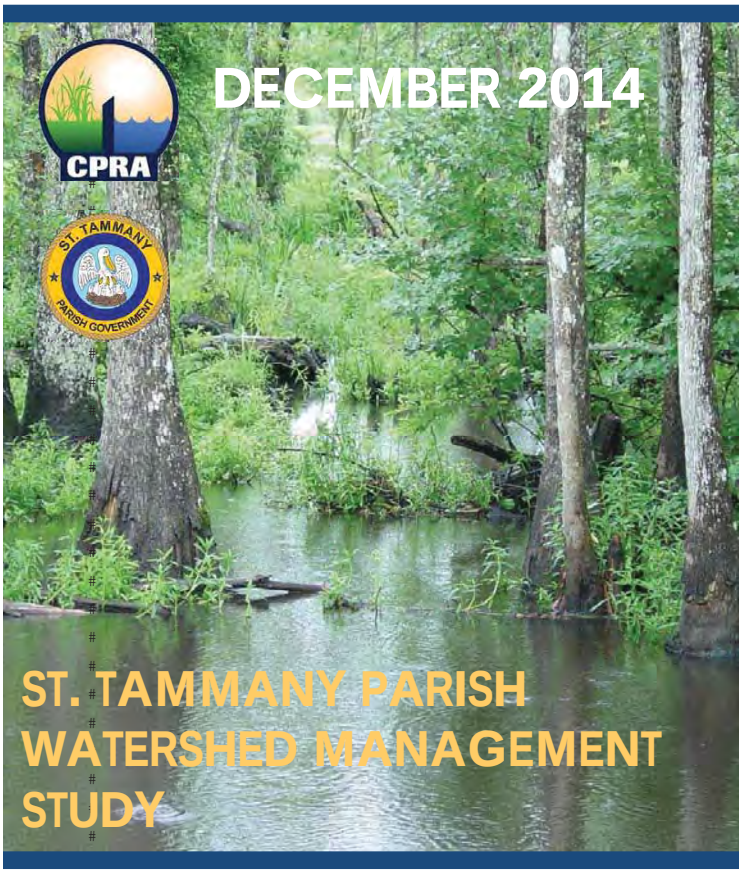
PART 2

St. Tammany Parish 2014 MS4 Annual Report

2014 MS4 Annual Report Appendix: Watershed Study



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1.0 INTRODUCTION

Surface water quality in St. Tammany Parish ("Parish" or "the Parish") has been lowered over the past many decades due to water resource management issues, which arise from rapid urban growth, uncontrolled storm water runoff, insufficient drainage infrastructure, insufficient surge protection, and wetland degradation/loss. Based on the objectives outlined under this study, the project team set out to gather the necessary data and information to develop modeling tools, instruments and recommendation that will allow the Parish, planners, regulators, and stakeholders to evaluate various options for ways to protect and enhance water quality in St. Tammany Parish.

The overall goal of this watershed management study is to achieve measurable water quality improvements through a targeted watershed approach supported by data and science that provides a road map of cost-effective, implementable projects. The outcome of the study was to develop and provide the Parish with a prioritized list of targeted watershed management projects with associated costs that will lead to improvements in surface water quality within the Parish. These projects, presented herein, include wastewater, storm water, flood mitigation, and regulatory updates to address surface water quality impacts from various sources in the Parish, including urban growth, storm water runoff, insufficient drainage, water body modification, wetland degradation and standards updates.

St. Tammany Parish enjoys the status as one of the most prosperous parishes in Louisiana. High speed road connections led to the growth of the entire parish and suburban communities started springing up. The Town of Slidell, on the eastern side of the Parish, is one of the first examples of suburban sprawl in the region. The western towns started seeing fast development in the 1950s. By the early 2000's the population of St Tammany Parish had grown to a sizable 200,000 and today the population sits just under 250,000.

But as with many areas that experience rapid growth and progress, challenges have presented themselves. The pace of development in the Parish over the past twenty years has become so accelerated that municipal infrastructure including water, sewer, and drainage, has not been able to keep pace with population growth. The result has been

the installation of thousands of individual home wells and sewage treatment units, and localized water and sewer infrastructure by private developers and utility companies. This rapid urban sprawl combined with decentralization and privatization of traditional public services has led to a noticeable decline in surface water quality in St. Tammany Parish.

In an effort to ensure the Parish's many scenic waterways remained pristine, in the mid-1980's the Parish worked with the Louisiana Department of Environmental Quality (LDEQ) to establish an area wide policy of higher effluent standards for new and existing sewage discharges in the Parish. Although this policy has been in place for nearly thirty years, many of the Parish's water bodies remain in what state and federal regulators have determined is poor health. Several of these impacted water bodies have little or no human impact or influence. And those water bodies that one would consider significantly impacted by human activities (numerous point source discharges, channel modifications, *etc.*) cannot be brought back into good health by removing all man made sources. This scenario in St. Tammany Parish and across coastal south Louisiana has led state and local regulators to reconsider the standards as associated with a healthy water body.

As demonstrated in this study, most Parish water bodies suffer poor health due to low dissolved oxygen (DO) levels that result from a lack of elevation, stagnating waters, and wetlands loss exacerbated by point source discharges. Wind and tidal backflows cause further stagnation in low volume waters by preventing the water flowing downstream and thereby preventing reaeration. However, the scientific modeling efforts contained within demonstrate that ratcheting down on all point source dischargers may not effect or restore water quality. This study recognizes that a holistic approach will be necessary to resolve water quality issues in St. Tammany Parish addressing the necessary regulatory changes, flood and drainage modifications, re-establishment of historical flow paths, and proposed projects which demonstrate actual measurable improvements in water quality.

Rapid population growth in St. Tammany Parish has led to decentralized sewer practices. In outlying municipal boundaries and unincorporated areas of the Parish, private utility companies and now Tammany Utilities (owned/operated by the Parish)

operate community sewage treatment systems in order to meet the demand of urban sprawl. Outside of organized neighborhood developments and in older neighborhoods, individual home treatment units operated by the homeowners are commonplace. The majority of incorporated municipalities provide sewage treatment collection and treatment operated by the respective municipality. The Parish has established five (5) geographical Wastewater Management Areas to facilitate overall monitoring, regulation and enhancement of existing and proposed wastewater treatment in the unincorporated areas of the Parish. In addition, the Parish established eighteen (18) geographical Wastewater Service Delivery Areas to facilitate the extension of sewerage and water services, the coordination and consolidation of wastewater collection and treatment, and the management of decentralized, on-site wastewater treatment systems.

1.1 The Apparent Challenge - Decentralized Wastewater Treatment

Individual on-site and decentralized wastewater treatment systems can and do provide a satisfactory level of water quality protection if they are properly selected, sited, designed, operated and maintained. Decentralized wastewater systems derive their name from their location—they treat wastewater close to the source, typically providing treatment on the property of individual homes or businesses. Decentralized systems also include systems serving clusters of individual homes, large capacity septic systems, and small collection and treatment systems (including "package plants"). These systems similarly treat wastewater close to the source, typically using small pipes for collecting small volumes of domestic wastewater, unlike centralized urban wastewater treatment systems that pipe large amounts of wastewater many miles through sewers prior to reaching the treatment facility.

Unfortunately, many of these systems do not provide the level of treatment necessary to achieve existing water quality goals. Many of these systems are over 20 years old and were not designed to meet the more stringent limitations established by LDEQ in the TMDLs. To exacerbate the problem, in St. Tammany, the Parish does not currently have a mechanism in place to track unsewered homes on individual treatment plants.

While it is difficult to measure and document specific relationships between these decentralized systems and local water quality, it is widely accepted that improperly operating systems are a major contributor to water quality problems. Just because the projection models presented in Section 4 do not indicate that sewering a certain neighborhood or area will directly result in a water quality improvement in the form of raising DO levels, providing regional/municipal sewer service to as many homes as reasonably possible is the desired result. Removing improperly or partially treated sanitary wastewater from local water bodies improves aesthetics, reduces fecal coliform levels, and reduces vector attraction thereby eliminating conditions that further contribute to stagnation. The goal of this study was to pinpoint those areas where sewering will provide the most immediate improvement/impact to water quality; however, as monies become available and a more extensive collection system and regionalization efforts are realized, the Parish should strive to provide wastewater treatment services to all serviceable homes.

The reality in St. Tammany Parish is that many homes will remain connected to decentralized or on-site treatment systems for many years to come, especially in rural areas of the Parish. By instituting an effective management program of these systems, the Parish can ensure that all existing and new developments which require use of decentralized systems remain effective, compliant, and meet water quality goals.

EPA's focus and strategy on decentralized wastewater treatment systems acknowledges that systems when appropriately managed, perform effectively, protect human health and the environment, and are a key component of our nation's wastewater infrastructure. EPA has provided national direction and support to improve the performance of decentralized systems by promoting the concept of continuous management and facilitating upgraded professional standards of practice. The decision to implement a centralized or decentralized (or combination) solution to wastewater treatment is best made at the local level where planning decisions, available capacity and other local factors can be considered. Furthermore, watershed-wide integrated wastewater planning and management of water resources on a watershed level promotes sound and

sustainable communities. The role of properly sited, designed, installed and managed decentralized systems that provide protection of ground water, should be considered in local planning efforts.

2.0 STAKEHOLDER IDENTIFICATION AND DATA COLLECTION AND EVALUATION

To achieve the objectives identified for the study, the project team set out to obtain and review any and all data available related to the hydrologic, hydraulic and water quality characteristics of the specific focus areas within the Parish. Entities which may have information related to the study objectives were identified and their data related to the water quality conditions within the study area water bodies was obtained. The team compiled and reviewed the data to identify data gaps.

2.1 Identify Stakeholders

The project team first set out to identify all entities and stakeholders that may be impacted by development of the study and that may have information pertinent to the study. The project team identified the following groups of stakeholders including third party groups, private utility companies, local municipalities, and regulators that potentially had data and/or information that could be used in development of this study:

- St. Tammany Parish (Environmental Services, Geographic Information Systems, Engineering Services)
- Tammany Utilities
- Utilities Inc. of Louisiana (UIL)
- City of Slidell
- City of Mandeville
- City of Covington
- City of Madisonville
- Lake Pontchartrain Basin Foundation (LPBF)
- Louisiana Department of Environmental Quality (LDEQ)

To establish an open dialogue with each entity, the project team met face to face and discussed the overall goals of the study. In order to engage and ensure a mutually beneficial relationship, the individual goals and priorities of each entity were also discussed. The overall goals of the study were compared to the individual goals of each entity and in general, the identified parties have goals similar in nature to the goals of the study.

2.2 Data Collection and Evaluation

The project team gathered specific data and information from the Parish, LDEQ, and LPBF, in various formats (Microsoft Excel, Geographic Information System (GIS), Microsoft Access, hard copy reports, etc.). The project team compiled and reviewed ambient and effluent data, water body hydrology, severe repetitive loss (SRL) and repetitive loss (RL) structures, storm water data and identified gaps and holes in the collective data sets. Presented below is a detailed discussion of the data collection and evaluation efforts undertaken for the study.

2.2.1 Wastewater Flows and Characterization

In order to characterize point source wastewater discharges within the study area, the project team collected the following information regarding wastewater dischargers and infrastructure:

- All available GIS mapping data for wastewater treatment facilities and wastewater infrastructure (front gate coordinates, discharge point coordinates, collection lines, lift stations, *etc.*) for both private and publicly owned treatment facilities
- All available GIS mapping data for Parish watersheds, drainage areas, retention ponds, and storm water infrastructure for both publicly and privately owned structures
- All available data on all wastewater treatment facilities in the parish including, but not limited to:, effluent discharge limits for each outfall, effluent flow rates for each outfall, permit type and number, agency

interest number, effective date of the permit, expiration date of the permit, and physical address of the facility
- Population data, 911 rooftop data, urbanized area maps and/or delineations
- List of all Municipal Separate Storm Sewer Systems (MS4) outfalls and coordinate locations
- Flood control projects, flooded structure data, and event flooding data
- Building permit data, zoning information, census data, and planning information
- Any documentation or studies related to wetland assimilation projects in the Parish including, but not limited to, feasibility studies or baseline studies, annual monitoring reports, etc.
- Documentation and existing studies related to drainage, flooding, and storm water management in the Parish
- Streets data layers
- Sewered and unsewered subdivision data layers, and utility districts
- All available locational data on individual home units
- Current wastewater and storm water ordinances
- Current Parish wastewater planning and consolidation documents

The project team used LDEQ's Tools for Environmental Protection Management Organizations (TEMPO) and Electronic Data Management System (EDMS) to obtain effluent limitation data and discharge monitoring report (DMR) data for facilities located within the study area of the Parish. Team members pulled permits and fact sheets for wastewater treatment facilities if TEMPO data were not adequate. Parish 911 location/rooftop data and the locations of sewered and unsewered subdivisions were used to fill in the data gaps for the location of onsite (individual home) wastewater treatment systems. The project team met with the Parish multiple times to verify sewered and unsewered subdivision datasets. LDEQ's EDMS was also used to obtain effluent data for small businesses with individual sewage treatment units.

Because these businesses typically have treatment units similar to individual home units, a review of effluent data was necessary to properly characterize treatment plant performance. This particular data collection effort proved to be unsuccessful due to the lack of reliable data from self-reported DMRs.

The project team requested any and all relevant data from each identified entity including, readily available GIS layers, ambient water quality monitoring data, current and future project descriptions and locations, water distribution information, and sewer infrastructure information.

Planning, development, and evaluation of wastewater measures intended to improve stream water quality began with organizing the collected data to identify target areas within the various drainage basins where the implementation of wastewater and/or storm water projects offers the best potential of improving water quality. Because the greatest number and concentration of homes lie within established subdivisions for which data have been developed and are available, and because homes outside of named subdivisions are more sparsely distributed and generate significantly less wastewater effluent, the study focused on subdivisions as the unit of evaluation for wastewater project consideration. Based on this premise, the estimated wastewater pollutant loads and flows generated from each subdivision (those currently served by centralized wastewater collection systems and those that are not) formed the basis of evaluating the water quality impact within identified stream segments or reaches. These data became the backbone of the water quality modeling effort that evaluated the impact of each identified wastewater infrastructure project in a specific reach of the stream.

The first step of data development was to segregate the study area into well-defined hydrologic drainage basins, isolating areas that contribute flow to each major stream, and then further dividing them into sub-basins reflecting drainage on a much smaller, local stream scale. Dividing the drainage basins into smaller sub-basins allowed the project team to quantify the sub-basins and determine a location of each sub-basin drainage outfall. Using this information, project team was able to account for every drop of storm water or wastewater that falls

within the 10 major watersheds. Knowing where every drop of storm water or wastewater drains within the Parish allowed the project team to focus on sub-basins that are significantly contributing to water quality problems in the Parish. The approach taken to delineate the drainage boundaries is described in further detail in Section 2.2.2. Maps of these defined drainage boundaries were then superimposed on relevant data layers, including parish infrastructure, 911 rooftop data, zoning information, political boundaries, water and wastewater service providers, outfall location data, treatment plant location data, and subdivision boundaries. This exercise allowed the creation of smaller polygons that tabulated the projected wastewater flow paths and loads within a small, more defined area, and forms the basic unit of load determination for development of existing conditions model runs, and ultimately improvement scenarios/projection runs for evaluation in the model.

All of the subdivisions within unincorporated St. Tammany Parish were further divided into smaller polygons bound by street segments. These base polygons formed the smallest unit of developing and analyzing the data, and for estimating wastewater flows and loads in particular. With the data compiled from the various sources, it was possible to attribute various fields to these polygons by merging information describing parish infrastructure, census information, zoning information, political boundaries, water and wastewater service providers, subdivision boundaries, defined drainage basins, and area streams, as follows:

- Drainage outfall locations derived from existing drainage studies
- Treated wastewater outfalls from the coordinates given in the LDEQ discharge permit database
- Structure counts derived from Parish structures dataset, utilizing the 2010 St. Tammany Parish United States Department of Agriculture (USDA) National Agriculture Imagery Program (NAIP) imagery to verify building locations
- A population coefficient derived from the St. Tammany Parish Block Group data given in the 2012 US Census database

2.2.1.1 Basis for Estimating Wastewater Flows

Wastewater flow from individual residences was calculated based on an assumed wastewater generation rate of 70-gallons per person per day (Tchobanoglous, 1991), using the 2010 St. Tammany Parish Census Data to estimate the average number of persons per household for each block group, and the Parish's 911 dataset of residential rooftops to determine the number of homes per block group. The study team recognized that using building footprints to estimate the number of persons within multi-family buildings was a limitation in estimating flows, as many multi-family residential buildings share a single rooftop. Therefore a uniform number of persons per household (or rooftop) for the entire parish was not used, but instead the average number of persons per household for each census block group from the most recent census was considered. As a result, the number varies by geographic location as dictated by the density of each block group. This more precise approach was taken to reflect the actual population and density within the subdivisions, rather than a typical number to be applied parish-wide. The resulting estimated wastewater generation rate was applied to both, subdivisions served by centralized collection and treatment systems and those unsewered subdivisions with individual treatment units at each residence.

Limits and flow data provided by LDEQ were based on the most recent LPDES permit issued to each commercial facility. Limits for treated sanitary wastewater are based on the volume of wastewater. Flow data are estimated based on the size of the treatment plant or on the number of employees at each facility. Flows from larger treatment plants for subdivisions and/or municipalities are based on the design capacity of the treatment plant. Because flows from all LDEQ-permitted commercial facilities within the Parish were determined to be unreliable, the study required development of an estimated daily flow from such facilities. An examination of LDEQ-provided data of permitted flows and the facilities actual flows revealed that overall, "anticipated" discharge flows were approximately 23.4-percent of the permitted

discharge flows. This percentage was used to estimate average flows from the LDEQ permitted facilities for which discharge flows were not given.

2.2.1.2 Basis for Estimating Pollutant Loads

The measure of wastewater load for each source was based on the assumed biochemical oxygen demand of the wastewater (as defined by the 5-day biochemical oxygen demand, or BOD_5) and the assumed ammonia-nitrogen (NH_3-N) concentration. These assumed concentrations, for both sewered and unsewered sources, were applied to the estimated wastewater flows, yielding the estimated load of BOD_5 and NH_3-N, given in pounds per day for each source.

Because existing mechanisms are in place to limit pollutants and enforce LDEQ issued permits, concentrations for treated wastewater (commercial and residential) were assumed to be the permitted concentration for the associated treatment facility. If no permit limit was given for NH_3-N, a concentration of 15-milligrams per liter (mg/l), or 15-parts per million (ppm), was used for treatment plants with a 30 mg/l or 30 ppm limitation for BOD_5. A concentration of 5 mg/l was used from treatment plants with a 10 mg/l or 10 ppm limitation for BOD_5. In the few instances where the LDEQ permits did not provide the BOD_5 and NH_3-N concentration limits, concentrations of 30-ppm and 15-ppm for BOD_5 and NH_3-N, respectively, were assumed.

For unsewered residences, which include those not served by centralized/neighborhood collection and treatment systems, it was assumed the discharges entering the drainage system were untreated. While it is recognized that most unsewered home utilize some form of individual sewage treatment (septic tank, aerated unit, etc.), because of the age of these individual units, the pollutant concentrations were estimated using assumed concentrations consistent with typically assumed raw wastewater concentration values (Tchobanoglous, 1991):

- BOD_5: 220-mg/l, or 220-ppm
- NH_3-N: 25-mg/l or 25-ppm

2.2.1.3 Projection of Required Pollutant Load Reduction

In order to assess the existing water quality, which is measured in terms of DO concentration in the receiving stream, pollutant loads of all polygons were calculated for each sub-basin. Loads were calculated for all permitted treatment facilities as well as unsewered residences. **Appendix A** provides a summary of existing commercial loads utilized in model development.

As a preliminary indicator of the relative contribution of wastewater loads on the DO of the various stream segments, models reflecting the existing conditions were developed with the above determined wastewater loads. These loads reflected the wastewater contribution from commercial and residential, as well as sewered and unsewered sources, in each sub-basin. These model results indicated the general trend of BOD_5 impact on DO, and the preliminary load reduction required to achieve acceptable DO levels in the various stream segments. The tables below summarize the projected flows and loads within each sub-basin, and the approximate BOD_5 load reduction necessary in order to achieve compliance. Ammonia load reductions are assumed as a result of the BOD_5 load reductions, however no specific ammonia reductions were included in the models.

The model results indicated a wide range of load reductions necessary, varying between 0 where no load reductions are required to 98-percent (%) where data indicate all loads must be removed. BOD_5 load reduction is required in most stream segments to achieve compliance with LDEQ standards. The results of this exercise revealed those areas where providing community or municipal sewage service have the potential of improving water quality and achieving compliance. These areas would become the identified target areas considered for further evaluation and

identification of potential improvement measures and projects. The BOD_5 load reductions for each water body and sub-basins are described in detail in Section 6 of the report.

2.2.2 Flood Assessment

The objective of evaluating drainage under this study was to provide the Parish with a parish wide flood risk assessment. The limit of the study area as it pertains to flooding was limited to the named waterways within the Parish and the sub-segments that contribute to them. It is understood that the end goal was to identify projects that would first improve water quality within the study area, and as an added benefit, minimize the risk of flooding. In order to accurately determine loads and develop representative models in the study area, the project team determined that it was of utmost importance to define and refine exactly how surface water flows throughout the parish.

According to the United States Geological Survey (USGS) (http://water.usgs.gov/edu/watershed.html) a watershed, which is also referred to as a drainage basin, is the area of land where surface water from rain converges to single point at a lower elevation. A drainage basin is separated from adjacent basins by ridges and hills known as drainage divides. The Parish is comprised of 10 major watersheds which include Gum Bayou, W-14/W-15 Basin, Bayou Bonfouca, Bayou Lacombe, Bayou Cane, Bayou Castine, Little Bayou Castine, Bayou Chinchuba, and the Tchefuncte River. In general, watersheds are range from 1,697 acres to 264,349 acres and sub-basins range from 50 acres to 9,675 acres. Within the Bayou Lacombe, Bayou Bonfouca, and the Tchefuncte River basins there are several large named waterways that were also modeled as independent sub-basins in order to target both water quality and water quantity projects. In total, 17 Basin Models were developed for the 20 basins and sub-basins that were evaluated.

Assessment of the Parish waterways and drainage basins began with review of a number of flood studies that have been performed for St. Tammany Parish Government over the past several years. The study areas for these flood studies

ranged in size from several acres targeted to small geographic areas within a sub-segment of the basin to entire drainage basins. A few of the larger drainage studies had identified smaller sub-basins within larger areas. The project team used these sub-basins to create a detailed parish wide sub-basin level drainage map. These sub-basins are much smaller than the existing Hydrologic Unit Codes (HUC) currently available for St. Tammany Parish. These smaller sub-basins allowed the team to target smaller geographic areas in order to assess the impacts of each area with respect to water quantity and water quality. The project team utilized GIS software to combine sub-basins from previous studies. Conflicts between studies and non-delineated areas were resolved using Light Detection and Radar (LIDAR) data and occasional field verification. Using this process, the project team was able to separate the parish into 330 sub-basins as well as assigning a recognized drainage outfall point for each sub basin. Having the ability to quantify the sub-basins and determine a location of the drainage outfall allowed the project team to account for every drop of storm water that falls within the 10 major watersheds. Along with the sub-basin boundaries and drains, the project team also prepared an up-to-date GIS layer of all the waterways and sub-basins within the Parish. The above GIS layers served as the basis for the evaluation of all water quality and water quantity projects considered during this study.

2.2.2.1 Basins

Starting on the east side of the Parish is the Pearl River drainage basin which forms the eastern border of St. Tammany Parish. The Pearl River drainage basin is approximately 444 miles long and drains approximately 8,760 square miles, most of which is located outside of St. Tammany Parish. Due to sheer size and the fact that the Pearl River is not considered impacted or impaired for DO by LDEQ, the Pearl River basin was not included in this study.

Gum Bayou is approximately 7.8 miles long and flows in a southeasterly direction, eventually discharging into the West Pearl River. It has a relatively small drainage basin comprised of approximately 3,600 acres

of moderate to heavily developed land. It is bordered to the east by the West Pearl River basin and to the west by the W-15 (French Branch) basin. It is assumed that Gum Bayou is not impaired because there is no specific data indicating it is impaired and because Gum Bayou discharges into an unimpaired water body (West Pearl River). Therefore, this basin was not evaluated for water quality projects; however, this area was considered for flood mitigation projects.

Moving west, the next basin is the W-15 (French Branch) basin which encompasses approximately 7,300 acres. The W-15 canal was once a natural stream which flows generally in southeasterly direction ultimately emptying into Doubloon Bayou. In the 1930's and 40's the Works Progress Administration (WPA) cleaned and dredged canals in certain portions of the Parish to facilitate drainage. These canals were labeled from West to East and were donated with a "W" in the name. Examples are the W-14 and W-15. The W-15 Basin is heavily developed area throughout much of the basin. The waterway is approximately 8.76 miles long and is connected to the W-14 Canal by a man-made ditch called the Reine Canal. The Reine Canal is a bi-directional flow canal that is about 1.7 miles long. In addition to the W-15 Basin, the W-14 Basin comprises about 4,600 acres of heavily developed land and is bordered to the west by the Bonfouca Basin. This man made waterway is approximately 8.43 miles long and converges with Doubloon Bayou prior to discharging into the Fritchie Marsh. These two drainage basins were subdivided into 17 separate sub-basins and are shown as one unit in the map below. They are grouped together because they heavily influence each other and together provide drainage for most of the incorporated City of Slidell.

Bayou Bonfouca is the fourth largest drainage basin in the Parish comprising slightly more than 43,500 acres which was further divided into 15 sub-basin segments for this study. The southeastern corner of the basin is highly developed and drains western areas of Slidell. Development is moderate in the southwestern portion of the basin, while

the northern half of the basin is mostly undeveloped forested land. The drainage basin contains four significant waterways; Bayou Vincent (W-13) at 4.9 miles in length empties into Bayou Bonfouca which is about 12.24 miles long. These two bayous drain most of the eastern side of the Bayou Bonfouca basin. Bayou Paquet is approximately 5.1 miles in length and converges with Bayou Liberty (W-12). Bayou Liberty, which is about 15.31 miles long also empties into Bayou Bonfouca approximately 3,000 feet upstream of where Bayou Bonfouca empties into Lake Pontchartrain. It should be noted that the W-14, W-15, and Bayou Bonfouca Basin, consisting of the W-12, W-13, and Bayou Paquet encompass 72% of all RL/SRL properties in St. Tammany Parish, 68% of which were a result of rain flooding and 32% a result of flooding caused by surge. This is clearly due to the unique location in which these basins are located within St. Tammany Parish. These three basins are relatively flat with slow meandering bayous which are subject to storm surge, river flooding from the Pearl River, and from rain events.

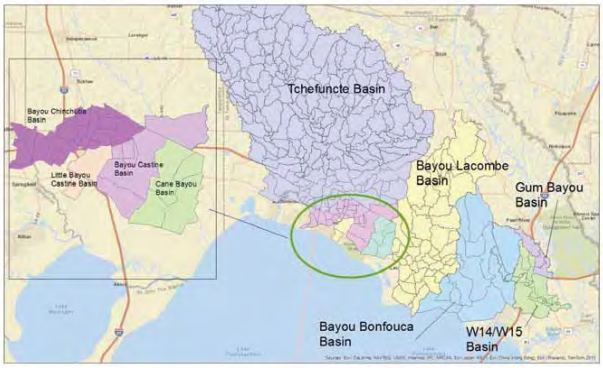
The Bayou Lacombe drainage basin constitutes the western border of the Bayou Bonfouca basin. The Bayou Lacombe drainage basin is the largest drainage basin which is entirely in St. Tammany Parish but only contains 7% of the flooded structures within the parish. Both the Tchefuncte River Basin and the Pearl River Basins are larger but have a significant amount of their drainage area is outside of St. Tammany Parish. The Bayou Lacombe basin has been separated into 47 sub-basins and comprises over 61,500 acres of drainage. The lower portion of the basin can be categorized as having a moderate to slightly heavy development; however, the majority of the basin is considered sparsely developed. Bayou Lacombe is the principal waterway in this basin and is approximately 24.82 miles long. Cypress Bayou and Big Branch Bayou, 8.65 miles and 5.79 miles respectively, are two significant tributaries within the Bayou Lacombe drainage basin. Both Cypress Bayou and Big Branch are similar in size, length and slope to the W-13, W-14 and the W-15 Basins. The difference between these areas is the density of development. A proactive approach to addressing storm water

in the areas to be developed should prevent further negative impact to the basins drainage systems.

Moving west in the Parish is a series of small drainage basins starting with Bayou Cane. Bayou Cane is approximately 24,000 feet in length and its basin is composed of an area just over 5,300 acres which is mostly undeveloped land and swamp. Bayou Cane has been divided into 5 sub-basins. A unique quality of the Bayou Cane basin is how relatively short, flat and undeveloped the basin is compared to other neighboring basins. Even with limited human impact, the basin is still considered impaired due to low DO levels. There are very few existing drainage problems with this basin due to the lack of development. In fact, there is only one RL/SRL within the Bayou Cane Basin.

The Bayou Castine drainage basin borders the west of Bayou Cane and comprises about 6,395 acres of low to moderate development, most of which is located on the western side of the drainage basin, east of Highway 59 and along Highway 1088. The Bayou Castine drainage basin has been separated into 6 sub-basin and its primary waterway is about 6.59 miles in length. Little Bayou Castine is the smallest of all basins, comprising only 1,700 acres of highly developed land which has been separated into 2 sub-basins. The Little Bayou Castine waterway measures 6.6 miles long. Within the Bayou Castine and Little Bayou Castine Basins only 2.4% of all RL/SRL structures exist. Most of these structures have flooded due to surge events

FIGURE 1
ST. TAMMANY PARISH BASINS



The Bayou Chinchuba Basin drains about 5,700 acres highly developed land, a significant portion of which is in the city limits of Mandeville. There are 16 RL/SRL homes in the Bayou Chinchuba drainage basin. The only undeveloped portions of the Bayou Chinchuba Basin are the upper headwaters near Highway 59. The basin has been separated into 19 sub-basins. The waterway is approximately 8.5 miles long, and generally flows from the northeast to the southwest. Bayou Chinchuba is comparable in both size, slope and development density to the W-14 and W-15 in the Slidell area. The majority of the RL/SRL structures are from rain (riverine) events. This basin even being similar in size, topographic fall and development density to the W-14 and W-15, was primarily under different development regulations than the eastern portion of the Parish. Because much of the development that has taken place in this basin has been required to provide detention to mitigate for storm water runoff, the number of RL/SRL structures are substantially less. Another contributing factor to the difference in the number of RL/SRL structures is the overall ground elevation of the Bayou Chinchuba Basin being higher than the eastern side of the Parish. The project team believes these are two reasons for the vast difference between the two basins with respect to the number and density of RL/SRL structures.

The Tchefuncte River Basin covers more land within the Parish than any other basin. In fact, the Tchefuncte River Basin covers approximately 30% of the Parish's 720,000 acres. In its entirety, the Tchefuncte River is 70 miles long and drains approximately 264,349 acres of land. The Parish is home to about 47.12 miles or two-thirds of the length of the Tchefuncte River. In a previous study, the Tchefuncte Basin was sub-divided into 246 sub-basins, 212 of which are located within the Parish. These 212 sub-basins comprise approximately 208,969 acres of the 264,349 acres of the Tchefuncte Watershed. The Tchefuncte River Basin is composed of many major tributaries including Bayou Tete L'Ours, Ponchitolawa Creek, the Abita River, the Bogue Falaya River and the Little Tchefuncte River. While the Tchefuncte River basin is

clearly the largest basin, only 11.1% of all RL/SRL flooding is within the basin, of which the majority is from rain.

Finally, the Black River is the western most drainage basin waterway in the parish and is generally located in the Madisonville/Goodbee area. This portion of the Parish, north of I-12 along highway 1077 between the parish line and the Tchefuncte River, is one of the flattest areas in the Parish. Due to its very small drainage area and relatively close proximity to Lake Pontchartrain, the Black River Basin was not subdivided and a water quality model was not developed. However, this basin was considered for flood control projects.

Several other waterways drain the western side of St. Tammany Parish to the Tangipahoa River located in neighboring Tangipahoa Parish.

The following table presents the drainage studies used to develop the 330 sub-basins considered in this study.

Table 1
Drainage Studies

Basin	Study Title	Date	Prepared By
Bayou Castine	Bayou Castine Headwaters Analysis	6/1/2003	Kyle Associates, LLC
Bayou Chinchuba	Bayou Chinchuba Watershed Management Plan	2/1/2010	Buchart Horn, Inc.
Bayou Lacombe	Hydrologic and Hydraulic Analysis of Bayou Lacombe Drainage Basin	5/1/2010	Neel-Schaffer
Bayou Lacombe	Bayou Lacombe Watershed Management Plan	9/1/2004	CDM
Bayou Liberty	Bayou Liberty Watershed Management Plan	4/1/2007	Burk-Klienpeter, Inc.
Little Bayou Castine	Analysis and Recommendations for Drainage Improvements	7/11/2008	Buchart Horn, Inc.
Tchefuncte	Drainage Report for Abita River Sub-Basin	12/15/2008	J. Thibodeaux and Associates, LLC
Tchefuncte	Bayou Tete L'Ours Watershed Management Plan	8/20/2004	Richard C. Lambert
Tchefuncte	St. Tammany Parish Hydrologic and Hydraulics Models	11/9/2007	CH2M Hill
W-15	French Branch Drainage Evaluation	8/1/2004	CTE Engineers
W-15/W-14	French Branch(W-15) and Doubloon Bayou Drainage Study	3/18/2013	DDG/Owen & White

2.2.2.2 Assessment of Flood Risk

St. Tammany Parish is bordered to the south by Lake Pontchartrain. This 630 square mile oval shaped lake is connected to the Gulf of Mexico via the Rigolets Pass and Chef Pass. This connection to the Gulf of Mexico makes the southern areas of the Parish susceptible to coastal flooding. According to the National Oceanic and Atmospheric Administration (NOAA), three fourths of all presidential declared disasters are associated with flooding (http://www.noaawatch.gov/themes/flooding.php). Being a coastal parish, St. Tammany has an increased risk of flooding due to storm surge or an abnormally high tide caused by off-shore storm events. According to Louisiana's Comprehensive Master Plan for a Sustainable Coast, the Parish is expected to see up to 5 inches of subsidence by the year 2050. Furthermore, the Master Plan reports that sea level will rise anywhere from 4 inches to 1 foot during that time period. Relative sea level rise, or the combination of subsidence and sea level rise could account for a water surface elevation that is close to 18 inches higher than what is seen today.

The project team utilized historic flooding data to assess the current flood risk to the parish. This was done by utilizing the repetitive loss (RL) and Severe Repetitive Loss (SRL) properties within the Parish. According to the Federal Emergency Management Agency (FEMA) (http://www.fema.gov/severe-repetitive-loss-program),a RL property is one in which two or more National Flood Insurance Program (NFIP) losses of at least $1,000 each have been paid within any 10 year period since 1978. A SRL property is defined as a residential property that is covered under the NFIP and meets one of the following conditions. The first condition is that a property (a) has at least four NFIP claim payments (including building and contents) over $5,000 each claim, and the cumulative amount of such claims payments exceeds $20,000. The second condition is that a property (b) has at least two separate claims payments (building payment only) that have been made with the cumulative amount of the building portion of such claims exceeding the

market value of the building. The last condition is that (c) for both (a) and (b), at least two of the referenced claims must have occurred within any ten-year period and must be greater than ten days apart.

Table 2
Tiers and Number of Claims

Tier	Claims/Event	No Events
1	<25	138
2	26-100	14
3	101-250	6
4	>250	6

The project team received the RL/RSL dataset from the Parish. The list, which dates back to 1978, contains 3,216 structures. The project team grouped dates that were associated with similar storm events, which allowed the team to identify 163 separate events causing 3,216 flooded structures. Due to the wide spread magnitude of flooding caused by individual storms, the project team separated each storm into a tier system. The tier system categorized storm events from a 1, least amount of flooding, to a 4 which had the highest level of flooding claims per event. **Table 2** above shows the different Tiers and the number of claims per event associated with each Tier. Tier 1 events were those that had localized flooding that only affected small pockets of homes. Of the 163 separate events, 138 were Tier 1 events which accounted for approximately $5,140,000 in total flood claims or $11,200 per flooded structure. The cost of tiers 2 and 3 were fairly consistent at an average of $13,800 and $14,200 per flooded structure, respectively. Tier 4 structures exhibit highly variable costs per flooded structures relative to the storms in other tiers.

Tier 4 events are much more costly than other level storms. In fact, the combined cost of tier 1, tier 2, and tier 3 storms combined is a little less

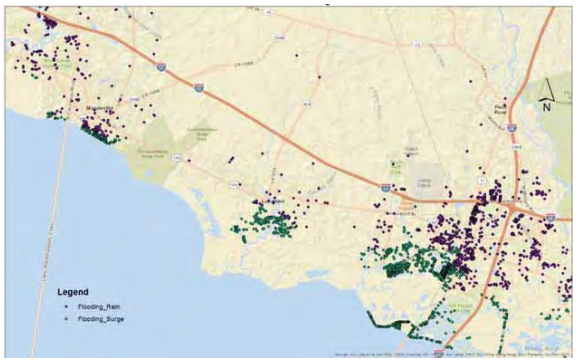
than $25,000,000. The combined cost of all structures flooded in tier 4 events is $384,586,000. Tier 4 flooding had an average cost of $53,700 per structure, more than 4 times the cost of a non-tier 4 event. Only 6 events account for all tier 4 flooding, including the May 1995 flood, Tropical Storm Allison (2001), Hurricane Isadore (2002), Hurricane Katrina (2005), Hurricane Gustav (2008) and Hurricane Isaac (2012). The tier 4 events account for 66.2% (2,128 structures) of all RL and SRL properties. It is important to note that the first Tier 4 storm didn't occur until 1995 and five of the six have occurred since 2001. Reasons for this increase in flooding can't be certain but are likely associated with a period of increased tropical storm activity, increased population density, subsidence, relative sea level rise, and a deteriorating coastal environment. Unfortunately, these storms far exceed the typical 100 year storm that most projects are designed for, which makes any project design solution uneconomical.

The nature of flooding is an important consideration in the design of projects. Utilizing data from several storm events, the project team separated all flooded structures into one of two groups. The first is surge flooding, meaning that these homes could flood during an event that causes waters in Lake Pontchartrain to rise above the normal tidal range. Typically this is from high wind events in the Gulf of Mexico. As southern winds blow across the Gulf of Mexico, the energy is transferred to the water surface through friction. This friction produces waves which push water up into the Rigolets and Lake Borgne. The water flows into Lake Pontchartrain causing water surface elevation to rise. If the winds are significant enough in duration and intensity, the water surface elevation will build up enough to cause structural flooding, even in the absence of rain. Unfortunately, given the geographic location and relative sparse development along the coastal Parish, it is difficult to justify the high cost of large levee systems and pump stations. In addition to unsightly impacts, a levee system causes many secondary environmental issues. Therefore, elevation of structures will likely be a preferred solution to addressing flooding caused by storm surge.

Education of the general public as well as obtaining elevation funding to mitigate flooded structures will likely be a continued process for the foreseeable future for many of the structures that are impacted by surge events. It should be noted that, through this project, an evaluation of all flooded structures due to surge through the Parish since 1978, were assessed to see what percentage have been mitigated or elevated or no longer exist. This was accomplished by visually assessing each structure provided in the GIS data base to see if the structure had been raised. St. Tammany Parish has 3,216 RL/SRL structures, 1,513 of which are located within the surge zone. 610 of the structures located in the surge zone have either been elevated or removed leaving 903 RL/SRL structures at risk.

It should be noted that just because a structure is elevated or a drainage project is implemented, this does not eliminate the risk of flooding. Mother Nature is very unpredictable and these projects are designed to minimize the risk due to flooding while maintaining a delicate balance with nature's ecosystem and the cost effectiveness of these projects.

FIGURE 2
RL/SRL FLOODING



The second group is rain flooding and which consist of structures that are predominately outside of the coastal zone where drainage problems cause localized flooding. Many of these drainage problems can be attributed to either the lack of conveyance capacity to carry the storm water or a lack of flood plain storage within the basin. Due to an increase in development within the Parish, there are certain drainage basins like the W-14/W-15 and Bayou Chinchuba where there has been a loss of flood plain storage within the basin. When rainfall intensity exceeds the ability of an area to drain, water levels begin to rise. Depending on rainfall intensity and duration, the water surface elevations can exceed Finished Floor Elevations (FFE). Most of Tier 1 and some of Tier 2 flooded structure events are from localized flooding that occurred with high intensity rain events over a small geographic area, usually within a short period of time. These small storms overload the ability of the area to either store or convey water out to the receiving stream and cause isolated flooding. Tier 1 and some Tier 2 flooding will typically be aided by localized drainage improvements while Tier 2 and some Tier 3 project goals would be aimed at slightly larger drainage areas and collection systems aimed at either adding storage or detention within the basin or increasing the conveyance capacity of the channel. Surge flooding is a frequent contributor to rain flooding events. The rising coastal waters provide an elevated tailwater condition which lowers the drainage gradient. This causes an elevated water surface elevation within the drainage ways, prevents the water from draining and causes water to back up into homes and businesses.

Throughout much of the 70's, 80's and early 90's development on the north shore was not regulated as it is today. During this time, developers were not required to provide storm water detention and/or flood plain mitigation. Furthermore, a good amount of development in and near the Slidell and Mandeville areas developed within a natural flood plain and over bank areas which negatively impacted the flood plain storage within the drainage basins. Therefore, when the project team was analyzing the existing drainage basins, it was noted that many of the

older developed areas have a loss of storage within the basin as well as conveyance systems that have insufficient culvert capacity at road crossings. In either case, there are two major aspects as it relates to flood control on the drainage system that the project team reviewed. Improving or restoring storm water conveyance and replacing the lost storage within a particular basin by adding detention ponds to attenuate peak flows and/or replacing impacted flood plain storage.

The final step in evaluating the Parish's current risk of flooding was to take into account projects aimed at reducing flooding that were constructed subsequent to the flooding last occurred. Once the flooded structures within the benefit areas of previously constructed or projects in design with funding were accounted for, the project team was able to identify target areas for new flood control projects.

FIGURE 3
TIER 1 (<25 CLAIMS/EVENT)

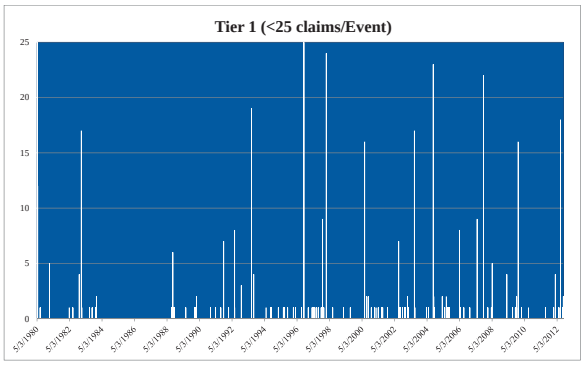


FIGURE 4
TIER 2 (26-100 CLAIMS/EVENT)

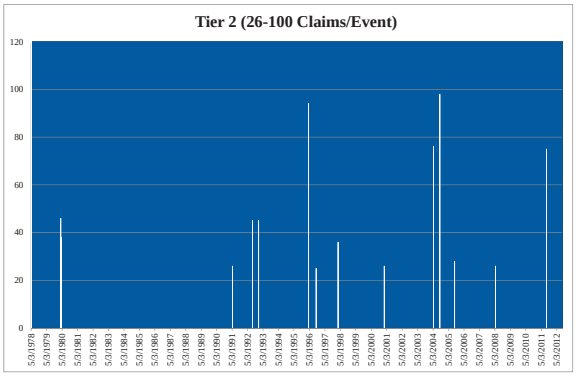


FIGURE 5
TIER 3 (101 – 250 CLAIMS/EVENT)

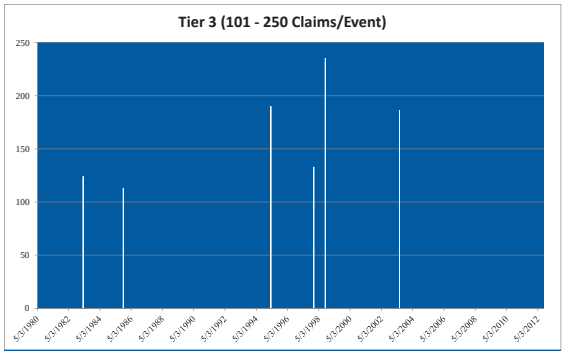
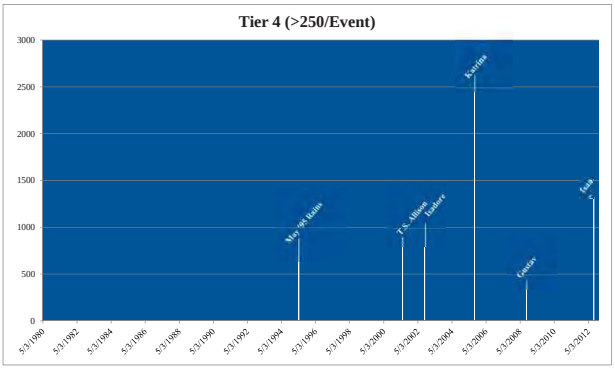


FIGURE 6
TIER 4 (>250/EVENT)



2.2.3 Water Body Characterization and Hydraulics

In order to develop existing conditions and projection models, the project team gathered the following electronic modeling files (LA-QUAL Files) from LDEQ:

- Bayou Lacombe TMDL for Oxygen Demanding Substances (040901 & 040902)
- Bayou Cane TMDL for Oxygen Demanding Substances (040903 & 040904)
- Lower Tchefuncte River TMDL for Oxygen Demanding Substances (040802 & 040803)
- Bayou Liberty and Bayou Bonfouca TMDLs for Oxygen Demanding Substances (040905, 040906, 040907 & 040908)

The following TMDL supporting documents were also requested from LDEQ:

- All ambient and effluent data collected in support of TMDLs
- All GIS layers/data created in support of TMDLs
- All ArcView figures created in support of TMDLs
- All Vector Diagrams of Modeled Areas
- All survey data collected in support of TMDLs
- Results of any dye studies if conducted
- Results of any watershed surveys
- Current and projected land use and land cover data
- Current and projected population data
- Data from any nonpoint source projects (§ 319)
- Any ambient water quality data LDEQ may have including but not limited to: temperature, salinity, conductivity, DO, biochemical oxygen demand (BOD), nitrogenous biochemical oxygen demand (NBOD), phosphorus, metals data, nitrogen (organic, nitrate-nitrogen, ammonia nitrogen), chlorophyll A, coliform, dissolved solids, flows/velocities

(dry and wet weather/peak flows), sediment data, biological data, and geomorphological data

- Any ambient climatological data LDEQ may have including, but not limited to: temperature, precipitation, wind speed, and evaporation
- Physical water body characteristics LDEQ may have including, but not limited to: stream widths, stream depths, stream lengths, elevations, and slopes

To support the modeling effort, the following water quality data was also requested from the Parish: temperature, salinity, conductivity, DO, BOD_5, NBOD, phosphorus, and metals data.

The applicable TMDL reports, data files and supporting documentation for the Bayou Lacombe, Bayou Liberty, Bayou Bonfouca, Bayou Cane, and the Lower Tchefuncte River watersheds were reviewed. Additionally, historical models for the W14 Canal and Bayou Chinchuba were reviewed. Ambient data for all the watersheds in the study area were also reviewed.

The project team reviewed information regarding the location, physical characteristics, and operation of control structures in the study area waterways, including but not limited to weirs, pumps, gated spillways, and diversions. Available flow and stage data recorded in the study area water bodies including the evaluation of seasonal and annual flow rates, and the distribution of flow between surface runoff, base flow, and wastewater discharges were reviewed to determine flow estimates.

In addition, the project team identified criteria on a Federal State, Parish and Municipal Level. The criteria includes State and Federal Water Quality Criteria and Regulations and Parish and Municipal Regulations and Ordinances which are presented below.

Table 3
Water Quality Criteria

Code	Stream Description	Designated Uses[1]	Numerical Criteria CL[2]	SO$_4$[3]	DO[4]	pH[5]	BAC[6]	°C	TDS[7]
Lake Pontchartrain Basin (04)									
040801	Tchefuncte River–From headwaters to Bogue Falaya River; includes tributaries (Scenic)	A B C G	20	10	5.0	6.0-8.5	400	30	110
040802	Tchefuncte River–From Bogue Falaya River to LA-22 (Scenic)	A B C G	850	135	5.0	6.0-8.5	400	30	1,850
040803	Tchefuncte River–From LA-22 to Lake Pontchartrain (Estuarine)	A B C	850	135	4.0	6.0-8.5	400	30	1,850
040804	Bogue Falaya River–From headwaters to Tchefuncte River (Scenic)	A B C G	20	10	5.0	6.0-8.5	400	30	110
040805	Chinchuba Swamp Wetland–Forested wetland located 0.87 miles southwest of Mandeville, southeast of Sanctuary Ridge, and north of Lake Pontchartrain	B C	8	8	8	8	2000	8	8
040806	East Tchefuncte Marsh Wetland–Freshwater and brackish marsh located just west of Mandeville, bounded on the south by Lake Pontchartrain, the west by Tchefuncte River, the north by LA-22, and the east by Sanctuary Ridge	B C	8	8	8	8	2000	8	8
040901	Bayou LaCombe–From headwaters to US-190 (Scenic)	A B C G	30	30	5.0	6.0-8.5	400	30	150
040902	Bayou LaCombe–From US-190 to Lake Pontchartrain (Scenic) (Estuarine)	A B C G	835	135	4.0	6.0-8.5	400	32	1,850
040903	Bayou Cane–From headwaters to US-190 (Scenic)	A B C G	30	30	5.0	6.0-8.5	400	30	150
040904	Bayou Cane–From US-190 to Lake Pontchartrain (Scenic) (Estuarine)	A B C G	N/A	N/A	4.0	6.0-8.5	400	32	N/A

Table 3
Water Quality Criteria

Code	Stream Description	Designated Uses[1]	Numerical Criteria						
			CL[2]	SO_4[3]	DO[4]	pH[5]	BAC[6]	°C	TDS[7]
040905	Bayou Liberty–From headwaters to LA-433	A B C	250	100	5.0	6.0-8.5	400	32	500
040906	Bayou Liberty–From LA-433 to Bayou Bonfouca (Estuarine)	A B C	N/A	N/A	4.0	6.0-8.5	400	32	N/A
040907	Bayou Bonfouca–From headwaters to LA-433	A B C	250	100	5.0	6.0-8.5	400	32	500
040908	Bayou Bonfouca–From LA-433 to Lake Pontchartrain (Estuarine)	A B C	N/A	N/A	4.0	6.0-8.5	400	32	N/A
040909	W-14 Main Diversion Canal–From headwaters to Salt Bayou	A B C	N/A	N/A	2.5 Apr. – Oct.; 4.0 Nov. – Mar.	6.0-8.5	400	32	N/A
040910	Salt Bayou–From headwaters to Lake Pontchartrain (Estuarine)	A B C	N/A	N/A	4.0	6.0-8.5	400	32	N/A
040911	Grand Lagoon; includes associated canals (Estuarine)	A B C	N/A	N/A	4.0	6.0-8.5	400	32	N/A
041001	Lake Pontchartrain–West of US-11 bridge (Estuarine)	A B C	N/A	N/A	4.0	6.5-9.0	400	32	N/A
041701	The Rigolets (Estuarine)	A B C	N/A	N/A	4.0	6.5-9.0	400	32	N/A
081611	Bayou Funny Louis–From headwaters to Little River	A B C	50	75	5.0	6.0-8.5	400	33	260

Footnote [1] Designated Uses

A Primary Contact Recreation

B Secondary Contact Recreation

C Fish and Wildlife Propagation

G Outstanding Natural Resource Waters

Footnote [2] Chlorides, mg/L

Footnote 3 Sulfate, mg/L

Footnote 4 Dissolved Oxygen, mg/L

Footnote 5 pH, standard units

Footnote 6 Fecal Coliform Bacteria col/100 mL

Footnote 7 Total Dissolved Solids, mg/L

Footnote [8] Designated Naturally Dystrophic Waters Segment. The following criteria apply: no more than 20% reduction in the total above-ground wetland productivity as measured by tree, shrub, and/or marsh grass productivity

Table 4
Water Quality Criteria

Code	Stream Description	Designated Uses[1]	Numerical Criteria						
			CL[2]	SO_4[3]	DO[4]	pH[5]	BAC[6]	°C	TDS[7]
Pearl River Basin (09)									
090102	East Pearl River–From Holmes Bayou to I-10	A B C	20	15	5.0	6.0-8.5	400	32	180
090103	East Pearl River–From I-10 to Lake Borgne (Estuarine)	A B C	N/A	N/A	4.0	6.0-8.5	400	35	N/A
090105	Pearl River Navigation Canal–From Pools Bluff to Lock No. 3	A B C	20	15	5.0	6.0-8.5	400	32	180
090106	Holmes Bayou–From Pearl River to West Pearl River (Scenic)	A B C G	20	15	5.0	6.0-8.5	400	32	180
090107	Pearl River–From Pearl River Navigation Canal to Holmes Bayou	A B C	20	15	5.0	6.0-8.5	400	32	180
090201	West Pearl River–From headwaters to Holmes Bayou (Scenic)	A B C G	20	15	5.0	6.0-8.5	400	32	180
090202	West Pearl River–From Holmes Bayou to The Rigolets; includes east and west mouths (Scenic)	A B C G	90	20	5.0	6.0-8.5	400	32	235
090202-5126	Morgan River–From Porters River to West Pearl River (Scenic)	A B C G	90	20	5.0	6.0-8.5	400	32	235
090203	Lower Bogue Chitto–From Pearl River Navigation Canal to Wilsons Slough	A B C	15	10	5.0	6.0-8.5	400	32	105
090204	Pearl River Navigation Canal–From below Lock No. 3	A B C	15	10	5.0	6.0-8.5	400	32	105
090205	Wilson Slough–From Bogue Chitto to West Pearl River (Scenic)	A B C G	15	10	5.0	6.0-8.5	400	32	105
090206	Bradley Slough–From Bogue Chitto to West Pearl River (Scenic)	A B C G	15	10	5.0	6.0-8.5	400	32	105
090207	Middle Pearl River and West Middle Pearl River–From West Pearl River to Little Lake	A B C	90	20	5.0	6.0-8.5	400	32	235

Table 4
Water Quality Criteria

Code	Stream Description	Designated Uses[1]	Numerical Criteria						
			CL[2]	SO_4[3]	DO[4]	pH[5]	BAC[6]	°C	TDS[7]
Pearl River Basin (09)									
090207-5112	Morgan Bayou–From headwaters near I-10 to Middle River	A B C	90	20	5.0	6.0-8.5	400	32	235
090208	Little Lake (Estuarine)	A B C	N/A	N/A	4.0	6.0-8.5	400	32	N/A

Footnote [1] Designated Uses

A Primary Contact Recreation

B Secondary Contact Recreation

C Fish and Wildlife Propagation

G Outstanding Natural Resource Waters

Footnote [2] Chlorides, mg/L

Footnote 3 Sulfate, mg/L

Footnote 4 Dissolved Oxygen, mg/L

Footnote 5 pH, standard units

Footnote 6 Fecal Coliform Bacteria col/100 mL

Footnote 7 Total Dissolved Solids, mg/L

The following water bodies within the Parish are designated scenic streams by the Louisiana Department of Wildlife and Fisheries and are considered Outstanding Natural Resource Waters by LDEQ:

- Tchefuncte River–From headwaters to Bogue Falaya River; includes tributaries (but not tributaries to the tributaries)
- Tchefuncte River–From Bogue Falaya River to LA-22
- Bogue Falaya River–From headwaters to Tchefuncte River (Scenic River Segment limited to: Confluence of East and West Prong to LA HWY 437, north of Covington)
- Bayou LaCombe–From headwaters to US-190
- Bayou LaCombe–From US-190 to Lake Pontchartrain (Estuarine)
- Bayou Cane–From headwaters to US-190
- Holmes Bayou–From Pearl River to West Pearl River
- West Pearl River–From headwaters to Holmes Bayou
- West Pearl River–From Holmes Bayou to The Rigolets; includes east and west mouths
- Morgan River–From Porters River to West Pearl River
- Wilson Slough–From Bogue Chitto to West Pearl River
- Bradley Slough–From Bogue Chitto to West Pearl River

Based on the identified criteria, water body pollutant impairments that have the potential to be improved were identified by reviewing the LDEQ 2012 Clean Water Act §303(d) inventory of impaired watersheds (Integrated Report) and the TMDLs issued by LDEQ and USEPA in the study area.

The Integrated Report indicates that the areas of concern with lowered water quality are located in the southern suburban areas of the Parish where the streams have very little differential elevations and thus very low flow velocities. A review of the

watershed-pollutant combinations reveals that the two main pollutants of concern in the Parish are mercury from atmospheric deposition and oxygen demand which results in low DO levels. While other pollutants such as fecal coliform, chlorides, sulfates and dissolved solids are also listed as suspected causes of impairments to the designated uses of water bodies in the Parish, these causes of impairments are fewer in number and can be readily managed through enforcement of existing regulation and policy.

Where mercury is listed as a cause of impairment, EPA has recognized that greater than 99% of mercury in Louisiana water bodies is a result of atmospheric deposition. This is substantiated by data collected from the Hammond, Louisiana ambient mercury deposition network monitoring site from 2008 to 2010 which averaged 358 nanograms per liter (ng/L) of mercury in the rainfall during this period. TMDLs to address mercury in Louisiana have therefore focused on potential hot spots and pollution prevention measures in certain dischargers that have the reasonable potential to discharge mercury at elevated levels such as hospitals, clinics, sanitary wastewater treatment systems with industrial/medical inputs, and dental clinics. Pollution prevention techniques are anticipated to control mercury levels in wastewater effluent at levels to ensure point source discharges are not causing or contributing to elevated levels of mercury in Louisiana water bodies.

Many subsegments in the southern portions of the Parish were included on the 2006, 2008, and Final Partially Approved 2010 Section 305(b) Integrated Reports as “not supporting” the designated use of Fish and Wildlife Propagation attributed to low DO. These subsegments were slated for development of TMDLs for oxygen-demanding substances based on the current DO standard of 5 mg/L or 4 mg/L for estuarine water bodies. However, LDEQ recognizes that these standards may be unrealistic and is in the process of re-evaluating Louisiana’s ecoregions and modifying the ecoregion boundaries where appropriate to better quantify the

appropriate DO criteria for these areas. The DO criteria for these areas are in the process of being revised by LDEQ through a Use Attainability Analysis (UAA).

For several watersheds located in the identified hot spot areas, calibrated water quality models have been developed by LDEQ to address the DO impairments. LDEQ acknowledges that the DO standards are being reviewed through the ecoregion UAA, and therefore ran preliminary projections based on a DO target range of 2.3 to 3.8 mg/L in lieu of the current 5.0 mg/L or 4.0 mg/L standard. Below is a list of proposed criteria based on the data from the LDEQ TMDLs. The criteria for Bayou Castine and Bayou Chinchuba also appears to be inappropriate. However, data collection is necessary to determine proposed criteria for these water bodies.

Table 5
Current and Proposed DO Criteria

Code	Stream Description	Current DO Criteria	Proposed Summer DO Criteria
040802	Tchefuncte River–From Bogue Falaya River to LA-22	5.0	3.8
040803	Tchefuncte River–From LA-22 to Lake Pontchartrain	5.0	3.8
040901	Bayou LaCombe–From headwaters to US-190	5.0	2.3
040902	Bayou LaCombe–From US-190 to Lake Pontchartrain	4.0	3.8
040903	Bayou Cane–From headwaters to US-190*	5.0	2.3
040904	Bayou Cane–From US-190 to Lake Pontchartrain*	4.0	2.3
040905	Bayou Liberty–From headwaters to LA-433	5.0	2.3
040906	Bayou Liberty–From LA-433 to Bayou Bonfouca	4.0	2.3
040907	Bayou Bonfouca–From headwaters to LA-433	5.0	2.3
040908	Bayou Bonfouca–From LA-433 to Lake Pontchartrain	4.0	2.3

* This watershed includes Bayou Castine, Little Bayou Castine, and Bayou Chinchuba.

The resulting projections from many of these models indicate that the required load reductions are greater than 50% of man-made loadings. Due to time limitations and budget constraints, LDEQ recognizes that numerous individual commercial package plants and individual residential treatment units discharging directly or indirectly within Parish watersheds are suspected of having a major impact, but did not explicitly consider these discharges. LDEQ recommended incorporating such dischargers into a regional collection and treatment system.

Table 6
Impairments

Impairment	Cause(s)
DO	On-site Treatment Systems (Septic Systems and Similar Decentralized Systems)
	Package Plant or Other Permitted Small Flows Discharges
	Source Unknown
	Municipal (Urbanized High Density Area)
	Natural Sources
pH, low	Natural Sources
	Naturally Occurring Organic Acids
Chlorides	Drainage/Filling/Loss of Wetlands
	Habitat Modification - other than Hydromodification
	Littoral/shore Area Modifications (Non-riverine)
Sulfates	Drainage/Filling/Loss of Wetlands
	Habitat Modification - other than Hydromodification
	Littoral/shore Area Modifications (Non-riverine)
	Natural Sources
	Sources Outside State Jurisdiction or Borders
	Source Unknown
	Drought-related Impacts
Total Dissolved Solids (TDS)	Drainage/Filling/Loss of Wetlands
	Habitat Modification - other than Hydromodification
	Littoral/shore Area Modifications (Non-riverine)
	Natural Sources
	Source Unknown

Table 6 Impairments	
Impairment	**Cause(s)**
	Drought-related Impacts
Mercury	Atmospheric Deposition – Toxics
	Source Unknown
Copper	Source Unknown
Fecal Coliform	Drought-related Impacts
	On-site Treatment Systems (Septic Systems and Similar Decentralized Systems)
	Sanitary Sewer Overflows (Collection System Failures)
Temperature	Changes in Tidal Circulation/Flushing
	Drought-related Impacts
	Urban Runoff/Storm Sewers
Turbidity	Natural Sources
	Sources Outside State Jurisdiction or Borders
	Sediment Resuspension (Clean Sediment)
	Source Unknown
Benzo (a) pyrene	CERCLA NPL (Superfund) Sites
	Contaminated Sediments

The LDEQ developed DO TMDLs require drastic reductions in permit limitations for a large number commercials business, in addition to municipalities and privately owned treatment plants. In most cases, the reductions are unachievable for small businesses, and are unlikely to be realized. Therefore, it can be expected that there will be little to no improvement in water quality through upgrades at small commercial establishments. The project team therefore focused on providing treatment to unsewered subdivisions and small businesses in close proximity to subdivisions in order to effectuate improvements in water quality. Additionally, the DO criteria in several of the water bodies within the Parish, may not truly be representative of natural Louisiana water bodies. In these instances, the DO criteria will need to be modified in order to better define the need for water quality

improvements. Lastly, obstacles to water quality improvements were identified by the project team.

Although none of the water bodies within the Parish currently have a nutrient impairment, LDEQ is in the process of evaluating phosphorus and nitrogen criteria statewide. Until the state or federal government develop phosphorus and nitrogen criteria, LDEQ maintains that when oxygen demanding substances are limited in order to ensure that the DO criterion is supported, nutrients such as phosphorus and nitrogen are also controlled. Therefore, by limiting or controlling the BOD_5 in wastewater discharges, phosphorus and nitrogen are also controlled.

Gaps in the collected water quality data were identified. Bayou Chinchuba, Bayou Castine, and the W14 Canal have limited and/or outdated water quality and water body data. The limitations of the data include the number of data points for each water body, alterations in the hydrology of the water body since the data was collected, or lack of appropriate data necessary to calibrate the model. The data used to calculate the LDEQ TMDLs for Bayou Lacombe, Cypress Bayou and Big Branch Bayou is considered inappropriate because it was collected in October during non-critical temperatures and within weeks of Hurricanes Gustav and Ike. The data used to calculate the LDEQ TMDLs for the Lower Tchefuncte River, Bayou Tete L'Ours, and Bayou DeZaire is considered to be inappropriate because it was collected in November during non-critical temperatures. Collecting data at non-critical conditions results in "better" or less impacted existing conditions model runs. Additional and more appropriately collected DO, temperature, CBOD, NBOD and flow data is necessary for the above identified water bodies in order to generate models that represent true critical ambient conditions. It becomes difficult to effectuate water quality improvement through implementation of sewer and drainage projects when the existing conditions are not representative of summer critical flow and temperature conditions.

2.2.3.1 Naturally Dystrophic Waters

LDEQ defines naturally dystrophic waters at LAC 33:IX.1105 as waters which are stained with organic material and which are low in DO because of natural conditions. These water bodies are generally surrounded by bottomland hardwood forests, freshwater swamps and freshwater marshes with slow-moving, low gradient flows the majority of the year. Though naturally dystrophic water bodies may be deficient in DO, designated uses including fish and wildlife propagation, are typically maintained.

Louisiana has abided by the requirements set forth in Section 304(a) by adopting criteria for all state waters by one of the four methods described. For DO, Louisiana did not have state-specific data or other scientifically defensible methods for establishing state-specific standards within the USEPA mandated time frame. Louisiana was therefore required by USEPA to establish a statewide DO criterion of 5 mg/L for inland and open ocean waters and 4 mg/L for interior marsh estuarine areas, which was based on the nationally recommended criteria (*Use Attainability Analysis of Barataria and Terrebonne Basins for Revision of Dissolved Oxygen Water Quality Criteria*, LDEQ, 2008). In the criteria document, 5 mg/L is recommended as a one-day minimum for early life stages for warm water fishes. Due to lack of state-specific data and monitoring capabilities at the time, Louisiana was not able to adopt a set of freshwater DO criteria that would address other life stages and/or other site-specific or regional environmental conditions throughout the state. Therefore, St. Tammany Parish water bodies currently have DO criteria of 5 mg/L for freshwater and marine and 4 mg/L for estuarine waters, except where site-specific revisions have been made, the W-14 Canal for example. However, these nationally recommended and state adopted criteria are inappropriate for many St. Tammany Parish water bodies where DO is low due to the natural conditions described above. Many of the water bodies located along, adjacent to and flowing into Lake Pontchartrain in southeast Louisiana are

good examples where DO is naturally low, resulting in exceedance of the DO criteria.

While many of the water bodies identified in this report contain significant point source discharges of oxygen demanding loads from both point and non-point sources, the modeling conducted by LDEQ for TMDL development and as part of this study demonstrate that many of these water bodies cannot meet the existing DO criteria even with all point and non-point sources removed. These model iterations clearly demonstrate that the DO criteria for these water bodies is inappropriately set.

The mechanism through which the Parish and LDEQ have the opportunity to designate waters as naturally dystrophic and/or modify DO criteria is a use attainability analysis (UAA). A UAA is a structured scientific assessment of the beneficial uses a water body could support, given application of required effluent limits and implementation of cost-effective and reasonable best management practices. A UAA is required anytime a state or tribe designates a use that does not include the fishable/swimmable" goals of the Clean Water Act or changes a use to one that would apply less stringent criteria than the current use.

The goal of the UAA is to document the water quality and biological characteristics of reference water bodies to describe the natural conditions. The data collected is used to determine the critical periods for DO, characterize the water quality, and describe the biological (fish) community at reference locations. In St. Tammany Parish, Bayou Cane is the least impacted stream with very few point source discharges, and cannot attain existing water quality standards. The results from data collection efforts on the reference streams are then used to propose appropriate DO criteria based on the naturally attainable conditions in this least-impacted area. Typically,

LDEQ uses the 10th percentile of the reference stream data to determine or calculate minimum criteria for similar water body types within the region.

In 2008, LDEQ and USEPA agreed upon a protocol for determining the DO concentrations needed for protection of the fish and wildlife propagation use in Louisiana freshwater and estuarine streams, bayous, rivers, and lakes. This protocol uses an ecoregion approach to revise DO criteria for a particular ecoregion. Given the absence of data linking aquatic life condition with DO, LDEQ has used the default nationwide DO criteria of 5 (freshwater or marine) or 4 (estuarine) mg/L. As a result, some streams may be listed for TMDL action unnecessarily, while others may be overlooked. However, using the ecoregion approach for revising DO criteria may help address these issues by characterizing the water quality at reference (least-impacted) sites and allowing for appropriate DO criteria to be determined for water body types or classifications within an ecoregion.

The following criteria are established for selection of reference streams:

- The entire watershed should be without any unusual or unique morphological or hydrological characteristics that are not exhibited by any other water body within the ecoregion;
- No significant point or nonpoint sources should discharge to or impact the water body. Examples of significant nonpoint sources could be agricultural activities, urban developments, silviculture activities, gravel mining, etc.;
  - The water body should be natural, preferably with no hydromodification;
  - The water body should have a site that is accessible to the sampling crew;
- The water body should be able to be sampled with gear of choice for ecoregion and water body type.

Based on data and information collected by the Parish and the criteria listed above, it is the determination of this study team and the Parish that the establishment of Bayou Cane as a reference stream in St. Tammany Parish is justifiable and defensible.

Once a reference stream for the ecoregion of the north shore of Lake Pontchartrain is selected, LDEQ and the Parish can move forward with the intensive survey and data collection effort necessary to establish appropriate DO criteria and naturally dystrophic streams where applicable.

2.2.4 Field Sampling

On July 7, 2014, several survey teams conducted a widespread field sampling effort in several identified water bodies in an effort to fill data gaps identified in **Section 2** and to verify uncertain data. The following water bodies were surveyed: the W14 Canal, Bayou Vincent, Bayou Bonfouca, Bayou Liberty, Bayou Paquet, Bayou Chinchuba, Bayou Castine, Cypress Bayou, Big Branch, Bayou Lacombe, Bayou Tete L'Ours, Bayou DeZaire, and Ponchitolawa Creek. Due to time restraints and access, the desired supplementary sampling on Bayou Bonfouca, Bayou Liberty, and Bayou Paquet were not completed. The survey team collected the following parameters in all of the above listed water bodies: DO, pH, temperature, and specific conductivity. Additionally, salinity was collected in the W14 Canal, Bayou Vincent, Bayou Chinchuba, Cypress Bayou, Big Branch, Bayou Lacombe, Bayou Tete L'Ours, and Ponchitolawa Creek. BOD_5 was sampled and analyzed for samples collected in the W14 Canal, Bayou Vincent, Bayou Bonfouca, Bayou Liberty, Bayou Paquet, Bayou Chinchuba, and Bayou Lacombe. Samples were collected in accordance with the St. Tammany Parish Water Quality Action Plan, Receiving Water Quality Sampling Plan. ESC Lab Sciences performed the laboratory analysis for BOD_5 in accordance with EPA approved methods. Field analyses were performed for DO, pH, salinity, temperature, and specific conductivity by the survey teams in accordance with EPA

approved methods. All data results, laboratory reports, and field sheets are included at **Appendix B**.

Because the majority of BOD_5 samples collected during this field sampling effort were reported as less than 5 mg/L, this data was not utilized in any model runs for this project. Additional sampling would be necessary to appropriately quantify ambient water quality.

2.2.5 Ordinances

Parish and Municipal level regulations and ordinances were evaluated to determine if additional ordinances are necessary to support improvement of water quality. The existing ordinances that regulate and control water quality related issues are presented below. Additional ordinances recommended by the project team to be considered by the Parish in order to further improve water quality are identified in **Section 7** of this report.

2.2.5.1 St. Tammany Parish Wastewater Ordinances

- Sewerage systems shall comply with the objective standards established by statutes, codes, ordinances, and rules and regulations that provide for the protection of public health and the environment. Sewerage systems shall be operated in accordance or compliance with the applicable law, which shall include, but not limited to, all applicable ordinances of the Parish of St. Tammany, and the rules and regulations of any state or local agency having jurisdiction over sewerage or water systems in the Parish.
- The Parish has the authority to monitor and inspect sewerage systems to ensure that the system provides for the protection of public health and the environment.

