heritage tracked species are encountered within the project area, please contact the LNHP Data Manager at 225-765-2643. If you have any questions, or need additional information, please call 225-765-2357.

Sincerely,

for Carey Lynn Perry, Program Manager
Natural Heritage Program

DEPARTMENT OF NATURAL RESOURCES
OFFICE OF COASTAL MANAGEMENT

P.O. BOX 44487
BATON ROUGE, LOUISIANA 70804-4487
(225)342-7591
1-800-267-4019

COASTAL USE PERMIT/CONSISTENCY DETERMINATION

C.U.P. No.: **P20150247 (Revised)**

C.O.E. No.: **MVN 2012- 0958- EII**

NAME: **CITY OF SLIDELL, LOUISIANA**
c/o H. DAVIS COLE & ASSOCIATES, LLC (HDCA)
1340 POYDRAS STREET SUITE 1850
NEW ORLEANS, LA 70112
Attn: David Martin

LOCATION: **Saint Tammany Parish, LA**
Lat. 30-16-24.02N, Long. 89-47-17.94W; Bayou Pattosat; 2200 Bayou Lane (approximate), Slidell, LA

DESCRIPTION: Improvements at the existing City Barn Drainage Pump Station which will include the construction of a new pre-cast concrete pump station work platform, installation of a new drainage pump and sheet piling, excavation for a new drainage pump sump and outfall pipe (including temporary dewatering) as well as excavation within the inlet channel to provide for additional storage capacity within Bayou Pattosat. Approx. 491 cu. yds. of native material will be displaced and approx. 14 cu. yds. of concrete will be required for project activities.

REVISION 1: Proposed replacement of an existing drainage pump and 36" discharge piping with a pumping capacity of 67 cubic feet per second with a new drainage pump and 48" discharge piping with a pumping capacity of 133 cubic feet per second as well as the lowering of the pump sump. Also, proposed construction of a new diesel storage facility to house a 2,000 gallon diesel storage tank. An additional 223 cu. yds. of native material will be displaced and 32 cu. yds. of concrete will be required for project activities.

This revised permit supersedes the original permit which was issued September 9, 2015.

In accordance with the rules and regulations of the Louisiana Coastal Resources Program and Louisiana R.S. 49, Sections 214.21 to 214.41, the State and Local Coastal Resources Management Act of 1978, as amended, the permittee agrees to:

1. Carry out, perform, and/or operate the use in accordance with the permit conditions, plans and specifications approved by the Department of Natural Resources.
2. Comply with any permit conditions imposed by the Department of Natural Resources.
3. Adjust, alter or remove any structure or other physical evidence of the permitted use if, in the opinion of the Department of Natural Resources, it proves to be beyond the scope of the use as approved or is abandoned.
4. Provide, if required by the Department of Natural Resources, an acceptable surety bond in an appropriate amount to ensure adjustment, alteration, or removal should the Department of Natural Resources determine it necessary.
5. Hold and save the State of Louisiana, the local government, the department, and their officers and employees harmless from any damage to persons or property which might result from the use, including the work, activity, or structure permitted.
6. Certify that the use has been completed in an acceptable and satisfactory manner and in accordance with the plans and specifications approved by the Department of Natural Resources. The Department of Natural Resources may, when appropriate, require such certification to be given by a registered professional engineer.
7. All terms of the permit shall be subject to all applicable federal and state laws and regulations.
8. This revised permit, or a copy thereof, shall be available for inspection at the site of work at all times during operations.
9. The applicant will notify the Office of Coastal Management of the date on which initiation of the permitted activity described under the "Coastal Use Description" began. The applicant shall notify the Office of Coastal Management by entering a commencement date through the online system, or by mailing said information to OCM.
10. Unless specified elsewhere in this revised permit, this revised permit authorizes the initiation of the coastal use described under "Coastal Use Description" for two (2) years from the date of the signature of the Secretary or his designee on the original permit which was September 9, 2015. If the coastal use is not initiated within this two (2) year period, then this revised permit will expire and the applicant will be required to submit a new application. Initiation of the coastal use, for the purposes of this permit, means the actual physical beginning of the use of activity for which the permit is required. Initiation does not include preparatory activities, such as movement of equipment onto the coastal use site, expenditure of funds, contracting out of work, or performing activities which by themselves do not require a permit. In addition, the permittee must, in good faith, and with due diligence, reasonably progress toward completion of the project once the coastal use has been initiated.
11. The following special conditions must also be met in order for the use to meet the guidelines of the Coastal Resources Program:

a. This revised permit does not convey any property rights, mineral rights, or exclusive privileges; nor does it authorize injury to property.

b. All fill/spoil material to be hauled off-site shall be disposed of at a State approved facility.

c. Structures must be marked/lighted in accordance with U. S. Coast Guard regulations.

d. All logs, stumps and other debris encountered during dredging activities shall be removed from the site during or immediately after the activity and disposed of in accordance with all applicable laws and regulations.

e. All structures built under the authorization and conditions of this permit shall be removed from the site within 120 days of abandonment of the facilities for the herein permitted use, or when these structures fall into a state of disrepair such that they can no longer function as intended. This condition does not preclude the necessity for revising the current permit or obtaining a separate Coastal Use Permit, should one be required, for such removal activities.

f. That permittee shall insure that all sanitary sewage and/or related domestic wastes generated during the subject project activity and at the site, thereafter, as may become necessary shall receive the equivalent of secondary treatment (30 mg/l BOD5) with disinfection prior to discharge into any of the streams or adjacent waters of the area or, in the case of total containment, shall be disposed of in approved sewerage and sewage treatment facilities, as is required by the State Sanitary Code. Such opinion as may be served by those comments offered herein shall not be construed to suffice as any more formal approval(s) which may be required of possible sanitary details (i.e. provisions) scheduled to be associated with the subject activity. Such shall generally require that appropriate plans and specifications be submitted to the Department of Health and Hospitals for purpose of review and approval prior to any utilization of such provisions.

g. Permittee is subject to all applicable state laws related to damages which are demonstrated to have been caused by this action.

h. Permittee shall allow representatives of the Office of Coastal Management or authorized agents to make periodic, unannounced inspections to assure the activity being performed is in accordance with the conditions of this permit.

i. Permittee shall comply with all applicable state laws regarding the need to contact the Louisiana One Call (LOC) system (1-800-272-3020) to locate any buried cables and pipelines.

j. This revised permit authorizes the initiation of the Coastal Use described under "Coastal Use Description" for two (2) years from the date of the signature of the Secretary or his designee on the original permit which was September 9, 2015. Initiation of the Coastal Use, for purposes of this revised permit, means the actual physical beginning of the use or activity for which the permit is required. Initiation does not include preparatory activities, such as movement of equipment onto the Coastal Use site, expenditure of funds, contracting out of work, or performing activities which by themselves do not require a permit. In addition, Permittee must, in good faith and with due diligence, reasonably progress toward completion of the project once the Coastal Use has been initiated. If the Coastal Use is not initiated within this two (2) year period, an extension may be granted pursuant to the requirements contained in the Rules and Procedures for Coastal Use Permits (Title 43:I.723.D.). Please note that a request for permit extension MUST be made no sooner than one hundred eighty (180) days and no later than sixty (60) days prior to the expiration of the permit.

The expiration date of this revised permit is five (5) years from the date of the signature of the Secretary or his designee on the original permit which was September 9, 2015. If the Coastal Use is not completed within this five (5) year period, an extension may be granted pursuant to the requirements contained in the Rules and Procedures for Coastal Use Permits (LAC 43:I.723(D)).

Upon expiration of this revised permit, a new Coastal Use Permit will be required for completion of any unfinished or uncommenced work items and for any maintenance activities involving dredging or fill that may become necessary. Other types of maintenance activities may also require a new Coastal Use Permit.

k. This determination does not eliminate the need to obtain a permit from the United States Army, Corps of Engineers or any other Federal, state or local approval that may be required by law. The drawings submitted with your referenced application are attached hereto and made a part of the record.

********** End of Conditions **********

By accepting this revised permit the applicant agrees to its terms and conditions.

I affix my signature and issue this revised permit this 21st day of May, 2018.

THE DEPARTMENT OF NATURAL RESOURCES

Keith Lovell, For Karl L. Morgan, Administrator
Office of Coastal Management

This agreement becomes binding when signed by Administrator of
the Office of Coastal Management Permits/Mitigation Division, Department of Natural Resources.

Attachments

Final Plats:

1) P20150247 Final Plats 05/10/2018

cc: Martin Mayer, COE w/attachments
Dave Butler, LDWF w/attachments
Johan Forsman, DHH w/attachments
Jessica Diez, OCM w/attachments
Craig Leblanc, OCM/FI w/attachments
Saint Tammany Parish w/attachments

CITY OF SLIDELL, LOUISIANA w/attachments

NOTE: Figure numbers after Figure 8 are incorrectly referenced in the text and Figures 12, 13, 16 and 17 (referenced as 10, 11, 13, and 14 in the text) on Pages 13,14,16, and 17 of the document were confidential and omitted from the attached document.

FEMA

U.S. Department of Homeland Security
Federal Emergency Management Agency
FEMA-1603/1607 -DR-LA
FEMA Louisiana Recovery Office
Environmental/Historic Preservation
1500 Main Street
Baton Rouge, LA 70802

May 18, 2015

No known historic properties will be affected by this undertaking. This effect determination could change should new information come to our attention.

Pam Breaux 5-21-15
Pam Breaux Date
State Historic Preservation Officer

Pam Breaux
State Historic Preservation Officer
Department of Culture, Recreation & Tourism
P.O. Box 44247
Baton Rouge LA 70804

RE: Section 106 Review Consultation, Hurricane Katrina, FEMA-1603-DR-LA
Applicant: **City of Slidell, Louisiana**
Undertakings: **City Barn Drainage Improvements Project,**
Latitude 30.273241 and Longitude -89.788288,
Eastwood Drainage Improvements Project,
Latitude 30.277724 and Longitude -89.760399, and
Markham-Peachtree Storm Drain Line Improvements Project,
Latitude 30.253132 and Longitude -89.784820,
Slidell, Louisiana in St. Tammany Parish
(HMGP Project# 1603-0321)
Determination: No Effect to Historic Properties

Dear Ms. Breaux:

The Federal Emergency Management Agency (FEMA) will be providing funds authorized under the Robert T. Stafford Disaster Relief and Emergency Assistance Act, P.L. 93-288, as amended, in response to the following major Disaster Declarations:

FEMA-1603-DR-LA, dated August 29, 2005, as amended.

FEMA, through its 404 Hazard Mitigation Grant Program (HMGP) proposes to fund Drainage Improvement (Undertaking) as requested by the City of Slidell (Applicant) (see Figure 1 for project locations). FEMA is initiating Section 106 review for the above referenced properties in accordance with the Louisiana State-Specific Programmatic Agreement among FEMA, the Louisiana Governor's Office of Homeland Security and Emergency Preparedness (GOHSEP), the Louisiana State Historic Preservation Officer of the Department of Culture Recreation and Tourism (SHPO), the Alabama-Coushatta Tribe of Texas (ACTT), the Chitimacha Tribe of Louisiana (CTL), the Choctaw Nation of Oklahoma (CNO), the Jena Band of Choctaw Indians (JBCI), the Mississippi Band of Choctaw Indians (MBCI), the Seminole Tribe of Florida (STF), and the Advisory Council on Historic Preservation (ACHP) regarding FEMA's Hazard Mitigation Grant Program (2011 LA HMGP PA) dated January 31st, 2011 and providing the State Historic Preservation Office with the opportunity to consult on the proposed Undertaking. Documentation in this letter is consistent with the requirements in 36 CFR §800.11(d).

Description of the Undertaking

The undertaking is intended to improve drainage infrastructure in three (3) separate areas of the City of Slidell. The locations referenced include: 1) the City Barn Drainage Improvements Project, 2) the Eastwood Drainage Improvements Project, and 3) the Markham-Peachtree Storm Drain Line Improvements Project. See

Figure 1 showing locations and Right-of-Ways (ROW) and/or Areas of Potential Effect (APE) for the proposed projects.

The City Barn Drainage Pump
The City Barn Drainage Pump Station is located near the historic area of Slidell between the railroad and Bayou Bonfouca. The Scope of Work (SOW) for the City Barn Drainage Improvements Project APE at the station calls for removing and reconstructing an access ramp from a parking area to a pumping station situated on the confluence of Bayous Pattosat and Bonfouca, expanding the size of the station from approximately 8.5 x 14 meters (28 x 45 feet) to 8.5 x 20 meters (28 x 65 feet) by adding a precast working deck measuring approximately 6 x 8.5 meters (20 x 28 feet) to the existing deck, installing a new diesel driven vertical-type drainage pump, dredging the channel bottom of the Bayou Pattosat to allow for the installation of the new pump, installing an outlet pipe from the new pump through a levee and into Bayou Bonfouca, and excavating an area measuring approximately 12 x 61 meter (40 x 200 feet) along the western side of Bayou Pattosat in order to expand the width of the inlet channel. See Figures 2-3, details for the design plans for details of the SOW.

Eastwood Storm Drain Line
The St. Tammany Parish Eastwood Storm Drain Line Improvements Project is located in Lakewood Subdivision in Slidell. The existing drainage system is composed of reinforced concrete pipe and box culverts buried along the back yards of properties between Fremaux Avenue and Eastwood Drive and storm water enters the system through curb and grate inlets along the roadways of the subdivision. The SOW for this project includes the filling and plugging of the existing 36 inch reinforced concrete pipe and 32 by 36 inch box culvert and replacing the drain system with a four by six feet precast reinforced concrete box culvert along the southern side Fremaux Avenue. An extension of the existing box culvert with dual five by eight feet reinforced concrete box culverts is also required. As part of the project, the southern part of the asphalt street, some sidewalks and driveways, and drainage inlets along Fremaux Avenue will be removed and replaced. The SOW meets allowances defined in the Louisiana State-Specific Programmatic Agreement Regarding FEMA's Hazard Mitigation Grant Program dated January 31, 2011 (2011 LA HMGP PA), Appendix C: Programmatic Allowances, Items I.A., II.B.1, V.D., and V.G. Due to this, FEMA will not be developing an APE nor will we be consulting further on this portion of the Undertaking.

Markham-Peachtree Storm Drain Line
The SOW for the Markham-Peachtree Storm Drain Line Improvement Project APE calls for re-grading and shaping 55 meters (180 feet) of a drainage ditch from an existing box culvert to an existing bridge located on Olive Drive, removing 103 meters (337 feet) of existing underground box culvert which is to be replaced with an open ditch, and removing 286 meters (939 feet) of existing box culvert which is to be replaced with an open top flume structure measuring six feet in height by ten feet in width. Additional ground disturbing activities will include clearing vegetation and debris; removing trees and obstructions such as two metal sheds, two frame sheds, two aboveground swimming pools, and fences from the utility easement or servitude; excavation and embankment; scarification and compaction that will include undercutting and replacing unsuitable soils; building storm drains; rerouting pool drainage; construction of erosion control systems using granular material as backfill; relocating and adjusting water distribution systems; removing materials for building retaining walls and foundations; and sheet piling driving for flume walls and wing walls. Additionally, a wooded area adjacent to the ROW, on property owned by the Lakeside Swim Club, will be used during construction as a staging and/or parking area.

Areas of Potential Effect (APE)

In accordance with Stipulation VII.B.1 of the 2011 LA HMGP PA, the APE for both the standing structures and archaeology is defined as the individual facility when an undertaking is limited to retrofit as defined in

36 CFR 68.2(b) of an individual facility's interior or exterior as defined in 44 CFR 206.201(c) with associated ground disturbance.

The City Barn Drainage Pump: APE
The APE for the City Barn Drainage Improvements Project consists of two areas where excavating will be done and an area that will be used as a staging area. A plan view encompassing all the areas is shown in Figure 2. Photos of the area attached (Figures 4-8).

The first area is situated on the levee containing outlet pipes extending west from the pumps into Bayou Bonfouca and the Bayou Pattosat channel adjacent to the levee. The a section of levee that will be excavated in order for a new outlet pipe to be set in measures approximately eight meters (26 feet) from north to south by 14 meters (46 feet) from west to east encompassing a total of 112 square meters (0.03 acres). Figure 3 is profile view of new pump and outlet pipe running through the levee and Figure 4, 5 and 6 are photographs of the existing pumping station and levee between Bayous Pattosat and Bonfouca. The second area is located on the southern bankline of Bayou Pattosat where soil will be dredged from the bayou and hauled away along a road situated between the bayou and the neighboring Textron facility (Figure 7). The bankline that will be removed measures approximately 28 meters (92 feet) from north to south by 127 meters (417 feet) from west to east encompassing a total of 3,556 square meters (0.36 acres). The area to be used for staging purposes is situated within an open area northwest of the pumping station and is presently being used for storing pipes and other drainage maintenance type materials (Figure 8). The area measures approximately 72 meters (236 feet) from northwest to southeast by 83 meters (272 feet) from southwest to northeast including areas that are presently being used for storage purposes. The area equals 5,976 square meters (1.48 acres).

Markham-Peachtree Storm Drain Line: APE
The APE for the Markham-Peachtree Improvements Project consists of the construction Right-of-Way (ROW) and the wooded area to the north of the Lakeside Swim Club, located at 497 Cumberland Street. The location of the APE is shown in Figure 9. The APE encompasses all construction work and staging for this project and is approximately 1.69 acres in size.

Identification and Evaluation

Historic Properties within the APE were identified based on FEMA's review of the National Register of Historic Places (NRHP) database, the Louisiana Cultural Resources Map, historic map research conducted on March 4, 2015, and a site visit conducted on November 1, 2009 and March 17, 2015 by FEMA Historic Preservation staff. This data was evaluated by FEMA using the National Register (NR) Criteria.

The City Barn Drainage Pump
Based on data provided by the LA SHPO's Office, FEMA learned that Sites 16ST145, 16ST152, 16ST205, and 16ST228 were located within one half of a mile of the APE of the City Barn Drainage Improvements Project and Site 16ST225 was located within one mile of the APE (Figure 10 and Figure 11). Site 16ST145 is the presently used Our Lady of Lourdes Catholic Cemetery with the earliest grave marker dating to 1835 and the eligibility status of the site being listed on the National Register of Historic Places (NRHP) has not been determined. Site 16ST152, the Salmen Brick Factory or Salmen Brothers Brick and Lumber Company was reported as a brick and lumber yard with remains of multiple brick floors, a foundation, and four machinery piers (Williams et al 1996; Hunter and Duay 1998; Ryan and Duplantis 2001; Eberwine et al. 2007) and had previously been determined as being eligible for listing on the NRHP. Site 16ST205, Brock Elementary Locus 1, was an historic artifact scatter dating from the early to mid-20th century and lacking in depositional integrity to consider it eligible for listing on the NRHP (Eberwine et al. 2007). Site 16ST228 was the former Our Lady of Lourdes Catholic Church Compound which consisted of late 19th to early 20th century features representing a brick facade foundation footing, brick pier footings, and a concrete swimming pool and had been determined as being ineligible for listing on the (NRHP) (Martin and Wolke 2010). Site

16ST225 was an historic artifact scatter representing a circa 1900 dump that had been determined as being ineligible for listing on the NRHP.

Additionally, FEMA reviewed a series of aerial images and historic topographic maps for this location provided via NETR Online (www.historicalaerials.com). Aerial Images and USGS Topo maps reflect the current landscape from the present to c. 1980, when the current drainage way is photo revised on to the location. Prior to 1980, land form to be removed is either non-existent as represented through the 1969 aerial image or partially non-existent as demonstrated on the USGS quad maps that date from 1964 to 1935. Generally speaking, the drainage area is larger and towards the south. The earliest available 7.5' USGS map of this location is the Slidell Quad from 1935. On this map the location appears to be an extension of Bayou Bonfouca into a turning basin to support the Salmen Bick Factor (Figure 13).

Because of the APE's close proximity to Bayou Bonfouca and the former location of the Salmen Brick Factory, Site 16ST152 two visits to the APE were conducted. The first visit was done on October 1, 2009 by Jason Emery, FEMA's SHPO liaison, and Pamela Pyatt, an HMGP Specialist/Archaeologist for FEMA. During the visit, three shovel tests were excavated along the section of property on the west side of the bayou. No intact cultural deposits were identified and the soils appeared to mottled mixture of sediments deposited during the last few decades of the twentieth century (Figure 12). FEMA Archaeologists Jason Emery and Maria Tavaszi revisited the APE on March 17, 2006 and confirmed that the newly proposed ground disturbing activities would be confined to previously disturbed or recently deposited areas.

Markham-Peachtree Storm Drain Line
FEMA Archaeologists Jason Emery and Maria Tavaszi revisited the APE on March 17, 2006 and confirmed that the newly proposed ground disturbing activities appeared to be confined to previously disturbed areas and found no indication of archaeological deposits within the linear APE or the Staging APE.

Records review indicate that two archaeological sites: 16ST153, the Guzman site, and 16ST225 are within approximately 1.15 miles and 0.90 miles APE of the Markham-Peachtree project (Figure 13) and (Figure 14). Site 16ST153, the Guzman site, was a sparse brick and artifact scatter most likely representing an early 20th century house or camp and had been determined as being ineligible for listing on the NRHP and a stated before, Site 16ST225 was an historic artifact scatter representing a circa 1900 dump that had been determined as being ineligible for listing on the NRHP.

As noted in the undertaking, obstructions such as two metal sheds, two frame sheds, two above-ground swimming pools, and fences will be removed from the utility easement or servitude. All of these were built in the last 20 years and none of them meet the NRHP-eligibility criteria.

Additionally, FEMA archaeologists investigated the triangular Staging APE on May 1, 2015. The area was predominantly inundated with water (Figure 15) and contained shrubs and saplings (Figure 16), testing of the soils was limited to two shovel tests excavated in areas that were higher in elevation and dry enough to be tested. The first shovel test was dug near the westernmost extent of the property and the second was dug near the southeastern side of the property. See Figure 9 for locations of the shovel tests (STP1 and STP2). Soils in both tests were a mottled mixture of recently deposited sediments (Figure 17) most likely associated with the construction of the buried box culvert adjacent to the wooded area and no intact cultural deposits were identified.

Based on the available evidence, it is unlikely that intact NRHP-eligible archaeological deposits would encountered during the implementation of this undertaking, as the Slidell City Barn APE is either man-made berm, heavily utilized industrial area, or not containing archaeological deposits; and the Markham-Peachtree APE is either heavily disturbed by earlier drainage activities or not void of archaeological deposits as demonstrated through limited shovel testing.

Assessment of Effects

Based on the aforementioned identification and evaluation, FEMA has determined that there are no historic properties as defined in 36 CFR 800.16(l) within the APEs of the City Barn Drainage Improvements Project, the Eastwood Drainage Improvements Project, or the Markham-Peachtree Storm Drain Line Improvement Project. Therefore, FEMA has determined a finding of **No Historic Properties Affected** for this Undertaking and is submitting this Undertaking to you for your review and comment. FEMA requests your comments within 15 days.

We look forward to your concurrence with this determination. Should you have any questions or need additional information regarding this Undertaking, please contact me at (504) 247-7771 or jerame.cramer@fema.dhs.gov, or Kathryn Wollan, Lead Historic Preservation Specialist at (504) 289-1941 or kathryn.wollan@fema.dhs.gov Jason Emery, Lead Historic Preservation Specialist at (504) 570-7292 or jason.emery@fema.dhs.gov.

Sincerely,

TIFFANY R SPANN WINFIELD

Jeramé J. Cramer
Environmental Liaison Officer
FEMA-DR-1603-LA, FEMA-DR-1607-LA

References

Eberwine, James E, George Abry and William P. Athens
2007 *Results of the 2007 Phase I Cultural Resources Survey and Archaeological Inventory of the Brock Elementary School Project in St. Tammany Parish, Louisiana*. R. Christopher Goodwin and Associates, Inc. Submitted to the St. Tammany Parish School Board. Report on file at the Division of Archaeology, Louisiana Department of Culture, Recreation and Tourism, Baton Rouge.

Hunter, Don G. and Sylvia Duay
1998 *Cultural Resources Survey and Significance Evaluations of a Proposed Electrical Substation Site and Power Transmission Corridor, Slidell, St. Tammany Parish, Louisiana*. Coastal Environments, Inc. Submitted to the Central Louisiana Electric Company (CLECO). Report on file at the Division of Archaeology, Louisiana Department of Culture, Recreation and Tourism, Baton Rouge.

Martin, Robert W. and Dale Wolke
2010 *Cultural Reconnaissance Survey and Archaeological Monitoring of the Slidell City Hall Administrative Complex Building #2, St. Tammany Parish, Louisiana.* Department of Homeland Security, Federal Emergency Management Agency, New Orleans. Report on file at the Division of Archaeology, Louisiana Department of Culture, Recreation and Tourism, Baton Rouge.

Ryan, Joanne and Brad Duplantis
2001 *The Salmen Brick Factory, Archaeological Data Recovery at 16ST152, Slidell, St. Tammany Parish, Louisiana.* Coastal Environments, Inc. Submitted to the Central Louisiana Electric Company (CLECO). Report on file at the Division of Archaeology, Louisiana Department of Culture, Recreation and Tourism, Baton Rouge.

Williams, Luis, Katherine Grandine, Kevin Hymel, Thomas Fenn, and William P. Athens
1996 *Cultural Resources Survey and Testing of the Schneider Canal Hurricane Protection Project, Slidell, St. Tammany Parish, Louisiana*. R. Christopher Goodwin and Associates, Inc. Submitted to NODCOE. Report on file at the Division of Archaeology, Louisiana Department of Culture, Recreation and Tourism, Baton Rouge.

CC: File
State Historic Preservation Office

Enclosures

Figure 1. Aerial Image showing the proposed locations of the City Barn, Eastwood, and Markham-Peachtree Drainage Improvements Projects in Slidell, Louisiana.

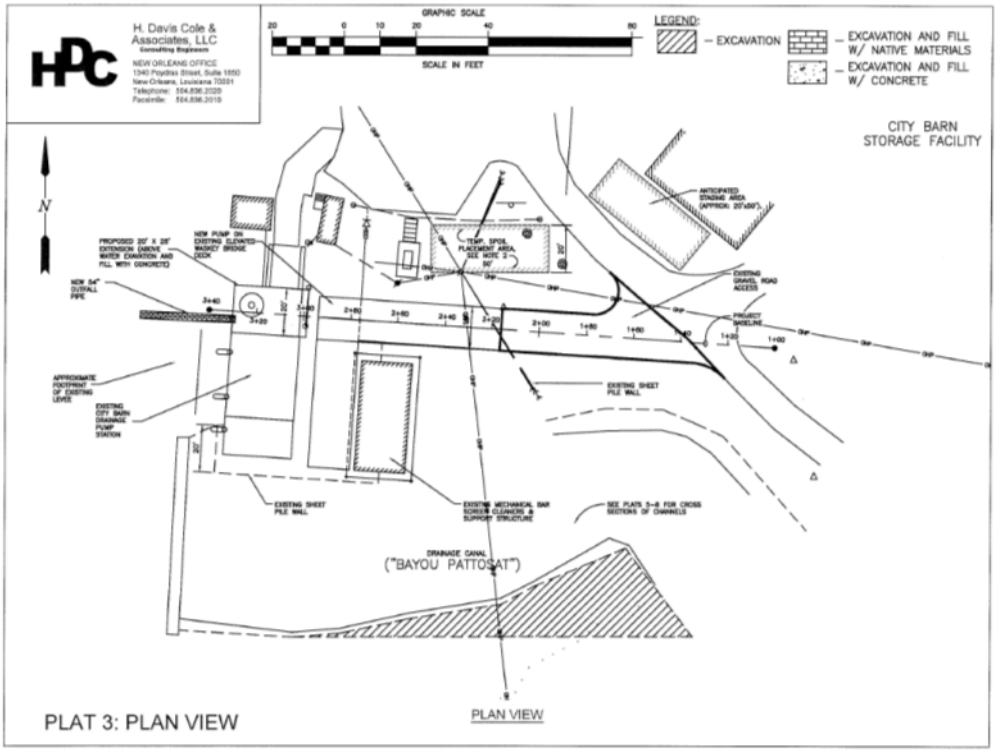


Figure 2. H. Davis Cole & Associates Consulting Engineers plan view for the **City Barn Drainage** Improvements Project in Slidell.