- Every governed sewerage system shall obtain a LPDES permit in accordance and compliance with applicable law, and shall comply with the provisions set forth in the LPDES permit, or any order or directive issued by the LA DEQ which relates to the/a LPDES permit.
- The Parish has the authority over all construction necessary or incidental to the provision of sewage disposal in the unincorporated portion of St. Tammany Parish. Plans and specifications for sewerage systems to be constructed in said portion of St. Tammany Parish shall be submitted to and approved by the Parish prior to initiating such construction, and the conduct of such construction shall be subject to inspection by the Department. Copies of any amendments to plans and specifications for such systems shall also be submitted to the Parish, and the Parish shall approve such amendments prior to operation of such systems.
- Any private person or political entity who/which owns, leases, or otherwise maintains or possesses control of any property which is situated in the unincorporated portion of St. Tammany Parish, and on which there is located a residence, camp, trailer coach, or any other building, structure, or establishment wherein people customarily or occasionally live, work, or congregate, shall connect any such premises to a sewerage system as may be required for the premises by applicable law.
- Any private person or political entity who/which owns, leases, or otherwise maintains or possesses control of any property which is situated in the unincorporated portion of St. Tammany Parish, and on which there is located a residence, camp, trailer coach, or any other building, structure, or establishment wherein people customarily or occasionally live, work or congregate, shall, at such person's sole expense, connect any such premises to a public sewerage system if such public sewer line is situated within three hundred (300') feet of the boundary line of such premises. Such construction to connect the

premises shall commence within the time required by LSA R.S. 33:4042, upon receipt of a notice to connect. If such connection is not begun in the time required, the Parish may connect the premises to the public sewer in the manner prescribed by LSA R.S. 33:4041, et seq. and apportion the connection costs and fees to each owner as also provided therein. The Parish shall have all other remedies for enforcement and collection of connection costs and fees as is provided by applicable law.

- The Parish shall provide for the inspection of an individual sewerage system, as defined in the State Sanitary Code, whenever the system is constructed or modified and the monitoring or inspection of such construction or modification is not accomplished by the DEQ, DH&H, or DOTD.
- The provision of sewage disposal or water shall not occur until the constructed or modified sewerage or water system has been inspected by the Parish or appropriate state authority and determined to be constructed or modified in accordance with the applicable and appropriate plans and specifications for installation which have been approved in advance by the Parish and/or appropriate state authority prior to the start of construction or modification.
- Any community-type sewerage system located in the unincorporated portion of St. Tammany Parish which has an anticipated flow of 10,000 gallons-per-day or more of treated sanitary sewage wastewater into, or into the basin of, any river, bayou, stream, or lake within or bordering St. Tammany Parish, shall be operated and maintained in accordance with the following effluent limitations:

Parameter	Daily Average	Maximum Average
BOD_5	10 mg/L	15 mg/L
TSS	15 mg/L	23 mg/L
Fecal Coliform Bacteria	200 col/100 mL	400 col/100 mL

- Every noncommunity-type sewerage system to be installed in the unincorporated portion of St. Tammany Parish shall be so constructed that the disposal of its sewage effluent is realized essentially within the boundaries of the building site upon which the sewage effluent originated by means of an approved post-secondary treatment sewage effluent disposal method.
- Installation of a noncommunity-type sewerage system shall require the construction of an approved septic system. Whenever the Parish Health Unit determines that the installation of an approved septic system is not feasible or would not be in accordance or compliance with applicable law, the Parish Health Unit shall authorize, as may be reasonable and appropriate, an alternative system selected from a list of approved systems which have been specified by the LA Department of Health and Hospitals.
- The owner of any property which is situated in a marsh or swamp, or on, over, or contiguous to any river, stream, bayou, lake, or other waterway within or bordering the unincorporated portion of St. Tammany Parish, and on which there is located a residence, camp, or any other structure which is occupied customarily or occasionally as a dwelling, must connect the toilet facilities and other plumbing fixtures within the said residence, camp, or structure to a community-type sewerage system where available, or to an individual sewerage system specifically approved for the premises by the State Health Officer after determining that connection to a community-type sewerage system is not feasible and that the installation and operation of an individual sewerage system will not create a nuisance or public health hazard.
- The Parish established five (5) geographical Wastewater Management Areas to facilitate overall monitoring, regulation and enhancement of existing and proposed wastewater treatment in the unincorporated areas of the Parish.

- The Parish established eighteen (18) geographical Wastewater Service Delivery Areas to facilitate the extension of sewerage and water services, the coordination and consolidation of wastewater collection and treatment, and the management of decentralized, on-site wastewater treatment systems.
- Wastewater generated from the industrial and light industrial customers shall not exceed the following standards prior to said wastewater entering the wastewater collection systems owned and operated by St. Tammany Parish:

Parameter	Limit
BOD_5	348 mg/L
COD	1,133 mg/L
Oil & Grease	128 mg/L
TSS	368 mg/L
pH	5.8 s.u. to 9.6 s.u.

Failure by any customer to provide this quality wastewater prior to treatment by St. Tammany Parish shall result in termination of wastewater treatment services and/or water service at the sole discretion of St. Tammany Parish.

- Every Septage and/or Sludge producing system located within the Parish shall be operated in accordance or compliance with applicable law, which shall include, but not be limited to, all applicable ordinances of the Parish, and the rules and regulations of any state or local agency having jurisdiction over Septage and/or Sludge producing systems in the Parish.
- Permitted On-Site Treatment Systems ("OTS") shall be serviced a minimum of every three (3) years.

- An owner or operator of an OTS shall be required to insure that the wastewater or other discharge from said system shall meet the applicable discharge requirements as set for by the LDEQ.
- Chemical Toilet/Port-o-Potty. Owners and operators of port-a-lets shall be required to properly dispose of any and all extracted waste therefrom in accordance with the provisions of this Ordinance.
- The inspection of individual on-site sewage treatment systems will be conducted in accordance with the procedures set forth in St. Tammany Parish Ordinance No. 2445, Ordinance Calendar Series No. 02-0538.
- License Required: No person shall engage in the business of cleaning, pumping or otherwise servicing OTS or any other facility or apparatus which accumulates septage or sludge without first obtaining a license from the Parish or its designee for each service vehicle to be used in such business. A license shall be issued on or after the service vehicle has been inspected and certified as satisfactory by the Parish health unit or the designee of the Parish.
- It shall be illegal for any entity, corporation, firm, association, or individual to burn or release into the air or water of St. Tammany Parish any of such hazardous wastes or by-products. (Ord. No. 82-502, adopted 12/16/82)
- It shall be unlawful for any person, group, company, corporation or organization to apply, use, or incorporate the use of any herbicide, including but not limited to, those registered with and/or approved by the U. S. Environmental Protection Agency or the Louisiana Department of Agriculture and Forestry, for the management, control, eradication or maintenance of weeds, grass, trees, shrubs, foliage, vegetation or other natural growth in any Parish right-of-way, ditch, servitude, drainage area, roadside, road shoulder, green area, buffer

zone, waterway, neutral ground or median in the unincorporated areas of St. Tammany Parish. (Ord. No. 93-1789, adopted 08/19/93)

- The owner of any property which is situated in a marsh or swamp, or on, over, or contiguous to any river, stream, bayou, lake, or other waterway within or bordering the unincorporated portion of St. Tammany Parish, and on which there is located a residence, camp, or any other structure which is occupied customarily or occasionally as a dwelling, must connect the toilet facilities and other plumbing fixtures within the said residence, camp, or structure to a community-type sewage system where available, or to an individual sewage system specifically approved for the premises by the State Health Officer after determining that connection to a community-type sewage system is not feasible and that the installation and operation of an individual sewage system will not create a nuisance or public health hazard. (Ord. No. 92-1676, adopted 11/19/92)
- Individual sewage systems shall be kept in service and in a serviceable condition sufficient to ensure compliance with the secondary treatment standard and to avoid creating or contributing to a nuisance to the public. (Ord. No. 84-209, adopted 09/20/84)
- The sewer facilities shall comply with all of the provisions of the Louisiana State Department of Health and Human Resources, hereby referred to as (DHHR) or its successor agency. The Sanitary Code of the State of Louisiana, and the Department of Environmental Quality, hereby referred to as (DEQ) [or its successor agency], and the Water Quality Control Standards of the State of Louisiana. (Ord. No. 86-630, adopted 06/19/86)
- The Parish of St. Tammany hereby adopts for implementation and enforcement Chapter 5 of Part X3 of Title 51of the Louisiana Administrative Code, as it may be amended, less and except Section 511, Paragraph B(1).

- Community sewerage shall be provided in subdivisions comprised of 15 lots or more. This requirement shall apply to all new subdivision developments. (Ord. No. 06-1241, adopted 02/02/2006)

  The use of individual sewerage systems in lieu of a community sewerage system may be authorized and will be considered under the following circumstances:

  In subdivisions comprised of less than 15 lots with a minimum lot size of two acres or greater and a minimum frontage of 125 feet, when the developer submits a comprehensive drainage plan, as well as a proposal for restrictive covenants which detail requirements for perpetual maintenance of drainage. Whenever the average lot size of a proposed subdivision is greater than five acres, the DES may waive the requirement for a community sewerage system upon demonstration by the developer that the implementation of such provisions would prove to be a manifestly unreasonable financial hardship.
- All new or existing premises, public or private, where people live, work, or congregate shall be provided with approved toilet facilities, including hand washing facilities. Such plumbing facilities shall be properly connected to a community sewerage system, whenever available, or to an individual on-site sewage disposal system which is specifically approved for the premises by the State Health Officer or his duly authorized representative after determining that the installation and operation of an individual on-site sewage disposal system will not create a nuisance or public health hazard. It shall be the duty of the owner, manager or agent of any occupied premises, public or private, where people live, work or congregate to provide the premises with an approved method of sewage disposal in compliance with the requirements of the ordinance.

- Whenever the Parish determines that any building or structure to be constructed is in proximity to the sewage collection or treatment facility of a qualified community sewerage system, said building or structure shall be required to connect thereto. When a qualified community sewerage system is available, and there is an approved public water supply with adequate water capacity, all plumbing fixtures within any building or structure shall be connected to such approved public water supply and community sewerage system.
- Prior to the issuance of a sewerage system inspection permit for any non-residential mobile home, permanent building or structure, the Parish shall inspect the premises to determine if the plumbing fixtures are properly connected to a permitted individual on-site sewage disposal system. The Parish shall inspect individual on-site sewage disposal systems to determine that said systems are not causing an apparent health or environmental problem prior to the issuance of any sewerage system inspection permit for the connection or transfer of electrical power service. In no event, however, shall a sewerage system inspection permit be issued or shall any other such final action occur unless and until an individual on-site sewage disposal system has been specifically approved for the premises by the State Health Officer or his duly authorized representative.
- Prior to the issuance of a sewerage system inspection permit for any residential mobile home, permanent building or structure, the Parish shall inspect the premises to determine if the plumbing fixtures are properly connected to an individual on-site sewage disposal system. The DES shall inspect individual on-site sewage disposal systems to determine that said systems are not causing an apparent health or environmental problem prior to the issuance of any sewerage system inspection permit for the connection or transfer of electrical power service.

- Except for existing mobile homes and permanent building or structures exempt from the requirements of this Article outlined in Section 21-403.00(C), no sewerage system shall be used or placed in operation without approval in the form of a sewerage system permit issued by the State Health Officer or his duly authorized representative. For the purposes of this Article, a new sewerage system permit shall be required upon the initial installation of an individual on-site sewage disposal system. Each time the occupancy, connection or transfer of electrical power service changes, an inspection of the individual on-site sewage disposal system and the issuance of a sewerage system inspection permit by the DES shall be required.
- No electrical power utility company licensed to do or doing business in the Parish shall install or connect permanent electrical service to any mobile home or permanent building or structure until a sewerage system inspection permit has been issued. No electrical power utility company licensed to do or doing business in the Parish shall install or connect temporary electrical service to any mobile home or permanent building or structure unless a work authorization has been issued by the Parish.
- If an electrical service connection is made absent any authorization by the Parish, the Parish shall provide written notification to the appropriate electrical power utility company to terminate electrical service. The electrical power company shall provide for termination of unauthorized electrical service within 48 hours of receiving notification from the Parish. If no or insufficient action is taken after proper notification, the Parish shall take any and all steps which it is empowered to take pursuant to La. R.S. 33:4064.1, et. seq., and the St. Tammany Parish Code of Ordinances in order to require compliance with this Article.
- All persons who own or operate apartment complexes of four or more units and mobile home parks with four or more units shall be required

to obtain a sewerage system permit from the State Health Officer or his duly authorized representative verifying that the sewage treatment plant associated with the complex or mobile home park is an approved system and in compliance with all applicable provisions of the State Sanitary Code.

- All owners or operators of complexes or mobile home parks as defined in this Section shall apply to the St. Tammany Parish Health Unit for a sewerage system permit.
- For the purpose of convenience, the owner or operator of complexes or mobile home parks may acquire for the period of one year on rental property, an approved sewerage system permit. It shall be the duty of any of the aforementioned persons to obtain, make available and provide such approved sewerage system permit to the renter of the property. It shall also be the responsibility of any of the aforementioned persons to obtain renewal of such approved sewerage system permit each year thereafter.

2.2.5.2 St. Tammany Parish Flood Hazard Area Ordinance

Statutory Authorization

The Legislature of the State of Louisiana has in LSA R.S. 38:84 delegated the responsibility to local governmental units to adopt regulations designed to minimize flood losses.

Findings of Fact

(a) The flood hazard areas of the Parish are subject to periodic inundation which results in loss of life and property, health and safety hazards, disruption of commerce and governmental services, and extraordinary

public expenditures for flood protection and relief, all of which adversely affect the public health, safety and general welfare.

(b) These flood losses are created by the cumulative effect of obstructions in floodplains which cause an increase in flood heights and velocities, and by the occupancy of flood hazard areas by uses vulnerable to floods and hazardous to other lands because they are inadequately elevated, flood proofed, or otherwise protected from flood damage.

Drainage and Paving Plan (Commercial, Industrial, Institutional and Certain Multi-Family Developments)

The purpose and intent of this section is to require a drainage and paving plan to be stamped and certified by a Licensed Louisiana State Registered Engineer for construction of commercial, industrial, institutional and certain multi-family developments, with the goal of improving pre-development runoff and reducing post-development runoff based on a minimum twenty-five (25) year storm event.

1. All commercial, industrial, institutional and multi-family development for town houses, apartments, condominiums and nursing home uses that require a building permit shall submit drainage and paving plan with the permit application. Requirements are set forth in below in Sec. 7-051.00. Said plan shall be forwarded to the Parish Engineer for review and approval before the issuance of a building permit.
2. It shall be the responsibility of the developer and design engineer to create a site development plan that will complement the drainage and paving plan utilizing site design criteria so as to result in the reduction of runoff from post-development.

3. The drainage and paving plan shall be stamped and certified by a Licensed Louisiana State Registered Engineer and shall meet the following criteria:
   (a) Parcels 0-2 acres in size shall be required to reduce pre-development peak runoff by at least 10% for a twenty-five (25) year storm event, with on-site detention ponds optional.
   (b) Parcels 2-5 acres in size shall be required to reduce pre-development peak water runoff by at least 15% for a twenty-five (25) year storm event, with on-site detention ponds required.
   (c) Parcels 5 acres and larger shall meet all drainage requirements for Subdivisions established by Subdivision Regulatory Ordinance No. 499, including a reduction of pre-development peak runoff by at least 25% for a one hundred (100) year storm event with on-site detention ponds required.
   (d) Whenever a parcel that is greater than five (5) acres is proposed to be developed in phases, or subdivided through the minor subdivision process, where any proposed phase or lot is less than five (5) acres, such development shall meet the requirements of subparagraph (c) immediately herein above and the applicable provisions of Section 40-061.01. The drainage and paving plan must address drainage in terms of the development of the entire parcel, not just the phase currently being proposed to be developed, taking into consideration all of the regulations of the zoning district designation of the property that could be pertinent to drainage, including maximum net density permitted, minimum area regulations, maximum lot coverage, and off street parking and loading requirements. (Ord. No. 10-2275AA, adopted 06/03/2010)
4. A combination of detention methods may be utilized to meet the criteria as established above. Off-site detention facilities may be utilized if approved by the Parish Engineer.

5. Developments located within the boundaries of Gravity Drainage District No. 5 shall also submit their drainage and paving plans to the District at the time permit application is made to the Parish. A building permit shall not be issued until the Drainage District has had an opportunity to review and make comment on the proposed plans to the Parish Engineer. All costs associated with the review of the plans by the Parish and Drainage District shall be assessed to the developer. The Parish Engineer shall have final authority on approval of the permit application.
6. Developments located within the boundaries of Sub-Drainage District No. 1 of Gravity Drainage District No. 3 shall also submit their drainage and paving plans to the Sub-District at the time permit application is made to the Parish. A building permit shall not be issued until the Sub-Drainage District has had an opportunity to review and make comment on the proposed plans to the Parish Engineer. All costs associated with the review of the plans by the Parish and Sub-Drainage District shall be assessed to the developer. The Parish Engineer shall have final authority on approval of the permit application.

Use of Fill Materials Prohibited

A. ADVERSE DRAINAGE IMPACT: It shall be prohibited to place fill or construct improvements on any parcel of property so as to cause adverse drainage impacts on any adjacent parcel.

B. PLACEMENT OF FILL MATERIAL:
   1. Definitions:
      (a) Net Fill: For purposes of this ordinance, “net fill” is defined as the placement of any fill material that results in any increase in the surface elevation of property from its natural or pre-development state.

(b) Critical Drainage Area: A critical drainage area is an area determined by the St. Tammany Parish Department of Engineering, after careful consideration of the available data, to be of critical importance for its role in the conveyance, moderation or storage of storm water. Areas within this designation include, but are not limited to, the following:

a. Areas anticipated to be inundated by a 100-year storm event, including areas adjacent to streams, upland areas, and areas of isolated or permanent flooding.

b. Areas of concentrated storm water flow, including but not limited to concentrated sheet flow, channelized flow, and natural hydrologic features or channels of all types and sizes.

c. Any area designated by FEMA as Flood Hazard Area A, V, or the equivalent, indicating inundation during a 100-year event.

d. Areas included within wetlands as defined by the 1987 U.S. Army Corps of Engineers Wetland Delineation Manual.

e. Those areas that are designated as a Critical Drainage Area on the most current Critical Drainage Area Map that is on file in the office of the St. Tammany Parish Department of Engineering.

An Area of special concern is an area that is experiencing development without an approved hydrological plan for the area and, although it may not be located within a critical drainage area, has been determined by the St. Tammany Parish Department of Engineering, after careful consideration of the available data, to be an area that is particularly susceptible to adverse drainage and flooding impacts that are likely to result from continued

development and fill, necessitating the application of specific fill and building regulations to address those impacts.

2. Net fill prohibited:

(a) Net fill shall be strictly prohibited in any Critical Drainage Area and on any lot or parcel ninety (90) feet or less in width, except with an approved development plan or with the express written consent of the Department of Engineering. The procedures and guidelines outlined herein shall apply to any request to place any fill in a Critical Drainage Area or on any lot or parcel ninety (90) feet or less in width**.**

(b) A lot or parcel of property shall be deemed to be located in a critical drainage area when any part thereof is located within a critical drainage area. Net fill shall not be placed on any part of such property, except with an approved development plan or with the express written consent of the Department of Engineering.

3. Jurisdictional Wetlands:

All fill/excavation activities within jurisdictional wetlands shall secure all necessary permits from the U.S. Army Corps of Engineers and any other relevant local, state or federal agencies before such activities are commenced.

4. General Residential Fill Standards:

The placement of fill material on any lot or parcel located within any Critical Drainage Area shall be permitted only after a development plan has been submitted and approved by the Department of Engineering. In the event that the Department of Engineering determines that fill work is permitted on the particular parcel, the fill work must comply with the following specific standards:

a. In some cases, subject to the discretion of the Department of Engineering, excavation of existing soil and its replacement with fill is permissible at the site provided it can be demonstrated to have no increase in the natural ground elevation and no net impact on the function of the Critical Drainage Area.

b. Fill shall be limited to the roof shed area of the proposed primary structure and access to the site and shall not exceed that which is necessary to prepare an adequate building footprint.

c. Site improvements (roads, structures, fill, etc.) shall not impede natural drainage pathways or parish road or drainage easements, servitudes, or rights-of-way.

d. Fill for driveways must not exceed 6 inches above natural ground elevation except where fill is part of the foundation for the main residence, carport, or garage. Fill may also be placed to soften the transition between elevations to a slope not less than four horizontal feet to every one vertical foot.

e. Fill may be authorized by the Department of Engineering in those cases where, due to the size and location of the parcel of property, on-site or off-site mitigation can be provided and the Department of Engineering also determines that there will be no loss of flood plain storage, no loss of stream flow capacity and the applicant demonstrates that no adverse impacts will occur to adjacent properties, to other properties within the subject watershed, and to the function of the Critical Drainage Area.

5. Lots Ninety (90) Feet or Less in Width:

The placement of fill material on any lot or parcel ninety (90) feet or less in width shall be permitted only when a development plan has been submitted and approved by the Department of Engineering regardless of its location or critical drainage area status. If it is

located in a critical drainage area, the provisions of this section governing fill in a critical drainage area apply. If not in a critical drainage area, the fill work proposed must comply with the following standards:

a. Fill shall be limited to the roof-shed area of the lot or parcel's primary structure and shall not exceed the volume required to prepare an adequate building footprint.

b. A concrete slab shall be permitted under the primary structure provided that the finished surface or footing does not exceed an average of 24 inches above natural ground grade. Fill for a slab with a finished surface less than 24 inches above natural ground shall taper out from the slab at a slope of two horizontal feet for one vertical foot.

c. Construction shall be accomplished using pier or piling construction according to applicable building codes for finished elevations above 24 inches above natural ground.

d. Site improvements shall not impede natural drainage pathways or parish road or drainage easements, servitudes, or rights-of-way.

e. There shall be no net change in the average elevation of the natural grade of the lot or parcel outside of the roof-shed area of the primary structure.

f. Fill for driveways must not exceed 12 inches above natural ground grade except were fill is part of the transition from the foundation for the primary structure, carport, or garage. Fill may also be placed adjacent to the driveway to soften the transition between elevations to a slope not steeper than four horizontal feet for every one vertical foot.

g. The placement of fill may not encroach into the required side yard setbacks, except as otherwise permitted in this ordinance.

h. Fill for non-contiguous landscaping areas within the front and rear yards resulting in the finished ground elevation up to an average of 6 inches above natural ground for each such area is permitted, provided that an equal volume of fill is removed from the lot.

6. Non-residential Standards

In cases of commercial, industrial, or institutional development on any lot or parcel of property that has any part thereof located within a Critical Drainage Area, the placement of fill on such lot or parcel may be permitted, in the discretion of the Department of Engineering, provided that:

a. Soil material in a volume equal to the fill material proposed to be placed on the property is excavated and removed from the property, such that the flood storage capacity of the property is maintained for a 100-year frequency flood event; or

b. Off-site mitigation will be provided, and the Department of Engineering also determines that there will be no loss of flood plain storage and no loss of stream flow capacity; and

c. The applicant can demonstrate that no adverse impacts will occur to adjacent properties, to other properties within the subject watershed, and to the function of the Critical Drainage Area; and

d. The proposed development complies with all other applicable drainage regulations.

Fill Materials Prohibited Within 200 Feet of Drainage Waterway

The St. Tammany Police Jury provides for the requirement that any development, including a residence located within 200 feet from the middle of a drainage waterway in Ward 8, excluding Police Jury District 6, as further specified must utilize pilings, piers or other similar methods to elevate the structure to the appropriate base flood elevation height as determined by FEMA instead of the use of fill.

A. No fill should be allowed within 200 feet which is not a part of the building envelope or driveway.

B. Fill not to exceed an average of 18 inches may be allowed to level the building envelope.

C. Piers or similar methods allowing the sheet flow of water under the structure should be utilized to meet the required flood zone elevation.

The specified drainage ways are as follows:

1. W-15 Canal
2. Gum Bayou
3. W-14 Canal
4. Reine Canal
5. Eddins Canal
6. Poor Boy Canal
7. Exemptions areas or projects from the above specified drainage ways.

D. Excluding 1000 feet on the north side and 1000 feet on the south side of Gause Boulevard - W-15 Canal.

E. Excluding the FEMA Hazard Mitigation Grant Program - Daney Street Project - W-14 Canal.

F. Any other authorized St. Tammany Parish Police Jury drainage project.

Coastal High-Hazard Areas

Located within the areas of special flood hazard established in Division 3, Section 7-022.00, are areas designated as Coastal High Hazard Areas (Zones V1-30, VE and/or V). These areas have special flood hazards associated with high velocity waters from tidal surges and hurricane wave wash; therefore, in addition to meeting all provisions outlined in this Ordinance, the following provisions must also apply:

1. Obtain the elevation (in relation to mean sea level) of the bottom of the lowest structural member of the lowest floor (excluding pilings and columns) of all new substantially improved structures, and whether or not such structures contain a basement. The Floodplain Administrator shall maintain a record of all such information.

2. All new construction shall be located landward of the reach of mean high tide.

3. All new construction and substantial improvements shall be elevated on pilings and columns so that:

(i) The bottom of the lowest horizontal structural member of the lowest floor (excluding the pilings or columns) is elevated to or above the base flood level;

(ii) The pile or column foundation and structure attached thereto is anchored to resist flotation, collapse and lateral movement due to the effects of wind and water loads acting simultaneously on all building components. Wind and water loading values shall each have a one (1%) percent chance of being equaled or exceeded in any given year (100-year mean recurrence interval);

(iii) A registered professional engineer or architect shall develop or review the structural design, specification and plans for the

construction and shall certify that the design and methods of construction to be used are in accordance with accepted standards of practice for meeting the provisions of this paragraph (3)(i), (ii) and (iii) of this Section.

4. Provide that all new construction and substantial improvements have the space below the lowest floor either free of obstruction or constructed with non-supporting breakaway walls, open wood lattice work, or insect screening intended to collapse under wind and water loads without causing collapse, displacement or other structural damage to the elevated portion of the building or supporting foundation system.

For the purpose of this Section, a breakaway wall shall have a design safe loading resistance of not less than ten (10 lbs.) and nor more than twenty (20 lbs.) pounds per square foot. Use of breakaway walls which exceed a design safe loading resistance of twenty (20 lbs.) pounds per square foot (either by design or when so required by local or State codes) may be permitted only if a registered professional engineer or architect certifies that the designs proposed meet the following conditions:

(i) Breakaway wall collapse shall result from a water load less than that which would occur during the base flood; and

(ii) The elevated portion of the building and supporting foundation system shall not be subject to collapse, displacement or other structural damage due to the effects of wind and water loads acting simultaneously on all building components (structural and nonstructural). Maximum wind and water loading values to be used in this determination shall each have one (1%) percent chance of being equaled or exceeded in any given year (100-year mean recurrence interval).

5. If breakaway walls are utilized, such enclosed space shall be usable solely for parking of vehicles, building access or storage. Such space shall not be used for human habitation.
6. Prohibit the use of fill for structural support of buildings.
7. Prohibit man-made alteration of sand dunes and mangrove stands which would increase potential flood damage.
8. Any alteration, repair, reconstruction or improvements to a structure started after the enactment of this Ordinance shall not enclose the space below the lowest floor unless breakaway walls are used as provided.
9. Prior to construction, plans for any structure that will have breakaway walls must be submitted to the Floodplain Administrator for approval.

3.0 MODEL SELECTION

As part of the scope of work the team was tasked with identifying the best modeling tool(s) to evaluate options for protecting and enhancing water quality. The project team, upon a thorough review and analysis of various available models determined the LA-QUAL (Model Version 9.05) to be an appropriate basis for modeling current and projected surface water quality impacts. This model was developed by the LDEQ, specifically for use on Louisiana streams, and therefore includes various parameters and constituent values suitable for Louisiana waters. It has mechanisms for incorporating Louisiana specific reaeration equations, tidal fluctuations, dispersion, and algal impacts. The model can also accommodate sediment oxygen demand (SOD), a nonpoint and point source residual that is typically a constituent of concern in Louisiana and may be the dominant constituent in warm shallow waters. Additionally, while the primary emphasis is expected to be modeling DO and related constituents, LA-QUAL has the ability to model other constituents should the need arise. It is a flexible model which can range from “simple” to “complex” depending on the goal of the modeling and the amount and type of data available.

3.1 Approach

In order to evaluate the long-term benefits of the projects to be proposed by this study, the project team initially compared modeling results of existing conditions to modeling of projected future conditions in the parish to identify areas of concern. Once areas of concern were identified, additional models runs were carried out to zero-in on problem areas and determine where proposed watershed management projects would be the most cost-effective. Therefore, it was critical that the selected model have the capability to accurately reflect and model the types of waterways found in the Parish.

In order to provide the Parish with a prioritized list of targeted watershed management projects that will lead to the greatest measurable improvements in water quality in Parish water bodies, the project team recommended modeling for various DO scenarios. There are many existing surface water quality models capable of modeling oxygen demanding parameters. However, based on experience of the project team, the two most suitable models considered for this application are QUAL2E and LA-QUAL, which are discussed in detail below.

3.2 Models for Surface Water Quality

QUAL2E and LA-QUAL were evaluated for purposes of this study. The models have a shared development lineage. As a result, the two models use comparable approaches to simulate constituent fate and transport within a defined watershed.

QUAL2E: The history of both models begins with the QUAL-I model developed by the Texas Water Development Board in 1970 to 1971. In June, 1972, QUAL-I was modified for application to the Chattahoochee-Flint River, the Upper Mississippi River, the Iowa-Cedar River, and the Santee River, which became known as QUAL-II. Over the next three years, several versions of the model evolved in response to specific client needs. In March, 1976, further modifications

were made to combine the best features of the existing versions of QUAL-II into a single model which became known as QUALII/SEMCOG version. Between 1978 and 1984, the Texas Department of Water Resources modified QUAL-II for application to the Houston Ship Channel estuarine system. Numerous modifications were made to enable modeling this very large and complex system including the addition of tidal dispersion, lower boundary conditions, nitrification inhibition, sensitivity analysis capability, branching tributaries, and various input/output changes. This model became known as QUAL-TX and was subsequently applied to streams throughout the State of Texas. In 1985, EPA’s Center for Water Quality Modeling sponsored a review of other versions of QUAL-II and incorporated certain features of these versions into a program called the Enhanced Stream Water Quality Model (QUAL2E). In 1987, further enhancements were added to QUAL2E. In 2009, QUAL2K was released as a modernized version of QUAL2E.

QUAL2E can simulate up to 15 water quality constituents in any combination and is applicable to well-mixed dendritic stream systems. The model utilizes calculated stream flow rate, velocity, cross-sectional area, and water depth as the basis for determining heat and mass transfer. The model considers material flux, transformation of nutrients, algal production, benthic and carbonaceous demand, atmospheric reaeration, and the effects of these process on DO balance. QUAL2E can operate as either a steady-state model or a quasi-dynamic model. As a steady-state model it can be used to study the impact of wasteloads (magnitude, quality, and location) on instream water quality.

LA-QUAL: In 1999, the LDEQ and Wiland Consulting, Inc. developed the original version of LA-QUAL based on QUAL-TX Version 3.4. LA-QUAL is a steady-state, one-dimensional water quality model, developed by the Watershed Support Division of LDEQ to provide the modeling basis for evaluating TMDLs in the state of Louisiana. Version 9.05, developed in 2010, is dimensioned for a maximum of 200 reaches, 100 headwaters, 300 waste loads, and 3000 elements. Program

modifications specific to the needs of Louisiana and the LDEQ were made during development, including:

- The temperature correction constants for re-aeration, Biochemical Oxygen Demand (BOD) Decay, nonconservative material (NCM) Decay, Benthal Decay, and Organic Nitrogen Decay were changed to Louisiana default values.
- An option was included to allow hydraulic calculations to be based on width/depth input in addition to velocity/depth input to better address Louisiana waterways.
- Modifications were made allowing settling rates to be input on a per day basis in addition to a settling velocity basis.
- New reaeration equations were added that more closely fit Louisiana conditions, and the NCM oxygen uptake rate default was modified to the Louisiana default value.
- Additional modifications are detailed in the LA-QUAL FOR WINDOWS USER’S MANUAL, available on the LDEQ website.

Numerous other modifications were made to LA-QUAL as the model was revised to more accurately reflect conditions present in Louisiana’s slower-moving streams and bayous. The current version, v. 9.05, is superior to QUAL2E for Louisiana applications, especially the target area of lower St. Tammany Parish typically exhibiting lower velocity systems and tidally-influenced ecosystems with low-gradient, muddy-bottom channels and silty, organic-laden waters.

3.3 Modeling Options and Program Constants

The receiving water, identified existing wasteloads, and projected wasteloads after improvements must be qualitatively and quantitatively evaluated in order to determine the expected pollutant reductions of proposed projects. This section describes the various data input options in LA-QUAL and addresses Louisiana specific rate constants, equations, and coefficients that are available.

3.3.1 Modeling Data Requirements – Headwaters/Stream Conditions

Water quality constituents that may be modeled in LA-QUAL include temperature, salinity, conservative materials, DO, BOD, nitrogen demand, phosphorus, phytoplankton or chlorophyll a, periphyton or macrophytes, and NCM. Initial concentrations must be set for all modeled water quality constituents. These data establish initial conditions for the stream system and are required. Initial conditions are specified for the head of each reach since the model interpolates initial conditions from the head of one reach to the head of the next reach.

- ***Temperature***
  Temperature is used in calculating DO saturation concentrations and reaction rates. Temperature does not have to be simulated in order for the temperature effects on reactions to be included in the model. Since Temperature was not simulated by LDEQ in the production of the TMDLs, it has not been simulated in these models.
- ***Salinity***
  Salinity is used in calculating DO saturation concentrations. Salinity can be either simulated or specified in the initial conditions.
- ***Conservative Materials***
  Any conservative constituent may be simulated (chlorides, TDS, sulfates, conductivity, etc.). The constituents to be simulated are specified in the

model. LA-QUAL allows two separate conservative materials to be modeled in a simulation.

- ***DO and BOD***
  LA-QUAL simulates DO levels for each stream reach entered. The initial DO conditions are used as a starting point in the iterative solution technique for oxygen dependent rates.

  The model accommodates both short-term and long-term BOD. BOD may be simulated as either BOD_5 or BODu by adjustment of the BOD oxygen uptake rates.
- ***Nitrogen Series and Nitrogenous BOD***
  Nitrogen may be simulated either through the nitrogen series or through Nitrogenous BOD (NBOD)/NBOD_Oxy depending on the data available. The nitrogen series simulation addresses organic nitrogen, ammonia nitrogen, and nitrate nitrogen, whereas the NBOD simulation will focus on NBOD as a whole.
- ***Phosphorus Series***

  LA-QUAL will simulate the phosphorus series as organic and inorganic phosphorus. If ammonia nitrogen, nitrate nitrogen, and phosphorus are being simulated, the initial conditions are used as a starting point in the iterative solution techniques for phytoplankton and periphyton growth rates.
- ***Phytoplankton or Chlorophyll a***

  The phytoplankton simulation will constitute floating algae only. If phytoplankton are not simulated, they may be specified in the Initial Conditions to account for net productivity in oxygen balance, net loss of nitrogen and phosphorus, and to adjust for effective concentrations of BOD, organic nitrogen, and organic phosphorus. The initial phytoplankton conditions are used in calculating net oxygen production due to

photosynthesis. If phytoplankton are being simulated, the initial conditions are used as a starting point in the iterative solution technique.

- ***Periphyton or Macrophytes***

  Similar to phytoplankton, periphyton or macrophytes may be either simulated or specified in the initial conditions to account for net primary productivity. Periphyton and macrphytes are defined as attached algae. The initial periphyton conditions are used in calculating net oxygen production due to photosynthesis. If periphyton are being simulated, the initial conditions are used in calculating periphyton growth rates in the iterative solution technique
- ***Fecal Coliform***

  LA-QUAL is capable of simulating fecal coliform loading in areas of concern.
- ***Nonconservative Materials***

  LA-QUAL is capable of simulating any NCM that may be required. The constituent and units are user defined.

3.3.2 Modeling Data Requirements - Waste Loads

When DO, BOD, or nitrogen is simulated, the model requires data associated with potential waste loads that may enter the receiving water body. LA-QUAL is designed to incorporate waste loads from both point sources and non-point sources. The data needs for these respective sources are outlined below. The program is dimensioned for a maximum of 300 point source waste loads.

- ***Point Source Data***
  LA-QUAL can include specific waste load data for any or all of the constituents identified in Section 4.1. In order to effectively model point source waste load impacts, LA-QUAL requires the location (reach) and

projected flow of the waste load, as well as concentrations for the parameters to be modeled.

- ***Non-point Source Data***
  LA-QUAL has the capability to account for nonpoint source loads not associated with flows on a reach by reach basis. The model can simulate short-term and long-term BOD, DO, organic nitrogen or NBOD, organic phosphorus, coliforms, and/or NCM loading derived from non-point sources within the identified reach. The simulation requires data input for those non-point source constituents to be modeled.

3.3.3 Advective Hydraulic Coefficients

LA-QUAL includes several Louisiana specific program constants that can be modified as needed to accommodate site-specific conditions.

- ***Hydraulic Calculation Method***

  For purposes of estimating in-stream mixing, the hydraulic calculation method is significant. LA-QUAL includes a hydraulic calculation method that utilizes both stream width and depth in addition to the standard velocity and depth calculation. The width and depth calculation is considered the Louisiana default. This flexibility allows for more accurate simulation of Louisiana's characteristic slow moving streams. If a depth less than one centimeter is calculated, the depth will be set to one centimeter. Manning's "n" is then used to compute advective dispersion and to compute reaeration rates when the Thackston-Krenkel or Tsivoglou-Neal option is specified in the Reaeration, SOD, and BOD Coefficients.
- ***KL Minimum***

  LA-QUAL incorporates a Louisiana-specific KL Minimum value of 0.7 meters/day as a default value. KL Minimum is used to calculate the minimum reaeration rate.

- ***NCM Oxygen Uptake Rate***

  LA-QUAL includes a Louisiana-specific NCM Oxygen Uptake Rate of 1.0 as a default value. This line describes the oxygen uptake rate per unit of nonconservative material decayed and is used in the DO simulation. The default assumes that NCM decay does not consume oxygen.

3.3.4 Reaeration, SOD, and BOD Coefficients

These data set the reaeration, SOD, and BOD coefficients and are required when BOD or DO is being simulated. Twenty options are currently available for reaeration coefficient calculations, including a Louisiana Equation developed by LDEQ.

3.4 Conclusions

In summary, the project team has determined that LA-QUAL is more appropriate for application in the St. Tammany Watershed Management Study. LA-QUAL is a highly flexible model, with graphic output superior to comparable models. Graphical modeling results are typically more easily understood and facilitate stakeholder involvement. As a Louisiana-specific model, it has built in defaults suitable for Louisiana streams and mechanisms for incorporating dynamics unique to Louisiana waters. Additionally, LA-QUAL has an internal sensitivity analysis which is particularly useful in interpreting modeling results and assuring the model accurately depicts the state of the water body.

Furthermore, the model was specifically developed for Louisiana TMDL modeling and was used by LDEQ to develop all TMDLs in the Lake Pontchartrain Water Quality Management Basin which potentially simplifies the revision process should TMDL revisions be identified during the study. LA-QUAL is the model most suited to the St. Tammany Watershed Management Study.

4.0 MODEL APPLICATION

The project team utilized existing LDEQ water quality models where available to set up and apply the model representation of the Parish study area. The modeling tool(s) were set up and applied for existing and projected conditions using the LA-QUAL model.

DO models are developed in 3 stages. Stage 1 encompasses the data collection activities. These activities may include gathering such information as stream cross sections, stream flow, stream water chemistry, stream temperature and DO at various locations on the stream, location of the stream centerline and the boundaries of the watershed which drains into the stream, and other physical and chemical factors which are associated with the stream. Additional data gathering activities include gathering all available information on each facility which discharges pollutants in to the stream, gathering all available stream water quality chemistry and flow data from other agencies and groups, land use and crop rotation data where available, and any other information which may have some influence on the quality of the waters within the watershed. During Stage 1, any data available from reference or least impacted streams which can be used to gauge the relative health of the watershed is also collected.

Stage 2 involves organizing all of this data into one or more useable forms from which the input data required by the model can be obtained or derived. Water quality samples, field measurements, and historical data must be analyzed and statistically evaluated in order to determine a set of conditions which have actually been measured in the watershed. The findings are then input to the model. Best professional judgment (BPJ) is used to determine initial estimates for parameters which were not or could not be measured in the field. These estimated variables are adjusted in sequential runs of the model until the model reproduces the field conditions which were measured. In other words, the model produces a value of DO, or other parameter which matches the measured value within an acceptable margin of error at the locations along the stream where the measurements were actually made. When this happens, the model is said to be calibrated to the actual stream conditions. At this point, the model should confirm that there is an impairment and give some indications of the

causes of the impairment. If a second set of measurements is available for slightly different conditions, the calibrated model is run with these conditions to see if the calibration holds true for both sets of data. When this happens, the model is said to be verified.

Stage 3 covers the projection modeling. The critical conditions of flow and temperature are determined for the water body and the updated pollutant discharge loads from the identified projects are determined. These conditions are then inserted into the model. At this point, the loadings from the point and nonpoint sources (increased by an acceptable margin of safety) were run at the end of Stage 3, a projection model is produced which shows the improvement in water quality from the reductions achieved by the identified project.

4.1 Existing Conditions Models

The project team used existing data to develop the best representation of current watershed and water body conditions for each watershed in the study area. Existing condition input parameters were compared to the available data. Each model was calibrated to the available existing conditions data. To calibrate the model, parameters were compared to available historical flow/stage and water quality data to validate the model results, or to support modification of input parameters to achieve better agreement between the model results and the historical flow and water quality data. Several iterations were conducted for each existing condition model. Existing conditions models were developed for the following watersheds: W-14 Canal, Bayou Castine, Bayou Chinchuba, the Abita River, the Upper Tchefuncte River, and the Bogue Falaya River. Existing Wasteload Allocation Models were used to develop the models for the W14 Canal and Bayou Chinchuba. Existing LDEQ data collected during the Lower Tchefuncte River survey was used to develop the models for the Bogue Falaya, Abita River, and Upper Tchefuncte River. Bayou Cane was used as a reference stream to develop the model for Bayou Castine.

LDEQ existing conditions or calibration models were updated for Bayou Vincent, Bayou Bonfouca, Bayou Liberty and Bayou Paquet, Bayou Lacombe, Big Branch Bayou, Cypress Bayou, Cane Bayou the Lower Tchefuncte River, Bayou DeZaire, Ponchitolawa Creek, and Bayou Tete L'Ours. Below are general descriptions of the data types input into the model. Any changes in data will be noted in the water body sections that follow.

General Input Data Documentation

Model Schematics and Maps

GIS maps of the stream and subsegment showing river kilometers, the locations of survey stations or sampling locations, the reach/element design, and the locations of the tributaries are also included in for each water body.

Model Options

DO, BOD_5, and Ammonia were modeled during the calibration process. However, only DO was evaluated for calibration purposes.

Program Constants

A minimum KL value of 0.7 m/day was used. This value is a conversion from 2.3 ft/day which is a Louisiana standard minimum. The K2 maximum was set to 25 1/day at 20 degrees Celsius (°C), which is EPA Policy in the absence of a measured value. The inhibition control value was set to option 3 which for all rates but SOD. The water column DO demand is assumed to come primarily from facultative bacteria under aerobic, anaerobic, anoxic conditions and SOD is not influenced by modeled DO levels in the upper water column.

The hydraulic calculation method was set to option 2 or "widths and depths." This was done because the low slopes in these water bodies cause a substantial amount of water to be present in some reaches during critical flow. Using a modified

Leopold relationship allows the model to predict a more accurate depth and width during low flow.

Two options are available for the settling rate units. Option 1 is to be used when the model utilizes a settling velocity. This option essentially ties the settling rate to the stream depth. Option 2 is to be used when the model utilizes a settling rate. Option 2 states that a defined percentage of the constituent will settle out of the water column in one day. Option 2 was used for these water bodies. Dispersion equation 3 was used to account for all modes of transport.

The Tidal Period, Period of Tidal Rise, and Tide Height were calculated values from the LDEQ model.

Temperature Correction of Kinetics

The temperature correction factors are used to correct the rate coefficients in the source/sink terms for the other water quality variables. These coefficients are input at 20 °C and are then corrected to temperature using the following equation:

XT = X 20 * Theta (T-20)

Where:

XT = the value of the coefficient at the local temperature T in °C

X20 = the value of the coefficient at the standard temperature at 20 °C

Theta = an empirical constant for each reaction coefficient

In the absence of specified values for temperature correction of kinetics, the model uses default values. A complete listing of these values can be found in the *LA-QUAL for Windows User's Manual* (LDEQ, 2010). For this model all temperature correction values used were LA-QUAL default values.

Reach Identification Data

A diagram of the modeled area is presented in the water body sections that follow. The GIS Map shows the reach/element design and the location of all modeled tributaries and main stem.

Advective Hydraulic Coefficients

The Leopold equations are used to scale the velocity (U), width (W), and depth (H) of a free flowing stream from a lower value of flow to a higher value or from a higher value of flow to a lower value. Note that the exponents add to one and the coefficients multiply to 1. This is known as the rule of ones. This method is not appropriate for streams which are not dependent entirely on flow such as water bodies where flow approaches zero, but contain some depth.

$U = aQ^b$ $H = cQ^d$ $W = eQ^f$

$b + d + f = 1$ $(a)(c)(e) = 1$

The Leopold equations presume that the water surface width and average depth of a stream are zero at zero flow. Most Louisiana streams retain a significant width and depth at zero flow. The equations have therefore been modified to allow for a zero flow width and depth. The rule of ones does not apply to the modified equations. The modified Leopold equations are:

$W = aQ^b + c$ $H = dQ^e + f$ $U = gQ^h$

For the tidal reaches, the widths and depths were assumed to be independent of flow and relatively constant. Consequently, the modified Leopold coefficients and exponents were not calculated for the tidal reaches.

Dispersive Hydraulic Coefficients

LDEQ conducted dye studies for the Lower Tchefuncte River, Ponchitolawa Creek, Bayou Cane, Bayou Liberty, Bayou Lacombe, and Bayou Bonfouca. A dispersion value was calculated for each run using the dye concentration measurements.

To take into consideration all modes of transport, equation 3 (E = aDbQcVMd) in LA-QUAL was used. Using b=5/6, c=0, and d=1 took into account all modes of transport in the manner of the Tracor and QUAL2E equations. The value for coefficient ─a was varied during calibration until the measured dispersion value was obtained.

Ultimately the dispersion rates were calibrated to chlorides, conductivity, and salinity using the dispersion equation of Tracor (Rates & Constants, pg. 40).

Initial Conditions

The initial conditions are used to reduce the number of iterations required by the model. The values required for this model were temperature and DO by reach. The input values came from the survey station(s) located closest to the reach.

When the continuous monitoring DO data for at least one diurnal cycle is available and the diurnal variation is less than 2 mg/L, it is standard practice for LDEQ to calibrate to the mean DO. The standard LDEQ practice at some sites for this is as follows:

1. Calibrate without simulating algal production as follows:

Range of DO cycle	Calibrate
0 – 2 mg/l	Mean DO for one or more full cycles
2 – 9 mg/l	One mg/l over minimum DO
>9 mg/l	0.11*DO cycle over minimum DO

These practices were followed for these models.

Chlorophyll a values were also used since the mild effects of algae on the DO concentrations were also simulated with this model. The initial conditions are only a starting point for the model, therefore, all values were set to the measured and interpolated values.

Reaeration Rates

The applicability of the various reaeration equations was examined and utilized based upon appropriate hydrology of the reach. Several equations were used in the models for the water bodies. The equations are stated below.

O'Conner-Dobbins Equation (Rates & Constants, 1985)

$$K2(1/day) = \frac{1.923\ V^{0.273}}{D^{0.894}}$$

where: V = stream velocity (meters)
D = stream depth (meters)

Texas Equation (Rates & Constants, 1985)

$$K2 = \frac{0.664\ (1 + 21.52\ V)}{D}$$

where: V = stream velocity
D = stream depth

Mattingly Equation (Bowie, 1985)

$$\frac{k2}{(k2)o} - 1 = 0.2395\ Vw^{1.643}$$

where: k2=reaeration coefficient under windy conditions, 1/day
(k2)o=reaeration coefficient without wind, 1/day
Vw=wind velocity in the free stream above the boundary layer near the water surface, m/s

Louisiana Equation (Smythe, 1993, 1999 and Waldon 1993)

$$K2 = \frac{0.664\ (1 + 21.52\ V)}{D}$$

where: V = stream velocity

D = stream depth

Equation 20

$$K2 = \frac{a}{D}$$

Sediment Oxygen Demand

The SOD values were achieved through calibration. The values were considered to be reasonable for these water bodies.

Carbonaceous BOD Decay and Settling Rates

Settling rates were achieved through calibration. Decay rates were calculated values based on in-stream measurements or achieved through calibration. See Water Body Specific Section.

Nitrogenous BOD Decay and Settling Rates

Settling rates were achieved through calibration. Decay rates were calculated values based on in-stream measurements or achieved through calibration. See Water Body Specific Section.

Incremental Conditions

Incremental flow was used in the water bodies for calibration of advective flow.

Nonpoint Sources

Nonpoint source loads which are not associated with a flow are input into this part of the model. These can be most easily understood as resuspended load from the bottom sediments and are modeled as SOD, CBOD, and NBOD loads. These values are achieved through calibration. The loads determined through calibration were reasonable for a water body with low slope and velocity and bed sediment composed primarily of silt and clay.

Headwaters

The headwater flows were assumed to be a minimal flow of 0.1 cfs as per the LTP with the exception of a few water bodies where a measured flow was obtained. The UCBOD and UNBOD loading from measured sites was used as loading for all headwaters.

Wasteloads

LDEQ's TEMPO database was used to determine the permitted discharges in the Parish. Additionally, 911 rooftop data was used to determine loads for individual homes in the Parish. All were included directly in the calibration and projection models. Loading for permitted facilities was determined using the permit limits and an estimated flow. Loadings for the individual homes was calculated using an estimated flow and estimated concentration value. See Section 2.1.2 for methodology. UCBOD was calculated as BOD_5*2.3. UNBOD is generally assumed to be 4.3*BOD_5/2. UNBOD by this method is so close to UCBOD that calibration assumed UNBOD = UCBOD. The default effluent DO was 2.0 which is consistent with LDEQ's *Louisiana Technical Procedures (LTP)* (LDEQ, 2012).

Boundary Conditions

Measured values were used for boundary conditions.

The General Input Documentation for each water body is included in **Tables 7** through **18** below. The Model Schematics and Maps for each water body are

included in **Figures 7** through **23**. The complete justification tables, calibration input, and output for each water body are included in **Appendix C**.

Table 7
Program Constants

Water Body	KL minimum (m/day)	K2 Maximum (1/day @ 20°C)	Inhibition Control Value	S Oxygen Dependence Threshold	SOD Maximum Rate (gm/m2-day)	Hydraulic Calculation Method	Settling Rates Units (1/day)	Dispersion Equation	Tidal Period (hours)	Tidal Rise (hours)	Tide Height (meters)	Ocean Exchange Ratio	Algae Oxygen Production (mg O/g chl-a/day)	Data Source
W 14 Canal	0.7	10	Option 3; all rates but SOD	2	10	Option 2; widths and depths	Option 2	3	25	12.5	0	N/A	N/A	The KL Minimum is Louisiana Standard Practice. The dispersion equation was used to account for all modes of transport. LTP default values were used for all other program constants.
Bayou Vincent	0.7	25	Option 3; all rates but SOD	1	50	Option 2; widths and depths	Option 2	3	19.75	10.5	0.1	N/A	N/A	The KL Minimum is Louisiana Standard Practice. EPA Policy was used in the absence of a measured value for K2 Maximum. The S Oxygen Dependence Threshold was determined through calibration. SOD Maximum was used to verify reasonableness of model values. The dispersion equation was used to account for all modes of transport. The tidal period, tidal rise, and tide height were calculated from the TMDL survey. *LTP* (LDEQ, 2012) default values were used for all other program constants.
Bayou Bonfouca	0.7	25	Option 3; all rates but SOD	1	50	Option 2; widths and depths	Option 2	3	19.75	10.5	0.1	N/A	N/A	The KL Minimum is Louisiana Standard Practice. EPA Policy was used in the absence of a measured value for K2 Maximum. The S Oxygen Dependence Threshold was determined through calibration. SOD Maximum was used to verify reasonableness of model values. The dispersion equation was used to account for

Table 7
Program Constants

Water Body	KL minimum (m/day)	K2 Maximum (1/day @ 20°C)	Inhibition Control Value	S Oxygen Dependence Threshold	SOD Maximum Rate (gm/m2-day)	Hydraulic Calculation Method	Settling Rates Units (1/day)	Dispersion Equation	Tidal Period (hours)	Tidal Rise (hours)	Tide Height (meters)	Ocean Exchange Ratio	Algae Oxygen Production (mg O/µg chl-a/day)	Data Source
														all modes of transport. The tidal period, tidal rise, and tide height were calculated from the TMDL survey. *LTP* (LDEQ, 2012) default values were used for all other program constants.
Bayou Liberty	0.7	25	Option 3; all rates but SOD	1	50	Option 2; widths and depths	Option 2	3	19.75	10.5	0.1	N/A	N/A	The KL Minimum is Louisiana Standard Practice. EPA Policy was used in the absence of a measured value for K2 Maximum. The S Oxygen Dependence Threshold was determined through calibration. SOD Maximum was used to verify reasonableness of model values. The dispersion equation was used to account for all modes of transport. The tidal period, tidal rise, and tide height were calculated from the TMDL survey. *LTP* (LDEQ, 2012) default values were used for all other program constants.
Bayou Lacombe	0.7	25	Option 3; all rates but SOD	N/A	N/A	Option 2; widths and depths	Option 2	1	25	12.5	0.152	1	0.05	The KL Minimum is Louisiana Standard Practice. Dispersion values were entered manually. The tidal rise is typical for Lake Pontchartrain stream and was verified by New Canal Station data. The tide height

Table 7
Program Constants

Water Body	KL minimum (m/day)	K2 Maximum (1/day @ 20°C)	Inhibition Control Value	S Oxygen Dependence Threshold	SOD Maximum Rate (gm/m2-day)	Hydraulic Calculation Method	Settling Rates Units (1/day)	Dispersion Equation	Tidal Period (hours)	Tidal Rise (hours)	Tide Height (meters)	Ocean Exchange Ratio	Algae Oxygen Production (mg O/µg chl-a/day)	Data Source
														accounts for dispersive/tidal exchange between the lower boundary and the stream. *LTP* (LDEQ, 2012) default values were used for all other program constants.
Big Branch Bayou	0.7	25	Option 3; all rates but SOD	N/A	N/A	Option 2; widths and depths	Option 2	1	25	12.5	0.152	1	0.05	The KL Minimum is Louisiana Standard Practice. Dispersion values were entered manually. The tidal rise is typical for Lake Pontchartrain stream and was verified by New Canal Station data. The tide height accounts for dispersive/tidal exchange between the lower boundary and the stream. *LTP* (LDEQ, 2012) default values were used for all other program constants.
Cypress Bayou	0.7	25	Option 3; all rates but SOD	N/A	N/A	Option 2; widths and depths	Option 2	1	25	12.5	0.152	1	0.05	The KL Minimum is Louisiana Standard Practice. Dispersion values were entered manually. The tidal rise is typical for Lake Pontchartrain stream and was verified by New Canal Station data. The tide height accounts for dispersive/tidal exchange between the lower boundary and the stream. *LTP* (LDEQ, 2012) default values were used for all other program constants.

Table 7
Program Constants

Water Body	KL minimum (m/day)	K2 Maximum (1/day @ 20°C)	Inhibition Control Value	S Oxygen Dependence Threshold	SOD Maximum Rate (gm/m2-day)	Hydraulic Calculation Method	Settling Rates Units (1/day)	Dispersion Equation	Tidal Period (hours)	Tidal Rise (hours)	Tide Height (meters)	Ocean Exchange Ratio	Algae Oxygen Production (mg O/µg chl-a/day)	Data Source
Bayou Cane	0.7	10	Option 3; all rates but SOD	N/A	N/A	Option 2; widths and depths	Option 2	3	24.58	11.625	0.236	N/A	0.05	The KL Minimum is Louisiana Standard Practice. The dispersion equation was used to account for all modes of transport. The tidal period, tidal rise, and tide height were calculated from level monitor data from the TMDL. *LTP* (LDEQ, 2012) default values were used for all other program constants.
Bayou Castine	0.7	10	Option 3; all rates but SOD	N/A	N/A	Option 2; widths and depths	Option 2	3	25	12.5	0	N/A	N/A	The KL Minimum is Louisiana Standard Practice. The dispersion equation was used to account for all modes of transport. *LTP* (LDEQ, 2012) default values were used for all other program constants.
Bayou Chinchuba	0.7	10	Option 3; all rates but SOD	N/A	N/A	Option 2; widths and depths	Option 2	3	25	12.5	0	N/A	N/A	The KL Minimum is Louisiana Standard Practice. The dispersion equation was used to account for all modes of transport. *LTP* (LDEQ, 2012) default values were used for all other program constants.
Abita River	0.7	25	Option 3; all rates but SOD	N/A	N/A	Option 2; widths and depths	Option 2	3	25	12.5	0	N/A	N/A	The KL Minimum is Louisiana Standard Practice. EPA Policy was used in the absence of a measured value for K2 Maximum. The dispersion equation was used to account for all modes of transport. *LTP* (LDEQ, 2012) default values were used for all other program constants.

Table 7
Program Constants

Water Body	KL minimum (m/day)	K2 Maximum (1/day @ 20°C)	Inhibition Control Value	S Oxygen Dependence Threshold	SOD Maximum Rate (gm/m2-day)	Hydraulic Calculation Method	Settling Rates Units (1/day)	Dispersion Equation	Tidal Period (hours)	Tidal Rise (hours)	Tide Height (meters)	Ocean Exchange Ratio	Algae Oxygen Production (mg O/µg chl-a/day)	Data Source
Bogue Falaya River	0.7	25	Option 3; all rates but SOD	N/A	N/A	Option 2; widths and depths	Option 2	3	25	12.5	0	N/A	N/A	The KL Minimum is Louisiana Standard Practice. EPA Policy was used in the absence of a measured value for K2 Maximum. The dispersion equation was used to account for all modes of transport. *LTP* (LDEQ, 2012) default values were used for all other program constants.
Upper Tchefuncte River	0.7	25	Option 3; all rates but SOD	N/A	N/A	Option 2; widths and depths	Option 2	3	25	12.5	0	N/A	N/A	The KL Minimum is Louisiana Standard Practice. EPA Policy was used in the absence of a measured value for K2 Maximum. The dispersion equation was used to account for all modes of transport. *LTP* (LDEQ, 2012) default values were used for all other program constants.
Ponchitolawa Creek	0.7	25	Option 3; all rates but SOD	N/A	N/A	Option 2; widths and depths	Option 2	3	25	12.2	0.156	N/A	N/A	The KL Minimum is Louisiana Standard Practice. EPA Policy was used in the absence of a measured value for K2 Maximum. The dispersion equation was used to account for all modes of transport. The tidal period, tidal rise, and tide height were calculated from the TMDL survey. *LTP* (LDEQ, 2012) default values were used for all other program constants.

Table 7
Program Constants

Water Body	KL minimum (m/day)	K2 Maximum (1/day @ 20°C)	Inhibition Control Value	S Oxygen Dependence Threshold	SOD Maximum Rate (gm/m2-day)	Hydraulic Calculation Method	Settling Rates Units (1/day)	Dispersion Equation	Tidal Period (hours)	Tidal Rise (hours)	Tide Height (meters)	Ocean Exchange Ratio	Algae Oxygen Production (mg O/µg chl-a/day)	Data Source
Bayou Tete L'Ours	0.7	25	Option 3; all rates but SOD	N/A	N/A	Option 2; widths and depths	Option 2	3	25	12.2	0.156	N/A	N/A	The KL Minimum is Louisiana Standard Practice. EPA Policy was used in the absence of a measured value for K2 Maximum. The dispersion equation was used to account for all modes of transport. The tidal period, tidal rise, and tide height were calculated from the TMDL survey. *LTP* (LDEQ, 2012) default values were used for all other program constants.
Bayou DeZaire	0.7	25	Option 3; all rates but SOD	N/A	N/A	Option 2; widths and depths	Option 2	3	25	12.2	0.156	N/A	N/A	The KL Minimum is Louisiana Standard Practice. EPA Policy was used in the absence of a measured value for K2 Maximum. The dispersion equation was used to account for all modes of transport. The tidal period, tidal rise, and tide height were calculated from the TMDL survey. *LTP* (LDEQ, 2012) default values were used for all other program constants.
Lower Tchefuncte River	0.7	25	Option 3; all rates but SOD	N/A	N/A	Option 2; widths and depths	Option 2	3	25	12.2	0.156	N/A	N/A	The KL Minimum is Louisiana Standard Practice. EPA Policy was used in the absence of a measured value for K2 Maximum. The dispersion equation was used to account for all modes of transport. The tidal period, tidal rise, and tide height were calculated from the TMDL survey.

Table 7
Program Constants

Water Body	KL minimum (m/day)	K2 Maximum (1/day @ 20°C)	Inhibition Control Value	S Oxygen Dependence Threshold	SOD Maximum Rate (gm/m2-day)	Hydraulic Calculation Method	Settling Rates Units (1/day)	Dispersion Equation	Tidal Period (hours)	Tidal Rise (hours)	Tide Height (meters)	Ocean Exchange Ratio	Algae Oxygen Production (mg O/µg chl-a/day)	Data Source
														LTP (LDEQ, 2012) default values were used for all other program constants.

Table 8
Adjective Hydraulic Coefficients

Water Body	Coefficient	Data Source
W 14 Canal	Widths and depths were assumed to be independent of flow; therefore constant widths and depths were used. The modified Leopold equations were not used in this model	*A Wasteload Allocation for the City of Slidell Municipal Wastewater Treatment Facilities* (Limno-Tech, Inc. 1984)
Bayou Vincent	Hydraulic geometry of the stream channels was used to calculate coefficients and exponents in the upland reaches; constant widths and depths were used in the lower tidal reaches	*Bayou Bonfouca and Bayou Liberty Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2011)
Bayou Bonfouca	Hydraulic geometry of the stream channels was used to calculate coefficients and exponents in the upland reaches; constant widths and depths were used in the lower tidal reaches	*Bayou Bonfouca and Bayou Liberty Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2011)
Bayou Liberty	Hydraulic geometry of the stream channels was used to calculate coefficients and exponents in the upland reaches; constant widths and depths were used in the lower tidal reaches	*Bayou Bonfouca and Bayou Liberty Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2011)
Bayou Lacombe	Widths and depths were assumed to be independent of flow; therefore constant widths and depths were used. The modified Leopold equations were not used in this model	*Bayou Lacombe Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2012)
Big Branch Bayou	Widths and depths were assumed to be independent of flow; therefore constant widths and depths were used. The modified Leopold equations were not used in this model	*Bayou Lacombe Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2012)
Cypress Bayou	Widths and depths were assumed to be independent of flow; therefore constant widths and depths were used. The modified Leopold equations were not used in this model	*Bayou Lacombe Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2012)
Bayou Cane	Widths and depths were assumed to be independent of flow; therefore constant widths and depths were used. The modified Leopold equations were not used in this model	*Bayou Cane Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2011)
Bayou Castine	Widths and depths were assumed to be independent of flow; therefore constant widths and depths were used. The modified Leopold equations were not used in this model	July 2014 Cross-section
Bayou Chinchuba	Widths and depths were assumed to be independent of flow; therefore constant widths and depths were used. The modified Leopold equations were not used in this model	*Bayou Chinchuba Survey Report* (LDEQ, 1994)
Abita River	Widths and depths were assumed to be independent of flow; therefore constant widths and depths were used. The modified Leopold equations were not used in this model	*Abita River Survey* (LDEQ 2009)

Table 8
Adjective Hydraulic Coefficients

Water Body	Coefficient	Data Source
Bogue Falaya River	Widths and depths were assumed to be independent of flow; therefore constant widths and depths were used. The modified Leopold equations were not used in this model	*Bogue Falaya River Survey* (LDEQ 2009)
Upper Tchefuncte River	Widths and depths were assumed to be independent of flow; therefore constant widths and depths were used. The modified Leopold equations were not used in this model	*Upper Tchefuncte River Survey* (LDEQ 2009)
Ponchitolawa Creek	Widths and depths were assumed to be independent of flow; therefore constant widths and depths were used. The modified Leopold equations were not used in this model	*Lower Tchefuncte River Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2012)
Bayou Tete L'Ours	Widths and depths were assumed to be independent of flow; therefore constant widths and depths were used. The modified Leopold equations were not used in this model	*Lower Tchefuncte River Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2012)
Bayou DeZaire	Widths and depths were assumed to be independent of flow; therefore constant widths and depths were used. The modified Leopold equations were not used in this model	*Lower Tchefuncte River Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2012)
Lower Tchefuncte River	Widths and depths were assumed to be independent of flow; therefore constant widths and depths were used. The modified Leopold equations were not used in this model	*Lower Tchefuncte River Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2012)

Table 9
Dispersive Hydraulic Coefficients

Water Body	Coefficient	Data Source
W 14 Canal	Dispersion was not calculated for the W14 Canal model.	Not Applicable
Bayou Vincent	The dispersion was estimated for the lower tidal reaches of Bayou Vincent based on the dye studies. Ultimately the dispersion rates were calibrated to chlorides, conductivity, and salinity using the dispersion equation of Tracor (Rates & constants, pg. 40)	*Bayou Bonfouca and Bayou Liberty Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2011)
Bayou Bonfouca	The dispersion was estimated based on the dye studies. The calculated dispersion rates are: Bayou Bonfouca at 25.7 hours from dye injection 3.0 sq m/sec at RKM 4.5 – 7.7, Bayou Bonfouca at 34.5 hours from dye injection 1.2 sq m/sec at RKM 4.5 – 8.4, and average measured dispersion rate 1.9 sq m/sec. Dispersion rates were calibrated to chlorides, conductivity, and salinity using the dispersion equation of Tracor (Rates & constants, pg. 4.)	*Bayou Bonfouca and Bayou Liberty Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2011)
Bayou Liberty	The dispersion was estimated based on the dye studies. The calculated dispersion rates are: Bayou Liberty at 26.2 hours from dye injection 2.0 sq m/sec at RKM 3.5 – 5.7, Bayou Liberty at 35.3 hours from dye injection 1.4 sq m/sec at RKM 3.6 – 6.1, and average measured dispersion rate 1.9 sq m/sec. Dispersion rates were calibrated to chlorides, conductivity, and salinity using the dispersion equation of Tracor (Rates & constants, pg. 40). Dispersion in upland reaches was set to zero.	*Bayou Bonfouca and Bayou Liberty Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2011)
Bayou Lacombe	Dispersion calculated from the dye studies was not used in the model. The dispersion rates were entered manually and ranged from 0.5 sq m/sec to 7.5 sq m/sec. These values are similar to the values in previous models for Lower Tchefuncte River and Bayous Bonfouca/Liberty. Lower Tchefuncte River ranged from 0 sq m/sec to 7.4 sq m/sec. Bayous Bonfouca/Liberty ranged from 0 sq m/sec to 9.3 sq m/sec.	*Bayou Lacombe Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2012)
Big Branch Bayou	Dispersion calculated from the dye studies was not used in the model. The dispersion rates were entered manually and ranged from 0.5 sq m/sec to 7.5 sq m/sec. These values are similar to the values in previous models for Lower Tchefuncte River and Bayous Bonfouca/Liberty. Lower Tchefuncte River ranged from 0 sq m/sec to 7.4 sq m/sec. Bayous Bonfouca/Liberty ranged from 0 sq m/sec to 9.3 sq m/sec.	*Bayou Lacombe Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2012)
Cypress Bayou	Dispersion calculated from the dye studies was not used in the model. The dispersion rates were entered manually and ranged from 0.5 sq m/sec to 7.5 sq m/sec. These values are similar to the values in previous models for Lower Tchefuncte River and Bayous Bonfouca/Liberty. Lower Tchefuncte River ranged from 0 sq m/sec to 7.4 sq m/sec. Bayous Bonfouca/Liberty ranged from 0 sq m/sec to 9.3 sq m/sec.	*Bayou Lacombe Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2012)
Bayou Cane	The dispersion was estimated based on the dye studies. Dispersion rates were calibrated to chlorides, conductivity, and salinity using the dispersion equation of Tracor (Rates & constants, pg. 40).	*Bayou Cane Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2011)

ST. TAMMANY PARISH WATERSHED MANAGEMENT STUDY

Table 9
Dispersive Hydraulic Coefficients

Water Body	Coefficient	Data Source
Bayou Castine	Dispersion was not calculated for the Bayou Castine Model	Not Applicable
Bayou Chinchuba	Dispersion was not calculated for the Bayou Chinchuba Model	Not Applicable
Abita River	Dispersion was not calculated for the Abita River Model	Not Applicable
Bogue Falaya River	Dispersion was not calculated for the Bogue Falaya River Model	Not Applicable
Upper Tchefuncte River	Dispersion was not calculated for the Upper Tchefuncte River Model	Not Applicable
Ponchitolawa Creek	The dispersion was estimated based on the dye studies. Dispersion rates were calibrated to chlorides, conductivity, and salinity using the dispersion equation of Tracor (Rates & constants, pg. 40).	*Lower Tchefuncte River Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2012)
Bayou Tete L'Ours	The dispersion was estimated based on the dye studies. Dispersion rates were calibrated to chlorides, conductivity, and salinity using the dispersion equation of Tracor (Rates & constants, pg. 40).	*Lower Tchefuncte River Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2012)
Bayou DeZaire	The dispersion was estimated based on the dye studies. Dispersion rates were calibrated to chlorides, conductivity, and salinity using the dispersion equation of Tracor (Rates & constants, pg. 40).	*Lower Tchefuncte River Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2012)
Lower Tchefuncte River	The dispersion was estimated based on the dye studies. Dispersion rates were calibrated to chlorides, conductivity, and salinity using the dispersion equation of Tracor (Rates & constants, pg. 40).	*Lower Tchefuncte River Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2012)

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Table 10
Initial Conditions

Water Body	Initial Conditions	Data Source
W 14 Canal	Data was used to establish initial condition in the W14 Canal Model for DO, ammonia, salinity, and temperature. Nitrate-nitrite as nitrogen, phosphorus, and chlorophyll a were not used in the W14 Canal Model.	For ammonia, an average was calculated from the *A Wasteload Allocation for the City of Slidell Municipal Wastewater Treatment Facilities* (Limno-Tech, Inc. 1984) data. For DO, salinity, and temperature July 2014 in situ data was used.
Bayou Vincent	Data was used to establish initial condition in the Bayou Vincent Model for DO, salinity, and temperature. Nitrate-nitrite as nitrogen, phosphorus, ammonia, and chlorophyll a were not used in the Bayou Vincent Model.	For DO, salinity, and temperature July 2014 in situ data was used for Bayou Vincent. Survey data from the *Bayou Bonfouca and Bayou Liberty Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2011) was used for the drainage ditches.
Bayou Bonfouca	Data was used to establish initial condition in the Bayou Bonfouca Model for DO, salinity, chlorophyll a, and temperature. Nitrate-nitrite as nitrogen, phosphorus, and ammonia were not used in the Bayou Bonfouca Model.	Survey data from the *Bayou Bonfouca and Bayou Liberty Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2011) was used.
Bayou Liberty	Data was used to establish initial condition in the Bayou Liberty Model for DO, salinity, chlorophyll a, and temperature. Nitrate-nitrite as nitrogen, phosphorus, and ammonia were not used in the Bayou Liberty Model.	Survey data from the *Bayou Bonfouca and Bayou Liberty Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2011) was used.
Bayou Lacombe	Data was used to establish initial condition in the Bayou Lacombe Model for DO, salinity, chlorophyll a, and temperature. Nitrate-nitrite as nitrogen, phosphorus, and ammonia were not used in the Bayou Lacombe Model.	For DO, salinity, and temperature July 2014 in situ data was used for Bayou Lacombe. *Bayou Lacombe Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2012) Survey Data was used for chlorophyll a.
Big Branch Bayou	Data was used to establish initial condition in the Big Branch Bayou Model for DO, salinity, chlorophyll a, and temperature. Nitrate-nitrite as nitrogen, phosphorus, and ammonia were not used in the Big Branch Bayou Model.	For DO, salinity, and temperature July 2014 in situ data was used for Big Branch Bayou. *Bayou Lacombe Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2012) Survey Data was used for chlorophyll a.
Cypress Bayou	Data was used to establish initial condition in the Cypress Bayou Model for DO, salinity, chlorophyll a, and temperature. Nitrate-nitrite as nitrogen, phosphorus, and ammonia were not used in the Cypress Bayou Model.	For DO, salinity, and temperature July 2014 in situ data was used for Cypress Bayou. *Bayou Lacombe Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2012) Survey Data was used for chlorophyll a.

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Table 10
Initial Conditions

Water Body	Initial Conditions	Data Source
Bayou Cane	Data was used to establish initial condition in the Bayou Cane Model for DO, salinity, chlorophyll a, and temperature. Nitrate-nitrite as nitrogen, phosphorus, and ammonia were not used in the Bayou Cane Model.	For DO and temperature *Bayou Cane Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2011) continuous monitoring averages were used for Bayou Cane. The *Bayou Cane Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2011) lab data was used for chlorophyll a.
Bayou Castine	Data was used to establish initial condition in the Bayou Castine Model for DO, salinity, and temperature. Nitrate-nitrite as nitrogen, ammonia, phosphorus, and chlorophyll a were not used in the Bayou Castine Model.	For DO, salinity, and temperature July 2014 in situ data was used.
Bayou Chinchuba	Data was used to establish initial condition in the Bayou Chinchuba Model for DO, salinity, and temperature. Nitrate-nitrite as nitrogen, ammonia, phosphorus, and chlorophyll a were not used in the Bayou Chinchuba Model.	For DO, salinity, and temperature July 2014 in situ data was used.
Abita River	Data was used to establish initial conditions in the Abita River Model for DO and temperature. Nitrate-nitrite as nitrogen, phosphorus, ammonia, salinity, and chlorophyll a were not used in the Abita River Model	Data from the *Abita River Survey* (LDEQ 2009) was used for DO and temperature.
Bogue Falaya River	Data was used to establish initial conditions in the Bogue Falaya River Model for DO and temperature. Nitrate-nitrite as nitrogen, phosphorus, ammonia, salinity, and chlorophyll a were not used in the Bogue Falaya River Model	Data from the *Bogue Falaya River Survey* (LDEQ 2009) was used for DO and temperature.
Upper Tchefuncte River	Data was used to establish initial conditions in the Upper Tchefuncte River Model for DO and temperature. Nitrate-nitrite as nitrogen, phosphorus, ammonia, salinity, and chlorophyll a were not used in the Upper Tchefuncte River Model	Data from the *Upper Tchefuncte River Survey* (LDEQ 2009) was used for DO and temperature.
Ponchitolawa Creek	Data was used to establish initial condition in the Ponchitolawa Creek Model for DO, chlorophyll a, and temperature. Nitrate-nitrite as nitrogen, phosphorus, salinity, and ammonia were not used in the Ponchitolawa Creek Model.	For DO and temperature July 2014 in situ data was used for Ponchitolawa Creek. Survey data (PC06) from the *Lower Tchefuncte River Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2012) was used for chlorophyll a.

Table 10
Initial Conditions

Water Body	Initial Conditions	Data Source
Bayou Tete L'Ours	Data was used to establish initial condition in the Bayou Tete L'Ours Model for DO, chlorophyll a, and temperature. Nitrate-nitrite as nitrogen, phosphorus, salinity, and ammonia were not used in the Bayou Tete L'Ours Model.	For DO and temperature July 2014 in situ data was used for Bayou Tete L'Ours. Survey data (BTL01)from the *Lower Tchefuncte River Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2012) was used for chlorophyll a.
Bayou DeZaire	Data was used to establish initial condition in the Bayou DeZaire Model for DO, chlorophyll a, and temperature. Nitrate-nitrite as nitrogen, phosphorus, salinity, and ammonia were not used in the Bayou DeZaire Model.	For DO and temperature July 2014 in situ data was used for Bayou DeZaire. The *Lower Tchefuncte River Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2012) calibration was used for chlorophyll a.
Lower Tchefuncte River	Data was used to establish initial condition in the Lower Tchefuncte River Model for DO, chlorophyll a, and temperature. Nitrate-nitrite as nitrogen, phosphorus, salinity, and ammonia were not used in the Lower Tchefuncte River Model.	For DO and temperature LDEQ TMDL continuous monitoring averages were used for the Lower Tchefuncte River. The *Lower Tchefuncte River Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2012) lab data was used for chlorophyll a.

Table 11
Reaeration Equations

Water Body	K2 Option	Data Source
W 14 Canal	3	O'Connor-Dobbins (Rates and Constants, 1985)
Bayou Vincent	15	Louisiana Equation (Smythe, 1993, 1999 and Waldon 1993)
Bayou Bonfouca	1, 11, 15	Mattingly (K2=a) (Bowie, 1985), Texas Equation (Rates and Constants, 1985), Louisiana Equation (Smythe, 1993, 1999 and Waldon 1993)
Bayou Liberty	1, 11, 15	Mattingly (K2=a) (Bowie, 1985), Texas Equation (Rates and Constants, 1985), Louisiana Equation (Smythe, 1993, 1999 and Waldon 1993)
Bayou Lacombe	3, 11, 15	O'Connor-Dobbins (Rates and Constants, 1985), Texas Equation (Rates and Constants, 1985), Louisiana Equation (Smythe, 1993, 1999 and Waldon 1993)
Big Branch Bayou	3, 11	O'Connor-Dobbins (Rates and Constants, 1985), Texas Equation (Rates and Constants, 1985)
Cypress Bayou	3, 11, 15	O'Connor-Dobbins (Rates and Constants, 1985), Texas Equation (Rates and Constants, 1985), Louisiana Equation (Smythe, 1993, 1999 and Waldon 1993)
Bayou Cane	11	Texas Equation (Rates and Constants, 1985)
Bayou Castine	15	Louisiana Equation (Smythe, 1993, 1999 and Waldon 1993)
Bayou Chinchuba	15	Louisiana Equation (Smythe, 1993, 1999 and Waldon 1993)
Abita River	3	O'Connor-Dobbins (Rates and Constants, 1985)
Bogue Falaya River	3	O'Connor-Dobbins (Rates and Constants, 1985)
Upper Tchefuncte River	3	O'Connor-Dobbins (Rates and Constants, 1985)

Table 11
Reaeration Equations

Water Body	K2 Option	Data Source
Ponchitolawa Creek	11	Texas Equation (Rates and Constants, 1985)
Bayou Tete L'Ours	3	O'Connor-Dobbins (Rates and Constants, 1985)
Bayou DeZaire	3	O'Connor-Dobbins (Rates and Constants, 1985)
Lower Tchefuncte River	3	O'Connor-Dobbins (Rates and Constants, 1985)

Table 12
SOD Inputs

Water Body	SOD Values	Data Source
W 14 Canal	The SOD values for the W14 Canal Model ranged from 1.0 to 2.0 gmO2/m2/day at 20 deg C.	Calibration
Bayou Vincent	The SOD values for the Bayou Vincent Model ranged from 0.2 to 1.5 gmO2/m2/day at 20 deg C.	Calibration
Bayou Bonfouca	The SOD values for the Bayou Bonfouca Model ranged from 0 to 7 gmO2/m2/day at 20 deg C.	Calibration
Bayou Liberty	The SOD values for the Bayou Liberty Model ranged from 0 to 0.76 gmO2/m2/day at 20 deg C.	Calibration
Bayou Lacombe	The SOD values for the Bayou Lacombe Model ranged from 0 to 4.50 gmO2/m2/day at 20 deg C.	Calibration
Big Branch Bayou	The SOD values for the Big Branch Bayou Model ranged from 1.50 to 2.50 gmO2/m2/day at 20 deg C.	Calibration
Cypress Bayou	The SOD values for the Big Branch Bayou Model ranged from 0.05 to 2.00 gmO2/m2/day at 20 deg C.	Calibration
Bayou Cane	The SOD values for the Bayou Cane Model ranged from 0 to 3.50 gmO2/m2/day at 20 deg C.	Calibration
Bayou Castine	The SOD values for the Bayou Castine Model ranged from 0.2 to 1.0 gmO2/m2/day at 20 deg C.	Calibration
Bayou Chinchuba	The SOD values for the Bayou Castine Model ranged from 0.5 to 1.5 gmO2/m2/day at 20 deg C.	Calibration
Abita River	The SOD values for the Abita River Model ranged from 0.8 to 2.00 gmO2/m2/day at 20 deg C.	Calibration
Bogue Falaya River	The SOD values for the Bogue Falaya River Model ranged from 0.4 to 2.00 gmO2/m2/day at 20 deg C.	Calibration
Upper Tchefuncte River	The SOD values for the Upper Tchefuncte River Model ranged from 0.25 to 2.00 gmO2/m2/day at 20 deg C.	Calibration
Ponchitolawa Creek	The SOD values for the Ponchitolawa Creek Model ranged from 0.9 to 5.9 gmO2/m2/day at 20 deg C.	Calibration

Table 12
SOD Inputs

Water Body	SOD Values	Data Source
Bayou Tete L'Ours	The SOD values for the Bayou Tete L'Ours Model remained constant at 2.6 gmO2/m2/day at 20 deg C.	Calibration
Bayou DeZaire	The SOD values for the Bayou DeZaire Model ranged from 0.9 to 5.9 gmO2/m2/day at 20 deg C.	Calibration
Lower Tchefuncte River	The SOD values for the Lower Tchefuncte River Model ranged from 0.1 to 2.8 gmO2/m2/day at 20 deg C.	Calibration

Table 13
BOD Settling and Decay Rates

Water Body	BOD Settling Rates (1/day)	BOD Decay Rates (1/day)	Data Source
W 14 Canal	The BOD Settling Rates for the W14 Canal Model remained constant at 0.07.	The BOD Decay Rates for the W14 Canal Model ranged from 0.03 to 0.05.	*A Wasteload Allocation for the City of Slidell Municipal Wastewater Treatment Facilities* (Limno-Tech, Inc. 1984) Calibration
Bayou Vincent	The BOD Settling Rates for the Bayou Vincent Model remained constant at 0.05.	The BOD Decay Rates for the Bayou Vincent Model remained constant at 0.08. The in-stream carbonaceous BOD decay rates (bottle rates) ranged from 0.042 1/day to 0.134 1/day, with an average of 0.08 1/day. The values were comparable to instream values observed in other Lake Pontchartrain Basin water bodies of comparable hydrology. Calibration started with 0.10 and was adjusted to 0.08 to improve calibration.	*Bayou Bonfouca and Bayou Liberty Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2011) Calibration
Bayou Bonfouca	The BOD Settling Rates for the Bayou Bonfouca Model remained constant at 0.05.	The in-stream carbonaceous BOD decay rates (bottle rates) ranged from 0.042 1/day to 0.134 1/day, with an average of 0.08 1/day. There was not much variation in rates. The values were comparable to instream values observed in other Lake Pontchartrain Basin water bodies of comparable hydrology. Calibration started with 0.10 and was adjusted to 0.08 to improve calibration.	*Bayou Bonfouca and Bayou Liberty Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2011) Calibration
Bayou Liberty	The BOD Settling Rates for the Bayou Liberty Model remained constant at 0.05.	The in-stream carbonaceous BOD decay rates (bottle rates) ranged from 0.042 1/day to 0.134 1/day, with an average of 0.08 1/day. There was not much variation in rates. The values were comparable to instream values observed in other Lake Pontchartrain Basin water bodies of comparable hydrology. Calibration started with 0.10 and was adjusted to 0.08 to improve calibration.	*Bayou Bonfouca and Bayou Liberty Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2011) Calibration
Bayou Lacombe	The BOD Settling Rates for the Bayou Lacombe Model remained constant at 0.05.	The in-stream carbonaceous BOD decay rates (bottle rates) ranged from 0.029 1/day to 0.08 1/day. There was not much variation in the rates. The values were comparable to instream values observed in other Lake Pontchartrain Basin water bodies of comparable hydrology.	*Bayou Lacombe Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2012) Calibration

Table 13
BOD Settling and Decay Rates

Water Body	BOD Settling Rates (1/day)	BOD Decay Rates (1/day)	Data Source
Big Branch Bayou	The BOD Settling Rates for the Big Branch Bayou Model remained constant at 0.05.	The in-stream carbonaceous BOD decay rates (bottle rates) ranged from 0.049 1/day to 0.07 1/day. There was not much variation in the rates. The values were comparable to instream values observed in other Lake Pontchartrain Basin water bodies of comparable hydrology.	*Bayou Lacombe Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2012) Calibration
Cypress Bayou	The BOD Settling Rates for the Cypress Bayou Model remained constant at 0.05.	The in-stream carbonaceous BOD decay rates (bottle rates) ranged from 0.052 1/day to 0.08 1/day. There was not much variation in the rates. The values were comparable to instream values observed in other Lake Pontchartrain Basin water bodies of comparable hydrology.	*Bayou Lacombe Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2012) Calibration
Bayou Cane	The BOD Settling Rates for the Bayou Cane Model remained constant at 0.05.	The in-stream carbonaceous BOD decay rates (bottle rates) ranged from 0.044 1/day to 0.068 1/day. There was not much variation in the rates. The values were comparable to instream values observed in other Lake Pontchartrain Basin water bodies of comparable hydrology.	*Bayou Cane Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2011) Calibration
Bayou Castine	The BOD Settling Rates for the Bayou Castine Model remained constant at 0.1.	The BOD Settling Rates for the Bayou Castine Model ranged from 0.3 to 0.4.	*LTP* (LDEQ, 2012) and Calibration
Bayou Chinchuba	The BOD Settling Rates for the Bayou Chinchuba Model remained constant at 0.1.	The BOD Settling Rates for the Bayou Chinchuba Model ranged from 0.3 to 0.5.	*LTP* (LDEQ, 2012) and Calibration
Abita River	The BOD Settling Rates for the Abita River Model remained constant at 0.8.	The in-stream carbonaceous BOD decay rates (bottle rates) ranged from 0.05 1/day to 0.3820 1/day. The values were comparable to instream values observed in other Lake Pontchartrain Basin water bodies of comparable hydrology.	*Abita River Survey* (LDEQ 2009) and Calibration
Bogue Falaya River	The BOD Settling Rates for the Bogue Falaya River Model remained constant at 0.8.	The in-stream carbonaceous BOD decay rates (bottle rates) ranged from 0.082 1/day to 0.2190 1/day. The values were comparable to instream values observed in other Lake Pontchartrain Basin water bodies of comparable hydrology.	*Bogue Falaya River Survey* (LDEQ 2009) and Calibration
Upper Tchefuncte River	The BOD Settling Rates for the Upper Tchefuncte River Model remained constant at 0.8.	The in-stream carbonaceous BOD decay rates (bottle rates) ranged from 0.067 1/day to 0.154 1/day. The values were comparable to instream values observed in other Lake Pontchartrain Basin water bodies of comparable hydrology.	*Upper Tchefuncte River Survey* (LDEQ 2009) Survey and Calibration

Table 13
BOD Settling and Decay Rates

Water Body	BOD Settling Rates (1/day)	BOD Decay Rates (1/day)	Data Source
Ponchitolawa Creek	The BOD Settling Rates for the Ponchitolawa Creek Model remained constant at 0.8.	The in-stream carbonaceous BOD decay rates (bottle rates) ranged from 0.2 1/day to 0.5 1/day. The values were comparable to instream values observed in other Lake Pontchartrain Basin water bodies of comparable hydrology.	*Lower Tchefuncte River Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2012) Calibration
Bayou Tete L'Ours	The BOD Settling Rates for the Bayou Tete L'Ours Model remained constant at 0.1.	The BOD Decay Rates for the Bayou Tete L'Ours Model remained constant at 0.405.	*Lower Tchefuncte River Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2012) Calibration
Bayou DeZaire	The BOD Settling Rates for the Bayou DeZaire Model remained constant at 0.1.	The BOD Decay Rates for the Bayou DeZaire Model remained constant at 0.0296.	*Lower Tchefuncte River Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2012) Calibration
Lower Tchefuncte River	The BOD Settling Rates for the Lower Tchefuncte River Model remained constant at 0.1.	The BOD Decay Rates for the Lower Tchefuncte River Model ranged from 0.0301 to 0.0652.	*Lower Tchefuncte River Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2012) Calibration

Table 14

NBOD Settling and Decay Rates

Water Body	NBOD Settling Rates (1/day)	NBOD Decay Rates (1/day)	Data Source
W 14 Canal	The BOD Settling Rates for the W14 Canal Model remained constant at 0.00.	The BOD Decay Rates for the W14 Canal Model remained constant at 0.05.	*A Wasteload Allocation for the City of Slidell Municipal Wastewater Treatment Facilities* (Limno-Tech, Inc. 1984) Calibration
Bayou Vincent	The BOD Settling Rates for the Bayou Vincent Model ranged from 0.05 to 0.15.	The BOD Decay Rates for the Bayou Vincent Model remained constant at 0.02. The decay rates ranged from 0.079 1/day to 0.451 1/day, providing an average of 0.19 1/day. Both the maximum and the average values were higher than in-stream values observed in other Lake Pontchartrain Basin water bodies of comparable hydrology. A much lower rate of 0.03 was needed to calibrate.	*Bayou Bonfouca and Bayou Liberty Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2011) Calibration
Bayou Bonfouca	The BOD Settling Rates for the Bayou Bonfouca Model ranged from 0.05 to 0.15.	The in-stream nitrogenous BOD decay rates (bottle rates) were extremely variable. The decay rates ranged from 0.079 1/day to 0.451 1/day, providing an average of 0.19 1/day. Both the maximum and the average values were higher than in-stream values observed in other Lake Pontchartrain Basin water bodies of comparable hydrology. A much lower rate of 0.03 was needed to calibrate.	*Bayou Bonfouca and Bayou Liberty Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2011) Calibration
Bayou Liberty	The BOD Settling Rates for the Bayou Liberty Model remained constant at 0.05.	The in-stream nitrogenous BOD decay rates (bottle rates) were extremely variable. The decay rates ranged from 0.079 1/day to 0.451 1/day, providing an average of 0.19 1/day. Both the maximum and the average values were higher than in-stream values observed in other Lake Pontchartrain Basin water bodies of comparable hydrology. A much lower rate of 0.03 was needed to calibrate.	*Bayou Bonfouca and Bayou Liberty Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2011) Calibration
Bayou Lacombe	The BOD Settling Rates for the Bayou Lacombe Model remained constant at 0.05.	The in-stream nitrogenous BOD decay rates (bottle rates) were extremely variable. The decay rates ranged from 0.005 1/day to 0.595 1/day.	*Bayou Lacombe Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2012) Calibration
Big Branch Bayou	The BOD Settling Rates for the Big Branch Bayou Model remained constant at 0.05.	The in-stream nitrogenous BOD decay rates (bottle rates) were extremely variable. The decay rates ranged from 0.042 1/day to 0.595 1/day.	*Bayou Lacombe Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2012) Calibration
Cypress Bayou	The BOD Settling Rates for the Cypress Bayou Model remained constant at 0.05.	The in-stream nitrogenous BOD decay rates (bottle rates) were extremely variable. The decay rates ranged from 0.030 1/day to 0.136 1/day.	*Bayou Lacombe Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2012) Calibration

Table 14

NBOD Settling and Decay Rates

Water Body	NBOD Settling Rates (1/day)	NBOD Decay Rates (1/day)	Data Source
Bayou Cane	The BOD Settling Rates for the Bayou Cane Model remained constant at 0.05.	The BOD Decay Rates for the Bayou Cane Model remained constant at 0.1.	*Bayou Cane Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2011) Calibration
Bayou Castine	The BOD Settling Rates for the Bayou Castine Model remained constant at 0.1.	The BOD Decay Rates for the Bayou Castine Model ranged from 0.1 to 0.2.	*LTP* (LDEQ, 2012) and Calibration
Bayou Chinchuba	The BOD Settling Rates for the Bayou Chinchuba Model remained constant at 0.1.	The BOD Decay Rates for the Bayou Chinchuba Model ranged from 0.1 to 0.2.	*LTP* (LDEQ, 2012) and Calibration
Abita River	The BOD Settling Rates for the Abita River Model remained constant at 0.05.	The in-stream nitrogenous BOD decay rates (bottle rates) were extremely variable. The decay rates ranged from 0.005 1/day to 0.336 1/day.	*Abita River Survey* (LDEQ 2009) and Calibration
Bogue Falaya River	The BOD Settling Rates for the Bogue Falaya River Model remained constant at 0.05.	The in-stream nitrogenous BOD decay rates (bottle rates) were extremely variable. The decay rates ranged from 0.034 1/day to 0.102 1/day.	*Bogue Falaya River Survey* (LDEQ 2009) and Calibration
Upper Tchefuncte River	The BOD Settling Rates for the Upper Tchefuncte River Model remained constant at 0.05.	The in-stream nitrogenous BOD decay rates (bottle rates) were extremely variable. The decay rates ranged from 0.134 1/day to 0.595 1/day.	*Upper Tchefuncte River Survey* (LDEQ 2009) Survey and Calibration
Ponchitolawa Creek	The BOD Settling Rates for the Ponchitolawa Creek Model remained constant at 0.05.	The BOD Decay Rates for the Ponchitolawa Creek Model remained constant at 0.05.	*Lower Tchefuncte River Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2012) Calibration
Bayou Tete L'Ours	The BOD Settling Rates for the Bayou Tete L'Ours Model remained constant at 0.3.	The BOD Decay Rates for the Bayou Tete L'Ours Model remained constant at 0.2.	*Lower Tchefuncte River Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2012) Calibration
Bayou DeZaire	The BOD Settling Rates for the Bayou DeZaire Model remained constant at 0.3.	The BOD Decay Rates for the Bayou DeZaire Model remained constant at 0.2.	*Lower Tchefuncte River Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2012) Calibration
Lower Tchefuncte River	The BOD Settling Rates for the Lower Tchefuncte River Model ranged from 0.1 to 0.2.	The BOD Decay Rates for the Lower Tchefuncte River Model ranged from 0.0447 to 0.1076.	*Lower Tchefuncte River Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2012) Calibration

Table 15

Incremental Inputs

Water Body	Incremental Data	Data Source
W 14 Canal	Incremental data was not used in the W14 Canal model.	Not Applicable
Bayou Vincent	Incremental data was not used in the Bayou Vincent model.	Not Applicable
Bayou Bonfouca	Incremental data was not used in the Bayou Bonfouca model.	Not Applicable
Bayou Liberty	Incremental data was not used in the Bayou Liberty model.	Not Applicable
Bayou Lacombe	Incremental data including flow, temperature, salinity, chlorides, conductivity, DO, UCBOD, and UNBOD was used in Bayou Lacombe for calibration of advective flow. It was not used in the tidal areas of the water bodies.	*Bayou Lacombe Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2012) Continuous Monitoring Data and Lab Data
Big Branch Bayou	Incremental data including flow, temperature, salinity, chlorides, conductivity, DO, UCBOD, and UNBOD was used in Big Branch Bayou for calibration of advective flow. It was not used in the tidal areas of the water bodies.	*Bayou Lacombe Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2012) Continuous Monitoring Data and Lab Data
Cypress Bayou	Incremental data including flow, temperature, salinity, chlorides, conductivity, DO, UCBOD, and UNBOD was used in Cypress Bayou for calibration of advective flow. It was not used in the tidal areas of the water bodies.	July 2014 in situ data for temperature, salinity, conductivity, and DO. *Bayou Lacombe Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2012) Continuous Monitoring Data and Lab Data for flow, UCBOD, and UNBOD
Bayou Cane	Incremental data was not used in the Bayou Cane model.	Not Applicable
Bayou Castine	Incremental data was not used in the Bayou Castine model.	Not Applicable
Bayou Chinchuba	Incremental data was not used in the Bayou Chinchuba model.	Not Applicable
Abita River	Incremental data was not used in the Abita River model.	Not Applicable
Bogue Falaya River	Incremental data was not used in the Bogue Falaya River model.	Not Applicable
Upper Tchefuncte River	Incremental data was not used in the Upper Tchefuncte River model.	Not Applicable

Table 15

Incremental Inputs

Water Body	Incremental Data	Data Source
Ponchitolawa Creek	Incremental data including flow, temperature, salinity, chlorides, conductivity, DO, UCBOD, and UNBOD was used in Ponchitolawa Creek for calibration of advective flow.	July 2014 in situ data for temperature and DO. *Lower Tchefuncte River Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2012) Continuous Monitoring Data and Lab Data for flow, salinity, conductivity, chloride, UCBOD, and UNBOD
Bayou Tete L'Ours	Incremental data including flow, temperature, salinity, chlorides, conductivity, DO, UCBOD, and UNBOD was used in Bayou Tete L'Ours for calibration of advective flow.	July 2014 in situ data for temperature and DO. *Lower Tchefuncte River Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2012) Continuous Monitoring Data and Lab Data for flow, salinity, conductivity, chloride, UCBOD, and UNBOD
Bayou DeZaire	Incremental data including flow, temperature, salinity, chlorides, conductivity, DO, UCBOD, and UNBOD was used in Bayou DeZaire for calibration of advective flow.	July 2014 in situ data for temperature and DO. *Lower Tchefuncte River Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2012) Continuous Monitoring Data and Lab Data for flow, salinity, conductivity, chloride, UCBOD, and UNBOD
Lower Tchefuncte River	Incremental data including temperature, salinity, chlorides, conductivity, DO, UCBOD, and UNBOD was used in Bayou DeZaire for calibration of advective flow.	LDEQ TMDL Continuous Monitoring Data and Lab Data for DO, temperature, salinity, conductivity, chloride, UCBOD, and UNBOD

Table 16

Nonpoint Source Inputs

Water Body	CBOD (kg/day)	NBOD (kg/day)	Data Source
W 14 Canal	Nonpoint loading was not used in the W14 Canal Model	Nonpoint loading was not used in the W14 Canal Model	Calibration
Bayou Vincent	CBOD nonpoint loading in the Bayou Vincent Model ranged from 0 to 0.65	NBOD nonpoint loading in the Bayou Vincent Model ranged from 0 to 0.5	Calibration
Bayou Bonfouca	CBOD nonpoint loading in the Bayou Bonfouca Model ranged from 0 to 325	NBOD nonpoint loading in the Bayou Bonfouca Model ranged from 0 to 40	Calibration
Bayou Liberty	CBOD nonpoint loading in the Bayou Liberty Model ranged from 0 to 220	NBOD nonpoint loading in the Bayou Liberty Model ranged from 0 to 35	Calibration
Bayou Lacombe	CBOD nonpoint loading in the Bayou Lacombe Model ranged from 0 to 1500	NBOD nonpoint loading in the Bayou Lacombe Model ranged from 0 to 500	Calibration
Big Branch Bayou	CBOD nonpoint loading in the Big Branch Bayou Model ranged from 0 to 90	NBOD nonpoint loading in the Big Branch Bayou Model ranged from 0 to 200	Calibration
Cypress Bayou	CBOD nonpoint loading in the Cypress Bayou Model ranged from 0 to 150	NBOD nonpoint loading in the Cypress Bayou Model ranged from 0 to 0.007	Calibration
Bayou Cane	CBOD nonpoint loading in the Bayou Cane Model ranged from 5 to 55	NBOD nonpoint loading in the Bayou Cane Model ranged from 1.8 to 28	Calibration

Table 16

Nonpoint Source Inputs

Water Body	CBOD (kg/day)	NBOD (kg/day)	Data Source
Bayou Castine	CBOD nonpoint loading in the Bayou Castine Model ranged from 0 to 3.7	NBOD nonpoint loading in the Bayou Castine Model ranged from 0 to 3.7	Calibration
Bayou Chinchuba	CBOD nonpoint loading in the Bayou Chinchuba Model ranged from 0 to 45	NBOD nonpoint loading in the Bayou Chinchuba Model ranged from 0 to 45	Calibration
Abita River	CBOD nonpoint loading in the Abita River Model ranged from 0 to 130	NBOD nonpoint loading in the Abita River Model ranged from 0 to 130	Calibration
Bogue Falaya River	CBOD nonpoint loading in the Bogue Falaya River Model was set to 0	NBOD nonpoint loading in the Bogue Falaya River Model was set to 0	Calibration
Upper Tchefuncte River	CBOD nonpoint loading in the Upper Tchefuncte River Model was set to 0	NBOD nonpoint loading in the Upper Tchefuncte River Model was set to 0	Calibration
Ponchitolawa Creek	CBOD nonpoint loading in the Ponchitolawa Creek Model was set to 0	NBOD nonpoint loading in the Ponchitolawa Creek Model was set to 0	Calibration
Bayou Tete L'Ours	CBOD nonpoint loading in the Bayou Tete L'Ours Model was set to 65	NBOD nonpoint loading in the Bayou Tete L'Ours Model was set to 10	Calibration
Bayou DeZaire	CBOD nonpoint loading in the Bayou DeZaire Model was set to 28	NBOD nonpoint loading in the Bayou DeZaire Model was set to 5	Calibration
Lower Tchefuncte River	CBOD nonpoint loading in the Lower Tchefuncte River Model ranged from 0 to 1200	NBOD nonpoint loading in the Lower Tchefuncte River Model ranged from 5 to 800	Calibration

Table 17

Headwater Input

Water Body	Data Source
W 14 Canal	Minimal flow as used in the W14 model. Ambient data was used for chlorides. July 2014 in situ data was used for temperature, salinity, and conductivity. The W14 Canal criteria was used for DO. Data from the 1987 W14 Canal Wasteload Allocation was used for UCBOD and UNBOD.
Bayou Vincent	Minimal flow was used for Bayou Vincent. July 2014 in situ data was used for temperature, salinity, and conductivity on Bayou Vincent and *Bayou Bonfouca and Bayou Liberty Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2011) survey averages were used for the drainage ditches. The *Bayou Bonfouca and Bayou Liberty Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2011) Survey averages were used for chlorides. The Bayou Vincent/Bayou Bonfouca criteria was used for DO. The UCBOD and UNBOD loading measured in Bayou Vincent just downstream of the groundwater inflow (UCBOD/UNBOD = 2.2/1.0 mg/l) was used as loading for all headwaters. Nonpoint (benthic) loading for generic ditches and tributaries was set to maintain levels of UCBOD/UNBOD in the water column of 2.0/1.0 mg/l by modeling each generic ditch/tributary without facility discharges.
Bayou Bonfouca	Minimal flow was used for Bayou Bonfouca. *Bayou Bonfouca and Bayou Liberty Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2011) survey averages were used for temperature, salinity, chlorides, DO, and conductivity on Bayou Bonfouca. The UCBOD and UNBOD loading measured in Bayou Vincent just downstream of the groundwater inflow (UCBOD/UNBOD = 2.2/1.0 mg/l) was used as loading for all headwaters. Nonpoint (benthic) loading for generic ditches and tributaries was set to

Table 17

Headwater Input

Water Body	Data Source
	maintain levels of UCBOD/UNBOD in the water column of 2.0/1.0 mg/l by modeling each generic ditch/tributary without facility discharges.
Bayou Liberty	Minimal flow was used for Bayou Liberty. *Bayou Bonfouca and Bayou Liberty Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2011) survey averages were used for temperature, salinity, chlorides, DO, and conductivity on Bayou Liberty. The UCBOD and UNBOD loading measured in Bayou Vincent just downstream of the groundwater inflow (UCBOD/UNBOD = 2.2/1.0 mg/l) was used as loading for all headwaters. Nonpoint (benthic) loading for generic ditches and tributaries was set to maintain levels of UCBOD/UNBOD in the water column of 2.0/1.0 mg/l by modeling each generic ditch/tributary without facility discharges.
Bayou Lacombe	The headwater flows were set to the measured values during the *Bayou Bonfouca and Bayou Liberty Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2011) survey. July 2014 in situ data was used for temperature, salinity, DO, and conductivity on Bayou Lacombe. *Bayou Lacombe Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2012) survey averages were used for chlorides. LDEQ TMDL survey averages were used for the drainage ditches. The UCBOD and UNBOD loading from LDEQ TMDL measured sites was used as loading for the headwaters.

Table 17

Headwater Input

Water Body	Data Source
Big Branch Bayou	The headwater flows were set to minimal flow. July 2014 in situ data was used for temperature, salinity, DO, and conductivity on Big Branch Bayou. LDEQ TMDL survey averages were used for chlorides. *Bayou Lacombe Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2012) survey averages were used for the drainage ditches. The UCBOD and UNBOD loading from LDEQ TMDL measured sites was used as loading for the headwaters.
Cypress Bayou	The headwater flows were set to minimal flow. July 2014 in situ data was used for temperature, salinity, DO, and conductivity on Cypress Bayou. LDEQ TMDL survey averages were used for chlorides. *Bayou Lacombe Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2012) survey averages were used for the drainage ditches. The UCBOD and UNBOD loading from *Bayou Lacombe Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2012) measured sites was used as loading for the headwaters.
Bayou Cane	Minimal flow was used for Bayou Cane. *Bayou Cane Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2011) survey averages were used for temperature, salinity, chlorides, DO, and conductivity on Bayou Cane. The UCBOD and UNBOD loading from LDEQ TMDL measured sites was used as loading for the headwaters.
Bayou Castine	Minimal flow as used in the Bayou Castine model. Ambient data was used for chlorides and salinity. July 2014 in situ data was used for temperature and conductivity. The Bayou Cane criteria was used for DO.

Table 17

Headwater Input

Water Body	Data Source
	Data from the *Bayou Lacombe Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2012) was used for UCBOD and UNBOD.
Bayou Chinchuba	Minimal flow as used in the Bayou Chinchuba model. Ambient data was used for chlorides. July 2014 in situ data was used for DO, temperature, salinity, and conductivity. Data from the 1994 Bayou Chinchuba WLA was used for UCBOD and UNBOD.
Abita River	The headwater flows were set to the critical flows used in the UIL Arrowwood LPDES Permit. *Abita River Survey* (LDEQ, 2009) continuous monitoring data (ABIT06) was used for temperature, DO, and conductivity on Abita River. 2010 and 2011 ambient monitoring from the Bogue Falaya was used for chlorides. The UCBOD and UNBOD loading from *Abita River Survey* (LDEQ, 2009) ABIT06 site was used as loading for the headwaters.
Bogue Falaya River	The headwater flows on the Bogue Falaya were set to the critical flows used in the LDEQ 1984 Intensive Survey for the St. Tammany Sewer District #6 WLA. Minimal flow was used for the Little Bogue Falaya River. *Bogue Falaya River Survey* (LDEQ, 2009) continuous monitoring data (BFAl06) was used for temperature, DO, and conductivity on Bogue Falaya River. *Bogue Falaya River Survey* (LDEQ, 2009) continuous monitoring data (BFAL03 and BFAL04 average) was used for temperature, DO, and conductivity on Little Bogue Falaya River. 2010 and 2011 ambient monitoring from the Bogue Falaya was used for chlorides. The UCBOD and UNBOD loading from *Bogue Falaya River Survey* (LDEQ, 2009) BFAL06 site was used as loading for the headwaters on the Bogue Falaya River and survey site averages for BFAL03 and BFAL04 were used for the headwaters on the Little Bogue Falaya River.

Table 17

Headwater Input

Water Body	Data Source
Upper Tchefuncte River	The headwater flows were set to the critical flows the USGS site near Folsom, LA. *Upper Tchefuncte River Survey* (LDEQ, 2009) continuous monitoring data (TCHF10) was used for temperature, DO, and conductivity on the Upper Tchefuncte River. 2010 and 2011 ambient monitoring from the Upper Tchefuncte River was used for chlorides. The UCBOD and UNBOD loading from *Upper Tchefuncte River Survey* (LDEQ, 2009) TCHF10 site was used as loading for the headwaters.
Ponchitolawa Creek	The headwater flows were set to the measured values during the *Lower Tchefuncte River Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2012) survey. July 2014 in situ data was used for temperature and DO on Ponchitolawa Creek. *Lower Tchefuncte River Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2012) survey averages were used for chlorides, conductivity, and salinity. The UCBOD and UNBOD loading from *Lower Tchefuncte River Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2012) measured sites was used as loading for the headwaters.
Bayou Tete L'Ours	The headwater flows were set to minimal flow. July 2014 in situ data was used for temperature and DO on Bayou Tete L'Ours. *Lower Tchefuncte River Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2012) survey averages were used for chlorides, conductivity, and salinity. The UCBOD and UNBOD loading from *Lower Tchefuncte River Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2012) measured sites was used as loading for the headwaters.

Table 17

Headwater Input

Water Body	Data Source
Bayou DeZaire	The headwater flows were set to minimal flow. July 2014 in situ data was used for temperature and DO on Bayou DeZaire. *Lower Tchefuncte River Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2012) survey averages were used for chlorides, conductivity, and salinity. The UCBOD and UNBOD loading from LDEQ TMDL measured sites was used as loading for the headwaters.
Lower Tchefuncte River	The headwater flows were estimated based on critical flows for the Upper Tchefuncte River and the Bogue Falaya River. *Lower Tchefuncte River Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2012) survey averages were used for DO, temperature, chlorides, conductivity, and salinity. The UCBOD and UNBOD loading from *Lower Tchefuncte River Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2012) measured sites was used as loading for the headwaters.

Table 18

Boundary Conditions

Water Body	Data Source
W 14 Canal	Salt Bayou ambient data (Temperature, Salinity, chlorides, conductivity, and DO) and data collected for the 1987 W14 Canal WLA (CBOD and NBOD) were used for boundary conditions.
Bayou Vincent	Data collected from LDEQ TMDL Survey Site BB02 was used for boundary conditions.
Bayou Bonfouca	Data collected from LDEQ TMDL Survey Site BB07 was used for boundary conditions.
Bayou Liberty	Data collected from LDEQ TMDL Survey Site BB07 was used for boundary conditions.
Bayou Lacombe	Data collected from *Bayou Lacombe Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2012) Survey Site LP01 was used for boundary conditions.
Big Branch Bayou	Data collected from *Bayou Lacombe Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2012) Survey Site BL07 was used for boundary conditions.
Cypress Bayou	Data collected from *Bayou Lacombe Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2012) Survey Site BL08 was used for boundary conditions.
Bayou Cane	Data collected from *Bayou Cane Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2011) Survey Site BC09 was used for boundary conditions.
Bayou Castine	Data collected from *Lower Tchefuncte River Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2012) Survey Site PONT01 was used for boundary conditions.
Bayou Chinchuba	Data collected from *Lower Tchefuncte River Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2012) Survey Site PONT01 was used for boundary conditions.
Abita River	Data collected from *Abita River Survey* (LDEQ, 2009)Site BFAL01 was used for boundary conditions.

Table 18

Boundary Conditions

Water Body	Data Source
Bogue Falaya River	Data collected from *Bogue Falaya River Survey* (LDEQ, 2009) Site BFAL01 was used for boundary conditions.
Upper Tchefuncte River	Data collected from *Upper Tchefuncte River Survey* (LDEQ, 2009) Site TCHF05 was used for boundary conditions.
Ponchitolawa Creek	Data collected from *Lower Tchefuncte River Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2012) Survey Sites TCHF04 and TCHF05, and ambient data from site 106 were used for boundary conditions.
Bayou Tete L'Ours	Data collected from *Lower Tchefuncte River Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2012) Survey Sites TCHF04 and TCHF05, and ambient data from site 106 were used for boundary conditions.
Bayou DeZaire	Data collected from *Lower Tchefuncte River Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2012) Survey Sites TCHF04 and TCHF02, and ambient data from site 106 were used for boundary conditions.
Lower Tchefuncte River	Data collected from *Lower Tchefuncte River Watershed TMDL For Biochemical Oxygen-Demanding Substances* (LDEQ, 2012) Survey Site PONT01 was used for boundary conditions.

4.1.1 W14 Canal

Model Schematics and Maps

FIGURE 7

W14 CANAL

4.1.2 Bayou Vincent

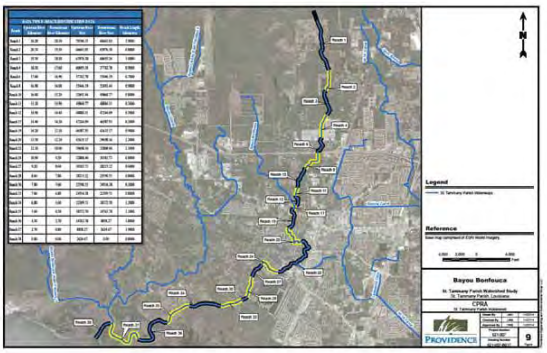
Model Schematics and Maps

FIGURE 8
BAYOU VINCENT

4.1.3 Bayou Bonfouca

Model Schematics and Maps

FIGURE 9
BAYOU BONFOUCA



4.1.4 Bayou Liberty

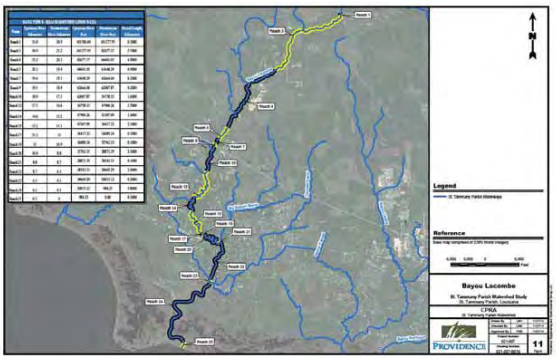
Model Schematics and Maps

FIGURE 10
BAYOU LIBERTY

4.1.5 Bayou Lacombe

Model Schematics and Maps

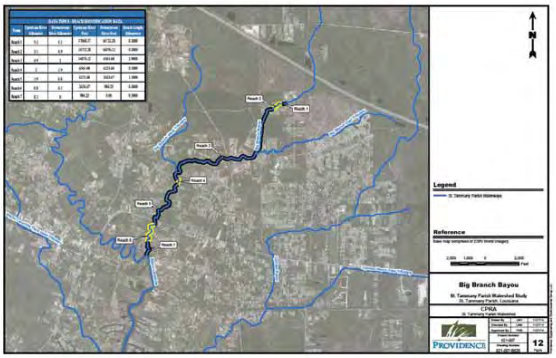
FIGURE 11
BAYOU LACOMBE



4.1.6 Big Branch

Model Schematics and Maps

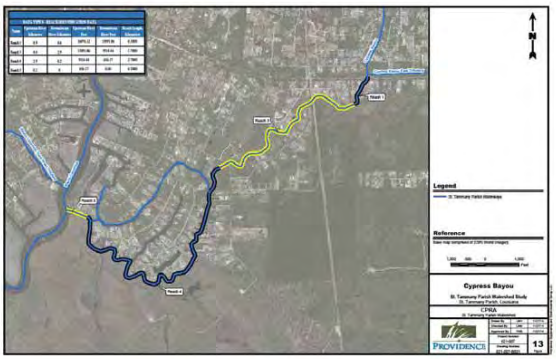
FIGURE 11
BIG BRANCH BAYOU



4.1.7 Cypress Bayou

Model Schematics and Maps

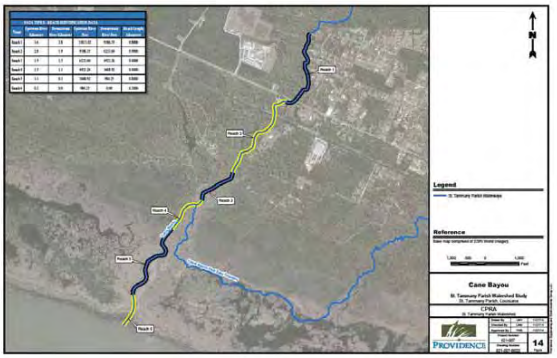
FIGURE 11
CYPRESS BAYOU



4.1.8 Bayou Cane

Model Schematics and Maps

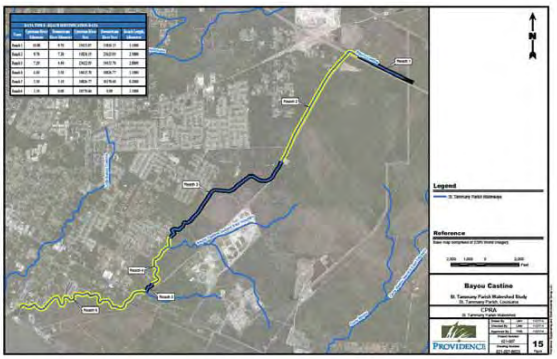
FIGURE 14
BAYOU CANE



4.1.9 Bayou Castine

Model Schematics and Maps

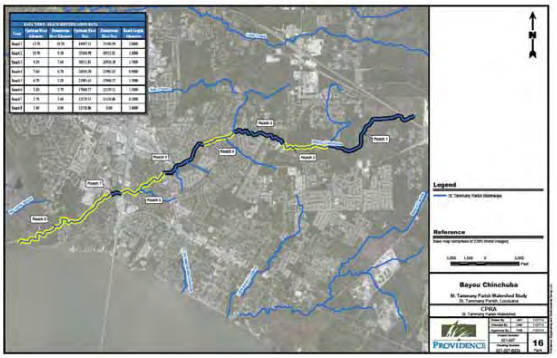
FIGURE 14
BAYOU CASTINE



4.1.10 Bayou Chinchuba

Model Schematics and Maps

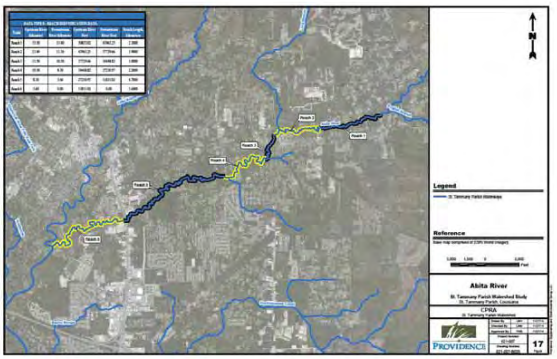
FIGURE 16
BAYOU CHINCHUBA



4.1.11 Abita River

Model Schematics and Maps

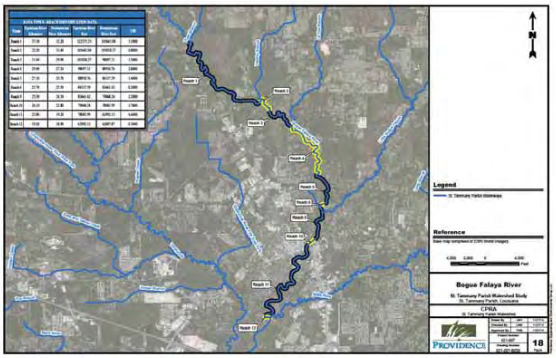
FIGURE 17
ABITA RIVER



4.1.12 Bogue Falaya

Model Schematics and Maps

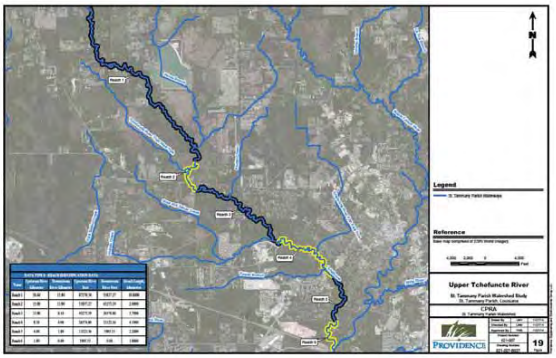
FIGURE 18
BOGUE FALAYA RIVER



4.1.13 Upper Tchefuncte

Model Schematics and Maps

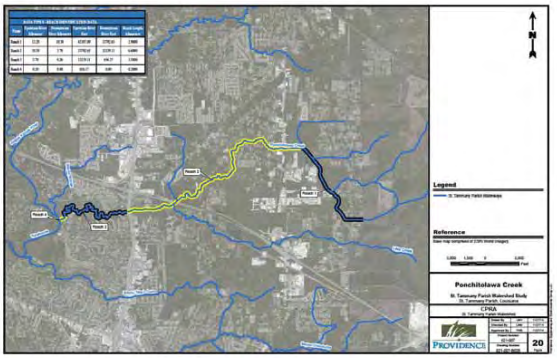
FIGURE 19
UPPER TCHEFUNCTE RIVER



4.1.14 Ponchitolawa Creek

Model Schematics and Maps

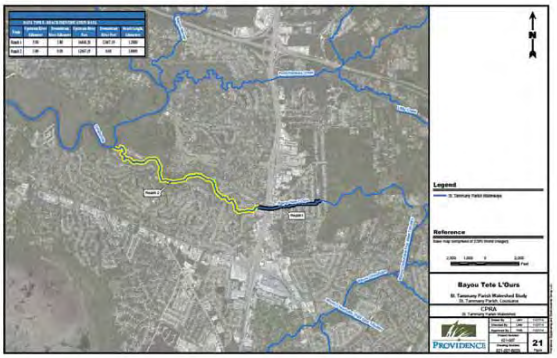
FIGURE 20
PONCHITOLAWA CREEK



4.1.15 Bayou Tete L'Ours

Model Schematics and Maps

FIGURE 21
BAYOU TETE L'OURS



4.1.16 Bayou DeZaire

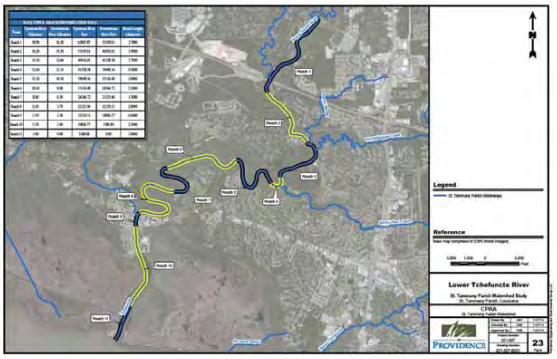
Model Schematics and Maps

FIGURE 21
BAYOU DEZAIRE

4.1.17 Lower Tchefuncte River

Model Schematics and Maps

FIGURE 21
LOWER TCHEFUNCTE RIVER



4.1.18 Calibration Models Discussion

For most of the water bodies within the Parish, a significant portion of the loading comes from man-made sources, including many permitted and unpermitted dischargers located within the watershed.

The drops in DO shown in the calibration models represents loading from commercial discharges and neighborhood facility discharges as well as unsewered subdivisions. The loading tends to travel more quickly through the upland reaches, with less time for decay and settling. Near the boundary of the upstream and tidal reaches, the stream velocity and reaeration decrease and the water body becomes somewhat stagnant. At this point, the oxygen demanding loading has its greatest impact.

Most of the urban development and dischargers are located along major highways to include Hwy 190, Interstate 12, and Interstate 10 that drain into the tributaries of the water bodies. The combination of urban development and stagnant flow cause a significant reduction in water quality in the tributaries, neighboring mainstem reaches, and upper tidal reaches.

It is observed in the lower tidal reaches (e.g. Bayou Bonfouca, Bayou Liberty, Bayou Paquet, and the Lower Tchefuncte River) where adequate tidal flow and flushing occurs, these water bodies do not experience the same water quality impacts as the upper tidal and upland reaches.

Bayou Cane is somewhat different in that the DO levels (high SOD, high resuspended CBOD and NBOD) may be influenced by the loads delivered from the relatively small number of dischargers (permitted and non-permitted) but is certainly compounded by continuous, long-term BOD loading from the wetlands adjacent to Bayou Cane and the low reaeration capacity of the bayou. Wetland seepage is very low in solids and is high in color from the dissolved tannins; it

would be expected to remain in the water column, not dropped out to be resuspended at a later time. These constituents are naturally occurring and will remain even after water quality projects are implemented.

The W14 Canal is somewhat impacted by commercial discharges and neighborhood facility discharges as well as unsewered subdivisions. However, the flow restrictions from water body modifications near the Fritchie Marsh have a significant impact on water quality in the canal.

4.2 Projection Models

Upon satisfactory completion of model runs based on existing conditions, the project team applied the calibrated model based on anticipated future conditions in the Parish using the available data. Several iterations were conducted for each projected conditions model. The iterations included alternative water quality criteria or standards and specific hydrology and/or water quality projects.

The summer critical projection loading scenario was performed at the current annual DO standard. This scenario was based on load reductions needed to obtain compliance in each water body. The General Input Data Documentation remained unchanged. A typical summer critical projection loading scenario to calculate a TMDL would have adjusted total nonpoint loads at summer season critical conditions (*i.e.* 90th percentile seasonal temperatures and summer default flows) in accordance with the Louisiana Technical Procedures (LTP), in addition to a reduction in SOD, CBOD, and NBOD based on projected conditions. However, only the BOD_5 and Ammonia concentrations were adjusted in the model to determine the concentration needed to achieve compliance in the water body. The model results are presented in **Figures 24** through **40** below.

FIGURE 24
W14 CANAL

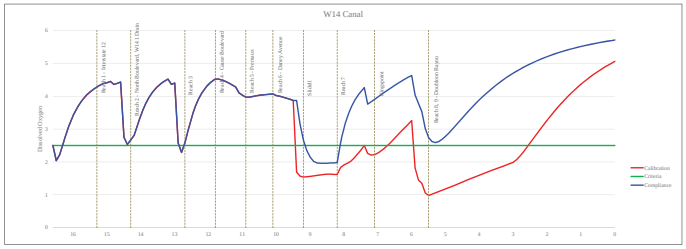


FIGURE 29
BAYOU VINCENT

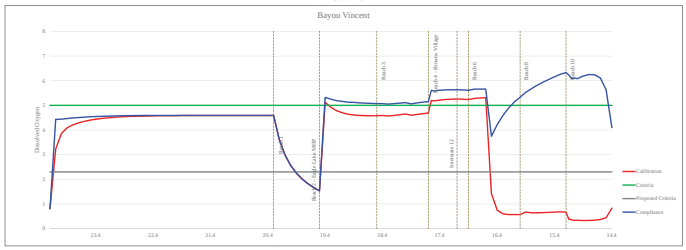


FIGURE 26
BAYOU BONFOUCA

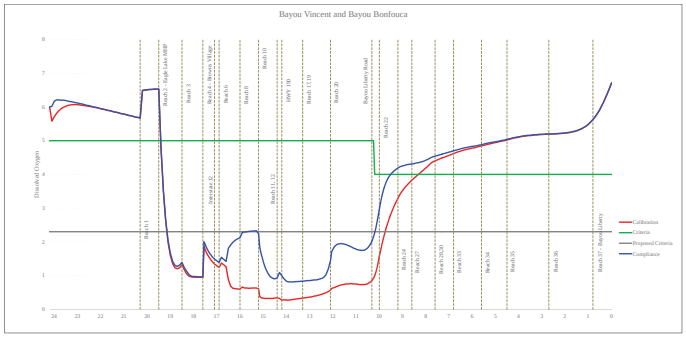


FIGURE 27
BAYOU LIBERTY

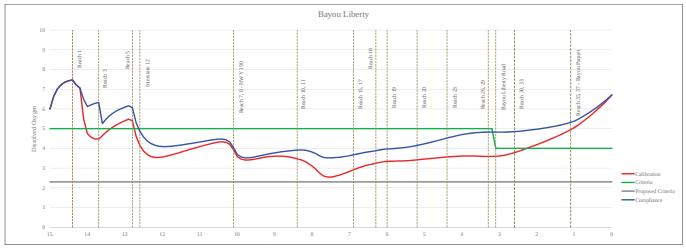


FIGURE 28
BAYOU LACOMBE

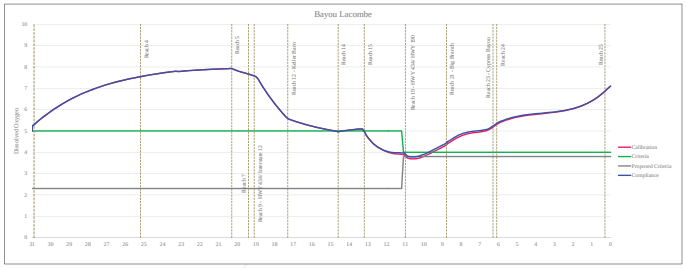


FIGURE 29
BIG BRANCH BAYOU

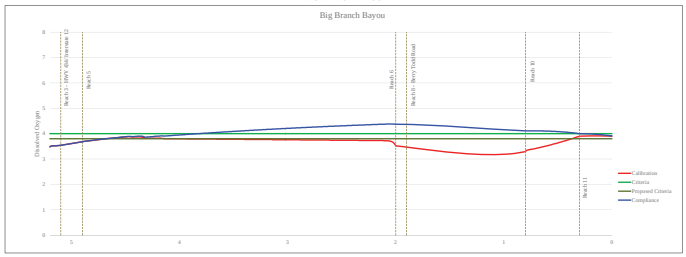


FIGURE 30
CYPRESS BAYOU

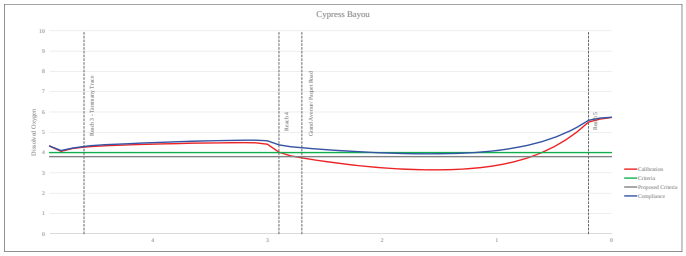


FIGURE 31
BAYOU CANE

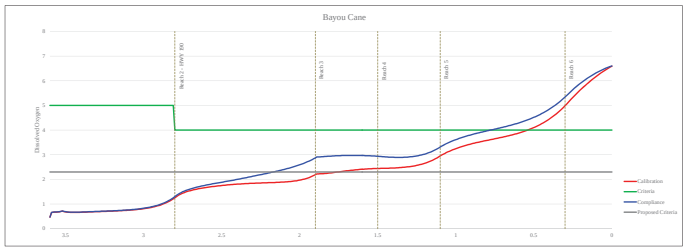


FIGURE 32
BAYOU CASTINE

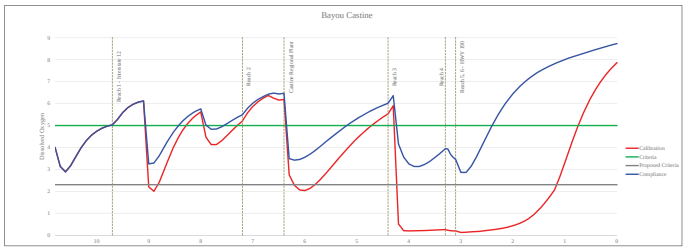


FIGURE 33
BAYOU CHINCHUBA

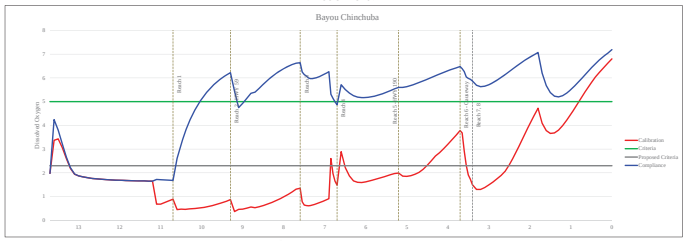


FIGURE 34
ABITA RIVER

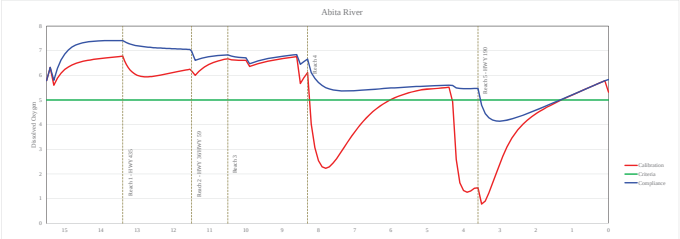


FIGURE 35
BOGUE FALAYA

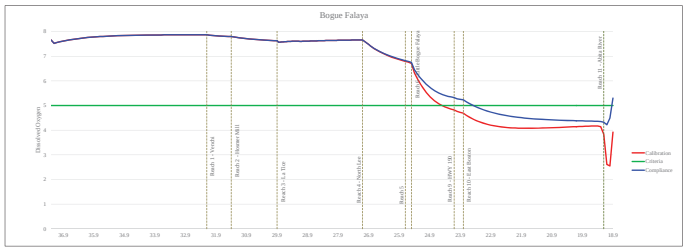


FIGURE 36
UPPER TCHEFUNCTE RIVER

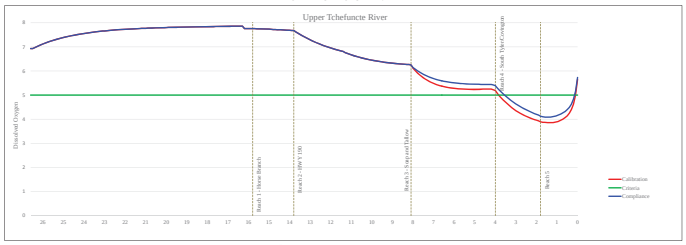


FIGURE 37
PONCHITOLAWA CREEK

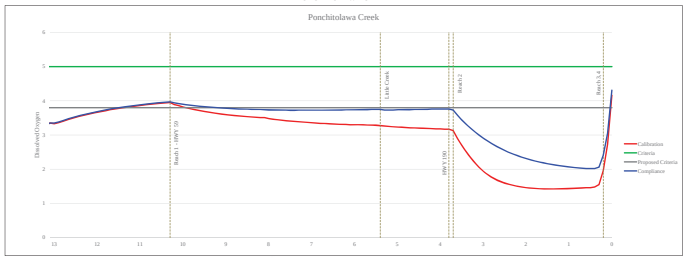


FIGURE 38
BAYOU TETE L'OURS

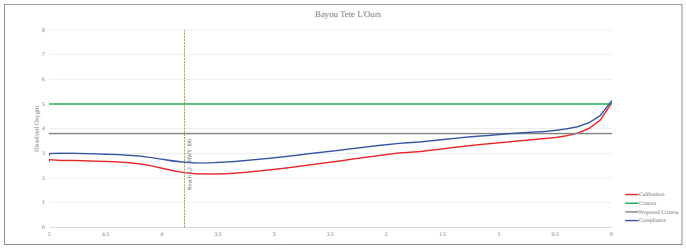


FIGURE 39
BAYOU DEZAIRE

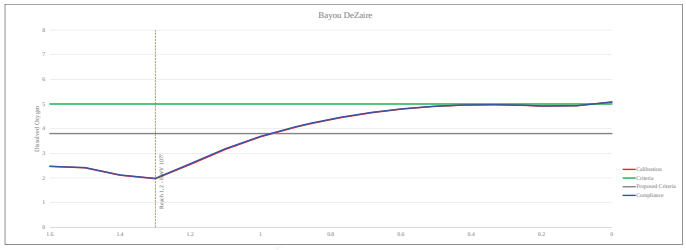
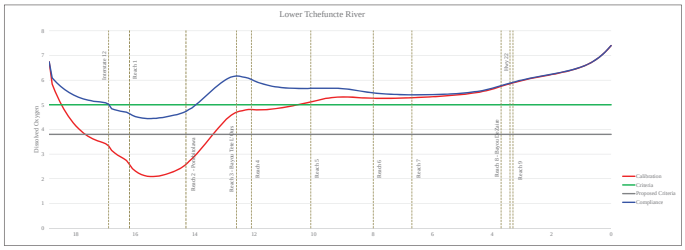


FIGURE 40
LOWER TCHEFUNCTE RIVER



5.0 EVALUATION OF PROJECTS

As part of the evaluation of alternatives, the project team has prepared a financial analysis, considering the anticipated requirements and conditions of the state's Revolving Loan Fund program. In the financial analysis, scenarios and strategies were evaluated to develop a prioritized list of projects for water quality and water quantity... The analysis was used to develop an implementable list of projects based on the study findings.

The project team developed criteria to rank and prioritize projects and alternative measures including the projects' impact to water quality (BOD_5 removal), capital cost, long term operation and maintenance costs, revenue generation potential and flood alleviation.

A financial analysis was then conducted to develop planning level costs for each project and alternative measure. The cost of each project and alternative measure was correlated with the pollutant load reduction demonstrated by the project or alternative measure. The project team also evaluated the impact of each project and alternative measure to allow economic development and future planning.

5.1 Wastewater Project Identification

The project team developed a list of sewered and un-sewered subdivisions within the parish. As part of the identification of projects, the team developed costs and conceptual design to provide sewer to the un-sewered subdivisions. The list and cost of unsewered subdivisions by watershed is included in **Section 6**.

Figures 41 through **67** in **Section 6**, show all the sewered, and un-sewered subdivisions, wastewater treatment plants and site outfalls, LDEQ discharges within each drainage basin. Also shown are the total Existing BOD_5 loads generated within each sub-basin as well as the Compliance Loads required to meet the current water quality standards.

5.2 Concept Design Development for Unsewered Sub Divisions

The report provides a list of all unsewered subdivisions within the specified drainage basins. In general, unsewered subdivisions within each basin have the potential to generate some water quality improvements in the receiving streams if sewered. Subdivisions with relatively higher residential density have a greater potential of generating water quality improvement. However, implementing these projects individually or as group may not achieve compliance with current standards in all streams. Additional evaluation factors such as potential of a project to meet water quality compliance, construction cost, life-cycle cost, and a measurement of the projects' benefit-to-cost ratio, as well the project's role in growth or alignment with Parish's planning objectives play an important role in the prioritizing implementation.

Evaluation of the relative priority of the identified projects begins with the development of conceptual designs and rough order of magnitude cost estimates to determine economic feasibility and to verify that these projects are practically implementable.

5.3 Methodology of Conceptual Level Design

The project team performed conceptual designs for sewer collection and conveyance infrastructure to two levels of detail. The conceptual designs for unsewered subdivisions which indicated higher residential density and greater potential for water quality improvement were developed to a relatively higher level of detail, and termed as Conceptual Level Designs. For the remaining unsewered subdivisions in each drainage basin (those showing a relatively lower potential for overall water quality improvements in the streams), designs and cost estimates were prepared to a lesser, pre-concept level of detail. If selected for implementation, these designs and cost estimates will require further development during the project planning stages. As previously discussed, each project consists of installing a gravity sewer collection system and pump station within an unsewered residential subdivision. The extent of each project coincides with the actual subdivision boundary as currently defined

by the Parish. At the time of implementation and detailed design of a particular project, the actual project boundary should be re-evaluated and adjusted as needed to establish more practical project boundaries based on existing conditions so as not to leave isolated pockets of unsewered homes that could be added to the project at an incremental cost, and to meet planning and growth objectives of the area.

Along with the subdivision boundaries, the design team utilized currently available GIS data consisting of street length data, number of houses, aerial photography and LIDAR information to determine the conceptual level layout of the gravity collection and conveyance system and overall general topography of the prospective project site. This information was imported into AutoDesk Civil 3D for the creation of the gravity pipe and force main pipe network. Typical plan and profile drawings are given as **Figures 41** and **42** below.

FIGURE 41
TYPICAL WASTEWATER SYSTEM CONCEPTUAL PLAN

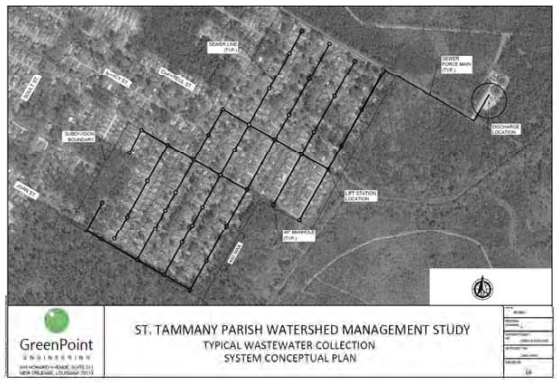
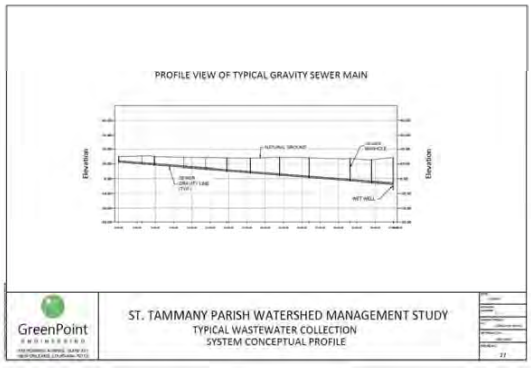


FIGURE 42
PROFILE VIEW OF TYPICAL GRAVITY SEWER MAIN



Flows for the conceptual level design were determined as described in Section 2 for each prospective project. These flows were utilized in the sizing of the gravity collection system as well as the lift stations and force mains.

Standard design guidelines for the gravity sewer system were based on *"Recommended Standards for Wastewater Facilities"*, 2004 edition, also known as the "Ten State Standards".

At the conceptual level, the gravity collection system consists of the following items:

- Sanitary Sewer Pipe – The size of a gravity sewer pipe is determine by projecting flows within the collection system. The required size of gravity pipes can vary from 8" (minimum size allowed) all the way up to 48" or more in large trunk lines. Size determination of individual pipe segments based on actual pipe by pipe flow accumulation is beyond the scope of this conceptual level design, The design team therefore utilized 10" PVC pipe as an average pipe size for conceptual design and cost considerations. The pipe slope for the gravity collection system was maintained at 0.4% to provide adequate flow velocity and to prevent solids buildup within the pipes. The pre-determined maximum depth for any gravity collection system considered as part of these designs is approximately twenty feet below grade. The 20-ft maximum depth of the proposed gravity systems is generally achievable in the region. However, a more detailed alternative evaluation should be performed in a design effort to determine an optimum depth of each gravity system. In relatively flat areas like St. Tammany Parish, depth can be mitigated by providing additional lift stations, a strategy that increases capital as well as operation and maintenance costs. Beyond this depth, installation of gravity lines becomes increasingly cost prohibitive. Pump stations were inserted at this elevation to lift the sewer flow back up to a shallower manhole or convey flow to another pump station within the project area.

- Sewer Manholes – Sewer manholes of 48-inch diameter were placed at the ends of each gravity sewer line and spaced no more than four hundred feet apart. Manholes were also placed at each pipe intersection. The minimum depth of a manhole was designated as four feet below grade and the maximum depth was designated as 18.4 feet below grade. This is generally consistent with the expected depth of a typical gravity sewer system.
- Sewer House Connections – Each structure within the project area was designated as requiring a sewer connection to the gravity sewer collection system.
- Sewer Force Mains – Sewer force mains were designed to convey the flow from the designated sewer collection basin to either: i) an existing wastewater treatment facility, ii) to the collection system of an existing treatment facility (*i.e.* an existing gravity collection system or existing pump station) or iii) to another pump station within the project boundary. The force mains were sized to maintain a minimum flow velocity of two feet per second and a maximum flow velocity of six feet per second within the pipe. The pipe diameters vary between two inches and six inches depending on flow. The length of the force main was determined once a conceptual route was established. At the conceptual level, the design team established the force main route by attempting to place the main within existing roadway or other right of ways to the maximum extent possible. Actual force main routes and discharge locations may change during the implementation and detailed design of each project for several reasons, including but not limited to adjustment of final sewer flow destination, right of way acquisition and permitting issues.
- Pump Stations – Pump stations were located at the end of each gravity collection system to convey flow to a nearby treatment facility. For conceptual level design, the design team determined the size of the pump station based on power requirements. The power, or horsepower required for a pump station is calculated based on the flow capacity of

the pumps and the head loss that will be produced by the conveyance of the flow through the force main. The pump stations vary from 5 horsepower to 15 horsepower.

There are several sewer projects that required multiple pump stations due to the length of the streets within the project area and depths reached by the gravity system as described above. In the case of multiple pump station projects, the smaller pump station(s) pump the wastewater flow to the larger pump station. From there, all flows are conveyed to the designated wastewater treatment facility for the project.

There are several projects that required multiple pump stations due to the length of the streets within the project area and depths reached by the gravity system as described above. In the case of multiple pump station projects, the smaller pump station(s) pump the wastewater flow to the larger pump station. From there, all flows are conveyed to the designated wastewater treatment facility for the project.

5.3.1 Treatment Facilities for Proposed Wastewater Projects

A general review of the potential wastewater projects indicates that construction of new, dedicated new treatment facilities for individual projects or groups of projects would not be cost effective. Further planning for the addition of several smaller wastewater facilities contradicts Parish's broader wastewater consolidation and regionalization objectives. In addition to the Parish's existing treatment facilities, the incorporated municipalities as well as the larger private utility providers have facilities that either have capacity to treat the flows from these projects or can be expanded. This approach to treatment offers a more cost effective approach to treating the wastewater flows from the proposed collection systems.

While this report does not propose specific treatment plant projects, the study team assessed the feasibility of utilizing the existing wastewater treatment

facilities in the basins as destination treatment facilities for future sewer projects. In conjunction with the Parish's Department of Environmental Services Staff, the study team examined the most practical treatment facilities for various sewer projects. This exercise also served as guide in estimating the conveyance costs of these sewer projects to a suitable treatment facility. The attribution of treatment facilities to proposed projects reflects in many cases the Parish's long-term planning and the discussions the Parish has already initiated with these potential partners.

In general, the nearest available regional treatment facility in the area was attributed with the wastewater discharges from the identified projects. The vicinity of a project to the target treatment facility also determined whether the collected wastewater would be directly pumped to the destination plant or connected by an intermediate lift station to the closest existing gravity collection system network served by the destination treatment plant.