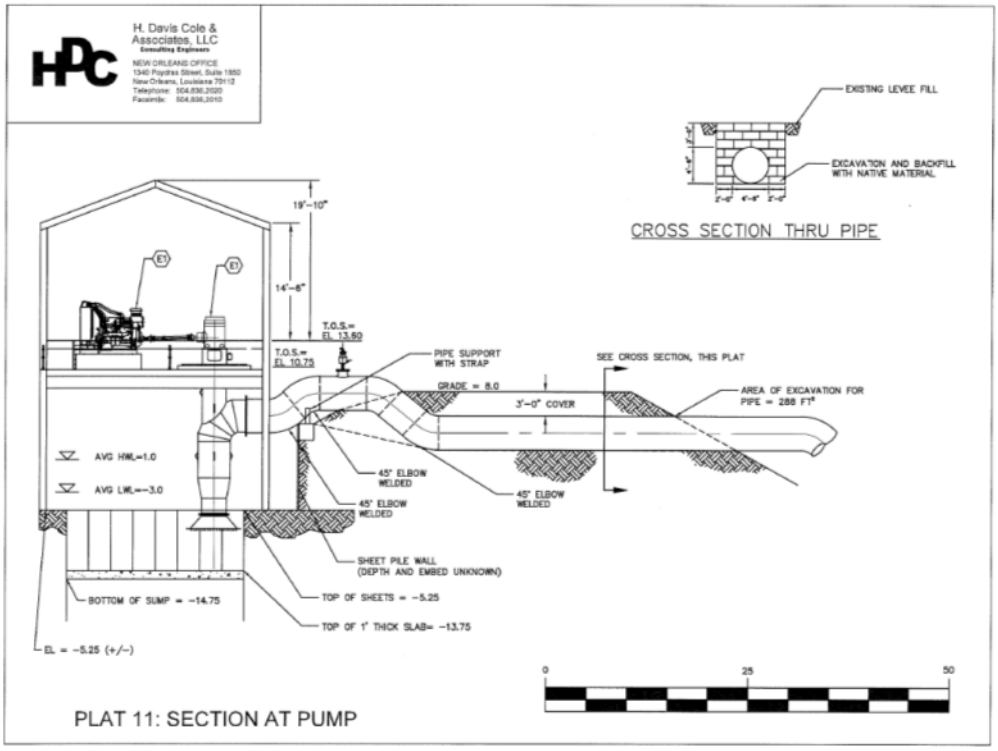


Figure 3. H. Davis Cole & Associates Consulting Engineers profile view of new pump and outlet pipe running through levee for the **City Barn Drainage** Improvements Project in Slidell.

Figure 4. View of outlet pipes from pumping station for **City Barn Drainage** on Bayou Pattosat through earthen embankment facing southwest.

Figure 5. **City Barn Drainage** : Northwest facing view of earthen embankment (overlooking Bayou Bonfouca) that will be impacted during construction.

Figure 6. **City Barn Drainage**: Northwest facing view of an existing outlet pipe on the Bayou Bonfouca side of the earthen embankment.

Figure 7. **City Barn Drainage**: Land along Bayou Pattosat facing south and road between the land along Bayou Pattosat and the Textron facility facing south.

Figure 8. **City Barn Drainage**: Area east of the pumping station proposed to be used as a staging area for the City Barn Drainage Improvements Project in Slidell.

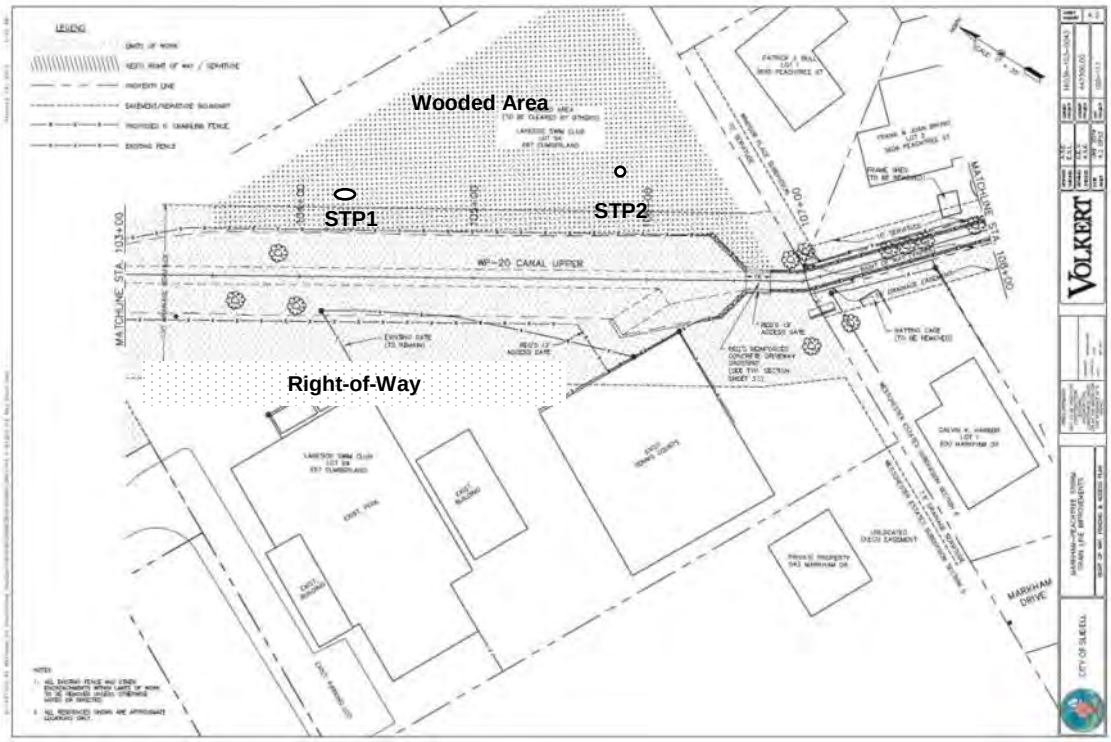


Figure 9. **Markham-Peachtree Drainage Way**: Staging Area APE shown in relation to the construction Right-of-Way (adapted from Volkert Engineering Services' construction plan).

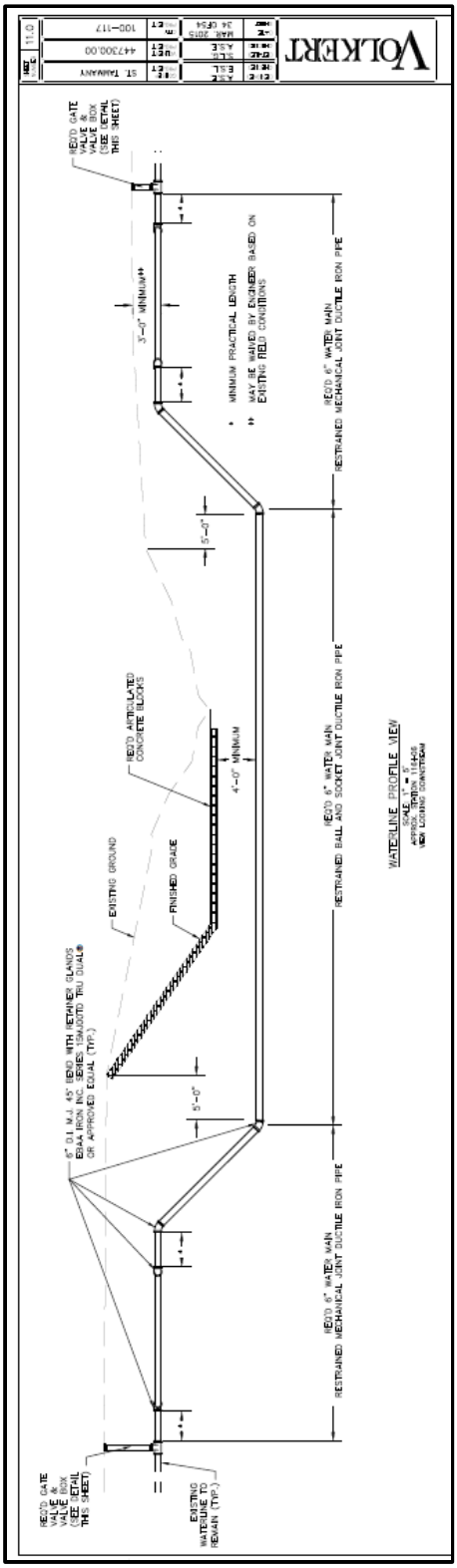


Figure 10. **Markham-Peachtree Drainage Way**: Detail of how the current drainage way will be typically altered to increase the drainage capacity. The dashed line is the existing ditch profile and the dark-hashed line is the intended final profile. Also, shows how the project addresses pipeline crossings.

Figure 11. **Markham-Peachtree Drain Line**: Photograph of the Staging APE for the Drain Line Improvements Project shown on the left in relation to the construction Right-of-Way shown in the center.

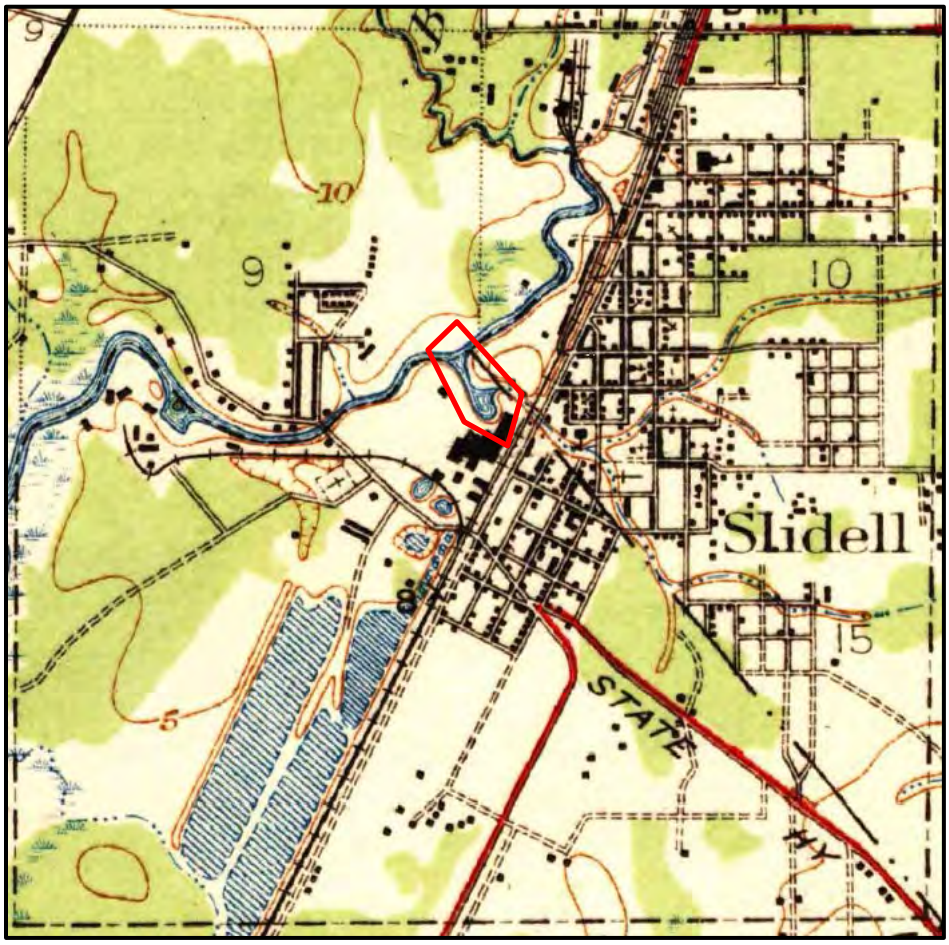


Figure 14. Detail of the 1935 15' Slidell Map, Note the interpreted turning basin outlined in red.

Figure 15. Shovel test along Bayou Pattosat shoving the mottled mixture of sediments.

Figure 18. Photograph showing an example of areas inundated with water in the APE of the Markham-Peachtree Drainage Improvements Project APE facing northwest.

Figure 19. Photograph showing dense shrubs and saplings in the APE of the Markham-Peachtree Drainage Improvements Project APE facing northwest.

Figure 20. Photograph of STP2 in the APE of the Markham-Peachtree Drainage Improvements Project facing east.

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, NEW ORLEANS DISTRICT
7400 LEAKE AVENUE
NEW ORLEANS LA 70118-3651

REPLY TO
ATTENTION OF

Operations Division
Eastern Evaluation Section

OCT 17 2016

Subject: MVN 2012-0958-EII

City of Slidell Louisiana
Post Office Box 828
Slidell, Louisiana 70459

Gentlemen:

The proposed work (installation and maintenance of a new drainage pump at 2200 Bayou Lane in Slidell in St. Tammany Parish), as shown on the enclosed drawings, is authorized under **Category I** of the **Programmatic General Permit** provided that all conditions of the permit are met.

This authorization has a blanket water quality certification from the Louisiana Department of Environmental Quality; therefore, no additional authorization from DEQ is required.

However, prior to commencing work on your project, you must obtain approvals from state and local agencies as required by law and by terms of this permit. These approvals include, but are not limited to, a permit, consistency determination or determination of "no direct or significant impact (NDSI) on coastal waters" from the Louisiana Department of Natural Resources, Office of Coastal Management.

This approval to perform work is valid for 5 years from the date of this letter.

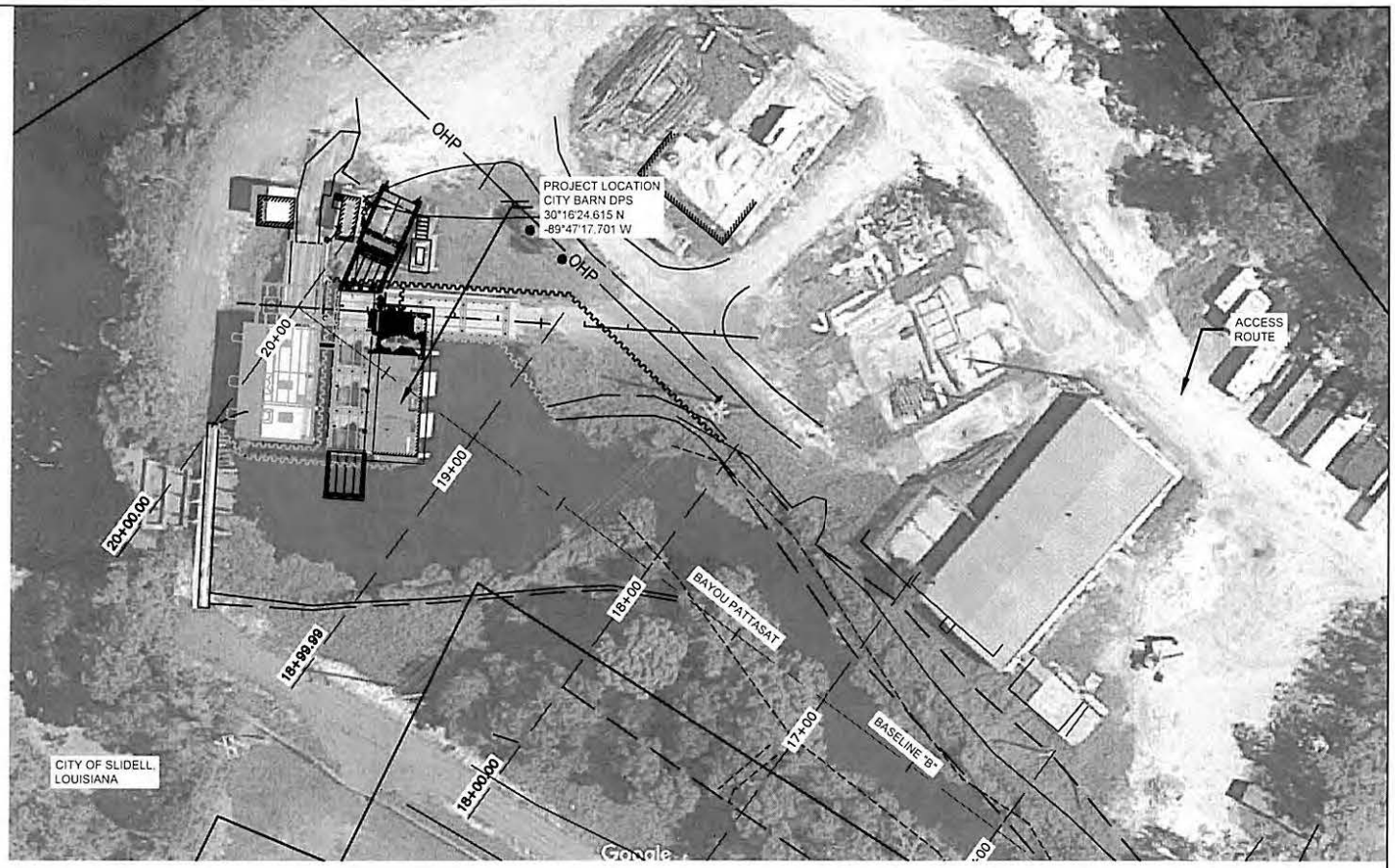
Permittee is aware that this office may reevaluate its decision on this permit at any time the circumstances warrant.

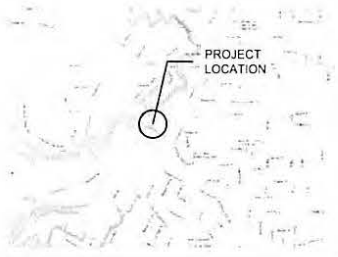
Should you have any further questions concerning this matter, please call Ed Wrubluski of this office at (504) 862-2822.

Sincerely,

for Martin S. Mayer
Chief, Regulatory Branch

Enclosures



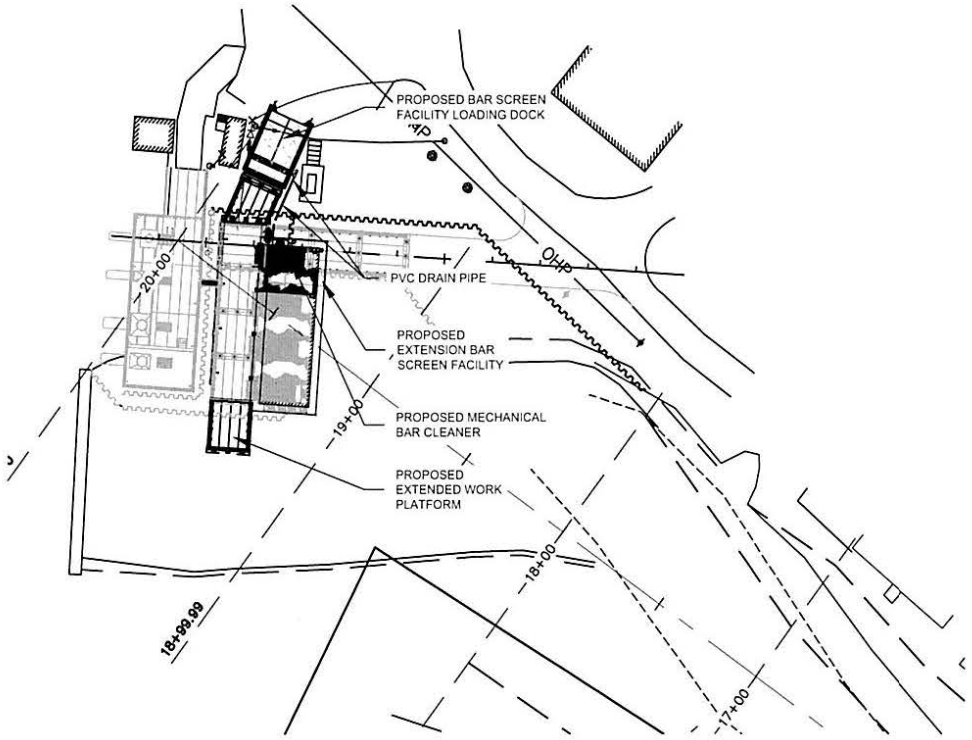


VICINITY MAP

NOT TO SCALE

CITY BARN DRAINAGE IMPROVEMENTS PROJECT
CITY OF SLIDELL, LOUISIANA
PLAT 1: VICINITY MAP

H. Davis Cole & Associates, LLC
Consulting Engineers
NEW ORLEANS OFFICE
1340 Poydras Street, Suite 1850
New Orleans, Louisiana 70112
Telephone: 504.836.2020
Facsimile: 504.836.2010



SITE PLAN VIEW

SCALE: 1" = 60'-0"

N

NOTES:
1. SEE PLATS 8-11 FOR CROSS SECTIONS OF PROPOSED CHANNEL EXCAVATION OF BAYOU PATTASAT.
2. SEE PLAT 13 FOR EXPLANATION OF QUANTITIES.

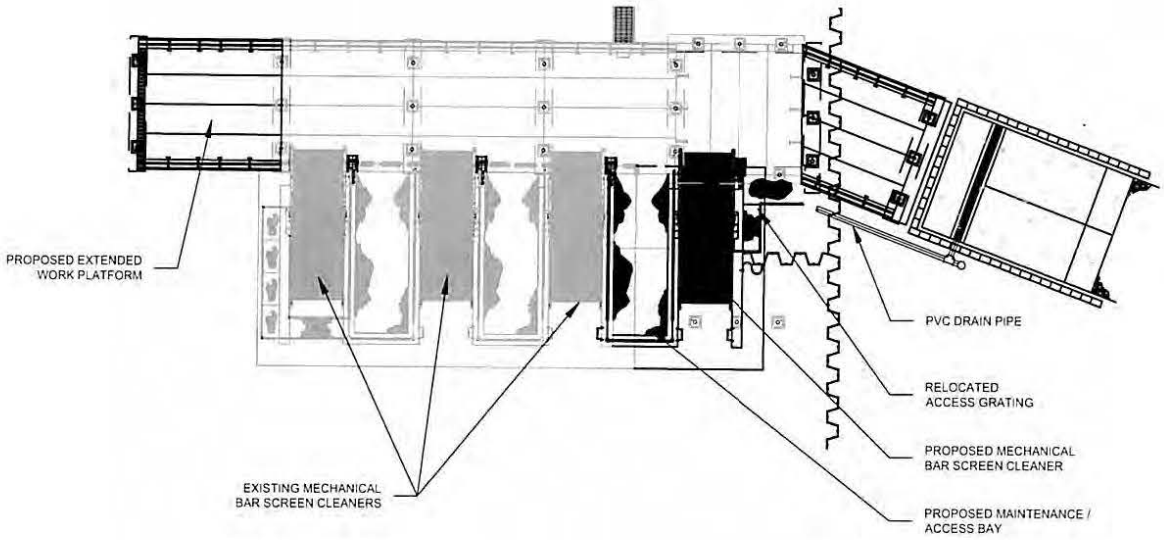
GRAPHIC SCALE

30 0 20 30 60 120

SCALE IN FEET

CITY BARN DRAINAGE IMPROVEMENTS PROJECT
CITY OF SLIDELL, LOUISIANA
PLAT 2: PLAN VIEW (SITE)

H. Davis Cole & Associates, LLC
Consulting Engineers
NEW ORLEANS OFFICE
1340 Poydras Street, Suite 1850
New Orleans, Louisiana 70112
Telephone: 504.836.2020
Facsimile: 504.836.2010



MECHANICAL PLAN VIEW (NEW SCREENS AND DECK)

SCALE: 1" = 20'-0"

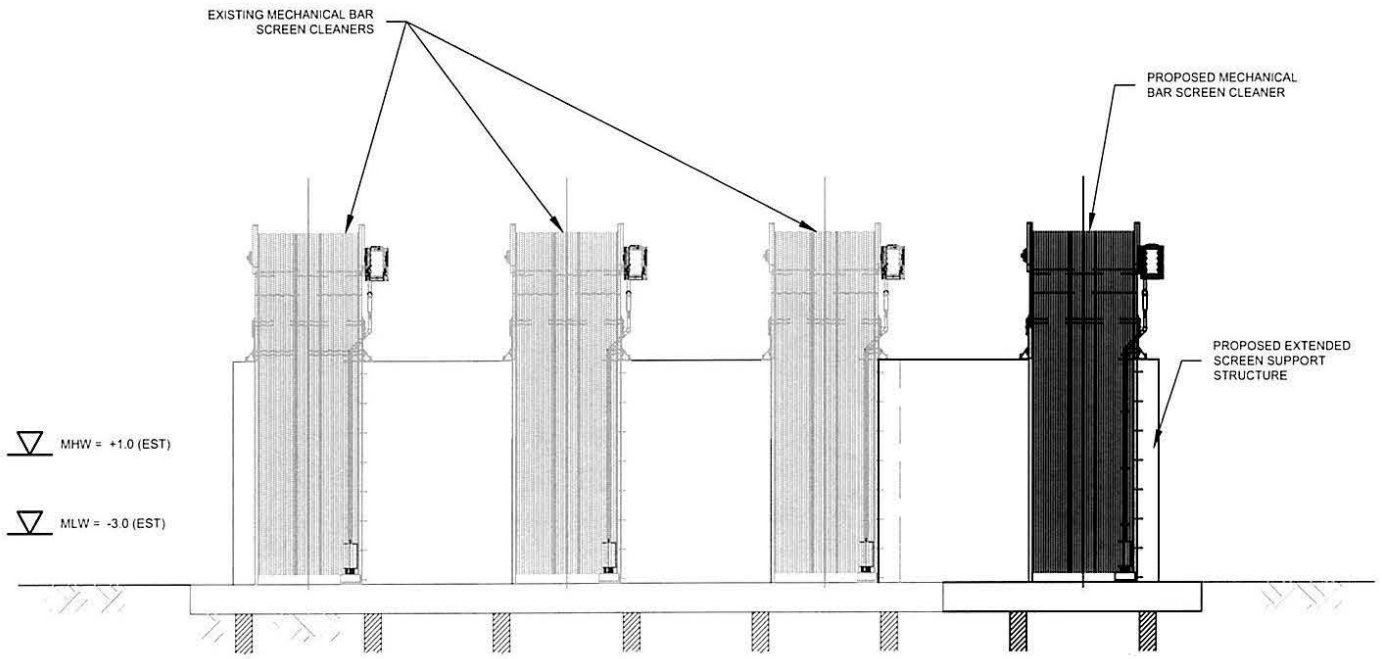
GRAPHIC SCALE

10 0 5 10 20 40

SCALE IN FEET

CITY BARN DRAINAGE IMPROVEMENTS PROJECT
CITY OF SLIDELL, LOUISIANA
PLAT 3: MECHANICAL PLAN

H. Davis Cole &
Associates, LLC
Consulting Engineers
NEW ORLEANS OFFICE
1340 Poydras Street, Suite 1850
New Orleans, Louisiana 70112
Telephone: 504.836.2020
Facsimile: 504.836.2010