5.4 Cost Estimates

5.4.1 Methodology for Cost Estimating

5.3.1.1. Quantity Calculations

Quantity calculations were made utilizing the functionality of the Civil 3D platform within which the conceptual level projects were designed. The design team was able to extract quantity takeoffs of all of the major gravity and conveyance systems components outlined in Section 5.2.1.1. These design components were then organized and unit prices applied to determine the conceptual level cost estimate.

5.3.1.2. Unit Prices

The unit prices used in preparing the cost estimates came from various sources, including:

- Recent bid price information from several similar construction projects in surrounding communities
- Jefferson Parish Sewer Capital Improvement Program data base of standard construction prices
- LA Department of Transportation and Development's database of recently bid state project, some of which include unit prices for similar work

5.3.1.3. Contingency

Contingencies are typically included in engineering cost estimates and represent the level of uncertainty regarding the actual project size and scope and potential unit cost fluctuations at the actual time of construction. At the conceptual level, there is a considerable amount of uncertainty in these areas; the design team therefore used a contingency factor of twenty (20) percent for these projects. This contingency factor is typically reduced as the project evolves through detailed design.

5.3.1.4. Permitting and Compliance

An estimated cost for permitting and compliance services of 0.5% of the construction cost is included in the cost estimate of each project. Permitting and compliance costs are associated with the effort required for activities related to regulatory agency requirements such as preparation of DOTD highway permits, railroad crossing permits, coordination with regulatory agencies, etc. This cost does not include mitigation costs that may be encountered if there is determined to be wetland impacts by any part of the projects. Determination of wetland impacts is beyond the scope of the conceptual level design and is one of the reasons all design for the projects are maintained within existing street or other right of ways to the maximum extent possible.

5.3.1.5. Engineering

Engineering fees of 15-percent of the construction cost are included as part of the total project costs. This cost includes basic engineering design services, i.e. preliminary design, final design, bid phase services and construction management. Also estimated in this fee is additional engineering and survey services that may be required that are not part of basic engineering services such topographic survey and geotechnical engineering.

5.5 Identification of Drainage Projects

Biochemical Oxygen Demand (BOD) and DO were the two significant parameters considered during the waterway modeling. DO can be impacted by a number of different parameters such as, total suspended solids (TSS), phosphorus, and nitrogen. There are several proven methods to address water quality in receiving waterways. Based on the geographic area and layout of the parish, the relatively low topographic relief, soil make up and limitations of the terrain, the project team focused its efforts on utilizing existing and potential locations to create storm water ponds to address water quality. The project team looked for ways to utilize the multitude of existing ponds within St. Tammany Parish as well as constructing new ponds for a different function, to improve water quality.

5.5.1 Flow Augmentation Ponds

The streams in St. Tammany Parish serve multiple functions to the Parish and its residents, including recreation and navigation. The regulation of stream flow can be utilized to maintain water quality levels during more critical conditions while continuing to serve the residents of the Parish.

Flow augmentation can be used as a partial solution to water-quality problems. In St. Tammany Parish, a relationship exists between stream discharge and the

magnitude of problems associated with low DO levels. Factors tending to increase DO in ambient waters include increased physical reaeration; decreased temperature, which increases DO solubility; and decreased nutrient concentrations resulting from dilution (thereby decreasing algal growth).

The project team looked at several different ways to help improve water quality within the receiving streams and water bodies that were analyzed throughout St. Tammany Parish. One of the methods considered and evaluated through this design alternative process was producing augmented flow ponds which would temporarily store rain water and discharge over an extended period of time with the intent of increasing the base flow to the receiving stream in order to help improve the overall DO and the base flow within the channel. The design team looked at historical rain data over a three year period within the Bayou Vincent Watershed to see if the concept of an augmented flow pond would work. Based on evaluating a three year statistical data of the rainfall at the Slidell airport during the summertime low flow conditions, enough rain falls within a ten day period, even through a period of mild drought, to recharge the augmented flows volume within a detention pond. Based on the fact that every 10 days there is enough rain within the basin in order to recharge the volume necessary to maintain a 1 cfs continuous flow 10 days after a rain event, allows for the ability to provide a base flow during the summer low flow conditions when the DO levels within the receiving stream are at their lowest state.

The team looked at several different ways of maintaining a base flow of 1 cfs discharge into a receiving stream after the normal reservoir routing has taken place. The team looked at a long broad crested weir which would vary in height roughly 12 inches to over a 10 day period to maintain 1 inch of head difference to discharge 1 cfs continuously. While this method worked on paper in that you can size and design a broad crested weir to vary in height in 1 inch increments to maintain a 1 cfs base flow, the problem was the continued maintenance required in order to remove debris, *etc.* from clogging up or affecting the ability of the weir to move up and down. The other method that was looked at in order to maintain a 1 cfs continuous flow was the installation of a pump. After much

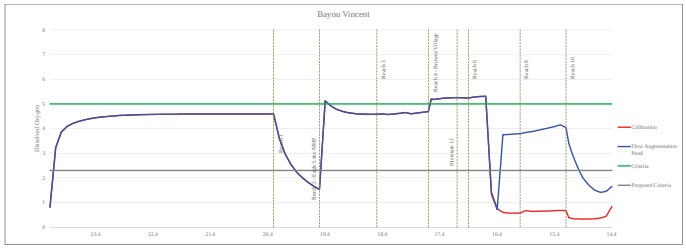
consideration by the design team, it was decided that a 1 cfs pump would provide the required flow without the concern of maintaining the broad crested variable height weir.

Although the continuous flow or augmented flow ponds provided substantial improvement to the DO on most streams, the additional water increase the BOD load and a latent drop in DO was seen in all but 1 of the waterways. Bayou Vincent was the only waterway that saw an overall benefit by using flow augmentation.

The modeling effort for this project evaluated water quality at critical low flow conditions. The project team evaluated ways to increase flow in the waterways by using long term detention, approximately 10-12 days. This water would be released at a base flow level to prevent in stream conditions from becoming stagnant, leading to water with suppressed DO levels. The project team modeled an additional 1cfs flow which showed DO improvements of up to 2 mg/L in the smaller waterways. Very little impact was seen in the larger waterways since 1cfs flow had very little effect on the larger streams flows. Several methods were considered for augmenting flow; however, the chosen delivery method was via a 1cfs pump which also allowed discharged water to run down a structure that would help elevate DO in the receiving body. Unfortunately the modeling effort identified only one location, Bayou Vincent, that didn't experience a latent drop in DO caused by additional BOD load from the added water:

1. Bayou Vincent- flow augmentation would be added to a project currently in design called the Ben Thomas Rd Detention project. Due to the size of the outfall waterway, the point in design for this project and the ease of modification, this project scores very high in cost/benefit. Based on the model, this project can increase the DO ranging from 4.04 mg/L to 3.74 mg/L. The complete cost of adding the flow augmentation component to this pond would be approximately $970,000. Plans, design details are included in **Appendix D**.

FIGURE 41
BAYOU VINCENT
FLOW AUGMENTATION POND



5.5.2 Water Quality Ponds

During the process of running models and completing cost estimates for this project the team recognized that it was not cost effective to sewer homes that were much further apart or on larger lots than what is seen in a typical neighborhood. The project team evaluated small sub-basin level ponds that could offer some sort of treatment in an effort to reduce the BOD_5 load and increase the DO in the water that would eventually find its way into the Parish's waterways. The models simulate loads during critical low flow events, however, during intermittent *de minimis* summer storms, there is a BOD_5 load associated with the discharge from these ponds. And because these minimal rain events do not produce enough flow to increase the assimilative capacity of the water body, it is considered appropriate and conservative to model the discharge from these ponds, which contains a low load, during critical conditions. Although the ponds would only discharge during a rain event, the ponds would offer treatment to partially treated sewage discharges thereby reducing the overall BOD_5 in the receiving water body. The project team identified 11 potential sub-basins where ponds could be placed to collect the high BOD_5 storm water and provide treatment before that water enters the main waterways. By capturing the "first flush" or the first 0.5" to 1" of rain fall within a sub-basin and using large surface aerators or , the BOD load could be reduced by up to 80%. The water quality ponds would function similar to wastewater treatment oxidation ponds which in accordance with the regulations at LAC 33:IX.5903 are eligible for treatment equivalent to Secondary Treatment. An 85% removal rate is required for BOD_5 according to the Louisiana Administrative Code (LAC) at LAC 33:IX.5905.A. The project team selected an 80% removal rate as a conservative measure.

It is important to note that ponds can serve multiple functions. As in most instances, ponds are designed for one function, but with some careful planning, ponds can easily be designed to serve another. One example is the Abita River Regional detention pond. This project is located on a relatively small tributary that has experienced some RL/SRL flooding downstream. The project would provide flood plain storage to decrease the water levels downstream while still

maintaining enough storage for treating water flowing from upstream on the tributary thereby improving in-stream DO levels. Plans, design details are included in **Appendix D**.

Table 19
Water Quality Ponds

Target Sub-Basin	Drainage Basin	Current BOD_5 Load (lb)	Current Total BOD_5 Load (lb)	Drainage Basin Volume (acre ft)	Drainage Area (acres)	BOD/Acre ft	Load Reduction (%)	Load Reduction (lb/d)	Final BOD_5 Load
BCSWT2	Bayou Chinchuba	62.32	147.63	13.90	1668	10.62	80.00%	49.86	12.46
BL12	Bayou Lacombe	23.99	23.99	13.53	1623	1.77	80.00%	19.19	4.80
BV1	Bayou Vincent	339.74	339.74	46.58	5589	7.29	80.00%	271.79	67.95
SATC1	Upper Tchefuncte	6.20	60.93	13.75	1650	4.43	80.00%	4.96	1.24
HC2	Upper Tchefuncte	50.43	50.43	15.35	1842	3.29	80.00%	40.34	10.09
TB 1	Upper Tchefuncte	69.19	69.19	12.94	1553	5.35	80.00%	55.35	13.84
AR3	Abita River	319.80	319.8	6.50	780	49.20	80.00%	255.84	63.96
BBWT1	Big Branch Bayou	57.16	57.16	9.15	1098	6.25	80.00%	45.73	11.43

5.5.3 Flood Control Projects

Two types of projects were identified for utilization in flood risk reduction. The first was conveyance improvements. As mentioned in Section 2, when storm water runoff exceeds the ability of a local drainage system to convey water, flooding will occur. This is often the case as land is developed and the floodway is impacted.

The second type of project is storm water detention ponds and replacement of flood plain storage. These ponds will remove a portion of the storm water runoff from the channel, thus reducing the peak flows. Thus as the water surface elevation begins to descend the storm water is released back into the channel over a longer time thus attenuating the hydrograph (peak flow in the channel). These ponds only attenuate the peak flows coming down stream which in effect lowers the water surface elevations in the channels.

1. W-14/ West Diversion East - this small pond site is located in a highly developed area of Slidell along the W-14. The area both upstream and downstream has experienced very heavy flooding in the past due to rapid growth without maintaining the necessary flood plain storage or providing detention. Therefore, this project would provide for storage lost within the basin. Although this site is only 9 acres in size, it would provide approximately 45 acre-feet of needed storm water detention.
2. Robert Road Detention Pond Extension - A portion of this site consists of an existing flood plain storage project. The proposed project would expand and lower the existing storage and increase the available depth of storage by going to the most downstream point on the W-14. This would lower the starting water surface elevation in this stretch of the W-14 canal. The project is just downstream of the W-14 /west diversion east site and would provide up to 75 acre-feet of additional flood plain storage. The strategic location of this

project on the west end of the Reine Canal, a bi-directional canal, could compliment the Tenet Regional Detention Pond currently planned on the east end of the Reine Canal. These ponds will serve as a surge buffer in the bi-directional channel which could further reduce water surface elevations in the W-14 and W-15 canals.

3. Bayou Bonfouca Regional Detention Pond- located just south of I-12, this 100 acre site would be vital to reducing the downstream flooding that has been experienced. Again, the purpose of this pond is to provide upstream detention and attenuate the peak flows. Due to the relatively flat landscape, this is the southern-most point that a detention pond of this magnitude could benefit these structures downstream along Bayou Bonfouca.
4. Belair North and Belair South—two regional detention projects aimed at reducing the RL and SRL flooding along Bayou Liberty below I-12. As noted in Burk-Klienpeter Inc.'s (BKI) *Bayou Liberty watershed management plan* these two ponds, each over 100 acres in size, can provide in excess of 1400 acre-ft of storage. As identified by BKI, these two projects along with the "Raising Tammany Trace Bridge Improvements" could provide as much as 2.0 feet of reduction in the water surface elevation during a 100 year storm.
5. Bayou Lacombe/LA 434 Corridor Pond—this project was presented in the August 2010 report from Neel-Schaffer *South Central Study Area Drainage Master Plan*. This goal of this project is to provide the necessary detention for the expected growth along the 434 corridor. The long term goal is a regional detention pond of approximately 131 surface acres with a functional depth of approximately 12 feet. While this project is geared toward providing detention for the developed portion of the site, its proximity to Bayou Lacombe could allow modification to provide storage due to tail water back up during major rain events.
6. Big Branch Detention Pond- very similar to the Bayou Bonfouca pond, this one is also located below I-12 with similar terrain. This

project was evaluated in the CDM Drainage Study prepared for the Bayou Lacombe Basin which identified placing roughly 1,180 ac-ft of storage within Big Branch Bayou. Again, this project is intended to reduce the peak flows and lower the downstream water surface elevations.

7. The remaining projects, Abita River, East Fork of the Little Bogue Falaya, Little Bogue Falaya, La Tice Branch, Venchy Branch and the upper Tchefuncte Regional Detention Ponds are all an attempt to detain and attenuate the peak flows so that the downstream waters have the ability to get out prior to the upstream peaks. These series of ponds are intended to reduce the downstream water surface elevations by providing headwater hold-up. These projects would be constructed over 10-20 years with the intent of minimizing additional flooding in an area that is experiencing a very large and intense land development.
   - The Abita River Regional Detention Pond would consist of assembling 3 parcels just north of Harrison Ave. and the Tammany Hills area which has been identified as a critical drainage area. The project would consist of a detention pond to address localized flooding in the vicinity of A Street to L Street south of Harrison Avenue as well as provide flood plain storage within the Abita River Basin. In addition to the flood control aspects, the existing pond located on 1 of the 3 parcels would be retrofitted to provide for water quality of the receiving stream. It is estimated the project would generate over 1000 ac-ft of storage within the basin as well as addressing water quality from un-sewered subdivisions within the Parish.
   - East Fork of Little Bogue Falaya Detention Pond would consist of roughly 37 acres and could provide roughly 370 acre-ft of storm water detention. The purpose of this project would be to strategically locate a pond within the Tchefuncte

River Basin along the other regional detention ponds to reduce the frequency of downstream flooding.

- Little Bogue Falaya Detention Pond would consist of roughly 72 acre detention pond providing roughly 570 acre-ft of storm water detention. This project is intended to provide similar benefits as the east fork of the Little Bogue Falaya project.
- La Tice Branch Detention Pond would consist of roughly 50 acre detention pond providing roughly 500 acre-ft of storm water detention.
- Venchy Branch Detention Pond would consist of roughly 45 acre detention pond providing roughly 675 acre-ft of storm water detention.
- Upper Tchefuncte Detention Pond would consist of roughly 180 acre detention pond providing approximately 1,800 acre-ft of storm water detention.

Based on the combination of the above projects, the Tchefuncte River Basin which could consist of 6 different detention ponds, would add about 5,000 ac-ft of storm water detention to the basin.

It should be noted that the above list of projects are not all of the potential improvements possible for these watersheds. The projects are representative of the projects that could feasibly be implemented within the watersheds. There are several more potential improvements and combinations of improvements that could be targeted which may yield higher benefits at more cost effective prices. Plans, design details for each are included in **Appendix D**.

Table 20
Storm Water Ponds

Project Name	Drainage Basin	Cost	Size (AC)
Abita River Detention Pond	Abita River	$20,858,011.00	109
Bayou Bonfouca Regional Detention Pond	Bayou Bonfouca	$25,186,983.00	109
Big Branch Detention Pond	Bayou Lacombe	$23,643,558.00	110
LA 434 Detention Pond	Bayou Lacombe	$7,829,381.00	100
Belair North Detention Pond	Bayou Liberty	$30,104,800.00	119
Belair South Detention Pond	Bayou Liberty	$17,188,457.00	72
LaTice Branch Detention Pond	Bogue Falaya River	$12,129,130.23	50
East Fork Little Bogue Falaya Detention Pond	Little Boque Falaya	$9,316,575.00	37
Little Bogue Falaya Detention Pond	Little Boque Falaya	$14,463,483.06	72
Upper Tchefuncte Detention Pond	Tchefuncte River	$44,146,512.98	180
Venchy Branch Detention Pond	Venchy Branch	$8,504,152.00	45
Robert Road Detention Pond	W-14	$3,464,768.00	25
W-14_West Diversion East	W-14	$2,411,129.00	9

6.0 BASIN SUMMARIES

6.1 W14 Canal

The W14 Canal watershed drains approximately 4,600 acres in and around the City of Slidell. The Reine Canal is a bi-directional flow canal that links the W-14 with the W-15 and ultimately drains into the Fritchie Marsh. The current LDEQ DO standard for the W14 Canal is 2.5 mg/L. The LDEQ *2012 Integrated Report Including the §303(d) List of Impaired Waterbodies* and additional data collected in July 2014 for this study indicates that the W14 Canal is not meeting the current DO standard of 2.5 mg/L.

The W14 Canal watershed currently contains 28 subdivisions with community sewage systems, 22 subdivisions with individual home sewage systems, and various individual sewage systems at remotely located businesses and residences not in designated neighborhoods.

The calculated load for these dischargers is estimated to be 120.1 lb/day for the LDEQ permitted sewage systems and 427.3 lb/day for the individual, unpermitted home sewage systems. Based on the model runs completed for this project, it is not feasible for the W14 Canal to meet the 2.5 mg/L DO standard.

To achieve compliance with the current DO standard of 2.5 mg/L, concentrations of BOD_5 were reduced to 5 mg/L or 10 mg/L for the permitted dischargers and 69 mg/L for un-sewered subdivisions based on size and location. The percent total load reduction ranged from 0% in basins where no existing loads are present to approximately 68.64% in more heavily populated areas. Even with these significant BOD_5 reductions, compliance can be achieved in only 93% of the W14 Canal at the current DO standard. **Table 20** presents the compliance BOD_5 loadings in pounds, the original BOD_5 loading in pounds, the pounds of BOD_5 removed and the percent reduction required for each sub-basin in the W14 Canal watershed.

Table 21
W14 Canal

Subbasin	Original BOD Loading	Compliance BOD Loading	lbs of BOD Removed	Percent Reduction Required
W14-1	24.23	24.23	0.00	0.00%
W14-2	0.71	0.71	0.00	0.00%
W14-3	**326.70**	**123.34**	**203.36**	**62.25%**
RC1	2.38	2.38	0.00	0.00%
RC2	4.71	4.71	0.00	0.00%
DB1	62.58	19.80	42.79	68.37%
DB2	43.13	13.98	29.16	67.60%
DB3	0.00	0.00	0.00	0.00%
DB4	74.99	23.52	51.47	68.64%
DB5	7.97	3.84	4.13	51.80%
TOTALS	**547.41**	**216.51**	**345.79**	**63.17%**

The bolded sub-basins drain to those portions (7%) of the W14 Canal where the DO standard cannot achieved with the described upgrades. Increases of BOD_5 loads in these areas, even if offset by reductions in another sub-basin of the W14 Canal, should not be allowed without significant offsets and consideration.

The data shows that the W14 Canal is overloaded with man-made point sources and significant hydro-modifications that prevent adequate downstream flow. However, reductions in BOD_5 limitations and providing sewer to unsewered neighborhood, the W14 Canal has the ability to achieve compliance with the current DO standard. The W14 Canal results are based on a limited data set. Further date collection and updates to the model will deliver more precise results.

Table 22 below provides information on the current permitted loads to the W14 Canal. The current load associated unsewered neighborhoods and cost associated with providing sewer to each neighborhood is illustrated in **Table 23**.

Table 22
W14 Canal
Existing Permitted Dischargers

Subbasin	Permit Number	Facility Name	Flow GPD	BOD_5 Load lb/day
DB1	LAG531559	Uniamercas	1171.91	0.29
DB1	LAG533843	Hartzell Mt Zion United Methodist Church & Family Life Center	1171.91	0.29
DB2	LAG470208	Cryer Car Care	1171.91	0.44
DB2	LAG534368	Slidell Community Baptist Church	585.96	0.22
DB5	LAG570033	LA Water Service Inc - Village Acadian Subdivision	23438.27	1.95
RC2	LAG532073	Covenant Baptist Church	1171.91	0.29
W14-1	LAG531734	I-12 Shell	1171.91	0.29
W14-1	LAG480662	Jubilee #4815	234.38	0.06
W14-3	LAG532152	Norvell Inc - HHJ Joint Realty Ventures	1171.91	0.29
W14-3	LA0047180	SLIDELL	922037.90	76.90
W14-3	LA0049794	KINGSPOINT	348208.00	29.04
W14-3	LAG470018	Craig's Automotive Center	1171.91	0.44
W14-3	LAG531507	Dunaway - Dollar General	1171.91	0.29
W14-3	LAG470169	Frank's Accurate Body Shop	1171.91	0.44
W14-3	LAG531847	Gulf States Marble	1171.91	0.29
W14-3	LAG530281	Guest Lodge LLC	1171.91	0.29

Table 22
W14 Canal
Existing Permitted Dischargers

Subbasin	Permit Number	Facility Name	Flow GPD	BOD_5 Load lb/day
W14-3	LAG540167	Azalea Lane Trailer Park	5859.57	1.47
W14-3	LAG530814	Iglesia Rey De Reyes	585.96	0.22
W14-3	LAG530159	Pub Zero #2 Inc	1171.91	0.29
W14-3	LA0101648	Southwest Engineers	421.89	0.11
W14-3	LAG530010	Topper World of Slidell Inc	1171.91	0.29
W14-3	LAG533737	J J Food Store	585.96	0.22
W14-3	LAG532289	Parish Cab Inc	1171.91	0.29
W14-3	LAG531310	Prisma Enterprises LLC - Children's International Medical Group	1171.91	0.29
W14-3	LAG531418	GLBJ LLC Dunaway Office - Retail Center - Chinese King	1171.91	0.29
W14-3	LAG531506	Daiquiri's Now	1171.91	0.29
W14-3	LAG531610	Interstate Plaza	585.96	0.22
W14-3	LAG531603	Lamb of God Lutheran Church	1171.91	0.29
W14-3	LAG531940	The Lion's Den Karate Academy	1171.91	0.29
W14-3	LAG531887	Don Wolsefer Office Warehouse	585.96	0.22
W14-3	LAG531804	Department of Motor Vehicles	1171.91	0.29
W14-3	LAG531761	JVG LLC - JVG Burkes Office Park STP	1171.91	0.29

Table 22
W14 Canal
Existing Permitted Dischargers

Subbasin	Permit Number	Facility Name	Flow GPD	BOD_5 Load lb/day
W14-3	LAG532108	1453 Lindberg - Office Building	1171.91	0.29
W14-3	LAG532122	Lindberg Square STP	1171.91	0.29
W14-3	LAG532180	Joy Fellowship Church of Slidell Inc - Joy Fellowship Church	1171.91	0.29
W14-3	LAG532266	GLBJ LLC - Dunaway Ice WWTP	1171.91	0.29
W14-3	LAG532566	CJS Real Estate LLC - Linburg Glen Retail Development	1171.91	0.29
W14-3	LAG533001	AGL Associates Inc - WWTP	585.96	0.22
W14-3	LAG750742	Slidell Truck Wash LLC	234.38	0.06
W14-3	LAG750879	Pit Stop Car Wash - S&H Car Wash Inc	234.38	0.06
W14-3	LAG534016	Dunaway Bros Inc - Lishman's City Market	585.96	0.22
W14-3	LAG470342	Jesse Bergens - Jesse's Jeeps	1171.91	0.44
W14-3	LAG470349	Triola's of Slidell LLC	1171.91	0.44

With respect to flood control projects in the W-14 and W-15 basins, several projects have been completed and more are currently in design which help alleviate the frequency of flooding within the basin. Two additional projects identified in the modeling of the W-14 basin are the W-14/West Diversion East Pond and the Robert Road Detention Pond extension.

The proposed W-14/ West Diversion East pond site is located in a highly developed area of Slidell along the W-14 canal. The area both upstream and downstream has experienced very heavy flooding in the past due to rapid growth without maintaining the necessary flood plain storage or providing detention. Therefore, this project would provide for storage lost within the basin. Although this site is only 9 acres in size, it would provide approximately 45 acre-feet of needed storm water detention.

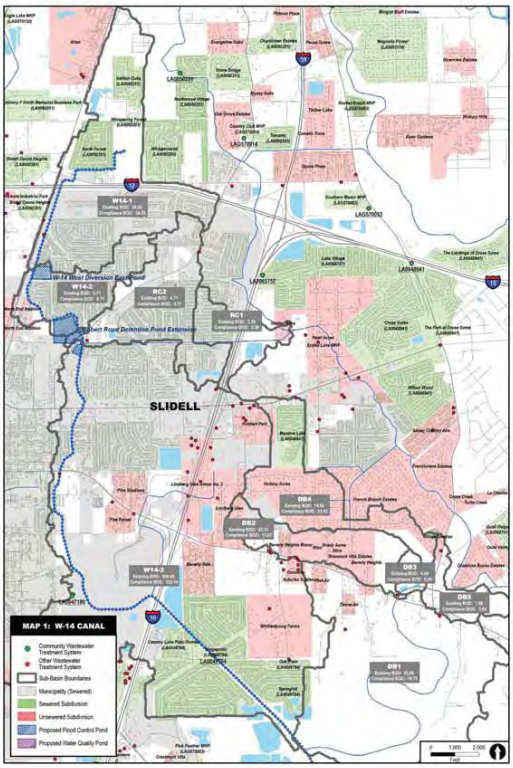
The proposed Robert Road Detention Pond Extension consists of an existing flood plain storage project. The proposed project would expand and lower the existing storage and increase the available depth of storage by going to the most downstream point on the W-14. This would lower the starting water surface elevation in this stretch of the W-14 canal. The project is just downstream of the W-14 /west diversion east site and would provide up to 75 acre-feet of additional flood plain storage. The strategic location of this project on the west end of the Reine Canal, a bi-directional canal, could compliment the Tenet Regional Detention Pond currently planned on the east end of the Reine Canal. These ponds will serve as a surge buffer in the bi-directional channel which could further reduce water surface elevations in the W-14 and W-15 canals. Additional information pertaining to project specifics, location of project, and project cost on the Flood Control projects are located in **Appendix D**. .

With respect to flooding due to storm surge no structures in the W-14 basin are listed as RL/SRL.

Table 23
W-14 Canal

Project Subdivision Name	BASIN	Total Number of New Customers	Total Sewer Project Cost ($)	Total Water Project Cost ($)	Total Projects Cost ($)	BOD Load Reduction (Lb)	BOD Reduction Cost ($/Lb)
Bel-Air	W-14 Canal	14	$ 581,700.00	$ -	$ 581,700.00	4.8	$ 121,900.00
Beverly Heights	W-14 Canal	21	$ 1,059,900.00	$ -	$ 1,059,900.00	7.1	$ 148,300.00
Beverly Heights Manor	W-14 Canal	42	$ 1,059,900.00	$ -	$ 1,059,900.00	14.7	$ 72,200.00
Beverly Hills	W-14 Canal	183	$ 5,514,000.00	$ 1,757,300.00	$ 7,271,300.00	60.9	$ 119,500.00
Dunaway	W-14 Canal	8	$ 460,300.00	$ 177,900.00	$ 638,200.00	2.7	$ 234,100.00
French Branch Estates	W-14 Canal	308	$ 15,275,000.00	$ -	$ 15,275,000.00	104.6	$ 146,000.00
Holiday Acres	W-14 Canal	44	$ 3,712,700.00	$ 680,500.00	$ 4,393,200.00	15.1	$ 291,000.00
Lindburg Glenn	W-14 Canal	80	$ 2,382,700.00	$ 839,700.00	$ 3,222,400.00	28.0	$ 115,300.00
Lindburg Glenn Annex II	W-14 Canal	42	$ 2,688,700.00	$ 604,000.00	$ 3,292,700.00	14.4	$ 228,300.00
Ozone Air	W-14 Canal	24	$ 972,600.00	$ 283,900.00	$ 1,256,500.00	8.2	$ 153,600.00
Ozone Woods	W-14 Canal	816	$ 24,522,800.00	$ -	$ 24,522,800.00	253.1	$ 96,900.00
Pine Forest	W-14 Canal	49	$ 3,091,200.00	$ 654,800.00	$ 3,746,000.00	10.7	$ 350,300.00
Pine Shadows	W-14 Canal	124	$ 4,217,900.00	$ 1,154,500.00	$ 5,372,400.00	41.3	$ 129,900.00
Roberts Park	W-14 Canal	57	$ 2,397,500.00	$ 834,800.00	$ 3,232,300.00	19.9	$ 162,300.00
Shady Acres	W-14 Canal	16	$ 717,000.00	$ 191,100.00	$ 908,100.00	5.4	$ 167,100.00
Shamrock Villa	W-14 Canal	13	$ 795,400.00	$ 210,300.00	$ 1,005,700.00	4.4	$ 227,800.00
Slico	W-14 Canal	4	$ 269,200.00	$ 129,900.00	$ 399,100.00	1.4	$ 293,800.00
Suburba Gardens	W-14 Canal	9	$ 614,900.00	$ 293,300.00	$ 908,200.00	3.1	$ 296,100.00
Village Acadian	W-14 Canal	25	$ 747,900.00	$ -	$ 747,900.00	8.5	$ 88,100.00
Whitmesbourg Farms	W-14 Canal	38	$ 2,490,800.00	$ 853,200.00	$ 3,344,000.00	12.7	$ 264,000.00
Totals		***1,917***	***$ 73,572,100.00***	***$ 8,665,200.00***	***$ 82,237,300.00***	***621***	***$ 132,400.00***

FIGURE 44
W14 CANAL



6.2 Bayou Vincent

The Bayou Vincent Basin drains approximately 6,826 acres on the west side of Slidell. Bayou Vincent is located within the Bayou Bonfouca Basin above LA Highway 433 and therefore has the same DO standard as Bayou Bonfouca of 5 mg/L. The LDEQ *2012 Integrated Report Including the §303(d) List of Impaired Waterbodies* and the *Bayou Liberty and Bayou Bonfouca Watershed TMDL for Biochemical Oxygen-Demanding Substances*(LDEQ, 2011), indicate that Bayou Vincent by virtue of being located within the Bayou Bonfouca watershed is not meeting the current DO standard. In the *Bayou Liberty and Bayou Bonfouca TMDL for Biochemical Oxygen-Demanding Substances*, LDEQ stated the DO standard for Bayou Bonfouca and therefore, Bayou Vincent may be inappropriate and suggests a DO standard of 2.3 mg/L.

The Bayou Vincent Basin currently contains four subdivisions with community sewage systems, 13 subdivisions with individual home sewage systems, and various individual sewage systems at remotely located businesses and residences not in designated neighborhoods.

The calculated load for these dischargers is estimated to be 9.1 lb/day for the LDEQ permitted sewage systems and 428.7 lb/day for the individual, unpermitted home sewage systems. Based on the model runs completed for this project, it is not feasible for Bayou Vincent to meet the 5.0 mg/L DO standard.

To achieve compliance with the current DO standard of 5.0 mg/L, concentrations of BOD_5 were reduced to 5 mg/L for permitted dischargers and un-sewered subdivisions. The percent total load reduction ranged from 96.96% to approximately 97.73%. Even with these significant BOD_5 reductions, compliance can only be achieved in 51% of Bayou Vincent at the current DO standard. In the *Bayou Liberty and Bayou Bonfouca Watershed TMDL for Biochemical Oxygen-*

Demanding Substances (LDEQ, 2011), LDEQ stated the DO standards may be inappropriate and suggests an updated DO standard 2.3 mg/L. If LDEQ revises the DO standards to 2.3 mg/L, compliance would be achieved in 96% of Bayou Vincent.

Table 24 presents the compliance BOD_5 loadings in pounds, the original BOD_5 loading in pounds, the pounds of BOD_5 removed and the percent reduction required for each sub-basin in the Bayou Vincent watershed.

Table 24 Bayou Vincent				
Subbasin	**Original BOD Loading**	**Compliance BOD Loading**	**lbs of BOD Removed**	**Percent Reduction Required**
BV1	**342.09**	**10.39**	**331.70**	**96.96%**
BV2	58.97	1.34	57.63	97.73%
BV3	0.33	0.01	0.32	97.73%
WD1	36.41	1.00	35.41	97.26%
TOTALS	**437.80**	**12.74**	**425.06**	**97.09%**

The bolded sub-basins drain those portions (4%) of Bayou Vincent where the DO standard cannot achieved with the described upgrades. Increases of BOD_5 loads in these areas, even if offset by reductions in another sub-basin of Bayou Vincent, should not be allowed without significant offsets or consideration.

The above discussion and data demonstrates that the Bayou Vincent DO standard is inappropriate and overloaded with man-made point sources. However, reducing the BOD_5 limitations of current permitted dischargers to 5 mg/L and sewering all unsewered neighborhoods did not achieve compliance with the current DO standard but has the ability to achieve compliance with the proposed standard in 96% of the bayou.

Table 25 below provides information on the current permitted loads to Bayou Vincent. The current load associated unsewered neighborhoods and cost associated with providing sewer to each neighborhood is illustrated in **Table 26**.

Table 25 Bayou Vincent Existing Permitted Dischargers				
Subbasin	**Permit Number**	**Facility Name**	**Flow GPD**	**BOD_5 Load lb/day**
BV1	LAG530198	Circle K Store #7678	1171.91	0.29
BV1	LAG570066	STA Ltd Partnership - Stones Throw	23438.27	1.95
BV1	LAG570120	EAGLE MHP	30523.50	2.55
BV1	LAG490031	Brown's Village Road Sand Pit	1171.91	0.44
BV1	LAG532382	J&K Management LLC	1171.91	0.29
BV1	LAG110052	Lafarge North America Inc - Slidell Plant	1171.91	0.44
BV1	LAG480553	Ellis Recycling Inc	1171.91	0.29
BV1	LA0109495	Wadleigh Industries Inc dba Offshore Equipment Solutions	46.88	0.01
BV1	LAG531447	Kastner Enterprises LLC - Tuff Storage Rentals	1171.91	0.29
BV1	LAG531511	Johnson Apartments	1171.91	0.29
BV1	LAG531526	Venson Harold Seal Apartments	1171.91	0.29
BV1	LAG532253	Platform Crane - Bldg 2	1171.91	0.29
BV1	LAG533000	RDG Properties LLC - Southeast LA Veterans Healthcare System & Omni Engineering	585.96	0.22
BV1	LAG533762	Louis Ochoa Investments LLC - Morgan Apartments	585.96	0.22

Table 25 Bayou Vincent Existing Permitted Dischargers				
Subbasin	**Permit Number**	**Facility Name**	**Flow GPD**	**BOD_5 Load lb/day**
WD1	LAG533337	Northshore Utility Co Inc - Northshore Mobile Home Park	1171.91	0.29
WD1	LAG530274	John's Automotive Machine Shop Inc	1171.91	0.29
WD1	LAG531494	Charter Communications	1171.91	0.29
WD1	LAG531786	JGILS - J&D Investments	1171.91	0.29

Bayou Vincent- flow augmentation would be added to a project currently in design called the Ben Thomas Rd Detention project. Due to the size of the outfall waterway, the point in design for this project and the ease of modification, this project scores very high in cost/benefit. Based on the model, this project can increase the DO ranging from 4.04 mg/L to 3.74 mg/L. Additional information pertaining to project specifics, location of project, and project cost on the Water Quality Ponds and are located in **Appendix D**. The complete cost of adding the flow augmentation component to this pond would be approximately $970,000. The current load and load removal for the Water Quality pond is illustrated in **Table 26.**

Table 26
Water Quality Ponds

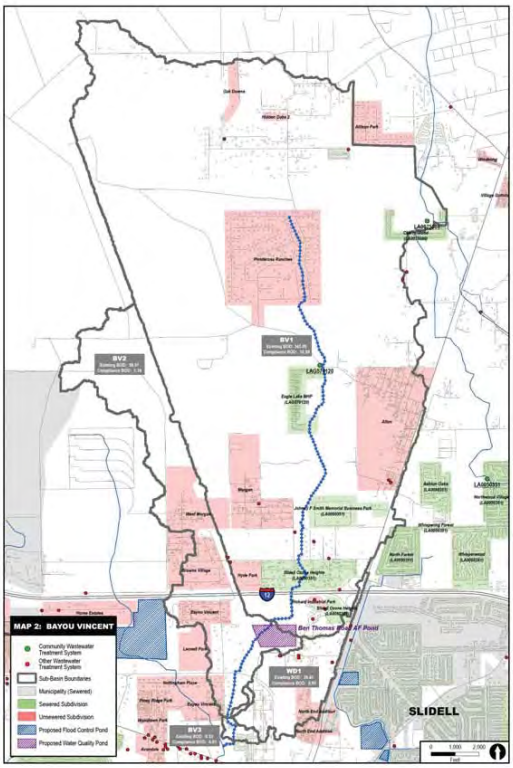
Target Sub-Basin	Drainage Basin	Current BOD_5 Load (lb)	Current Total BOD_5 Load (lb)	Drainage Basin Volume (acre ft)	Drainage Area (acres)	BOD/Acre ft	Load Reduction (%)	Load Reduction (lb/d)	Final BOD_5 Load
BV1	Bayou Vincent	339.74	339.74	46.58	5589	7.29	80.00%	271.79	67.95

With respect to flooding due to storm surge no structures in the Bayou Vincent basin are listed as RL/SRL.

Table 27
Bayou Vincent

Project Subdivision Name	BASIN	Total Number of New Customers	Total Sewer Project Cost ($)	Total Water Project Cost ($)	Total Projects Cost ($)	BOD Load Reduction (Lb)	BOD Reduction Cost ($/Lb)
Alton	Bayou Vincent	190	$ 12,523,800.00	$ 3,893,500.00	$ 16,417,300.00	59.7	$ 275,100.00
Bayou Vincent (SUB)	Bayou Vincent	75	$ 3,689,900.00	$ 1,079,800.00	$ 4,769,700.00	23.6	$ 201,800.00
Browns Village	Bayou Vincent	45	$ 3,718,200.00	$ 1,185,100.00	$ 4,903,300.00	12.0	$ 407,700.00
Hidden Oaks 2	Bayou Vincent	5	$ 474,200.00	$ 88,400.00	$ 562,600.00	1.6	$ 355,700.00
Hyde Park	Bayou Vincent	9	$ 1,095,600.00	$ 317,000.00	$ 1,412,600.00	2.8	$ 502,100.00
Morgan	Bayou Vincent	82	$ 6,256,800.00	$ -	$ 6,256,800.00	25.6	$ 244,100.00
North End (Vincent)	Bayou Vincent	46	$ 2,610,300.00	$ 663,400.00	$ 3,273,700.00	14.7	$ 222,400.00
Oak Downs	Bayou Vincent	3	$ 6,720,000.00	$ 2,438,400.00	$ 9,158,400.00	0.9	$ 9,651,500.00
Ponderosa Ranches	Bayou Vincent	222	$ 14,403,900.00	$ -	$ 14,403,900.00	70.2	$ 205,100.00
West Morgan	Bayou Vincent	62	$ 4,755,900.00	$ 1,528,600.00	$ 6,284,500.00	16.6	$ 378,200.00
Totals		***739***	***$ 56,248,600.00***	***$ 11,194,200.00***	***$ 67,442,800.00***	***228***	***$ 296,000.00***

FIGURE 45
BAYOU VINCENT



6.3 Bayou Bonfouca

The Bayou Bonfouca Basin drains approximately 16,401 acres in and around the City of Slidell. Bayou Vincent, Bayou Liberty and Bayou Paquet drain into Bayou Bonfouca. The current LDEQ DO standard for Bayou Bonfouca from the headwaters to LA Highway 433 is 5 mg/L and the DO standard from LA Highway 433 to Lake Pontchartrain is 4 mg/L. The LDEQ *2012 Integrated Report Including the §303(d) List of Impaired Waterbodies* and the *Bayou Liberty and Bayou Bonfouca Watershed TMDL for Biochemical Oxygen-Demanding Substances* (LDEQ, 2011), indicate that Bayou Bonfouca is not meeting the current DO standard. In the *Bayou Liberty and Bayou Bonfouca TMDL for Biochemical Oxygen-Demanding Substances* (LDEQ, 2011), LDEQ notes that the 4.0 and 5.0 mg/L DO standards for Bayou Bonfouca may be inappropriate and suggest an updated DO standard of 2.3 mg/L.

The Bayou Bonfouca Basin currently contains 16 subdivisions with community sewage systems, 25 subdivisions with individual home sewage systems, and various individual sewage systems at remotely located businesses and residences not in designated neighborhoods.

The calculated load for these dischargers is estimated to be 17.6 lb/day for the LDEQ permitted sewage systems and 413.4 lb/day for the individual, unpermitted home sewage systems. Based on the model runs completed for this project, it is not feasible for Bayou Bonfouca to meet the 4.0 mg/L or 5.0 mg/L DO standards or the proposed standard of 2.3 mg/L.

To achieve compliance with the current DO standard of 4.0 mg/L or 5.0 mg/L, concentrations of BOD_5 were reduced to 5 mg/L and 10 mg/L for permitted dischargers and un-sewered subdivisions depending on size and location. The percent total load reduction ranged from 0% in sub-basins with no existing loads to approximately 96.93% in more heavily populated areas. Even with these significant

BOD_5 reductions, compliance can only be achieved in 53% of Bayou Bonfouca at the current DO standards. If LDEQ revises the DO standards to 2.3 mg/L, compliance would be achieved in 58% of Bayou Bonfouca. Because Bayou Bonfouca is unable to meet the proposed DO standard of 2.3 mg/L for a majority of the stream, it is likely the water body is naturally dystrophic and any DO standard during the summer months may be inappropriate.

Table 28 presents the compliance BOD_5 loadings in pounds, the original BOD_5 loading in pounds, the pounds of BOD_5 removed and the percent reduction required for each sub-basin in the Bayou Bonfouca watershed.

Table 28
Bayou Bonfouca

Subbasin	Original BOD Loading	Compliance BOD Loading	lbs of BOD Removed	Percent Reduction Required
BBF1	**247.44**	**7.60**	**239.84**	**96.93%**
BBF2	249.21	248.97	0.24	0.09%
BBF3	0.00	0.00	0.00	0.00%
TOTALS	**496.65**	**256.58**	**240.07**	**48.34%**

The bolded sub-basins drain to those portions (42%) of Bayou Bonfouca where the DO standard cannot be achieved with the described upgrades. Increases of BOD_5 loads in these areas, even if offset by reductions in another sub-basin of Bayou Bonfouca, should not be allowed without significant offsets and consideration.

The above discussion and data demonstrates that the Bayou Bonfouca DO standard is inappropriate and overloaded with man-made point sources. Because the model runs demonstrate that consolidation projects and sewering of individual treatment systems would not bring the bayou into compliance with the existing standard or

the proposed standard, the Parish should petition the LDEQ to update the DO standard for Bayou Bonfouca as a naturally dystrophic water body.

Table 29 below provides information on the current permitted loads to Bayou Bonfouca. The current load associated unsewered neighborhoods and cost associated with providing sewer to each neighborhood is illustrated in **Table 30**.

Table 29
Bayou Bonfouca
Existing Permitted Dischargers

Subbasin	Permit Number	Facility Name	Flow GPD	BOD_5 Load lb/day
BBF1	LAG533518	Cut-Rite Inc - Cut-Rite/Northshore Driveline	117.19	0.04
BBF1	LAG470293	Advantage Tire & Wheel	1171.91	0.44
BBF1	LAG470303	Jung's Automotive Inc	1171.91	0.44
BBF1	LAG533431	Randall A Evans DDS LLC	117.19	0.03
BBF1	LAG533501	Rowland Duffour Clinic Inc PMC	117.19	0.03
BBF1	LA0122459	Northshore Chemical LLC	1.64	0.00
BBF1	LAG530200	American Furniture	1171.91	0.29
BBF1	LAG530736	Ernest Walder	1171.91	0.29
BBF1	LAG540932	Piney Ridge MHP	5859.57	1.47
BBF1	LAG533440	S&H Good Eats Cafe	1171.91	0.29
BBF1	LAG540642	Coastal Property Holdings LLC - Shady Pines Mobile Home Park	5859.57	1.47
BBF1	LAG530811	Skater's Paradise	1171.91	0.29
BBF1	LAG532783	Blue Bell Creameries LP	1171.91	0.29
BBF1	LAG533427	Speedy G's #1	253.13	0.10
BBF1	LAG533633	Circle K #1689	1171.91	0.29
BBF1	LAG750602	Terminix - Home Estates Drive Office Project	234.38	0.06

Table 29
Bayou Bonfouca
Existing Permitted Dischargers

Subbasin	Permit Number	Facility Name	Flow GPD	BOD_5 Load lb/day
BBF1	LAG531318	Tymeless Flooring Inc	1171.91	0.29
BBF1	LAG531938	Acadiana Stor-N-Lock	1171.91	0.29
BBF1	LAG532329	Peace Lutheran Church - RV Units	1171.91	0.29
BBF1	LAG532580	Good Shepherd Lutheran Church	1171.91	0.29
BBF1	LAG470290	St Tammany Brake Tag Center - St Tammany Wholesale LLC	1171.91	0.44
BBF1	LAG533301	Guardian Angel Learning Center	1171.91	0.29
BBF1	LAG533559	Pentecost Missionary Baptist Church of Slidell	585.96	0.22
BBF1	LAG533399	Honaker Funeral Home & Cemeteries Inc - Honaker Funeral Home Forest Lawn Cemetery	421.89	0.16
BBF1	LAG470301	Coco's Auto/Truck Repair	1171.91	0.44
BBF1	LAG533457	Janice & Leonard Brown Commercial Property	585.96	0.22
BBF1	LA0125539	Slidell Seafood West LLC	117.19	0.03
BBF1	LAG533422	Lee's Hamburgers Inc	1171.91	0.29
BBF1	LAG533465	Flowers Baking Co of New Orleans LLC	585.96	0.22
BBF1	LAG533505	John L's Plumbing Inc	585.96	0.22
BBF1	LAG533838	Alfred A Singer - Warehouse	585.96	0.22

Table 29
Bayou Bonfouca
Existing Permitted Dischargers

Subbasin	Permit Number	Facility Name	Flow GPD	BOD_5 Load lb/day
BBF1	LAG533976	Yusuf Hasan - Fourplex Property	1171.91	0.29
BBF1	LAG530943	New Life Ministries	585.96	0.22
BBF1	LAG530987	South Seas Restaurant	1171.91	0.29
BBF2	LAG470233	Slidell Easy Pay Tire Store	234.38	0.06
BBF2	LAG480493	Textron Marine & Land Systems Inc	234.38	0.06
BBF2	LAG570065	Coin Du Lestin	29238.30	2.44
BBF2	LA0109461	Pearl River Navigation LLC	1171.91	0.29
BBF2	LAG534381	Acadian Veterinary Clinic	585.96	0.22
BBF2	LAG540085	Acadian Garden Condominums	5859.57	1.47
BBF2	LAG570166	STP - Oakwood Estates	4482.10	0.37
BBF2	LAG531327	Tu Tai Inc	1171.91	0.29
BBF2	LAG750907	Maritime Systems Inc - Slidell Facility	234.38	0.06
BBF2	LAG532176	Slidell Marine Inc	1171.91	0.29
BBF2	LAG531773	Carroll Road Building - STP Construction	1171.91	0.29
BBF2	LAG532075	ARC Mechanical Contractors Inc	1171.91	0.29
BBF2	LAG533292	Casadaban Marine Services	1171.91	0.29

Table 29
Bayou Bonfouca
Existing Permitted Dischargers

Subbasin	Permit Number	Facility Name	Flow GPD	BOD_5 Load lb/day
BBF2	LA0124877	Coastal Marine Contractors LLC (CMC) - Main Yard - Ship & Barge Repair Facility	70.31	0.02
BBF2	LAG533333	Ozone Aggregates	18.75	0.01
BBF2	LAG533302	Romar Services Inc - Warehouse	1171.91	0.29
BBF2	LAG533343	Carolyn Draperies	585.72	0.22
BBF2	LAG750881	Rain Forest Express of Slidell LLC	234.38	0.06

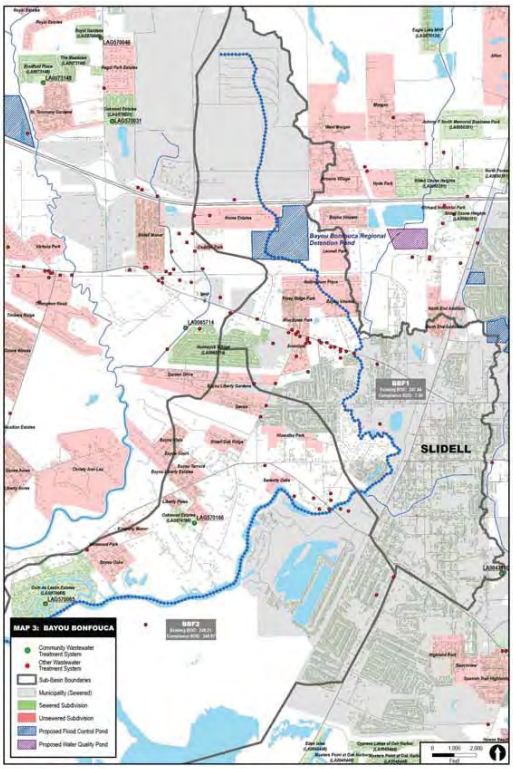
Table 30
Bayou Bonfouca

Project Subdivision Name	BASIN	Total Number of New Customers	Total Sewer Project Cost ($)	Total Water Project Cost ($)	Total Projects Cost ($)	BOD Load Reduction (Lb)	BOD Reduction Cost ($/Lb)
Avondale	Bayou Bonfouca	37	$ 2,387,900.00	$ 687,100.00	$ 3,075,000.00	11.8	$ 260,300.00
Bayou Court	Bayou Bonfouca	9	$ 392,400.00	$ 247,900.00	$ 640,300.00	2.6	$ 246,900.00
Bayou Liberty Estates	Bayou Bonfouca	80	$ 6,122,700.00	$ -	$ 6,122,700.00	22.6	$ 271,500.00
Bayou Liberty Gardens	Bayou Bonfouca	66	$ 4,815,500.00	$ -	$ 4,815,500.00	21.7	$ 221,600.00
Bayou Oaks	Bayou Bonfouca	46	$ 3,729,700.00	$ -	$ 3,729,700.00	12.5	$ 299,300.00
Bayou Terrace	Bayou Bonfouca	16	$ 732,300.00	$ 440,800.00	$ 1,173,100.00	4.6	$ 254,500.00
Bayou Vincent	Bayou Bonfouca	32	$ 1,871,900.00	$ 723,200.00	$ 2,595,100.00	10.1	$ 257,400.00
Devon	Bayou Bonfouca	47	$ 1,217,300.00	$ 1,294,800.00	$ 2,512,100.00	13.5	$ 185,500.00
Hiawatha Park	Bayou Bonfouca	1	$ 864,300.00	$ 27,900.00	$ 892,200.00	0.3	$ 3,057,700.00
Home Estates	Bayou Bonfouca	18	$ 1,278,700.00	$ 387,200.00	$ 1,665,900.00	5.7	$ 293,700.00
Kimberly Manor	Bayou Bonfouca	8	$ 463,100.00	$ -	$ 463,100.00	2.2	$ 213,700.00
Liberty Pines	Bayou Bonfouca	24	$ 820,700.00	$ -	$ 820,700.00	6.5	$ 126,200.00
North End (Bonfuca)	Bayou Bonfouca	35	$ 1,285,200.00	$ 500,200.00	$ 1,785,400.00	11.0	$ 162,600.00
Nottingham	Bayou Bonfouca	33	$ 1,317,100.00	$ -	$ 1,317,100.00	10.4	$ 126,700.00
Piney Ridge Park	Bayou Bonfouca	95	$ 2,802,600.00	$ -	$ 2,802,600.00	29.9	$ 93,600.00
Serenity Oaks	Bayou Bonfouca	4	$ 493,800.00	$ -	$ 493,800.00	1.1	$ 455,600.00
Slidell Oak Ridge	Bayou Bonfouca	32	$ 1,314,400.00	$ -	$ 1,314,400.00	9.2	$ 142,600.00
Wildwood Park	Bayou Bonfouca	9	$ 307,200.00	$ 233,200.00	$ 540,400.00	2.4	$ 221,600.00
Woodlawn Park	Bayou Bonfouca	57	$ 1,241,400.00	$ 500,100.00	$ 1,741,500.00	18.0	$ 97,000.00
Totals		***649***	***$ 33,458,200.00***	***$ 5,042,400.00***	***$ 38,500,600.00***	***196***	***$ 196,400.00***

As it relates to a flood control projects the proposed Bayou Bonfouca Regional Detention Pond would be located just south of I-12. This 100 acre site would be vital to reducing the downstream flooding that has been experienced in the area. Again, the purpose of this pond is to provide upstream detention in an effort to attenuate the peak flows. Due to the relatively flat landscape, this is the southern-most point that a detention pond of this magnitude could benefit these structures downstream along Bayou Bonfouca.

With respect to flooding due to storm surge approximately 661 structures in the Bayou Bonfouca Basin are listed as RL/SRL. Of those approximately 209 have already been elevated which leaves a balance of 452 remaining to be mitigated. Relocation and elevation are likely the only cost effective solutions to mitigate the risk of future flooding. Additional information pertaining to project specifics, location of project, and project cost on the Flood Control projects are located in **Appendix D**.

FIGURE 46
BAYOU BONFOUCA



6.4 Bayou Liberty

The Bayou Liberty Basin drains approximately 27,230 acres. Bayou Paquet drains into Bayou Liberty. The current LDEQ DO standard for Bayou Liberty from the headwaters to LA Highway 433 is 5 mg/L and the DO standard from LA Highway 433 to Lake Pontchartrain is 4 mg/L. The LDEQ *2012 Integrated Report Including the §303(d) List of Impaired Waterbodies* and the *Bayou Liberty and Bayou Bonfouca Watershed TMDL for Biochemical Oxygen-Demanding Substances* (LDEQ, 2011), indicate that Bayou Liberty is not meeting the current DO standard. In the *Bayou Liberty and Bayou Bonfouca TMDL for Biochemical Oxygen-Demanding Substances* (LDEQ, 2011), LDEQ notes that the 4.0 and 5.0 mg/L DO standards for Bayou Liberty may be inappropriate and suggest an updated DO standard of 2.3 mg/L.

The Bayou Liberty Basin currently contains six subdivisions with community sewage systems, 34 subdivisions with individual home sewage systems, and various individual sewage systems at remotely located businesses and residences not in designated neighborhoods.

The calculated load for these dischargers is estimated to be 48.9 lb/day for the LDEQ permitted sewage systems and 1039.97 lb/day for the individual, unpermitted home sewage systems. Based on the model runs completed for this project, it is not feasible for Bayou Liberty to meet the 4.0 mg/L or 5.0 mg/L DO standards. However, Bayou Liberty has the ability to meet the proposed DO standard through completion of sewer projects and upgrades within the basin.

To achieve compliance with the current DO standard of 4.0 mg/L and 5.0 mg/L, concentrations of BOD_5 were reduced to 5 mg/L, 10 mg/L, and 30 mg/L for permitted dischargers and un-sewered subdivisions based on size and location. The percent total load reduction ranged from 0% in sub-basin with no existing loads to approximately 92.81% in more heavily populated areas. Even with these significant

BOD_5 reductions, compliance can only be achieved in 37% of Bayou Liberty at the current DO standards. If LDEQ revises the DO standards to 2.3 mg/L, compliance would be achieved in 100% of Bayou Liberty.

Table 31 presents the compliance BOD_5 loadings in pounds, the original BOD_5 loading in pounds, the pounds of BOD_5 removed and the percent reduction required for each sub-basin in the Bayou Liberty watershed.

Table 31
Bayou Liberty

Subbasin	Original BOD Loading	Compliance BOD Loading	lbs of BOD Removed	Percent Reduction Required
BLIB1	0.00	0.00	0.00	0.00%
BLIB2	0.00	0.00	0.00	0.00%
BLIB3	15.75	3.60	12.15	77.14%
BLIB4	126.44	9.09	117.35	92.81%
BLIB5	523.82	54.47	469.35	89.60%
BLIB6	390.35	390.35	0.00	0.00%
BLIB7	11.71	11.71	0.00	0.00%
BLIB8	20.79	20.79	0.00	0.00%
TOTALS	**1088.87**	**490.02**	**598.85**	**55.00%**

The above discussion and data demonstrates that the Bayou Liberty DO standard is inappropriate and overloaded with man-made point sources. Bayou Liberty did not achieve compliance with the current DO standards but it has the ability to achieve compliance with the proposed DO standards in 100% of the in the bayou with consolidation project and sewering of individual treatment systems.

Table 32 below provides information on the current permitted loads to Bayou Liberty. The current load associated unsewered neighborhoods and cost associated with providing sewer to each neighborhood is illustrated in **Table 33**.

Table 32
Bayou Liberty
Existing Permitted Dischargers

Subbasin	Permit Number	Facility Name	Flow GPD	BOD_5 Load lb/day
BLIB3	LAG570046	Royale Gardens	10395.00	0.87
BLIB3	LAG530916	Andy Knight	1171.91	0.29
BLIB3	LAG530895	Northshore Squadron	1171.91	0.29
BLIB4	LAG533438	Fernandez-Zimmerle LLC	585.96	0.22
BLIB4	LA0090409	Sunbelt Innovative Plastics LLC	117.19	0.03
BLIB4	LAG570031	Oakmount Subdivision	23347.80	1.95
BLIB4	LAG532103	Cleco Power LLC - Slidell Service Center	1171.91	0.29
BLIB4	LAG531763	Baker Sales Inc - Baker Sales Warehouse	1171.91	0.29
BLIB4	LAG531763	Baker Sales Inc - Baker Sales Warehouse	1171.91	0.29
BLIB4	LAG531519	Beau's Air Conditioning & Heating LLC	1171.91	0.29
BLIB4	LAG531527	G&S Bear Enterprises LLC	1171.91	0.29
BLIB4	LAG532174	CalWes Properties LLC - CalWes Center	1171.91	0.29
BLIB4	LAG531861	Hanna Brothers Enterprises LLC - Hanna Brother Extreme Motion Picture Catering	1171.91	0.29
BLIB4	LAG531980	Gause West Properties LLC - Shopping Center for Faye Wagner	1171.91	0.29
BLIB4	LAG532037	Ochsner Clinic	1171.91	0.29

Table 32
Bayou Liberty
Existing Permitted Dischargers

Subbasin	Permit Number	Facility Name	Flow GPD	BOD_5 Load lb/day
BLIB4	LAG532293	GBR Properties Inc - Advance Auto	1171.91	0.29
BLIB4	LAG532559	Airgas USA LLC	1171.91	0.29
BLIB4	LAG532786	CRS Properties LLC - Albers AC & Heating	1171.91	0.29
BLIB4	LAG533803	Equity Creek Real Estate LLC	585.96	0.22
BLIB4	LAG532887	All American Lodge Greatest in Elkdom	1171.91	0.29
BLIB4	LAG533686	ABC Electric	585.96	0.22
BLIB4	LAG533101	M & R File Service LLC - Russell & Michelle Bolotte	1171.91	0.29
BLIB4	LAG533393	Carl Hodge Rental	585.96	0.22
BLIB4	LA0125351	Sparrows Offshore LLC	117.19	0.03
BLIB4	LA0125334	Diversified Oil Field Services Inc	23.44	0.01
BLIB5	LAG530716	Bayou Liberty Water Association	1171.91	0.29
BLIB5	LAG532809	Herron Wire Products Inc	1171.91	0.29
BLIB5	LA0073148	The Meadows	224095.00	18.69
BLIB5	LA0065714	Louisiana Water Service Inc - Huntwyck Village	65158.39	5.43
BLIB5	LAG532824	2315 Hwy 190 Building	1171.91	0.29
BLIB5	LAG570109	Curtis Environmental Utilities Inc - Timber Ridge Subdivision	23438.27	1.95

Table 32
Bayou Liberty
Existing Permitted Dischargers

Subbasin	Permit Number	Facility Name	Flow GPD	BOD_5 Load lb/day
BLIB5	LAG531992	The Southern District of the Lutheran Church - Missouri Synod	1171.91	0.29
BLIB5	LAG530650	St Tammany Parish Police Jury - Thompson Road WWTP	1171.91	0.29
BLIB5	LAG531535	Pit Stop #3	1171.91	0.29
BLIB5	LAG531327	Liberty Food Store	1171.91	0.29
BLIB5	LAG532825	Thompson Road Grocery	1171.91	0.29
BLIB5	LAG480616	Waste Management of Louisiana LLC - Slidell	1171.91	0.29
BLIB5	LAG750317	Sunlover Carwash LLC	234.38	0.06
BLIB5	LAG470187	Level Ten Motorsports	1171.91	0.44
BLIB5	LAG541304	Butera Investments Inc - Lake Castle Private School	5859.57	1.47
BLIB5	LAG470178	J&J Auto Brokers	234.38	0.06
BLIB5	LAG531777	Louisiana Lumber Inc - Construction Project	1171.91	0.29
BLIB5	LAG531454	ABC Supply Co Inc	1171.91	0.29
BLIB5	LAG541174	Indian Hills RV Park	5859.57	1.47
BLIB5	LAG531717	Dollar General Store #6578	1171.91	0.29
BLIB5	LAG541455	Jolly Investments LLC - Jolly Investments Apartments	5859.57	1.47
BLIB5	LAG532056	Omni Storage VI LLC	585.96	0.22

Table 32
Bayou Liberty
Existing Permitted Dischargers

Subbasin	Permit Number	Facility Name	Flow GPD	BOD_5 Load lb/day
BLIB5	LAG532799	Seventh-Day Adventist Church - WWTP	1171.91	0.29
BLIB5	LAG532861	2319 Hwy 190 Building	1171.91	0.29
BLIB5	LAG532860	2317 Hwy 190 Building	1171.91	0.29
BLIB5	LAG532904	Assunta Restaurant of Slidell Inc - Assunta's Italian Restaurant	1171.91	0.29
BLIB5	LAG532890	Lion Consulting Inc - Lion Multimedia & Consulting	1171.91	0.29
BLIB5	LAG532842	Chill Rite	1171.91	0.29
BLIB6	LAG531273	Acts-1 Tax Service	1171.91	0.29
BLIB6	LAG531273	A-1 Remodeling & Building Inc	1171.91	0.29
BLIB6	LAG531330	Bayou Liberty Marina	1171.91	0.29
BLIB6	LAG531465	Bonfouca Marina LLC	1171.91	0.29
BLIB6	LAG532165	Thompson Road Baptist Church - WWTP	1171.91	0.29
BLIB6	LAG470244	Accurate Alignment	1171.91	0.44
BLIB6	LAG532770	All American Cargo Elevators LLC - All American Cargo Elevators LLC - WWTP	1171.91	0.29
BLIB6	LAG532800	St Genevieve Catholic Church - WWTP	1171.91	0.29
BLIB6	LAG541758	Henry Mayfield Elementary School	5859.57	1.47

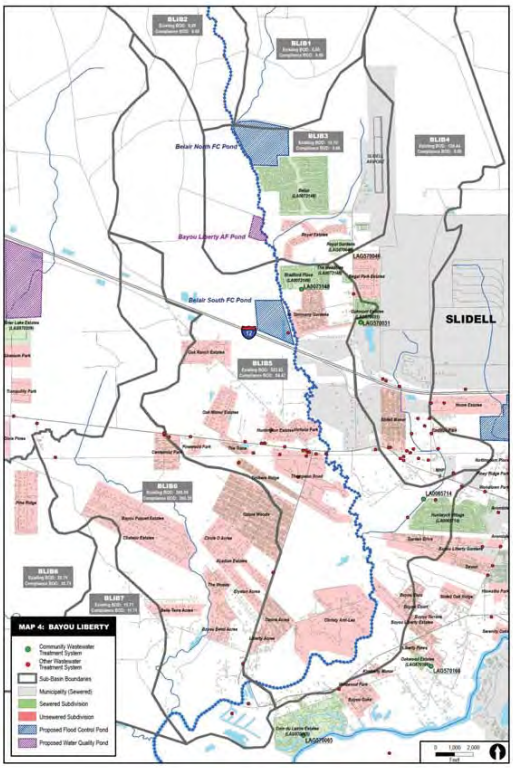
With respect to flood control projects within the Bayou Liberty Basin the proposed Belair North and Belair South regional detention projects are aimed at reducing the RL and SRL flooding along Bayou Liberty below I-12. As noted in Burk-Klienpeter Inc.'s (BKI) "Bayou Liberty watershed management plan" these two ponds, each over 100 acres in size, can provide in excess of 1400 acre-ft of storage for peak storm water flows. As identified by BKI, these two projects along with the "Raising Tammany Trace Bridge Improvements" could provide as much as 2.0 feet of reduction in the water surface elevation duringa100yearstorm.

With respect to flooding due to storm surge approximately 112 structures in the Bayou Liberity Basin are listed as RL/SRL. Of those approximately 31 have already been elevated which leaves a balance of 81 remaining to be mitigated. Relocation and elevation are likely the only cost effective solutions to mitigate the risk of future flooding. Additional information pertaining to project specifics, location of project, and project cost on the Flood Control projects are located in Appendix D.

Table 33
Bayou Liberty

Project Subdivision Name	BASIN	Total Number of New Customers	Total Sewer Project Cost ($)	Total Water Project Cost ($)	Total Projects Cost ($)	BOD Load Reduction (Lb)	BOD Reduction Cost ($/Lb)
Acadian Estates	Bayou Liberty	35	$ 3,713,600.00	$ -	$ 3,713,600.00	10.9	$ 342,100.00
Bayou Bend Acres	Bayou Liberty	25	$ 1,392,400.00	$ 741,500.00	$ 2,133,900.00	7.8	$ 275,200.00
Bayou Paquet Estates	Bayou Liberty	92	$ 7,343,500.00	$ 2,459,100.00	$ 9,802,600.00	25.7	$ 381,200.00
Bayou Vista	Bayou Liberty	47	$ 1,832,800.00	$ -	$ 1,832,800.00	13.5	$ 135,400.00
Belle Terre Acres	Bayou Liberty	15	$ 1,542,600.00	$ 400,900.00	$ 1,943,500.00	4.2	$ 463,500.00
Cadillac Park	Bayou Liberty	19	$ 643,400.00	$ 164,500.00	$ 807,900.00	6.0	$ 135,000.00
Centennial Park	Bayou Liberty	68	$ 5,510,900.00	$ 1,907,100.00	$ 7,418,000.00	19.9	$ 371,900.00
Chateau Estates	Bayou Liberty	43	$ 3,513,000.00	$ 1,149,300.00	$ 4,662,300.00	12.0	$ 387,900.00
Christie Ann Lee	Bayou Liberty	68	$ 5,935,000.00	$ 2,164,600.00	$ 8,099,600.00	19.5	$ 415,200.00
Circle O Acres	Bayou Liberty	26	$ 2,092,000.00	$ 771,200.00	$ 2,863,200.00	8.1	$ 355,000.00
Elysian Acres	Bayou Liberty	20	$ 1,468,800.00	$ -	$ 1,468,800.00	6.2	$ 236,800.00
Garden Drive	Bayou Liberty	46	$ 2,490,200.00	$ -	$ 2,490,200.00	15.6	$ 160,000.00
Huntington	Bayou Liberty	30	$ 1,460,200.00	$ -	$ 1,460,200.00	9.3	$ 157,500.00
Liberty Acres	Bayou Liberty	45	$ 1,559,700.00	$ -	$ 1,559,700.00	12.9	$ 120,800.00
Oak Manor	Bayou Liberty	43	$ 1,929,500.00	$ 646,400.00	$ 2,575,900.00	13.3	$ 193,900.00
Oak Ranch	Bayou Liberty	28	$ 2,448,200.00	$ 831,700.00	$ 3,279,900.00	8.7	$ 379,200.00
Ozone Acres	Bayou Liberty	120	$ 3,117,800.00	$ -	$ 3,117,800.00	34.4	$ 90,600.00
Ozone Park	Bayou Liberty	178	$ 3,683,000.00	$ 1,231,200.00	$ 4,914,200.00	56.1	$ 87,600.00
Pine Ridge	Bayou Liberty	69	$ 4,804,600.00	$ 1,844,300.00	$ 6,648,900.00	19.3	$ 344,700.00
Pinewood Park	Bayou Liberty	5	$ 494,800.00	$ 96,000.00	$ 590,800.00	1.4	$ 420,900.00
Regal Park	Bayou Liberty	51	$ 2,717,400.00	$ -	$ 2,717,400.00	13.6	$ 199,400.00
Royal Estates	Bayou Liberty	41	$ 2,109,600.00	$ 718,900.00	$ 2,828,500.00	13.6	$ 208,400.00
Slidell Manor	Bayou Liberty	259	$ 6,885,500.00	$ -	$ 6,885,500.00	81.6	$ 84,400.00
St. Tammany Gardens	Bayou Liberty	140	$ 3,797,900.00	$ 1,402,700.00	$ 5,200,600.00	46.3	$ 112,200.00
The Trace	Bayou Liberty	40	$ 818,200.00	$ 245,100.00	$ 1,063,300.00	11.2	$ 94,700.00
The Woods	Bayou Liberty	48	$ 4,229,700.00	$ -	$ 4,229,700.00	14.9	$ 284,100.00
Thompson Road	Bayou Liberty	33	$ 5,061,000.00	$ 1,791,600.00	$ 6,852,600.00	9.6	$ 711,800.00
Timber Ridge	Bayou Liberty	111	$ 1,917,300.00	$ 691,700.00	$ 2,609,000.00	34.4	$ 75,800.00
Victoria Park	Bayou Liberty	29	$ 1,003,600.00	$ 304,300.00	$ 1,307,900.00	9.0	$ 146,000.00
Totals		***1,774***	***$ 85,516,200.00***	***$ 19,562,100.00***	***$ 105,078,300.00***	***539***	***$ 195,000.00***

FIGURE 47
BAYOU LIBERTY



6.5 Bayou Lacombe

The Bayou Lacombe watershed drains approximately 42,295 acres in and around Lacombe. Big Branch Bayou and Cypress Bayou drain into Bayou Lacombe. The current LDEQ DO standard for Bayou Lacombe from the headwaters to US Highway 190 is 5 mg/L and the DO standard from US Highway 190 to Lake Pontchartrain is 4 mg/L. The LDEQ *2012 Integrated Report Including the §303(d) List of Impaired Waterbodies* and the *Bayou Lacombe Watershed TMDL for Biochemical Oxygen-Demanding Substances* (LDEQ, 2012), indicate that Bayou Lacombe is not meeting current DO standard. In the *Bayou Lacombe Watershed TMDL for Biochemical Oxygen-Demanding Substances* (LDEQ, 2012), LDEQ notes that the DO standard for Bayou Lacombe from the headwaters to US Highway 190 may be inappropriate and suggested a DO standard of 2.3 mg/L and the DO standard from US Highway 190 to Lake Pontchartrain may be inappropriate and suggested a DO standard of 3.8 mg/L.

The Bayou Lacombe Basin currently contains one subdivision with a community sewage system, 40 subdivisions with individual home sewage systems, and various individual sewage systems at remotely located businesses and residences not in designated neighborhoods.

The calculated load for these dischargers is estimated to be 22.75 lb/day for the LDEQ permitted sewage systems and 606.3 lb/day for the individual, unpermitted home sewage systems. Based on the model runs completed for this project, it is not feasible for Bayou Lacombe to meet the 4.0 mg/L or 5.0 mg/L DO standard in the portion of the bayou near US Highway 190. However, Bayou Lacombe has the ability to meet the proposed 3.8 mg/L DO standard.

To achieve compliance with the current DO standards of 4.0 mg/L and 5.0 mg/L, concentrations of BOD_5 were reduced to 10 mg/L for permitted dischargers and 30 mg/L for the un-sewered subdivisions around the US Highway 190 area. The

percent total load reduction ranged from 0% in basins where no existing loads are present to approximately 85.71% in more heavily populated areas. With these significant BOD_5 reductions, compliance can only be achieved in 84% of Bayou Lacombe at the current DO standards. If LDEQ revises the DO standards to 2.3 mg/L and 3.8 mg/L, compliance would be achieved in 99% of Bayou Lacombe. **Table 34** presents the compliance BOD_5 loadings in pounds, the original BOD_5 loading in pounds, the pounds of BOD_5 removed and the percent reduction required for each sub-basin in the Bayou Lacombe watershed.