MECHANICAL ELEVATION

SCALE: 1" = 10'-0"

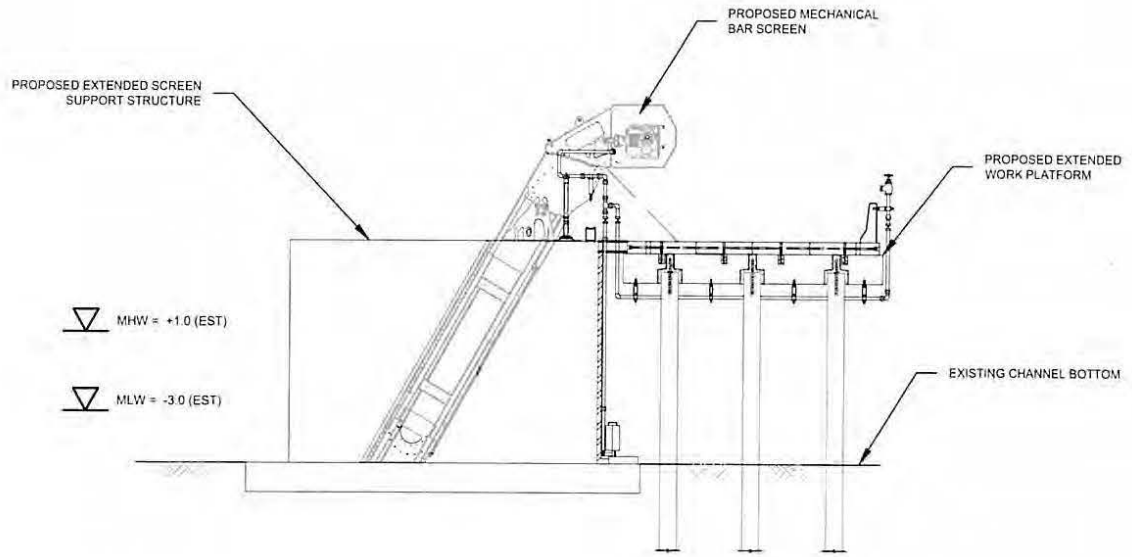
GRAPHIC SCALE

5 0 2.5 5 10 20

SCALE IN FEET

CITY BARN DRAINAGE IMPROVEMENTS PROJECT
CITY OF SLIDELL, LOUISIANA
PLAT 4: MECHANICAL ELEVATION

H. Davis Cole & Associates, LLC
Consulting Engineers
NEW ORLEANS OFFICE
1340 Poydras Street, Suite 1850
New Orleans, Louisiana 70112
Telephone: 504.836.2020
Facsimile: 504.836.2010



MECHANICAL SECTION

SCALE: 1" = 10'-0"

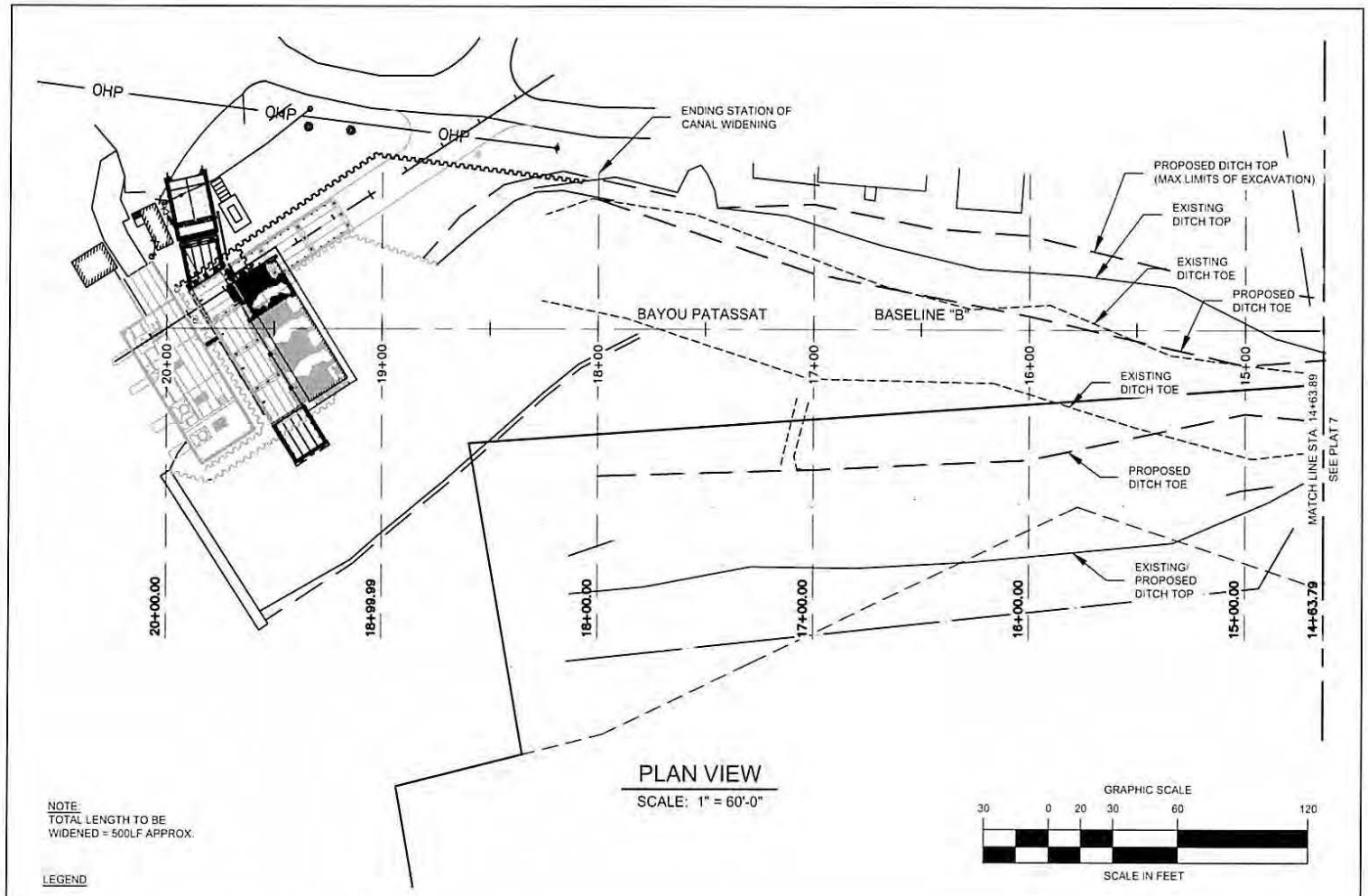
GRAPHIC SCALE

5 0 2.5 5 10 20

SCALE IN FEET

CITY BARN DRAINAGE IMPROVEMENTS PROJECT
CITY OF SLIDELL, LOUISIANA
PLAT 5: MECHANICAL SECTION

H. Davis Cole & Associates, LLC
Consulting Engineers
NEW ORLEANS OFFICE
1340 Poydras Street, Suite 1850
New Orleans, Louisiana 70112
Telephone: 504.836.2020
Facsimile: 504.836.2010



PLAN VIEW

SCALE: 1" = 60'-0"

GRAPHIC SCALE

30 0 20 30 60 120

SCALE IN FEET

NOTE:
TOTAL LENGTH TO BE WIDENED = 500LF APPROX.

LEGEND

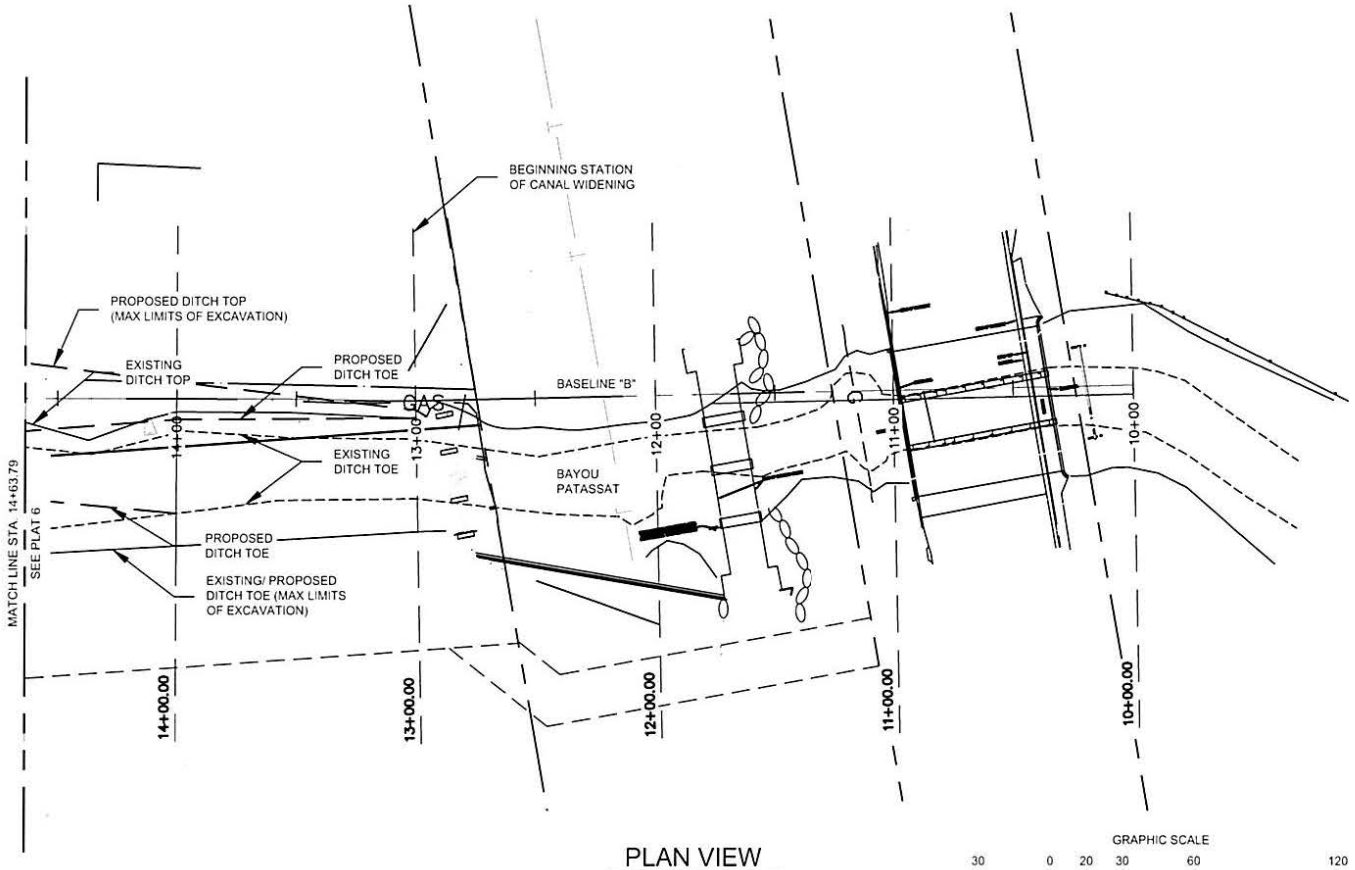
EXISTING DITCH TOP

PROPOSED DITCH TOP / TOE

EXISTING DITCH TOE

CITY BARN DRAINAGE IMPROVEMENTS PROJECT
CITY OF SLIDELL, LOUISIANA
PLAT 6: PLAN VIEW (BAYOU PATASSAT)

H. Davis Cole & Associates, LLC
Consulting Engineers
NEW ORLEANS OFFICE
1340 Poydras Street, Suite 1850
New Orleans, Louisiana 70112
Telephone: 504.836.2020
Facsimile: 504.836.2010



PLAN VIEW

SCALE: 1" = 60'-0"

GRAPHIC SCALE

30 0 20 30 60 120

SCALE IN FEET

NOTE:
TOTAL LENGTH TO BE
WIDENED = 500LF APPROX.

LEGEND

EXISTING DITCH TOP

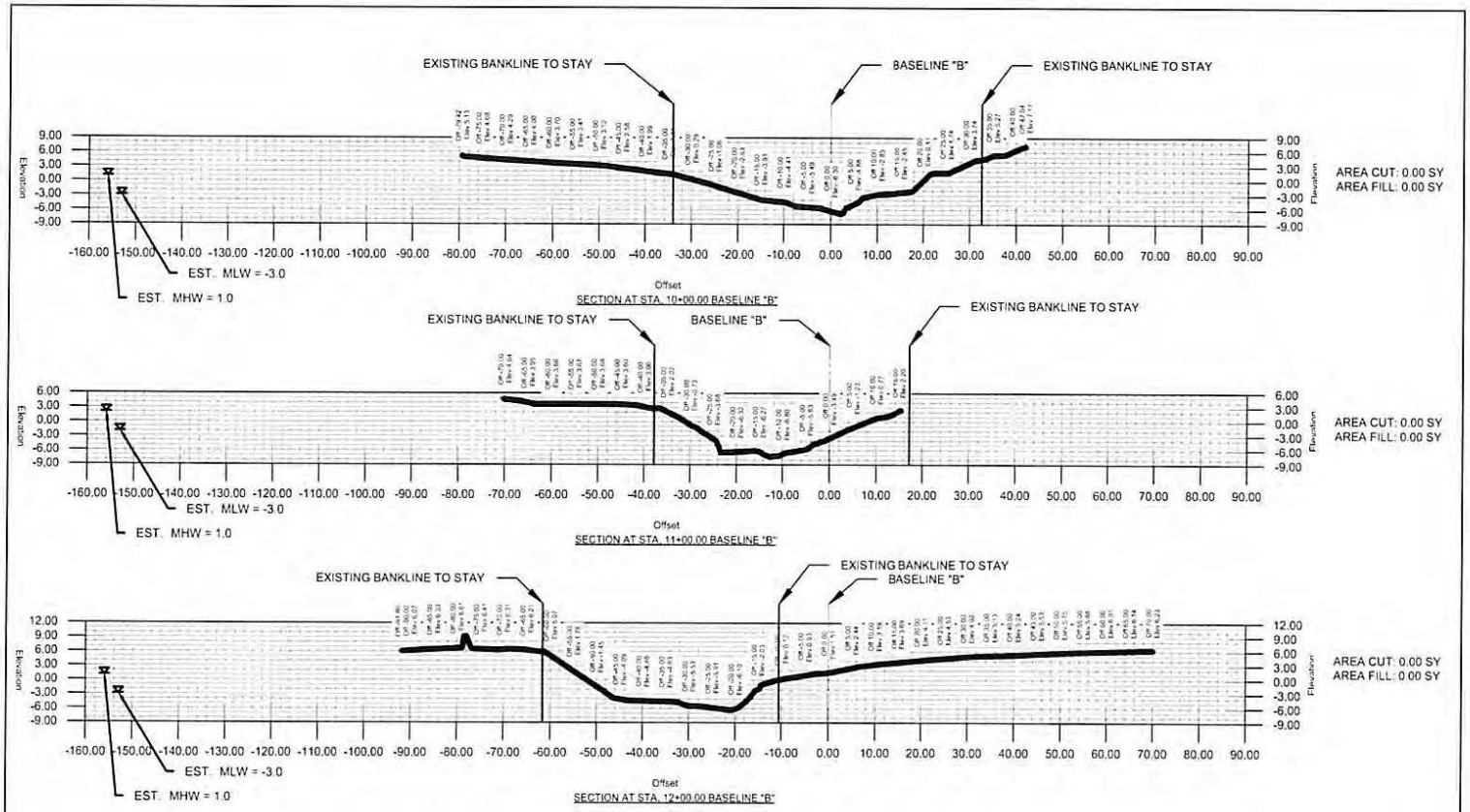
PROPOSED DITCH TOP / TOE

EXISTING DITCH TOE

CITY BARN DRAINAGE IMPROVEMENTS PROJECT
CITY OF SLIDELL, LOUISIANA
PLAT 7: PLAN VIEW (BAYOU PATASSAT)

H. Davis Cole & Associates, LLC
Consulting Engineers

NEW ORLEANS OFFICE
1340 Poydras Street, Suite 1850
New Orleans, Louisiana 70112
Telephone: 504.836.2020
Facsimile: 504.836.2010

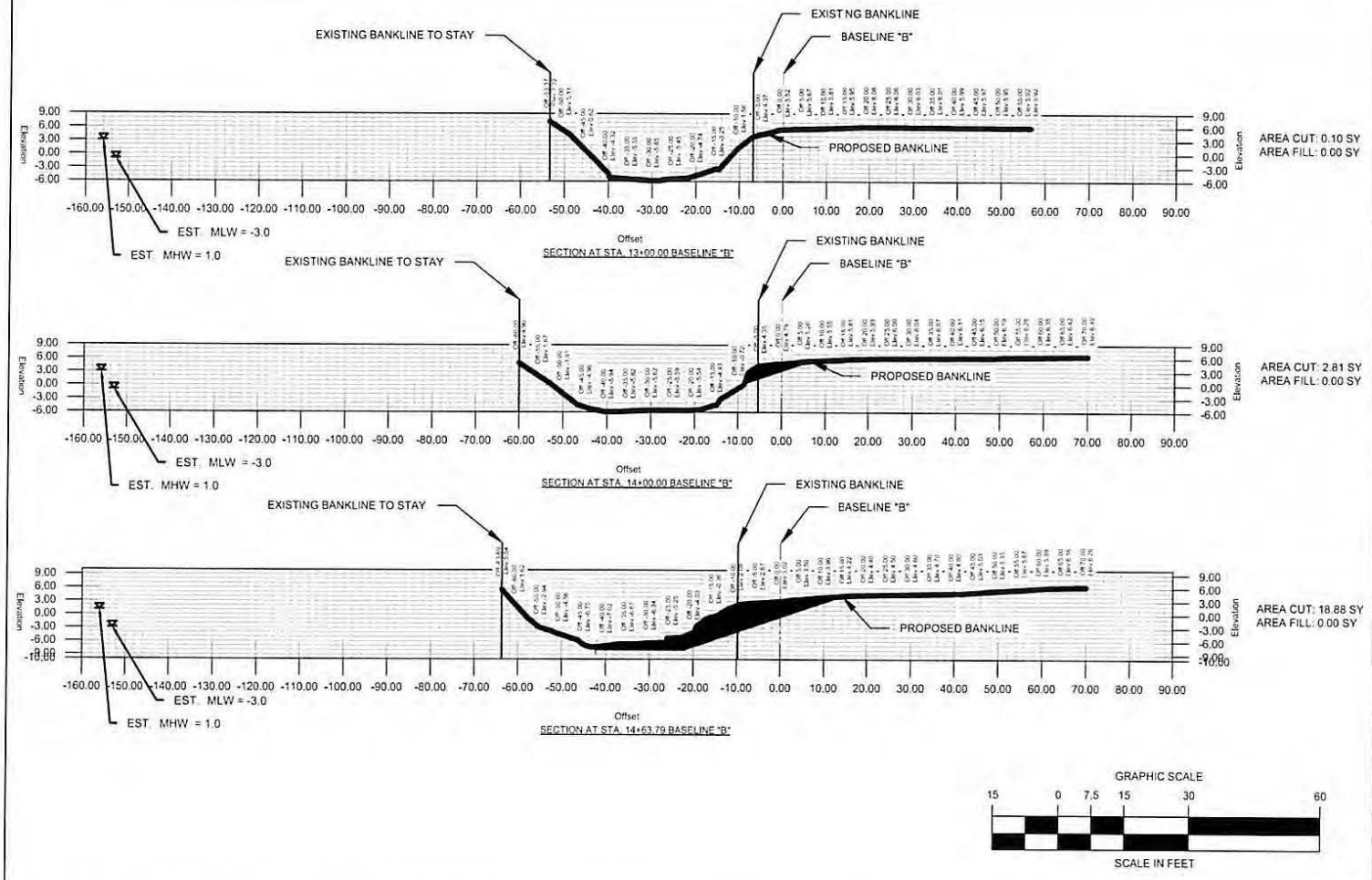


LEGEND:

EXCAVATION AND STOCKPILE OFF-SITE

CITY BARN DRAINAGE IMPROVEMENTS PROJECT
CITY OF SLIDELL, LOUISIANA
PLAT 8: CROSS SECTIONS

H. Davis Cole & Associates, LLC
Consulting Engineers
NEW ORLEANS OFFICE
1340 Poydras Street, Suite 1850
New Orleans, Louisiana 70112
Telephone: 504.836.2020
Facsimile: 504.836.2010

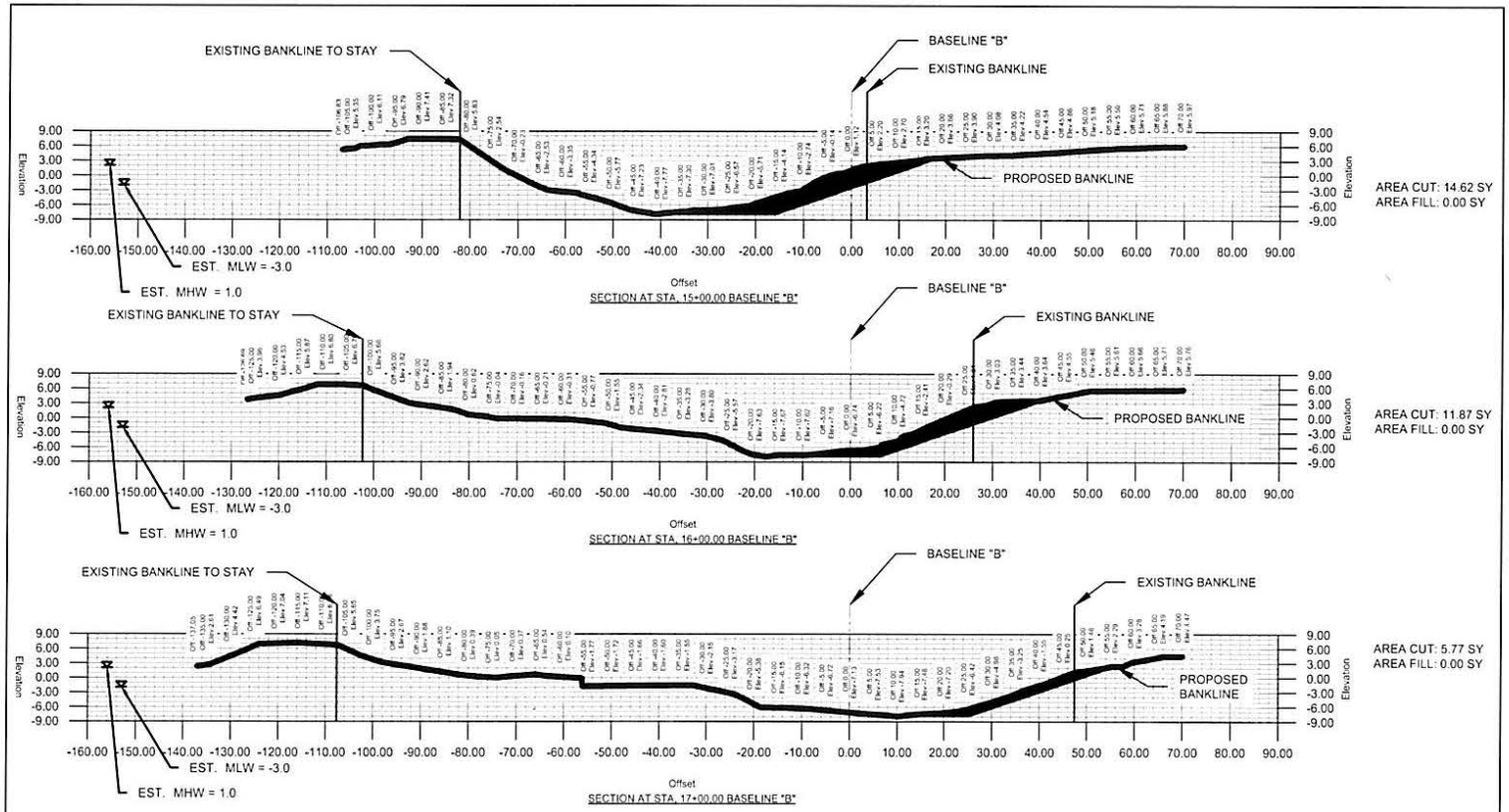


LEGEND:

EXCAVATION AND STOCKPILE OFF-SITE

CITY BARN DRAINAGE IMPROVEMENTS PROJECT
CITY OF SLIDELL, LOUISIANA
PLAT 9: CROSS SECTIONS

H. Davis Cole & Associates, LLC
Consulting Engineers
NEW ORLEANS OFFICE
1340 Poydras Street, Suite 1850
New Orleans, Louisiana 70112
Telephone: 504.836.2020
Facsimile: 504.836.2010



GRAPHIC SCALE

15 0 7.5 15 30 60

SCALE IN FEET

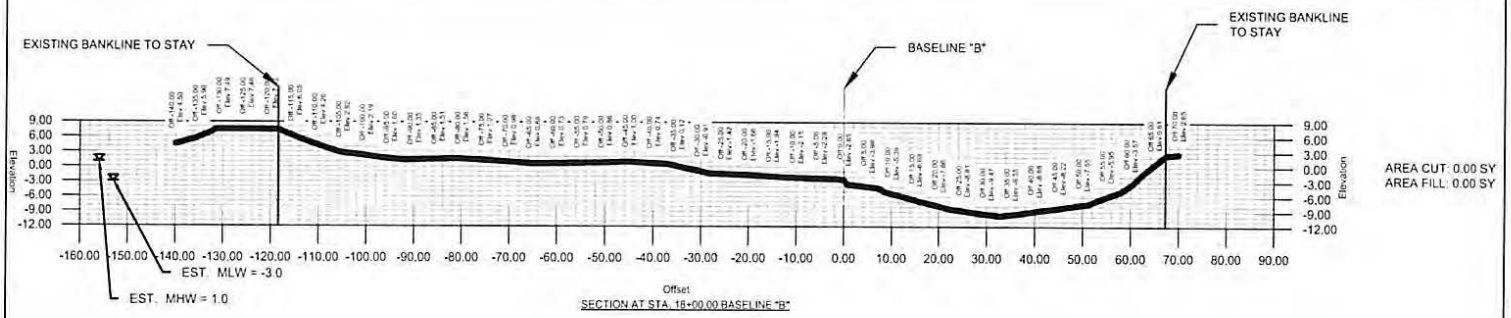
LEGEND:

EXCAVATION AND STOCKPILE OFF-SITE

CITY BARN DRAINAGE IMPROVEMENTS PROJECT
CITY OF SLIDELL, LOUISIANA
PLAT 10: CROSS SECTIONS

H. Davis Cole & Associates, LLC
Consulting Engineers

NEW ORLEANS OFFICE
1340 Poydras Street, Suite 1850
New Orleans, Louisiana 70112
Telephone: 504.836.2020
Facsimile: 504.836.2010



SECTION AT STA. 16+00.00 BASELINE "B"

GRAPHIC SCALE

15 0 7.5 15 30 60

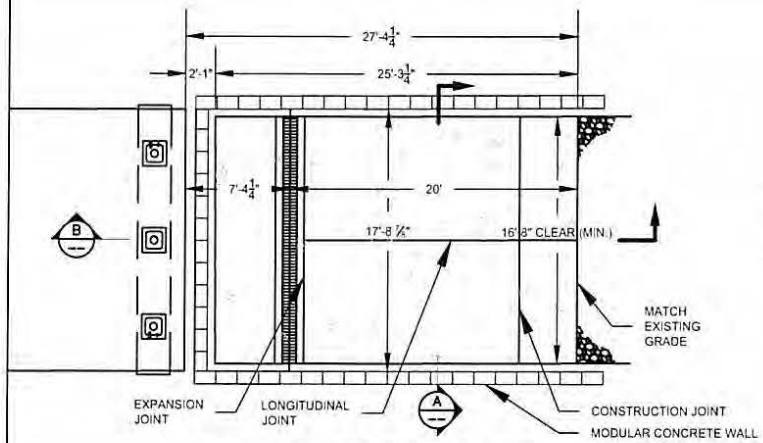
SCALE IN FEET

LEGEND:

EXCAVATION AND STOCKPILE OFF-SITE

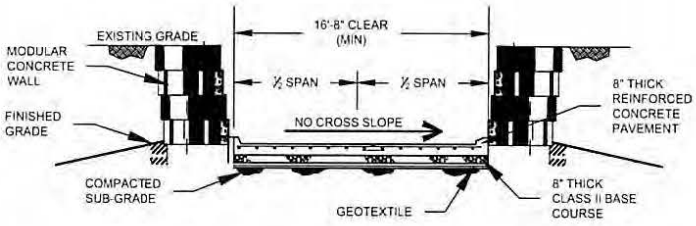
CITY BARN DRAINAGE IMPROVEMENTS PROJECT
CITY OF SLIDELL, LOUISIANA
PLAT 11: CROSS SECTIONS

H. Davis Cole & Associates, LLC
Consulting Engineers
NEW ORLEANS OFFICE
1340 Poydras Street, Suite 1850
New Orleans, Louisiana 70112
Telephone: 504.836.2020
Facsimile: 504.836.2010



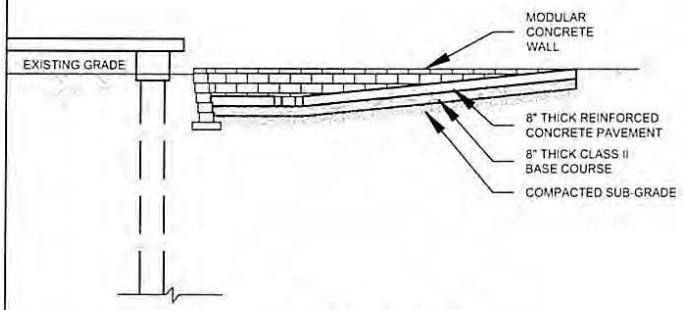
LOADING DOCK PLAN VIEW

SCALE: 1" = 10'-0"



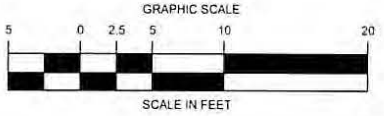
SECTION A

SCALE: N.T.S.



SECTION B

SCALE: 1" = 10'-0"



CITY BARN DRAINAGE IMPROVEMENTS PROJECT
CITY OF SLIDELL, LOUISIANA
PLAT 12: LOADING DOCK FILL AREA

H. Davis Cole & Associates, LLC
Consulting Engineers
NEW ORLEANS OFFICE
1340 Poydras Street, Suite 1850
New Orleans, Louisiana 70112
Telephone: 504.836.2020
Facsimile: 504.836.2010

EXPLANATION OF QUANTITIES:

ITEM (1) - EXCAVATION FOR PROPOSED BAR SCREEN STRUCTURE

TOTAL FOR ITEM (1): 400 CUBIC YARDS (EXCAVATED AND STOCKPILED OFF SITE)

ITEM (2) - CONCRETE FILL FOR PROPOSED BAR SCREEN SUPPORT STRUCTURE

TOTAL FOR ITEM (1): 85 CUBIC YARDS (CONCRETE FILL)

ITEM (3) - EXCAVATION FOR PROPOSED LOADING DOCK

TOTAL FOR ITEM (3): 65 CUBIC YARDS (EXCAVATED AND STOCKPILED OFF SITE)

ITEM (4) - MODULAR RETAINING WALL FOR PROPOSED LOADING DOCK

TOTAL FOR ITEM (4): 75 LINEAR FEET

ITEM (5) - CONCRETE PAVEMENT FOR PROPOSED LOADING DOCK

TOTAL FOR ITEM (5): 12 CUBIC YARDS (CONCRETE FILL)

ITEM (6) - CHANNEL EXCAVATION: CHANNEL EXCAVATION QUANTITIES WERE DETERMINED USING CROSS SECTIONS AND AVERAGE END AREA METHOD PER TABLE.

TOTAL FOR ITEM (6): 1315 CUBIC YARDS CUT (EXCAVATED AND STOCKPILED OFF SITE)

CUT & FILL QUANTITIES FOR CHANNEL EXCAVATION						
STATION (FEET)	DISTANCE (FT)	DISTANCE (YD)	AREA CUT (SY)	AREA FILL (SY)	AVERAGE CUT VOLUME (CY)	AVERAGE FILL VOLUME (CY)
1000			0.00	0.00		
	100	33.33			0.00	0.00
1100			0.00	0.00		
	100	33.33			0.00	0.00
1200			0.00	0.00		
	100	33.33			1.67	0.00
1300			0.10	0.00		
	100	33.33			48.50	0.00
1400			2.81	0.00		
	63.79	21.26			230.60	0.00
1463.79			16.88	0.00		
	36.21	12.07			202.17	0.00
1500			14.62	0.00		
	100	33.33			441.50	0.00
1600			11.87	0.00		
	100	33.33			294.00	0.00
1700			5.77	0.00		
	100	33.33			96.17	0.00
1800			0.00	0.00		
	100	33.33			0.00	0.00
1900			0.00	0.00		
	100	33.33			0.00	0.00
2000			0.00	0.00		
					1314.61	0.00
					TOTAL CUT	TOTAL FILL

CITY BARN DRAINAGE IMPROVEMENTS PROJECT
CITY OF SLIDELL, LOUISIANA
PLAT 13: EXPLANATION OF QUANTITES

H. Davis Cole & Associates, LLC
Consulting Engineers
NEW ORLEANS OFFICE
1340 Poydras Street, Suite 1850
New Orleans, Louisiana 70112
Telephone: 504.836.2020
Facsimile: 504.836.2010

1. Activities authorized under this general permit shall not be used for piecemeal work and shall be applied to single and complete projects. All components of a single and complete project shall be treated together as constituting one single and complete project. All planned phases of multi-phased projects shall be treated together as constituting one single and complete project. This general permit shall not be used for any activity that is part of an overall project for which an individual permit is required.

2. No activity is authorized under this general permit which may adversely affect significant cultural resources listed or eligible for listing in the National Register of Historic Places until the requirements for Section 106 of the National Historic Preservation Act are met. Upon discovery of the presence of previously unknown historic and/or prehistoric cultural resources, all work must cease and the permittee must notify the State Historic Preservation Office and the Corps of Engineers. The authorization is suspended until it is determined whether or not the activity will have an adverse effect on cultural resources. The authorization may be reactivated or modified through specific conditions if necessary, if it is determined that the activity will have no adverse effect on cultural resources. The CEMVN-PGP authorization will be revoked if it is determined that cultural resources would be adversely affected, and an individual permit may be necessary.

3. There shall be no unreasonable interference with navigation by the existence or use of the activity authorized herein. The permittee will, at his or her expense, install and maintain any safety lights, signals, and signs prescribed by the United States Coast Guard, through regulations or otherwise, on authorized facilities or on equipment used in performing work under the authorization.

4. No activity may substantially disrupt the movement of those species of aquatic life indigenous to the water body, including those species which normally migrate through the area, unless the activity's primary purpose is to block or impound water.

5. If the proposed activity involves the installation of aerial transmission lines, submerged cable, or submerged pipelines across navigable waters of the United States the following is applicable:

The National Ocean Service (NOS) has been notified of this authorization. You must notify NOS and this office in writing, at least two weeks before you begin work and upon completion of the activity authorized by this permit. Your notification of completion must include a drawing which certifies the location and configuration of the completed activity (a certified permit drawing may be used). Notification to NOS will be sent to the following address: National Ocean Service, Office of Coast Survey, N/CS261, 1315 East West Highway, Silver Springs, Maryland 20910-3282.

6. For pipelines under an anchorage or a designated fairway in the Gulf of Mexico the following is applicable: The NOS has been notified of this authorization. You must notify NOS and this office in writing, at least two weeks before you begin work and upon completion of the activity authorized by this permit. Within 30 days of completion of the pipeline, 'as built' drawings certified by a professional engineer registered in Louisiana or by a registered surveyor shall be furnished to this office, the Commander (dpw), Eighth Coast Guard District, Hale Boggs Federal Building, 500 Poydras Street, Room 1230, New Orleans, Louisiana 70130, and to the Director, National Ocean Service, Office of Coast Survey, N/CS261, 1315 East West Highway, Silver Springs, Maryland 20910-3282. The plans must include the location, configuration and actual burial depth of the completed pipeline project.

7. If the proposed project, or future maintenance work, involves the use of floating construction equipment (barge mounted cranes, barge mounted pile driving equipment, floating dredge equipment, dredge discharge pipelines, etc.,) in the waterway, you are advised to notify the Eighth Coast Guard District so that a Notice to Mariners, if required, may be prepared. Notification with a copy of your permit approval and drawings should be mailed to the Commander (dpw), Eighth Coast Guard District, Hale Boggs Federal Building, 500 Poydras Street, Room 1230, New Orleans, Louisiana 70130, about 1 month before you plan to start work. Telephone inquiries can be directed to the Eighth Coast Guard District, Waterways Management at (504) 671-2107.

8. All activities authorized herein shall, if they involve, during their construction or operation, any discharge of pollutants into waters if the United States, be at all times consistent with applicable water quality standards, effluent limitations and standards of performance, prohibitions, pretreatment standards and management practices established pursuant to the Clean Water Act (PL 92-500:86 Stat 816), or pursuant to applicable state and local laws.

9. Substantive changes to the Louisiana Coastal Resources Program may require immediate suspension and revocation of this permit in accordance with 33 CFR 325.7.

10. Irrespective of whether a project meets the other conditions of this permit, the Corps of Engineers retains discretionary authority to require an individual Department of the Army permit when circumstances of the proposal warrant this requirement.

11. Any individual authorization granted under this permit may be modified, suspended, or revoked in whole or in part if the Secretary of the Army or his authorized representative determines that there has been a violation of any of the terms or conditions of this permit or that such action would otherwise be in the public interest.

12. The Corps of Engineers may suspend, modify, or revoke this general permit if it is found in the public interest to do so.

13. Activities proposed for authorization under the PGP must comply with all other necessary federal, state, and/or local permits, licenses, or approvals. Failure to do so would result in a violation of the terms and conditions of CEMVN-PGP.

14. The permittee shall permit the District Commander or his authorized representative(s) or designee(s) to make periodic inspections of the project site(s) and disposal site(s) if different from the project site(s) at any time deemed necessary in order to assure that the activity being performed under authority of this permit is in accordance with the terms and conditions prescribed herein.

15. This general permit does not convey any property rights, either in real estate or material, or any exclusive privileges; and it does not authorize any injury to property or invasion of rights or any infringement of federal, state, or local laws or regulations nor does it obviate the requirements to obtain state or local assent required by law for the activity authorized herein.

16. In issuing authorizations under this permit, the federal government will rely upon information and data supplied by the applicant. If, subsequent to the issuance of an authorization, such information and data prove to be false, incomplete, or inaccurate, the authorization may be modified, suspended, or revoked, in whole or in part.

17. For activities resulting in sewage generation at the project site, such sewage shall be processed through a municipal sewage treatment system or, in areas where tie-in to a municipal system is not practical, the on-site sewerage system must be approved by the local parish sanitarian before construction.

18. Any modification, suspension, or revocation of CEMVN-PGP, or any individual authorization granted under this permit, will not be the basis for any claim for damages against the United States.

19. Additional conditions deemed necessary to protect the public interest may be added to the general permit by the District Commander at any time. If additional conditions are added, the public will be advised by public notice. Individual authorizations under CEMVN-PGP may include special conditions deemed necessary to ensure minimal impact and compliance with CEMVN-PGP.

20. CEMVN-PGP is subject to periodic formal review by CEMVN and OCM in coordination with the Environmental Protection Agency, US Fish and Wildlife Service, the National Marine Fisheries Service, and the Louisiana Department of Wildlife and Fisheries. Comments from reviewing agencies will be considered in determination as to whether modifications to the general permit are needed. Should the District Commander make a determination not to incorporate a change proposed by a reviewing agency, after normal negotiations between the respective agencies, the District Commander will explain in writing to the reviewing agency the basis and rationale for his decision.

21. CEMVN retains discretion to review CEMVN-PGP, its terms, conditions, and processing procedures, and decide whether to modify, reissue, or revoke the permit. If CEMVN-PGP is not modified or reissued within 5 years of its effective date, it automatically expires and becomes null and void.

22. The permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.

23. You must maintain the activity authorized by this permit in good condition and in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the permitted activity, although you may make a good faith transfer to a third party as described in Special Condition 26 below. Should you wish to cease to maintain the authorized activity or should you desire to abandon it without a good faith transfer, you must obtain a modification of this permit from this office, which may require restoration of the area.

24. If you discover any previously unknown historic or archeological remains while accomplishing the activity authorized by this permit, you must immediately notify this office of what you have found. We will initiate the Federal and State coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

25. If you sell the property associated with this permit, you must provide this office with a copy of the permit and a letter noting your agreement to transfer the permit to the new owner and the new owner's agreement to accept the permit and abide by all conditions of the permit. This letter must be signed by both parties.

26. If a conditioned water quality certification has been issued for your project, you must comply with the conditions specified in the certification as special conditions to this permit.

27. Many local governing bodies have instituted laws and/or ordinances in order to regulate dredge and/or fill activities in floodplains to assure maintenance of floodwater storage capacity and avoid disruption of drainage patterns that may affect surrounding properties. Your project involves dredging and/or placement of fill; therefore, you must contact the local municipal and/or parish governing body regarding potential impacts to floodplains and compliance of your proposed activities with local floodplain ordinances, regulations or permits.

28. In issuing authorizations under this permit, the federal government does not assume any liability for: damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes; damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the United States in the public interest; damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit, and; design or construction deficiencies associated with the permitted work.

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, NEW ORLEANS DISTRICT
7400 LEAKE AVE
NEW ORLEANS LA 70118-3651

REPLY TO
ATTENTION OF

JUN 2 1 2018

Programs and Project Management Division
Protection and Restoration Office

Merina Christoffersen
Environmental Protection Specialist
Federal Emergency Management Agency
Louisiana Recovery Office
1500 Main Street
Baton Rouge, Louisiana 70802

Dear Ms. Christoffersen:

This letter is in reference to Tiffany Spann-Winfield's Solicitation of Views request dated May 22, 2018 concerning the proposed City Barn Drainage Improvements Project in Slidell, Louisiana.

Information and signatures obtained from recent maps, aerial photography, and local soil surveys concerning this site are indicative with the occurrence of Waters of the US (WOUS). Department of the Army (DA) permits under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act are required prior to the deposition and/or redistribution of dredge or fill material into waters subject to Corps' jurisdiction.

This preliminary determination is advisory in nature. The fact that a field wetland delineation/determination has not been completed does not alleviate your responsibility to obtain the proper DA permits prior to working in WOUS occurring on this site.

Please contact Mr. Jon Barmore of our Regulatory Branch by telephone at (504) 862-1704, or by e-mail: jonathan.g.barmore@usace.army.mil for questions concerning wetlands determinations or need for on-site evaluations. Questions concerning regulatory permit requirements may be addressed to Mr. Michael Farabee by telephone at (504) 862-2292 or by email: michael.v.farabee@usace.army.mil.

Future correspondence concerning this matter should reference account number MVN-2012-01166-1-SG. This will allow us to more easily locate records of previous correspondence, and thus provide a quicker response.

Sincerely,

Brett Herr
Chief
Lake Pontchartrain and Vicinity Branch

Appendix D
2016 and 2018 Hydrologic and Hydraulic Studies

HYDROLOGIC AND HYDRAULIC STUDY

FOR

CITY BARN DRAINAGE IMPROVEMENTS
REMOVAL AND REPLACEMENT OF 67 – CFS DRAINAGE PUMP

CITY OF SLIDELL, LOUISIANA
DEPARTMENT OF ENGINEERING

CITY OF SLIDELL PROJECT NO. 100-118 (PHASE III)

HDCA PROJECT NO. 2018-05

04/27/2018

STATE OF LOUISIANA
DAVID ALAN MARTIN
License No. 37832
PROFESSIONAL ENGINEER
CIVIL ENGINEERING

Prepared by:

H. Davis Cole & Associates, LLC
Consulting Engineers

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APRIL 2018

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Hydrologic and Hydraulic Study
City Barn Drainage Improvements
Removal and Replacement of 67 – CFS Drainage Pump
Funded by Hazard Mitigation Grant Program
The City of Slidell, Louisiana

SECTION 1 – PROJECT BACKGROUND

Prepared By:

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SECTION 1 – PROJECT BACKGROUND

INTRODUCTION

The City of Slidell, Louisiana (COS), has applied for funding under the Hazard Mitigation Grant Program (HMGP), a program funded through the Federal Emergency Management Agency (FEMA), to improve existing drainage systems within the City. Part of these ongoing efforts have included various improvements to the City Barn Drainage Pump Station (CBDPS) and associated drainage system. The goal of this series of projects is to further improve the performance of the existing drainage system located along the US 11 (Front Street) Highway Route near Bayou Pattasat and Bayou Bonfouca in Slidell, Louisiana and to further reduce the recurring flooding throughout the drainage basin by reducing maximum water surface elevations within the area.

Previous projects funded under this program have included the following:

- Installation of a fourth drainage pump, which increased the station capacity from 400 CFS to 575 CFS (completed);
- Construction of a fourth mechanical bar screen cleaner (nearing completion)

Proposed further improvements at CBDPS include the removal of the existing 67 – CFS drainage pump and replacement with a 133 CFS drainage pump, which will bring the pumping capacity of CBDPS to 641 cubic feet per second.

PURPOSE

The focus and purpose of this Hydrologic and Hydraulic (H&H) Study is to detail the effects of the in progress capacity improvements to the pump station on the performance of the drainage system. Additionally, this study reviews the downstream effects of the previous capacity expansion as well as the proposed capacity expansion.

PROJECT AUTHORIZATION

COS entered into an agreement with H. Davis Cole & Associates, LLC (HDCA) to provide engineering consulting services for the City Barn Drainage Pump Station Capacity Improvements. These services included development of a study describing the existing drainage basin and the development of recommendations to improve the conveyance of water within the basin and through the CBDPS.

STUDY LOCATION AND AREA

The general study area includes the full length of Bayou Pattasat, northwest of US 11 through the CBDPS and where it intersects with Bayou Bonfouca and Southeast of US 11 where it branches off into two reaches, one extending to the W-14 Canal and the other extending to 3rd Street (Sgt. Alfred Drive). The entire drainage basin consists of over 350 acres including commercial, industrial, and residential properties.

The length of Bayou Pattasat from the CBDPS and where it crosses US 11 is approximately 950 feet. Once crossing under US 11 the bayou continues on for approximately 850 feet until splitting off into the northern reach with a length of approximately 4200 feet and ending at the W-14 canal and the southern reach with a length of approximately 2200 feet and ending at 3rd Street (Sgt. Alfred Drive).

All of the storm water collected in the basin described above flows downstream through Bayou Pattasat until it reaches the CBDPS. The water is then pumped up and over the existing berm and into Bayou Bonfouca where it flows south to its eventual outfall into Lake Pontchartrain. The general study area is depicted below in the following figure.

Figure 1.1 – Vicinity Map and General Study Area

The existing CBDPS, located at the most downstream point of Bayou Pattasat has a current pumping capacity of 575 cfs.

PREVIOUS WORK AND STUDIES BY OTHERS

The following list of studies and/or works done by others were utilized by HDCA in order to develop the basis for this H&H Study of the described project area:

- Bayou Patassat (City Barn) Drainage Study Addendum 1 by J.V. Burkes & Associates, Inc.
- Flood Insurance Study for the City of Slidell prepared by the Federal Emergency Management Agency

Copies of these references are included as Appendix "A" and "B", respectively, to this study.

Additionally, this H&H study builds upon work previously completed by HDCA for the City of Slidell which is documented within the report titled "Hydraulic and Hydrologic Study for City Barn Drainage Improvements", prepared by HDCA and dated April 12, 2016. A copy of this report is not reproduced herein, but is cited within this report as a reference.

The observations and recommendations related to areas upstream of the City Barn Drainage Pumping Station contained within this H&H Study are generally based upon the unsteady – state existing drainage model provided to HDCA by COS. It is HDCA's understanding that the drainage model was originally developed by the United States Army Corps of Engineers and utilized in previous studies of the project area. The model is assumed to be a true and accurate representation of the geometry of the drainage basin, drainage features, and prevailing hydrologic conditions.

The observations and recommendations related to areas downstream of the City Barn Drainage Pumping Station contained within this H&H study are generally based upon the unsteady – state drainage model prepared for this study by GAEA Consultants, LLC (a sub – consultant to HDCA). The model was created in HEC – RAS 5.0.4 Beta2 (March 2018) and is assumed to be a true and accurate representation of the geometry of the drainage basin, drainage features, and prevailing hydrologic conditions.

STUDY ORGANIZATION

This H&H Study for the CBDPS is divided into three sections and two appendices as described below:

- Section 1 – Project Background
- Section 2 – Study Procedures and General Hydrologic and Hydraulic Findings
- Section 3 – Recommended Improvements
- Appendix A – Previous Study – Bayou Pattasat Drainage Study, Prepared by J.V. Burkes and Associates
- Appendix B – Flood Insurance Study for the City of Slidell, 1999
- Appendix C – Calculations
- Appendix D – Inundation Maps Depicting Downstream Effects of Previous and Proposed Improvements

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Hydrologic and Hydraulic Study
City Barn Drainage Improvements
Removal and Replacement of 67 – CFS Drainage Pump
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SECTION 2 – STUDY PROCEDURES AND GENERAL HYDROLOGIC AND HYDRAULIC FINDINGS

Prepared By:

H. Davis Cole & Associates, LLC
Consulting Engineers

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SECTION 2 – STUDY PROCEDURES AND GENERAL HYDROLOGIC AND HYDRAULIC FINDINGS

GENERAL

The work documented within this H&H Study builds upon work previously completed by our firm and others as indicated in Section 1. As such, a description of the study area, drainage characteristics, climate, soils and land use, and study assumptions and procedures can be found in previous reports and reference documents as indicated herein.

DETERMINATION OF UPSTREAM EFFECTS OF PROPOSED IMPROVEMENTS

The upstream effects for various configurations of the drainage pumping station have been extensively modeled by HDCA and others as detailed in previous reports and reference documents. These models have included detailed scenarios of pumping capacities of 400, 575, 601, and 801 CFS. As such, HDCA utilized a polynomial regression analysis to determine the upstream effects of the proposed increase in capacity of CBDPS from 575 CFS to 641 CFS. Results of this analysis are included in Section 3 of this H&H Study.

Copies of calculations prepared are included as Appendix C to this H&H Study.

DETERMINATION OF DOWNSTREAM EFFECTS OF PROPOSED IMPROVEMENTS

Over the course of the construction of improvements at CBDPS, an area of concern has been the potential for effects of increased peak water surface elevations in Bayou Bonfouca downstream of the drainage pumping station.

HDCA consulted with GAEA Consultants of New Orleans, Louisiana (GAEA) in the preparation of a two – dimensional model of the Bayou Bonfouca watershed. The purpose of the model was to map the 10, 25, 50, and 100 – year storm events with corresponding City Barn Drainage Pump Station Inflows. The model was created using HEC – RAS 5.0.4, terrain data from the U.S. Geological Survey, and FEMA Flood Insurance Studies. The 2 – D model is constructed with a mesh size of 40 feet by 40 feet.

Results related to this model are included in Section 3 of this H&H Study.

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Hydrologic and Hydraulic Study
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SECTION 3 – GENERAL HYDRAULIC FINDINGS AND RECOMMENDATIONS

Prepared By:

H. Davis Cole & Associates, LLC
Consulting Engineers

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SECTION 3 – GENERAL HYDRAULIC FINDINGS AND RECOMMENDATIONS FOR IMPROVEMENTS

GENERAL FINDINGS

The analysis of the drainage basin modeling data indicated that the maximum water surface elevations for the Bayou Pattasat drainage basin are indeed reduced by previous and proposed improvements. Further, modeling indicated that the downstream effects of the previously constructed improvements and proposed future improvements are small.

As a basis of comparison, HDCA compared the previous modeling results prepared by others with modeling work done by our firm. Results of that comparison are detailed below.

10 – YEAR STORM EVENT

Table 3.1 below illustrates the average water surface elevations for the Phase I, Phase II, and Phase III projects for the ten – year storm event. These are compared against the previous existing conditions model for comparison.

Table 3.1 – 10 Year Storm Event – Average WSE

Average Maximum WSE, Previous Existing Conditions Model	Average Maximum WSE, HDCA Existing Conditions Model	Average WSE Elevation after Installation of 175 CFS Pump (City Project 100-118A "Phase I")	Average WSE Elevation after Installation of 4th Mechanical Bar Screen (City Project 100-118A "Phase II")	Average WSE Elevation after Removal of 67 CFS Pump and Replacement with 133 CFS Pump (City Project 100-118B "Phase III)
6.21	6.19	5.69	5.69	5.67

Analysis of the modeling data indicates that the proposed increase in capacity of CBDPS from 575 CFS to 641 CFS will reduce the average peak water surface elevation in the basin by 0.02 feet (0.24 inches) for the ten - year storm event. Overall, modeling data indicates that the entire suite of improvements yields a total reduction of 0.54 feet (6.48 inches) in the average peak water surface elevation in the basin for the ten - year storm event.

25 – YEAR STORM EVENT

Table 3.2 below illustrates the average water surface elevations for the Phase I, Phase II, and Phase III projects for the ten – year storm event. These are compared against the previous existing conditions model for comparison.