Table 34
Bayou Lacombe

Subbasin	Original BOD Loading	Compliance BOD Loading	lbs of BOD Removed	Percent Reduction Required
BL1	1.27	1.27	0.00	0.00%
BL11	2.80	2.80	0.00	0.00%
BL12	24.00	24.00	0.00	0.00%
BL13	24.90	24.90	0.00	0.00%
BL14	1.55	1.55	0.00	0.00%
BL15	5.88	5.88	0.00	0.00%
BL16	0.00	0.00	0.00	0.00%
BL17	39.69	39.69	0.00	0.00%
BL18	0.00	0.00	0.00	0.00%
BL19	4.71	4.71	0.00	0.00%
BL2	19.38	19.38	0.00	0.00%
BL20	8.15	8.15	0.00	0.00%
BL21	11.15	11.15	0.00	0.00%
BL5	76.15	75.95	0.20	0.26%
BL7	**35.70**	**6.58**	**29.13**	**81.57%**
BL8	**23.72**	**3.39**	**20.33**	**85.71%**

Table 34
Bayou Lacombe

Subbasin	Original BOD Loading	Compliance BOD Loading	lbs of BOD Removed	Percent Reduction Required
BL8WT	0.00	0.00	0.00	0.00%
BL9	48.72	48.72	0.00	0.00%
BLFWT1	40.16	40.14	0.00	0.00%
BLFWT2	8.63	8.63	0.00	0.00%
BLTET	57.75	57.75	0.00	0.00%
BLTWT1	36.55	36.55	0.00	0.00%
BLTWT2	58.50	55.79	2.71	4.64%
BLTWT3	43.65	43.09	0.56	1.29%
BLTWT4	50.86	50.86	0.00	0.00%
NDS1-1	2.91	2.91	0.00	0.00%
NDS1-2	0.00	0.00	0.00	0.00%
NDS1-3	0.32	0.32	0.00	0.00%
NDS2-2	1.93	1.93	0.00	0.00%
TOTALS	**629.05**	**576.11**	**52.92**	**8.41%**

The bolded sub-basins drain to those portions (1%) of Bayou Lacombe where the DO standard cannot achieved with the described upgrades. Increases of BOD_5 loads in these areas, even if offset by reductions in another sub-basin of Bayou Lacombe, should not be allowed without significant offsets and consideration.

The above data demonstrates that Bayou Lacombe is overloaded with man-made point sources in the US Highway 190 area. However, with reductions in BOD_5 limitations and providing sewer to unsewered neighborhoods, Bayou Lacombe did not achieve compliance with the current DO standards but it has the ability to achieve compliance with the proposed DO standard in 99% of the in the bayou. **Table 35** below provides information on the current permitted loads to Bayou

Lacombe. The current load and load removal for the Water Quality Pond is illustrated in **Table 36**. Additional information pertaining to project specifics, location of project, and project cost on the Water Quality Ponds and Flood Control projects are located in Appendix D. The current load associated unsewered neighborhoods and cost associated with providing sewer to each neighborhood is illustrated in **Table 37**.

Table 35
Bayou Lacombe
Existing Permitted Dischargers

Subbasin	Permit Number	Facility Name	Flow GPD	BOD_5 Load lb/day
BL1	LAG531264	US Fish & Wildlife Service - Southeast Louisiana Refuges	1171.91	0.29
BL12	LAG480356	St Tammany Parish Government - Keller Barn	70.31	0.02
BL13	LAG530822	First NBC Bank Holding Co	1171.91	0.29
BL13	LAG480263	Pavestone LLC of Delaware - Lacombe Crushing Plant	234.38	0.06
BL13	LAG531123	Coast Concrete Service Inc	1171.91	0.29
BL13	LAG570479	St Tammany Parish Government - Medcath - LA Medical Center & Heart Hospital	23438.27	1.95
BL13	LAG531308	North Shore Unitarian Universalist Society of LA Inc	1171.91	0.29
BL13	LAG531352	First NBC Bank	1171.91	0.29
BL13	LAG531504	Krentel Road Office Building	1171.91	0.29
BL13	LAG531823	Lacombe Land LLC - The North Institute Project	1171.91	0.29
BL13	LAG531702	St Tammany Parish Fire District # 3 - St Tammany Fire Station # 33	1171.91	0.29
BL13	LAG531876	Lacombe Stores LLC	1171.91	0.29
BL13	LAG532240	Patten's Metal Express	1171.91	0.29
BL13	LAG541687	Journey Fellowship Church Inc	7500.00	1.88
BL14	LAG531415	Southern Natural Gas - Lacombe Compressor Statioin	1171.91	0.29

Table 35
Bayou Lacombe
Existing Permitted Dischargers

Subbasin	Permit Number	Facility Name	Flow GPD	BOD_5 Load lb/day
BL14	LAG532735	Axonic, LLC Neurology Clinic	1171.91	0.29
BL17	LAG530665	Frito-Lay Inc	585.96	0.22
BL19	LAG531589	St Tammany Speedway	1171.91	0.29
BL5	LAG532765	Village Church Lutheran Inc - The Village Church Lutheran	1171.91	0.29
BL7	LAG540330	Goux Enterprises Inc - Lacombe Nursing Home	1171.91	0.29
BL7	LAG530691	Janie Brown's Casual Restaurant	1171.91	0.29
BL7	LAG530456	Regina Coeli Child Develoment Center	1171.91	0.29
BL7	LAG530845	M&Ms Snoballs	1171.91	0.29
BL7	LAG530471	Abraham Williams Apartments	1171.91	0.29
BL7	LAG532035	Russell's Quick Stop LLC - Russell's Quick Stop	1171.91	0.29
BL7	LAG532912	J&S Bayou Gas & Go LLC	1171.91	0.29
BL7	LAG532848	A&L Enterprise LLC - A&L Enterprise	1171.91	0.29
BL7	LAG531332	US Fish & Wildlife Service - Southeast Louisiana Refuges	1171.91	0.29
BL7	LAG531325	OW Inc - Bayou Mini Storage	1171.91	0.29
BL7	LAG531655	Pepes Mexican Restaurant LLC	1171.91	0.29
BL7	LAG532100	Anna Elliot - 28105 Hwy 190 Building	1171.91	0.29

Table 35
Bayou Lacombe
Existing Permitted Dischargers

Subbasin	Permit Number	Facility Name	Flow GPD	BOD_5 Load lb/day
BL7	LAG532286	Saad Alisha LLC - Alisha's Bayou Bargains	1171.91	0.29
BL7	LAG532808	Sacred Heart Catholic Church	1171.91	0.29
BL7	LAG532807	St Tammany Fire Protection District 3 - Administration Office	1171.91	0.29
BL7	LAG532992	Kingdom Hall of Jehovah's Witness	1171.91	0.29
BL7	LAG532847	Mottie McClary/Southern Motor Carrier Safety Consultants	1171.91	0.29
BL7	LAG533019	John Davis Park Community Center	1171.91	0.29
BL8	LAG531601	LACOMBE CAR CARE	1171.91	0.29
BL8	LAG532891	Cris Tees - Chris's Screen Printing	1171.91	0.29
BL9	LAG531587	Highway 434 Retail Space	1171.91	0.29
BL9	LAG532869	Carmelite Spirituality Center - Sisters of Mt Carmel - WWTP	1171.91	0.29
BLFWT1	WECN1200528	Beau Village Subdivision	8232.00	0.69
BLTWT1	LAG532808	Sacred Heart Catholic Church	1171.91	0.29
BLTWT2	LAG531415	Chahta Ima Elementary School	1171.91	0.29
BLTWT2	LAG570058	Bayou Lacombe Middle School	23438.27	1.95
BLTWT2	LAG531082	J & S Chevron LLC	1171.91	0.29
BLTWT2	LAG531238	Sal & Judy's Restaurant	1171.91	0.29

Table 35
Bayou Lacombe
Existing Permitted Dischargers

Subbasin	Permit Number	Facility Name	Flow GPD	BOD_5 Load lb/day
BLTWT2	LAG531547	Carollo's Shopping Center	1171.91	0.29
BLTWT2	LAG531889	St Tammany Parish Sheriff's Office - Lacombe Substation - STP	1171.91	0.29
BLTWT2	LAG532247	Taxpayer Properties II Lacombe LLC - Family Dollar	1171.91	0.29
BLTWT2	LAG532531	US Postal Service - Lacombe Post Office	1171.91	0.29
BLTWT2	LAG532568	Russell's Quick Stop LLC - Bayou Daiquiris	1171.91	0.29
BLTWT2	LAG532764	First Baptist Church of Lacombe - First Baptist Church	1171.91	0.29
BLTWT2	LAG532867	Vinson Guard Service Inc	1171.91	0.29
BLTWT2	LAG532899	Salvatore Impastato - New Orleans Bistro	1171.91	0.29
BLTWT2	LAG533692	Batiste Apartments	1171.91	0.29
BLTWT2	LAG533692	Batiste Apartments	1171.91	0.29
BLTWT2	LAG534138	Lacombe United Methodist Church	585.96	0.22
BLTWT3	LAG531135	Eric's Landscape Supply	1171.91	0.29
BLTWT3	LAG532793	Convention Key Cards LLC - Key Marketing	1171.91	0.29
BLTWT3	LAG533918	Jaxon Square LLC	585.96	0.22
NDS2-2	LAG532078	Animal Services Campus - St Tammany Parish Govt	1171.91	0.29

Table 36
Water Quality Ponds

Target Sub-Basin	Drainage Basin	Current BOD_5 Load (lb)	Current Total BOD_5 Load (lb)	Drainage Basin Volume (acre ft)	Drainage Area (acres)	BOD/Acre ft	Load Reduction (%)	Load Reduction (lb/d)	Final BOD_5 Load
BL12	Bayou Lacombe	23.99	23.99	13.53	1623	1.77	80.00%	19.19	4.80

Flood Control project along the Bayou Lacombe main channel is the Bayou Lacombe/LA 434 Corridor Pond—this project was presented in the August 2010 report from Neel-Schaffer "South Central Study Area Drainage Master Plan." This goal of this project is to provide the necessary detention for the expected growth along the 434 corridor. The long term goal is a regional detention pond of approximately 131 surface acres with a functional depth of approximately 12 feet. While this project is geared toward providing detention for the developed portion of the site, its proximity to Bayou Lacombe could allow modification to provide storage due to tail water back up during major rain events.

With respect to flooding due to storm surge approximately 125 structures in the Bayou Lacombe basin are listed as RL/SRL. Of those approximately 60 have already been elevated which leaves a balance of 65 remaining to be mitigated. Relocation and elevation are likely the only cost effective solutions to mitigate the risk of future flooding.

Table 37
Bayou Lacombe

Project Subdivision Name	BASIN	Total Number of New Customers	Total Sewer Project Cost ($)	Total Water Project Cost ($)	Total Projects Cost ($)	BOD Load Reduction (Lb)	BOD Reduction Cost ($/Lb)
Bayou Heights	Bayou Lacombe	72	$ 7,446,500.00	$ 1,944,200.00	$ 9,390,700.00	20.3	$ 461,900.00
Bayou Lacombe Estates	Bayou Lacombe	37	$ 1,759,900.00	$ 828,500.00	$ 2,588,400.00	8.7	$ 298,800.00
Bayou Lacombe Manor	Bayou Lacombe	22	$ 2,081,400.00	$ 691,700.00	$ 2,773,100.00	5.2	$ 538,300.00
Bayou Mellun	Bayou Lacombe	23	$ 2,398,200.00	$ 805,600.00	$ 3,203,800.00	5.4	$ 594,900.00
Choctaw Springs	Bayou Lacombe	8	$ 2,398,600.00	$ 233,500.00	$ 2,632,100.00	2.4	$ 1,077,800.00
Cloverland Acres	Bayou Lacombe	57	$ 8,047,600.00	$ 2,299,900.00	$ 10,347,500.00	16.8	$ 617,000.00
Deer Haven	Bayou Lacombe	24	$ 3,305,600.00	$ 717,500.00	$ 4,023,100.00	7.5	$ 536,200.00
Edgar Kennedy Rd	Bayou Lacombe	2	$ 351,400.00	$ 50,900.00	$ 402,300.00	0.5	$ 756,100.00
Fisherman's Haven	Bayou Lacombe	28	$ 1,032,700.00	$ 627,000.00	$ 1,659,700.00	6.6	$ 253,100.00
Forest Glen	Bayou Lacombe	289	$ 11,608,500.00	$ -	$ 11,608,500.00	86.3	$ 134,500.00
Forest Glen Farm Lots	Bayou Lacombe	105	$ 11,594,800.00	$ 3,893,500.00	$ 15,488,300.00	29.1	$ 532,900.00
Francois Cousin	Bayou Lacombe	80	$ 4,930,300.00	$ 1,371,000.00	$ 6,301,300.00	23.5	$ 267,700.00
Glenwood Annex	Bayou Lacombe	31	$ 700,300.00	$ 281,800.00	$ 982,100.00	9.1	$ 107,700.00
Lacombe Acres	Bayou Lacombe	23	$ 1,847,300.00	$ 608,100.00	$ 2,455,400.00	7.0	$ 349,700.00
Lacombe Acres Annex	Bayou Lacombe	70	$ 2,917,900.00	$ 1,047,600.00	$ 3,965,500.00	21.4	$ 185,600.00
Lacombe Forest	Bayou Lacombe	12	$ 1,555,500.00	$ 492,700.00	$ 2,048,200.00	3.7	$ 559,100.00
Lacombe Park	Bayou Lacombe	302	$ 18,165,800.00	$ -	$ 18,165,800.00	84.3	$ 215,600.00
Lincolnville	Bayou Lacombe	2	$ 15,100.00	$ 44,800.00	$ 59,900.00	0.5	$ 127,900.00
Orleans	Bayou Lacombe	26	$ 1,827,400.00	$ 695,000.00	$ 2,522,400.00	7.3	$ 347,100.00
Pinehurst	Bayou Lacombe	4	$ 601,400.00	$ 119,600.00	$ 721,000.00	1.3	$ 576,600.00
Powell Heights	Bayou Lacombe	39	$ 3,048,900.00	$ 873,300.00	$ 3,922,200.00	9.1	$ 429,500.00
Ridgewood	Bayou Lacombe	21	$ 2,853,900.00	$ 598,200.00	$ 3,452,100.00	6.3	$ 551,800.00
Ridgewood Addition No 2	Bayou Lacombe	9	$ 1,092,000.00	$ 28,500.00	$ 1,120,500.00	0.3	$ 3,761,200.00
Rouville	Bayou Lacombe	32	$ 3,211,000.00	$ 1,087,900.00	$ 4,298,900.00	11.4	$ 377,900.00
Rustling Oaks	Bayou Lacombe	10	$ 678,800.00	$ 340,000.00	$ 1,018,800.00	3.6	$ 286,600.00
Sportsman Park	Bayou Lacombe	7	$ 458,900.00	$ 187,100.00	$ 646,000.00	2.0	$ 330,200.00
St. Tammany	Bayou Lacombe	20	$ 2,851,900.00	$ 590,900.00	$ 3,442,800.00	6.2	$ 557,200.00
Tag A Long	Bayou Lacombe	94	$ 4,909,600.00	$ 2,644,800.00	$ 7,554,400.00	27.7	$ 273,100.00
Tary Estates	Bayou Lacombe	3	$ 384,600.00	$ 85,500.00	$ 470,100.00	0.9	$ 526,000.00
West Oakland	Bayou Lacombe	73	$ 1,790,800.00	$ 556,400.00	$ 2,257,200.00	21.0	$ 107,400.00
Wildwood Farms	Bayou Lacombe	2	$ 75,400.00	$ 50,900.00	$ 126,300.00	0.5	$ 237,400.00
Woodhaven	Bayou Lacombe	9	$ 2,238,500.00	$ 750,600.00	$ 2,989,100.00	2.7	$ 1,088,000.00
Woodlawn	Bayou Lacombe	5	$ 3,311,300.00	$ 112,000.00	$ 3,423,300.00	1.2	$ 2,923,900.00
Totals		***1,541***	***$ 111,401,800.00***	***$ 24,659,000.00***	***$ 136,060,800.00***	***439***	***$ 309,600.00***

FIGURE 48
BAYOU LACOMBE

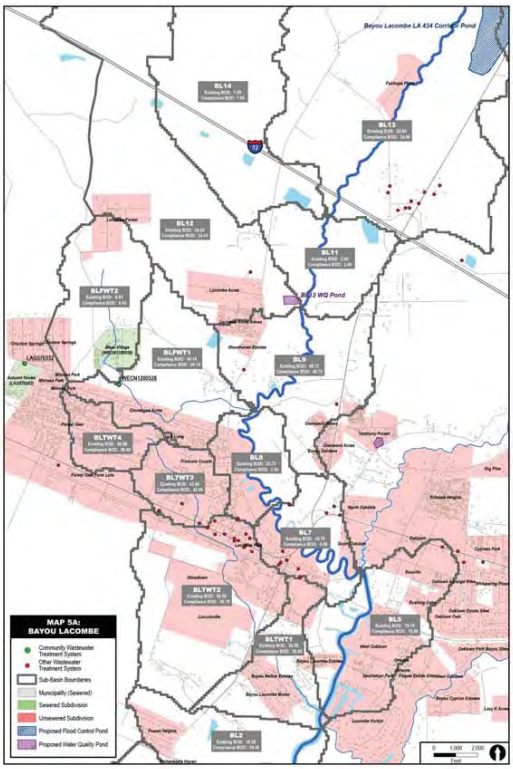
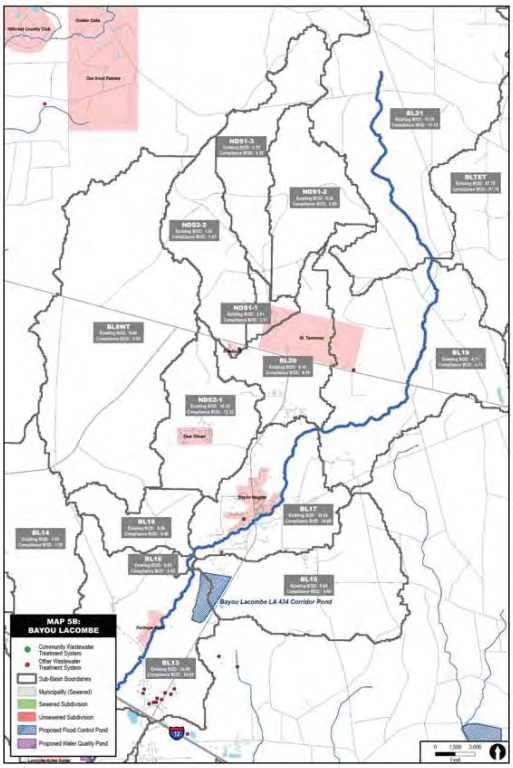


FIGURE 49
BAYOU LACOMBE



6.6 Big Branch Bayou

The Big Branch watershed drains approximately 5,198 acres in and around the City of Lacombe. Big Branch is located within the Bayou Lacombe Basin and therefore assumes the DO standard from Bayou Lacombe, 4 mg/L. The LDEQ *2012 Integrated Report Including the §303(d) List of Impaired Waterbodies* and the *Bayou Lacombe Watershed TMDL for Biochemical Oxygen-Demanding Substances* (LDEQ, 2012), indicate that Bayou Lacombe is not meeting the current DO standard. Big Branch is therefore considered unassessed since data collection efforts have not been carried out by LDEQ. However, data collected as part of this study in July 2014 indicates that Big Branch is not meeting the current DO standard of 4 mg/L.

The Big Branch Basin currently contains one subdivision with a community sewage system, 13 subdivisions with individual home sewage systems, and various individual sewage systems at remotely located businesses and residences not in designated neighborhoods.

The calculated load for these dischargers is estimated to be 40.6 lb/day for the LDEQ permitted sewage systems and 193.85 lb/day for the individual, unpermitted home sewage systems. Based on the model runs completed for this project, it is not feasible for Big Branch Bayou to meet the 4.0 mg/L DO standard.

To achieve compliance with the current DO standard of 4.0 mg/L, concentrations of BOD_5 were reduced to 10 mg/L and 30 mg/L for permitted dischargers and un-sewered subdivisions depending on size and location. The percent total load reduction ranged from 26.66% to approximately 94.97% in more heavily populated areas. Even with these significant BOD_5 reductions, compliance can only be achieved in 68% of Big Branch at the current DO standard. In the *Bayou Lacombe Watershed TMDL for Biochemical Oxygen-Demanding Substances* (LDEQ, 2012), LDEQ notes that the DO standards for Bayou Lacombe and therefore Big Branch

Bayou may be inappropriate and suggested an updated DO standard of 3.8 mg/L. If LDEQ revises the DO standards to 3.8 mg/L, compliance would be achieved in 91% of Big Branch. **Table 38** presents the compliance BOD_5 loadings in pounds, the original BOD_5 loading in pounds, the pounds of BOD_5 removed and the percent reduction required for each sub-basin in the Big Branch watershed.

Table 38

Big Branch Bayou

Subbasin	Original BOD Loading	Compliance BOD Loading	lbs of BOD Removed	Percent Reduction Required
BB1	68.54	9.85	58.69	85.62%
BB2	46.70	6.35	40.35	86.40%
BB3	8.72	0.69	8.03	92.09%
BB4	**17.06**	**12.51**	**4.55**	**26.66%**
BBET1	35.97	11.34	24.63	68.48%
BBWT1	57.45	2.89	54.56	94.97%
TOTALS	**234.45**	**43.64**	**190.81**	**81.39%**

The bolded sub-basins drain to those portions (9%) of Big Branch where the DO standard cannot be achieved with the described upgrades. Increases of BOD_5 loads in these areas, even if offset by reductions in another sub-basin of Big Branch Bayou, should not be allowed without significant offsets and consideration.

The above discussion and data demonstrates that the existing DO standard is inappropriate and Big Branch is overloaded with man-made point sources. However, reductions in BOD_5 limitations and providing sewer to unsewered neighborhoods, Big Branch can achieve compliance with the proposed DO standard in 91% of the in the water body. As noted above, Big Branch has little available ambient data, and the model results are based on a limited data set. Further data collection and updates to the model will deliver more precise output and validate the erroneous DO standard. **Table 39** below provides information on the current permitted loads to Big Branch. The current load and load removal for the Water

Quality Pond is illustrated in **Table 40.** Additional information pertaining to project specifics, location of project, and project cost on the Water Quality Ponds are located in Appendix D. The current load associated unsewered neighborhoods and cost associated with providing sewer to each neighborhood is illustrated in **Table 41**.

Table 39
Big Branch Bayou
Existing Permitted Dischargers

Subbasin	Permit Number	Facility Name	Flow GPD	BOD_5 Load lb/day
BB1	LAG532801	St Tammany Fire Protection District 3 - Fire Station 32	1171.91	0.29
BB1	LAG532658	Python Corp - Office/Warehouse	1171.91	0.29
BB4	LAG531459	Folgers Coffee Co - Lacombe Distribution Center	1171.91	0.29
BB4	LA0124451	St Tammany Parish Government - University Square WWTP	140629.63	11.73
BBET1	LA0123986	Feather & Fin Ranch	131254.32	27.37
BBET1	LAG533227	H2O Systems, Inc., St. Tammany Parish Coroner's Complex	1171.91	0.29
BBWT1	LAG531823	Lacombe Land LLC - The North Institute Project	1171.91	0.29

The proposed Big Branch Detention Pond, very similar to the Bayou Bonfouca pond, is also located below I-12 with similar terrain. This project was evaluated in the CDM Drainage Study prepared for the Bayou Lacombe Basin which identified the placement of roughly 1,180 ac-ft of storage within Big Branch Bayou. Again, this project is intended to reduce upstream peak flows and lowering downstream water surface elevations.

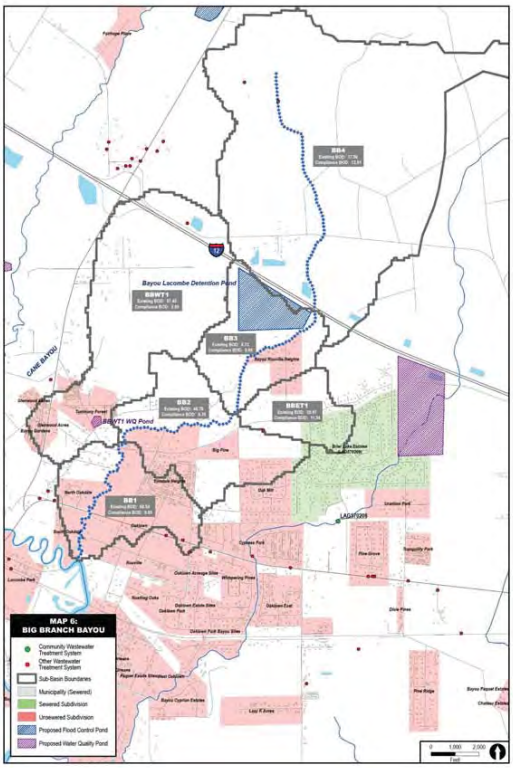
With respect to flooding due to storm surge no structures in the Big Branch Basin are listed as RL/SRL.

Table 40
Water Quality Ponds

Target Sub-Basin	Drainage Basin	Current BOD_5 Load (lb)	Current Total BOD_5 Load (lb)	Drainage Basin Volume (acre ft)	Drainage Area (acres)	BOD/Acre ft	Load Reduction (%)	Load Reduction (lb/d)	Final BOD_5 Load
BBWT1	Big Branch Bayou	57.16	57.16	9.15	1098	6.25	80.00%	45.73	11.43

Table 41 Big Branch Bayou							
Project Subdivision Name	BASIN	Total Number of New Customers	Total Sewer Project Cost ($)	Total Water Project Cost ($)	Total Projects Cost ($)	BOD Load Reduction (Lb)	BOD Reduction Cost ($/Lb)
Bayou Gardens	Big Branch Bayou	53	$ 2,151,600.00	$ 735,900.00	$ 2,887,500.00	15.6	$ 185,200.00
Bayou Roseville Heights	Big Branch Bayou	26	$ 1,869,500.00	$ 744,400.00	$ 2,613,900.00	7.8	$ 335,800.00
Big Pine	Big Branch Bayou	7	$ 554,100.00	$ 206,000.00	$ 760,100.00	2.2	$ 352,900.00
Erindale Heights	Big Branch Bayou	135	$ 5,192,400.00	$ 1,911,300.00	$ 7,103,700.00	41.5	$ 171,000.00
Glenwood Acres	Big Branch Bayou	7	$ 370,200.00	$ 142,900.00	$ 513,100.00	2.2	$ 238,200.00
North Oakdale	Big Branch Bayou	18	$ 1,319,300.00	$ 507,700.00	$ 1,827,000.00	5.5	$ 329,800.00
Oaklawn	Big Branch Bayou	95	$ 6,720,000.00	$ 2,438,400.00	$ 9,158,400.00	30.9	$ 296,600.00
South Oakdale	Big Branch Bayou	12	$ 986,400.00	$ 284,900.00	$ 1,271,300.00	4.3	$ 298,000.00
Tammany Forest	Big Branch Bayou	63	$ 2,357,200.00	$ 830,700.00	$ 3,187,900.00	19.0	$ 167,600.00
Totals		***416***	***$ 21,520,700.00***	***$ 7,802,200.00***	***$ 29,322,900.00***	***129***	***$ 227,400.00***

FIGURE 50
BIG BRANCH BAYOU



6.7 Cypress Bayou

The Cypress Bayou watershed drains approximately 6,657 acres in and around Lacombe. Cypress Bayou is located within the Bayou Lacombe Basin and therefore assumes the DO standard from Bayou Lacombe, 4 mg/L. The LDEQ *2012 Integrated Report Including the §303(d) List of Impaired Waterbodies* and the *Bayou Lacombe Watershed TMDL for Biochemical Oxygen-Demanding Substances* (LDEQ, 2012), indicate that Bayou Lacombe is not meeting the current DO standard. Cypress Bayou is therefore considered unassessed since data collection efforts have not been carried out by LDEQ.

The Cypress Bayou Basin currently contains one subdivision with a community sewage system, 21 subdivisions with individual home sewage systems, and various individual sewage systems at remotely located businesses and residences not in designated neighborhoods.

The calculated load for these dischargers is estimated to be 9.4 lb/day for the LDEQ permitted sewage systems and 329.3 lb/day for the individual, unpermitted home sewage systems. Based on the model runs completed for this project, it is not feasible for Cypress Bayou to meet the 4.0 mg/L DO standard in a small portion of the bayou.

To achieve compliance with the current DO standard of 4.0 mg/L, concentrations of BOD_5 were reduced 30 mg/L for un-sewered subdivisions depending on size and location. The percent total load reduction ranged from 0% in basins where no existing loads are present to approximately 88.57% in more heavily populated areas. Even with these significant BOD_5 reductions, compliance can only be achieved in 84% of Cypress Bayou at the current DO standard. In the *Bayou Lacombe Watershed TMDL for Biochemical Oxygen-Demanding Substances* (LDEQ, 2012), LDEQ notes that the DO standards for Bayou Lacombe and therefore Cypress Bayou may be inappropriate and suggested DO standard 3.8 mg/L. If LDEQ revises the DO standards to 3.8 mg/L, compliance would be

achieved in 100% of Cypress Bayou. **Table 42** presents the compliance BOD_5 loadings in pounds, the original BOD_5 loading in pounds, the pounds of BOD_5 removed and the percent reduction required for each sub-basin in the Cypress Bayou watershed.

Table 42 Cypress Bayou				
Subbasin	Original BOD Loading	Compliance BOD Loading	lbs of BOD Removed	Percent Reduction Required
CB1	23.43	23.43	0.00	0.00%
CB2	41.58	5.67	35.91	86.36%
CB3	71.97	10.11	61.86	85.96%
CB4	76.79	15.69	61.10	79.57%
CB5	0.00	0.00	0.00	0.00%
CB6	10.13	1.32	8.81	86.98%
CB7	0.00	0.00	0.00	0.00%
CBET1	61.04	11.89	49.16	80.53%
CBET2	52.27	8.49	43.78	83.76%
CBSET	1.54	0.18	1.36	88.57%
TOTALS	**338.74**	**76.76**	**261.98**	**77.34%**

The above discussion and data demonstrates that the existing DO standard is inappropriate and Cypress Bayou is overloaded with man-made point sources. However, reductions in BOD_5 limitations and providing sewer to unsewered neighborhoods, Big Branch can achieve compliance with the proposed DO standard in 100% of the in the water body. As noted above, Big Branch has little available ambient data, and the model results are based on a limited data set. Further data collection and updates to the model will deliver more precise output and validate the erroneous DO standard. **Table 43** below provides information on the current permitted loads to Cypress Bayou. The current load associated unsewered

neighborhoods and cost associated with providing sewer to each neighborhood is illustrated in **Table 44**.

Table 43
Cypress Bayou
Existing Permitted Dischargers

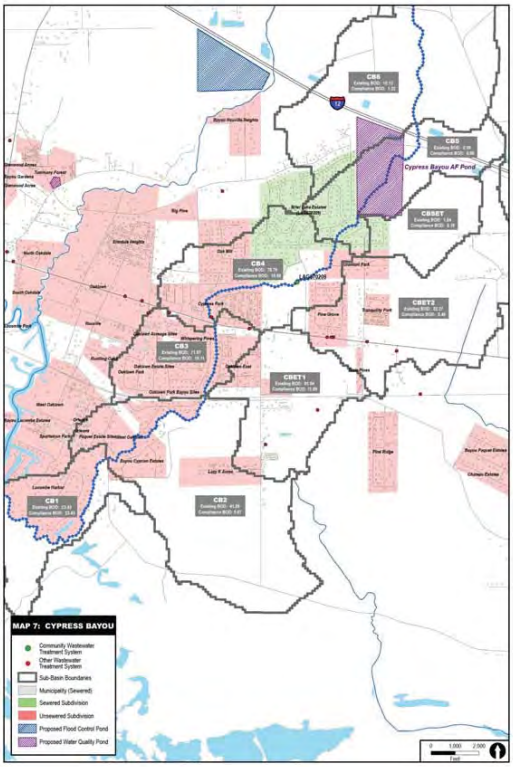
Subbasin	Permit Number	Facility Name	Flow GPD	BOD_5 Load lb/day
CB3	LAG532796	30246 Hwy 190 Building - Rodney Bourgeois - WWTP	1171.91	0.29
CB4	LAG570209	Brier Lake Estates Wastewater Treatment Facility	54818.40	4.57
CB4	LAG531543	Tiller of the Land	1171.91	0.29
CB4	LA0123862	H2O Systems Inc - Cypress Park - WWTP	28125.93	1.17
CBET1	LAG470270	R&D Automotive	1171.91	0.44
CBET1	LAG531573	Timberland Trailer Park LLC	1171.91	0.29
CBET1	LAG531695	Smith Office Building	1171.91	0.29
CBET1	LAG531853	A to Z Preschool LLC	1171.91	0.29
CBET1	LA0123692	H2O Systems Inc - Oaklawn Trace	14906.74	1.24
CBET2	LAG532804	NC Investments LLC - Mom & Dad's Consignment Store	1171.91	0.29
CBET2	LAG533088	Broadway Inc - K-Bar-B Youth Ranch - Cabins & Administrative Complex	585.96	0.22

There are no drainage projects in the Cypress Bayou watershed.

Table 44
Cypress Bayou

Project Subdivision Name	BASIN	Total Number of New Customers	Total Sewer Project Cost ($)	Total Water Project Cost ($)	Total Projects Cost ($)	BOD Load Reduction (Lb)	BOD Reduction Cost ($/Lb)
Bayou Cyprian	Cypress Bayou	25	$ 2,042,800.00	$ 683,800.00	$ 2,726,600.00	7.0	$ 390,200.00
Cypress Park	Cypress Bayou	122	$ 6,414,800.00	$ 2,435,500.00	$ 8,850,300.00	37.5	$ 235,700.00
Dixie Pines	Cypress Bayou	16	$ 626,300.00	$ 152,400.00	$ 778,700.00	5.7	$ 136,900.00
Lacombe Harbor	Cypress Bayou	91	$ 8,186,100.00	$ 2,432,300.00	$ 10,618,400.00	25.4	$ 417,400.00
Lazy K	Cypress Bayou	41	$ 1,079,300.00	$ 322,600.00	$ 1,401,900.00	11.5	$ 122,300.00
Oak Mill	Cypress Bayou	87	$ 4,545,500.00	$ 1,651,100.00	$ 6,196,600.00	26.8	$ 231,500.00
Oaklawn Acreage Sites	Cypress Bayou	13	$ 622,700.00	$ 442,000.00	$ 1,064,700.00	4.6	$ 230,400.00
Oaklawn East	Cypress Bayou	90	$ 4,589,300.00	$ 1,656,600.00	$ 6,245,900.00	32.0	$ 195,200.00
Oaklawn Estate Sites	Cypress Bayou	12	$ 948,000.00	$ 408,000.00	$ 1,356,000.00	4.3	$ 317,800.00
Oaklawn Park	Cypress Bayou	19	$ 2,154,400.00	$ 646,000.00	$ 2,800,400.00	6.8	$ 414,600.00
Oaklawn Park Bayou Sites	Cypress Bayou	83	$ 2,596,500.00	$ 900,500.00	$ 3,497,000.00	27.3	$ 128,100.00
Paquet	Cypress Bayou	20	$ 1,615,200.00	$ 514,400.00	$ 2,129,600.00	5.6	$ 380,900.00
Pine Grove	Cypress Bayou	63	$ 2,888,100.00	$ 882,800.00	$ 3,762,900.00	19.5	$ 192,700.00
Tranquility	Cypress Bayou	60	$ 2,241,700.00	$ 560,700.00	$ 2,802,400.00	18.5	$ 151,800.00
Uranium Park	Cypress Bayou	25	$ 2,119,000.00	$ 365,200.00	$ 2,484,200.00	7.7	$ 322,900.00
Whispering Pines	Cypress Bayou	27	$ 4,119,000.00	$ 917,900.00	$ 5,036,900.00	9.6	$ 524,700.00
Totals		***794***	***$ 46,780,700.00***	***$ 14,971,800.00***	***$ 61,752,500.00***	***250***	***$ 247,300.00***

FIGURE 51
CYPRESS BAYOU



6.8 Bayou Cane

The Bayou Cane Basin drains approximately 5,363 acres in and around the St. Tammany Wildlife Refuge. The current LDEQ DO standard for Bayou Cane is 5 mg/L from the headwaters to US Highway 190 and 4 mg/L from US Highway 190 to Lake Pontchartrain. The LDEQ *2012 Integrated Report Including the §303(d) List of Impaired Waterbodies* and the *Bayou Cane Watershed TMDL for Biochemical Oxygen-Demanding Substances* (LDEQ, 2011), indicate that Bayou Cane is not meeting the current DO standards.

The Bayou Cane Basin is currently composed of eight subdivisions with individual home sewage systems and a small number of individual sewage systems at remotely located businesses and residences not in designated neighborhoods.

The calculated load for these dischargers is estimated to be 10.4 lb/day for the LDEQ permitted sewage systems and 100.2 lb/day for the individual, unpermitted home sewage systems. Based on the model runs completed for this project, it is not feasible for Bayou Cane to meet the 4.0 mg/L or 5.0 mg/L DO standard.

In an attempt to achieve compliance with the current DO standards of 4.0 mg/L and 5.0 mg/L, concentrations of BOD_5 were reduced to 30 mg/L for the un-sewered subdivisions. The percent total load reduction ranged from 0% in basins where no existing loads are present to approximately 83% in more heavily populated areas. Even with these significant BOD_5 reductions, compliance can only be achieved in 21.9% of Bayou Cane at the current DO standards. In the *Bayou Cane Watershed TMDL for Biochemical Oxygen-Demanding Substances* (LDEQ, 2011), LDEQ stated the DO standards for Bayou Cane may be inappropriate and suggested a DO standard of 2.3 mg/L. If LDEQ revises the DO to 2.3 mg/L, compliance would be achieved in only 60.4% of Bayou Cane. **Table 45** presents the compliance BOD_5 loadings in pounds, the original BOD_5 loading in pounds, the pounds of BOD_5

removed and the percent reduction required for each sub-basin in the Bayou Cane watershed.

Table 45
Bayou Cane

Subbasin	Total Original BOD Loading	Compliance BOD Loading	lbs of BOD Removed	Percent Reduction Required
CNB1	36.38	11.52	24.86	68.34%
CNB2	**0.00**	**0.00**	**0.00**	**0.00%**
CNBFET1	**74.25**	**12.34**	**61.91**	**83.38%**
CNBSET1	0.00	0.00	0.00	0.00%
TOTALS	**110.62**	**23.86**	**86.77**	**78.44%**

The bolded sub-basins are located in portions (39.6%) of Bayou Cane where even the proposed DO standard of 2.3 mg/L cannot achieved.

The data shows that Bayou Cane is relatively unimpacted from man-made point sources. Because Bayou Cane won't meet the proposed DO standard of 2.3 mg/L, it is likely the bayou is naturally dystrophic and any DO standard during the summer months may be inappropriate. **Table 46** below provides information on the current permitted loads to Bayou Cane. The current load associated unsewered neighborhoods and cost associated with providing sewer to each neighborhood is illustrated in **Table 47**.

Table 46
Bayou Cane
Existing Permitted Dischargers

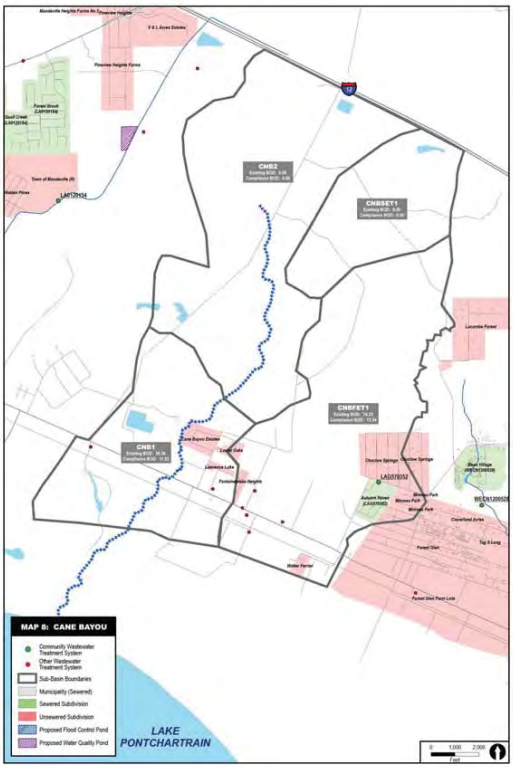
Subbasin	Permit Number	Facility Name	Flow GPD	BOD_5 Load lb/day
CNB1	LAG531412	St Tammany Fire Protection District #4 Station #44 - Fountainbleau Fire Station #44	1171.91	0.29
CNB1	LAG532086	Demmonlicious Catering LLC	1171.91	0.29
CNB1	LA0049671	Southeast Louisiana State Hospital	84000.00	7.01
CNBFET1	LAG470268	Ace Auto Source LLC - WWTP	1171.91	0.44
CNBFET1	LAG530558	Northshore Duplicate Bridge Club	1171.91	0.29
CNBFET1	LAG531081	BRG Catering LLC dba LA Provence	1171.91	0.29
CNBFET1	LAG531583	Union Service & Maintenance Co Inc	1171.91	0.29
CNBFET1	LAG541172	Big Branch Mobile Home Community LLC - Big Branch Mobile Home Community	5859.57	1.47

There are no drainage projects located in the Bayou Cane watershed. There are also no RL/SRL structures within the Bayou Cane Basin.

Table 47
Cane Bayou

Project Subdivision Name	BASIN	Total Number of New Customers	Total Sewer Project Cost ($)	Total Water Project Cost ($)	Total Projects Cost ($)	BOD Load Reduction (Lb)	BOD Reduction Cost ($/Lb)
Cane Bayou Estates	Cane Bayou	23	$ 1,370,600.00	$ 671,400.00	$ 2,042,000.00	7.0	$ 290,800.00
Choctaw Springs	Cane Bayou	38	$ 6,889,800.00	$ 1,109,300.00	$ 7,999,100.00	11.6	$ 689,600.00
Fontainebleau Heights	Cane Bayou	26	$ 939,700.00	$ 759,000.00	$ 1,698,700.00	7.9	$ 214,000.00
Laurel Oaks	Cane Bayou	5	$ 548,900.00	$ 146,000.00	$ 694,900.00	1.5	$ 455,300.00
Lawrence Lake	Cane Bayou	5	$ 161,100.00	$ 146,000.00	$ 307,100.00	1.5	$ 201,200.00
Mimosa Park	Cane Bayou	28	$ 1,132,000.00	$ 817,300.00	$ 1,949,300.00	8.5	$ 228,100.00
Walter Ferrier	Cane Bayou	3	$ 113,800.00	$ 67,200.00	$ 181,000.00	0.7	$ 257,700.00
Totals		***120***	***$ 11,155,900.00***	***$ 3,716,200.00***	***$ 14,872,100.00***	***39***	***$ 382,700.00***

FIGURE 5!
BAYOU CANE



6.9 Bayou Castine

The Bayou Castine Basin drains approximately 6,395 acres near the City of Mandeville. Although, Bayou Castine is located within the Bayou Cane Watershed, its flow does not drain to Bayou Cane. Bayou Castine's DO standard is therefore determined by the next downstream water body's DO standard. Because Bayou Castine discharges directly to Lake Pontchartrain, which has a DO standard of 5 mg/L, the default DO standard for Bayou Castine is 5 mg/L. Bayou Castine is therefore considered unassessed since data collection efforts have not been carried out by LDEQ. However, data collected as part of this study in July 2014 indicates that Bayou Castine is not meeting the current DO standard of 5 mg/L.

The Bayou Castine Basin currently contains ten subdivisions with community sewage systems, nine subdivisions with individual home sewage systems, a regional sewage treatment system, and a small number of individual sewage systems at remotely located businesses and residences not in designated neighborhoods.

The calculated load for these dischargers is estimated to be 34.7 lb/day for the LDEQ permitted sewage systems and 351.6 lb/day for the individual, unpermitted home sewage systems. Based on the model runs completed for this project, it is not feasible for Bayou Castine to meet the 5.0 mg/L DO standard.

To achieve compliance with the current DO standard of 5.0 mg/L, concentrations of BOD_5 were reduced to 5 mg/L or 10 mg/L for the un-sewered subdivisions and permitted dischargers depending on size and location. The percent total load reduction ranged from 0% in basins where no existing loads are present to approximately 95.43% in more heavily populated areas. Even with these significant BOD_5 reductions, compliance can only be achieved in 55% of Bayou Castine at the current DO standard. In the *Bayou Cane Watershed TMDL for Biochemical Oxygen-Demanding Substances* (LDEQ, 2011), LDEQ notes that the DO standard

for Bayou Cane may be inappropriate and suggested a DO standard of 2.3 mg/L. The Bayou Castine watershed is very similar in nature to Bayou Cane. If LDEQ would revise the DO standard to 2.3 mg/L for Bayou Castine, as proposed for Bayou Cane, compliance would be achieved in 100% of Bayou Castine. **Table 48** presents the compliance BOD_5 loadings in pounds, the original BOD_5 loading in pounds, the pounds of BOD_5 removed and the percent reduction required for each sub-basin in the Bayou Castine watershed.

Table 48
Bayou Castine

Subbasin	Original BOD Loading	Compliance BOD Loading	lbs of BOD Removed	Percent Reduction Required
BCS1	32.79	1.92	30.87	94.15%
BCS2	350.29	19.34	330.95	94.48%
BCS3	0.84	0.04	0.80	95.45%
BCS4	0.00	0.00	0.00	0.00%
BCSVO	2.38	0.39	2.00	83.72%
TOTALS	**386.30**	**21.68**	**364.62**	**94.39%**

The above discussion and data demonstrates that the Bayou Castine DO standard is inappropriate and relatively un-impacted from man-made point sources. However, with reductions in BOD_5 limitations and providing sewer to unsewered neighborhood, Bayou Castine has the ability to meet a DO standard of 2.3 mg/L. As noted above, Bayou Castine has little available ambient data, and the model results are based on a limited data set. Further data collection and updates to the model will deliver more precise output and validate the erroneous DO standard. **Table 49** below provides information on the current permitted loads to Bayou Castine. The current load associated unsewered neighborhoods and cost associated with providing sewer to each neighborhood is illustrated in **Table 50**.

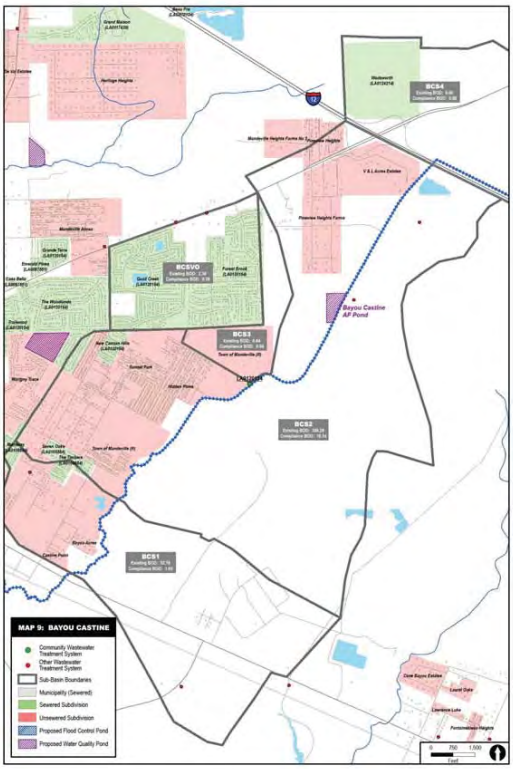
Table 49
Bayou Castine
Existing Permitted Dischargers

Subbasin	Permit Number	Facility Name	Flow GPD	BOD_5 Load lb/day
BCS1	LAG530528	St Tammany Parish Rec District #1	585.96	0.22
BCS1	LAG532681	LADCRT - Fountainbleau State Park	1171.91	0.29
BCS1	LAG534201	Stepping Stones Preschool & Daycare Center LLC	585.96	0.22
BCS1	LAG470054	St Tammany Marine	1171.91	0.29
BCS2	LA0123382	WREDCO - Weyerhauser Real Estate & Development Co	70314.81	5.86
BCS2	LA0124214	St Tammany Parish of - Wadsworth Subdivision WWTP	42188.89	3.52
BCS2	LA0120154	St Tammany Parish Government - Castine Regional Sewage Treatment Plant	287866.60	24.01
BCSVO	LAG537212	All Creatures Country Club - Shari K Karanas - WWTP	1171.91	0.29

There are no drainage projects located in the Bayou Castine watershed. With respect to flooding due to storm surge approximately 11 structures in the Bayou Castine are listed as RL/SRL. Of those approximately 7 have already been elevated which leaves a balance of 4 remaining to be mitigated. Relocation and elevation are likely the only cost effective solutions to mitigate the risk of future flooding.

Table 50 Bayou Castine							
Project Subdivision Name	BASIN	Total Number of New Customers	Total Sewer Project Cost ($)	Total Water Project Cost ($)	Total Projects Cost ($)	BOD Load Reduction (Lb)	BOD Reduction Cost ($/Lb)
Bayou Acres	Bayou Castine	8	$ 404,400.00	$ 242,900.00	$ 647,300.00	2.5	$ 254,800.00
Castine Point	Bayou Castine	17	$ 387,200.00	$ 516,200.00	$ 903,400.00	5.4	$ 167,400.00
Hidden Pines	Bayou Castine	281	$ 6,088,100.00	$ 2,271,200.00	$ 8,359,300.00	105.6	$ 79,200.00
Pineview Heights	Bayou Castine	66	$ 3,587,300.00	$ 796,800.00	$ 4,384,100.00	23.2	$ 188,800.00
Pineview Heights Farms	Bayou Castine	51	$ 4,434,200.00	$ 1,202,800.00	$ 5,637,000.00	20.5	$ 274,900.00
Sunset Park	Bayou Castine	62	$ 2,719,800.00	$ 914,100.00	$ 3,633,900.00	22.4	$ 162,100.00
Town of Mandeville	Bayou Castine	1161	$ 13,822,300.00	$ 5,175,700.00	$ 18,998,000.00	390.5	$ 48,700.00
V & L Acres	Bayou Castine	11	$ 1,020,700.00	$ 295,600.00	$ 1,316,300.00	4.4	$ 297,600.00
Totals		***1,657***	***$ 32,464,000.00***	***$ 11,415,300.00***	***$ 43,879,300.00***	***575***	***$ 76,400.00***

FIGURE 5.1
BAYOU CASTINE



6.10 Bayou Chinchuba

The Bayou Chinchuba Basin drains approximately 5,703 acres in and around the City of Mandeville. Although Bayou Chinchuba is located within the Bayou Cane watershed, its flow does not drain to Bayou Cane. Bayou Chinchuba's DO standard is therefore determined by the next downstream water body's DO standard. Because Bayou Chinchuba discharges directly to Lake Pontchartrain, which has a DO standard of 5 mg/L, the default DO standard for Bayou Chinchuba is 5 mg/L. Bayou Chinchuba is therefore considered unassessed since data collection efforts have not been carried out by LDEQ. However, data collected as part of this study in July 2014 indicates that Bayou Chinchuba is not meeting the current DO standard of 5 mg/L.

The Bayou Chinchuba Basin currently contains eight subdivisions with community sewage systems, 36 subdivisions with individual home sewage systems, and various individual sewage systems at remotely located businesses and residences not in designated neighborhoods.

The calculated load for these dischargers is estimated to be 56.1 lb/day for the LDEQ permitted sewage systems and 341 lb/day for the individual, unpermitted home sewage systems. Based on the model runs completed for this project, it is not feasible for Bayou Chinchuba to meet the 5.0 mg/L DO standard.

To achieve compliance with the current DO standard of 5.0 mg/L, concentrations of BOD_5 were reduced to 5 mg/L or 10 mg/L for the un-sewered subdivisions and permitted dischargers depending on size and location. The percent total load reduction ranged from 0% in basins where no existing loads are present to approximately 97.73% in more heavily populated areas. Even with these significant BOD_5 reductions, compliance can only be achieved in 73% of Bayou Chinchuba at the current DO standards. In the *Bayou Cane Watershed TMDL for Biochemical Oxygen-Demanding Substances* (LDEQ, 2011), LDEQ notes that the DO standard

for Bayou Cane may be inappropriate and suggested a DO standard of 2.3 mg/L. The Bayou Chinchuba watershed is very similar in nature to Bayou Cane. If LDEQ would revise the DO standard to 2.3 mg/L for Bayou Chinchuba, as proposed for Bayou Cane, compliance would be achieved in 82% of Bayou Chinchuba. **Table 50** presents the compliance BOD_5 loadings in pounds, the original BOD_5 loading in pounds, the pounds of BOD_5 removed and the percent reduction required for each sub-basin in the Bayou Chinchuba watershed.

Table 51 Bayou Chinchuba				
Subbasin	Original BOD Loading	Compliance BOD Loading	lbs of BOD Removed	Percent Reduction Required
BCC1	0.91	0.91	0.00	0.00%
BCC2	24.16	23.83	0.33	1.36%
BCC3	19.74	2.98	16.76	84.90%
BCC4	61.52	2.81	58.70	95.43%
BCC5	3.71	0.08	3.63	97.73%
BCC6	45.29	18.47	26.82	59.23%
BCC7	5.86	0.15	5.71	97.43%
BCC8	26.19	1.69	24.50	93.54%
BCC9	61.35	2.47	58.89	95.98%
BCC10	24.25	0.59	23.66	97.55%
BCCFET	0.00	0.00	0.00	0.00%
BCCFET1	2.47	0.11	2.35	95.45%
BCCFTET3	5.07	0.23	4.84	95.45%
BCCFTHET1	0.00	0.00	0.00	0.00%
BCCFWT1	11.90	0.81	11.09	93.23%
BCCFWT2	21.70	1.38	20.32	93.65%
BCCSWT1	53.45	1.21	52.23	97.73%

Table 51 Bayou Chinchuba				
Subbasin	Original BOD Loading	Compliance BOD Loading	lbs of BOD Removed	Percent Reduction Required
BCCSWT2	37.55	4.29	33.26	88.57%
TOTALS	**405.10**	**62.02**	**343.09**	**84.69%**

The bolded sub-basins drain to those portions (18%) of Bayou Chinchuba where the DO standard cannot achieved with the described upgrades. Increases of BOD_5 loads in these areas, even if offset by reductions in another sub-basin of Bayou Chinchuba, should not be allowed without significant offsets and consideration.

The above discussion and data demonstrates that the Bayou Chinchuba DO standard is inappropriate and overloaded with man-made point sources. However, with reductions in BOD_5 limitations and providing sewer to unsewered neighborhood, Bayou Chinchuba has the ability to meet a DO standard of 2.3 mg/L in a majority of the water body. As noted above, Bayou Chinchuba has little available ambient data, and the model results are based on a limited data set. Further date collection and updates to the model will deliver more precise output and validate the erroneous DO standard.

Because Bayou Chinchuba is unable to meet the proposed DO standard of 2.3 mg/L 100% of the time, it is likely the bayou is naturally dystrophic and any DO standard during the summer months may be inappropriate. The Parish should petition the LDEQ to update the DO standard for Bayou Chinchuba as a naturally dystrophic water body.

Table 52 below provides information on the current permitted loads to Bayou Chinchuba. The current load associated unsewered neighborhoods and cost associated with providing sewer to each neighborhood is illustrated in **Table 53**. With respect to Flood Control Project and Water Quality Projects Bayou Chinchuba

Phase II which is a Water Quality and Flood Control Pond located upstream of Hwy 59 is planned to further alleviate flooding within the Basin.

With respect to flooding due to storm surge approximately 2 structures in the Bayou Chinchuba are listed as RL/SRL and remain to be mitigated. Relocation and elevation are likely the only cost effective solutions to mitigate the risk of future flooding.

Table 52 Bayou Chinchuba Existing Permitted Dischargers				
Subbasin	Permit Number	Facility Name	Flow GPD	BOD_5 Load lb/day
BCC2	LAG533613	5 Minute Oil Change #3 - OJALA Ltd	117.19	0.04
BCC2	LAG532087	Sun Cleaners LLC	1171.91	0.29
BCC2	LAG531242	State Farm Insurance - Chuck & Barbara Miraman - State Farm Insurance Facility	1171.91	0.29
BCC2	LAG532062	Redi Med Clinic	1171.91	0.29
BCC2	LAG531285	Karate USA Inc	1171.91	0.29
BCC2	LAG531821	Thomas Danos - STP	1171.91	0.29
BCC2	LAG532760	Sunshine Nursery & Pottery	1171.91	0.29
BCC2	LAG480603	C-Innovation LLC	117.19	0.03
BCC3	LAG530527	St Tammany Parish Hospital - Hospice	585.96	0.22
BCC3	LAG570039	H2O Systems Inc - Woodland Apartments STF	23438.27	1.95
BCC3	LAG531491	Liberty Self Storage LLC #3	1171.91	0.29
BCC3	LAG532737	2140 LLC - 2140 Eighth Street Building	1171.91	0.29
BCC3	LAG532877	422 Canal St Corp - Iberia Bank Building	1171.91	0.29
BCC3	LAG532736	2160 LLC - 2160 Eighth Street Building	1171.91	0.29
BCC4	LAG540551	St Tammany Parish Government - Forest Park Apts STP	5859.57	1.47

Table 52 Bayou Chinchuba Existing Permitted Dischargers				
Subbasin	Permit Number	Facility Name	Flow GPD	BOD_5 Load lb/day
BCC4	LAG530765	S&G Investments LLC	1171.91	0.29
BCC4	LAG530165	Marret LLC - 2180 3rd St Bldg	1171.91	0.29
BCC4	LAG530208	Hosanna Lutheran Church Inc	1171.91	0.29
BCC4	LAG530273	B&N Investments	1171.91	0.29
BCC4	LAG530395	Brookside Office Complex - Northshore I Commercial Condo Association Inc	585.96	0.22
BCC4	LAG532219	Gayle Betz - Century 21 Gaylaxey Office Building	1171.91	0.29
BCC4	LAG532769	The Soil & Garden Depot	1171.91	0.29
BCC4	LAG532815	Dejaunay Hair Design	1171.91	0.29
BCC4	LAG532757	Latter & Blum Inc	1171.91	0.29
BCC4	LAG533093	US Impact Inc	585.96	0.22
BCC4	LAG533743	GIendale Healthcare	117.19	0.04
BCC4	LAG533873	101 Brookside Dr - St Tammany 4	585.96	0.22
BCC6	LA0068730	H2O Greenleaves	438098.50	36.54
BCC8	LAG570487	St Tammany Parish Government - Twin Oaks	23438.27	1.95
BCC9	LAG570104	Total Environmental Solutions Inc - Beau Pre Subdivision	25687.20	2.14

Table 52
Bayou Chinchuba
Existing Permitted Dischargers

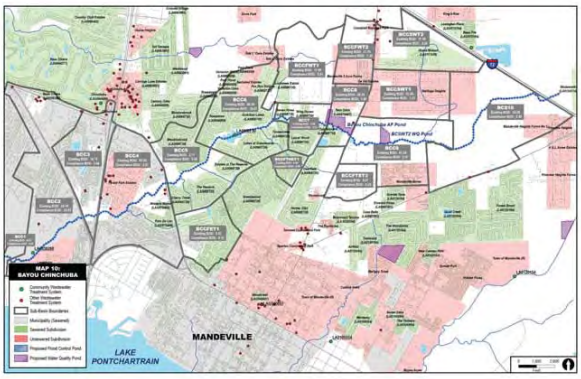
Subbasin	Permit Number	Facility Name	Flow GPD	BOD_5 Load lb/day
BCC10	LAG531885	Liberty Self Storage #11	1171.91	0.29
BCCFWT1	LAG534286	Fidelis Northshore I LLC	1171.91	0.29
BCCFWT2	LAG531402	Campbell Shelving Co Inc - Campbell Building	1171.91	0.29
BCCFWT2	LAG531986	Campbell Shelving	1171.91	0.29
BCCFWT2	LAG531964	WSA LLC - 3933 Hwy 59 Building	1171.91	0.29
BCCFWT2	LAG531953	Tammany Oaks Church of Christ	1171.91	0.29
BCCFWT2	LAG531263	BMC Investments LLC - Strip Mall	1171.91	0.29
BCCFWT2	LAG532680	OJALA Ltd - 5 Minute Oil Change	1171.91	0.29
BCCFWT2	LAG531514	Hwy 59 Project - Construction	1171.91	0.29
BCCFWT2	LAG531622	Riecke & Associates LLC - Hwy 59 Warehouse	1171.91	0.29
BCCSWT2	LAG570064	Fountainbleau Junior & Fountainbleau High Schools	23438.27	1.95
BCCSWT2	LAG531061	HJH Land Development	1171.91	0.29
BCCSWT2	LAG531738	DeVun Veterinary Medical Hospital	1171.91	0.29
BCCSWT2	LAG532177	Campbell Ventures No 3 LLC	1171.91	0.29

There are no drainage projects located in the Bayou Chinchuba watershed.

Table 53
Bayou Chinchuba

Project Subdivision Name	BASIN	Total Number of New Customers	Total Sewer Project Cost ($)	Total Water Project Cost ($)	Total Projects Cost ($)	BOD Load Reduction (Lb)	BOD Reduction Cost ($/Lb)
Campbell Business Park	Bayou Chinchuba	2	$ 223,000.00	$ -	$ 223,000.00	0.6	$ 355,300.00
Chinchuba	Bayou Chinchuba	12	$ 1,335,800.00	$ -	$ 1,335,800.00	3.4	$ 394,800.00
De Val Estates	Bayou Chinchuba	106	$ 5,167,100.00	$ 333,700.00	$ 5,500,800.00	34.0	$ 161,700.00
Forest Park Estates	Bayou Chinchuba	111	$ 4,437,700.00	$ -	$ 4,437,700.00	22.7	$ 195,300.00
Heritage Heights	Bayou Chinchuba	163	$ 4,475,100.00	$ 1,445,300.00	$ 5,920,400.00	57.4	$ 103,200.00
Lewisburg	Bayou Chinchuba	53	$ 2,882,900.00	$ -	$ 2,882,900.00	15.3	$ 188,000.00
Mandeville 5 Acre	Bayou Chinchuba	12	$ 1,812,300.00	$ 587,200.00	$ 2,399,500.00	4.2	$ 576,200.00
Mandeville Annex	Bayou Chinchuba	242	$ 7,925,400.00	$ 2,669,500.00	$ 10,594,900.00	71.0	$ 149,200.00
Mandeville Heights Farm	Bayou Chinchuba	6	$ 617,700.00	$ 142,100.00	$ 759,800.00	2.1	$ 359,900.00
Random Oaks	Bayou Chinchuba	4	$ 148,600.00	$ -	$ 148,600.00	1.2	$ 128,400.00
Secluded Estates	Bayou Chinchuba	18	$ 2,695,500.00	$ 333,700.00	$ 3,029,200.00	5.6	$ 536,200.00
Tote L' Ours Estates	Bayou Chinchuba	13	$ 451,100.00	$ 390,100.00	$ 841,200.00	4.1	$ 206,200.00
Totals		***742***	***$ 32,172,200.00***	***$ 5,901,600.00***	***$ 38,073,800.00***	***222***	***$ 171,800.00***

FIGURE 61
BAYOU CHINCHUBA



6.11 Abita River

The Abita River Basin drains approximately 40,082 acres in and around the Town of Abita Springs, Louisiana. The current LDEQ DO standard for the Abita River is 5 mg/L. Based on current LDEQ data the Abita River is not considered impaired for low DO. However, the Abita is not considered impaired due to the fact that it has not been assessed by LDEQ, as the river is considered a reach of the larger Bogue Falaya watershed. Based on the data and information considered for this project, the Abita River is not meeting the existing DO standard of 5 mg/L at several ambient monitoring locations, which if assessed on its own, it would be expected that the Abita River would be listed as impaired for low DO. However, since the Bogue Falaya is not considered impaired, the Abita River benefits from this designation.

The Abita River Basin currently contains 21 subdivisions with community sewage systems, 32 subdivisions with individual home sewage systems, a municipal sewage system serving primarily the incorporated area of Abita Springs and various individual sewage systems at remotely located businesses and residences not in designated neighborhoods.

The calculated load for these dischargers is estimated to be 68.8 lb/day for the community, municipal and other LDEQ permitted sewage systems, and 1178.9 lb/day for the individual, unpermitted home sewage systems. Based on the model runs completed for this project, it is feasible for the Abita River to meet a 5.0 mg/L DO standard through removal/connection of all individual treatment systems, both in residential and commercial use to community/municipal sewage systems, in addition to upgrade of existing LDEQ permitted discharges to meet more stringent 5.0 mg/L BOD_5 limitations. These upgrades/improvements would bring the Abita River into compliance with the existing DO standard for approximately 87% of the river (4 out of the 5 reaches). Given the river's ability to comply with the existing DO standard through upgrades to existing systems and the sewering of individual

treatment plants, it is unlikely that LDEQ will consider revision/lower of the DO standard in the Abita River.

To achieve compliance with the current DO standard of 5 mg/L, concentrations of BOD_5 were reduced to 5 mg/L for small point sources, sewered subdivisions, and unsewered subdivisions in the projection model. The load reduction necessary to meet the 5.0 mg/L standard ranged from 0% in basins where no existing loads are present to approximately 98.5% in heavily populated areas. With these BOD_5 reductions, compliance was achieved in 87% of the Abita River. **Table 54** presents the compliance BOD_5 loadings in pounds, the original BOD_5 loading in pounds, the pounds of BOD_5 removed and the percent reduction required for each sub-basin in the Abita River watershed to meet the existing DO standard of 5 mg/L.

Table 54
Abita River

Subbasin	Original BOD Loading	Compliance BOD Loading	lbs of BOD Removed	Percent Reduction Required
AR1	**31.46**	**3.18**	**28.28**	**89.90%**
AR2	**55.07**	**1.84**	**53.23**	**96.66%**
AR3	**325.35**	**7.32**	**318.04**	**97.75%**
AR4	**142.03**	**18.09**	**123.94**	**87.27%**
AR5	0.00	0.00	0.00	0.00%
AR6	130.30	2.69	127.61	97.93%
AR7	0.00	0.00	0.00	0.00%
AR8	23.23	0.53	22.70	97.70%
AR9	20.62	0.47	20.15	97.73%

Table 54
Abita River

Subbasin	Original BOD Loading	Compliance BOD Loading	lbs of BOD Removed	Percent Reduction Required
AR10	26.86	0.61	26.25	97.73%
AR11	28.81	0.65	28.15	97.73%
AR12	5.93	0.13	5.80	97.73%
AR13	10.31	0.23	10.07	97.73%
AR14	0.00	0.00	0.00	0.00%
AR15	1.41	0.70	0.70	50.00%
AR16	0.00	0.00	0.00	0.00%
AR17	3.03	0.07	2.96	97.73%
AR18	15.46	0.35	15.11	97.73%
ARFSF1	0.00	0.00	0.00	0.00%
ARFSF2	0.00	0.00	0.00	0.00%
ARFSF3	7.78	0.12	7.66	98.49%
ARTSF1	75.53	8.69	66.84	88.50%
BEEFBR1	34.14	0.78	33.36	97.73%
DBRCH1	8.32	0.23	8.09	97.22%
DBRCH2	6.47	0.15	6.33	97.73%
DBRCH3	7.44	0.17	7.27	97.73%
DBRCH4	6.11	0.13	5.98	97.95%
DBRCH5	11.35	0.21	11.14	98.12%

Table 54
Abita River

Subbasin	Original BOD Loading	Compliance BOD Loading	lbs of BOD Removed	Percent Reduction Required
EBFSF1	0.00	0.00	0.00	0.00%
EBFSF2	0.29	0.05	0.24	83.33%
EBFSF3	8.42	0.19	8.22	97.73%
ENGBR1	6.80	0.15	6.64	97.73%
ENGBR2	2.91	0.07	2.85	97.73%
ENGBR3	9.39	0.21	9.17	97.73%
JB1	34.00	1.13	32.86	96.66%
KIMBR1	0.00	0.00	0.00	0.00%
KIMBR2	8.79	0.20	8.59	97.73%
LONGBR1	0.47	0.01	0.46	98.47%
LONGBR2	85.01	1.93	83.08	97.73%
LONGBR3	28.60	0.63	27.97	97.79%
LONGBR4	69.69	2.32	67.37	96.67%
TMBR1	4.24	0.10	4.15	97.73%
TMBR2	12.12	0.28	11.85	97.73%
TOTALS	**1247.74**	**54.61**	**1193.13**	**95.62%**

The bolded sub-basins drain to those portions (13%) of the Abita where the DO standard cannot be achieved with the described upgrades. Increases of BOD_5 loads

in these areas, even if offset by reductions in another sub-basin of the Abita River, should not be allowed without significant offset and consideration.

The above data demonstrates that the Abita River is currently overloaded with existing loads. Consolidation of existing community sewage systems and individual treatment plants at commercial businesses in addition to the below listed unsewered subdivision projects should be implemented. These upgrades would allow the parish to keep the Abita River from becoming listed as impaired for DO, and allow future development while keeping the overall load to the River in check. **Table 55** below 0 a detention pond to address localized flooding in the vicinity of A Street to L Street south of Harrison Avenue as well as provide flood plain storage within the Abita River Basin. In addition to the flood control aspects, the existing pond located on 1 of the 3 parcels would be retrofitted to provide for water quality of the receiving stream. It is estimated the project would generate over 1000 ac-ft of storage within the basin as well as addressing water quality from un-sewered subdivisions within the Parish.

There are no RL/SRL Structures within the Abita River Basin which were affected by Storm Surge.