Table 3.2 – 25 Year Storm Event – Average WSE

Average Maximum WSE, Previous Existing Conditions Model	Average Maximum WSE, HDCA Existing Conditions Model	Average WSE Elevation after Installation of 175 CFS Pump (City Project 100-118A "Phase I")	Average WSE Elevation after Installation of 4th Mechanical Bar Screen (City Project 100-118A "Phase II")	Average WSE Elevation after Removal of 67 CFS Pump and Replacement with 133 CFS Pump (City Project 100-118B "Phase III)
6.70	6.69	6.16	6.17	6.04

Analysis of the modeling data indicates that the proposed increase in capacity of CBDPS from 575 CFS to 641 CFS will reduce the average peak water surface elevation in the basin by 0.13 feet (1.56 inches) for the twenty – five - year storm event. Overall, modeling data indicates that the entire suite of improvements yields a total reduction of 0.54 feet (6.48 inches) in the average peak water surface elevation in the basin for the twenty - five - year storm event.

50 – YEAR STORM EVENT

Table 3.3 below illustrates the average water surface elevations for the Phase I, Phase II, and Phase III projects for the fifty – year storm event. These are compared against the previous existing conditions model for comparison.

Table 3.3 – 50 Year Storm Event – Average WSE

Average Maximum WSE, Previous Existing Conditions Model	Average Maximum WSE, HDCA Existing Conditions Model	Average WSE Elevation after Installation of 175 CFS Pump (City Project 100-118A "Phase I")	Average WSE Elevation after Installation of 4th Mechanical Bar Screen (City Project 100-118A "Phase II")	Average WSE Elevation after Removal of 67 CFS Pump and Replacement with 133 CFS Pump (City Project 100-118B "Phase III)
6.94	6.93	6.38	6.39	6.27

Analysis of the modeling data indicates that the proposed increase in capacity of CBDPS from 575 CFS to 641 CFS will reduce the average peak water surface elevation in the basin by 0.12 feet (1.44 inches) for the fifty - year storm event. Overall, modeling data indicates that the entire suite of improvements yields a total reduction of 0.67 feet (8.04 inches) in the average peak water surface elevation in the basin for the fifty - year storm event.

100 – YEAR STORM EVENT

Table 3.4 below illustrates the average water surface elevations for the Phase I, Phase II, and Phase III projects for the one hundred – year storm event. These are compared against the previous existing conditions model for comparison.

Table 3.4 – 100 Year Storm Event – Average WSE

Average Maximum WSE, Previous Existing Conditions Model	Average Maximum WSE, HDCA Existing Conditions Model	Average WSE Elevation after Installation of 175 CFS Pump (City Project 100-118A "Phase I")	Average WSE Elevation after Installation of 4th Mechanical Bar Screen (City Project 100-118A "Phase II")	Average WSE Elevation after Removal of 67 CFS Pump and Replacement with 133 CFS Pump (City Project 100-118B "Phase III)
7.38	7.36	6.82	6.81	6.59

Analysis of the modeling data indicates that the proposed increase in capacity of the CBDPS from 575 CFS to 641 CFS will reduce the average peak water surface elevation in the basin by 0.22 feet (2.64 inches) for the one - hundred - year storm event. Overall, modeling data indicates that the entire suite of improvements yields a total reduction of 0.79 feet (9.48 inches) in the average peak water surface elevation in the basin for the one - hundred - year storm event.

DOWNSTREAM EFFECTS

Analysis of the modeling data indicates that the proposed improvements will have small effects on the peak water surface elevation within Bayou Bonfouca downstream of the drainage pump station due to the influence of Lake Pontchartrain. Results indicate that the increase in water surface elevation will be small (on the order of 0.01 to 0.08 feet) near the pumping station outfall.

Inundation maps depicting the effects of previous and proposed improvements at CBDPS on the water surface elevations of Bayou Bonfouca are included in Appendix D to this H&H Study.

GENERAL CONCLUSIONS AND RECOMMENDATIONS

In general, it was found that the previous and proposed improvements will reduce the water surface elevations within the Bayou Pattasat Drainage Basin and yield hydraulic benefits which will enhance efficiency and service life of the mechanical components of the station with very small impacts to the receiving waters of Bayou Bonfouca.

Hydrologic and Hydraulic Study
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APPENDIX A – PREVIOUS STUDY – BAYOU PATTASAT DRAINAGE STUDY, PREPARED BY J.V. BURKES AND ASSOCIATES

Prepared By:

H. Davis Cole & Associates, LLC
Consulting Engineers

EXCERPTED SUPPORTING DOCUMENTATION FROM Bayou Pattasat (City Barn) Drainage Study ADDENDUM 1 Prepared by J.V. Burkes and Associates, Inc., June 2014

For a full version of this report, the general public can send a request to:
email: FEMA-NOMA@dhs.gov,
telephone: 225-267-2962
fax: 225-346-5848

Regular mail:
DEPARTMENT OF HOMELAND SECURITY-FEMA
ATTN: SLIDELL CITY BARN PUMP STATION DRAINAGE IMPROVEMENTS
1500 MAIN STREET
BATON ROUGE, LOUISIANA 70802.

Bayou Pattasat (City Barn)

Drainage Study ADDENDUM#1 – June 2014

For the

CITY OF SLIDELL

J.V. Burkes & Associates, Inc.
1805 Shortcut Hwy
Slidell, LA 70458

STATE OF LOUISIANA
SEAN M. BURKES
REG. No. 27642
REGISTERED
PROFESSIONAL
CIVIL ENGINEERING

CONTENTS

APPENDIX

Executive Summary

This report was commissioned by GOHSEP to provide an analysis and evaluation of the current and prospective improvements for Bayou Pattasat within the City of Slidell. Methods of analysis include modifying an existing Corps HEC-RAS unsteady model of Eastern St. Tammany Parish by adding the Bayou Pattasat sub-basin, and performing soil borings. A summary of the calculations can be found in the appendix. Results of the analysis show that water levels can drop basin wide approximately 4"-5" for a total project cost of approximately $1,556,113.38. Recommendation includes a swapping out a 200 cfs pump for an old 67 cfs pump, straightening out a small section of Bayou and installing sheet piling in an existing problem area.

Introduction

The Bayou Pattasat(City Barn) channel improvement project is located in the old Town of Slidell area. The boundary is delineated to the west by Bayou Bonfouca, to the east by Hwy 11 (Front Street), to the south by property owned by Robin Goldsmith, et.al (leased by Textron), and to the north by property owned by the City of Slidell. A prior study was completed reviewing adding storage to the basin in the vicinity of the project area as shown below.

Figure 1. Vicinity Map - Bayou Pattasat/City Barn

It was determined that a conveyance issue occurred further upstream and an unknown factor with regard to the W-14 Drainage Canal flow spilling into this basin for any solutions that would be determined.

As a result of those questions, this updated model and analysis was authorized as addendum#1 to the original contract. The main scope was to look at a HEC-RAS unsteady model of the intermixing of the W-14, Bayou Bonfouca and Bayou Pattasat basins, look at proposed improvements and see what the basin wide benefits would be. In order to accomplish these tasks, additional survey work and geotechnical work was authorized to help this study and to reduce uncertainty of cost estimates for the solutions. The unsteady model created by the Corps and modified by adding this subbasin gives a more realistic example of the elevations encountered during large rain events with the natural intermixing of the water from each of these basins.

The Bayou Pattasat basin has an estimate 2000 residences within the basin. From 1995 to 2005 several flooding events have occurred within the Bayou Pattasat basin with an estimated $12,276,666 in damages reported by the City of Slidell. Also on 8/28/2012 Hurricane Isaac caused backwater flooding from Lake Pontchartrain through Bayou Bonfouca into Patassat that caused an additional 129 homes to be flooded and approximate 447 acres of flooding in the basin.

The intent of the City Barn Channel Improvement Project is to increase conveyance in the basin, reduce the propensity for vegetation to clog the bayou, reduce backwater effects from Hurricane Surges and ultimately, reduce flooding within the entire basin. The HEC-RAS unsteady model was performed under existing conditions and four proposed solutions were investigated further for benefits derived.

Existing Conditions – the City of Slidell placed a temporary berm around the City Barn property to prevent hurricane backwater effects from entering into the Pattasat basin as what occurred during Hurricane Isaac in 2012. This change occurred after our original model in this study previously. A model was created to analyze the effects of the basin for the ten, twenty five and one hundred year storm events.

Option #1 – A 200 cfs pump was added to the existing pump station configuration and corresponding water surface elevations were determined for the ten, twenty five, fifty and one hundred year storm events.

Option #2 – Two – 200cfs pumps were added to the existing pump station configuration and corresponding water surface elevations were determined for the ten, twenty five, fifty and one hundred year storm events.

Option#3 – A floodgate with a 400sf opening was added at the pump station and corresponding water surface elevations were determined for the ten, twenty five, fifty and one hundred year storm events.

Option#4 -The 36" lo-lift (67 cfs) pump will be replaced with another 200 cfs pump, and a 5 acre retention pond was constructed, and corresponding water surface elevations were determined for the ten, twenty five, fifty and one hundred year storm events. This was a City requested additional option.

Site Description and History

The project area is located within the old Town of Slidell between Textron and City Barn (a City of Slidell Public Operations facility). Most structures within the entire basin were built prior to the first FEMA Flood Insurance Rate Maps initialized November 16, 1973. These subdivisions include Town of Slidell (1903), Prevost Addition (1907), Dittmar Addition (1927), Robert Addition (1927), Terrace Park (1928), Spanish Trail Highlands (1931), Greenwood Cemetary (prior to 1936), Cousin Addition(before 1936), Park Place (1954), Lincoln Park (1959), and Pine Park Place (1962).

The land use within the drainage basin includes industrial, commercial and residential. The majority of the land is already developed; however some vacant and wooded areas exist within this basin. Performing work on the banks of the bayou near the pump station require coordination with the adjacent landowner, Textron in order to gain access and maintain the sensitive nature and security of its production facility. Also previous storms in the area have highlighted a problem of storm debris collecting in the bends and blocking the flows.

Drainage Basin

The drainage area for the Bayou Pattasat (City Barn) area is 351.7 acres . The area was determined by using LiDAR mapping and Burk & Associates Master Drainage Plan (part of Bayou Bonfouca Drainage Area).

Bayou Pattasat empties into Bayou Bonfouca and runs east upstream under the Norfolk Southern Railroad (approx. 800' upstream), Highway 11 – Front Street (approx. 1000' upstream) – SEGMENT A to a fork at approximately 1870' upstream of Bayou Bonfouca. This area is characterized by commercial and institutional area to the north including a shopping center and Brock Elementary School. South of this Bayou is mainly residential. The Bayou forks to a north reach and a south reach.

The south reach, SEGMENT C, extends approximately 2150 linear feet and has crossings at Carey Street, runs through Greenwood Cemetary and then across Bryan Street, Cleveland Avenue and then 3rd Street (aka Sgt Alfred Drive). The area is comprised of a Cemetary, residential area and a housing complex for the mentally handicapped.

Another reach forks from the southern reach at 3rd Street eastward for approximately 1540 linear feet that runs at the rear of residential homes.

The north reach, SEGMENT B, extends approximately 4000 linear feet and has crossings at Carey Street, 2nd Street, 3rd Street (aka Sgt Alfred Drive), Cousin Street, 6th Street and ends at 10th Street. The area is comprised of a residential area with a wooded buffer along the banks of the Bayou to Cousin Street. North of Cousin Street the Bayou is split by the Courthouse and the Boys and Girls Club and then runs east through a residential area to its terminus just east of 11th Street.

Bayou Pattasat has a very close proximity to the W-14 Drainage Canal in several locations near Park Place Subdivision. There has been a history of flooding within this subdivision. There is a potential for flow between the W-14 Basin and the Bayou Pattasat Basin in this vicinity.

The drainage basin has many repetitive loss structures within the area. These home elevations range from a 4.8 foot to a 6.5 foot elevation. They appear to occur mainly in the old town area as well as the uppermost reaches of the Bayou as shown in figure 2 below.

Figure 2. Repetitive Loss Structures in Red

Soils

Additional soil borings were used to look at long term design solutions for the entire basin. These borings included analyzing the possibility of using existing soils at berm around city barn pump station for the permanent berm to existing soils around the existing channels to see about future widening projects if so warranted. Please see appendix A for geotechnical report.

Bayou Pattasat Outfall

Bayou Pattasat's entrance into Bayou Bonfouca is controlled by two outfalls: 1) by gravity through a mechanical gate that can be closed off during tropical storm events, and 2) through its pump station that has three pumps. The existing pump flows are shown below:

Table 1. Existing Pump Flows at City Barn Pumpstation

Description	Flow (gpm)	Flow (cfs)
48" Vertical Axial Flow	60,000 gpm	134 cfs
54"x54" Vertical Axial Flow	90,000 gpm	200 cfs
36" Lolift	30,000 gpm	67 cfs

Hydrologic and Hydraulic Study
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APPENDIX B – FLOOD INSURANCE STUDY FOR CITY OF SLIDELL, 1999

Prepared By:

H. Davis Cole & Associates, LLC
Consulting Engineers

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FLOOD INSURANCE STUDY

CITY OF SLIDELL, LOUISIANA
ST. TAMMANY PARISH

REVISED: APRIL 21,1999

Federal Emergency Management Agency

COMMUNITY NUMBER - 220204

NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program have established repositories of flood hazard data for flood plain management and flood insurance purposes. This Flood Insurance Study may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

This publication incorporates revisions to the original Flood Insurance Study. These revisions are presented in Section 9.0.

This preliminary revised Flood Insurance Study contains only profiles added or revised as part of the restudy. These profiles are presented in a reduced scale to minimize reproduction costs. All profiles will be included and printed at full scale in the final published report.

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FLOOD INSURANCE STUDY
CITY OF SLIDELL, LOUISIANA

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in the City of Slidell, St. Tammany Parish, Louisiana, and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study will be used to convert the City of Slidell to the regular program of flood insurance by the Federal Insurance Administration (FIA). Local and regional planners will use this study in their efforts to promote sound flood plain management.

In some states or communities, flood plain management criteria or regulations may exist that are more restrictive or comprehensive than those on which these Federally-supported studies are based. These criteria take precedence over the minimum Federal criteria for purposes of regulating development in the flood plain, as set forth in the Code of Federal Regulations at 24 CFR, 1910.1 (d). In such cases, however, it shall be understood that the state (or other jurisdictional agency) shall be able to explain these requirements and criteria.

1.2 Authority and Acknowledgments

The source of authority for this Flood Insurance Study is the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses for this study were performed by the New Orleans District, U.S. Army Corps of Engineers (COE), for the FIA, under Interagency Agreement No. (IAA)-H-7-76, Project Order No. 10. This study was completed in February 1979.

1.3 Coordination

Community base map selection and identification of potential flooding sources requiring detailed study were determined in meetings attended by personnel of the COE, FIA, and officials of the City of Slidell in January 1976. On December 11, 1979, the results of the work by the COE were reviewed at a final coordination meeting attended by personnel of the COE, FIA and city officials.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the incorporated area of the City of Slidell, St. Tammany Parish, Louisiana. The area of study is shown on the Vicinity Map (Figure 1).

This area is subject to overflows from Bayou Bonfouca-Bayou Vincent (W-13), the Diversion Canal (W-14 main) and hurricane surges from Lake Pontchartrain. The entire area of the City of Slidell was studied in detail.

2.2 Community Description

The City of Slidell is located near the northeast shores of Lake Pontchartrain, approximately 33 miles north of New Orleans, Louisiana. The total land area within the city limits is about 6.7 square miles. According to U.S. Census Bureau figures, the city's population for 1970 is 16,101, an increase of 9,745 from the 1960 census (Reference 1). Major transportation routes traverse the study area in many directions. Interstate Route 12 and 10 generally form the north and east boundary of the study area. Other transportation routes which pass through the area are U.S. Route 190, 11, and State Route 433.

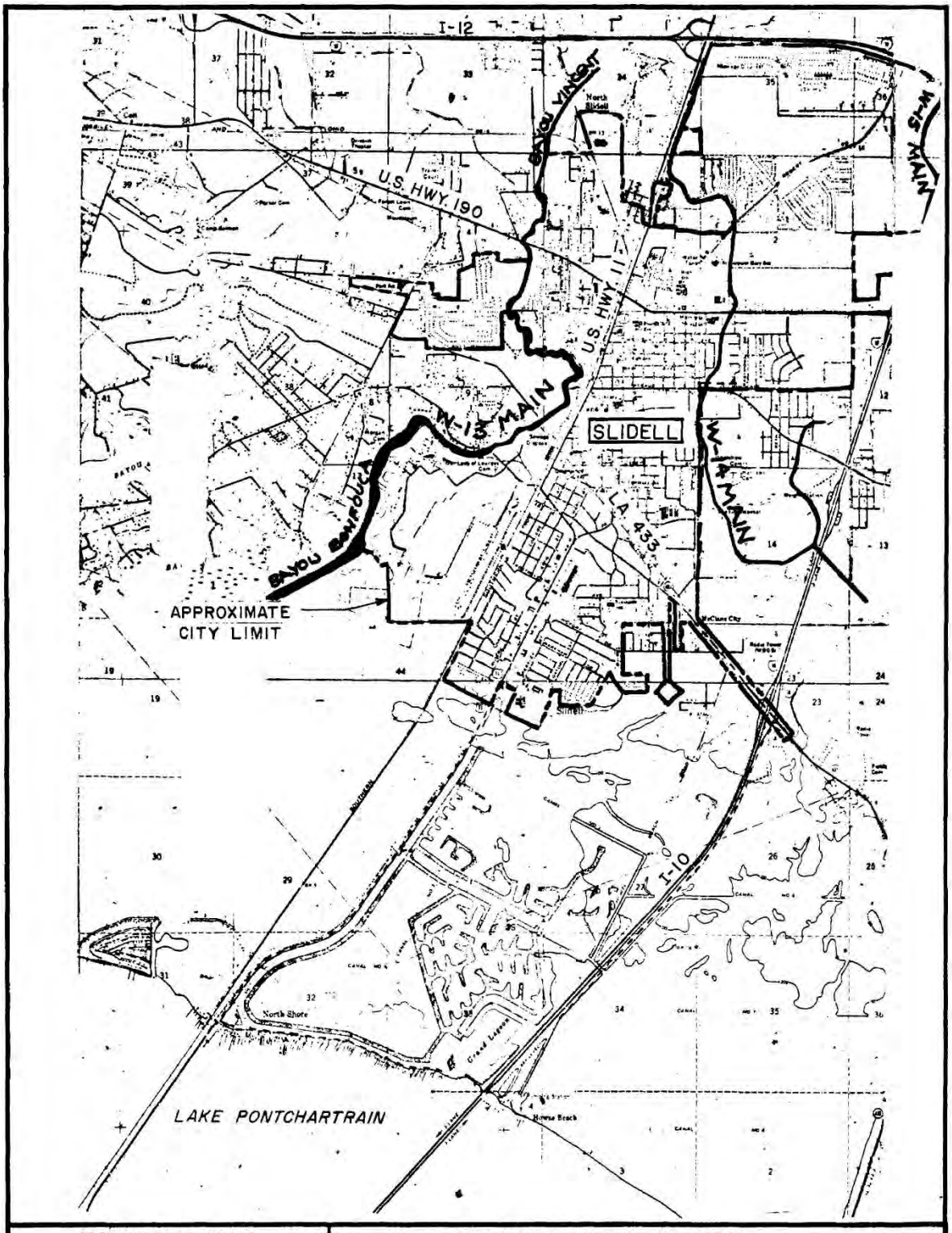
Due to the close proximity of the area to metropolitan New Orleans, ease of transportation and the availability of the developable land, the Slidell area offers good potential for commercial and residential development.

Three major streams originating in the relatively flat rural areas flow through the study area in a southerly direction and discharge into Lake Pontchartrain. These streams are Bayou Bonfouca-Bayou Vincent (W-13 main), and the Diversion Canal (W-14 main). The Doubloon-French Branch (W-15) which generally flows outside the incorporated city limits has no impact on the flooding situation in Slidell.

Bayou Vincent, which flows about 3.6 miles from Interstate 12 to the junction of Bayou Bonfouca, traverses through the swampy area southwest of Slidell and empties into Lake Pontchartrain. The average slope of the stream is 0.001 foot per foor and its flood plain is relatively flat.

The Diversion Canal (W-14) spans about 6 miles from the northern boundary of the study area at I-12 to the flat marshy area in the south. The average slope of this stream is about 0.0005 foot per foot. The flood plain of W-14 is relatively flat particularly on the western bank of the stream, where the principal commercial and residential developments of the city are located. The ground elevation in this area is generally lower than the top of the stream banks.

The study area has several small industries such as ship yards, lumber companies, fabricated metal products, food processing, roofing, concrete products and industrial gases. Most of the study area is urban in nature comprised of shopping centers, small commercial establishments and residential areas.



APPROXIMATE SCALE
1000 0 2000 4000 FEET

VICINITY MAP

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF SLIDELL, LA
(ST. TAMMANY PARISH)

FIGURE 1

The climate of the area is generally influenced by the Gulf of Mexico, giving it a semitropical marine character. Major rainfall can occur due to tropical storms moving inland, intense convective storms triggered by southerly gulf winds and frontal storms resulting from the interaction of warm moist air with cold dry air. Annual average rainfall for the study area is 62 inches. The average annual temperature ranges from 52 degrees F in the winter and 82 degrees F in the summer.

2.3 Principal Flood Problems

Flooding in the City of Slidell and vicinity is relatively frequent. It is caused by both headwater flooding due to intense rainfall in the upper reaches of the streams as well as high stages in Lake Pontchartrain caused by hurricanes.

The principal causes of flooding are the inadequacy of the existing channel system to convey the storm runoff, relatively low flat flood plain areas which are easily inundated, and high stages in Lake Pontchartrain created by hurricane.

One of the critical flood prone areas is the residential and commercial areas concentrated between the west bank of W-14 Diversion Canal and U.S. Route 11. Much of this area is below W-14's west bank elevation and slopes west towards U.S. Route 11. In addition to the overfrow from W-14, local storm runoff from this residential and business district between East Hall Avenue and Route 433 drains westerly through a small drainage channel, which passes under U.S. Route 11 and is pumped into W-13 main. This pumping station is presently inadequate to handle high intensity runoff and causes water to backup in the channel. This backup further adds to the flooding problems of this area.

The residential area on the eastern bank of W-14 is relatively high (varying in elevation from 15 to 20 feet) and is safer from headwater or hurricane flooding.

The flooding problem along W-13 is less severe. Much of the channel upstream from Route 433, however, is inadequate to carry a 100-year discharge. Residential and commercial areas on both sides of W-13 around West Hall Avenue are susceptible to flooding.

In the lower reaches of both W-13 and W-14 Mains, high lake stages and the flat terrain are responsible for flooding problems. A rise of stage in Lake Pontchartrain is rapidly experienced in the lower reaches of these canals and in the southern portion of the City of Slidell.

The flooding problem in the study area is compounded when high lake stages are accompanied by intense rainfall.

The greatest flood of record for Slidell, Louisiana, and vicinity occurred on Sunday, May 18, 1958, when 13.2 inches of rainfall in a 24-hour period was recorded at the Central Fire Station in Slidell. At Bayou Liberty (a stream west of Slidell), 10.85 inches of rainfall was recorded. A high water stage of 7.1 feet above the National Geodetic Vertical Datum of 1929 (NGVD) was recorded in the center of Slidell. Flood waters caused considerable damage to the stocks of merchandise in the commercial areas. More than 40 families were forced to evacuate their homes while flooding in outlying areas caused highways and streets to be closed. Assuming that this storm was distributed over the entire drainage area of Slidell, it is estimated that it would be equivalent to a 100-year flood for headwater discharges.

Another large flood occurred on January 3-5, 1966. It was associated with a 3-day rainfall of 4.87 inches recorded at the Slidell Central Fire Station and caused a stage of 7.4 feet NGVD at Bayou Vincent, just upstream of U.S. Highway 190. In recent years, the flood of March 25, 1973 with a rainfall of 4.35 inches crested to 7.0 feet NGVD at Bayou Vincent upstream of Highway 190. The May 21-22, 1974 flood, a rainfall of 7.9 inches caused a stage of 8.0 feet NGVD at this gage location.

Other significant floods in the study area were those of July 22-23, 1946; June 12-13, 1956; September 23-24, 1956; September 30 and October 1, 1956; July 21-22, 1958; and March 17-18, 1961.

Flooding in the lower part of the study area has resulted from high stages in Lake Pontchartrain caused by hurricanes. Some of the significant hurricanes in recent times affecting Slidell are as follows: September-October 1915; "Hurricane Flossy" September 1956; "Hurricane Hilda" October 1964; "Hurricane Betsy" September 1965; "Hurricane Camille" August 1969; and "Hurricane Carmen" September 1974.

2.4 Flood Protection Measures

There are no Federal projects to provide flood protection measures for the City of Slidell.

Several drainage improvement projects are being undertaken by the City of Slidell. The projects consist of the expansion and improvement of the Diversion Canal (W-14) in the lower reaches; increasing pumping capacity of the main pump station at the W-13 main and providing a new pump station at Lee Street.

The Diversion Canal channel improvement project calls for the enlargement and deepening the channel from the marshy area south of Slidell to the Daney Street Bridge. This project is expected to be completed within the next two years.

3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude which are expected to be equalled or exceeded once on the average during any 10-, 50-, 100-, and 500-year period (recurrence intervals), have been selected as having special significance for flood plain management and for flood insurance premium rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10, 2, 1, and 0.2 percent chance, respectively, of being equalled or exceeded during any year. Although the recurrence interval represents the long term, average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than one year are considered. For example, the risk of having a flood which equals or exceeds the 100-year flood (one percent chance of annual occurrence) in any 50 year period is about 40 percent (four in 10), and for any 90 year period, the risk increases to about 60 percent (six in 10). The analyses reported here reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish peak discharge-frequency relationships for floods of the selected recurrence intervals for each flooding source studied in detail in the community.

The City of Slidell lies within a coastal area and is subject to flooding from two natural causes: all-season rainfall and hurricanes accompanied by above normal high tides with rainfall. To properly evaluate the flooding problem, consideration was given to both rainfall and hurricane criteria. The frequency of flooding, regardless of the source of flood, was considered as the basis for final selection of the base flood. Detailed investigations were made of each of the two types of flood conditions and the flood which caused the greater crest height was selected as the flood to be used for the delineation of the flood plain limits.

Headwater discharges due to intense rainfalls are more critical in the upper reaches of the study area while the high lake stages resulting from hurricane surges cause critical flooding problems in the lower reaches of both W-13 and W-14 mains and in southern portion of the City of Slidell.

No flow records exist for any stream in the study area. Flood hydrographs for different storm frequencies were developed by synthetic methods utilizing the basin characteristics and the associated 10-, 50-, 100-, and 500-year frequency rainfall in the study area. The basin characteristics such as the size of the drainage area, mean basin length, slope factor, lag time, etc., were determined from U.S. Geological Survey (USGS) quad (Scale 1" = 2,000 feet, contour interval 5 feet). The synthetic unit hydrographs

were developed by the procedures developed for small urban and rural drainage basins by the Texas Water Development Board (Reference 2). The resulting peak discharges were also verified by other hydrograph techniques (References 3 and 4). Generalized rainfall frequency-depth-duration data (Reference 5) were used with the synthetic unit hydrographs to develop runoff hydrographs for the study area. The resultant discharge hydrographs were assumed to have the same frequencies of occurrences as their associated storms. The 500-year frequency rainfall was extrapolated from the 10-, 50-, and 100-year rainfall plot on log-probability paper.

The peak discharge-drainage area relationships for the selected recurrence intervals are presented in Table 1, "Summary of Discharges."

The hurricane surge elevations for the 10-, 50-, 100-, and 500-year floods have been determined for Lake Pontchartrain. The analyses reported herein reflect the stillwater elevations caused by tidal surges which propagate inshore from Lake Pontchartrain, but do not include any local wind setup or wave action effects at Slidell because depths are too small to support their generation.

The hurricane surge elevations for Slidell (W-13 and W-14 lower reaches) for the 10-, 50-, 100-, and 500-year frequencies are shown on the Flood Profiles (Exhibit 1). These elevations are computed assuming that an inland travelling hurricane surge drops a foot every 2.75 miles.

Table 1. Summary of Discharges

Flooding Source and Location	Drainage Area (Square Miles)	Peak Discharges (Cubic Feet per Second) 10-Year	50-Year	100-Year	500-Year
Diversion Canal (W-14 Main)					
At mouth	8.0	3,200	4,300	4,900	6,100
At Station 11,0000 (near Interstate 10, excluding eastern branch)	4.5	2,200	2,800	3,200	4,000
At Fremaux Avenue	3.36	555	725	828	925
At Gause Boulevard (U.S. Highway 190)	2.98	479	578	658	744
At Robert Road	2.26	230	352	434	497
At Interstate Highway 12	1.00	303	384	418	452
Bayou Vincent (W-13 Main)					
At junction of Bayous Vincent and Bonfouca, near main pumping station	17.3	5,500	6,700	7,700	9,600
At Gause Boulevard (U.S. Highway 190)	13.78	1,976	2,624	2,939	3,244
At Illinois Gulf Central Railroad	9.51	1,376	1,832	2,050	2,262
West Diversion Canal					
At mouth	0.41	478	584	629	688
Reine Canal East					
At mouth	0.36	118	149	168	190
Reine Canal West					
At mouth	0.22	70	94	105	113

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of the flooding sources studied in detail in the City of Slidell were carried out to provide estimates of floods of the selected recurrence intervals along each flooding source. As previously stated, the southern portion of the City of Slidell is subject to flooding due to hurricane surges from Lake Pontchartrain. Flood levels were predicted for both hurricane and non-hurricane conditions, and were determined for each location or area. The higher stages were selected for use in each case.

Topography of the flood plains were obtained by field measurements, and existing topographic maps and the channel cross sections for W-13 and W-14 mains were obtained from the Louisiana Office of Public Works. Included in the hydraulic analysis were the effects of bridges, culverts and pumping stations.

Roughness coefficients (Manning's "n") for the channels and flood plains were estimated on the basis of field reconnaissance and engineering judgment. In general, roughness coefficients of 0.04 and 0.07 were used for channel flow and flood plain flow, respectively. For the proposed new channel expansion in the lower reaches of W-14 main, a channel roughness of 0.03 was used.

Water-surface elevations of floods for the selected recurrence intervals were computed through use of COE, HEC-2 computer program (Reference 6). Flood profiles were drawn showing computed water-surface elevations for floods of selected recurrence intervals. Starting elevations for the backwater profiles for W-13 and W-14 main were calculated using the slope-area method. Since hurricane surges from Lake Pontchartrain are critical in the lower portion of the study area, the water-surface profiles, show only the higher elevations for the headwater and hurricane flooding. All elevations are referenced from NGVD.

The frequency-elevation relationships for the hurricane flooding areas in the community are presented in Table 2, "Summary of Elevations.

TABLE 2 - SUMMARY OF ELEVATIONS

FLOODING SOURCE AND LOCATION	ELEVATION ABOVE NGVD (feet) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
LAKE PONTCHARTRAIN				
Hurricane Flooding Area 1	5.0	8.1	9.0	10.6
Hurricane Flooding Area 2	6.5	8.1	9.0	10.6
Hurricane Flooding Area 3	7.0	8.1	9.0	10.6
Hurricane Flooding Area 4	5.4	8.1	9.0	10.6

The hydraulic analyses for this study were based on unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

Locations of the selected cross sections used in the hydraulic analysis are shown on the Flood Profiles (Exhibit 1).

There are three pump stations in the City of Slidell for discharging the storm water from the urban areas. The total combined capacity of these stations, including additional planned expansion, is about 475 cfs. Since the hurricane surge elevations are critical in the southern part of Slidell, these pumping stations have no appreciable impact on the base flood elevations.

Bayou Vincent (W-13) and the Diversion Canal (W-14 main) are separated by the Southern Railroad embankment. Water elevations for hurricane flooding will be the same on both sides of the railroad embankment in the lower half of the study area. The drainage systems are not entirely independent and limited crossflow in the upper reaches of the study area could occur.

4.0 FLOOD PLAIN MANAGEMENT APPLICATIONS

The National Flood Insurance Program encourages state and local governments to adopt sound flood plain management programs. Therefore, each Flood Insurance Study includes a flood boundary map designed to assist communities in developing sound flood plain management measures.

4.1 Flood Boundaries

In order to provide a national standard without regional discrimination, the 100-year flood has been adopted by the FIA as the base flood for purposes of flood plain management measures. The 500-year flood is employed to indicate additional areas of flood risk in the community. For each stream studied in detail, the boundaries of the 100- and the 500-year floods have been delineated using the flood elevations determined at each cross section; between cross sections, the boundaries were interpolated using a topographic map at a scale of 1:24,000 with a contour interval of five feet. In cases where the 100- and the 500-year flood boundaries are close together, only the 100-year boundary has been shown.

The boundaries of the 100- and 500-year floods are shown on the Flood Insurance Rate Map (Exhibit 2). Small areas within the flood boundaries may lie above the flood elevations, and therefore not be subject to flooding. Owing to limitations of the map scale, such areas are not shown.

4.2 Floodways

The concept of a floodway, wherein the channel of a stream plus a portion of the adjacent flood plain would be kept free of encroachment, is not applicable to Slidell. Neither Bayou Bonfouca - Bayou Vincent (W-13 main) nor the Diversion Canal (W-14 main) have fully confined flood plains. A fully encroached flood plain, under these circumstances, would increase the flood heights only by insignificant amounts. Minimum water levels would be practically limited by the tendency of flood waters to flow across lower watershed boundaries. Also, since the lower reach of each stream within the city limits is characterized by hurricane flooding, the floodway concept would not be applicable to those reaches.

5.0 INSURANCE APPLICATION

In order to establish actuarial insurance rates, the FIA has developed a process to transform the data from the engineering study into flood insurance criteria. This process includes the determination of reaches, Flood Hazard Factors (FHFs), and flood insurance zone designations for each significant flooding source affecting the City of Slidell.

5.1 Reach Determinations

Reaches are defined as lengths of watercourses having relatively the same flood hazard, based on the average weighted difference in water-surface elevations between the 10- and 100-year floods. This difference does not have a variation greater than that indicated in the following table for more than 20 percent of the reach.

Average Difference Between 10- and 100-Year Floods	Variation
Less than 2 feet	0.5 foot
2 to 7 feet	1.0 foot

For the areas subject to hurricane flooding, reaches are limited to the distance for which the 100-year flood elevation does not vary more than 1.0 foot.

5.2 Flood Hazard Factors (FHFs)

The Flood Hazard Factor is used to correlate flood information with insurance rate tables. Correlations between property damages from floods and their assigned FHFs are used to set actuarial insurance premium rate tables based on FHFs from 005 to 200.

The FHF for a reach is the average weighted difference between the 10- and 100-year flood water-surface elevations expressed to the nearest one-half foot, and shown as a three-digit code. For example, if the difference between the water-surface elevations of the 10- and 100-year floods is 0.7 foot, the FHF is 005; if the difference is 1.4 feet, the FHF is 015; if the difference is 5.0 feet, the FHF is 050. When the difference between the 10- and 100-year flood water-surface elevations is greater than 10.0 feet, the accuracy for the FHF is to the nearest foot.

5.3 Flood Insurance Zones

After the determination of reaches and their respective FHFs, the entire study area of the City of Slidell was divided into zones, each having a specific flood potential or hazard. Each zone was assigned one of the following flood insurance zone designations.

Zones A1, A2, A4, A5, A7, A8:	Special Flood Hazard Areas inundated by the 100-year flood, determined by detailed methods; base flood elevations shown, and zones subdivided according to FHFs.
Zone B:	Areas between the Special Flood Hazard Area and the limits of the 500-year flood, including areas of the 500-year flood plain that are protected from the 100-year flood by dike, levee, or other water control structure; areas subject to certain types of 100-year shallow flooding where depths are less than 1.0 foot; or areas subject to 100-year flooding from sources with drainage areas less than 1 square mile. Zone B is not subdivided.
Zone C:	Areas of minimal flooding.

5.4 Flood Insurance Rate Map Description

The Flood Insurance Rate Map (Exhibit 2) for the City of Slidell is, for insurance purposes, the principal result of the Flood Insurance Study. This map contains the official delineation of flood insurance zones and base flood elevation lines. Base flood elevation lines show the locations of the expected whole-foot water-surface elevations of the base (100-year) flood. This map is developed in accordance with the latest flood insurance map preparation guidelines published by the FIA.

6.0 OTHER STUDIES

A Type 5 Flood Insurance Study of the Louisiana Gulf Coast was completed by the COE for the Department of Housing and Urban Development in May 1970 (Interagency Agreement No. AA-H-8-70, Project Order No. 4). The portion of the above study pertaining to Slidell was an update of data contained in the "Interim Survey Report, Lake Pontchartrain, Louisiana and Vicinity," prepared by the COE in November 1962.

A Flood Plain Information Report for the City of Slidell was prepared by the COE in December 1971.

This study is authoritative for the purposes of the Flood Insurance Program, and the data presented here either supersede or are compatible with previous determinations.

7.0 LOCATION OF DATA

Information concerning the pertinent data used in the preparation of this study can be obtained by contacting the Federal Emergency Management Agency, Mitigation Division, Federal Regional Center, Room 206, 800 North Loop 288, Denton, Texas 76201-3698.

8.0 BIBLIOGRAPHY AND REFERENCES

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10. U.S. Department of the Army, Corps of Engineers, Hydrologic Engineering Center, HEC-2 Water-Surface Profiles, Generalized Computer Program, Davis, California, May 1991.

11. U.S. Department of the Interior, Geological Survey, 7.5-Minute Series Topographic Maps, Scale 1:24,000, Contour Interval 5 feet, Haaswood, Louisiana-Mississippi, 1993.

9.0 REVISION DESCRIPTIONS

This section has been added to provide information regarding significant revisions made since the original Flood Insurance Study was printed. Future revisions may be made that do not result in the republishing of the Flood Insurance Study report. To assure that any user is aware of all revisions, it is advisable to contact the community repository of flood-hazard data located at the City of Slidell Planning Department, 2056 Second Street, P.O. Box 828, Slidell, Louisiana 70459.

9.1 First Revision

This study was revised on April 21, 1999, to show modifications to flood hazards along Diversion Canal (W-14 Main), Bayou Vincent (W-13 Main), West Diversion Canal, and Reine Canals East and West. Diversion Canal (W-14 Main) was studied from Daney Street to 700 feet upstream of Pawns Boulevard, a distance of approximately 3.75 miles. Bayou Vincent (W-13 Main) was studied from 1,500 feet downstream of West Hall Road to 1,000 feet downstream of Interstate 12, a distance of approximately 2.36 miles. West Diversion Canal was studied from its confluence with Bayou Vincent (W-13 Main) to its confluence with Diversion Canal (W-14 Main), a distance of approximately 0.85 mile. Reine Canal East was studied from its confluence with French Branch to its confluence with Reine Canal West, a distance of approximately 0.80 mile. Reine Canal West was studied from

its confluence with Diversion Canal (W-14 Main) to its confluence with Reine Canal East, a distance of approximately 0.85 mile. All flooding sources were studied by detailed methods.

The hydrologic and hydraulic analyses for the restudy were performed for the Federal Emergency Management Agency (FEMA) by Owen and White, Inc., under Contract No. EMT-96-CO-0023. This restudy was completed on November 12, 1997.

The results of the restudy were reviewed at the final Consultation Coordination Officer meeting held on January 21, 1998, and attended by representatives of the City of Slidell; the Louisiana Department of Transportation; Owen and White, Inc.; and FEMA. All problems raised at that meeting have been addressed in this restudy.

There was a major flood in the City of Slidell in 1995. Between Monday evening, May 8, 1995, and Wednesday morning, May 10, 1995, 23.9 inches of rain fell in the City of Slidell. The 100-year, 2-day storm is 14 inches.

There are various flood-protection measures in place along some of the studied streams and within the study area. A storage basin has been constructed along Diversion Canal (W-14 Main) north of Robert Road. A detention basin is being constructed on West Diversion Canal downstream of U.S. Highway 11. An improved drainage-outlet system is being constructed for the Belvedere area to Bayou Bonfouca. Several pumping stations in the "Hurricane Flood Effects" area are being expanded.

Discharge-drainage area relationships for Diversion Canal (W-14 Main), Bayou Vincent (W-13 Main), West Diversion Canal, and Reine Canals East and West were determined using the U.S. Army Corps of Engineers (USACE) HEC-1 computer program (Reference 7). Due to the topography of the detailed study area, hydrologic analyses need to emphasize slope in overbank and channel, flow diversion, and storage and ponding. Times of concentration and storage coefficients were computed for overland flow using the Espey Huston model (Reference 8). Clark unit hydrographs were computed for all streams and converted to runoff hydrographs using rainfall from isopluvial maps (References 5 and 9) and initial uniform loss rates. These computations and those for routing and combining the hydrograph ordinate using the modified-Puls routing method were performed using the USACE HEC-1 computer program (Reference 7).

After computation of the peak discharges, an array of decision combinations was made. Diversion occurs from Diversion Canal (W-14 Main) through West Diversion Canal to Bayou Vincent (W-13 Main). Also, Reine Canal West flow is divided between Diversion Canal (W-14 Main) and French Branch. In addition, downstream split flow occurs from Diversion Canal (W-14 Main) to Bayou Bonfouca (W-13 Main). Diversion combinations concluded when equally calculated water- surface elevations were obtained on Diversion Canal (W-14 Main) upstream of West Diversion Canal and at a common point in Reine Canal West. The discharges for the streams studied using detailed methods are shown in Table 1, "Summary of Discharges."

Water-surface elevations for detailed studied streams were computed using the USACE HEC-2 computer program (Reference 10).

Roughness coefficients (Manning's "n" values) used in the hydraulic computations were estimated from field observations, aerial photography, and photographs. Roughness coefficients for the streams studied by detailed methods are shown in Table 3, "Manning's "n" Values."

Special flood hazard area boundaries were interpolated using topographic maps with a contour interval of 2 feet, developed for the restudy. For areas beyond the limits of these contour maps, the flood boundaries were determined using USGS 7.5-minute series topographic maps at a scale of 1:24,000, with a contour interval of 5 feet (Reference 11).

All elevations are referenced to the NGVD. Elevation reference marks and their descriptions are shown on the maps.

No floodways were computed for the streams studied by detailed methods. All streams and overbanks are relatively flat. There is ample storage available and there are numerous diversion canals. Minor fluctuations in water surface can cause diversion to adjacent basins. Streams are more affected by changes in storage than encroachment.

Exhibit 1, "Flood Profiles," was revised to reflect changes as a result of the restudy.

Table 3. Manning's "n" Values

Flooding Source	Roughness Coefficients	
	Channel	Overbanks
Diversion Canal (W-14 Main)	0.04 to 0.12	0.04 to 0.20
Bayou Vincent (W-13 Main)	0.04 to 0.12	0.04 to 0.20
West Diversion Canal	0.04 to 0.12	0.04 to 0.20
Reine Canal East	0.04 to 0.12	0.04 to 0.20
Reine Canal West	0.04 to 0.12	0.04 to 0.20

FLOOD PROFILES

DIVERSION CANAL (W14 MAIN)

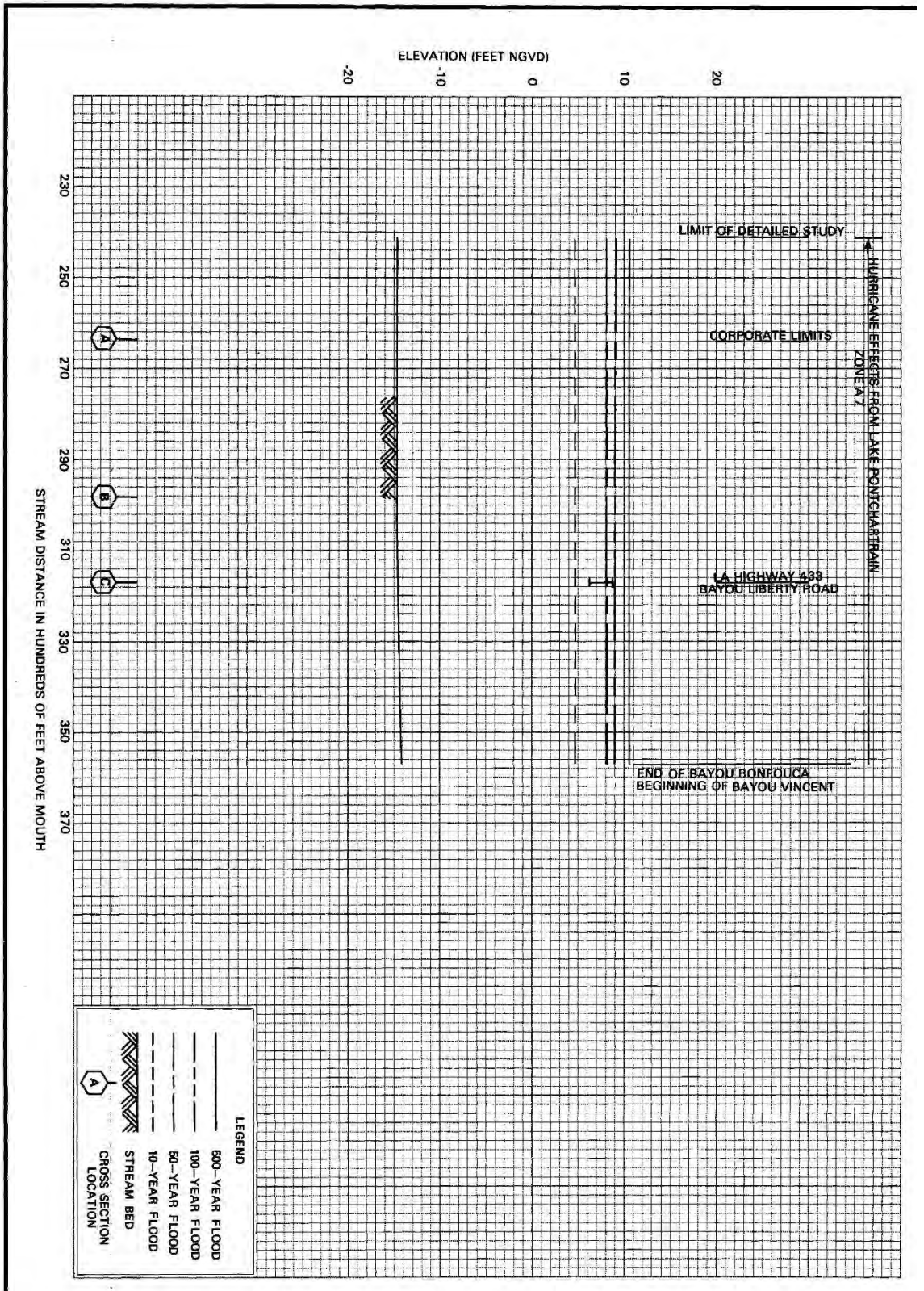
FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF SLIDELL, LA

(ST. TAMMANY PARISH)

01P

02P
FEDERAL EMERGENCY MANAGEMENT AGENCY
CITY OF SLIDELL, LA
(ST. TAMMANY PARISH)
FLOOD PROFILES
DIVERSION CANAL (W-14 MAIN)
LEGEND
500 YEAR FLOOD
100 YEAR FLOOD
50 YEAR FLOOD
10 YEAR FLOOD
STREAM BED
CROSS SECTION LOCATION
STREAM DISTANCE IN HUNDREDS OF FEET ABOVE MOUTH
ELEVATION IN FEET (NGVD)
LIMIT OF FLOODING AFFECTING CITY OF SLIDELL
BROWNS SWITCH ROAD
CITY OF SLIDELL
ST. TAMMANY PARISH
NORTH BOULEVARD
CONFLUENCE OF WEST DIVERSION CANAL
ROBERT BOULEVARD
CONFLUENCE OF DETENTION BASIN
INDEPENDENCE DRIVE
US HIGHWAY 190
FLORIDA AVENUE
FRERAUX AVENUE
COUSIN STREET
DANEY STREET
CONFLUENCE OF REINE CANAL WEST
HURRICANE EFFECTS FROM LAKE PONTCHARTRAIN



FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF SLIDELL, LA
(ST. TAMMANY PARISH)

FLOOD PROFILES

BAYOU BONFOUCA (W13 MAIN)

03P

04P

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF SLIDELL, LA

(ST. TAMMANY PARISH)

FLOOD PROFILES

BAYOU VINCENT (W-13 MAIN)

05P
FEDERAL EMERGENCY MANAGEMENT AGENCY
CITY OF SLIDELL, LA
(ST. TAMMANY PARISH)
FLOOD PROFILES
WEST DIVERSION CANAL
LEGEND
500 YEAR FLOOD
100 YEAR FLOOD
50 YEAR FLOOD
10 YEAR FLOOD
STREAM BED
CROSS SECTION LOCATION
U.S. HIGHWAY 11
CHICAGO CENTRAL GULF RAILROAD
DIVERGENCE FROM DIVERSION CANAL (W14-MAIN)
ST. TAMMANY PARISH
CITY OF SLIDELL
DETENTION POND OUTLET
CITY OF SLIDELL
ST. TAMMANY PARISH
ILLINOIS CENTRAL GULF RAILROAD
CARNATION STREET
MAGNOLIA STREET
FLOODING CONTROLLED BY BAYOU VINCENT (W13-MAIN)
CONFLUENCE WITH BAYOU STREET (W13-MAIN)
ST TAMMANY PARISH
CITY OF SLIDELL
STREAM DISTANCE IN FEET ABOVE CONFLUENCE WITH BAYOU VINCENT (W13-MAIN)
ELEVATION IN FEET (NGVD)
35
30
25
20
15
10
5
0
-5
-10
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
A
B
C
D

06P
FEDERAL EMERGENCY MANAGEMENT AGENCY
CITY OF SLIDELL, LA
(ST. TAMMANY PARISH)
FLOOD PROFILES
REINE CANAL WEST
LEGEND
500 YEAR FLOOD
100 YEAR FLOOD
50 YEAR FLOOD
10 YEAR FLOOD
STREAM BED
CROSS SECTION LOCATION
LIMIT OF REINE CANAL WEST
AUDUBON DRIVE
CONFLUENCE WITH DIVERSION CANAL (W14-MAIN)
ELEVATION IN FEET (NGVD)
STREAM DISTANCE IN FEET ABOVE CONFLUENCE WITH DIVERSION CANAL (W14-MAIN)

07P
FEDERAL EMERGENCY MANAGEMENT AGENCY
CITY OF SLIDELL, LA
(ST. TAMMANY PARISH)
FLOOD PROFILES
REINE CANAL EAST
LEGEND
500 YEAR FLOOD
100 YEAR FLOOD
50 YEAR FLOOD
10 YEAR FLOOD
STREAM BED
CROSS SECTION LOCATION
LIMIT OF FLOODING REINE CANAL EAST
ELEVATION IN FEET (NGVD)
STREAM DISTANCE IN FEET ABOVE CONFLUENCE WITH FRENCH BRANCH

HYDROLOGIC AND HYDRAULIC STUDY

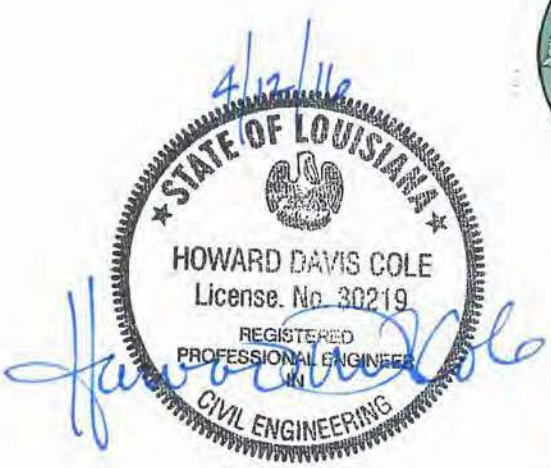
FOR

CITY BARN DRAINAGE IMPROVEMENTS

CITY OF SLIDELL, LOUISIANA
DEPARTMENT OF ENGINEERING

CITY OF SLIDELL PROJECT NO. 100-118

HDCA PROJECT NO. 2014-10 (PHASE II)



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APRIL 2016

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The City of Slidell, Louisiana

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SECTION 1 – PROJECT BACKGROUND

INTRODUCTION

The City of Slidell, Louisiana (COS), has applied for funding under the Hazard Mitigation Grant Program (HMGP), a program funded through the Federal Emergency Management Agency (FEMA), to improve existing drainage systems within the City. Part of these ongoing efforts have included various improvements to the City Barn Drainage Pump Station (CBDPS) and associated drainage system. The goal of this project is to further improve the performance of the existing drainage system located along the US 11 (Front Street) Highway Route near Bayou Pattasat and Bayou Bonfouca in Slidell, Louisiana and to further reduce the recurring flooding throughout the drainage basin by reducing maximum water surface elevations within the area.

This project will include improvements to the existing CBDPS, located at the end of Bayou Lane, and reshaping the cross-section of Bayou Pattasat as it approaches the drainage pump station. The existing CBDPS, which has a current capacity of 400 cubic feet per second (cfs) and is being upgraded to a capacity of 575 cfs, is the primary means of removing rain water from the south side of US 11 (Front Street) to Bayou Bonfouca. Improving the pump station itself and increasing the capacity of the channel leading to the pump station will decrease the extents of flooding in the entire basin. Further, the inclusion of a fourth mechanical bar screen cleaner at the drainage pump station will protect the pumps from damage due to foreign object ingestion as well as reduce pump down time associated with foreign object ingestion. Lastly, the reshaping of the channel directly in front of the fourth pump will reduce the velocities through the screen, helping to protect the screens themselves from damage from unusually massive objects.

PURPOSE

The focus and purpose of this Hydrologic and Hydraulic (H&H) Study is to detail the effects of the in progress capacity improvements to the pump station on the performance of the drainage system. Additionally, this study reviews the downstream effects of the proposed pump expansion.

PROJECT AUTHORIZATION

COS entered into an agreement with H. Davis Cole & Associates, LLC (HDCA) to provide engineering consulting services for the City Barn Drainage Pump Station Capacity Improvements. These services included development of a study describing the existing drainage basin and the development of recommendations to improve the conveyance of water within the basin and through the CBDPS. This study is captured under Amendment 2 to the Agreement mentioned above, which was executed on February 18th, 2016.