Table 55
Abita River
Existing Permitted Dischargers

Subbasin	Permit Number	Facility Name	Flow GPD	BOD_5 Load lb/day
AR1	LA0118664	Corporate Cleaners of Covington Inc	187.51	0.05
AR1	LAG532033	3 C Properties LLC - Sister Stuff Building	1171.91	0.29
AR1	LAG530020	190 Plaza Professional Center LLC	1171.91	0.29
AR1	LAG531710	H Elder Brown Jr Properties LLC	1171.91	0.29
AR1	LAG530138	Bolivar Investors Group LLC - 2401 Buildings	1171.91	0.29
AR1	LAG530139	Continental Underwriters Ltd	1171.91	0.29
AR1	LAG530209	Bank One	1171.91	0.29
AR1	LAG530347	Magee Financial Corp	1171.91	0.29
AR1	LAG531092	Geodan LLC	1171.91	0.29
AR1	LAG541077	Wellemeyer Enterprises - Tammany Home Center	5859.57	1.47
AR1	LAG531322	Regional Office Supply LLC	1171.91	0.29
AR1	LAG534204	Freres Lepage LLC - North Lion Stone Corp	585.96	0.22

Table 55
Abita River
Existing Permitted Dischargers

Subbasin	Permit Number	Facility Name	Flow GPD	BOD_5 Load lb/day
AR1	LAG531523	Communications Realty LLC	1171.91	0.29
AR1	LAG531741	Joe Piediscalzo - Joe Piediscalzo Rental Property	1171.91	0.29
AR1	LAG470234	Rainbow Suzuki Imports - Rainbow Automotive of Hammond LLC	234.38	0.06
AR1	LAG532892	Bolivar Investors Group LLC - DC Office Building	1171.91	0.29
AR1	LAG530358	Hummingbird Enterprises LLC	1171.91	0.29
AR1	LAG470141	Rainbow Northshore Buick GMC LLC	234.38	0.06
AR1	LAG531269	Robinwood Rental Property	1171.91	0.29
AR1	LAG470132	Hood Chevrolet LLC - Used Car Lot	234.38	0.06
AR1	LAG470132	Hood Chevrolet LLC - Used Car Lot	234.38	0.06
AR1	LAG531568	St Tammany Parish School Board - Covington Transportation Building	1171.91	0.29
AR15	LA0065587	Money Hill Plantation	16850.40	1.41
AR2	LAG470154	Baldwin Motors Inc	234.38	0.06

Table 55
Abita River
Existing Permitted Dischargers

Subbasin	Permit Number	Facility Name	Flow GPD	BOD_5 Load lb/day
AR2	LAG530219	General Animal Hospital Inc	1171.91	0.29
AR2	LAG530135	Gloria Coker MD	1171.91	0.29
AR2	LAG530894	Select Medical Staffing Inc	1171.91	0.29
AR2	LAG531317	STOR-All Covington LLC - Hoot Mon	1171.91	0.29
AR2	LAG533105	Malik & Sons LLC	585.96	0.22
AR2	LAG533739	Holton Enterprises of Covington Inc	1171.91	0.29
AR2	LAG531374	Jacquelyn Kay Davis	1171.91	0.29
AR2	LAG531405	Evangeline Oaks LLC - Colony Square	1171.91	0.29
AR2	LAG531594	Executive Plaza	1171.91	0.29
AR2	LAG531700	AutoZone #3026	1171.91	0.29
AR2	LAG470205	Jim Oliphants Premier Motor Co Ent LLC	234.38	0.06
AR2	LAG531886	Northshore Bible Church	1171.91	0.29

Table 55
Abita River
Existing Permitted Dischargers

Subbasin	Permit Number	Facility Name	Flow GPD	BOD_5 Load lb/day
AR2	LAG531793	Liberty Self Storage #4	1171.91	0.29
AR2	LAG531851	Robert Boettner - Building	1171.91	0.29
AR2	LAG532137	Jerry Braswell 1810 N Hwy 190 Building	1171.91	0.29
AR2	LAG533415	Trinity Evangelical Free Church	585.96	0.22
AR2	LAG534213	JNH Holding LLC - Complementary Aesthetics	585.96	0.22
AR2	LAG534224	Louis Jordano Rental Property	585.96	0.22
AR3	LAG531503	St Tammany Humane Society	1171.91	0.29
AR4	LA0066559	Utilities Inc of LA - Arrowwood WTP	384741.70	32.09
AR4	LAG540291	Artesian Utility Co Inc - Oak River Estates	6899.20	1.73
AR4	LAG533718	Northshore United Pentecostal Church	585.96	0.22
AR4	LAG533676	Louisiana Prayer Institute Inc - WWTP	585.96	0.22
AR8	LAG531647	Frabbieli's Food & Deli	1171.91	0.29

Table 55
Abita River
Existing Permitted Dischargers

Subbasin	Permit Number	Facility Name	Flow GPD	BOD_5 Load lb/day
ARTSF1	LAG541637	Abita Springs RV Resort	5859.57	1.47
ARTSF1	LAG530374	Muller Electrical Supply	1171.91	0.29
ARTSF1	LA0117391	St Tammany Parish Government - Autumn Wind Subdivision Utility Site	14700.48	1.23
ARTSF1	LA0032352	Abita Springs Town of - Abita Springs WWTP	165765.60	13.82
ARTSF1	LAG531541	Bayou Industrial Park - WWTP	1171.91	0.29
ARTSF1	LAG531518	Rio Grande of Abita LLC - Charles Collision Center	1171.91	0.29
ARTSF1	LAG470183	Transmission Depot Inc	1171.91	0.44
DBRCH1	LAG532636	St Tammany Fire District #7	1171.91	0.29
EBFSF2	LAG531601	Lacombe Car Care	1171.91	0.29
JB1	LAG541910	Abita Springs Apartments LLC - Hillcrest Lake Resort Apartments	5859.57	1.47
LONGBR4	LA0117412	St Tammany Parish Government - Abita Lakes Subdivision Utility	18270.00	1.52

Table 56
Abita River

Project Subdivision Name	BASIN	Total Number of New Customers	Total Sewer Project Cost ($)	Total Water Project Cost ($)	Total Projects Cost ($)	BOD Load Reduction (Lb)	BOD Reduction Cost ($/Lb)
Abita Nursery	Abita River	102	$ 6,507,800.00	$ -	$ 6,507,800.00	30.5	$ 213,300.00
Abita Springs Estates	Abita River	53	$ 8,040,500.00	$ 1,398,000.00	$ 9,438,500.00	14.6	$ 645,600.00
Alpine Village	Abita River	20	$ 1,404,300.00	$ 444,900.00	$ 1,849,200.00	5.5	$ 336,700.00
Atlas	Abita River	22	$ 1,734,900.00	$ 580,300.00	$ 2,315,200.00	6.1	$ 381,500.00
Calgonville	Abita River	38	$ 3,675,600.00	$ 1,122,600.00	$ 4,798,200.00	11.7	$ 408,700.00
Golden Oaks	Abita River	31	$ 9,499,400.00	$ 915,800.00	$ 10,415,200.00	9.6	$ 1,087,500.00
Green Woods	Abita River	36	$ 2,149,000.00	$ 962,200.00	$ 3,111,200.00	10.1	$ 309,200.00
Hillcrest Country Club	Abita River	239	$ 57,235,800.00	$ 7,060,700.00	$ 64,296,500.00	73.8	$ 870,800.00
Long Leaf Estates	Abita River	29	$ 2,522,200.00	$ 802,300.00	$ 3,324,500.00	8.4	$ 396,200.00
Mailleville	Abita River	103	$ 5,537,600.00	$ 2,028,500.00	$ 7,566,100.00	28.3	$ 267,500.00
Marci Acres	Abita River	55	$ 4,531,700.00	$ 1,644,200.00	$ 6,175,900.00	17.2	$ 359,200.00
Oak Knoll Estates	Abita River	65	$ 14,983,500.00	$ 1,920,300.00	$ 16,903,800.00	20.1	$ 841,800.00
Pailet	Abita River	27	$ 2,591,500.00	$ -	$ 2,591,500.00	8.3	$ 310,700.00
Pelican Estates	Abita River	25	$ 2,934,400.00	$ 738,600.00	$ 3,673,000.00	7.7	$ 475,600.00
Ponchitolawa	Abita River	29	$ 1,944,900.00	$ 866,900.00	$ 2,811,800.00	9.1	$ 310,100.00
Project 59	Abita River	4	$ 292,200.00	$ 113,900.00	$ 406,100.00	1.2	$ 340,800.00
Red Gap Acres	Abita River	117	$ 6,528,100.00	$ 2,397,200.00	$ 8,925,300.00	34.9	$ 256,100.00
River Highland	Abita River	12	$ 619,500.00	$ 147,100.00	$ 766,600.00	4.1	$ 187,400.00
Robindale	Abita River	80	$ 3,236,900.00	$ 2,288,400.00	$ 5,525,300.00	23.9	$ 230,900.00
Singing River	Abita River	159	$ 8,903,200.00	$ 3,279,800.00	$ 12,183,000.00	54.4	$ 224,000.00
Sunny Meadows Acres	Abita River	9	$ 3,029,300.00	$ 265,900.00	$ 3,295,200.00	2.8	$ 1,185,100.00
Sunrise Park	Abita River	69	$ 4,777,200.00	$ -	$ 4,777,200.00	20.6	$ 231,400.00
Tammany Hills	Abita River	1337	$ 27,952,800.00	$ 10,557,000.00	$ 38,509,800.00	375.8	$ 102,500.00
West Abita Springs	Abita River	182	$ 8,116,600.00	$ 5,201,400.00	$ 13,318,000.00	54.4	$ 244,800.00
Wilkosville	Abita River	13	$ 3,740,600.00	$ 347,500.00	$ 4,088,100.00	3.6	$ 1,125,000.00
Woodlands Grove Acres	Abita River	4	$ 1,049,900.00	$ 118,200.00	$ 1,168,100.00	1.2	$ 945,200.00
Totals		***2,860***	***$ 193,539,400.00***	***$ 45,201,700.00***	***$ 238,741,100.00***	***838***	***$ 284,900.00***

Table 57
Water Quality Pond

Target Sub-Basin	Drainage Basin	Current BOD_5 Load (lb)	Current Total BOD_5 Load (lb)	Drainage Basin Volume (acre ft)	Drainage Area (acres)	BOD/Acre ft	Load Reduction (%)	Load Reduction (lb/d)	Final BOD_5 Load
AR3	Abita River	319.80	319.8	6.50	780	49.20	80.00%	255.84	63.96

FIGURE 91
ABITA RIVER

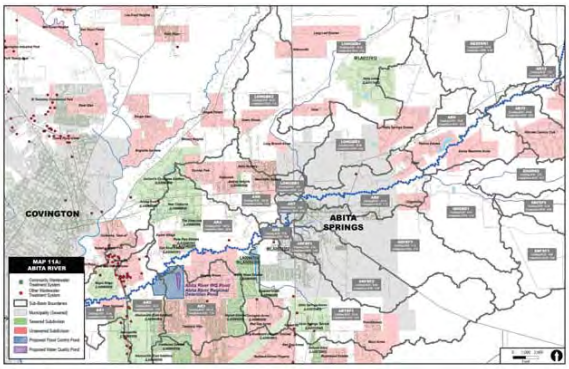
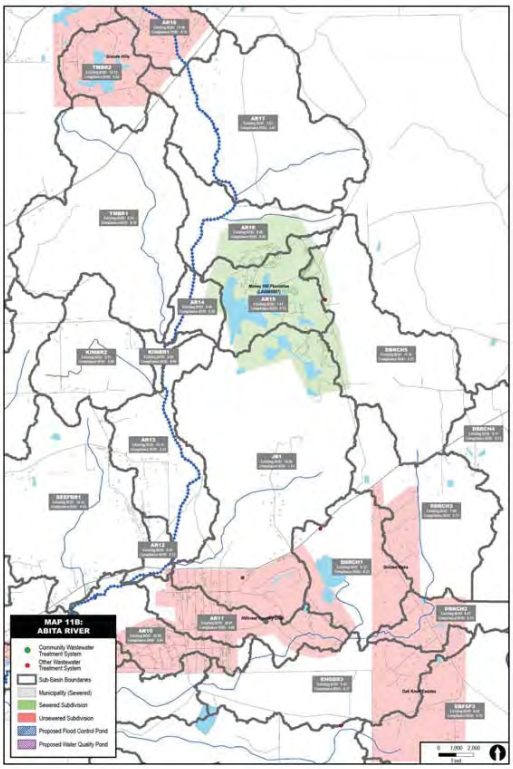


FIGURE 56
ABITA RIVER



6.12 Bogue Falaya

The Bogue Falaya River Basin drains approximately 125,384 acres in St. Tammany Parish including the Little Bogue Falaya and the Abita River, both of which drain into the Bogue Falaya River. The Little Bogue Falaya drains approximately 24,330 acres and the Abita River drains approximately 40,082 acres of the 125,384 acres. The current LDEQ DO standard for the Bogue Falaya River is 5 mg/L. Based on current LDEQ data the Bogue Falaya River is not considered impaired for low DO; however, based on the data and information considered for this project, the Bogue Falaya River is not meeting the existing DO standard of 5 mg/L at two ambient monitoring locations where the Bogue Falaya combines with the Tchefuncte River.

The Bogue Falaya River Basin currently contains four subdivisions with community sewage systems, 59 subdivisions with individual home sewage systems, a municipal sewage system serving the incorporated areas of the Village of Folsom, and various individual sewage systems at remotely located businesses and residences not in designated neighborhoods.

The calculated load for these dischargers is estimated to be 47.7 lb/day for the community and other LDEQ permitted sewage systems, and 1641.4 lb/day for the individual, unpermitted home sewage systems. Based on the model runs completed for this project, it is feasible for the Bogue Falaya River to meet a 5.0 mg/L DO standard through removal/connection of individual treatment systems, both in residential and commercial use, to community/municipal sewage systems, in addition to upgrade of existing LDEQ permitted discharges to meet more stringent BOD_5 limitations in the lower portions of the River. These upgrades/improvements would bring the Bogue Falaya River into compliance with the existing DO standard for approximately 79% of the river (9 out of the 11 reaches). Given the River's ability to comply with the existing DO standard through upgrades to existing systems and the sewering of individual treatment plants, it is unlikely that LDEQ will consider revision/lower of the DO standard in the Bogue Falaya River.

To achieve compliance with the current DO standard of 5 mg/L, concentrations of BOD_5 were reduced 5 mg/L for small point sources, sewered subdivisions, and un-sewered subdivisions, and 44 mg/L for several unsewered subdivisions in the lower portion of the River. The load reduction necessary to meet the 5.0 mg/L standard ranged from 0% in basins where no existing loads are present to approximately 98.23% in heavily populated areas. With these BOD_5 reductions, compliance was achieved in 79% of the Bogue Falaya River. **Table 58** presents the compliance BOD_5 loadings in pounds, the original BOD_5 loading in pounds, the pounds of BOD_5 removed and the percent reduction required for each sub-basin in the Bogue Falaya River watershed.

Table 58
Bogue Falaya River

Subbasin	Original BOD Loading	Compliance BOD Loading	lbs of BOD Removed	Percent Reduction Required
BFR10	7.04	7.04	0.00	0.00%
BFR11	18.96	18.96	0.00	0.00%
BFR12	40.94	40.94	0.00	0.00%
BFR13	18.55	18.55	0.00	0.00%
BFR14	12.76	12.76	0.00	0.00%
BFR15	3.01	3.01	0.00	0.00%
BFR16	0.30	0.30	0.00	0.00%
BFR17	15.93	15.93	0.00	0.00%
BFR18	3.01	3.01	0.00	0.00%
BFR19	2.40	2.40	0.00	0.00%
BFR20	0.60	0.60	0.00	0.00%
BFR21	7.21	7.21	0.00	0.00%
BFR22	16.53	16.53	0.00	0.00%

Table 58
Bogue Falaya River

Subbasin	Original BOD Loading	Compliance BOD Loading	lbs of BOD Removed	Percent Reduction Required
BFR23	30.40	30.40	0.00	0.00%
BFR24	2.40	2.40	0.00	0.00%
BFR25	0.30	0.30	0.00	0.00%
BFR26	4.50	4.50	0.00	0.00%
BFR27	0.60	0.60	0.00	0.00%
BFR3	**28.72**	**0.51**	**28.21**	**98.23%**
BFR4	**37.01**	**1.09**	**35.92**	**97.05%**
BFR5	7.13	0.16	6.97	97.73%
BFR6	39.46	2.04	37.42	94.83%
BFR7	36.52	0.85	35.67	97.66%
BFR8	77.92	77.92	0.00	0.00%
BFR9	16.21	16.21	0.00	0.00%
BFRFWF1	**97.69**	**4.68**	**93.01**	**95.21%**
BILLSCK1	24.94	24.94	0.00	0.00%
BILLSCK2	35.85	35.85	0.00	0.00%
BEACK1	6.79	6.79	0.00	0.00%
BFORK1	39.08	0.89	38.19	97.73%
BRUFK1	47.71	2.73	44.98	94.27%
EFLBFR1	2.41	0.48	1.93	80.00%
EFLBFR2	0.00	0.00	0.00	0.00%
EFLBFR3	34.80	8.37	26.43	75.96%
EFLBFR4	2.42	0.06	2.37	97.73%
EFLBFR5	3.96	0.09	3.87	97.73%
EFLBFS1	3.96	0.09	3.87	97.73%
EFLBFS2	7.27	0.17	7.11	97.73%

Table 58 Bogue Falaya River				
Subbasin	Original BOD Loading	Compliance BOD Loading	lbs of BOD Removed	Percent Reduction Required
EFLBFS3	13.86	0.53	13.33	96.18%
EFLBFS4	12.04	0.22	11.82	98.17%
EFLBFS5	26.08	0.59	25.49	97.73%
EFLBFS6	39.71	0.90	38.80	97.73%
LATBR1	45.18	45.18	0.00	0.00%
LATBR2	41.05	41.05	0.00	0.00%
LATBR3	21.80	21.80	0.00	0.00%
LATBR4	72.19	72.19	0.00	0.00%
LATBR5	13.51	13.51	0.00	0.00%
LBF1	**80.00**	**1.80**	**78.19**	**97.74%**
LBF2	13.26	1.23	12.03	90.69%
LBF3	17.51	0.40	17.12	97.73%
LBF4	24.15	0.55	23.60	97.73%
LBF5	24.43	0.64	23.79	97.38%
LBF6	5.81	0.13	5.68	97.73%
LBF7	32.07	0.81	31.26	97.46%
LBF8	67.32	1.53	65.79	97.73%
MICHBR	29.75	29.75	0.00	0.00%
MORGBR1	7.97	7.97	0.00	0.00%
MORGBR2	17.60	17.60	0.00	0.00%
NORTHBR1	5.71	0.13	5.58	97.73%
NORTHBR2	25.85	0.59	25.26	97.73%
NORTHBR3	33.70	1.53	32.18	95.47%
PRC1	49.33	49.33	0.00	0.00%
SIMCK1	0.98	0.98	0.00	0.00%

Table 58 Bogue Falaya River				
Subbasin	Original BOD Loading	Compliance BOD Loading	lbs of BOD Removed	Percent Reduction Required
SIMCK2	5.29	5.29	0.00	0.00%
SIMCK3	61.47	61.47	0.00	0.00%
SIMCK4	78.06	78.06	0.00	0.00%
TIGBR1	26.95	26.95	0.00	0.00%
VB1	1.69	1.69	0.00	0.00%
VB2	39.86	39.86	0.00	0.00%
WHFK1	18.41	0.42	17.99	97.73%
WPRG1	1.18	1.18	0.00	0.00%
TOTALS	**1689.09**	**895.25**	**793.84**	**47.00%**

The bolded sub-basins drain to those portions (21%) of the Bogue Falaya River where the DO standard cannot be achieved with the described upgrades. Increases of BOD_5 loads in these areas, even if offset by reductions in another sub-basin of the Bogue Falaya River, should not be allowed without significant offset and consideration.

The above data demonstrates that the lower reaches of the Bogue Falaya River are currently overloaded with existing loads. Consolidation of existing community sewage systems and individual treatment plants at commercial businesses in addition to the below listed unsewered subdivision projects should be implemented in these portions of the River. These upgrades would allow the parish to keep the Bogue Falaya River from becoming listed as impaired for DO, and allow future development while keeping the overall load to the River in check. **Table 59** below provides information on the current permitted loads to the Bogue Falaya River. The

current load associated unsewered neighborhoods and cost associated with providing sewer to each neighborhood is illustrated in **Table 60**.

Table 59 Bogue Falaya River Existing Permitted Dischargers				
Subbasin	Permit Number	Facility Name	Flow GPD	BOD_5 Load lb/day
BFR12	LAG570469	St Tammany Parish Government - Lake Hills Subdivision	23438.27	1.95
BFR12	LAG534064	Scott A St Romain DDS	585.96	0.22
BFR12	LAG531443	Red Bluff Baptist Church Inc	1171.91	0.29
BFR13	LAG534446	Bogue Falaya Baptist Church	1171.91	0.29
BFR14	LAG570495	Land-O-Pines Family Campground	23438.27	1.95
BFR23	LAG533805	New Life Tabernacle Baptist Church	585.96	0.22
BFR3	LAG530206	Fidelity Homestead Association	1171.91	0.29
BFR3	LAG530261	Champion Cycle Center LLC	1171.91	0.29
BFR4	LAG531315	Collins Boulevard Spur Inc	1171.91	0.29
BFR4	LAG750787	LADOTD - Covington Maintenance Unit	234.38	0.06
BFR4	LAG531331	Mita Corp - Green Springs Motel	1171.91	0.29
BFR6	LAG540805	Village in the Oaks Apartments LLC	5859.57	1.47
BFR6	LAG570417	Palm Plaza LLC - Palm Plaza STP	23438.27	1.95
BFR7	LAG531615	Acme Machine & Welding LLC	1171.91	0.29
BFR8	LAG531323	Spell's Grocery	1171.91	0.29

Table 59
Bogue Falaya River
Existing Permitted Dischargers

Subbasin	Permit Number	Facility Name	Flow GPD	BOD_5 Load lb/day
BFR8	LAG533114	North Pointe Church of Christ - WWTP	1171.91	0.29
BFR9	LAG531475	Playmakers Inc - Playmakers Theater	1171.91	0.29
BFRFWF1	LAG470201	Docar Trucks Parts & Equipment Inc	234.38	0.06
BFRFWF1	LAG470196	Lesters Body Shop	1171.91	0.44
BFRFWF1	LAG532632	Sunshine Equipment Co Inc	1171.91	0.29
BFRFWF1	LAG530236	Covington Stripping & Refinishing Inc	1171.91	0.29
BFRFWF1	LAG531666	Wingfoot Commercial Tire Systems LLC	1171.91	0.29
BFRFWF1	LAG470213	Tire Kingdom #179	1171.91	0.44
BFRFWF1	LAG470209	St Tammany Parish Sheriff's Office - Auto Complex	234.38	0.06
BFRFWF1	LAG530023	Docar Sales Inc	1171.91	0.29
BFRFWF1	LAG531404	Highway Mini Storage	1171.91	0.29
BFRFWF1	LAG530689	Inwood Gardens	1171.91	0.29
BFRFWF1	LAG540527	St Tammany Parish Government - St Gertrude Heights Subdivision	5859.57	1.47
BFRFWF1	LAG531863	Holden's Wrecker Service Inc	1171.91	0.29
BFRFWF1	LAG531247	Chase Cabinet Makers	1171.91	0.29

Table 59
Bogue Falaya River
Existing Permitted Dischargers

Subbasin	Permit Number	Facility Name	Flow GPD	BOD_5 Load lb/day
BFRFWF1	LAG531409	Jerry Braswell - Braswell Storage Building	1171.91	0.29
BFRFWF1	LAG531432	PSX Inc	1171.91	0.29
BFRFWF1	LAG541125	Seafood World	5859.57	1.47
BFRFWF1	LAG470174	Huval Properties LLC	1171.91	0.44
BFRFWF1	LAG532647	Clayton Homes - John Fussell - WWTP	1171.91	0.29
BFRFWF1	LAG531545	Franco's Investments Co - Franco's Golf Course	1171.91	0.29
BFRFWF1	LAG532079	Daughters of Divine Providence - Foundation House	1171.91	0.29
BFRFWF1	LAG531569	Southern Comfort A/C & Heating Inc	1171.91	0.29
BFRFWF1	LAG531646	Gulf Crane Services Inc	1171.91	0.29
BFRFWF1	LAG531850	Favret Investments LLC - Flex-Space	1171.91	0.29
BFRFWF1	LAG531599	Keffer-Stubbs Building	1171.91	0.29
BFRFWF1	LAG531644	Enviro-Tech Systems	1171.91	0.29
BFRFWF1	LAG531858	Ja-Roy Exterminating Service of St Tammany Inc	1171.91	0.29
BFRFWF1	LAG531630	Cannon Tree Service Inc	1171.91	0.29
BFRFWF1	LAG531758	It Straps On Inc	1171.91	0.29

Table 59
Bogue Falaya River
Existing Permitted Dischargers

Subbasin	Permit Number	Facility Name	Flow GPD	BOD_5 Load lb/day
BFRFWF1	LAG531665	AC Supply Inc	1171.91	0.29
BFRFWF1	LAG531661	Royal Kraft	1171.91	0.29
BFRFWF1	LAG531662	Parish Trailer & Equipment LLC dba Northshore Trailer & Equipment	1171.91	0.29
BFRFWF1	LAG531667	Progressive Imaging Consultants	1171.91	0.29
BFRFWF1	LAG531715	Omni Storage	1171.91	0.29
BFRFWF1	LAG532076	MKM Properties LLC - Office Building	1171.91	0.29
BFRFWF1	LAG532206	Favret Investments LLC - Flexspace B	1171.91	0.29
BFRFWF1	LAG532282	GSI Covington LLC - Office Building	1171.91	0.29
BFRFWF1	LAG750635	Tuff Equipment Rentals LLC	234.38	0.06
BFRFWF1	LAG750731	Renegade Properties LLC	234.38	0.06
BFRFWF1	LAG570472	Planche/River Park Estates - H2O Systems Inc - WWTP	23438.27	1.95
BFRFWF1	LAG533299	Society of St Teresa of Jesus Convent	1171.91	0.29
BFRFWF1	LAG533106	Hard Hat Row	1171.91	0.29
BFRFWF1	LAG531629	A-1 Glass Services Inc	1171.91	0.29

Table 59
Bogue Falaya River
Existing Permitted Dischargers

Subbasin	Permit Number	Facility Name	Flow GPD	BOD_5 Load lb/day
BFRFWF1	LAG533940	St Tammany Fire District 12 - Station 122	585.96	0.22
BFRFWF1	LAG533459	Eagles Nest Mini-Storage	585.96	0.22
BFRFWF1	LAG470330	Simmons Auto Mart	1171.91	0.44
BILLSCK2	LAG534025	The Pentecostals of Lee Road Church	1171.91	0.29
BRUFK1	LAG541432	Freedom House Church of God	5859.57	1.47
BRUFK1	LAG534203	Campground Motel LLC	585.96	0.22
EFLBFR3	LAG531792	St Tammany Fire District #2 - Station 23 Weldon W Poole Memorial Fire Station	1171.91	0.29
EFLBFR3	LAG541936	Alexander Milne Home for Women	5859.57	1.47
EFLBFS3	LAG533955	Joy D Hobart Office	585.96	0.22
EFLBFS4	LAG533077	Joy's Beauty Salon	585.96	0.22
LATBR2	LAG533025	BAMS Enterprises - Existing Building	1171.91	0.29
LATBR2	LAG533079	Landmark Church of God	585.96	0.22
LATBR3	LAG531221	Hillside Veterinary Associates LLC	1171.91	0.29
LATBR3	LAG531245	Discount Depot #5 Inc	1171.91	0.29

Table 59
Bogue Falaya River
Existing Permitted Dischargers

Subbasin	Permit Number	Facility Name	Flow GPD	BOD_5 Load lb/day
LATBR4	LAG570085	Lee Road Junior High School	23438.27	1.95
LATBR4	LAG530007	Dianne's Grocery & Deli	1171.91	0.29
LATBR4	LAG531335	Mid Point Feed & Seed	1171.91	0.29
LATBR4	LAG531419	Citizens Savings Bank Inc - Barkers Corner Branch	1171.91	0.29
LATBR4	LAG531435	Galloway's Seafood	1171.91	0.29
LATBR4	LAG531483	Vince King	1171.91	0.29
LATBR4	LAG531509	Lee Road Drugs	1171.91	0.29
LATBR4	LAG531632	Corner Capital LLC - Dollar General Store #6485	1171.91	0.29
LATBR4	LAG532659	Maximum Storage - Dixie Properties & Development LLC - WWTP	1171.91	0.29
LBF2	LAG570471	Density Utilities of LA LLC - Terra Mariae Subdivision	23438.27	1.95
LBF5	LAG531187	William J Bagnell & Son Funeral Home	1171.91	0.29
LBF5	LAG531892	Shepherd's Care Ministries	1171.91	0.29
LBF7	LAG531246	La Vita Dolce Viviamo LLC	1171.91	0.29
LBF7	LAG531430	St Tammany Fire District #6 - Station #3	1171.91	0.29
MORGBR1	LA0064378	Folsom Village of - STP	52374.00	4.37

Table 59
Bogue Falaya River
Existing Permitted Dischargers

Subbasin	Permit Number	Facility Name	Flow GPD	BOD_5 Load lb/day
MORGBR2	LAG750436	Folsom Spur Inc	234.38	0.06
MORGBR2	LAG531492	Dollar General Store	1171.91	0.29
MORGBR2	LAG531989	Rawhide Western Store & Bridles & Britches	1171.91	0.29
MORGBR2	LAG533080	Metal Masters - Metal Masters LLC	585.96	0.22
NORTHBR3	LAG480391	St Tammany Parish Government - Folsom Area Maintenance Barn	468.77	0.12
PRUDCRK1	LAG531314	R&B Booth Investments LLC - Ramsey Grocery	1171.91	0.29
TIGBR1	LAG541418	Archdiocese of New Orleans - Camp Abbey Retreat Center	23438.27	1.95

Detention ponds in the Bogue Falaya River Watershed were considered in an attempt to detain and attenuate the peak flows so that the downstream waters have the ability to drain prior to receiving upstream flows. The proposed East Fork of Little Bogue Falaya Detention Pond could provide roughly 370 acre-ft of storm water detention. The purpose of this project would be to strategically locate a pond within the Bogue Falaya River Basin along the other regional detention ponds to reduce the frequency of downstream flooding. The proposed Little Bogue Falaya Detention Pond would provide roughly 570 acre-ft of storm water detention. This project is intended to provide similar benefits as the east fork of the Little Bogue Falaya project. The proposed La Tice Branch Detention Pond would provide roughly 500 acre-ft of storm water detention. The proposed Venchy Branch Detention Pond would provide roughly 675 acre-ft of storm water detention.

There are no RL/SRL structures due to storm surge flooding.

Table 60
Bogue Falaya River

Project Subdivision Name	BASIN	Total Number of New Customers	Total Sewer Project Cost ($)	Total Water Project Cost ($)	Total Projects Cost ($)	BOD Load Reduction (Lb)	BOD Reduction Cost ($/Lb)
Barker's Corner Estates	Bogue Falaya River	21	$ 1,709,500.00	$ 585,900.00	$ 2,295,400.00	6.1	$ 374,600.00
Beason Creek Acres	Bogue Falaya River	9	$ 1,976,600.00	$ 246,900.00	$ 2,223,500.00	2.6	$ 861,200.00
Beechwood Gardens	Bogue Falaya River	5	$ 1,378,400.00	$ 154,200.00	$ 1,532,600.00	1.6	$ 956,600.00
Blackburn Place	Bogue Falaya River	7	$ 479,900.00	$ 183,800.00	$ 663,700.00	1.9	$ 345,300.00
Bleu Lake Hills	Bogue Falaya River	59	$ 9,583,200.00	$ -	$ 9,583,200.00	17.8	$ 537,300.00
Bogue Falaya	Bogue Falaya River	43	$ 3,103,700.00	$ 1,079,700.00	$ 4,183,400.00	11.8	$ 353,600.00
Bouge Glen	Bogue Falaya River	95	$ 6,663,200.00	$ -	$ 6,663,200.00	24.9	$ 267,300.00
Chesel Farms	Bogue Falaya River	45	$ 11,014,200.00	$ 1,234,500.00	$ 12,248,700.00	12.9	$ 948,800.00
Claiborne, Town of	Bogue Falaya River	51	$ 8,016,700.00	$ 1,339,300.00	$ 9,356,000.00	14.0	$ 668,000.00
Covington Industrial Park	Bogue Falaya River	14	$ 3,773,000.00	$ 431,700.00	$ 4,204,700.00	4.5	$ 931,500.00
Glendale	Bogue Falaya River	9	$ 1,521,600.00	$ 475,200.00	$ 1,996,800.00	2.8	$ 704,200.00
Grande Hills	Bogue Falaya River	122	$ 25,059,500.00	$ 3,375,400.00	$ 28,434,900.00	35.3	$ 805,600.00
Great Southern Acres	Bogue Falaya River	31	$ 4,545,200.00	$ 857,700.00	$ 5,402,900.00	9.0	$ 602,400.00
Greenleaf Acres	Bogue Falaya River	6	$ 1,433,100.00	$ 178,000.00	$ 1,611,100.00	1.9	$ 865,700.00
Handsome Meadow Farms	Bogue Falaya River	32	$ 6,276,300.00	$ 877,800.00	$ 7,154,100.00	9.2	$ 779,300.00
Highland	Bogue Falaya River	24	$ 2,334,700.00	$ 774,800.00	$ 3,109,500.00	7.2	$ 433,100.00
Highland Acres	Bogue Falaya River	16	$ 1,618,600.00	$ 493,300.00	$ 2,111,900.00	5.2	$ 409,400.00
Hill Top Farms	Bogue Falaya River	10	$ 1,651,800.00	$ 522,400.00	$ 2,174,200.00	3.2	$ 674,300.00
Holliday Farms	Bogue Falaya River	8	$ 683,500.00	$ 219,500.00	$ 903,000.00	2.3	$ 393,500.00
Honey Suckle Estates	Bogue Falaya River	28	$ 2,586,500.00	$ 863,300.00	$ 3,449,800.00	9.0	$ 382,100.00
Lauraland	Bogue Falaya River	6	$ 952,700.00	$ 265,800.00	$ 1,218,500.00	1.9	$ 629,800.00
Lee Road	Bogue Falaya River	63	$ 3,464,400.00	$ 1,222,800.00	$ 4,687,200.00	19.6	$ 238,900.00
Magnolia Gardens	Bogue Falaya River	26	$ 3,509,900.00	$ -	$ 3,509,900.00	6.8	$ 514,500.00
Magnolia Trace	Bogue Falaya River	8	$ 519,200.00	$ -	$ 519,200.00	2.3	$ 222,400.00
Merrywood Estates	Bogue Falaya River	193	$ 25,735,200.00	$ -	$ 25,735,200.00	55.4	$ 464,800.00
Military Heights	Bogue Falaya River	16	$ 639,400.00	$ 155,300.00	$ 794,700.00	4.5	$ 177,700.00
Mill Haven	Bogue Falaya River	14	$ 2,154,500.00	$ 707,000.00	$ 2,861,500.00	4.5	$ 633,900.00
Oak Alley Estates	Bogue Falaya River	11	$ 1,382,000.00	$ 304,300.00	$ 1,686,300.00	3.2	$ 529,800.00
Old Military Hills	Bogue Falaya River	16	$ 2,299,000.00	$ 446,400.00	$ 2,745,400.00	4.7	$ 588,100.00
Ozone Place Annex	Bogue Falaya River	27	$ 1,537,600.00	$ 653,700.00	$ 2,191,300.00	6.8	$ 320,500.00
Palm Plaza	Bogue Falaya River	104	$ 5,142,600.00	$ -	$ 5,142,600.00	27.3	$ 188,500.00
Park Twenty-Five	Bogue Falaya River	5	$ 404,700.00	$ 154,200.00	$ 558,900.00	1.6	$ 346,700.00
Red Oak Estates	Bogue Falaya River	11	$ 589,200.00	$ 304,300.00	$ 893,500.00	3.2	$ 280,700.00
River Glen	Bogue Falaya River	65	$ 3,766,200.00	$ 1,157,800.00	$ 4,924,000.00	21.0	$ 234,900.00
River Heights	Bogue Falaya River	100	$ 5,554,300.00	$ 2,038,900.00	$ 7,593,200.00	31.1	$ 243,800.00

Table 60
Bogue Falaya River

Project Subdivision Name	BASIN	Total Number of New Customers	Total Sewer Project Cost ($)	Total Water Project Cost ($)	Total Projects Cost ($)	BOD Load Reduction (Lb)	BOD Reduction Cost ($/Lb)
Riverbank Farms	Bogue Falaya River	9	$ 1,188,600.00	$ 251,100.00	$ 1,439,700.00	2.6	$ 548,200.00
Riverside Drive Estates	Bogue Falaya River	5	$ 276,800.00	$ 131,300.00	$ 408,100.00	1.4	$ 297,200.00
Robert Lobdell	Bogue Falaya River	9	$ 398,400.00	$ 236,300.00	$ 634,700.00	2.5	$ 256,800.00
San Souci	Bogue Falaya River	15	$ 1,552,600.00	$ 493,300.00	$ 2,045,900.00	4.7	$ 438,000.00
Savannah Oaks	Bogue Falaya River	3	$ 494,000.00	$ 83,000.00	$ 577,000.00	0.9	$ 664,800.00
Schito Estates	Bogue Falaya River	17	$ 1,747,500.00	$ 474,300.00	$ 2,221,800.00	5.0	$ 447,900.00
Simalusa Estates	Bogue Falaya River	61	$ 13,448,600.00	$ 1,809,200.00	$ 15,257,800.00	18.9	$ 806,400.00
Spring Clover Acres	Bogue Falaya River	9	$ 1,711,700.00	$ 251,100.00	$ 1,962,800.00	2.6	$ 747,400.00
St Tammany Commercial Park	Bogue Falaya River	9	$ 1,512,200.00	$ 277,500.00	$ 1,789,700.00	2.9	$ 616,700.00
St. Gertrude Heights	Bogue Falaya River	20	$ 1,235,300.00	$ -	$ 1,235,300.00	6.4	$ 191,600.00
Sundown Farms	Bogue Falaya River	10	$ 293,900.00	$ 276,700.00	$ 570,600.00	2.9	$ 197,200.00
Tammany Terrace	Bogue Falaya River	35	$ 2,650,800.00	$ 976,500.00	$ 3,627,300.00	10.2	$ 355,200.00
Terra Mariae	Bogue Falaya River	54	$ 1,753,900.00	$ 1,354,700.00	$ 3,108,600.00	14.2	$ 219,400.00
Venchy Branch	Bogue Falaya River	17	$ 1,956,600.00	$ -	$ 1,956,600.00	5.5	$ 357,000.00
Village Farms	Bogue Falaya River	16	$ 2,615,700.00	$ 438,900.00	$ 3,054,600.00	4.6	$ 665,500.00
Waldheim Estates	Bogue Falaya River	29	$ 3,257,600.00	$ 802,300.00	$ 4,059,900.00	8.4	$ 483,900.00
Yellow Pine Park	Bogue Falaya River	10	$ 1,350,800.00	$ 279,000.00	$ 1,629,800.00	2.9	$ 558,600.00
Totals		***1,628***	***$ 190,505,100.00***	***$ 29,439,100.00***	***$ 219,944,200.00***	***474***	***$ 464,300.00***

FIGURE 57
BOGUE FALAYA RIVER

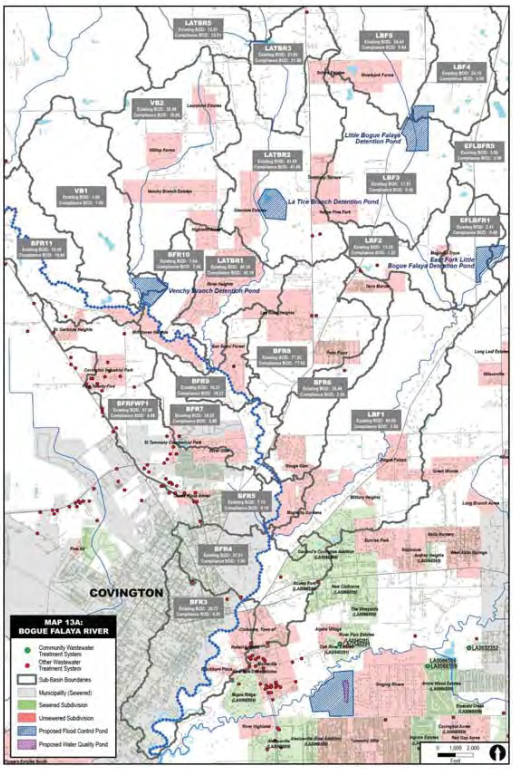


FIGURE 58
BOGUE FALAYA RIVER

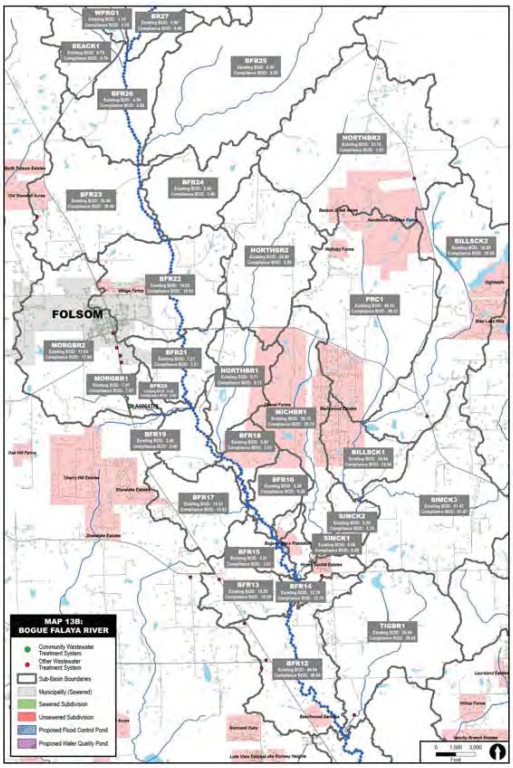
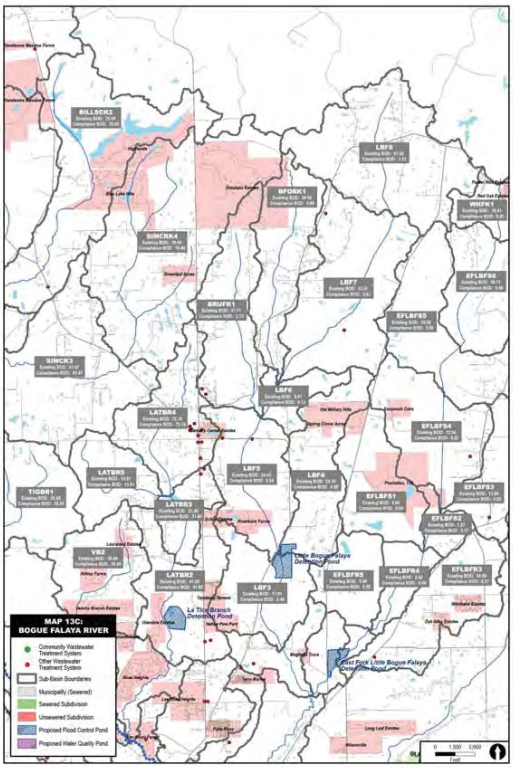


FIGURE 59
BOGUE FALAYA RIVER



6.13 Upper Tchefuncte

The Tchefuncte River Basin drains approximately 264,349 acres in Mississippi and Louisiana and approximately 210,366 acres are within St. Tammany Parish. The current LDEQ DO standard for the Upper Tchefuncte River is 5 mg/L. Based on current LDEQ data the Upper Tchefuncte River is not considered impaired for low DO; however, based on the data and information considered for this project, the upper Tchefuncte River is not meeting the existing DO standard of 5 mg/L at two ambient monitoring locations near the City of Covington.

The Upper Tchefuncte River Basin currently contains 25 subdivisions with community sewage systems, 38 subdivisions with individual home sewage systems, a municipal sewage system serving primarily the incorporated area of Covington and various individual sewage systems at remotely located businesses and residences not in designated neighborhoods.

The calculated load for these dischargers is estimated to be 88.8 lb/day for the community, municipal and other LDEQ permitted sewage systems, and 1,338.7 lb/day for the individual, unpermitted home sewage systems. Based on the model runs completed for this project, it is feasible for the Upper Tchefuncte River to meet a 5.0 mg/L DO standard through removal/connection of individual treatment systems, both in residential and commercial use, to community/municipal sewage systems, in addition to upgrade of existing LDEQ permitted discharges to meet more stringent 5.0 mg/L or 10 mg/L BOD_5 limitations in the lower reaches modeled. These upgrades/improvements would bring the Upper Tchefuncte River into compliance with the existing DO standard for approximately 87% of the river (3 out of the 5 reaches). Given the river's ability to comply with the existing DO standard through upgrades to existing systems and the sewering of individual treatment plants, it is unlikely that LDEQ will consider revision/lower of the DO standard in the Upper Tchefuncte River.

To achieve compliance with the current DO standard of 5 mg/L, concentrations of BOD_5 were reduced to 5 mg/L or 10 mg/L for small point sources, sewered subdivisions, and unsewered subdivisions in the lower portion of the River depending on size and location. The load reduction necessary to meet the 5.0 mg/L standard ranged from 0% in basins where no existing loads are present to approximately 98.14% in heavily populated areas. With these BOD_5 reductions, compliance was achieved in 87% of the Upper Tchefuncte River. **Table 61** presents the compliance BOD_5 loadings in pounds, the original BOD_5 loading in pounds, the pounds of BOD_5 removed and the percent reduction required for each sub-basin in the Upper Tchefuncte River watershed.

Table 61
Upper Tchefuncte River

Subbasin	Original BOD Loading	Compliance BOD Loading	lbs of BOD Removed	Percent Reduction Required
CLKBR1	8.27	8.27	0.00	0.00%
CLKBR2	9.75	9.75	0.00	0.00%
COWPEN1	7.76	7.76	0.00	0.00%
COWPEN2	18.41	18.41	0.00	0.00%
COWPEN3	39.64	39.64	0.00	0.00%
COWPEN4	15.92	15.92	0.00	0.00%
COWPEN5	21.07	21.07	0.00	0.00%
HC1	30.52	0.72	29.80	97.64%
HC2	56.58	2.46	54.12	95.66%
HORNBR1	15.66	15.66	0.00	0.00%
HORSEBR1	161.32	161.32	0.00	0.00%
HORSEBR2	23.73	23.73	0.00	0.00%
HORSEBR3	24.42	24.42	0.00	0.00%

Table 61
Upper Tchefuncte River

Subbasin	Original BOD Loading	Compliance BOD Loading	lbs of BOD Removed	Percent Reduction Required
HORSEBR4	25.19	25.19	0.00	0.00%
PRUDCRK1	157.08	157.08	0.00	0.00%
SATC1	10.15	2.47	7.68	75.63%
SATC2	56.74	1.32	55.43	97.68%
SAVBR1	11.05	11.05	0.00	0.00%
SAVBR2	18.10	18.10	0.00	0.00%
SAVBR3	22.20	22.20	0.00	0.00%
SAVBR4	29.24	29.24	0.00	0.00%
SAVBR5	12.40	12.40	0.00	0.00%
SAVBR6	23.04	23.04	0.00	0.00%
TCHFOL1	7.86	7.86	0.00	0.00%
TR10	**32.84**	**0.90**	**31.95**	**97.27%**
TR11	**42.61**	**19.58**	**23.03**	**54.05%**
TR12	20.63	0.66	19.97	96.80%
TR13	37.21	37.18	0.03	0.07%
TR14	32.81	32.81	0.00	0.00%
TR15	19.75	19.75	0.00	0.00%
TR16	11.68	11.68	0.00	0.00%
TR17	0.00	0.00	0.00	0.00%
TR18	5.83	5.83	0.00	0.00%
TR19	13.03	13.03	0.00	0.00%
TR20	13.72	13.72	0.00	0.00%
TR21	11.32	11.32	0.00	0.00%
TR22	32.06	32.06	0.00	0.00%

Table 61
Upper Tchefuncte River

Subbasin	Original BOD Loading	Compliance BOD Loading	lbs of BOD Removed	Percent Reduction Required
TR23	1.37	1.37	0.00	0.00%
TR24	9.74	9.74	0.00	0.00%
TR25	2.50	2.50	0.00	0.00%
TR26	0.31	0.31	0.00	0.00%
TR27	5.94	5.94	0.00	0.00%
TR28	0.00	0.00	0.00	0.00%
TR29	8.57	8.57	0.00	0.00%
TR30	0.89	0.89	0.00	0.00%
TR31	0.00	0.00	0.00	0.00%
TR33	0.00	0.00	0.00	0.00%
TR35	2.66	2.66	0.00	0.00%
TR36	0.00	0.00	0.00	0.00%
TR37	0.00	0.00	0.00	0.00%
TR38	11.23	11.23	0.00	0.00%
TR39	0.00	0.00	0.00	0.00%
TR40	0.00	0.00	0.00	0.00%
TR41	0.00	0.00	0.00	0.00%
TR42	0.00	0.00	0.00	0.00%
TR7	0.00	0.00	0.00	0.00%
TR8	**103.47**	**5.93**	**97.54**	**94.27%**
TR9	**9.40**	**0.18**	**9.22**	**98.14%**
TRFEF1	24.15	0.95	23.19	96.05%
TRTWF1	30.12	30.12	0.00	0.00%
TRTWF2	22.74	22.74	0.00	0.00%

Table 61 Upper Tchefuncte River				
Subbasin	**Original BOD Loading**	**Compliance BOD Loading**	**lbs of BOD Removed**	**Percent Reduction Required**
TB1	114.79	4.56	110.23	96.03%
TOTALS	**1427.48**	**965.30**	**462.18**	**32.38%**

The bolded sub-basins drain to portions (13%) of the Upper Tchefuncte River where the DO standard cannot achieved with the described upgrades. Increases of BOD_5 loads in these areas, even if offset by reductions in another sub-basin of the Upper Tchefuncte River, should not be allowed without significant offset and consideration.

The above data demonstrates that the lower reaches of the Upper Tchefuncte River are currently overloaded with existing loads. Consolidation of existing community sewage systems and individual treatment plants at commercial businesses in addition to the below listed unsewered subdivision projects should be implemented in these portions of the River. These upgrades would allow the parish to keep the Upper Tchefuncte River from becoming listed as impaired for DO, and allow future development while keeping the overall load to the River in check. **Table 62** below provides information on the current permitted loads to the Upper Tchefuncte River. The current load and load removal for the Water Quality Ponds are illustrated in **Table 63**. Additional information pertaining to project specifics, location of project, and project cost on the Water Quality Ponds and Flood Control Ponds are located in Appendix D. The current load associated unsewered neighborhoods and cost associated with providing sewer to each neighborhood is illustrated in **Table 64**.

Table 62 Upper Tchefuncte River Existing Permitted Dischargers				
Subbasin	**Permit Number**	**Facility Name**	**Flow GPD**	**BOD_5 Load lb/day**
HC1	LAG531211	Recreation District #14 - Hwy 1085 Recreation Facility	1171.91	0.29
HC1	LAG533242	Dog-Gone Purrfect LLC - Camp Bow Wow	117.19	0.04
HC2	LAG531721	Tallow Creek Shooting Grounds LLC	1171.91	0.29
HC2	LA0120235	St Tammany Parish Government - West St Tammany Regional STP	27883.80	2.33
HC2	LAG531784	Liberty Self Storage LLC #10	1171.91	0.29
HC2	LAG532314	Grace Harbor Family Church	1171.91	0.29
HORSEBR1	LA0105520	Artesian Utility Co Inc - Lake Ramsey Subdivision	46538.10	3.88
HORSEBR1	LA0105520	Artesian Utility Co Inc - Lake Ramsey Subdivision	28125.93	2.35
HORSEBR1	LA0118966	Penn Mill Lakes Subdivision - H2O Systems Inc	89338.20	7.45
HORSEBR1	LAG531947	Covington Youth Soccer Fields - STP	1171.91	0.29

Table 62 Upper Tchefuncte River Existing Permitted Dischargers				
Subbasin	**Permit Number**	**Facility Name**	**Flow GPD**	**BOD_5 Load lb/day**
HORSEBR4	LAG533115	Bogue Falaya Baptist Church - Bogue Falaya Baptist Church Office	585.96	0.22
PRUDCRK 1	LAG570286	Oak Villa Trailer Estates	23438.27	1.95
PRUDCRK 1	LA0110680	National Oilwell Varco LP - Covington Facility	1171.91	0.29
SATC1	LA0117927	St Tammany Parish Government - Tallow Creek STP	54779.20	4.57
SATC1	LAG532167	YMCA of Greater New Orleans - Recreational Development	1171.91	0.29
SATC2	LA0124648	Acadian Millwork & Supply	609.40	0.15
SATC2	LAG530917	Lawrence & June Rabalais - Private Owners	1171.91	0.29
SAVBR1	LAG532298	Gene's Country Store LLC	585.96	0.22

Table 62 Upper Tchefuncte River Existing Permitted Dischargers				
Subbasin	**Permit Number**	**Facility Name**	**Flow GPD**	**BOD_5 Load lb/day**
SAVBR5	LAG531633	St John the Baptist Roman Catholic Church Folsom LA - St John's Church STP	1171.91	0.29
TB1	LAG531453	Tulane University Medical Group - The Bone & Joint Clinic	1171.91	0.29
TB1	LA0122645	St Tammany Parish Government - Timber Branch II Subdivision	61157.60	5.10
TB1	LAG531730	Faith Presbyterian Church	1171.91	0.29
TB1	LAG531392	Children's Medical Center	1171.91	0.29
TB1	LAG541712	Acadian Village Highway 21 LLC - Acadian Village Apartments	5859.57	1.47
TB1	LAG532312	Montagnet Properties No 2 LLC - Office Building	1171.91	0.29
TR10	LAG470189	By-Pass Auto Clinic	1171.91	0.44
TR10	LAG531270	Urban Stone Properties LLC	1171.91	0.29

Table 62
Upper Tchefuncte River
Existing Permitted Dischargers

Subbasin	Permit Number	Facility Name	Flow GPD	BOD_5 Load lb/day
TR10	LAG531708	Gas Properties LLC	1171.91	0.29
TR10	LAG531586	VFW Post 7286	1171.91	0.29
TR10	LAG531289	Bail Bonding Service LLC	1171.91	0.29
TR10	LAG531499	Annie's Sewing Center	1171.91	0.29
TR10	LAG531556	Covington City of	1171.91	0.29
TR10	LAG531549	Fountain of Praise	1171.91	0.29
TR10	LAG531635	KDM Sales & Service Inc	1171.91	0.29
TR10	LAG531638	Charlie Maestri - Charlie Maestri Carpet & Furniture	1171.91	0.29
TR10	LAG531961	Poole Lumber Co LLC	1171.91	0.29
TR10	LAG534472	DMJM Land LLC - Storage Building	585.96	0.22

Table 62
Upper Tchefuncte River
Existing Permitted Dischargers

Subbasin	Permit Number	Facility Name	Flow GPD	BOD_5 Load lb/day
TR11	LA0084336	Covington City of - WWTP	467478.90	38.99
TR11	LAG532829	Northshore Surgical Center LLC	1171.91	0.29
TR12	LAG531522	St Tammany Parish Government - Outpatient Pavillion Medical Center	1171.91	0.29
TR14	LAG531550	Lacox Inc	1171.91	0.29
TR14	LAG531783	Steven Owens - Office Building Construction Project	1171.91	0.29
TR14	LAG531553	Delaune Apartments	1171.91	0.29
TR14	LAG531585	Ja-Roy Exterminating System of St Tammany Inc	1171.91	0.29
TR14	LAG531709	Covington Lions Club Inc	1171.91	0.29
TR14	LAG531706	Robert H Burns Post #16 of the American Legion	1171.91	0.29

Table 62
Upper Tchefuncte River
Existing Permitted Dischargers

Subbasin	Permit Number	Facility Name	Flow GPD	BOD_5 Load lb/day
TR14	LAG531600	Edward P Schnauder Co	1171.91	0.29
TR14	LAG534282	Archdiocese of New Orleans - St Scholastica Academy - Ball Field	585.96	0.22
TR15	LAG533088	Caserta's Land Clearing Service LLC - Casertas Land Clearing Service WWTP	585.96	0.22
TR15	LAG470352	Pamala M Taylor - Rental Building	1171.91	0.44
TR8	LAG531648	Tchefuncta Medical Services Inc	1171.91	0.29
TR8	LA0066567	Utilities of Louisiana Inc - Greenbrier WWTP	85928.50	7.17
TR8	LAG531174	Holy Trinity Lutheran Church New Life Center	1171.91	0.29
TR8	LAG531757	Delta Imaging LLC	1171.91	0.29
TRFEF1	LAG470274	Car Craft Inc	234.38	0.06

Table 62
Upper Tchefuncte River
Existing Permitted Dischargers

Subbasin	Permit Number	Facility Name	Flow GPD	BOD_5 Load lb/day
TRTWF1	LAG531452	Goodbee Quik Stop	1171.91	0.29
TRTWF1	LAG531427	Goodbee Commercial Park	1171.91	0.29
TRTWF1	LA0123269	St Tammany Parish Government - Goodbee Regional STP	560.70	0.05
TRTWF2	LAG570489	St Tammany Parish Government - Northridge Estate Subdivision	5420.10	0.45

Table 63
Water Quality Pond

Target Sub-Basin	Drainage Basin	Current BOD_5 Load (lb)	Current Total BOD_5 Load (lb)	Drainage Basin Volume (acre ft)	Drainage Area (acres)	BOD/Acre ft	Load Reduction (%)	Load Reduction (lb/d)	Final BOD_5 Load
SATC1	Upper Tchefuncte	6.20	60.93	13.75	1650	4.43	80.00%	4.96	1.24
HC2	Upper Tchefuncte	50.43	50.43	15.35	1842	3.29	80.00%	40.34	10.09
TB 1	Upper Tchefuncte	69.19	69.19	12.94	1553	5.35	80.00%	55.35	13.84

The Upper Tchefuncte River Detention Pond is an attempt to detain and attenuate the peak flows so that the downstream waters have the ability to get out prior to the upstream peaks. The Detention Pond would consist of roughly 180 acre detention pond providing approximately 1,800 acre-ft of storm water detention. La Tice Branch Detention Pond would consist of roughly 50 acre detention pond providing roughly 500 acre-ft of storm water detention. Venchy Branch Detention Pond would consist of roughly 45 acre detention pond providing roughly 675 acre-ft of storm water detention. Upper Tchefuncte Detention Pond would consist of roughly 180 acre detention pond providing approximately 1,800 acre-ft of storm water detention. Based on the combination of the above projects, the Tchefuncte River Basin which could consist of 6 different detention ponds, would add about 5,000 ac-ft of storm water detention to the basin.

Table 64
Upper Tchefuncte River

Project Subdivision Name	BASIN	Total Number of New Customers	Total Sewer Project Cost ($)	Total Water Project Cost ($)	Total Projects Cost ($)	BOD Load Reduction (Lb)	BOD Reduction Cost ($/Lb)
Ashland Oaks Business Park	Upper Tchefuncte River	3	$ 1,163,200.00	$ 93,900.00	$ 1,257,100.00	1.0	$ 1,280,100.00
Barbara Place	Upper Tchefuncte River	16	$ 1,122,700.00	$ 500,800.00	$ 1,623,500.00	5.2	$ 310,000.00
Bennett Woods	Upper Tchefuncte River	15	$ 5,709,200.00	$ 469,500.00	$ 6,178,700.00	4.9	$ 1,258,400.00
Bootlegger Run	Upper Tchefuncte River	10	$ 226,100.00	$ 313,000.00	$ 539,100.00	3.3	$ 164,700.00
Cherry Hill Estates	Upper Tchefuncte River	77	$ 14,335,400.00	$ 2,193,500.00	$ 16,528,900.00	22.9	$ 720,500.00
Creekwood Estates	Upper Tchefuncte River	5	$ 1,497,500.00	$ -	$ 1,497,500.00	1.6	$ 915,000.00
Deer Cross Park	Upper Tchefuncte River	13	$ 867,900.00	$ 406,900.00	$ 1,274,800.00	4.3	$ 299,600.00
Delaune Acres	Upper Tchefuncte River	4	$ 628,500.00	$ 113,900.00	$ 742,400.00	1.2	$ 623,000.00
Evergreen Acres	Upper Tchefuncte River	60	$ 3,803,600.00	$ 1,339,700.00	$ 5,143,300.00	19.7	$ 260,900.00
Flower Estates	Upper Tchefuncte River	195	$ 6,462,100.00	$ 2,432,600.00	$ 8,894,700.00	59.8	$ 148,800.00
Flower Estates South	Upper Tchefuncte River	110	$ 3,361,600.00	$ 1,227,200.00	$ 4,588,800.00	33.7	$ 136,100.00
Gordon Estates	Upper Tchefuncte River	15	$ 642,000.00	$ 156,600.00	$ 798,600.00	4.9	$ 162,600.00
Green Valley Acres	Upper Tchefuncte River	49	$ 8,520,200.00	$ 1,533,800.00	$ 10,054,000.00	16.0	$ 626,800.00
Innwoods	Upper Tchefuncte River	6	$ 703,900.00	$ -	$ 703,900.00	1.8	$ 382,800.00
Lake Ramsey Heights	Upper Tchefuncte River	62	$ 4,418,500.00	$ 1,940,700.00	$ 6,359,200.00	20.3	$ 313,300.00
Lake Villa Mobile Home Park	Upper Tchefuncte River	120	$ 3,669,900.00	$ 3,787,400.00	$ 7,457,300.00	39.6	$ 188,300.00
Lake Vista	Upper Tchefuncte River	79	$ 3,700,800.00	$ 1,395,100.00	$ 5,095,900.00	25.9	$ 193,600.00
Normand Oaks	Upper Tchefuncte River	35	$ 4,161,400.00	$ 1,095,500.00	$ 5,256,900.00	11.5	$ 458,800.00
North Folsom Estates	Upper Tchefuncte River	5	$ 4,087,300.00	$ 134,800.00	$ 4,222,100.00	1.4	$ 2,994,700.00
Oak Hill Farms	Upper Tchefuncte River	1	$ 1,158,900.00	$ 28,500.00	$ 1,187,400.00	0.3	$ 3,985,700.00
Oak Hills Estates	Upper Tchefuncte River	11	$ 2,252,200.00	$ 313,400.00	$ 2,565,600.00	3.3	$ 782,900.00
Old Stonehill Acres	Upper Tchefuncte River	69	$ 8,289,900.00	$ 1,860,500.00	$ 10,150,400.00	19.5	$ 521,700.00
Pine Air	Upper Tchefuncte River	11	$ 494,700.00	$ 294,000.00	$ 788,700.00	3.1	$ 256,500.00
Pineland Acres	Upper Tchefuncte River	27	$ 764,200.00	$ 845,100.00	$ 1,609,300.00	8.8	$ 182,100.00
Pradeo Acres	Upper Tchefuncte River	4	$ 848,800.00	$ 125,200.00	$ 974,000.00	1.3	$ 743,900.00
Ramsey Estates	Upper Tchefuncte River	72	$ 5,765,400.00	$ 2,253,700.00	$ 8,019,100.00	23.6	$ 340,300.00
River Bend Estates	Upper Tchefuncte River	56	$ 9,104,700.00	$ 1,752,900.00	$ 10,857,600.00	18.3	$ 592,300.00
River Forest Country Club	Upper Tchefuncte River	56	$ 3,295,300.00	$ 977,600.00	$ 4,272,900.00	18.4	$ 232,200.00
Shady Lake Estates	Upper Tchefuncte River	169	$ 7,832,000.00	$ 1,603,400.00	$ 9,435,400.00	55.5	$ 169,900.00
Spring River Park	Upper Tchefuncte River	41	$ 4,748,000.00	$ 1,105,500.00	$ 5,853,500.00	11.6	$ 506,300.00
Stonelake Estates	Upper Tchefuncte River	61	$ 8,119,800.00	$ 1,737,700.00	$ 9,857,500.00	18.2	$ 542,400.00
Tanzella Ranch Estates	Upper Tchefuncte River	24	$ 1,407,600.00	$ 751,200.00	$ 2,158,800.00	7.9	$ 274,800.00
TBFP Business Park	Upper Tchefuncte River	1	$ 417,600.00	$ 31,300.00	$ 448,900.00	0.3	$ 1,371,400.00
Tchefuncte Acres	Upper Tchefuncte River	6	$ 557,100.00	$ 187,800.00	$ 744,900.00	2.0	$ 379,300.00
Tiffany Farms	Upper Tchefuncte River	10	$ 745,700.00	$ 186,800.00	$ 932,500.00	3.3	$ 283,800.00
Totals		***1,498***	***$ 124,883,700.00***	***$ 33,099,500.00***	***$ 157,983,200.00***	***474***	***$ 333,100.00***

FIGURE 61
UPPER TCHEFUNCTE RIVER

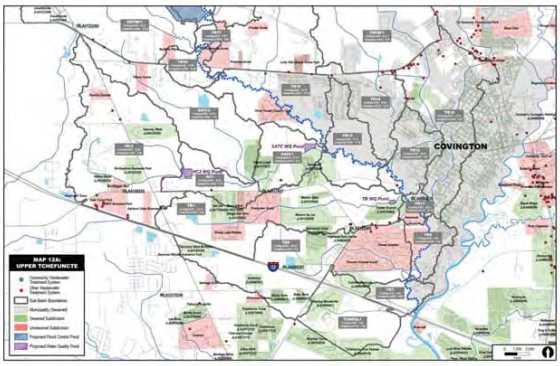


FIGURE 61
UPPER TCHEFUNCTE RIVER

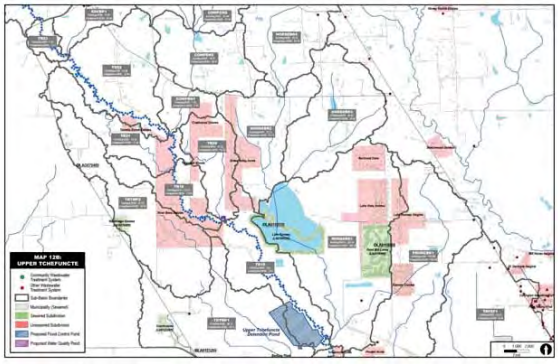


FIGURE 62
UPPER TCHEFUNCTE RIVER

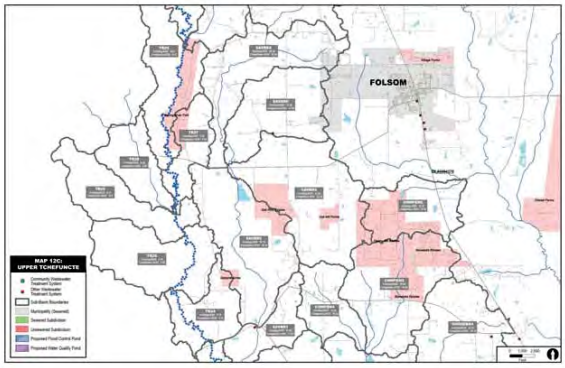
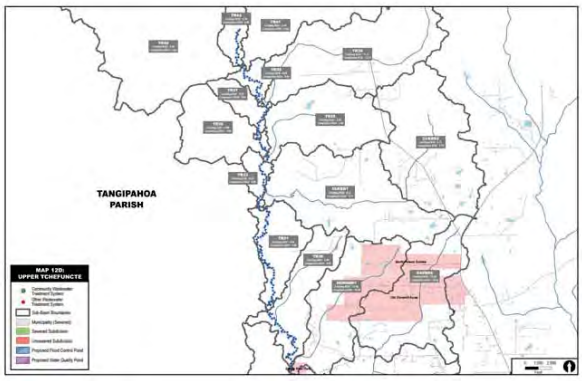


FIGURE 63
UPPER TCHEFUNCTE RIVER



6.14 Ponchitolawa Creek

The Ponchitolawa Creek Basin drains approximately 9,441 acres in St. Tammany Parish. Ponchitolawa Creek is located in the Lower Tchefuncte River Basin and therefore has the same DO standard as the Lower Tchefuncte River of 5 mg/L. The LDEQ *2012 Integrated Report Including the §303(d) List of Impaired Waterbodies* and the *Lower Tchefuncte River Watershed TMDL for Biochemical Oxygen-Demanding Substances* (LDEQ, 2012), indicate that Ponchitolawa Creek is not meeting the current DO standard. In the *Lower Tchefuncte River Watershed TMDL for Biochemical Oxygen-Demanding Substances* (LDEQ, 2012), LDEQ notes that the DO standards for the Lower Tchefuncte River may be inappropriate and suggested a DO standard of 3.8 mg/L.

The Ponchitolawa Creek Basin currently contains 24 subdivisions with community sewage systems, 20 subdivisions with individual home sewage systems, and various individual sewage systems at remotely located businesses and residences not in designated neighborhoods.

The calculated load for these dischargers is estimated to be 55.6 lb/day for the community, municipal and other LDEQ permitted sewage systems, and 577.7 lb/day for the individual, unpermitted home sewage systems. To achieve compliance with the current DO standard of 5 mg/L, concentrations of BOD_5 were reduced to 5 mg/L for small point sources, sewered subdivisions, and unsewered subdivisions. The load reduction necessary to meet the 5.0 mg/L standard ranged from 0% in basins where no existing loads are present to approximately 97.91% in heavily populated areas. With these BOD_5 reductions, compliance with current DO standard was not achieved in Ponchitolawa Creek and compliance with the proposed DO standard of 3.8 mg/L was achieved in only 18% of Ponchitolawa Creek. Based on the model runs it is not feasible for Ponchitolawa Creek to meet the DO standard of 5.0 mg/L, confirming LDEQs claim in the TMDL that the standard is incorrect. Because Ponchitolawa Creek is unable to meet the proposed

DO standard of 3.8 mg/L for a large portion of the creek, it is likely the water body is naturally dystrophic and any DO standard during the summer months may be inappropriate.

Table 65 presents the compliance BOD_5 loadings in pounds, the original BOD_5 loading in pounds, the pounds of BOD_5 removed and the percent reduction required for each sub-basin in the Ponchitolawa Creek watershed.

Table 65
Ponchitolawa Creek

Subbasin	Original BOD Loading	Compliance BOD Loading	lbs of BOD Removed	Percent Reduction Required
LCRK1	42.56	0.97	41.59	97.73%
LCRK2	7.52	0.19	7.33	97.52%
LCRK3	58.88	7.32	51.56	87.57%
PCFNF1	32.72	0.68	32.04	97.91%
PCFNF2	30.75	0.63	30.12	97.97%
PONTCRK1	44.50	10.41	34.09	76.61%
PONTCRK10	0.00	0.00	0.00	0.00%
PONTCRK11	1.63	0.04	1.59	97.73%
PONTCRK12	0.00	0.00	0.00	0.00%
PONTCRK13	0.00	0.00	0.00	0.00%
PONTCRK14	0.00	0.00	0.00	0.00%
PONTCRK2	44.10	0.94	43.16	97.87%
PONTCRK3	25.95	1.55	24.40	94.01%
PONTCRK4	191.68	4.93	186.75	97.43%
PONTCRK5	87.70	2.10	85.60	97.60%
PONTCRK6	39.82	1.12	38.70	97.18%
PONTCRK7	19.58	0.53	19.05	97.30%

Table 65
Ponchitolawa Creek

Subbasin	Original BOD Loading	Compliance BOD Loading	lbs of BOD Removed	Percent Reduction Required
PONTCRK8	5.90	0.13	5.76	97.73%
PONTCRK9	0.00	0.00	0.00	0.00%
TOTALS	**633.28**	**31.54**	**601.74**	**95.02%**

The above discussion and data demonstrates that the Ponchitolawa Creek DO standard is inappropriate and overloaded with man-made point sources. Because the model runs demonstrate that consolidation projects and sewering of individual treatment systems would not bring the bayou into compliance with the existing standard or the proposed standard, the Parish should petition the LDEQ to update the DO standard for Ponchitolawa Creek as a naturally dystrophic water body.

Table 66 below provides information on the current permitted loads to Ponchitolawa Creek. The current load associated unsewered neighborhoods and cost associated with providing sewer to each neighborhood is illustrated in **Table 67**.