STUDY LOCATION AND AREA

The general study area includes the full length of Bayou Pattasat, northwest of US 11 through the CBDPS and where it intersects with Bayou Bonfouca and Southeast of US 11 where it branches off into two reaches, one extending to the W-14 Canal and the other extending to 3rd

Street (Sgt. Alfred Drive). The entire drainage basin consists of over 350 acres including commercial, industrial, and residential properties.

The length of Bayou Pattasat from the CBDPS and where it crosses US 11 is approximately 950 feet. Once crossing under US 11 the bayou continues on for approximately 850 feet until splitting off into the northern reach with a length of approximately 4200 feet and ending at the W-14 canal and the southern reach with a length of approximately 2200 feet and ending at 3rd Street (Sgt. Alfred Drive).

All of the storm water collected in the basin described above flows downstream through Bayou Pattasat until it reaches the CBDPS. The water is then pumped up and over the existing berm and into Bayou Bonfouca where it flows south to its eventual outfall into Lake Pontchartrain. The general study area is depicted below in the following figure.

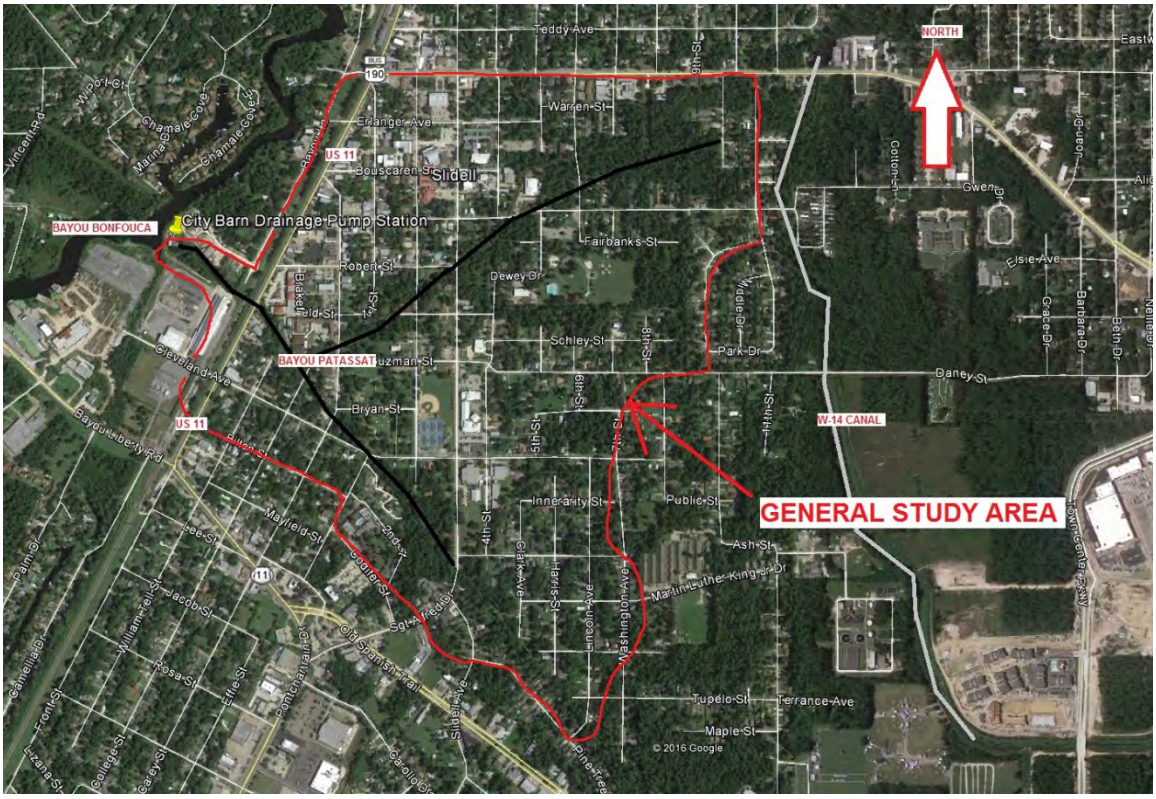

Figure 1.1 – Vicinity Map and General Study Area

The existing CBDPS, located at the most downstream point of Bayou Pattasat has a current pumping capacity of 400 cfs. A new project currently underway will increase the capacity of the station to 575 cfs by adding one more pump. This project is intended to be complete by September-October 2016 in anticipation of hurricane season. The improved capacity of the drainage pump station will better protect the drainage basin against a 100-year storm event.

PREVIOUS WORK AND STUDIES BY OTHERS

The following list of studies and/or works done by others were utilized by HDCA in order to develop the basis for this H&H Study of the described project area:

- Bayou Patassat (City Barn) Drainage Study Addendum 1 by J.V. Burkes & Associates, Inc.

- Flood Insurance Study for the City of Slidell prepared by the Federal Emergency Management Agency

Copies of these references are included as Appendix "A" and "B", respectively, to this study.

In addition, a geotechnical investigation was prepared by Professional Services Industries, Inc. (PSI) to define the general site and soil conditions and for the development of the safe canal slopes for the Bayou Pattasat drainage canal. A copy of this completed geotechnical investigation is included as Appendix "C" to this study.

Finally, a topographic and boundary survey was prepared by All South Consulting Engineers (ASCE). This topographic and boundary survey was utilized for topographic data to supplement the model runs and for the review of limitations of channel shaping due to property limitations, such as servitudes, rights – of – way, and property boundaries. A copy of the topographic survey prepared for the project is included as Appendix "D" to this study.

The observations and recommendations contained within this H&H Study are generally based upon the unsteady – state existing drainage model provided to HDCA by COS. It is HDCA's understanding that the drainage model was originally developed by the United States Army Corps of Engineers and utilized in previous studies of the project area. The model is assumed to be a true and accurate representation of the geometry of the drainage basin, drainage features, and prevailing hydrologic conditions. In addition, generally accepted hydraulic principles were utilized for the preparation of this study.

STUDY ORGANIZATION

This H&H Study for the CBDPS is divided into three sections and two appendices as described below:

- Section 1 – Project Background

- Section 2 – Study Procedures and General Hydrologic and Hydraulic Findings

- Section 3 – Recommended Improvements

- Appendix A – Previous Study – Bayou Pattasat Drainage Study, Prepared by J.V. Burkes and Associates

- Appendix B – Flood Insurance Study for the City of Slidell, 1999

- Appendix C – Geotechnical Investigation prepared by Professional Services Industries (PSI)

- Appendix D – Topographic and Boundary Survey, Prepared by All South Consulting Engineers (ASCE)

- Appendix E – Comparison of Water Surface Elevations for Various Events

- Appendix F – Exhibit Plates
- Appendix G – Downstream Water Surface Estimation Calculations

Hydrologic and Hydraulic Study
City Barn Drainage Improvements
Funded by Hazard Mitigation Grant Program
The City of Slidell, Louisiana

SECTION 2 – STUDY PROCEDURES AND GENERAL HYDROLOGIC AND HYDRAULIC FINDINGS

Prepared By:

H. Davis Cole & Associates, LLC
Consulting Engineers

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SECTION 2 – STUDY PROCEDURES AND GENERAL HYDROLOGIC AND HYDRAULIC FINDINGS

DESCRIPTION OF THE STUDY AREA AND DRAINAGE CHARACTERISTICS

The general area considered in this study consists of just over 350 acres and is depicted in Figure 2.1 below:

Figure 2.1 – General Hydrologic/Hydraulic Study Area

The study area is currently drained through Bayou Pattasat which consists of two major ditch reaches. Bayou Pattasat drains from East to West, reaching its confluence with Bayou Bonfouca (alternatively referred to as the W-13) at the City Barn Drainage Pump Station. The confluence of the two bayous is controlled by a floodgate facility. Generally, the water surface elevation in Bayou Bonfouca is higher than the water surface elevation in Bayou Pattasat and opening the floodgate serves no purpose in aiding the drainage of the Bayou Pattasat basin. Accordingly, all water runoff falling within the basin must be pumped out of the basin. Accordingly, the basin is served by forced drainage. Since the floodgates do not effectively provide a reliable means of drainage, and the pump station does not have the pumping capacity to directly drain the 100 – year event, it is the opinion of HDCA that the focus of improvements to the drainage basin should occur at or around the pump station itself, and other areas where storage for runoff may be available.

Generally, Bayou Pattasat in the area of the CBDPS is approximately 40 feet wide at top of bank, varying in depth from 4 to 10 feet. The canal widens and deepens in the vicinity of the drainage pump station. Based upon the review of the topographic and boundary survey prepared by ASCE, the southern bank of the canal actually is within property not owned by the COS, although some relief is provided by the way of servitudes granted to COS. The canal bank is generally steep, in some places exceeding a 3:1 (horizontal to vertical) slope.

Previous reports have indicated that there is some cross-over of flow from the W-14 drainage into the Bayou Pattasat basin. Based on previous reports, the W-14 drainage canal is not suitable for the water demand at which it should be so when heavy rainfall events occur the Bayou Pattasat drainage area is easily and adversely impacted. The effects of the W-14 drainage canal overflow were mentioned previously by others and HDCA believes was captured in the HEC-RAS model.

CLIMATE

Slidell, as with Southeast Louisiana, has a humid subtropical climate. Weather patterns are characterized by hot summers with frequent precipitation, mild winters, no actual dry season, and a generally warm and humid climate. As Slidell is rather close to the Gulf Coast, it does experience direct impacts from tropical activity.

SOILS AND LAND USE

HDCA utilized the United States Department of Agriculture (USDA) Web Soil Survey (WSS) to identify predominate soil types within the area.

The study area is predominantly composed of Myatt Fine Sandy Loam and Stough Fine Sandy Loam. These soils are generally frequently flooded and poorly drained, runoff time is long since the slope is nearly level, and the water table is usually high for long periods of time which generally occurs in the winter and spring.

According to the Louisiana Department of Transportation and Development (DOTD) Hydraulics Manual, Myatt soil is classified as hydrologic groups B and D and Stough soil is classified as hydrologic group C. Groups B and D are described as having moderate to very slow infiltration rates and water transmission therefore having high runoff potential. Soil group C is described as having slow infiltration rates and water transmission, also resulting in high runoff potential. Overall, the predominate soils throughout the Olde Towne drainage basin do not allow much infiltration, meaning that most of the water that hits the ground runs off and needs to then be transferred to the drainage ditches and on toward the CBDPS. The more the soils allow runoff the more water the drainage basin needs to drain, making the drainage outlets in need of storing and transporting large amounts of water on a daily basis much less during hurricane season.

The majority of the study area is developed and is used for residential and commercial purposes. This developed urban to suburban study area produces a more intensive peak discharge than an undeveloped area. Enhancing the drainage system is challenging because the slope is little to none in some areas of the drainage study area therefore not giving the water basin much relief.

STUDY ASSUMPTIONS AND PROCEDURES AND DRAINAGE MODEL

In general, the hydrologic behavior of the study area analyzed with the aid of a computer model created and run in HEC – RAS. Developed by the U. S. Army Corps of Engineers Institute for Water Resources, HEC – RAS is widely accepted as the industry standard for the modeling of unsteady and steady state flow regimes for riverine areas

The HEC-RAS has many capabilities, including but not limited to the calculation of Steady Flow Water Surface Profiles, Unsteady Flow Simulation, and Sediment Transport/Movable Boundary Computations. For this particular study, the Unsteady Flow Simulation was used. The Unsteady Flow Simulation is simply a program developed to mimic the effects of an unsteady flow traveling through a network of channels. These channels consists mainly of open ditches. Additionally, the drainage area contains bridges and junctions, which are modeled in accordance with standard procedures for the HEC – RAS program.

HEC – RAS completes its analysis of storm events by pairing a geometry with a specific flow file. In general, the program determines water surface elevations by balancing of the "Energy Equation", relating a specific flow at a specific time to a specific geometric consideration at the point of analysis. In this particular case, the geometry of this drainage basin has already been modeled by others. Some cross-sections throughout the length of Bayou Pattasat and the pumps located at the CBDPS were previously entered into the geometry of this project. HDCA modified the existing model by updating the geometry of the model to better suit existing and proposed conditions.

HDCA created three specific model geometries for this project as noted below:

- **Existing Conditions Model (HDCA):** This model geometry was derived from the original "existing conditions geometry" contained within the existing drainage model. HDCA modified this geometry by adjusting the "pump on and pump off" elevations to better reflect the pump set points as well as separating the pump groups into three separate groups to allow for variation in the pump set point elevations for each pump. Further, HDCA modified the canal cross sections directly adjacent to the drainage pump station to reflect the widening of the canal during the installation of the mechanical bar screen cleaners at the facility. Additional interpolated cross sections were included to provide additional model resolution near the drainage pump station.

- **Phase I Conditions**: This model geometry was derived from the HDCA conditions model to reflect the "City Barn Drainage Improvements Project" currently under construction. Specifically, these modifications included the addition of a fourth drainage pump with a rated capacity of 175 cubic feet per second and the revision of cross sections near the CBDPS to reflect the removal of earth on the south bank of the CBDPS facility.

- **Phase II Conditions:** This model geometry was derived from Phase I Conditions model geometry. These modification included the revision of cross sections to reflect proposed removal of material associated with proposed shaping of the canal.

In order to determine the effects of different rain events on specific geometry files, the software must have hydrographs input for each different rain event. To complete this process, HDCA paired unsteady flow data files with specific geometries. Given all of the necessary data, and after telling the program to compute, the software runs the specified hydrograph of unsteady

flow through the geometry of the drainage basin, through all of the ditches, junctions, pump stations, etc. The result of this computation is shown through different schematics such as a hydraulic grade line of the entire geometry, velocity at various locations throughout the geometry, and water surface elevations represented in cross-sections of river stations.

HDCA utilized unsteady flow files provided with the drainage model, as they were assumed to be a true and accurate representation of the hydrologic characteristics of the drainage basin. Of note, the previous model was completed utilizing restart files, commonly referred to as "Hot – Start" files. As a simplifying assumption, HDCA overwrote the initial conditions from initial model runs and checked the water surface elevations against the previous models. As these were in general concurrence (within hundredths of a foot), HDCA believes that the simplified initial conditions are relatively accurate. HDCA employed the existing conditions unsteady flow files for its initial conditions model runs, and the "Post 1" unsteady flow files for its Phase I and Phase II model runs as the Post 1 unsteady flow file was the most equivalent unsteady flow, consisting of the addition of one pump to CBDPS.

HDCA ran each different geometry with each different flow file, ultimately creating twelve plans within the program. The plans are as detailed in Table 2.1 below:

Table 2.1 – Geometry and Flow File Pairings

Analysis Case	HEC – RAS Geometry File	HEC – RAS Unsteady Flow File
10 Year – Existing Conditions	HDCA ECM (R)	ECM 10 Year
25 Year – Existing Conditions	HDCA ECM (R)	ECM 25 Year
50 Year – Existing Conditions	HDCA ECM (R)	ECM 50 Year
100 Year – Existing Conditions	HDCA ECM (R)	ECM 100 Year
10 Year Phase I Conditions	HDCA Phase I	Phase I 10 Year
25 Year Phase I Conditions	HDCA Phase I	Phase I 25 Year
50 Year Phase I Conditions	HDCA Phase I	Phase I 50 Year
100 Year Phase I Conditions	HDCA Phase II	Phase I 100 Year
10 Year Phase II Conditions	HDCA Phase II	Phase II 10 Year
25 Year Phase II Conditions	HDCA Phase II	Phase II 25 Year
50 Year Phase II Conditions	HDCA Phase II	Phase II 50 Year
100 Year Phase II Conditions	HDCA Phase II	Phase II 100 Year

The results of the Unsteady Flow Simulation for Existing Conditions Model, Phase I Conditions, and Phase II Conditions were all compared and the results are discussed Section 3 of this Study.

ESTIMATION OF EFFECTS DOWNSTREAM OF CBDPS

In order to estimate the effects of the increased flow in Bayou Bonfouca downstream of CBDPS, HDCA utilized the City of Slidell Flood Insurance Study to create a synthesized stage – discharge relationship for Bayou Bonfouca. This method is widely accepted in the industry for estimating the effects of increased or decreased flow within an open channel. The results of this analysis are included in Section 3 of this Study.

Hydrologic and Hydraulic Study
City Barn Drainage Improvements
Funded by Hazard Mitigation Grant Program
The City of Slidell, Louisiana

SECTION 3 – GENERAL HYDRAULIC FINDINGS AND RECOMMENDATIONS

Prepared By:

H. Davis Cole & Associates, LLC
Consulting Engineers

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SECTION 3 – GENERAL HYDRAULIC FINDINGS AND RECOMMENDATIONS FOR IMPROVEMENTS

GENERAL FINDINGS

The analysis of the drainage basin indicated that the maximum water surface elevations for the Bayou Pattasat drainage basin were indeed reduced by the under construction and proposed improvements. Detailed discussion of these is included below and in the appendices to this report. However, it was noted that the reduction in water surface elevations for the Phase I project are more dramatic than the Phase II project.

The geotechnical analysis of the Bayou Pattasat canal indicated that the maximum allowable slope of the canal should be limited to a 3:1 slope. Of further note, the ability to shape this canal is severely limited on the south side of the canal by existing servitudes and rights of way as well as utilities on the north side. As a general recommendation, COS should investigate possible acquisition or cooperative endeavor agreements to allow for additional excavation of the canal to the south of the channel. This would dramatically increase the available storage in the vicinity of CBDPS, allowing for further reductions

As a basis of comparison, HDCA compared the previous modeling results prepared by others with our own existing conditions model and Phase I and Phase II as detailed below.

10 – YEAR STORM EVENT

Table 3.1 below illustrates the average water surface elevations for the Phase I and Phase II projects for the ten – year storm event. These are compared against the previous existing conditions model for comparison.

Table 3.1 – 10 Year Storm Event – Average WSE

Average Maximum WSE, Previous Existing Conditions Model	Average Maximum WSE, HDCA Existing Conditions Model	Average Maximum WSE, HDCA Phase I Conditions Model	Average Maximum WSE, Previous Existing Conditions Model
6.21	6.19	5.69	5.69

A detailed comparison of water surface elevations for the ten – year storm event are included in Appendix “E” to this Study. Further, inundation maps for the ten – year event are included in Appendix “F” to this Study.

25 – YEAR STORM EVENT

Table 3.2 below illustrates the average water surface elevations for the Phase I and Phase II projects for the ten – year storm event. These are compared against the previous existing conditions model for comparison.

Table 3.2 – 25 Year Storm Event – Average WSE

Average Maximum WSE, Previous Existing Conditions Model	Average Maximum WSE, HDCA Existing Conditions Model	Average Maximum WSE, HDCA Phase I Conditions Model	Average Maximum WSE, Previous Existing Conditions Model
6.70	6.69	6.16	6.17

A detailed comparison of water surface elevations for the twenty five – year storm event are included in Appendix "E" to this Study. Further, inundation maps for the twenty five – year event are included in Appendix "F" to this Study.

50 – YEAR STORM EVENT

Table 3.3 below illustrates the average water surface elevations for the Phase I and Phase II projects for the fifty – year storm event. These are compared against the previous existing conditions model for comparison.

Table 3.3 – 50 Year Storm Event – Average WSE

Average Maximum WSE, Previous Existing Conditions Model	Average Maximum WSE, HDCA Existing Conditions Model	Average Maximum WSE, HDCA Phase I Conditions Model	Average Maximum WSE, Previous Existing Conditions Model
6.94	6.93	6.38	6.39

A detailed comparison of water surface elevations for the fifty – year storm event are included in Appendix "E" to this Study. Further, inundation maps for the fifty – year event are included in Appendix "F" to this Study.

100 – YEAR STORM EVENT

Table 3.4 below illustrates the average water surface elevations for the Phase I and Phase II projects for the one hundred – year storm event. These are compared against the previous existing conditions model for comparison.

Table 3.4 – 100 Year Storm Event – Average WSE

Average Maximum WSE, Previous Existing Conditions Model	Average Maximum WSE, HDCA Existing Conditions Model	Average Maximum WSE, HDCA Phase I Conditions Model	Average Maximum WSE, Previous Existing Conditions Model
7.38	7.36	6.82	6.81

A detailed comparison of water surface elevations for the one hundred – year storm event are included in Appendix "E" to this Study. Further, inundation maps for the one hundred – year event are included in Appendix "F" to this Study.

ADDITIONAL HYDRAULIC BENEFITS OF THE PHASE II PROJECT

While it should be noted that the Phase II project does not show appreciable benefits in terms of maximum water surface elevation reduction, the project has additional hydraulic benefits which will enhance the service life and reliability of the pump station components.

First, the straightening of the channel directly in front of the pump currently under installation will allow for a straighter, more direct flow of water. This is more ideal for the pump operation and will lead to smoother operation and less sacrifice of efficiency due to any turbulence.

Additionally, the addition of the fourth screen will reduce the velocities of the flow at the screen interface. At the approximate worst case pump off water surface of -2.0, the average screen velocities will be reduced from 9.5 feet per second to 7.0 feet per second. This will reduce potential for damage due to large, massive object impacts and will improve screen capture efficiency.

ANTICIPATED DOWNSTREAM EFFECTS

While the water surface elevations upstream of the CBDPS will certainly decrease as a result of improvements to the CDBPS and Bayou Pattasat canal, the increase of discharge into Bayou Bonfouca will result in a nominal increase in the water surface elevation downstream of the station.

Table 3.5 below illustrates the expected increases in water surface elevation. Detailed calculations are included as Appendix "G" to this Study.

Storm Return Interval	FIS Discharge, CFS (Note 1)	Elevation, NGVD (From FEMA FIS Profile)	Additional Flow (CFS)	Total Flow	Estimated Elevation w/ Additional Flow (Note 2)	Estimated Total Change (Inches) (Note 3)
10 Year	5500	5	175	5675	5.40	4.80
50 Year	6700	8	175	6875	8.30	3.60
100 Year	7700	9	175	7875	9.15	1.80
500 Year	9600	10	175	9775	10.15	1.80

Notes: 1) Discharge in CFS from FIS Study, City of Slidell, Louisiana, April 21, 1999. 2) Estimate from synthesized stage – discharge curve based on FIS Study Discharges. 3) Calculated as change in elevation in feet multiplied by 12 inches per foot. 4) Change in elevation less than 0.1 foot, reported as 0.1 foot.

GENERAL CONCLUSIONS AND RECOMMENDATIONS

In general, it was found that the proposed improvements will reduce the water surface elevations within the Bayou Pattasat Drainage Basin and yield hydraulic benefits which will enhance efficiency and service life of the mechanical components of the station. Further improvements are limited by the restrictive servitudes and rights of way which encumber potential widening of the channel and further pursuit of relief of these servitudes is in order.

Hydrologic and Hydraulic Study
City Barn DPS Capacity Improvements
Funded by Hazard Mitigation Grant Program
St. Tammany Parish, Louisiana

APPENDIX A – PREVIOUS STUDY – BAYOU PATTASAT DRAINAGE STUDY, PREPARED BY J.V. BURKES AND ASSOCIATES

Prepared By:

H. Davis Cole & Associates, LLC
Consulting Engineers

EXCERPTED SUPPORTING DOCUMENTATION FROM Bayou Pattasat (City Barn) Drainage Study ADDENDUM 1 Prepared by J.V. Burkes and Associates, Inc., June 2014

For a full version of this report, the general public can send a request to:
email: FEMA-NOMA@dhs.gov,
telephone: 225-267-2962
fax: 225-346-5848

Regular mail:
DEPARTMENT OF HOMELAND SECURITY-FEMA
ATTN: SLIDELL CITY BARN PUMP STATION DRAINAGE IMPROVEMENTS
1500 MAIN STREET
BATON ROUGE, LOUISIANA 70802.

Hydrologic and Hydraulic Study
City Barn Drainage Improvements
Removal and Replacement of 67 – CFS Drainage Pump
Funded by Hazard Mitigation Grant Program
The City of Slidell, Louisiana

APPENDIX B – FLOOD INSURANCE STUDY FOR CITY OF SLIDELL, 1999

Prepared By:

H. Davis Cole & Associates, LLC
Consulting Engineers

EXCERPTED SUPPORTING DOCUMENTATION FROM Bayou Pattasat (City Barn) Drainage Study ADDENDUM 1 Prepared by J.V. Burkes and Associates, Inc., June 2014

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BATON ROUGE, LOUISIANA 70802.

Hydrologic and Hydraulic Study
City Barn DPS Capacity Improvements
Funded by Hazard Mitigation Grant Program
St. Tammany Parish, Louisiana

APPENDIX C – GEOTECHNICAL INVESTIGATION PREPARED BY PROFESSIONAL SERVICES INDUSTRIES (PSI)

Prepared By:

H. Davis Cole & Associates, LLC
Consulting Engineers

EXCERPTED SUPPORTING DOCUMENTATION FROM Bayou Pattasat (City Barn) Drainage Study ADDENDUM 1 Prepared by J.V. Burkes and Associates, Inc., June 2014

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ATTN: SLIDELL CITY BARN PUMP STATION DRAINAGE IMPROVEMENTS
1500 MAIN STREET
BATON ROUGE, LOUISIANA 70802.

Appendix E

Public Notice, 8-Step, FONSI

FEMA PUBLIC NOTICE
OF AVAILABILITY FOR THE
DRAFT SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT AND
DRAFT FINDING OF NO SIGNIFICANT IMPACT
HAZARD MITIGATION GRANT PROPOSAL FOR THE
SLIDELL CITY BARN DRAINAGE IMPROVEMENTS IN
ST. TAMMANY PARISH
SLIDELL, LOUISIANA

Interested parties are hereby notified that the Federal Emergency Management Agency (FEMA) has prepared a draft Supplemental Environmental Assessment (SEA) and draft Finding of No Significant Impact (FONSI) in compliance with the National Environmental Policy Act (NEPA). The purpose of the SEA is to update the existing Environmental Assessment and associated FONSI signed on 1/27/17. The applicant's proposal will improve drainage within the Slidell area by upgrading the City Barn Pump Station's pumping capacity. The SEA has assessed the effects on the human and natural environment given the need for additional modifications to the original City Barn Pump Station proposal. The proposed site is located along the US 11 (Front Street) Highway Route, at the end of Bayou Lane, in St. Tammany Parish, Slidell, Louisiana.

The proposed drainage improvement project is intended to reduce the frequency of flooding within Slidell, Louisiana. This project entails replacing an existing pump with a higher pumping capacity pump, replacing an existing outfall pipe with a larger outfall pipe, temporary dewatering of the site, a new fuel storage area, and reconfiguration of the deck on the existing dock. FEMA has previously reviewed and provided funding for numerous hazard mitigation efforts for the City Barn Pump Station.

The purpose of the draft SEA is to analyze the potential environmental impacts associated with the preferred action and alternatives. The draft SEA evaluates a No Action Alternative; the Preferred Action Alternative- Improve the City Barn Pump Station; and an Alternative Action- Construct a Larger Retention Basin in Bayou Patassat at the City Barn Pumping Station.

The draft FONSI is FEMA's finding that the preferred action would not have a significant effect on the human and natural environment.