Table 66
Ponchitolawa Creek
Existing Permitted Dischargers

Subbasin	Permit Number	Facility Name	Flow GPD	BOD_5 Load lb/day
LCRK2	LAG530118	CLECO Power LLC - St Tammany Service Center	1171.91	0.29
LCRK3	LA0117439	St Tammany Parish Government - Preferred Equities Project	117191.36	9.77
LCRK3	LAG750379	Highway 59 Chevron	234.38	0.06
LCRK3	LAG531907	Schech Properties Inc	1171.91	0.29
LCRK3	LAG540697	St Tammany Parish Police Jury - Administration Complex	5859.57	1.47
LCRK3	LAG530560	Winn Dixie #1500	1171.91	0.29
LCRK3	LAG530631	Southland Real Estate Inv LLC	1171.91	0.29
LCRK3	LAG531420	Resource Bank	1171.91	0.29
LCRK3	LAG570445	Tammany Utilities - Lexington Place STP	23438.27	1.95
PCFNF1	LAG470114	Northshore Toyota	234.38	0.06
PONTCRK1	LA0043583	St Tammany Parish Sewerage District #4 - Sewer District #4 Plant	70221.90	5.86
PONTCRK1	LA0063991	St Tammany Parish Government - Westwood Regional POTW	163333.80	13.62
PONTCRK1	LAG750162	Rainforest Carwash	234.38	0.06
PONTCRK1	LAG530960	Deer Cross 2D LLC	1171.91	0.29
PONTCRK1	LAG470245	Hood Chevrolet LLC - Hood Northlake LLC	234.38	0.06

Table 66
Ponchitolawa Creek
Existing Permitted Dischargers

Subbasin	Permit Number	Facility Name	Flow GPD	BOD_5 Load lb/day
PONTCRK1	LAG532851	2213 Causeway Service Road Building	1171.91	0.29
PONTCRK2	LAG530250	Grace Disciples of Christ Church	1171.91	0.29
PONTCRK3	LAG570117	H2O Systems Inc - Alamosa Park	5712.00	0.48
PONTCRK3	LAG533877	Interior/Exterior Building Supply LP	585.96	0.22
PONTCRK3	LAG531286	Butcher Distributors Inc - Northshore Warehouse	1171.91	0.29
PONTCRK3	LAG531316	Paintball Command Inc	1171.91	0.29
PONTCRK3	LAG531424	St Tammany Fire Protection District #4 Station #43 - Ernest Prieto Memorial	1171.91	0.29
PONTCRK3	LAG534487	P-America's LLC	1171.91	0.29
PONTCRK3	LAG531487	Air Systems Design Inc	1171.91	0.29
PONTCRK3	LAG531456	Pine Grove Electrical Supply Inc	1171.91	0.29
PONTCRK3	LAG531457	Built Rite Construction	1171.91	0.29
PONTCRK3	LAG531551	David Norris - Office Warehouse	1171.91	0.29
PONTCRK3	LAG531477	Warriner Controls Inc	1171.91	0.29
PONTCRK3	LAG531516	Masonry Products Sales Inc	1171.91	0.29

Table 66
Ponchitolawa Creek
Existing Permitted Dischargers

Subbasin	Permit Number	Facility Name	Flow GPD	BOD_5 Load lb/day
PONTCRK3	LAG531534	RSC Equipment Rental Inc - Prime Industrial	1171.91	0.29
PONTCRK3	LAG532064	Subterranean Construction LLC - Office/Warehouse	1171.91	0.29
PONTCRK3	LAG532117	Venture Entities LLC - Acme Refrigeration	1171.91	0.29
PONTCRK3	LAG532270	1750 South Lane LLC - WWTP	1171.91	0.29
PONTCRK3	LAG533078	Office/Warehouse - Pyrotecnico LA LLC	585.96	0.22
PONTCRK3	LAG110212	Standard Materials LLC - Mandeville Facility	1171.91	0.44
PONTCRK3	LAG533100	Dixieland Forest Corp	1171.91	0.29
PONTCRK3	LAG533391	KM Stoessell-Seifert LLC - Alpha Industrial Park	585.96	0.22
PONTCRK4	LAG530791	Hwy 59 Properties Inc	1171.91	0.29
PONTCRK4	LAG530003	MCH LLC	1171.91	0.29
PONTCRK4	LAG570465	St Tammany Parish Government - Lazy Creek Subdivision WWTP	1606.50	0.13
PONTCRK4	LAG531099	Freedom Alarm	1171.91	0.29
PONTCRK4	LAG533245	Northshore Commercial Park	1171.91	0.29
PONTCRK4	LAG750465	The Car Spa	234.38	0.06
PONTCRK4	LAG531464	Copper by Tom LLC	1171.91	0.29

Table 66
Ponchitolawa Creek
Existing Permitted Dischargers

Subbasin	Permit Number	Facility Name	Flow GPD	BOD_5 Load lb/day
PONTCRK4	LAG531718	Omni Storage LLC	1171.91	0.29
PONTCRK4	LAG541437	Hwy 59 Properties Inc	5859.57	1.47
PONTCRK4	LAG531517	NOL Liberty LLC - NOL Liberty Facility	1171.91	0.29
PONTCRK4	LAG531486	One Stop	1171.91	0.29
PONTCRK4	LAG470284	Danny's Automotive Service	1171.91	0.44
PONTCRK4	LAG531574	Ewing Irrigation Golf & Industrial	1171.91	0.29
PONTCRK4	LAG531713	Huggins Fiberglass Repairs Inc	1171.91	0.29
PONTCRK4	LAG531895	Belloni Warehouse	1171.91	0.29
PONTCRK4	LAG531956	Campbell Ventures #2 LLC	1171.91	0.29
PONTCRK4	LAG531808	Evans Buildings A&B	1171.91	0.29
PONTCRK4	LAG531864	Heartwood Properties LLC	1171.91	0.29
PONTCRK4	LAG532210	Merlin Herberger Jr - Merlin Warehouse No 2	585.96	0.22
PONTCRK4	LAG532232	Hydraulic Industries LLC - WWTP	1171.91	0.29
PONTCRK4	LAG533358	Marion F Wilson - Building One	585.96	0.22
PONTCRK4	LAG470283	Nick's Car Care Inc	1171.91	0.44

Table 66
Ponchitolawa Creek
Existing Permitted Dischargers

Subbasin	Permit Number	Facility Name	Flow GPD	BOD_5 Load lb/day
PONTCRK4	LAG533990	Gilbert Copeland	585.96	0.22
PONTCRK4	LAG534202	Mandeville DG LLC - Dollar General	585.96	0.22
PONTCRK5	LAG110066	Parish Concrete LLC	585.96	0.22
PONTCRK5	LAG533094	TDG Investments - Abita Mini Storage	585.96	0.22
PONTCRK5	LAG530993	MDF LLC	1171.91	0.29
PONTCRK5	LAG531246	La Vita Dolce Viviamo LLC	1171.91	0.29
PONTCRK5	LAG531300	King Motors LLC	1171.91	0.29
PONTCRK5	LAG531423	Danken Building Material Dist Inc	1171.91	0.29
PONTCRK5	LAG531481	Robert's Hardware & Lumber Inc	1171.91	0.29
PONTCRK5	LAG531588	Abita Bar-B-Q	1171.91	0.29
PONTCRK5	LAG531759	Larry Loyd Facility	1171.91	0.29
PONTCRK5	LAG531931	Schaeffer of Louisiana Inc - Camellia Cafe	1171.91	0.29
PONTCRK5	LAG110206	Kalmar Enterprises IV LLC - Short Loads - Plant #2	585.96	0.22
PONTCRK5	LAG470285	TC's Auto Sales	1171.91	0.44
PONTCRK5	LAG533120	Fountains & Flowers	1171.91	0.29

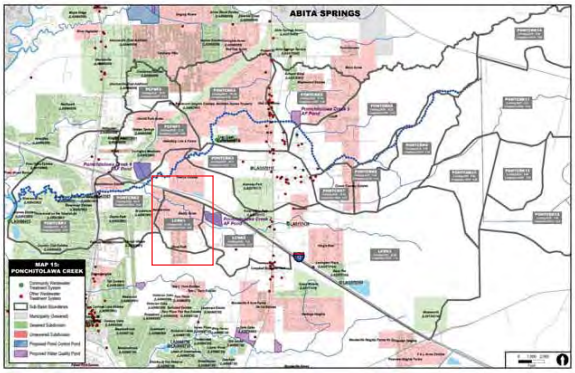
Table 66
Ponchitolawa Creek
Existing Permitted Dischargers

Subbasin	Permit Number	Facility Name	Flow GPD	BOD_5 Load lb/day
PONTCRK5	LAG533130	JK Logistics LLC - JK Services	1171.91	0.29
PONTCRK5	LAG533096	Saba Stucco LLC	1171.91	0.29
PONTCRK5	LAG534060	J Ernest Prieto - Casril Storage	585.96	0.22
PONTCRK6	LAG530394	Northlake Precision Inc	1171.91	0.29
PONTCRK6	LAG531266	Masterworks Construction Co Inc	1171.91	0.29
PONTCRK6	LAG531524	Marshall Rd Warehouse	1171.91	0.29
PONTCRK6	LAG531762	Merlin Warehouse	1171.91	0.29
PONTCRK6	LAG532213	St Tammany Parish Fire Dist #4 - Regional Training Facility - WWTP	1171.91	0.29
PONTCRK7	LAG531705	Gil Copeland	1171.91	0.29
PONTCRK7	LAG531479	Lanny Cazaux	1171.91	0.29

Table 67
Ponchitolawa Creek

Project Subdivision Name	BASIN	Total Number of New Customers	Total Sewer Project Cost ($)	Total Water Project Cost ($)	Total Projects Cost ($)	BOD Load Reduction (Lb)	BOD Reduction Cost ($/Lb)
Beatty Acres	Ponchitolawa Creek	33	$ 3,094,900.00	$ 1,067,600.00	$ 4,162,500.00	10.4	$ 401,300.00
Crown Country	Ponchitolawa Creek	64	$ 4,164,700.00	$ 1,492,300.00	$ 5,657,000.00	20.0	$ 282,700.00
Dove Park	Ponchitolawa Creek	82	$ 2,905,200.00	$ 1,037,200.00	$ 3,942,400.00	25.8	$ 152,900.00
Harold Park	Ponchitolawa Creek	21	$ 1,066,500.00	$ 314,700.00	$ 1,381,200.00	5.4	$ 255,500.00
Heathersonia	Ponchitolawa Creek	51	$ 2,322,400.00	$ 803,800.00	$ 3,126,200.00	16.1	$ 194,500.00
Helenbirg Lots	Ponchitolawa Creek	34	$ 3,640,500.00	$ 1,265,400.00	$ 4,905,900.00	10.1	$ 484,300.00
King's Row	Ponchitolawa Creek	79	$ 7,221,600.00	$ 2,361,600.00	$ 9,583,200.00	24.7	$ 388,000.00
Listoff	Ponchitolawa Creek	179	$ 8,481,800.00	$ 3,175,600.00	$ 11,657,400.00	56.0	$ 208,300.00
Mandabita	Ponchitolawa Creek	22	$ 1,340,000.00	$ 657,700.00	$ 1,997,700.00	6.9	$ 290,500.00
Maplewood	Ponchitolawa Creek	45	$ 2,267,900.00	$ 778,600.00	$ 3,046,500.00	14.1	$ 216,600.00
Nidda	Ponchitolawa Creek	66	$ 1,219,500.00	$ 387,700.00	$ 1,607,200.00	17.0	$ 94,600.00
Northern Home	Ponchitolawa Creek	198	$ 8,577,000.00	$ 3,195,500.00	$ 11,772,500.00	59.8	$ 196,900.00
Ponchitowala	Ponchitolawa Creek	32	$ 1,387,200.00	$ 447,600.00	$ 1,834,800.00	10.9	$ 168,200.00
Red Cap Annex	Ponchitolawa Creek	53	$ 2,229,000.00	$ 756,400.00	$ 2,985,400.00	16.2	$ 184,600.00
Thelma	Ponchitolawa Creek	32	$ 2,013,700.00	$ 677,700.00	$ 2,691,400.00	10.0	$ 269,000.00
Totals		***991***	***$ 51,931,900.00***	***$ 18,419,400.00***	***$ 70,351,300.00***	***303***	***$ 232,000.00***

FIGURE 61
PONCHITOLAWA CREEK



6.15 Bayou Tete L'Ours

Bayou Tete L'Ours Basin drains approximately 2,430 acres in St. Tammany Parish. Bayou Tete L'Ours is located in the Lower Tchefuncte River Basin and therefore has the same DO standard as the Lower Tchefuncte River of 5 mg/L. The LDEQ *2012 Integrated Report Including the §303(d) List of Impaired Waterbodies* and the *Lower Tchefuncte River Watershed TMDL for Biochemical Oxygen-Demanding Substances* (LDEQ, 2012), indicate that Bayou Tete L'Ours, by virtue of being located within the Lower Tchefuncte Basin is not meeting the current DO standard. In the *Lower Tchefuncte River Watershed TMDL for Biochemical Oxygen-Demanding Substances* (LDEQ, 2012), LDEQ notes that the DO standard for the Lower Tchefuncte River and therefore, Bayou Tete L'Ours may be inappropriate and suggests a DO standard of 3.8 mg/L.

The Bayou Tete L'Ours Basin currently contains ten subdivisions with community sewage systems, four subdivisions with individual home sewage systems, and various individual sewage systems at remotely located businesses and residences not in designated neighborhoods.

The calculated load for these dischargers is estimated to be 44.8 lb/day for the community, municipal and other LDEQ permitted sewage systems, and 577.7 lb/day for the individual, unpermitted home sewage systems. To achieve compliance with the current DO standard of 5 mg/L, concentrations of BOD_5 were reduced to 10 mg/L for small point sources, sewered subdivisions, and unsewered subdivisions, and 30 mg/L for some of the unsewered neighborhoods based on size and location. The load reduction necessary to meet the 5.0 mg/L standard ranged from 0% in basins where no existing loads are present to approximately 90.82% in heavily populated areas. With these BOD_5 reductions, compliance with current DO standard was achieved in in less than 2% of Bayou Tete L'Ours and compliance with the proposed DO stand was achieved in only 19.6% of Bayou Tete L'Ours. Based on the model runs it is not feasible for Bayou Tete L'Ours to meet the DO

standard of 5.0 mg/L, confirming LDEQs claim in the TMDL that the standard is incorrect. Because Bayou Tete L'Ours is unable to meet the proposed DO standard of 3.8 mg/L for a large portion of the water body, it is likely the water body is naturally dystrophic and any DO standard during the summer months may be inappropriate.

Table 68 presents the compliance BOD_5 loadings in pounds, the original BOD_5 loading in pounds, the pounds of BOD_5 removed and the percent reduction required for each sub-basin in the Bayou Tete L'Ours watershed.

Table 68
Bayou Tete L'Ours

Subbasin	Original BOD Loading	Compliance BOD Loading	lbs of BOD Removed	Percent Reduction Required
BTLO1	0.00	0.00	0.00	0.00%
BTLO2	20.70	20.70	0.00	0.00%
BTLO3	0.30	0.30	0.00	0.00%
BTLO4	0.00	0.00	0.00	0.00%
BTLO5	14.84	4.68	10.16	68.44%
BTLO6	62.80	5.76	57.03	90.82%
BTLO7	8.55	1.17	7.38	86.36%
BTLO8	8.22	1.12	7.10	86.36%
TOTALS	**115.40**	**33.73**	**81.67**	**70.78%**

The above discussion and data demonstrates that Bayou Tete L'Ours DO standard is inappropriate and overloaded with man-made point sources. Because the model runs demonstrate that consolidation projects and sewering of individual treatment systems would not bring the bayou into compliance with the existing standard or the proposed standard, the Parish should petition the LDEQ to update the DO standard for Bayou Tete L'Ours as a naturally dystrophic water body.

Table 69 below provides information on the current permitted loads to Bayou Tete L'Ours. The current load associated unsewered neighborhoods and cost associated with providing sewer to each neighborhood is illustrated in **Table 70**.

The Bayou Tete L'Ours basin does not contain any Flood Control Projects.

Table 69
Bayou Tete L'Ours
Existing Permitted Dischargers

Subbasin	Permit Number	Facility Name	Flow GPD	BOD_5 Load lb/day
BTLO2	LA0044377	Beau Chene Homeowners Association Inc - Beau Chene WWTF	171332.00	14.29
BTLO2	LA0080403	St Tammany Sewerage District #1 - Covington Country Club Subdivision	76823.60	6.41
BTLO5	LAG533345	Consolidated Performance Group Inc/CPG Power	585.96	0.22
BTLO5	LAG533108	Bedroom Galleries	1171.91	0.29
BTLO5	LAG750826	LA State Police Troop L	234.38	0.06
BTLO5	LAG530904	Levert St John Inc	1171.91	0.29
BTLO5	LAG531840	Northlake Veterinary Hospital	1171.91	0.29
BTLO5	LAG531840	Northlake Veterinary Hospital	1171.91	0.29
BTLO5	LAG531090	675 Properties LLC	1171.91	0.29
BTLO5	LAG530666	Guidry Investments	1171.91	0.29
BTLO5	LAG540400	5196 Corporation Inc	25660.60	6.42

Table 69
Bayou Tete L'Ours
Existing Permitted Dischargers

Subbasin	Permit Number	Facility Name	Flow GPD	BOD_5 Load lb/day
BTLO5	LAG532402	Safe Harbor Inc – WWTP	1171.91	0.29
BTLO5	LAG530754	Licciardi Development LLC - Marigny Plaza Shopping Center	1171.91	0.29
BTLO5	LAG530664	Pineapple Gallery	1171.91	0.29
BTLO5	LAG530435	TAHK Holding LLC	1171.91	0.29
BTLO5	LAG530652	Speedway Printing	1171.91	0.29
BTLO5	LAG531207	Southern Evaluators Properties LLC - Orthopaedic Clinic of Mandeville	1171.91	0.29
BTLO5	LAG531437	St Tammany Parish Government - McConnell STP	1171.91	0.29
BTLO5	LAG531455	Seventh Street LLC - 2210 Seventh Street Facility	1171.91	0.29
BTLO5	LAG531474	M&E Group LLC - Fabrics Second to None	1171.91	0.29
BTLO5	LAG531497	Norman H Voelkel Construction Inc	1171.91	0.29
BTLO5	LAG533117	TOP LLC - Tim O'Rourke Photography	1171.91	0.29

Table 69
Bayou Tete L'Ours
Existing Permitted Dischargers

Subbasin	Permit Number	Facility Name	Flow GPD	BOD_5 Load lb/day
BTLO5	LAG531660	Lakeview Square LLC	1171.91	0.29
BTLO5	LAG531860	2275 Eighth St LLC - 2275 Eighth St	1171.91	0.29
BTLO5	LAG532313	Grand Homes LLC – WWTP	1171.91	0.29
BTLO5	LAG532729	OG Properties LLC - Crest Custom Draperies & Roy Grob DDS	1171.91	0.29
BTLO5	LAG532739	B&N Investments - Southern Country Designs	1171.91	0.29
BTLO5	LAG533093	US Impact Inc	1171.91	0.29
BTLO5	LAG533225	Microland Computer Center	1171.91	0.29
BTLO5	LAG533778	Lam Builders Inc - Office Building	585.96	0.22
BTLO6	LAG470237	Northlake Automotive	1171.91	0.44
BTLO6	LAG470263	Tire Kingdom #180	1171.91	0.44
BTLO6	LAG530238	Lindsay Properties LLC	1171.91	0.29
BTLO6	LAG531848	Yeoh & Williams LLC - Little Tokyo	1171.91	0.29

Table 69
Bayou Tete L'Ours
Existing Permitted Dischargers

Subbasin	Permit Number	Facility Name	Flow GPD	BOD_5 Load lb/day
BTLO6	LAG531555	Quad Investments LLC	1171.91	0.29
BTLO6	LAG531510	Authement Building	1171.91	0.29
BTLO6	LAG531712	Earl Langhoff & Ronald Mental - North Institute	1171.91	0.29
BTLO6	LAG531521	Richard St Pe Co Inc	1171.91	0.29
BTLO6	LAG531564	Guaranty Savings & Homestead Association	1171.91	0.29
BTLO6	LAG531571	2156 3rd Street LLC - Creations Galore	1171.91	0.29
BTLO6	LAG533450	Sandy Corner LLC - Northlake Pharmacy	585.96	0.22
BTLO6	LAG532695	Performance Chiropractic	1171.91	0.29
BTLO6	LAG531634	Fairway Place	1171.91	0.29
BTLO6	LAG531656	Royal Homes - Asbury Drive Office Building	1171.91	0.29
BTLO6	LAG531688	Fundamentals Early Learing Center LLC - WWSTP	1171.91	0.29
BTLO6	LAG531685	Letsch Retail Center	1171.91	0.29

Table 69
Bayou Tete L'Ours
Existing Permitted Dischargers

Subbasin	Permit Number	Facility Name	Flow GPD	BOD_5 Load lb/day
BTLO6	LAG531766	2410 - 18 & 24 Causeway Building	1171.91	0.29
BTLO6	LAG531975	Merlin Herberger Jr - 520 Asbury Dr	1171.91	0.29
BTLO6	LAG531976	Merlin Herberger Jr - 530 Asbury Dr	1171.91	0.29
BTLO6	LAG470309	Motorworks by Dallas LLC	1171.91	0.44
BTLO6	LAG531884	Exquisite Properties I LLC - 594 Asbury STP	1171.91	0.29
BTLO6	LAG531857	Southfork Real Estate - Sixth Street Warehouse	1171.91	0.29
BTLO6	LAG531904	Camellia Creek Dental Center	1171.91	0.29
BTLO6	LAG470250	Zoom Tech Automotive LLC	1171.91	0.44
BTLO6	LAG532097	Art Time	1171.91	0.29
BTLO6	LAG532090	Darby Holdings LLC - Asbury Square	1171.91	0.29
BTLO6	LAG532135	700 Asbury LLC	1171.91	0.29
BTLO6	LAG532133	NU-Lite Electrical Supply	1171.91	0.29

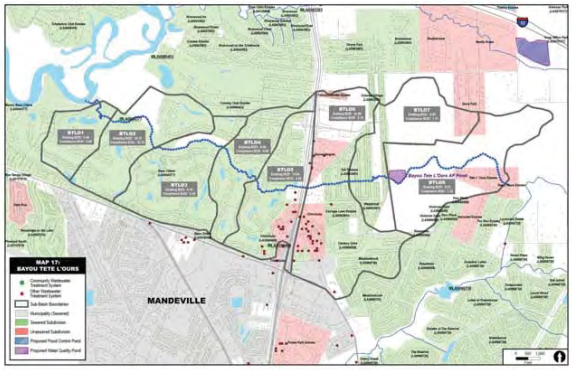
Table 69
Bayou Tete L'Ours
Existing Permitted Dischargers

Subbasin	Permit Number	Facility Name	Flow GPD	BOD_5 Load lb/day
BTLO6	LAG532743	B&N Investments - Onesource Professional Search	1171.91	0.29
BTLO6	LAG532742	B&N Investments - Basic Elements Day Spa	1171.91	0.29
BTLO6	LAG532791	Southern Fastening Systems	1171.91	0.29
BTLO6	LAG532851	2213 Causeway Service Road Building	1171.91	0.29
BTLO6	LAG532863	Bobette Laurendine - LCSW Office	1171.91	0.29

Table 70
Bayou Tete L'Ours

Project Subdivision Name	BASIN	Total Number of New Customers	Total Sewer Project Cost ($)	Total Water Project Cost ($)	Total Projects Cost ($)	BOD Load Reduction (Lb)	BOD Reduction Cost ($/Lb)
Fairway Garden Homes	Bayou Tete L'Ours	74	$ 1,295,000.00	$ 359,900.00	$ 1,654,900.00	23.3	$ 71,000.00
Ozone Heights	Bayou Tete L'Ours	28	$ 1,129,000.00	$ 843,600.00	$ 1,972,600.00	8.8	$ 223,600.00
Tete LOurs	Bayou Tete L'Ours	22	$ 1,518,800.00	$ 498,000.00	$ 2,016,800.00	6.9	$ 292,100.00
Totals		***124***	***$ 3,942,800.00***	***$ 1,701,500.00***	***$ 5,644,300.00***	***39***	***$ 144,600.00***

FIGURE 68
BAYOU TETE L'OURS



6.16 Bayou DeZaire

The Tchefuncte River Basin drains approximately 1,807 acres in and around the City of Madisonville in St. Tammany Parish. Bayou DeZaire is located within the Lower Tchefuncte River Basin and therefore has the same 5 mg/L DO standard as the Lower Tchefuncte River. The LDEQ *2012 Integrated Report Including the §303(d) List of Impaired Waterbodies* and the *Lower Tchefuncte River Watershed TMDL for Biochemical Oxygen-Demanding Substances* (LDEQ, 2012), indicates that the Lower Tchefuncte River and therefore Bayou DeZaire is not meeting current DO standard. In LDEQ's *Lower Tchefuncte River Watershed TMDL for Biochemical Oxygen-Demanding Substances* (LDEQ, 2012), LDEQ notes that the DO standards for the Lower Tchefuncte River may be inappropriate and has suggested a lower DO standard of 3.8 mg/L.

The Bayou DeZaire Basin currently contains eight subdivisions with community sewage systems, four subdivisions with individual home sewage systems, and various individual sewage systems at remotely located businesses and residences not in designated neighborhoods.

The calculated load for these dischargers is estimated to be 15.7 lb/day for the community, municipal and other LDEQ permitted sewage systems, and 171.7 lb/day for the individual, unpermitted home sewage systems. To achieve compliance with the current DO standard of 5 mg/L, concentrations of BOD_5 were reduced to 10 mg/L for small point sources. The percent total load reduction was 48.74%. With these BOD_5 reductions, compliance with current DO standard was not achieved in Bayou DeZaire and compliance with the proposed DO standard was achieved in only 58.8% of Bayou DeZaire. Based on the model runs it is not feasible for Bayou DeZaire to meeting the DO standard of 5.0 mg/L, confirming LDEQs claim in the TMDL that the standard is incorrect. Bayou DeZaire is able to meet the proposed DO standard of 3.8 mg/L in 58.8% of the bayou without any reductions; however, the upper portion of Bayou DeZaire is unable to meet the

proposed DO standard of 3.8 mg/L even with reductions in BOD_5 limitations for permitted dischargers. Because Bayou Dezaire is unable to meet the proposed DO standard of 3.8 mg/L for a large portion of the bayou, it is likely the water body is naturally dystrophic and any DO standard during the summer months may be inappropriate.

Table 71 presents the compliance BOD_5 loadings in pounds, the original BOD_5 loading in pounds, the pounds of BOD_5 removed and the percent reduction required for each sub-basin in the Bayou DeZaire watershed.

Table 71
Bayou DeZaire

Subbasin	Original BOD Loading	Compliance BOD Loading	lbs of BOD Removed	Percent Reduction Required
BDZ1	187.40	96.06	91.34	48.74%

The above discussion and data demonstrates that the Bayou DeZaire DO standard is inappropriate. Because the model runs demonstrate that consolidation projects and sewering of individual treatment systems would not bring the bayou into compliance with the existing standard and in the upper reaches the proposed standard, the Parish should petition the LDEQ to update the DO standard for Bayou DeZaire as a naturally dystrophic water body.

Table 72 below provides information on the current permitted loads to Bayou DeZaire. The current load associated unsewered neighborhoods and cost associated with providing sewer to each neighborhood is illustrated in **Table 73**.

Table 72
Bayou DeZaire
Existing Permitted Dischargers

Subbasin	Permit Number	Facility Name	Flow GPD	BOD_5 Load lb/day
BDZ1	LA0039730	Madisonville Town of - Sewer District #1	48875.40	4.08
BDZ1	LAG531787	Madisonville Chiropractic Clinic	1171.91	0.29
BDZ1	LAG531854	Robert E Ruel & Sally H P Ruel - J Scott Ruel Attorney at Law	1171.91	0.29
BDZ1	LAG531740	Keith Young's Steak House	1171.91	0.29
BDZ1	LAG531791	M & P Land LLC -Melissa H Pellegrini DDS & Laurie Miller DDS - Dental Offices	1171.91	0.29
BDZ1	LAG531855	Terrance M Donahue - Spartan Building Corp	1171.91	0.29
BDZ1	LAG531944	DFB Properties LLC - Offices for Daigle Fisse	1171.91	0.29
BDZ1	LAG532900	Tchefuncte Animal Hospital LLC - David Moores DVM	1171.91	0.29
BDZ1	LAG531694	Planet Kids Academy	1171.91	0.29
BDZ1	LAG531216	Kay Morse Properties LLC - Re/Max Northlake Associates	1171.91	0.29
BDZ1	LAG570486	St Tammany Parish Government - Madisonville Woods Subdivision	23438.27	1.95

Table 72
Bayou DeZaire
Existing Permitted Dischargers

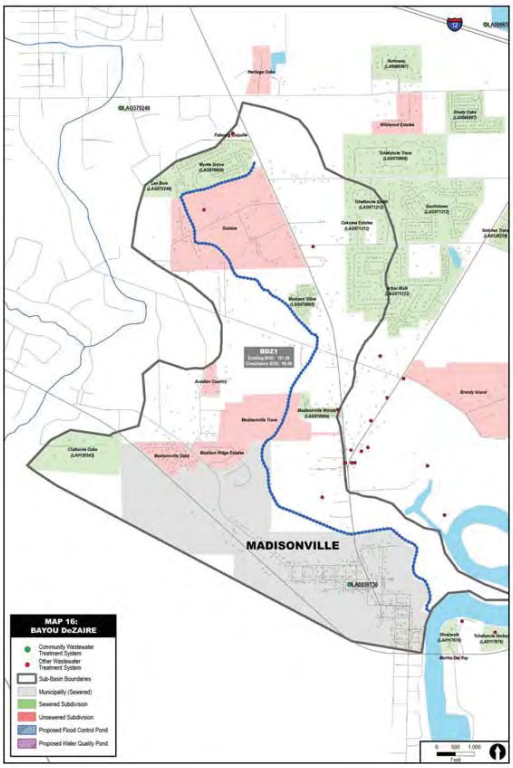
Subbasin	Permit Number	Facility Name	Flow GPD	BOD_5 Load lb/day
BDZ1	LAG531693	North Cross United Methodist Church - WWTP	1171.91	0.29
BDZ1	LAG570244	St Tammany Parish Government - Post Oak Landing STP	23438.27	1.95
BDZ1	LAG570464	St Tammany Parish Government - Faubourg Coquille	23438.27	1.95
BDZ1	LAG533300	Amazing Grace Early Childhood Development & Daycare Center - Historic St James Baptist Church	1171.91	0.29
BDZ1	LAG570340	St Tammany Parish Government - Madisonville Trace WWTP	23438.27	1.95
BDZ1	LAG570246	St Tammany Parish Government - Les Bois STP	1254.40	0.10
BDZ1	LAG534111	David S Derbes	585.96	0.22
BDZ1	LAG531703	Liberty Self Storage	1171.91	0.29

There are no drainage projects within the Bayou DeZaire watershed. With respect to flooding due to storm surge approximately 38 structures in the Bayou DeZaire are listed as RL/SRL. Of those approximately 20 have already been elevated or removed which leaves a balance of 18 remaining to be mitigated. Relocation and elevation are likely the only cost effective solutions to mitigate the risk of future flooding.

Table 73
Bayou DeZaire

Project Subdivision Name	BASIN	Total Number of New Customers	Total Sewer Project Cost ($)	Total Water Project Cost ($)	Total Projects Cost ($)	BOD Load Reduction (Lb)	BOD Reduction Cost ($/Lb)
Acadian	Bayou DeZaire	7	$ 797,100.00	$ 210,400.00	$ 1,007,500.00	2.2	$ 458,600.00
Galatas	Bayou DeZaire	59	$ 3,578,100.00	$ 1,265,600.00	$ 4,843,700.00	18.5	$ 261,600.00
Madisonville Oaks-Madison Ridge	Bayou DeZaire	51	$ 2,430,900.00	$ 621,000.00	$ 3,051,900.00	1.3	$ 2,431,000.00
Totals		***117***	***$ 6,806,100.00***	***$ 2,097,000.00***	***$ 8,903,100.00***	***22***	***$ 405,200.00***

FIGURE 66
BAYOU DEZAIRE



6.17 Lower Tchefuncte River

The Tchefuncte River Basin drains approximately 264,349 acres in Mississippi and Louisiana and approximately 210,366 acres are within St. Tammany Parish. The Abita River, Bogue Falaya River, Bayou Monga, Ponchitolawa Creek, Bayou DeZaire, and Bayou Tete L'Ours drain into the Lower Tchefuncte River. The current LDEQ DO standard for the Lower Tchefuncte River is 5 mg/L. The LDEQ *2012 Integrated Report Including the §303(d) List of Impaired Waterbodies* and the *Lower Tchefuncte River Watershed TMDL for Biochemical Oxygen-Demanding Substances* (LDEQ, 2012), indicate that Lower Tchefuncte River is not meeting the current DO standard. In the *Lower Tchefuncte River Watershed TMDL for Biochemical Oxygen-Demanding Substances* (LDEQ, 2012), LDEQ notes that the DO standards for the Lower Tchefuncte River may be inappropriate and suggested a DO standard of 3.8 mg/L.

The Lower Tchefuncte River Basin currently contains 31 subdivisions with community sewage systems, 10 subdivisions with individual home sewage systems, and various individual sewage systems at remotely located businesses and residences not in designated neighborhoods.

The calculated load for these dischargers is estimated to be 26.6 lb/day for the community, municipal and other LDEQ permitted sewage systems, and 118.6 lb/day for the individual, unpermitted home sewage systems. Based on the model runs completed for this project, it is feasible for the Lower Tchefuncte River to meet a 5.0 mg/L DO standard 84.7% of the River (8 out of the 11 reaches) and meet the proposed DO standard of 3.8 mg/L in 100% of the River without any reductions.

Table 74 presents the compliance BOD_5 loadings in pounds, the original BOD_5 loading in pounds, the pounds of BOD5 removed and the percent reduction required for each sub-basin in the Lower Tchefuncte River watershed.

Table 74 Lower Tchefuncte River				
Subbasin	**Original BOD Loading**	**Compliance BOD Loading**	**lbs of BOD Removed**	**Percent Reduction Required**
BFR1	0.00	0.00	0.00	0.00%
BFR2	3.93	3.93	0.00	0.00%
BMONG1	61.08	61.08	0.00	0.00%
NNB1	3.05	3.05	0.00	0.00%
TR1	16.20	16.20	0.00	0.00%
TR2	43.81	43.81	0.00	0.00%
TR3	0.00	0.00	0.00	0.00%
TR4	5.71	5.71	0.00	0.00%
TR5	11.43	11.43	0.00	0.00%
TR6	0.00	0.00	0.00	0.00%
TOTALS	**145.20**	**145.20**	**0.00**	**0.00%**

Table 75 below provides information on the current permitted loads to the Lower Tchefuncte River. The current load associated unsewered neighborhoods and cost associated with providing sewer to each neighborhood is illustrated in **Table 76**.

With respect to flooding due to storm surge approximately 27 structures in the Lower Tchefuncte basin are listed as RL/SRL. Of those approximately 8 have already been elevated which leaves a balance of 19 remaining to be mitigated. Relocation and elevation are likely the only cost effective solutions to mitigate the risk of future flooding.

Table 75 Lower Tchefuncte River Existing Permitted Dischargers				
Subbasin	**Permit Number**	**Facility Name**	**Flow GPD**	**BOD_5 Load lb/day**
BMONG1	LA0124079	Administrators of TEF-Tulane National Primate Research Center	11930.08	0.99
BMONG1	LAG531371	Sue B Osbon Co - Osbon Place	1171.91	0.29
BMONG1	LAG531959	Lawn & Saw Shop	1171.91	0.29
BMONG1	LAG531968	Elsie Mottinger - 1404 Hwy 190 Building	1171.91	0.29
BMONG1	LAG531901	1329 North Highway 190 Building	1171.91	0.29
BMONG1	LAG532051	Bevolo Gas & Electric Lights LLC	1171.91	0.29
NNB1	LA0117676	St Tammany Parish Government - Hwy 22 Regional STP	36519.00	3.05
TR1	LAG531888	FTB LLC	1171.91	0.29
TR1	LAG540495	Marina Del Ray	5859.57	1.47
TR1	LAG570002	Harbour Townhomes LLC - Tchefuncte Harbour Townhomes	23438.27	1.95
TR1	LAG530346	T Rivers Inc - WWTP	1171.91	0.29

Table 75 Lower Tchefuncte River Existing Permitted Dischargers				
Subbasin	**Permit Number**	**Facility Name**	**Flow GPD**	**BOD_5 Load lb/day**
TR1	LAG531025	Pineapple Management Services Inc	1171.91	0.29
TR1	LAG531768	Convenience Store	1171.91	0.29
TR1	LAG533687	Salty's Marina	585.96	0.22
TR1	LAG533999	Milda Woods Condo Association	585.96	0.22
TR2	LA0092673	Trinity Marine Products - Plant #38	1781.31	0.45
TR2	LA0049379	Tchefuncta Club Estates Inc (TCE)	53910.50	13.49
TR4	LAG570121	Total Environmental Solutions Inc - Lazy River Subdivision	25687.20	2.14

Table 76 Lower Tchefuncte River							
Project Subdivision Name	**BASIN**	**Total Number of New Customers**	**Total Sewer Project Cost ($)**	**Total Water Project Cost ($)**	**Total Projects Cost ($)**	**BOD Load Reduction (Lb)**	**BOD Reduction Cost ($/Lb)**
Brandy Island	Lower Tchefuncte River	19	$ 2,043,000.00	$ 470,000.00	$ 2,513,000.00	4.9	$ 511,300.00
Heritage Oaks	Lower Tchefuncte River	1	$ 692,800.00	$ -	$ 692,800.00	0.3	$ 2,108,600.00
Piney Wood Marina	Lower Tchefuncte River	4	$ 258,800.00	$ 130,400.00	$ 389,200.00	1.4	$ 285,500.00
River Isle	Lower Tchefuncte River	20	$ 669,800.00	$ 651,800.00	$ 1,321,600.00	6.8	$ 193,900.00
Roger Storm	Lower Tchefuncte River	10	$ 1,083,200.00	$ 275,500.00	$ 1,358,700.00	2.9	$ 471,600.00
Wildwood Estates	Lower Tchefuncte River	8	$ 688,700.00	$ 251,300.00	$ 940,000.00	2.6	$ 357,600.00
Totals		***62***	***$ 5,436,300.00***	***$ 1,779,000.00***	***$ 7,215,300.00***	***19***	***$ 381,100.00***

FIGURE 67
LOWER TCHEFUNCTE RIVER

7.0 RECOMMENDATIONS

The values and benefits of protecting water quality are many. Healthy water bodies provide fish and wildlife habitat, aesthetic resources, recreational opportunities, and safe drinking water supplies. Water quality is an integral part of our individual and community well-being. Water quality is regulated and protected in the US through numerous federal laws and regulations, including the Clean Water Act and the Safe Drinking Water Act. The LDEQ implements and enforces provisions of these federal acts and state water quality standards. The National Marine Fisheries Service (NMFS), U.S. Fish and Wildlife Service (USFWS) and the Louisiana Department of Wildlife and Fisheries also play a role in regulating aquatic habitat, through their listing of indigenous fish species as threatened or endangered. Many of these regulations have components that place requirements on local governments, or impose a liability on a local government whose actions result in degradation of surface water quality.

Local governments have an interest and a responsibility to participate in water quality protection and restoration efforts. However, due to the ever changing regulatory environment, local rules and ordinances may not adequately address water quality. Local government is best suited to determine how to best address water quality and habitat protection in conjunction with state and federal agencies.

7.1 Recommended Changes to Wastewater Ordinances

St. Tammany Parish currently has in place many ordinances to control discharges to surface water bodies of the parish. These ordinances have been established with the intent of balancing water quality protection and economic development. In addition, the Parish is now authorized under municipal separate storm water permit with its own permit conditions and requirements under which the Parish is responsible for localized water quality problems, even though the Parish may have no control over the source of the pollution. The intent of the ordinances is to ensure that permitted development shall be sited and designed to conserve natural drainage features and vegetation, prevent the

introduction of pollutants into Parish waters at levels which will degrade water quality, and protect the overall quality of Parish waters and resources.

In addition to the existing ordinances presented in Section 2 of this report, the project team recommends the Parish consider adoption of the following or similar ordinances to prevent further degradation of Parish water bodies:

- All development should be evaluated for potential adverse impacts to water quality and applicants should consider Site Design, Source Control, and Treatment Control BMPs in order to minimize and prevent polluted runoff (storm water and wastewater) from having water quality impacts resulting from the development.
- Significant natural features within St. Tammany Parish shall be identified and inventoried. These significant features shall include:
    - Seasonal and perennial scenic streams and other natural drainage ways, wetlands, and floodplains;
    - Lands abutting any scenic rivers or streams (list significant rivers and/or streams)
    - Rivers, streams and lakes shall be preserved and buffered as needed to protect their function.
- Significant natural drainage features and wetlands shall be preserved or have their losses mitigated.
- Site-specific buffering, setback requirements and best management practices may be required, as necessary, to enhance and protect resources.
- To minimize the negative impacts of development, storm water should be infiltrated on site to the greatest extent possible. Runoff that cannot be infiltrated shall be managed so that the hydrograph of the receiving stream is not significantly impacted and the demonstration must be made that receiving water quality is maintained.
- Locally significant wetlands shall be protected by buffers to preserve habitat and protect and enhance water quality.

EPA recommends a tiered management system to properly control discharges from decentralized on-site individual wastewater treatment systems. While the Parish currently practices several of the below described on-site management techniques, enforcement of the rules is key to effectuating actual water quality improvements.

- Program Item 1 Decentralized Systems Inventory and Awareness of Maintenance Needs – Conventional on-site individual home treatment systems are passive and durable treatment systems that can provide acceptable treatment under suitable site conditions despite a lack of attention by the homeowner. Failures that may occur and continue undetected pose a relatively low risk to water quality. The objective of this program is to ensure that the local authority has the ability to control design, siting, and installation of on-site individual systems in compliance with prevailing rules and ordinances, and that all systems are recorded, inventoried and property owners are informed of the maintenance needs of the systems.
- Program Item 2 Management through Maintenance Contracts - .this program component builds on component 1 by ensuring that maintenance contracts with certified and trained operators are maintained by all property owners of on-site systems and that these systems are maintained on a yearly basis.
- Program Item 3 Management through Operating Permits – in order to ensure on-site systems continuously meet performance requirements, limited term operating permits may be necessary to ensure water quality standards are maintained. Operating permits provide a mechanism for continuous oversight of system performance and negotiating corrective action.
- Program Item 4 Utility Operation and Maintenance – where the sensitivity of the area is high (ex: scenic streams) and water bodies are impaired, there is a need for continuous monitoring and reliable operation and maintenance. The objective of this program component is to achieve greater control over compliance. The utility takes

responsibility for operation and maintenance of the system owned by homeowners for a service fee.

- Program Item 5 Utility Ownership and Maintenance – the designated management entity or utility owns and operates the treatment system. This system component ensures a high level of control and reduces the likelihood of disputes between the owner and contract/utility operators. This also allows the replacement of existing systems with higher performance capabilities when necessary. The homeowner pays a service fee just as they would a sewer bill.

7.2 Recommended Changes to Drainage Ordinances

As the Parish continues to grow, modifications to the current Parish drainage ordinances are recommended by the design team. Many of the ordinances, which are currently in place for St. Tammany Parish, including the 25% reduction in the pre-developed peak flows for the 10 or 100 year storm events, are great starting points to address the flat topography throughout the Parish. However, there are no written requirements or criteria specifying what method of analysis (*i.e.* the SCS Method, Rational Method, and Modified Rational Method) is required for the reservoir routing. Due to the uniqueness of St. Tammany Parish with average over land slopes being sometimes less than 0.001 percent, and the fact that many of the areas of the Parish consist of the Pine Savannah wetlands, stricter regulations regarding what design method should be utilized in the detention analysis for developed property needs to be further defined. The project team believes that the SCS Method would be the preferred method utilized in any development over 1 acre in size, as it takes into account soil type, timing and swamping factors, shape factor of the hydrograph, and a better representation of the overall land use development. Specifying a specific method by which to analyze a new development, allows the Parish engineering department to specifically guide applicants and engineers who are working on those new developments, to design the drainage systems in accordance with a common criteria across all projects throughout the Parish. The Department of Transportation's hydraulic drainage manual has very specific definitions

describing the SCS Method by which to use runoff curve numbers, ponding and swamping factors as well as providing information regarding soil types, *etc*. In addition, the Parish needs to further adopt in their ordinance shape factors for the SCS Method so that a better representation of the flat terrain and topography can be utilized to represent the actual conditions of urban runoff within the Parish. The design team suggests that a 256 shape factor, similar to what Terrebonne Parish has utilized, which represents a relatively flat topography and provides for a better representation of the pre-developed runoff rates off of a particular piece of property.

In addition to specifying a specific method of analyzing detention ponds and drainage systems throughout the Parish, the Parish also needs to consider developing rules and regulations to create taxing district entities for regional detention ponds dealing with large scale urban runoff as the Parish continues to grow. The implementation of regional detention ponds at specific locations throughout the Parish and having those regional ponds funded through a sales tax mileage or property tax millage would curtail the effects of development in urban runoff further than what would be required by the individual developments throughout the Parish. With any development, the fact that a piece of wooded property is paved with an impervious surface, always generates a greater volume of runoff. Most design methods and criteria, required by municipalities, usually look at attenuating the post development flows back to a pre-developed condition. However, the total volume of water that runs off of that particular site is always greater due to the fact that that property has now been developed and the ability for water to percolate into the soils into the ground system, as well as the little small pockets of depressions that actually store water until it is evaporated or transmitted into the soil, no longer exists. Therefore, the regional detention ponds will be geared toward addressing the overall increased volume of water that occurs with the development and sprawl urban runoff. Many large municipalities with similar topographic challenges, such as the greater Houston area, all have implemented these regional detention ponds in order to curtail the increased volume of water occurred by urban runoff.

7.3 Regulatory Changes

Under the scope of the study, the project team evaluated existing LDEQ and LDHH regulations regarding water quality and any changes to the respective regulations that may help the Parish better achieve water quality goals.

St. Tammany Parish is home to multiple scenic rivers and streams including the Tchefuncte River and all first line tributaries. The scenic river system is administered for the purpose of preserving, protecting, developing, reclaiming, and enhancing the wilderness qualities, scenic beauties, and ecological regime of certain free-flowing streams or segments thereof. Previous LDEQ practice upon assumption of a stream into the scenic rivers program, was to adopt that stream, or segment of the stream, into LDEQ's Outstanding Natural Resource Waters (ONRW) program, protected waters system.

ONRWs are provided additional level of protection under LDEQ's antidegradation policy at LAC 33:IX.1119. If a wastewater discharge or activity is proposed for an outstanding natural resource water body, as defined by LAC 33:IX.Chapter 11, the administrative authority shall not approve that activity if it will cause degradation of these waters. For these purposes, degradation is defined as a statistically significant difference at the 90 percent confidence interval from existing physical, chemical, and biological conditions. Existing discharges of treated sanitary wastewater may be allowed if no reasonable alternative discharge location is available or if the discharge existed before the designation as an outstanding natural resource water body. Characteristics of outstanding natural resource waters include, but are not limited to, highly diverse or unique instream and/or riparian habitat, high species diversity, balanced trophic structure, unique species, or similar qualities. In the 1990s, LDEQ changed its practice on assumption of water bodies into its ONRW program. Because not all waters proposed by the Louisiana Department of Wildlife and Fisheries (LDWF) for inclusion in the scenic rivers program bear the characteristics as required by LDEQ for inclusion in the ONRW program and because many candidate streams had existing permitted discharges, LDEQ no longer began to assume all scenic streams into the ONRW program. Current

LDEQ practice is to review all proposed scenic streams for water quality and biological characteristics prior to assuming that stream into the ONRW program. Simply because a stream is scenic does not necessarily mean it is an ONRW.

However the Tchefuncte River and its tributaries were assumed into LDEQ's ONRW program prior to the practice of reviewing the stream for outstanding water quality or biological significance.

The project team realizes that the Tchefuncte River should remain included in LDEQ's ONRW program. However, the Parish should consider approaching LDEQ to remove some or all of the tributaries of the Tchefuncte River from its ONRW program. Many of these tributaries are storm drains that have been altered and modified to move storm water. LDEQ is in the process of updating its Antidegradation Policy to address existing and new discharges to Louisiana's waters. Updates to the Antidegradation Policy could severely limit and restrict new and existing discharges to ONRWs. St. Tammany Parish could see severe restrictions on development in these watersheds in the future. Parish staff should be active participants in updates to the State's Antidegradation Policy and should petition LDEQ for consideration of this update.

7.4 LDEQ criteria revisions

For many of the watersheds located in St. Tammany Parish, the above presented models demonstrate that even 100% reduction of man-made sources will not bring the water body into compliance with established standards. LDEQ acknowledges that the DO standards may be inappropriate and is in the process of updating these DO standards through the ecoregion UAA process. Previous ecoregion studies indicate the summer season for some estuarine water bodies in the LMRAP may be June through August and the criterion could range 2.3 mg/L to 3.8 mg/L.

St. Tammany Parish staff should be active participants in the LDEQ ecoregion UAA process.

7.5 Path Forward

The overall goal of this study was to provide the Parish with a list projects that will work toward the goal of achieving measurable water quality improvements in the Parish. These projects include wastewater, storm water, flood mitigation, and regulatory updates to address surface water quality impacts in the Parish.

Instituting a comprehensive water quality program and projects as described herein will assist the Parish in promoting attainment of water quality goals for current and future development.

As presented in the figures in **Section 6**, the project team has determined and assigned BOD loadings to each sub-basin located in southern St. Tammany Parish. Future development should be steered away from new discharges in those basins where the existing load has been consumed and directed to those areas where the water body has the assimilative capacity to accept additional load. In basins where development is proposed without available capacity, the development should be required to maintain a net zero increase in load through effluent reduction/elimination, sewering and providing additional treatment for existing dischargers, or other alternative technologies.

8.0 ABBREVIATIONS AND DEFINITIONS

7Q10	The minimum average stream flow for seven consecutive days with a recurrence interval of once every 10 years, also referred to as Critical Conditions.
ARCVIEW	Geographic Information System mapping tool
BAC	Bacteria
BMP	Best Management Practice
BOD	Biochemical Oxygen Demand
col/100 mL	Colonies per 100 milliliters
DO	Dissolved Oxygen
Ecoregion	Ecological regions or areas of general similarity in ecosystems and in the type, quality, and quantity of environmental resources.
FEMA	Federal Emergency Management Agency
GIS	Geographic Information System
HUC	Hydrologic Unit Code
KL Minimum	This value is used to calculate the minimum reaeration rate
K2 Maximum	Maximum Reaeration Rate
LA-QUAL	A steady-state, one-dimensional water quality model, developed by the Watershed Support Division of LDEQ to provide the modeling basis for evaluating TMDLs in the state of Louisiana. Version 9.05, developed in 2010, is dimensioned for a maximum of 200 reaches, 100 headwaters, 300 waste loads, and 3000 elements
LDEQ	Louisiana Department of Environmental Quality
LDHH	Louisiana Department of Health and Hospitals

LDOTD	Louisiana Department of Transportation and Development
Leopold Equations	Equations used to develop reaeration coefficients for the LA-QUAL Model.
LIDAR	Light Detection and Radar
LMRAP	Lower Mississippi River Alluvial Plain
LPBF	Lake Pontchartrain Basin Foundation
LTP	Louisiana Technical Procedures
mg/L	Milligrams per Liter
MOS	Margin of Safety
MS4	Municipal Separate Storm Sewer System
NAIP	National Agriculture Imagery Program
NBOD	Nitrogenous Biochemical Oxygen Demand
NCM	Non-conservative Material
NFIP	National Flood Insurance Program
ng/L	Nanograms per Liter
NOAA	National Oceanic and Atmospheric Administration
Reach	Stretches of constant characteristics within a stream system measured from upstream to downstream used in LA-QUAL.
RKM	River Kilometer
RL	Repetitive Loss
Shapefile	A geospatial vector data format for GIS software.
SOD	Sediment Oxygen Demand

SRL	Severe Repetitive Loss
Sub-basin	Smaller drainage basins within larger drainage basins or subsegments.
Subsegment	A named regulatory water body as defined by LAC 33:IX.1123. They are considered representative of the watershed through which they flow and, therefore, have numerical criteria assigned to them. This is the level of watersheds at which §305(b) assessments are applied. Each subsegment has a six digit number assigned in the following manner, 04=basin, 08=segment, 01=subsegment. This would be read as 040801, which represents the Tchefuncte River-From headwaters to Bogue Falaya River; includes tributaries. For mapping purposes, the subsegment is defined as a polygonal geographical area using GIS.
TDS	Total Dissolved Solids
TMDL	Total Maximum Daily Load
TSS	Total Suspended Solids
UAA	Use Attainability Analysis
UBOD	Ultimate Biochemical Oxygen Demand
USDA	United States Department of Agriculture
USGS	United States Geological Survey
WLA	Wasteload Allocation
WPA	Works Progress Administration

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St. Tammany Parish
2014
MS4 Annual Report

PART 3

2014 MS4 Annual Report Appendix: SWMP

St Tammany Parish
Stormwater Management Plan

December 2014

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B Urbanized Area Stormwater Maps
C Site Location & Storm Sewer System Maps
D TMDL Action Plan
E Annual Evaluation Checklist

Acronyms

BMPs	Best Management Practices
CWA	Clean Water Act
EPA	U.S. Environmental Protection Agency
LDEQ	Louisiana Department of Environmental Quality
LPDES	Louisiana Pollutant Discharge Elimination System
MCM	Minimum Control Measures
MEP	Maximum Extent Practicable
MS4	Municipal Separate Storm Sewer System
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
SPCC	Spill Prevention, Control, and Countermeasures
STP	St. Tammany Parish
SWMP	Stormwater Management Plan
UA	Urbanized Areas

1.0 Introduction

Polluted stormwater runoff is often transported to municipal separate storm sewer systems (MS4s) and ultimately discharged into local rivers and bayous without treatment. In order to improve the Nation's waterways, the Unite States Environmental Protection Agency (EPA) has set up the Stormwater Phase II Rule that establishes an MS4 stormwater management program that is intended to reduce the quantity of pollutants that stormwater picks up and carries into storm sewer systems during storm events. Pollutants that are deposited into nearby waterways through MS4 discharges can impair the waterways, thereby discouraging recreational use of the resource, contaminating drinking water supplies, and interfering with the habitat for fish, other aquatic organisms, and wildlife.

St. Tammany Parish (Parish) operates a number of open gravity flow ditches that collect and route stormwater into main conveyance systems that discharge the stormwater to eleven nearby waterways. The Parish is a Regulated Small Municipal Storm Sewer System (MS4) operating under General Permit # LAR041024, Agency Interest # 108405 with the Louisiana Department of Environmental Quality (LDEQ). A copy of this document is located in Appendix A. This section presents the background of the LPDES General Permit and a brief account of the Parish history.

1.1 Permit Background

The Stormwater Phase II Rule extends coverage of the NPDES stormwater program to certain small MS4s. A small MS4 is any MS4 not already covered by the Phase I program as a medium or large MS4. The Phase II Rule automatically covers on a nationwide basis all small MS4s located in "urbanized areas" (UAs) as defined by the Bureau of the Census, and on a case by case basis those small MS4s located outside of UAs that the NPDES permitting authority designates. Appendix B contains the major UAs located within St. Tammany Parish.

Stormwater discharges from the St. Tammany Parish are regulated by EPA through the state of Louisiana under the Louisiana Pollutant Discharge Elimination System (LPDES) Stormwater Program. The permit requires that the Parish prepare and implement a Stormwater Management Plan for the purpose of implementing public education/involvement and best management practices (BMPs). The intent of this Plan is to establish and implement a Stormwater Management Program and to select and employ the appropriate measures to prevent or control the discharge of pollutants in stormwater runoff.

Within five years following initial authorization under the permit, the Program must be developed, implemented, and enforced as documented in the Plan. The Program is designed to reduce the discharge of pollutants from the St. Tammany small municipal separate storm sewer system to the maximum extent practicable (MEP), to protect water quality, and to satisfy the appropriate water quality requirements of the Louisiana Environmental Quality Act.

Operators of regulated small MS4s are required to design their programs to:

- Reduce the discharge of pollutants to the maximum extent practicable (MEP);
- Protect water quality; and
- Satisfy the appropriate water quality requirements of the Clean Water Act (CWA).

Implementation of the MEP standard will typically require the development and implementation of BMPs and the achievement of measurable goals to satisfy each of the six minimum control measures. A summary of the established and projected measurable goals for the Parish are in included in Appendix A.

1.1.1 Six Minimum Control Measures

Development of the Stormwater Management Program must involve the 6 Minimum Control Measures (MCM):

1. Public Education and Outreach on Stormwater Impacts

Implement a public education program to distribute educational materials to the community or conduct equivalent outreach activities about the impacts of stormwater discharges on water bodies and the steps that the public can take to reduce pollutants in stormwater runoff.

2. Public Involvement/Participation

Comply with State and local public notice requirements when implementing a public involvement/participation program.

3. Illicit Discharge Detection and Elimination

Implement a program plan to detect and eliminate illicit discharges to the storm sewer system (including development of a system map and informing the community about hazards associated with illegal discharges and improper disposal of waste).

4. Construction Site Stormwater Runoff Control.

Enforce program to reduce pollutants in stormwater runoff to MS4 from construction activities disturbing greater than or equal to one acre, including projects less than one acre that are part of a larger common plan of development or sale, that discharge into the Parish small MS4. The Parish must also enforce an ordinance that controls construction site erosion, sediment and waste control requirements, site plan water quality impact review requirements, and public review and site inspection procedures.

5. Post-Construction Stormwater Management in New Development and Redevelopment

Execute a program to address stormwater runoff from new development and redevelopment projects that disturb greater than or equal to one acre, including projects less than one acre that are part of a larger common plan of development or sale, that discharge into the Parish small MS4. The program must ensure that controls

are in place that would prevent or minimize water quality impacts; including enforcement of ordinances.

6. Pollution Prevention/Good Housekeeping for Municipal Operations

Implement an operation and maintenance program that includes training and pollution prevention of municipal operations.

1.2 St. Tammany Parish History

St. Tammany Parish started as a French settlement, but became apart of the United States in the 1700's and in 1810 by proclamation a parish. The completion of the Lake Pontchartrain Causeway in 1956, spanning 24 miles, made driving to and from New Orleans South Shore a forty-minute commute, as shown in the Site Location Map located in Appendix C. Because of this and Hurricane Katrina related relocations, thousands of South Shore residents have relocated to the North Shore. St. Tammany Parish is today the fastest-growing parish in Louisiana.

There are 8 incorporated communities in St. Tammany Parish: Abita Springs, Covington, Folsom, Madisonville, Mandeville, Pearl River, Slidell, and Sun. The unincorporated areas in the parish include: Alton, Bonfouca, Blond, Bush, Chinchuba, Colt, Dave, St Tammany, Florenville, Goodbee, Haaswood, Hickory, Houltonville, McClane City, North City, North Shore, Onville, Ramsay, St. Benedict, St. Joe, Talisheek and Waldheim.

The major eleven receiving waterways in St. Tammany parish are: Tchefuncte River, Bayou Chinchuba, Bayou Castine, Cane Bayou, Bayou Lacombe, East Pearl River, Pearl River, Salt Bayou, Eden Isles, North Shore Beach and Bayou Bonfouca. Detailed waterway locations are documented in the Appendix C map.

The Parish's Stormwater Management Plan is maintained at the Parish Administrative Complex by the Watershed Management staff of the Department of Engineering and is maintained and updated annually. The Plan is available onsite for review by Louisiana Department of Environmental Quality (LDEQ), U.S. Environmental Protection Agency (EPA), other appropriate environmental officials and the public.

The preparation of this document will satisfy the LPDES general permit requirements.

1.3 Stormwater Management

The St. Tammany Stormwater Management staff is responsible for advising about the technical aspects related to implementing, maintaining, and updating the Stormwater Plan. The St. Tammany Stormwater Management staff consists of Parish personnel who are collectively knowledgeable about stormwater, spill control, and waste management. The Stormwater Management staff which may consist of one or more active members is responsible for developing the Plan and for assisting management in its implementation, maintenance, and update. Specifically, the responsibilities of the Stormwater Management staff are as follows:

- To be involved with and give input to the development of the *Stormwater Management Plan* including setting appropriate measurable goals and expectations

- To identify individual responsibilities for monitoring implementation and compliance with the Stormwater Management Program

These and other responsibilities of the St. Tammany Watershed Management staff include the following:

- Provide guidance and assistance in developing, implementing, maintaining, and updating the Plan.
- Evaluate the effectiveness of the Stormwater Management Program.

Table 1-1 describes the responsibilities of the key persons involved in implementing and maintaining this Plan.

TABLE 1-1
Stormwater Management

Name	Position - Responsibility	Phone Number
Sabrina Schenk	Watershed Coordinator – Watershed/MS4 Manager	985-898-2552
David Brunet	Environmental Program Manager-Coastal/Wetland Pemits	985-898-2552
Alycia Adams	Watershed Technician – Plan Review	985-898-2552
d'Ette Smythe, Ph.D.	Regulatory Manager – Regulatory Management	985-898-2552
Glenn Delatte	Engineering Inspector – Commercial Drainage/SW	985-898-2552
Paul Carroll	Drainage Engineer – Hydrology/Hydraulic Management	985-898-2552
Thomas Glaser	Drainage Inspector – Drainage/SW Inspections	985-898-2552

1.4 Plan Revision

The St. Tammany Stormwater Management staff will evaluate and update the Plan at least annually, in order to assess the effectiveness of the Plan and confirm the selected control measures are still applicable. A major revision of the SWMP will be required in 2015 to meet the escalating regulatory requirements of the TMDL's on STP waterways. See Appendix D for TMDL Action Plan.

2.0 Minimum Control Measures

Within five years following initial authorization under the permit, a Stormwater Management Program must be developed, implemented, and enforced. This Program documented in a stormwater management plan is designed to reduce the discharge of pollutants from the St. Tammany small municipal separate storm sewer system to the maximum extent practicable (MEP), to protect water quality, and to satisfy the appropriate water quality requirements of the Louisiana Environmental Quality Act. The stormwater management program includes the minimum control measures described in detail in the following sections.

Best Management Practices (BMPs) and measurable goals must be selected for each minimum control measure. The BMPs and measurable goals that are chosen for St. Tammany Parish are chosen due to their appropriateness for the parish and ability to meet permit requirements. Each measurable goal will include, when appropriate, the following three components:

- The activity, or BMP, to be completed;
- A schedule or date of completion; and
- A quantifiable target to measure progress toward achieving the activity or BMP

2.1 Public Education and Outreach on Stormwater Impacts

An informed community is vital for the success of a stormwater management program within the St. Tammany Parish. Knowledgeable citizens ensure greater support of stormwater management program when they are made aware of how their individual actions (proper waste disposal, sewage management, industrial and construction controls) impact the entire Parish stormwater quality and economics. The materials and outreach programs are directed toward targeted groups of commercial, residential, and institutional entities likely to have significant stormwater impacts.

To meet the permit requirements of the stormwater management program a public education program is mandatory. The public education program will distribute educational materials to the community and/or conduct equivalent outreach activities about the impacts of stormwater discharges on water bodies and the steps that the public can take to reduce pollutants in stormwater runoff. The public education program will also inform individuals and households about the steps they can take to reduce stormwater pollution, such as ensuring proper septic tank system maintenance, ensuring the proper use and disposal of landscape and garden chemicals including fertilizers and pesticides, protecting and restoring riparian vegetation, and properly disposing of used motor oil and household hazardous wastes.

2.1.1 Measurable Goals

TABLE 2-1
Public Education and Outreach on Stormwater Impacts Measurable Goals

Measurable Goals	Frequency	Start/End Date
Media – Continue to deliver various educational, promotional, or motivational messages through the parish website. http://stpgov.org	Continuous	Continuous
Homeowner Education – The Parish will dispatch building inspectors to various Homeowner Associations to educate homeowners on how to maintain onsite residential sewage systems and proper waste disposal.	Continuous	Continuous
Media - Deliver educational, promotional, or motivational messages through the governmental access channel.	Continuous	Continuous
Presentations and Workshops – Conduct workshops and provide presentations for Homebuilders Associations, Developers, and Engineers on how to reduce stormwater impacts related to construction and development projects.	Continuous	Continuous
Marina Education Outreach Project - Conduct presentation for local marina operators on the water quality and business benefits of the Clean Marina Program	Continuous	Continuous
Demonstration Projects – Conduct demonstration projects on proper BMP installation and maintenance on construction sites and demonstrations related to using the Critical Drainage Map to identify Critical/Sensitive Areas prior to development.	Continuous	Continuous
Educational Displays, Pamphlets, Booklets, etc. - Outreach materials that inform the public about stormwater pollution.	Continuous	Continuous

2.2 Public Involvement and Participation

Public participation is the key to success of a Stormwater Management Program due to citizens' ability to supply valuable and free intellectual and labor resources. Also involving the public will decrease potential legal challenges by the community since they will actively be involved in the program implementation. Also citizens involved in the stormwater program development process provide important cross-connections and relationships with other community and government programs. All public events will be effectively publicized and comply with state, and local public notice requirements.

2.2.1 Measurable Goals

TABLE 2-2
Public Involvement and Participation Measurable Goals

Measurable Goals	Frequency	Start/End Date
Adopt-A-Road Program: The St. Tammany Adopt-A-Road Program is a volunteer litter reduction and prevention campaign to remove litter from parish roadways and rights of way and improve the appearance of the Parish and water quality.	Continuous	Continuous
Litter Abatement Program: The Parish will assist the public in proper disposal of household hazardous and non-hazardous wastes by hosting an annual litter abatement program where residents can bring various wastes (paint cans, batteries, tires, etc.) to be properly disposed.	Continuous	Continuous
Individual Sewer Inspection/Permit Program: The St Tammany Parish Department of Environmental Services will assist the public with individual sewer systems by providing information and public awareness events. Sewer system events to be announced on website: http://stpgov.org	As needed	Continuous

2.3 Illicit Discharge Detection and Elimination

Federal regulations define an illicit discharge as "...any discharge to an MS4 that is not composed entirely of stormwater..." with some exceptions. These exceptions include discharges from NPDES-permitted industrial sources and discharges from fire-fighting activities. Illicit discharges, Table 2-3, are considered "illicit" because MS4s are not designed to accept, process, or discharge such non-stormwater wastes. Therefore, under this Minimum Control Measure, a plan must be developed and implemented to detect and eliminate illicit discharges to the storm sewer system (including development of a system map and informing the community about hazards associated with illegal discharges and improper disposal of waste).

TABLE 2-3
Sources of Illicit Discharges

Potential Sources of Illicit Discharges
Sanitary Wastewater
Effluent from Septic Tanks
Car Wash Wastewaters
Improper Oil Disposal
Radiator Flushing Disposal
Laundry Wastewaters
Spills from Roadway Accidents
Improper Disposal of Auto and Household Toxics

Recognizing the adverse effects illicit discharges can have on receiving waters, the final rule requires an operator of a regulated small MS4 to develop, implement and enforce an illicit discharge detection and elimination program. This program must include the following:

- A storm sewer system map, showing the location of all outfalls and the names and location of all waters of the United States that receive discharges from those outfalls;
- Through an ordinance, or other regulatory mechanism, a prohibition (to the extent allowable under State, Tribal, or local law) on non-stormwater discharges into the MS4, and appropriate enforcement procedures and actions;
- A plan to detect and address non-stormwater discharges, including illegal dumping, into the MS4;

- The education of public employees, businesses, and the general public about the hazards associated with illegal discharges and improper disposal of waste; and
- The determination of appropriate best management practices (BMPs) and measurable goals for this minimum control measure. Some program implementation approaches, BMPs (i.e., the program actions/activities), and measurable goals are suggested below.

2.3.1 Measurable Goals

TABLE 2-4
Illicit Discharge Detection and Elimination Measurable Goals

Measurable Goals	Frequency	Start/End Date
Detecting Sanitary Sewer Overflows: Annual sanitary sewer inspections of all nonexclusive franchise utility companies.	Annual	Annual
Identifying Illicit Connections: Ordinance (#2455) that requires septic tank inspections before each parish home is sold. Septic Tanks that fail inspections are then required to be removed by the owner and replaced with septic treatment systems that meet Parish regulations.	Continuous	Continuous
Identifying Illicit Connections: Ordinance that institutes building and plumbing codes to prevent connections of potentially hazardous pollutants to storm drains.	Continuous	Continuous
Educational Booklets: Continue producing outreach materials that inform the public about on-site sewage maintenance. Booklet and website information presently available.	Continuous	Continuous

2.4 Construction Site Stormwater Runoff Control

Construction is a major contributor to suspended solids concentration in stormwater and can cause major erosion issues. Polluted stormwater runoff from construction sites often flows to MS4s and ultimately is discharged into local rivers and bayous. Of the pollutants listed in Table 2-5, sediment is usually the main pollutant of concern. During a short period of time, construction sites can contribute more sediment to streams than can be deposited naturally during several decades. The resulting siltation, and the contribution of other pollutants from construction sites, can cause physical, chemical, and biological harm to the Parish receiving waters. For example, excess sediment can quickly fill the Tchefuncte and Pearl rivers and many Parish bayous, requiring dredging and destroying aquatic habitats.

TABLE 2-5
Potential Pollutants Discharged from Construction Sites

Potential Pollutants Commonly Discharged From Construction Sites
Sediment
Solid and sanitary wastes
Phosphorous (fertilizer)
Nitrogen (fertilizer)
Pesticides
Oil and grease
Concrete truck washout
Construction chemicals
Construction debris

The Phase II Final Rule requires an operator of a regulated small MS4 to develop, implement, and enforce a program to reduce pollutants in stormwater runoff to their MS4 from construction activities that result in a land disturbance of greater than or equal to one acre, including projects less than one acre that are part of a larger common plan of development or sale, and discharge into the Parish MS4. The Parish is required to:

- Have an ordinance or other regulatory mechanism requiring the implementation of proper erosion and sediment controls, and controls for other wastes, on applicable construction sites;
- Have procedures for site plan review of construction plans that consider potential water quality impacts;
- Have procedures for site inspection and enforcement of control measures;
- Have sanctions to ensure compliance (established in the ordinance or other regulatory mechanism);
- Establish procedures for the receipt and consideration of information submitted by the public; and
- Determine the appropriate best management practices (BMPs) and measurable goals for this minimum control measure.

2.4.1 Measurable Goals

TABLE 2-6
Construction Site Stormwater Runoff Control Measurable Goals

Measurable Goals	Frequency	Start/End Date
Contractor Education and Training – Educate and train contractors and developers doing business in the Parish. The training shall include permits required for different types of construction, and BMPs (construction sequencing, storm drain inlet protection, oil/water separators, sediment traps, etc.) to be utilized on construction sites to control and reduce sediment and pollutant laden runoff from leaving the construction site.	Continuous	Continuous
Construction Site BMP Inspection Program - Perform site inspections to determine compliance with erosion/sediment control measures are in place during construction	Continuous	Continuous
SWPPP Requirement for new subdivisions and commercial developments – Require SWPPP and/or Erosion Control Plans for all new subdivisions and commercial developments	Continuous	Continuous
SW Ordinance Revision – Improve ordinance to address escalated enforcement, SW plan review, and SWPP s on site for review by inspectors. Continue current requirements for BMPs that addresses silt and sedimentation runoff from construction sites to the extent allowable under State or local law.	Revise as needed	Submit to Council in 2015

2.5 Post-Construction Stormwater Management in New Development & Redevelopment

The Parish will develop, implement, and enforce a program to address stormwater runoff from new development and redevelopment projects that disturb greater than or equal to one acre, including projects less than one acre that are part of a larger common plan of development or sale, that discharge into the Parish small MS4. The program must ensure that controls are in place that would prevent or minimize water quality impacts.

2.5.1 Measurable Goals

TABLE 2-7
Post-Construction Stormwater Management in New Development & Redevelopment Measurable Goals

Measurable Goals	Frequency	Start/End Date
SW Ordinance Meetings – Schedule and conduct Stormwater Ordinance Sessions that include relevant members from the ST Homebuilders Association, Northshore Business Council, Tammany Together, League of Women Voters, and Parish personnel to assist in effective strategies for long-term BMPs and their enforcement within STP communities.	Monthly	2010-2013
Ordinances - Use an ordinance or other regulatory mechanism to address post-construction runoff from new development and redevelopment projects to the extent allowable under State or local law.	One-Time Preparation	2013

2.6 Pollution Prevention & Good Housekeeping for Parish Operations

Pollution Prevention for parish operations is required in order to improve and protect receiving water quality by altering the St. Tammany MS4 specific actions. This will help ensure a reduction and in the amount and type of pollution that: (1) collects on streets, parking lots, open spaces, and storage and vehicle maintenance areas and is discharged into local waterways; and (2) results from actions such as environmentally damaging land development and flood management practices or poor maintenance of storm sewer systems. The program must include parish staff training on pollution prevention measures and techniques (e.g., regular street sweeping, reduction in the use of pesticides or street salt, or frequent catch-basin cleaning).

2.6.1 Measurable Goals

TABLE 2-8
Pollution Prevention & Good Housekeeping for Parish Operations Measurable Goals

Measurable Goals	Frequency	Start/End Date
Capital Improvement Program - Maintain roadside vegetation; litter control; regular road and bridge maintenance.	Continuous	Continuous
Preventative Maintenance - The preventive maintenance program involves the periodic lubrication, adjustment, and replacement of worn parts in all equipment where failure could result in a spill of oils or hazardous materials.	Continuous	Continuous
Develop Spill Prevention Plans - Develop plans describing spill prevention and control procedures for parish field personnel.	As needed	As needed
Training Sessions - Conduct annual spill prevention and response training sessions for all Parish employees.	Annual	Annual
Roadway & Bridge Maintenance - Maintain regular street sweeping maintenance	Continuous	Continuous

2.6.2 Preventative Maintenance

Preventive maintenance addresses items that have the potential to directly affect stormwater quality. The preventative maintenance program established in the St. Tammany Public Works Department involves the periodic lubrication, adjustment, and replacement of worn parts in all equipment (for example, pump bearings and engine parts such as hydraulic lines) where equipment failure could result in a spill of oils or hazardous materials. The program includes the following:

- Periodic testing of equipment for integrity
- Periodic adjustment, cleaning, lubrication, and repair or replacement of parts and equipment as recommended by the manufacturer or required by good maintenance practices
- Tagging equipment that should not be operated because of ongoing maintenance activities or because it is inoperable
- Coating storage tanks, pipes, and associated equipment to avoid failure because of corrosion

2.6.3 Good Housekeeping

It is a general Parish Public Works policy to maintain a clean, orderly work environment. Good housekeeping practices include the proper labeling of significant materials, maintaining clean work areas, keeping work areas neat and well organized, disposing of wastes promptly, and making the above activities a priority. These practices are executed by each Public Works personnel every shift.

Good housekeeping practices contribute to the Parish's spill control and prevention effort. Those practices employed in the facility include:

1. Neat and orderly storage of chemicals:
2. Prompt removal of spillage;
3. Proper pathways and walkways; no containers and drums should protrude onto walkways;
4. Stimulation of employee interest in good housekeeping.