The Draft SEA and Draft FONSI is available for review at the St Tammany Parish Library, Slidell Branch, at 555 Robert Blvd, Slidell, LA 70458 – Mondays through Thursdays 9:00am to 8:00pm; Fridays and Saturdays 9:00am to 5:00pm. The documents can also be downloaded from FEMA's website at http://www.fema.gov/resource-document-library.

This public notice is published in the Advocate-New Orleans edition for five (5) days, Wednesday July 11, 2018 through Sunday, July 15, 2018, and in the Parish's newspaper of record –the St. Tammany Farmer on Wednesday, July 18, 2018. There is a thirty (30) day comment period, beginning on Wednesday July 11, 2018 and concluding on Friday, August 10, 2018 at 4 p.m. Comments may be mailed to: DEPARTMENT OF HOMELAND SECURITY-FEMA EHP-City Barn Drainage Improvements, 1500 MAIN STREET, BATON ROUGE, LOUISIANA 70802. Comments may be emailed to: fema-noma@fema.dhs.gov or faxed to: 225-

346-5848. Verbal comments will be accepted or recorded at 225-267-2962. If no substantive comments are received, the draft SEA and associated draft FONSI will become final.

8-STEP PROCESS

DATE: 7/2/2018
PREPARED BY: Jill Kelly, Environmental Protection Specialist
PROJECT: City of Slidell City Barn Pump Station Drainage Improvement Project
Hazard Mitigation Grant Program Project No. 1603-0321am7, FEMA DR-1603-LA
LOCATION: Slidell, LA
Latitude 30.273494 Longitude -89.788233

EO 11988-FLOODPLAIN MANAGEMENT
EO 11990-WETLAND PROTECTION

STEP 1 **Determine whether the proposed action is located in a wetland and/or The 100-yr floodplain (500-year floodplain for critical actions [44 CFR 9.4]), or whether it has the potential to affect or be affected by a floodplain or a wetland (see 44 CFR 9.7).**

The City of Slidell enrolled in the National Flood Insurance Program (NFIP) on 12/16/1980. Per Preliminary Digital Flood Insurance Rate Map (DFIRM) Panel Number 22103C0495F, dated 4/30/08, project is located in Zone "AE (EL 11)", areas with in the 100-year flood, Base Flood Elevations (BFE) determined. Per St. Tammany Parish Advisory Base Flood Elevation (ABFE) Map LA-MM40, dated 01/18/06, project is located in an "AE EL 10" Zone.

STEP 2 **Notify the public at the earliest possible time of the intent to carry out an action in a floodplain or wetland, and involve the affected and interested public in the decision making process (see 44 CFR 9.8).**

A cumulative public notice concerning the Hazard Mitigation Grant Program (HMGP) Assistance in floodplain and wetland areas will be or has been published in the New Orleans Times-Picayune, Baton Rouge Advocate, Lafayette Daily Advertiser, Lake Charles American Press, Hammond Star, Monroe News-Star, Shreveport Times, and the Alexandria Daily Town Talk.

STEP 3 **Identify and evaluate practicable alternatives to locating the proposed action in a floodplain or wetland (including alternative sites, actions and the "no action" option) [see 44 CFR 9.9]. If a practicable alternative exists outside the floodplain or wetland, FEMA must locate the action at the alternative site.**

(Proposed Alternative):

proposed improvements and upgrades at the existing City Barn Pump Station (CBPS):
-Construction of a new diesel fuel storage facility to house a 2,000 gallon diesel storage tank, to ensure efficient continuous operation of the City Barn pumps when needed during flooding.
-A new pre-cast concrete work platform on the CBPS, from which to safely perform upgrades and maintenance.
-Excavation for removal of the existing 67 cfs pump and its replacement with a 133 CFS pump. The replacement pump would increase the City Barn pumping capacity by 66 gallons per minute (gpm), to an overall capacity of 641 cfs, which is needed to ensure efficient operation during flooding.
-Installation of sheet piling for temporary dewatering within the inlet channel, to install a new drainage pump sump. Modifications of the sump area would allow for greater drawdown to better facilitate regular maintenance.
-Removal of the existing 36-inch outfall and installation of a new 48-inch outfall pipe in the levee, constructed in the same footprint as the existing outfall for the existing pump. The larger drainage outfall through the levee is needed to accommodate the new larger pump.

It is important to note that no excavation of Bayou Patassat or Bonfouca would be undertaken outside of the footprint of the existing drainage pumping station sump and outfall area, and no bank stabilization would be completed as a part of this project.

(Dismissed Alternatives):

CONSIDERED ACTION 2: Replace an Existing Pump a with a 200cfs Pump, and Construct a Larger Retention Basin in Bayou Patassat at the CBPS. The considered alternative to increase the retention area of the existing basin of Bayou Patassat at CBSP. The applicant would excavate about 92,000 cubic yard (cy) of material from the basin of Bayou Patassat property. This would provide approximately five (5) additional acres in stormwater retention. In addition, 361 liner feet of sheet pile would be added to the steep slope section adjacent to Textron on the bank opposite the CBPS. This bank would fail without the protection of the sheet pile.

CONSIDERED ACTION 3: Bank Stabilization, Larger Retention Ponds on Private Property Upstream, and a Gravity Outfall**.** According to the applicant's engineer, in the development of the project, many alternatives that would have armored the bank of Bayou Bonfouca, and/or created a larger detention basin for storm water upstream of the pumping station on other private property with a gravity outfall were explored.

The available land for construction of the proposed retention ponds was researched, and this alternative was dismissed due to cost and logistics to acquire and reconfigure any new property. The effort would exceed any benefit toward meeting the purpose and need.

The alternative for construction of a static, flood control structure was also considered that would eliminate the need for pumps by allowing flood waters to flow to Bayou Bonfouca via gravity. This alternative was deemed not feasible due to the fact that tidal influences would seasonally inhibit adequate gravity flow through such a structure. Additionally, an outfall was considered over the existing gravity flow control structure. Because the gravity flow control structure is an operational feature, clearances for access of personnel and equipment would be required. This would require the discharge pipe to go over the gravity control structure at a height appropriate for equipment to pass through. Due to the additional complexity of construction and logistics for crossing the levee at the gravity control structure, this alternative was also dismissed.

(No Action Alternative)

NO ACTION: Although funds to upgrade the CBPS have been approved, the surrounding area still experiences flooding during disasters and local heavy storm events, and the pump station is not operating at enough capacity. The No Action Alternative would result in no additional upgrades to the CBPS or increases to pumping capacity. If any of the existing pumps at the City Barn failed to pump water or did not pump enough water during a flood event, this would result in continued hazardous conditions for not only the residents of Slidell, but also businesses and emergency responders who utilize the roadways and live in this area.

STEP 4 **Identify the full range or potential direct or indirect impacts associated with, the occupancy or modification of floodplains and wetlands and the potential direct and indirect support of floodplain and wetland development that could result from the proposed action (see 44 CFR 9.10).**

Four (4) previous separate certified H and H Studies have been completed for the City Barn Pump Station, including:

- City Barn Pump Station Channel Improvements (Bayou Patassat) Drainage Study- Burkes & Associates, Inc., Engineer stamped by Sean M. Burkes, dated 6/12/2012.
- Bayou Patassat (City Barn) Drainage Study Addendum #1 for the city of Slidell, by J.V. Burkes & Associates, Inc., Engineer stamped by Sean M. Burkes, dated 6/14/ 2014.

- Hydrologic and Hydraulic Study for City Barn Drainage Improvements, city of Slidell, LA Dept. of Engineering Project No. 100-118, HDCA Project No. 2014-10 (Phase II), by H. Davis Cole & Associates, LLC, Engineering (HDCA) Stamped by Howard Davis Cole, 4/12/2016.
- Hydrologic and Hydraulic Study for City Barn Drainage Improvements, Removal and Replacement of 67 cfs Drainage Pump and its replacement with a 133 CFS pump, City of Slidell, LA Dept. of Engineering Project No. 100-118, HDCA Project No. 2018-05 (Phase III), by H. Davis Cole & Associates, LLC, Engineering Stamped by David Alan Martin, 4/27/2018.

Per these studies, generally the water surface elevation (WSE) in Bayou Bonfouca is higher than the water surface elevation in Bayou Patassat. Which means the stormwater must be forced from Bayou Patassat via pumping into Bayou Bonfouca. Flows from Bayou Patassat's entrance into Bayou Bonfouca are controlled by two (2) outfalls at the existing City Barn Pump Station: one (1) is gravity fed through a mechanical gate that can be closed off during tropical storm events, and the second outfall is currently connected to three (3) pumps. During rain events, the City Barn Pumping Station is designated to lower water levels throughout central Slidell. The maximum total pumping capacity for this station is 260,000 gallons per minute, or 575 cfs from the Bayou Patassat and the south side of U.S. 11 (Front Street) into Bayou Bonfouca. This is the primary means of removing rain and flood water in the surrounding area.

As cited in the Updated H and H by H. Davis Cole & Associates, LLC (HDCA) dated April 27, 2018, the analysis of the modeling data indicates that the proposed improvements would have small effects on the peak WSE within Bayou Bonfouca downstream of the drainage pump station due to the influence of Lake Pontchartrain. Results indicate that the increase in WSE would be small (on the order of 0.01 to 0.08-foot) near the pumping station outfall.

The proposed action would improve drainage at the CBPS, resulting in a decrease of maximum WSE throughout the drainage basin.

All of the previous H and H studies recommend upgrading pumps at the CBPS to protect the watershed area against storm events. The proposed upgrade of the fourth pump, and increasing the flow capacity of the CBPS would decrease the extent of flooding in the entire basin. Further, the inclusion of a larger outfall pipe connected to the upgraded fourth pump would help drain the area more quickly, and the inclusion of the new fuel storage tank area would help the CBPS run more continuously and drain floodwaters in the area more efficiently.

This pump station is the primary means of removing water from the south side of U.S. 11 (Front Street) to Bayou Bonfouca. H. Davis Cole & Associates, LLC, Engineering (HDCA) modeled in the previous H and H Studies Analysis of the modeling data indicates that the proposed increase in capacity of the CBPS from 575 cfs to 641 cfs would reduce the average peak WSE in the basin by 0.22-foot (2.64-inches) for the 100-year storm event. Overall, modeling data indicates that the entire suite of improvements yields a total reduction of 0.79 feet (9.48 inches) in the average peak WSE in the basin for the 100-year storm event.

The applicant is required to coordinate with the local floodplain administrator regarding floodplain permit(s) prior to the start of any activities. New construction must be compliant with current codes and standards.

Per 44 CFR 9.11(d)(6), no project should be built to a floodplain management standard that is less protective than what the community has adopted in local ordinances through their participation in the NFIP. All coordination pertaining to these activities and applicant compliance with any conditions should be documented and copies forwarded to the state and FEMA for inclusion in the permanent project files.

STEP 5 **Minimize the potential adverse impacts and support to or within floodplains and wetlands to be identified under step # 4, restore and preserve the natural and beneficial values served by floodplains, and preserve and enhance the natural and beneficial values served by wetlands (see 44 CFR 9.11).**

THE PREFERRED ACTION: The Improvements to the CBPS would allow the pump station to pump more water out of the water shed during storm events. The proposed drainage was designed to reduce flooding for the 10, 25, 50, and 100-year storms. The proposed pump station flows will discharge into the Bayou Bonfouca, which flows into Lake Ponchartrain then into the Gulf of Mexico.

Design plans, maps, and site photos included as attachments illustrate the work to be completed. The scope of work would not require the applicant to acquire structures for demolition, or right-of-ways. Servitudes have already been acquired. No additional right-of ways or residential or commercial structure demolition are anticipated. Additionally, the project does not require temporary access roads to be constructed.

The applicant is required to coordinate with the local floodplain administrator regarding floodplain permit(s) prior to the start of any activities. New construction must be compliant with current codes and standards.

Per 44 CFR 9.11(d)(6), no project should be built to a floodplain management standard that is less protective than what the community has adopted in local ordinances through their participation in the NFIP. All coordination pertaining to these activities and applicant compliance with any conditions should be documented and copies forwarded to the state and FEMA for inclusion in the permanent project files.

STEP 6 **Reevaluate the proposed action to determine first, if it is still practicable in light of its exposure to flood hazards, the extent to which it will aggravate the hazards to others. And it's potential to disrupt floodplain and wetland values and second, if alternatives preliminarily rejected at step # 3 are practicable in light of the information gained in steps # 4 and # 5. FEMA shall not act in a floodplain or wetland unless it is the only practicable location (see 44 CFR 9.9).**

The actions proposed are located in the only practicable location. There are no other practicable alternate locations outside the floodplain available.

STEP 7 **Prepare and provide the public with a finding and public explanation of any final decision that the floodplain or wetland is the only practicable alternative (see 44 CFR 9.12).**

A public notice will be published in the Advocate-New Orleans edition for 5 days, Wednesday July 11, 2018 through Tuesday, July 15, 2018, and will also be published in the paper of record –the St. Tammany Farmer on Wednesday, July 18, 2018.

STEP 8 **Review the implementation and post-implementation phases of the proposed action to ensure that the requirements of the order are fully implemented. Oversight responsibility shall be integrated into existing processes.**

APPROVAL CONDITIONED ON REVIEWS OF IMPLEMENTATION AND POST IMPLEMENTATION PHASES TO ENSURE COMPLIANCE WITH THE ORDER(S).

Project has been reviewed for compliance with 44 CFR Part 9.

U.S. Department of Homeland Security
Louisiana Recovery Office
1500 Main Street
Baton Rouge, Louisiana 70802

DRAFT FINDING OF NO SIGNIFICANT IMPACT FOR THE CITY OF SLIDELL CITY BARN PUMP STATION DRAINAGE IMPROVEMENTS PROJECT SLIDELL, LOUISIANA HAZARD MITIGATION GRANT PROGRAM

PROJECT NUMBER 1603-0321
FEMA-DR-1603 -LA

BACKGROUND

Through the Governor's Office of Homeland Security and Emergency Preparedness (GOHSEP), the applicant, the City of Slidell, which will simply be referred to as "City" throughout this document, has requested federal funding through the Federal Emergency Management's (FEMA) 404 Hazard Mitigation Grant Program (HMGP) to reduce localized flooding during and after storm events within the area of the city of Slidell (Slidell).

As documented by Slidell Public Works Department, during the major storms of 1995-2005 and later Hurricane Isaac in 2012 flood damage occurred to residences, commercial and retail industry, streets, utilities and infrastructure surrounding the City Barn Pump Station (CBPS). Flood protection is needed in this area of Slidell. The proposed City Drainage Improvement project is located at the existing CBPS, located along the US 11 (Front Street) Highway Route. This is at the end of Bayou Lane, and is within the city Servitude, at the eastern edge of the Southern Railroad right-of-way. The western edge of the existing City Barn structure is within the Bayou Patassat. Bayou Patassat consists of two (2) major reaches, and drains from East to West, reaching its confluence with Bayou Bonfouca (alternatively referred to as the W-13) at the City Barn.

FEMA-Environmental Historic Preservation (EHP) previously assessed several proposals for upgrades and improvements to the CBPS to mitigate against future flood events under NEPA Categorical Exclusions (CATEX) in accordance with 44 CFR Part 10.8(d) In addition, one (1) Environmental Assessment was completed on January 2017. The previously provided upgrades included adding and upgrading existing pumps and bar screen cleaners, and excavated and straightened a portion of Bayou Patassat to increase the water detention and pumping capacity of the CBPS. According to the four (4) H and H studies, upgrade work on the pumps would help reduce flooding at the site and surrounding areas during storm events. However, Slidell remains at high risk of water inundation from various sources, including flooding, hurricanes, tropical storms, and thunderstorms.

The purpose of this proposal is to further reduce flooding in Slidell, provide additional capacity to the pumping station, ensure adequate services are provided to residents, and structures are protected during local flooding events and disasters. The proposed improvements and upgrades at the existing CBPS would include:

-The removal of the existing 67 cubic feet per seconds (cfs) pump and its replacement with a 133 cfs pump.
-Replacement of an existing 36-inch outfall with a new 48-inch outfall pipe through the levee.
-Installation of sheet piling for temporary dewatering within the inlet channel, to install a new drainage pump sump.
-Construction of a new diesel fuel storage facility to house a 2,000 gallon diesel storage tank.
-A new pre-cast concrete work platform on the CBPS, from which to safely perform upgrades and maintenance.

In accordance with FEMA Instruction 108-1-1 and the DHS Instruction 023-01-001-01, pursuant to Section 102 of the National Environmental Policy Act of 1969 (NEPA), as implemented by the regulations promulgated by the President's Council on Environmental Quality (CEQ) (40 Code of Federal Regulations [CFR] Parts 1500-1508) a Supplemental Environmental Assessment (SEA) was prepared. This draft SEA supplements the existing Environmental Assessment (EA) dated January 2017. Together, these assessments documents evaluate the grant proposal's potential impacts on the physical and human environment. The purpose of this draft SEA is used to make a decision whether to initiate preparation of an Environmental Impact Statement (EIS) or to prepare a Finding of No Significant Impact (FONSI).

If left unprotected, future storm events have the potential to repeatedly damage homes and property in this area. The alternatives considered include 1) No Action Alternative, 2) Proposed Alternative: CBPS Construction of New Fuel Storage Area, Upgraded Pump and Replaced Drainage Outfall Through the Levee, and Modifications of the Sump Area, and 3) Considered Alternative: Replace an Existing Pump a with a 200cfs Pump, and Construct a Larger Retention Basin in Bayou Patassat at the CBPS.

FINDINGS

FEMA has evaluated the proposed project for significant adverse impacts to geology, soils, water resources (surface water, groundwater, and wetlands), floodplains, coastal resources, air quality, biological resources (vegetation, fish and wildlife, Federally-listed threatened or endangered species and critical habitats), cultural resources, socioeconomics (including minority and low income populations), safety, noise, and hazardous materials. The results of these evaluations as well as consultations and input from other federal and state agencies are presented in the SEA.

CONDITIONS

The following conditions must be met as part of the implementation of the project. Failure to comply with these conditions may jeopardize federal funds.

- Implement construction Best Management Practices; install silt fences/straw bales to reduce sedimentation. Area soils would be covered and/or wetted during construction. If fill is stored on site as part of unit installation or removal, the contractor would be required to appropriately cover it.

- The applicant is required to coordinate with the local floodplain administrator regarding floodplain permit(s) prior to the start of any activities. New construction must be compliant with current codes and standards.

- Per 44 CFR 9.11(d)(6), no project should be built to a floodplain management standard that is less protective than what the community has adopted in local ordinances through their participation in the National Flood Insurance Program.

- Take any necessary steps to obtain and/or update all necessary approvals and environmental permits regarding this proposed project.

- If your project results in a discharge to waters of the state, submittal of a Louisiana Pollutant Discharge Elimination System (LPDES) application may be necessary.

- If the project results in a discharge of wastewater to an existing wastewater treatment system, that wastewater treatment system may need to modify its LPDES permit before accepting the additional wastewater.

- All precautions should be observed to control nonpoint source pollution from construction activities. Louisiana Department of Environmental Quality (LDEQ) has stormwater general permits for construction areas equal to or greater than one (1) acre. It is recommended that you contact the LDEQ Water Permits Division at (225) 219-9371 to determine if your proposed project requires a permit.

- If your project will include a sanitary wastewater treatment facility, a Sewage Sludge and Biosolids Use or Disposal Permit is required. An application or Notice of Intent will be required if the sludge management practice includes preparing biosolids for land application or preparing sewage sludge to be hauled to a landfill. Additional information may be obtained on the LDEQ website at http://www.deq.louisiana.gov/portal/tabid/2296/Default.aspx or by contacting the LDEQ Water Permits Division at (225) 219- 9371.

- All precautions should be observed to protect the groundwater of the region.

- Be advised that water softeners generate wastewaters that may require special limitations depending on local water quality considerations. Therefore if your water system improvements include water softeners, you are advised to contact

the LDEQ Water Permits to determine if special water quality-based limitations will be necessary.

- Any renovation or remodeling must comply with Louisiana Administration Code (LAC) 33:III.Chapter 28, Lead-Based Paint Activities; LAC 33:III.Chapter 27, Asbestos-Containing Materials in Schools and State Buildings (includes all training and accreditation); and LAC 33:III.5151, Emission Standard for Asbestos for any renovations or demolitions.

- If any solid or hazardous wastes, or soils and/or groundwater contaminated with hazardous constituents are encountered during the project, notification to LDEQ's Single-Point-of-Contact (SPOC) at (225) 219-3640 is required. Additionally, precautions should be taken to protect workers from these hazardous constituents.

- Erosion Control Devises such as silt fencing, hay bales, sediment traps, etc. must be used and maintained extensively to prevent any potential direct or indirect adverse impacts to nearby waterways.

- Applicant must comply with all conditions listed in the Coastal Use Permit (CUP) (P20150247 Revised) issued May 21, 2018 which are found in Appendix C External Agency Correspondence of the SEA. The expiration date of this revised permit is five (5) years from the date of the signature of the Secretary or his designee on the original permit which was September 9, 2015. If the Coastal Use is not completed within this five (5) year period, an extension may be granted pursuant to the requirements contained in the Rules and Procedures for CUP its (LAC 43:I.723(D))

- Vehicle operation times would be kept to a minimum. Area soils must be covered and/or wetted during construction to minimize dust.

- If at any time Heritage tracked species are encountered within the project area, please contact the Louisiana Natural Heritage Program (LNHP) Data Manager at 225-765-2643.

- Any changes to the scope or location of the proposed project or if the project has not been initiated one (1) year from the date of the solicitation of views (03/30/18), the applicant is responsible for notifying FEMA for further coordination with U.S. Fish and Wildlife Service (USFWS).

- If human bone or unmarked grave(s) are present within the project area, compliance with the Louisiana Unmarked Human Burial Sites Preservation Act (R.S. 8:671 et seq.) is required. The applicant shall notify the law enforcement agency of the jurisdiction where the remains are located within 24 hours of the discovery. The applicant shall also notify FEMA and the Louisiana Division of Archaeology at 225-342-8170 within 72 hours of the discovery. (Louisiana Unmarked Human Burial Sites Preservation Act)

- If during the course of work, archaeological artifacts (prehistoric or historic) are discovered, the applicant shall stop work in the vicinity of the discovery and take

all reasonable measures to avoid or minimize harm to the finds. The applicant shall inform their, GOSHEP State Applicant Liaison and Hazard Mitigation Assistance contacts at FEMA, who will in turn contact FEMA Historic Preservation (HP) staff. The applicant will not proceed with work until FEMA HP completes consultation with the SHPO, and others as appropriate (Inadvertent Discovery Clause).

- Unusable equipment, debris and material shall be disposed of in an approved manner and location. The applicant shall handle, manage, and dispose of petroleum products, hazardous materials and/or toxic waste in accordance with all local, state and Federal agency requirements. All coordination pertaining to these activities should be documented and copies forwarded to the state and FEMA as part of the permanent project files.

- Mitigation and abatement measures will be required to reduce the noise levels to a range that would be considered acceptable. The applicant must comply with the local ordinance. Slidell Ordinance for dB limits is as follows:

  Industrial At all times 85 dB

  Commercial 7:00 a.m. to 10:00 p.m. 75 dB, and 10:00 p.m. to 7:00 a.m. 65 dB

  Residential 7:00 a.m. to 10:00 p.m. 70 dB, and 10:00 p.m. to 7:00 a.m. 65 dB

  Two-family or multifamily/intra-dwelling 7:00 a.m. to 10:00 p.m. 60 dB

  and 10:00 p.m. to 7:00 a.m. 50 dB

- The contractor must post appropriate signage and fencing to minimize potential adverse public safety concerns. Appropriate signage, fencing, barriers, and traffic control measures should be in place prior to construction activities in order to alert pedestrians and motorists of project activities and traffic pattern changes.

- To minimize worker and public health and safety risks from project construction and closure, all construction and closure work must be done using qualified personnel trained in the proper use of construction equipment, including all appropriate safety precautions. Additionally, all activities must be conducted in a safe manner in accordance with the standards specified in Occupational and Safety Health Act (OSHA) regulations and the U.S. Army Corps of Engineers (USACE) safety manual.

- If hazardous materials are unexpectedly encountered in the project area during the proposed construction operations, appropriate measures for the proper assessment, remediation, management and disposal of the contamination would be initiated in accordance with applicable federal, state, and local regulations. The contractor would be required to take appropriate measures to prevent, minimize, and control the spill of hazardous materials in the construction area.

- The Louisiana Department of Natural Resources (LDNR) Office of Conservation should be contacted at 225-342-5540 if any unregistered wells of any type are

encountered during construction work. For pipelines and other underground hazards, Louisiana One Call should be contacted at 800-272-3020 prior to commencing operations.

- Applicant must comply with all conditions listed in the USACE Programmatic General Permit (MVN 2012-0958-Ell) issued on October 17, 2016.

- During the project impact analysis process developers should identify project-related impacts to migratory birds and the conservation measures that will be used to mitigate them. For additional Migratory Bird Conservation recommendations, guidance and tools to help reduce impacts to birds and their habitats please visit the LESO webpage: https://www.fws.gov/lafayette/Migratory _Birds/MigBird.html and the Service's Migratory Bird Program Webpage (https://www.fws.gov/birds/bird-enthusiasts/threats-to-birds/collisions/communication-towers.php).

- The applicant must review the National Bald Eagle Management (NBEM) Guidelines is available at: http://www.fws.gov/migratorybirds/pdf/management/nationalbaldeaglenanagementguidelines.pdf to minimize potential project impacts to bald eagles, particularly where such impacts may constitute "disturbance," which is prohibited by the Bald and Golden Eagle Protection Act (BGEPA).

- If a bald eagle nest occurs or is discovered within 660 feet of the proposed project area, then USFWS requires an evaluation to be performed to determine whether the project is likely to disturb nesting bald eagles. The applicant is required to conduct the evaluation on-line at: https://www.fws.gov/southeast/our-services/eagle-technical-assistance. Following completion of the evaluation, that website will provide a determination of whether additional consultation is necessary. All coordination pertaining to these activities should be documented and copies forwarded to the state and FEMA as part of the permanent project files

- U.S. Fish and Wildlife Service (USFWS) recommends that a qualified biologist inspect the proposed work site for the presence of undocumented nesting colonies during the nesting season because some waterbird colonies may change locations year-to-year. To minimize disturbance to colonial nesting birds please refer to the colonial nesting waterbird guidance on the Louisiana Ecological Services Office (LESO) Web page https://www.fws.gov/lafayette/Migratory _Birds/MigBird.html.

CONCLUSIONS

Based upon the incorporated SEA, and in accordance with Presidential Executive Orders 12898 (Environmental Justice), 11988 (Floodplain Management), and 11990 (Wetland Protection), FEMA has determined that the proposed action implemented with the conditions and mitigation measures outlined above and in the SEA will not have any significant adverse effects on the quality of the natural and human environment. As a result

of this FONSI, an Environmental Impact Statement will not be prepared and the proposed action as described in the SEA may proceed.

APPROVALS

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Jerame Cramer Date
Environmental Liaison Officer, Region VI- LRO
DR-1603/1607-LA

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Thomas "Mike" Womack Date
Director of the Louisiana Recovery Office
FEMA 1603/1607-DR-LA