2.6.3.1 Operation and Maintenance

Good housekeeping practices for operations and maintenance include:

- Floors and ground surfaces are kept clean and dry by using brooms, shovels, vacuum cleaners, or cleaning machines.
- Garbage and waste material is regularly picked up and properly disposed. Currently garbage is picked up weekly.
- All spillage will be promptly removed. Spill cleanup kits and supplies are maintained onsite and readily available.

2.6.3.2 Material Storage Practice

Good housekeeping practices for material storage include:

- Containers of material are stored away from direct traffic routes to prevent accidental spills.
- Containers are stored in a neat and orderly fashion.
- Labels are present on all liquid storage vessels.
- Containers are stacked according to manufacturers' instructions.
- Containers and tanks are routinely inspected for leaks and current condition.

The importance of these practices will be emphasized through the measurable goal of training future personnel.

2.6.3.3 Employee Training

The facility also has an Emergency Response Team made up of personnel trained specifically for handling and responding to emergency situations.

2.7 Additional Requirements for Permit

The LPDES permit may require specific BMPs related to endangered species. This section will be completed following receipt of the final LPDES permit.

3.0 Annual Evaluation

3.1 Annual Evaluation

The Stormwater Management Plan Team will conduct an annual comprehensive inspection to evaluate the overall effectiveness of this Plan regarding whether minimum control measures to reduce pollutant loadings identified in this Plan are adequate and properly implemented or whether additional control measures are needed.

The process for conducting the annual evaluation will be as follows:

- Review the current Plan.
- Review Parish operations for the past year to determine if areas should be included from the Plan based on activities of the previous year. Also, determine if any existing areas were modified and thus require Plan modifications.
- Conduct a comprehensive inspection to determine if all spill prevention/Stormwater Management Plan measures 1) are accurately identified in the Plan and 2) are in place and working properly. A worksheet for the annual evaluation is included in Appendix E.
- Document findings in a brief report summarizing the scope of the inspection, personnel making the inspection, date(s) of the inspection, and major observations relating to the implementation of the Plan.

3.2 Reporting

St. Tammany Parish will submit annual reports to LDEQ by March 10 for the preceding calendar year. The report must include:

- The status of compliance with permit conditions, an assessment of the appropriateness of identified best management practices and progress towards achieving identified measurable goals for each of the minimum control measures;
- Results of information collected and analyzed, including monitoring data, if any, during the reporting period;
- A summary of the stormwater activities the Parish plans to undertake during the next reporting cycle; and
- A change in any identified measurable goals that apply to the program elements.

Appendix A

LPDES General Permit 2013-2018
For Small MS4s
Permit No.: LAR041024
Agency Interest No.: 108405

DEQ
LOUISIANA

GENERAL PERMIT FOR DISCHARGES FROM SMALL MUNICIPAL SEPARATE STORM SEWER SYSTEMS

MASTER GENERAL PERMIT NO. LAR040000
AUTHORIZATION TO DISCHARGE UNDER THE
LOUISIANA POLLUTANT DISCHARGE ELIMINATION SYSTEM

Pursuant to the Clean Water Act, as amended (33 U.S.C. 1251 et seq.), and the Louisiana Environmental Quality Act, as amended (La. R. S. 30:2001, et seq.), rules and regulations effective or promulgated under the authority of said Acts, this Louisiana Pollutant Discharge Elimination System (LPDES) General Permit is reissued. Except as provided in Part I.D of this permit, those operators of storm water discharges from small municipal separate storm sewer systems in the State of Louisiana who submit a completed Notice of Intent and a Storm Water Management Plan in accordance with Part II of this permit, and are approved for coverage, are authorized under this general permit.

This permit shall become effective on: March 1, 2013

This permit and the authorization to discharge shall expire five (5) years from the effective date.

Issued on: February 13, 2013

Sanford L. Phillips
Assistant Secretary

GALVEZ BUILDING ▯ 602 N. FIFTH STREET ▯ P.O. BOX 4313 ▯ BATON ROUGE, LA 70821-4313 ▯ PHONE (225) 219-3181

LPDES GENERAL PERMIT
DISCHARGES FROM
SMALL MUNICIPAL SEPARATE STORM SEWER SYSTEMS

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PART I
COVERAGE UNDER THIS PERMIT

A. Permit Area

This permit covers all areas, except agricultural lands, of the State of Louisiana that are served by regulated small municipal separate storm sewer systems (small MS4s).

B. Eligibility

1. This permit authorizes discharges of storm water from a regulated small municipal separate storm sewer system (MS4) as defined in LAC 33:IX.2511.B.16 and LAC 33:IX.2519, as stated below.

The MS4 systems which are required to obtain permit coverage include:

a) in Urbanized Areas (UAs), all core cities, plus any other MS4 systems operating within the UA unless specifically waived by the LDEQ;

b) outside Urbanized Areas, MS4 systems serving populations of 10,000 to 50,000 and a population density of at least 1,000 persons per square mile which have been "designated" by the LDEQ) Other MS4 systems may be designated by the Director in response to a petition or as needed to protect water quality.

LAC 33:IX.2511.B.16: Small Municipal Separate Storm Sewer System - a municipal separate storm sewer system that:

a. is owned or operated by the United States, a state, city, town, borough, county, parish, district, association, or other public body (created by or in accordance with state law) having jurisdiction over disposal of sewage, industrial wastes, storm water, and other wastes, including special districts under state law such as a sewer district, flood control district, or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the CWA that discharges to waters of the state;

b. is not defined as a large or medium municipal separate storm sewer system in accordance with Subsection B.4 and 7 of this Section, or designated under Subsection A.1.e of this Section; and

c. includes systems similar to separate storm sewer systems in municipalities, such as systems at military bases, large hospital or prison complexes, and highways and other thoroughfares. The term does not include separate storm sewers in very discrete areas, such as individual buildings.

LAC 33:IX.2519:

As an Operator of a Small MS4, am I regulated under the LPDES Storm Water Program?

A. Unless you qualify for a waiver under Subsection C of this Section, you are regulated if you operate a small MS4 including, but not limited to, systems operated by federal, state, tribal, and local governments, including state departments of transportation, and:

1. your small MS4 is located in an urbanized area as determined by the latest Decennial Census by the Bureau of the Census. (If your small MS4 is not located entirely within an urbanized area, only the portion that is within the urbanized area is regulated); or

2. you are designated by the state administrative authority, including where the designation is based upon a petition under LAC 33:IX.2511.F.4.

B. You may be the subject of a petition to the state administrative authority to require an LPDES permit for your discharge of storm water. If the state administrative authority determines that you need a permit, you are required to comply with LAC 33:IX.2521-2525.

C. The state administrative authority may waive the requirements otherwise applicable to you if you meet the criteria of Subsection D or E of this Section. If you receive this waiver, you may subsequently be required to seek coverage under an LPDES permit in accordance with LAC 33:IX.2521.A if circumstances change.

D. The state administrative authority may waive permit coverage if your MS4 serves a population of less than 1,000 within the urbanized area and you meet the following criteria:

1. your system is not contributing substantially to the pollutant loadings of a physically interconnected MS4 that is regulated by the LPDES storm water program; and

2. if you discharge any pollutant(s) that have been identified as a cause of impairment of any water body to which you discharge, storm water controls are not needed based on wasteload allocations that are part of a department-established total maximum daily load (TMDL) that addresses the pollutant(s) of concern.

E. The department may waive permit coverage if your MS4 serves a population under 10,000 and you meet the following criteria:

1. the department has evaluated all waters of the state, including small streams, tributaries, lakes, and ponds, that receive a discharge from your MS4;

2. for all such waters, the department has determined that storm water controls are not needed based on wasteload allocations that are part of a TMDL established by the department or by EPA and approved by EPA that addresses the pollutant(s) of concern or, if a TMDL has not been developed or approved, an equivalent analysis that determines sources and allocations for the pollutant(s) of concern;

3. for the purpose of this Subsection, the pollutant(s) of concern include biochemical oxygen demand (BOD), sediment or a parameter that addresses sediment (such as total suspended solids, turbidity, or siltation), pathogens, oil and grease, and any pollutant that has been identified as a cause of impairment of any water body that will receive a discharge from your MS4; and

4. the department has determined that future discharges from your MS4 do not have the potential to result in noncompliance with water quality standards, including impairment of designated uses, or other significant water quality impacts, including habitat and biological impacts.

C. Allowable Non Storm Water Discharges

The following non-storm water sources may be discharged from the MS4 and are not required to be addressed in the MS4s Illicit Discharge Detection and Elimination plan or other minimum control measures, provided that they have been determined by the permittee to not be substantial sources of pollutants to the MS4:

- discharges or flows from fire fighting activities (excludes predictable and controllable discharges from a fire fighting training facility);
- fire hydrant flushings;
- potable water including: water line flushings using potable water; drinking fountain overflows; lawn watering runoff; and similar sources of potable water;
- uncontaminated air conditioning or compressor condensate;
- residual street wash water and pavement wash waters where no detergents are used and no spills or leaks of toxic or hazardous materials have occurred (unless all spilled material has been removed);
- routine external building wash down which does not use detergents;
- drainage from landscape watering;
- rising ground waters;
- uncontaminated ground water infiltration (as defined at 40 CFR 35.2005(20));
- uncontaminated pumped ground water;
- foundation drains;
- irrigation water;

- uncontaminated spring water;
- water from crawl space pumps;
- footing drains;
- water from individual residential car washing;
- flows from riparian habitats and wetlands;
- dechlorinated swimming pool discharges;
- other similar occasional incidental discharges (e.g. non-commercial or charity car washes) where such discharges will not cause a problem either due to the nature of the discharge or controls the MS4 places on the discharge. The permittee must identify all types of discharges that they will allow as occasional incidental discharges and specify those discharges in their storm water management plan (SWMP).

D. Limitations on Coverage

The following discharges, whether discharged separately or commingled with municipal storm water, are not authorized by this permit:

1. Storm water discharges that are mixed with non-storm water or storm water associated with industrial activity unless such discharges are:

   a. in compliance with a separate LPDES permit, or

   b. identified by and in compliance with Part I.C of this permit.

2. Discharges of material resulting from a spill. Where discharge of material resulting from a spill is necessary to prevent loss of life, personal injury, or severe property damage, the permittee(s) shall take, or ensure the responsible party for the spill takes all reasonable steps to minimize or prevent any adverse effects on human health or the environment. This permit does not transfer liability for a spill itself from the party(ies) responsible for the spill to the permittee(s) nor relieve the party(ies) responsible for a spill from the reporting requirements of LAC 33:I.Subchapters A-E (40 CFR Part 117 and 40 CFR Part 302).

3. Storm water discharges whose direct, indirect, interrelated, interconnected, or interdependent impacts are likely to have adverse effects upon endangered or threatened species, or on the critical habitat for these species as determined in conjunction with the U.S. Fish and Wildlife Service (USFWS).

4. Storm water discharges or implementation of your storm water management plan, which adversely affect properties listed or eligible for listing in the National Register of Historic Places, unless you are in

compliance with requirements of the National Historic Preservation Act (NHPA) and any necessary activities to avoid or minimize impacts have been coordinated with the Louisiana State Historic Preservation Officer (SHPO) (for questions, the operator should contact the Section 106 Review Coordinator, Office of Cultural Development, P. O. Box 44247, Baton Rouge, LA 70804-4247 or telephone (225) 342-8170).

5. Storm water discharges into any waterbody for which a TMDL has been approved if the storm water discharges do not comply with Part III.B of this permit.

6. Any new source or new discharge containing the pollutants of concern to a 303(d) listed waterbody where a TMDL has not been approved unless allowed under LAC 33:IX.2317.A.9. You may be eligible under this section if you comply with Part IV.G of this permit.

E. Permittee Responsibilities

1. Each permittee is responsible for:

   a. Compliance with permit conditions relating to discharges from portions of the Municipal Separate Storm Sewer System where the permittee is the operator;

   b. Storm Water Management Program (SWMP) implementation on portions of the Municipal Separate Storm Sewer System where the permittee is the operator (including developing and implementing measurable goals for the Best Management Practices (BMPs) used to satisfy the control measures identified in Part IV.D1-6);

   c. Compliance with annual reporting requirements as specified in Part V.C.;

   d. Collection of representative wet weather monitoring data required by Part V.A, according to such agreements as may be established between permittees; and

   e. A plan of action to assume responsibility for implementation of storm water management and monitoring programs on their portions of the Municipal Separate Storm Sewer System should inter-jurisdictional agreements allocating responsibility between permittees be dissolved or in default.

2. Permittees are jointly responsible for permit compliance on portions of the Municipal Separate Storm Sewer System where operational or Storm Water Management Program implementation authority over portions of the

Municipal Separate Storm Sewer Systems is shared or has been transferred from one permittee to another in accordance with legally binding agreements.

F. Obtaining Authorization

All MS4 operators, including operators covered under a previous version of the LPDES General Permit LAR040000, must comply with the following application requirements.

Application and Public Notice Requirements
In order for storm water discharges from small municipal separate storm sewer systems to be authorized to discharge under this general permit, a regulated small MS4 must:

1. Submit a correctly completed Notice of Intent (NOI - Form MS4-G). In accordance with the requirements of Part II below, the applicant must submit either in the NOI, or as an attachment to the NOI, a proposed storm water management plan, using the NOI form provided by the State Administrative Authority (or a photocopy thereof). Operators authorized under a previous version of LPDES General Permit LAR040000 shall submit the current storm water management plan, revised as necessary to meet new requirements contained in this permit.

2. Where the operator changes, or where a new operator is added after the submittal of an NOI, a new NOI must be submitted in accordance with Part II.

3. Any NOI and Storm Water Management Plan submitted for authorization under this general permit will be placed on public notice on LDEQ's website and in at least one local circulation for a minimum of 30 days. All interested parties will be given the opportunity to comment and to request a public hearing to raise issues of concern related to permitting discharges from a particular drainage system during this period.

4. Dischargers who submit an NOI in accordance with the requirements of this permit may be granted coverage under the general permit after 30 days has elapsed to allow public comment on the contents of the NOI and, if necessary, to hold a public hearing on issues of concern that might arise during the public comment period. This office will issue written notification to those Small MS4s who are accepted for coverage under this general permit. If it is determined that an MS4 would be more appropriately regulated under an individual permit, the permittee will be notified that it will not be permitted under the general permit and an individual permit will be issued to the MS4 operator. The State Administrative Authority may later deny coverage under this permit and require submittal of an application for

an individual LPDES permit based on a review of the NOI or other information (see Part VI.L of this permit).

5. New MS4 permittees granted authorization to discharge under this general permit will be listed in the Water Permits Division activity report on the LDEQ website at: http://www.deq.louisiana.gov/portal/DIVISIONS/WaterPermits/WPDActivities.aspx. NOIs and associated documents will be available in the Electronic Document Management System (EDMS) for public review: http://edms.deq.louisiana.gov/app/doc/querydef.aspx.

PART II
NOTICE OF INTENT REQUIREMENTS

A. Deadlines for Notification

1. If you are an operator of a newly regulated small municipal separate storm sewer system designated under LAC 33:IX.2519.A.1 (located in urbanized areas as determined by the 2010 Decennial Census by the Bureau of the Census), you must apply for coverage under this permit within 120 days of being notified by LDEQ that you operate a regulated small MS4.

2. If you are an operator of a regulated small municipal separate storm sewer system designated under LAC 33:IX.2519.A.2, you must apply for coverage under this permit, or apply for a modification of an existing LPDES permit within 120 days of notice from the LDEQ that coverage is required.

3. If you are an operator of a regulated small municipal separate storm sewer system that was required to apply for coverage under a previous version of the LPDES General Permit LAR040000, you must reapply for coverage under this permit within 60 days of being notified by LDEQ.

4. Requests for waivers under LAC 33:IX.2519.C (see Part I.B) must be submitted in writing, with supporting documentation, no later than 60 days of becoming aware that you operate a regulated small MS4.

5. Where the operator changes, or where a new operator is added after the submittal of an NOI under Part II, the new owner/operator must complete and file an NOI in accordance with Part I.F of the permit at least 30 days prior to taking over operational control of the facility. The prior operator must submit a Notice of Termination once authorization is provided to the new operator.

B. Contents of Notice of Intent

The Notice(s) of Intent shall be signed in accordance with Part VI.G of this permit and shall include the following information:

1. The MS4 name;

2. The street address, parish, and the latitude and longitude of the city hall or municipal business office for the MS4 operator for which the notification is being submitted;

3. The name, address, and telephone number of the operator(s) filing the NOI for permit coverage;

4. The names of all states where the applicant has federal or state environmental permits identical to, or of a similar nature to the MS4 permit;

5. A statement that the applicant does not owe any outstanding fees or final penalties to DEQ; if there are outstanding fees or penalties, you should explain why they have not been paid;

6. Whether the applicant is a corporation or limited liability company;

7. The name of the all receiving water(s);

8. A USGS 7.5 minute topographic map, or equivalent, of the MS4 service area with the known municipal storm sewer outfalls and any major control structures identified;

9. An estimate of the square miles of the MS4 service area;

10. any existing quantitative data that characterizes the discharge, such as the monthly mean rainfall estimates, volume and quality of the discharges from the municipal storm sewer, and the results of any visual field screening at identified outfalls; and

11. In the NOI or as an attachment to the NOI, the following information for each of the six Minimum Control Measures (MCMs) defined below in Part IV.B:

    a. Selected best management practices (BMPs);

    b. the measurable goals for each of the storm water minimum control measures, the month and year in which the MS4 operator began or will begin full implementation of each of the minimum control measures, interim milestones, and the frequency of the action; and

    c. the person or persons responsible for implementing or coordinating the storm water management program (LAC 33:IX.2523.D.1.c).

C. Where to Submit

NOIs, signed in accordance with Part VI.G of this permit, are to be submitted to the LDEQ at the address:

Louisiana Department of Environmental Quality
Office of Environmental Services
P. O. Box 4313
Baton Rouge, LA 70821-4313
Attention: Water Permits Division

PART III
SPECIAL CONDITIONS

A. Discharge Compliance with Water Quality Standards

Your discharges must not be causing or have the reasonable potential to cause or contribute to a violation of a water quality standard. Where a discharge is already authorized under this permit and is later determined to cause or have the reasonable potential to cause or contribute to the violation of an applicable State or Federal Water Quality Standard, the permitting authority will notify you of such violation(s) and the permittee shall take all necessary actions to ensure future discharges do not cause or contribute to the violation of a water quality standard and document these actions in the SWMP. If violations remain or recur, then the permitting authority may require specific changes to the SWMP, or coverage under this permit may be terminated by the permitting authority, and an alternative general permit or individual permit may be issued, in accordance with Part VI.L below. Compliance with this requirement does not preclude any enforcement activity as provided by the Clean Water Act and Louisiana Environmental Quality Act for the underlying violation.

The LDEQ has established procedures for monitoring water quality throughout the state to determine if water quality standards are being met and to determine if TMDLs are required to prevent further degradation to water quality impaired streams. The permit requires that permittees implement a storm water management plan that is designed to minimize the discharge of pollutants from the regulated area to waters of the state. The permittee is required to implement BMPs to fulfill the requirements outlined in Part IV.D. Implementing BMPs to minimize the discharge of pollutants to the storm sewer system should result in less polluted storm water runoff from the regulated areas to receiving water bodies.

Permittees must comply with the state's antidegradation policy and plan (LAC 33:IX.1109.A; LAC 33:IX.1119). Permittees must ensure that storm water discharges to water bodies designated as Outstanding Natural Resource Waters (ONRWs) will not degrade water quality to the Maximum Extent Practicable (MEP). Additional BMPs and regulatory mechanisms (i.e. ordinances or codes) may be required in order to prevent erosion, sedimentation, or illicit discharges to ONRWs. If it is demonstrated that a discharge from a particular MS4 regulated by this permit would result in the violation of an in stream water quality criteria or adversely impact the designated uses of a receiving stream, the Department will consider how the implementation of the Control Measures outlined in Part IV.D will affect the quality of storm water discharges from the MS4. If it is determined that the Control Measures outlined in Part IV.D are inadequate

to control the discharge of pollutants from the MS4 effectively enough to meet the in stream water quality criteria or protect the designated uses of the receiving stream, then the procedures outlined in LAC 33:IX.1119.C may be implemented to determine if the discharge from the MS4 can be permitted under this general permit, or the MS4 may be required to obtain coverage under an individual LPDES permit.

Discharges of pollutants from an MS4 that cannot be effectively controlled under the conditions of this permit will not be authorized to discharge under this general permit.

B. Total Maximum Daily Load (TMDL) Allocations

Permittees must document in their SWMP how the BMPs and other controls implemented in the SWMP will control the discharge of any pollutant(s) of concern (POCs) for discharges into a receiving water which has been listed on the Clean Water Act 303(d) list of impaired waters. If a TMDL has been approved for a waterbody, the permittee will be required to include any TMDL requirements in the SWMP that are applicable to MS4 discharges into basin subsegments where TMDLs have been established.

If storm water runoff from a regulated MS4 flows into a basin subsegment **that is listed on the most recent EPA-approved 303(d) list**, then the permittee's SWMP must address any impairments where the suspected source has been identified as *urban runoff/storm sewers, municipal (urbanized high density area), or unspecified urban stormwater*. If a TMDL has not yet been approved for a 303(d) listed basin subsegment number that receives storm water runoff from the regulated MS4s, **and** the source of pollutants causing the impairment(s) have been attributed to MS4s, then the permittees must describe how the BMPs and other control(s) selected for the SWMP will minimize, to the maximum extent practicable (MEP), the discharge of those pollutants which have been identified as causing the impairment. Impaired water bodies (without a TMDL) are listed as Category 5 in Appendix A of LDEQ's most recent Integrated Report (IR), located at:
http://www.deq.louisiana.gov/portal/DIVISIONS/WaterPermits/WaterQualityAssessment/WaterQualityInventorySection305b.aspx.

If a TMDL allocation has been assigned for specific pollutants, which are identified as impairments attributed to discharges from regulated MS4s, then the permittee must modify the storm water management program to implement the TMDL within six months of the TMDL's approval or as otherwise specified in the TMDL. This requirement includes TMDLs that are developed during the term of this general permit. In addition to any MS4-specific requirements of the TMDL, the permittee must also: 1) implement storm water controls that specifically target the pollutant(s) of concern 2) identify a measurable goal for the pollutant(s) of concern and 3) implement a monitoring program

to assess whether or not the storm water controls are adequate to meet the WLA. *See Part IV.H for a thorough discussion of permit requirements should a WLA be assigned for discharges of one or more pollutants from your MS4.* Impaired water bodies for which TMDLs have been developed are listed as Category 4a in Appendix A of LDEQ's most recent IR, located at:
http://www.deq.louisiana.gov/portal/DIVISIONS/WaterPermits/WaterQualityAssessment/WaterQualityInventorySection305b.aspx.

C. Releases in Excess of Reportable Quantities

The discharge of hazardous substances or oil in the storm water discharge(s) from a regulated small MS4 shall be prevented or minimized in accordance with the applicable storm water management plan. This permit does not relieve the permittee of the reporting requirements of LAC 33:I.3915 and LAC 33:I.3917.

1. Emergency Notification - The permittee shall report any noncompliance which may endanger human health or the environment. As required by LAC 33:I.3915, in the event of an unauthorized discharge that does cause an emergency condition, the discharger shall notify the DPS 24-hour Louisiana Emergency Hazardous Materials Hotline by telephone at (225) 925-6595 (collect calls accepted 24 hours a day) immediately (reasonable period of time after taking prompt measures to determine the nature, quantity, and potential off-site impact of a release, considering the exigency of the circumstances), but in no case later than one hour after learning of the discharge. (An emergency condition is any condition which could reasonably be expected to endanger the health, safety of the public, cause significant adverse impact to the land, water, or air environment, or cause severe damage to property.) Notification required by this section will be made regardless of the amount of discharge. A written submission shall be provided within seven calendar days of the time the permittee becomes aware of the circumstances. The Written Notification Reports shall be **either faxed to** (225) 219-4044 or (225) 219-3695, **or mailed to** the Louisiana Department of Environmental Quality, ATTN: Inspections Division SPOC, Unauthorized Discharge Notification Report, P.O. Box 4312, Baton Rouge, LA 70821-4312. The Written Notification Report shall contain the following information:

a. the name, address, telephone number, Agency Interest (AI) number assigned by the Department, and any other applicable identification numbers of the person, company, or other party who is filing the written report, and specific identification that the report is the written follow-up report required by LAC 33:IX.2925; a description of the noncompliance and its cause;

b. the time and date of prompt notification, the state official contacted when reporting, the name of the person making that notification, and identification of the site/location or facility, vessel, transport vehicle, or storage area from which the unauthorized discharge occurred;

c. date(s), time(s), and duration of the unauthorized discharge and, if not corrected, the anticipated time it is expected to continue;

d. details of the circumstances (unauthorized discharge description and root cause) and events leading to any unauthorized discharge, including incidents of loss of sources of radiation, and if the release point is subject to a permit. If applicable, the current permitted limit for the pollutant(s) released, the permitted release point/outfall ID, and which limits were exceeded (PAH limit, BTEX limit, chlorine limit, etc.);

e. the common or scientific chemical name of each specific pollutant that was released as the result of an unauthorized discharge, including the CAS number and U.S. Department of Transportation hazard classification, and the best estimate of amounts of any or all released pollutants (total amount of each compound expressed in pounds, including calculations);

f. a statement of the actual or probable fate or disposition of the pollutant or source of radiation and what off-site impact resulted;

g. remedial actions taken, or to be taken, to stop unauthorized discharges or to recover pollutants or sources of radiation;

h. procedures or measures which have been or will be adopted to prevent recurrence of the incident or similar incidents, including incidents of loss of sources of radiation;

i. if an unpermitted or unlicensed site or facility is involved in the unauthorized discharge, a schedule for submitting a permit or license application to the department, or rationale for not requiring a permit or license;

j. the reporting party's status (former or present owner, operator, disposer, etc.);

k. all information of which the reporting party is aware that indicates pollutants are migrating, including, but not limited to, monitoring well data; possible routes of migrations; and all information of which the reporting

party is aware regarding any public or private wells in the area of the migration used for drinking, stock watering, or irrigation;

l. what other agencies were notified;

m. the names of all other responsible parties of which the reporting party is aware;

n. a determination by the discharger of whether or not the discharge was preventable, or if not, an explanation of why the discharge was not preventable;

o. the extent of injuries, if any; and

p. the estimated quantity, identification, and disposition of recovered materials, if any.

2. Prompt Notification - As required by LAC 33:I.3917, in the event of an unauthorized discharge that exceeds a reportable quantity specified in LAC 33:I.Subchapter E, but does not cause an emergency condition, the discharger shall promptly notify the Office of Environmental Compliance, Surveillance Division, SPOC within 24 hours after learning of the discharge. Prompt notification can be provided within a period not to exceed 24 hours and shall be given to the Office of Environmental Compliance SPOC. Notification can be made by email or orally utilizing any **one** of the following procedures: (1) use the Online Incident Reporting screens and procedures found at www.deq.louisiana.gov/portal/tabid/279/Default.aspx.; (2) use a direct email addressed to spillcomplaint@deq.state.la.us; or (3) verbally notify LDEQ by calling the LDEQ Hotline at (225) 342-1234, which is manned 24 hours a day, 7 days a week, or by calling the LDEQ-SPOC at (225) 219-3640 which is manned during normal office hours (M-F, 8:00 am – 4:30 pm). The online notification procedure removes the need to make a verbal call to the LDEQ Hotline or the SPOC phone number and allows the notification to be submitted directly to the SPOC electronically. In accordance with LAC 33:IX.3925, the discharger must also submit a Written Notification Report within seven (7) days after submitting the 24-hour electronic or verbal notification of any unauthorized discharge. Written Notification Reports may be either faxed or mailed to the LDEQ, Office of Environmental Compliance, Inspections Division. Written Notification Reports should be **either faxed to** (225) 219-4044 or (225) 219-3695, **or mailed to** the Louisiana Department of Environmental Quality, ATTN: Surveillance Division SPOC, Unauthorized Discharge Notification Report, P. O. Box 4312, Baton Rouge, LA 70821-4312.

3. The State Administrative Authority may waive the written report required above, on a case-by-case basis if the oral report has been received within 24 hours.

4. The storm water management plan required under Part IV of this permit must be modified within 14 calendar days of knowledge of the release to: provide a description of the release, the circumstances leading to the release, and the date of the release. In addition, the plan must be reviewed to identify measures to prevent the recurrence of such releases and to respond to such releases, and the plan must be modified where appropriate.

D. Spills

The permit does not authorize the discharge of hazardous substances or oil resulting from spills. Nor does the permit authorize the discharge of any other substance resulting from a spill event. All reasonable steps must be taken to minimize or prevent any adverse effects on human health or the environment resulting from such spills.

PART IV
STORM WATER MANAGEMENT PROGRAMS

A. Requirements

Within five years following **initial** authorization under the permit, you must develop, implement, and enforce a storm water management program.

Operators Applying for Initial Permit Coverage:

Operators who apply for initial permit coverage under the re-issued general permit must develop and implement a storm water management plan within five years following initial authorization under the general permit. While full program implementation may take up to five years, credible progress in implementing existing, partial or interim programs must be made during the term of the permit (e.g., initial illicit discharge and public education programs should be able to be launched within the first year of permit coverage).

Currently Permitted Operators:

Operators who were permitted more than five years prior to the effective date of this reissued general permit are required to have fully developed and implemented a storm water management plan. Operators who received initial coverage under the previous general permit within the last five years are required to have fully developed and implemented a storm water management plan within five years from the date of their initial coverage. Deadlines for complete program development and implementation are not extended with each general permit reissuance.

The storm water management program (SWMP) shall be described in detail in a written storm water management plan (SWMP). The storm water management plan shall be designed to reduce the discharge of pollutants from your small municipal separate storm sewer system to the maximum extent practicable (MEP), to protect water quality, and to satisfy the appropriate water quality requirements of the Louisiana Environmental Quality Act and the Clean Water Act.

The Storm Water Management Program shall cover the term of the permit and shall be updated as necessary, or as required by the Secretary or his designee, to ensure compliance with the statutory requirements of LAC 33:IX.2523 and Section 402(p)(3)(B) of the Act. Modifications to the Storm Water Management Program shall be made in

accordance with Parts IV.E and VI.W. Compliance with the Storm Water Management Program and any schedules required by the permit shall be deemed compliance with Parts IV.A and IV.D. The Storm Water Management Program, and all updates made in accordance with Part IV.E, are hereby incorporated by reference.

Your storm water management program must include the minimum control measures described below in Section C of this Part.

Program development resources are available through the EPA web site at http://cfpub.epa.gov/npdes/stormwatermonth.cfm. Guidance on Minimum Measures and Measurable Goals and a menu of BMPs are available on the EPA's main storm water program page which is located at http://cfpub.epa.gov/npdes/stormwater/swphases.cfm. Other important MS4-related information is available on the EPA website at http://cfpub.epa.gov/npdes/ whatsnew.cfm?program_id=6. Information related to BMPs that may be used to satisfy the requirements of the six Minimum Control Measures required by Part IV.D of the permit are provided at http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm?action=min_measure&min_measure_id=1.

B. Responsibilities of Co-permittees

Each permittee shall contribute to the development, revision and implementation of a comprehensive Storm Water Management Program (SWMP) including pollution prevention measures, treatment or removal techniques, storm water monitoring, use of legal authority, and other appropriate means to control the quality of storm water discharged from the Municipal Separate Storm Sewer System. Each permittee shall enforce the elements of the Storm Water Management Program required by this permit and as described within the SWMP document(s). Existing permittees with fully developed Storm Water Management Programs shall continue to implement the program and enforce the elements of the Storm Water Management Program specifically required by this permit to control the discharge of pollutants to the maximum extent practical (MEP). Existing permittees with fully developed programs shall also continue to revise the SWMP as necessary. Implementation of the Storm Water Management Program may be achieved through participation with other permittees, public agencies, or private entities in cooperative efforts to satisfy the requirements of Part IV in lieu of creating duplicate program elements for each individual permittee. You must describe in writing any participation in a cooperative effort and explain how that cooperative effort fulfills any of your Part IV permit requirements. Where a separate MS4 operator is contributing to implementation of the SWMP, the SWMP must clearly define the minimum measure and components(s) each entity agrees to implement and within which MS4 area(s). The Storm Water Management Program, taken as a whole, shall achieve the "effective prohibition on the discharge of non-storm water" and "MEP" standards from LAC 33:IX.2523 and Section 402(p)(3)(B) of the Act.

The Storm Water Management Program shall be implemented in accordance with Section 402(p)(3)(B) of the Act, and the LPDES Storm Water Regulations (LAC 33:IX.2511).

Controls and activities in the Storm Water Management Program shall identify areas of permittee responsibility on a jurisdiction, applicability, or specific area basis. The Storm Water Management Program shall include controls necessary to effectively prohibit the discharge of non-storm water into municipal separate storm sewers and reduce the discharge of pollutants from the Municipal Separate Storm Sewer System to the Maximum Extent Practicable (MEP).

C. Legal Authority

1. Traditional MS4s, such as Cities, Towns, and Parishes

Within one year from the effective date of this permit, dischargers permitted under a previous version of the general permit shall review and, if needed, initiate a revision of its relevant ordinance(s) or other regulatory mechanism(s) **or** shall adopt a new ordinance(s) or other regulatory mechanism(s) that provides the permittee with adequate legal authority to control pollutant discharges into and from its MS4 in order the meet the requirements of Part IV.D of this permit. If necessary, relevant ordinance(s) shall be revised no later than two years from the effective date of this permit. New operators without an appropriate ordinance or other regulatory mechanism shall establish a plan to adopt an ordinance prior to submittal of a Notice of Intent. New operators must adopt such an ordinance within two years of receiving notification of coverage.

2. Non-traditional MS4s, such as Transportation Entities

Where the permittee lacks the authority to develop ordinances or to implement enforcement actions, the permittee shall exert enforcement authority as required by this general permit for its facilities, employees, contractors, and other entities over which it has operation control, within the portion of the UA under jurisdiction of the permittee. If the permittee does not have enforcement authority and is unable to meet the goals of this permit through its own powers, then the permittee shall:

a. Enter into inter-jurisdictional agreements with municipalities where the small MS4 is located. These inter-jurisdictional agreements must state the extent to which the municipality will be responsible for enforcement in order to meet the conditions of this general permit; or,

b. If it is not feasible for the permittee to enter into inter-jurisdictional agreements, the permittee shall notify an adjacent MS4 operator with enforcement authority or the LDEQ's Regional Office as needed to report discharges or incidents for which it cannot itself take enforcement action.

D. Minimum Control Measures

You must provide a rationale for how and why you selected each of the BMPs and measurable goals for your storm water management program.

In addition to providing the rationale described above, your storm water management program must include the following information for each of the six minimum control measures described below.

- The best management practices (BMPs) that you or another entityare implementing, or will implement (for operators permitted less than 5 years ago), for each of the storm water minimum control measures;
- The measurable goals for each of the BMPs including, as appropriate, the months and years in which you have taken, or will undertake required actions, interim milestones and the frequency of the action; and
- The person or persons responsible for implementing or coordinating the BMPs for your storm water management program.

The six (6) minimum control measures to be included in your storm water management program are:

1. Public Education and Outreach on Storm Water Impacts

a. You must:

(1) implement a public education program to distribute educational materials to the community or conduct equivalent outreach activities about the impacts of storm water discharges on water bodies and the steps that the public can take to reduce pollutants in storm water runoff.

(2) identify each individual BMP and its corresponding measurable goal that you use in your public education and outreach program that is designed to minimize the discharge of pollutants into your MS4.

(3) describe how you inform individuals and households about the steps they can take to reduce storm water pollution.

(4) describe how you inform individuals and groups on how to become involved in the storm water program (with activities such as local stream and beach restoration activities.)

(5) identify the target audiences for your education program who are likely to have significant storm water impacts (including commercial, industrial and institutional entities) and why those target audiences were selected.

(6) identify the target pollutant sources your public education program is designed to address.

(7) identify your outreach strategy, including the mechanisms (e.g., printed brochures, newspapers, media, workshops, etc.) you use to reach your target audiences, and how many people do you expect to reach by your outreach strategy over the permit term.

(8) identify who is responsible for overall management and implementation of your storm water public education and outreach program and, if different, who is responsible for each of the BMPs identified for your storm water public education and outreach program.

(9) describe how you evaluate the success of this minimum measure, including how you selected the measurable goals for each of the BMPs.

b. Recommendations:

(1) use storm water educational materials locally developed or provided by: i) the EPA (refer to http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm?action=min_measure&min_measure_id=1), ii) the LDEQ (http://www.deq.louisiana.gov/portal/tabid/2953/Default.aspx), iii) environmental, public interest or trade organizations (refer to http://www.stormwaterauthority.org/library/library.aspx?id=199; http://www.smartgrowth.org/Default.asp?res=800), and/or iv) other MS4s;

(2) inform individuals and groups how to become involved in local stream and beach restoration activities as well as activities that are coordinated by youth service and conservation corps or other citizen groups;

(3) tailor your program, using a mix of locally appropriate strategies, to target specific audiences and communities. You should target some of the materials or outreach programs to be directed toward targeted groups of commercial, industrial, and institutional entities likely to have significant storm water impacts. For example, providing information to restaurants on the impact of grease clogging storm drains and to garages on the impact of oil discharges; and

(4) tailor your outreach program to address the viewpoints and concerns of all communities, particularly minority and disadvantaged communities, as well as any special concerns relating to children.

2. Public Involvement/Participation

a. You must:

(1) at a minimum, comply with State and local public notice requirements when implementing a public involvement/participation program.

(2) identify each individual BMP and its corresponding measurable goal that you use in your public involvement/participation program that is designed to minimize the discharge of pollutants into your MS4.

(3) describe how you involve the public in the development and submittal of your NOI and storm water management program. *(You are strongly encouraged to make the storm water management plan and Annual Reports available for review/comment at the local level prior to submittal to LDEQ.)*

(4) describe how you actively involve the public in the development of your storm water program. *(You are strongly encouraged to make updates to the storm water management plan and Annual Reports available for review/comment at the local level prior to submittal to LDEQ.)*

(5) identify the target audiences for your public involvement program. You are encouraged to actively involve all potentially affected stakeholder groups, including commercial and industrial businesses, trade associations, environmental groups, homeowners associations, and educational organizations, among others.

(6) identify and describe the types of public involvement activities included in your program. Where appropriate, consider the following types of public involvement activities:

i. Citizen representatives on a storm water management panel;
ii. Public hearings;
iii. Working with citizen volunteers willing to educate others about the program; and
iv. Volunteer monitoring or stream/beach clean-up activities.

(7) identify who is responsible for the overall management and implementation of your storm water public involvement/participation program and, if different, who is responsible for each of the BMPs identified for this program.

(8) describe how you evaluate the success of this minimum control measure, including how you selected the measurable goals for each of the BMPs.

b. Recommendations:

(1) use storm water educational materials locally developed or provided by: i) the EPA (refer to http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm?action=min_measure&min_measure_id=3), ii) the LDEQ (http://www.deq.louisiana.gov/portal/tabid/2953/Default.aspx), iii) environmental, public interest or trade organizations (refer to http://www.stormwaterauthority.org/assets/EPA%20Public%20Involvement%20&%20Participation.pdf), and/or iv) other MS4s; and

(2) include the public in developing, implementing, and reviewing your storm water management program and make efforts to reach out and engage all economic and ethnic groups. Opportunities for members of the public to participate in program development and implementation include serving as citizen representatives on a local storm water management panel, attending public hearings, working as citizen volunteers to educate other individuals about the program, assisting in program coordination with other pre-existing programs, or participating in volunteer monitoring efforts. (Citizens should obtain approval where necessary for lawful access to monitoring sites.)

3. Illicit Discharge Detection and Elimination

a. You must:

(1) develop, implement and enforce a program to detect and eliminate illicit discharges (as defined at LAC 33:IX.2511.B.2) into your small MS4;

(2) develop, if not already completed, a storm sewer system map, showing the location of all outfalls and the names and location of all waters of the State that receive discharges from those outfalls;

(3) to the extent allowable under State or local law, effectively prohibit, through ordinance, or other regulatory mechanism, non-storm water discharges into your storm sewer system and implement appropriate enforcement procedures and actions;

(4) develop, if not already completed, and implement a plan to detect and address non-storm water discharges, including illegal dumping, to your system;

(5) inform public employees, businesses, and the general public of hazards associated with illegal discharges and improper disposal of waste;

(6) **address the following categories of non-storm water discharges or flows only if you identify them as significant contributors of pollutants to your small MS4**: water line flushing, landscape irrigation, rising ground waters, uncontaminated ground water infiltration (as defined at 40 CFR 35.2005(20)), uncontaminated pumped ground water, incidental discharges of potable water (e.g. drinking fountain overflows), foundation drains, air conditioning condensate, irrigation water, springs, water from crawl space pumps, footing drains, lawn watering runoff, water from individual residential car washing, flows from riparian habitats and wetlands, de-chlorinated swimming pool discharges, residual street wash water, and discharges or flows from fire fighting activities (excludes predictable and controllable discharges from a fire fighting training facility), where such discharges will not cause a problem either due to the nature of the discharge or controls the MS4 places on the discharge. Significant contributors of pollutants from the above sources may require additional controls, such as enhanced public education, ordinances, or other regulatory mechanisms (to be implemented by the operator); and

(7) **develop a list of other similar occasional incidental non-storm water discharges (e.g. non-commercial or charity car washes, etc.) that will not be addressed as illicit discharges.** These non-storm water discharges must not be reasonably expected (based on information available to the permittees) to be significant sources of pollutants to the Municipal Separate Storm Sewer System, because of either the nature of the discharges or conditions you have established for allowing these

discharges to your MS4 (e.g., a charity car wash with appropriate controls on frequency, proximity to sensitive waterbodies, BMPs on the wash water, etc.). You must document in your SWMP any local controls or conditions placed on the discharges. You must include a provision prohibiting any individual non-storm water discharge that is determined to be contributing significant amounts of pollutants to your MS4.

b. You must identify each individual BMP and its corresponding measurable goal that you use in your illicit discharge detection and elimination program that is designed to minimize the discharge of pollutants into your MS4. You must include, at a minimum, the following information:

(1) describe how you will develop or have developed a storm sewer map showing the location of all outfalls and the names and location of all receiving waters. Describe the sources of information you used for the maps, and how you plan to verify the outfall locations with field surveys. Permittees that are required to have completed their storm sewer maps must describe how they developed this map and how the map will be regularly updated.

(2) describe the mechanism (ordinance or other regulatory mechanism) you use to effectively prohibit illicit discharges into the MS4 and why you chose that mechanism. If you need to develop this mechanism, describe your plan and a schedule to do so in accordance with Part IV.C. Permittees that are required to have already developed an ordinance or other regulatory mechanism must include a copy of the relevant section(s) with your SWMP.

(3) describe how you ensure t that your illicit discharge ordinance (or other regulatory mechanism) is implemented through appropriate enforcement procedures and actions.

(4) describe your plan to detect and address illicit discharges to your system, including discharges from illegal dumping and spills. Your plan must include dry weather field screening for non-storm water flows and field tests of selected chemical parameters as indicators of discharge sources. Your plan must also address on-site sewage disposal systems that flow into your storm drainage system. Your description must address, at a minimum, the following:

i. Procedures for locating priority areas, which includes areas with higher likelihood of illicit connections (e.g., areas with older sanitary sewer lines, for example), or ambient sampling to locate impacted reaches.

ii. Procedures for tracing the source of an illicit discharge, including the specific techniques you will use to detect the location of the source.

iii. Procedures for removing the source of the illicit discharge.

iv. Procedures for program evaluation and assessment.

(5) describe how you inform public employees, businesses, and the public of hazards associated with illegal discharges and improper disposal of waste. Include in your description how this plan will coordinate with your public education minimum measure and your pollution prevention/good housekeeping minimum measure programs.

(6) identify who is responsible for overall management and implementation of your storm water illicit discharge detection and elimination program and, if different, who is responsible for each of the BMPs identified for this program.

(7) describe how you evaluate the success of this minimum measure, including how you selected the measurable goals for each of the BMPs.

c. Recommendations:

(1) use storm water educational materials locally developed or provided by: i) the EPA (refer to http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm?action=min_measure&min_measure_id=3), ii) the LDEQ (http://www.deq.louisiana.gov/portal/tabid/2953/Default.aspx), iii) environmental, public interest or trade organizations (refer to http://cfpub.epa.gov/npdes/stormwater/casestudies.cfm and http://cwp.org.master.com/texis/master/search/+/form/New_IDDE.html), and/or iv) other MS4s; and

(2) conduct visual screening of the outfalls during dry weather and conduct field tests of selected pollutants as part of the procedures for locating priority areas.

4. Construction Site Storm Water Runoff Control

a. You must:

(1) Develop, implement, and enforce a program to reduce pollutants in any storm water runoff to your small MS4 from construction activities that result in a land disturbance of greater than or equal to one acre. Reduction of storm water discharges from construction activity disturbing less than one acre must be included in your program if that construction activity is part of

a larger common plan of development or sale that would disturb one acre or more. The extent to which the program will rely upon the LPDES Phase II Construction regulation should be specified.

(2) Your program must include the development and implementation of, at a minimum:

(a) an ordinance or other regulatory mechanism to require erosion and sediment controls, as well as sanctions to ensure compliance, to the extent allowable under State or local law;

(b) requirements for construction site operators to implement appropriate erosion and sediment control best management practices;

(c) requirements for construction site operators to control waste such as, but not limited to, discarded building materials, concrete truck washout (see EPA guidance at http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm?action=browse&Rbutton=detail&bmp=117), chemicals, litter, and sanitary waste at the construction site that may cause adverse impacts to water quality;

(d) procedures for site plan review which incorporate consideration of potential water quality impacts;

(e) procedures for receipt and consideration of information submitted by the public; and

(f) procedures for site inspection and enforcement of control measures.

(3) You must identify each individual BMP and its corresponding measurable goal that you use in your construction site storm water runoff control program that is designed to minimize the discharge of pollutants into your MS4. You must include, at a minimum, the following information:

(a) The mechanism (ordinance or other regulatory mechanism) you use to require erosion and sediment controls at construction sites and why you chose that mechanism. If you need to develop this mechanism, describe your plan and a schedule to do so in accordance with Part IV.C. Permittees that are required to have already developed an ordinance or other regulatory mechanism must include a copy of the relevant section(s) with your SWMP.

(b) Your mechanismsto ensure compliance with your erosion and sediment control mechanisms, including the sanctions and enforcement actions. Describe your procedures for determining which sanctions will apply to which infractions (such as your enforcement escalation process). Possible sanctions include non-monetary penalties (such as stop work orders and/or permit denials for non-compliance), as well as monetary penalties such as fines and bonding requirements.

(c) Your requirements for construction site operators to implement appropriate erosion and sediment control BMPs and to control waste at construction sites that may cause adverse impacts to water quality. Examples of such waste might include discarded building materials, concrete truck washout, chemicals, litter and sanitary waste.

(d) Your procedures for site plan review, including the review of pre-construction site plans, which incorporate consideration of potential water quality impacts. Describe your procedures and the rationale for how you will identify certain sites for site plan review, if your site plan review does not include the review of all pre-construction site plans.

(e) Your procedures for receipt and consideration of information submitted by the public. Consider coordinating this requirement with your public education program.

(f) Your procedures for site inspection and enforcement of control measures, including how you will prioritize sites for inspection. Include procedures for site inspections and enforcement of control measures including steps to identify priority sites for inspection and enforcement based on the nature of the construction activity, topography, and the characteristics of soils and receiving water quality.

(g) Who is responsible for overall management and implementation of your construction site storm water control program and, if different, who is responsible for each of the BMPs identified for this program.

(h) Describe how you evaluate the success of this minimum measure, including how you selected the measurable goals for each of the BMPs.

b. Recommendations:

(1) use storm water educational materials locally developed or provided by: the EPA (refer to http://cfpub1.epa.gov/npdes/stormwater/menuofbmps/index.cfm?action=min_measure&min_measure_id=4, http://www.epa.gov/smartgrowth/parking.htm, http://www.nrdc.org/water/pollution/rooftops/contents.asp, http://www.epa.gov/smartgrowth/stormwater.htm),the LDEQ, environmental, public interest or trade organizations, and/or other MS4s; and

(2) provide educational and training measures for construction site operators, including requiring implementing a storm water pollution prevention plan (SWPPP) at construction sites within your jurisdiction that discharge into your system.

5. Post-construction Storm Water Management in New Development and Redevelopment

a. You must:

(1) develop, implement, and enforce a program to address storm water runoff from new development and redevelopment projects that disturb greater than or equal to one acre, including projects less than one acre that are part of a larger common plan of development or sale, that discharge into your small MS4. Your program must ensure that controls are in place that would prevent or minimize water quality impacts.

(2) develop and implement strategies which include a combination of structural and/or non-structural best management practices (BMPs) appropriate for your community;

(3) use an ordinance or other regulatory mechanism to address post-construction runoff from new development and redevelopment projects to the extent allowable under State or local law; and

(4) ensure adequate long-term operation and maintenance of BMPs.

b. You must identify each individual BMP, and its corresponding measurable goal, that you use in your post-construction storm water management program that is designed to minimize the discharge of pollutants into your MS4. You must include, at a minimum, the following information:

(1) A description of your program to address storm water runoff from new development and redevelopment projects. Include in your description any specific priority areas for this program.

(2) A description of how your program isspecifically tailored for your local community, how it will minimize water quality impacts, and how it is designed to attempt to maintain pre-development runoff conditions.

(3) A description of any non-structural BMPs in your program, which may include, but is not limited to:

i. Policies and ordinances that provide requirements and standards to direct growth to identified areas, protect sensitive areas such as wetlands and riparian areas, maintain and/or increase open space (including a dedicated funding source for open space acquisition), provide buffers along sensitive water bodies, minimize impervious surfaces, and minimize disturbance of soils and vegetation;

ii. Policies or ordinances that encourage infill development in higher density urban areas, and areas with existing storm sewer infrastructure;

iii. Education programs for developers and the public about project designs that minimize water quality impacts; and

iv. Other measures such has minimization of the percentage of impervious area after development, use of measures to minimize directly connected impervious areas, and source control measures often thought of as good housekeeping, preventive maintenance and spill prevention.

(4) Any structural BMPs in your program, which may include, but is not limited to:

i. Storage practices such as wet ponds and extended-detention outlet structures;

ii. Filtration practices such as grassed swales, bioretention cells, sand filters and filter strips; and

iii. Infiltration practices such as infiltration basins and infiltration trenches.

(5) Describe the mechanism (ordinance or other regulatory mechanism) you use to address post-construction runoff from new development and why did you choose that mechanism. If you need to develop a mechanism, describe your plan and a schedule to do so in accordance with Part IV.D. If your ordinance or regulatory mechanism is already developed, include a copy of the relevant sections with your program.

(6) Describe how you ensure the long-term operation and maintenance (O&M) of your selected BMPs. Options to help ensure that future O&M responsibilities are clearly identified include an agreement between you and another party such as the post-development landowners or regional authorities.

(7) Describe who is responsible for overall management and implementation of your post-construction storm water management program and, if different, who is responsible for each of the BMPs identified for that control measure.

(8) Describe how you evaluate the success of this minimum measure, including how you selected the measurable goals for each of the BMPs.

c. Recommendations:

(1) use storm water educational materials locally developed or provided by: i) the EPA (refer to http://cfpub1.epa.gov/npdes/stormwater/menuofbmps/index.cfm?action=min_measure&min_measure_id=4, http://www.epa.gov/smartgrowth/parking.htm, http://www.nrdc.org/water/pollution/rooftops/contents.asp, and http://www.epa.gov/smartgrowth/stormwater.htm), ii) the LDEQ, iii) environmental, public interest or trade organizations, and/or iv) other MS4s;

(2) when choosing appropriate BMPs, participate in locally-based watershed planning efforts, which attempt to involve a diverse group of stakeholders including interested citizens. When developing a program that is consistent with this measure's intent, LDEQ recommends that you adopt a planning process that identifies the municipality's program goals (e.g., minimize water quality impacts resulting from post-construction runoff from new development and redevelopment), implementation strategies (e.g., adopt a combination of structural and/or non-structural BMPs), operation and maintenance policies and procedures, and enforcement procedures;

(3) when developing your program, consider assessing existing ordinances, policies, programs and studies that address storm water runoff quality. In addition to assessing these existing documents and programs, you should

provide opportunities to the public to participate in the development of the program;

(4) ensure the appropriate implementation of the structural BMPs by considering some or all of the following: pre-construction review of BMP designs; inspections during construction to verify BMPs are built as designed; post-construction inspection and maintenance of BMPs; and penalty provisions for the noncompliance with preconstruction BMP design; failure to construct BMPs in accordance with the agreed upon pre-construction design; and ineffective post-construction operation and maintenance of BMPs; and

(5) ensure that your requirements be responsive to the constantly changing storm water technologies, developments or improvements in control technologies.

6. Pollution Prevention/Good Housekeeping for Municipal Operations

a. You must:

(1) develop and implement an operation and maintenance program that includes a training component and has the ultimate goal of preventing or reducing pollutant runoff from municipal operations.

(2) using training materials that are available from EPA, LDEQ, or other organizations, your program must include employee training to prevent and/or reduce storm water pollution from activities such as park and open space maintenance, fleet and building maintenance, new construction and land disturbances, and storm water system maintenance.

(3) Describe how your operation and maintenance program is designed to prevent or reduce pollutant runoff from your municipal operations. Your program must specifically list the municipal operations that are impacted by this operation and maintenance program.

(4) Include a list of industrial facilities you own or operate that are subject to the LPDES Multi-Sector General Permit (MSGP) or individual LPDES permits for discharges of storm water associated with industrial activity that ultimately discharge to your MS4. Include the LPDES permit number or a copy of the industrial NOI for each facility.

(5) Describe any government employee training program you will use to prevent and reduce storm water pollution from activities such as park and open space maintenance, fleet and building maintenance, new

construction and land disturbances, and storm water system maintenance.

i. Describe any existing available materials you plan to use.
ii. Describe how this training program will be coordinated with the outreach programs developed for the public information minimum measure and the illicit discharge minimum control measure.

(6) Your program description must specifically address the following areas:

i. Maintenance activities, maintenance schedules, and long-term inspection procedures for controls to reduce floatables and other pollutants to your MS4.
ii. Controls for reducing or eliminating the discharge of pollutants from streets, roads, highways, municipal parking lots, maintenance and storage yards, waste transfer stations, fleet or maintenance shops with outdoor storage areas, and salt/sand storage locations and snow disposal areas you operate.
iii. Procedures for the proper disposal of waste removed from your MS4 and your municipal operations, including dredge spoil, accumulated sediments, floatables, and other debris.
iv. Procedures to ensure that flood management projects are assessed for impacts on water quality and existing projects are assessed for incorporation of additional water quality protection devices or practices.

(7) Describe who is responsible for overall management and implementation of your pollution prevention/good housekeeping program and, if different, who is responsible for each of the BMPs utilized in your pollution prevention/good housekeeping program.

(8) Describe how you evaluate the success of this minimum control measure, including how you selected the measurable goals for each of the BMPs.

b. Recommendations:

(1) use storm water educational materials locally developed or provided by: i) the EPA (refer to http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm?action=min_measure&min_measure_id=6, http://www.epa.gov/smart growth/parking.htm, http://www.nrdc.org/water/pollution/rooftops/ contents.asp, and http://www.epa.gov/smartgrowth/stormwater.htm), ii) the LDEQ, iii) environmental, public interest or trade organizations, and/or iv) other MS4s.

E. Reviewing and Updating Your Storm Water Management Program

You must do an annual review of your Storm Water Management Program in conjunction with preparation of the annual report required under Part V.C. You may change your Storm Water Management Program during the term of the permit in accordance with the following procedures:

1. Changes adding (but not subtracting or replacing) components, controls, or requirements to the Storm Water Management Program may be made at any time. For example, including new public education components or increasing the frequency of outfall inspections would be considered an addition. You must update your storm water management plan to include the changes. All changes shall be reported in the next annual report that is prepared and submitted to LDEQ.

2. Changes replacing an ineffective or unfeasible BMP identified in the Storm Water Management Program with an alternate BMP may be made at any time. For example, revising an ordinance or changing the parameters and sampling frequencies in the monitoring program would be considered a replacement. You must update your storm water management plan to incorporate the changes. All changes shall be reported in the next annual report that is prepared and submitted to LDEQ. Your SWMP update and annual report to LDEQ must include documentation of the following:

   (a) An analysis of why the BMP is ineffective or infeasible (including cost prohibitive),

   (b) Expectations on the effectiveness of the replacement BMP, and

   (c) An analysis of why the replacement BMP is expected to achieve the goals of the BMP to be replaced.

The Permitting Authority may require changes to the Storm Water Management Program as needed to:

1. Address impacts on receiving water quality caused, or contributed to, by discharges from the Municipal Separate Storm Sewer System;

2. Include more stringent requirements necessary to comply with new Federal statutory or regulatory requirements;

3. Include such other conditions deemed necessary by the Permitting Authority to comply with the goals and requirements of the Clean Water Act; or

4. Changes requested by the Permitting Authority must be made in writing, set forth the time schedule for you to develop the changes, and offer you the opportunity to propose alternative program changes to meet the objective of the requested modification. All changes required by the Permitting Authority will be made in accordance with LAC 33.IX.307, LAC 33.IX.2903, or as appropriate LAC 33.IX.2905.

You must implement the Storm Water Management Program on all new areas added to your portion of the municipal separate storm sewer system (or for which you become responsible for implementation of storm water quality controls) as expeditiously as practicable, but not later than one year from addition of the new areas. Implementation may be accomplished in a phased manner to allow additional time for controls that cannot be implemented immediately.

1. Within 90 days of a change of ownership, operational authority, or responsibility for storm water management program implementation, you must have a plan for implementing your Storm Water Management Program on all affected areas. The plan may include schedules for implementation. Information on all new annexed areas and any resulting updates required to the Storm Water Management Program must be included in the annual report.

2. Only those portions of the Storm Water Management Program specifically required as permit conditions shall be subject to the modification requirements of LAC 33.IX.307. *Addition of components, controls, or requirements by the permittee(s) and replacement of an ineffective or infeasible BMP implementing a required component of the Storm Water Management Program with an alternate BMP expected to achieve the goals of the original BMP shall be considered minor changes to the Storm Water Management Program and not modifications to the permit.*

F. Qualifying State or Local Programs (QLP)

Any municipality, including Small MS4s, may have its construction storm water program recognized as a QLP by LDEQ. A QLP is an LDEQ-approved program that fulfills the State LPDES program requirements for small construction activities stated in Parts IV.D4 and D.5. A local program can be recognized as a QLP if it meets or exceeds the

minimum requirements outlined in the regulations (LAC 33:IX.2707.R) and the program is reviewed by LDEQ and is officially authorized as a recognized QLP. The provisions stated in LAC 33:IX.2707.R offer an opportunity to streamline administrative requirements in the storm water program by formally recognizing local construction management programs that meet or exceed the provisions in LDEQ's construction general permits. Under such a scenario, a construction site operator, responsible for a project within the jurisdiction of a recognized municipality, would follow that municipality's requirements for storm water management.

LDEQ will consider whether an MS4's construction program meets or exceeds the requirements contained in LDEQ's construction general permits and whether the MS4 has the institutional capacity to take on the delegated regulatory responsibilities when considering a municipality's proposal to have its construction program recognized as an LDEQ-approved QLP. More information related to a QLP is available on the EPA's website at http://www.epa.gov/npdes/pubs/glp_memo.pdf.

G. Sharing Responsibility

If you are relying on another governmental entity that is regulated under LAC 33:IX.2511 of the storm water regulations to satisfy one or more of your permit obligations, you must note that fact in your NOI. This other entity must, in fact, implement the control measure(s); the measure of component thereof, must be at least as stringent as the corresponding LPDES permit requirement; and the other entity must agree to implement the control measure on your behalf.

If the other entity agrees to implement the control measure on your behalf, you must have a written acceptance of this obligation. The written agreement must be maintained as part of the description of your storm water management program. Should the other entity fail to implement the minimum control measure on your behalf, you remain liable for any discharges due to their failure to implement the minimum control measure.

If the other entity agrees to report on the minimum measure that it agrees to implement then the permittee must supply the other entity with the reporting requirements contained in Part V.C of this permit. Should the other entity fail to report in accordance with Part V.C on your behalf, you remain liable for failure to report any of the information required by Part V.C.

H. Discharges to Water Quality Impaired Waterbodies

Impaired Water Bodies Without an Established TMDL

If your MS4 discharges into a receiving water which has been listed on the LDEQ Section 303(d) List of Impaired Waters, a TMDL has not yet been approved, and the suspected source(s) of the impairment include discharges from MS4s, you must determine, within one year of the effective date of the permit, if the MS4 is a source of the pollutant(s). Monitoring for pollutants of concern is highly encouraged in order to establish the loading from the MS4, identify specific areas or sources of concern, and assess the effectiveness of the selected controls over time. If sources are identified, the permittee must develop appropriate storm water control measures or BMPs that will reduce the discharge of the pollutants of concern. You must describe in your SWMP how the BMPs and other controls selected will reduce the discharge of the pollutant(s) of concern. This discussion must specifically identify control measures and BMPs that will collectively control the discharge of the pollutants of concern to ensure that discharges will not cause or contribute to in-stream exceedances of water quality standards. Targeted BMPs shall be included in the SWMP no later than two years after the effective date of the permit. Report the progress on the implementation of the selected BMPs in your annual reports, thereafter. The MS4 operator may select one or more of the recommended control measures in the following section or develop other controls, as appropriate.

Impaired Water Bodies with an Approved TMDL

If a Waste Load Allocation (WLA) has been assigned to discharges of a particular pollutant from your MS4 to a particular basin subsegment:

1. You must include specific and measurable goals in your SWMP targeting the pollutant(s) of concern. Include details, such as identifying areas of focused effort or implementing additional control measures or BMPs that will reduce the pollutant(s) of concern. A schedule for implementing each targeted control shall be included in the SWMP.

2. The permittees shall adopt any assigned Waste Load Allocations (WLAs) as a benchmark goal in the SWMP. The benchmark goal is not a permit limit, but shall be used to measure the progress towards achieving pollutant reductions from the MS4. If the benchmark goal is met, the permittee shall maintain the

control measures, BMPs, or other pollutant reduction programs necessary to ensure the goal will continue to be met.

3. If applicable, the permittee must comply with monitoring or compliance schedules established in the TMDL.

4. The permittees shall select one or more of the following recommended controls, or develop other controls that may best achieve the pollutant reduction goals. The following storm water control measures address nutrient, dissolved oxygen, sediment, and/or bacteria impairments.

   a. Prioritize the detection and elimination of illicit discharges contributing the pollutant(s) of concern to the MS4.

   b. Implement public education measures to reduce the discharge of bacteria and nutrients contributed by pets, livestock, and zoos.

   c. Implement a public education program to reduce the discharge of nutrients from the over application of residential and commercial fertilizers.

   d. Implement programs to reduce the pollutant contributions to the MS4 from failing on-site sewage treatment systems, such as septic tanks and small package plants. Such a program could include requiring the replacement of old septic tanks, regionalization of heavily populated areas without a centralized waste treatment facility, and/or extension of existing sewage treatment lines.

   e. Implement programs to enhance the MS4's sanitary sewer systems. Such a program should address inadequate collection systems, malfunctioning lift stations, or violations of the sewage treatment plant's water discharge permit.

   f. For construction activities, require a minimum buffer zone adjacent to surface waters to reduce erosion and sediment runoff.

5. You must implement a monitoring program to determine whether the storm water controls that you have selected are adequate to meet the WLA. Each permitted MS4 must develop a monitoring program that is specific to the selected BMPs and will be an effective tool to determine if measurable goals are being met.

Document in your SWMP the reason and justification for the parameters and frequencies selected and how the monitoring program will effectively evaluate storm water controls. Monitoring programs may include, but are not limited to, the following elements:

   a. Regular visual inspections of outfalls during wet and dry weather;

   b. Regular inspections of receiving water bodies with the purpose of noting erosion or sedimentation problems;

   c. Regular inspections of storm drains, major canals, or junctions;

   d. Visual inspections of effluent samples for color, clarity, and the presence of foam, oil, debris, or noxious odors;

   e. Instantaneous (*in situ)* water quality measurements of the receiving water body, such as dissolved oxygen, temperature, pH, etc.; and

   f. Sampling and analysis of storm water discharges for pollutants of concern.

The permittee must also conduct any monitoring, including specific frequencies, required by applicable TMDLs.

6. The permittees must evaluate the effectiveness of the storm water management program and document progress towards the benchmark goal(s). The MS4 operator may utilize third party data, such as that collected by LDEQ, USGS, EPA, and volunteer organizations in the evaluation process. However, the evaluation shall not be limited to only third party data. If subsequent evaluations show that additional or modified controls are necessary to meet the WLA for a particular pollutant then you must describe the additional or modified controls that will be implemented and include a schedule for implementation. You must continue to evaluate the adequacy of the BMPs that you have implemented to meet the WLA for a particular pollutant. Make modifications to the SWMP as necessary until monitoring for a full permit cycle shows that the WLAs are being met or that the MS4 is no longer contributing to the water quality impairment.

[NOTE: You should consult the latest edition of the Louisiana Water Quality Management Plan, which is available on the LDEQ website at:

http://www.deq.louisiana.gov/portal/LinkClick.aspx?link=planning%2fWater+Quality+Management+Plan—volume+8.pdf, to determine if a Waste Load Allocation for any pollutant has been assigned to your MS4.]

Compliance with federal, state and local storm water programs revolves around the use of "best management practices" (BMPs) to manage storm water. Given the water quality and quantity benefits of smart growth at the site, neighborhood, and watershed levels, many smart growth techniques and policies are emerging as BMPs to manage storm water. Where appropriate, you are strongly encouraged to utilize principles and best management practices contained in the following publications to minimize the discharge of pollutants within watersheds:
http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm?action=factsheet_results&view=specific&bmp=124,
http://www.nrdc.org/water/pollution/storm/stoinx.asp and
http://www.epa.gov/smartgrowth/. You must document in your SWMP which smart growth practices you utilize and describe how those practices minimize the discharge of pollutants of concern to any waterbody with an established TMDL.

TMDL reports are maintained and regularly updated on the LDEQ web site at http://www.deq.louisiana.gov/portal/tabid/1563/Default.aspx .

PART V
MONITORING, RECORDKEEPING AND REPORTING

A. Monitoring

On an ongoing basis during the permit term, you must evaluate program compliance, the appropriateness of your identified best management practices, progress towards achieving your identified measurable goals, and make any necessary changes/updates to your plan. **If you discharge to a water for which a Waste Load Allocation (WLA) for a particular pollutant has been assigned to one or more of your MS4 outfalls, you are also required to develop and implement a monitoring program as described in Part IV.H.** If the permittee discharges to two or more water bodies, the monitoring requirements apply only to those outfalls located within the watershed for which the TMDL has been developed.

When conducting effluent (e.g. wet weather discharges) sampling and analysis, permitted small MS4s must comply with the following:

1. All sampling and testing shall be conducted in accordance with the test procedures approved under 40 CFR Part 136, Tables A, B, C, D, E, F, G.

2. Proper sampling techniques shall be used to ensure that analytical results are representative of pollutants in the discharge. Monitoring shall be conducted according to analytical, apparatus and materials, sample collection, preservation, handling, etc., procedures listed at 40 CFR Part 136, and in particular, Appendices A, B, and C. [LAC 33:IX.4901]

3. The flow measurement sample type for the effluent sampling shall be "estimate". Flow measurements shall not be subject to the accuracy provisions established in this permit. When collecting samples the flow value may be estimated using best engineering judgment. [LAC 33:IX.2701]

4. The permittee or designated laboratory shall have an adequate analytical quality assurance/quality control program to produce defensible data of known precision and accuracy. All quality control measures shall be assessed and evaluated on an on-going basis and quality control acceptance criteria shall be used to determine the validity of the data. All method specific quality control as prescribed in the method shall be followed. If quality control requirements are not included in the method, the permittee or designated laboratory shall follow the quality control requirements as prescribed in the Approved Edition (40 CFR Part 136)

Standard Methods for the Examination of Water and Wastes, Sections 1020A and 1020B. General sampling protocol shall follow guidelines established in the "Handbook for Sampling and Sample Preservation of Water and Wastewater, 1982"U.S. Environmental Protection Agency. This publication is available from the National Technical Information Service (NTS), Springfield, VA 22161, Phone number (800) 553-6847. Order by NTIS publication number PB-83-124503.

5. Analytical results for each sampling event at each discharge point (outfall number) described in your monitoring program must be reported on a Discharge Monitoring Report (DMR) form (EPA No. 3320-1 or an LDEQ approved substitute). Complete one DMR form per sampling event for every outfall where a sample is collected. The DMR(s) shall be submitted to LDEQ annually with the Annual Report.

6. Retain records of all monitoring information in accordance with Part V.B of this permit.

Record Content:

Records of monitoring information shall, at a minimum, include:

a. The date, exact place, and time of inspection, sampling or measurement;
b. The individual(s) who performed the inspection, sampling or measurements;
c. The results of inspections, samplings, or measurements; and
d. Calibration records for any *in situ* instruments used, such as a Hydrolab.

Records of laboratory-analyzed samples must also include:

a. The date(s) and time(s) analyses were performed;
b. The time(s) analyses were begun;
c. The individual(s) who performed the analyses;
d The analytical techniques or methods used;
e. The results of such analyses; and
f. The results of all quality control procedures.

The "Monthly Average" concentration that is reported on the DMR form is calculated using one formula when flow is not measured as a continuous record and is calculated using a different formula when flow is measured as a continuous record or with a totalizer. The two different scenarios are described as follows:

Monthly Average (also known as Daily Average), other than for fecal coliform bacteria, discharge limitations are calculated as the sum of all "daily discharge(s)" measured during a calendar month divided by the number of "daily discharge(s)" measured during that month. When the permit establishes monthly average concentration effluent limitations or conditions, and flow is measured as continuous record or with a totalizer, the monthly average concentration means the arithmetic average (weighted by flow) of all "daily discharge(s)" of concentration determined during the calendar month where C = daily discharge concentration, F = daily flow and n = number of daily samples; monthly average discharge =

$$\frac{C_1F_1 + C_2F_2 + \ldots + C_nF_n}{F_1 + F_2 + \ldots + F_n}$$

In accordance with LAC 33:IX.2503.A and B, DMRs must be signed and certified by an authorized person. Be aware the LDEQ will accept laboratory results only from "LDEQ accredited" laboratories.

B. Recordkeeping

You must retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, copies of Discharge Monitoring Reports (DMRs), a copy of the LPDES permit, and records of all data used to complete the application (NOI) for this permit, for a period of at least three years from the date of the sample, measurement, report or application, or for the term of this permit, whichever is longer. This period may be extended by request of the permitting authority at any time.

You must submit copies of DMRs to LDEQ as described in Parts V.A and V.C. You should not submit copies of other records to the permitting authority unless you are specifically asked to do so. You must retain a description of the Storm Water Management Program required by this permit (including a copy of the permit language) at a location accessible to the Permitting Authority. You must make your records, including the Notice of Intent (NOI) and the description of the Storm Water Management Program, available to the public if you receive a written request to do so.

C. Annual Report Requirements

You must submit annual reports to LDEQ by March 10 for the preceding calendar year. The Annual Reports must be postmarked no later than March 10. Your report must include:

1. The status of compliance with permit conditions, an assessment of the appropriateness of your identified best management practices, progress towards achieving the statutory goal of reducing the discharge of pollutants to the MEP, and the measurable goals for each of the minimum control measures;

2. Results of information collected and analyzed, if any, during the reporting period, including any monitoring data used to assess the success of the program at reducing the discharge of pollutants to the MEP;

3. A summary of the storm water activities you plan to undertake during the next reporting cycle (including an implementation schedule);

4. Proposed changes to your Storm Water Management Program, including changes to any BMPs or any identified measurable goals that apply to the program elements; and

5. Notice that you are relying on another government entity to satisfy some of your permit obligations (if applicable).

D. Reporting: Where and When to Submit

1. Signed copies of DMRs (**if** required under Part IV.H), the Annual Report required by Part V.C, and any other reports required herein, shall be mailed to:

Permit Compliance Unit
Office of Environmental Compliance
Louisiana Department of Environmental Quality
P. O. Box 4312
Baton Rouge, LA 70821-4312

You must submit these reports to LDEQ by March 10 for the preceding calendar year.

2. Requests concerning updates to the Storm Water Management Program, changes in monitoring locations, or application for an individual permit shall be submitted to:

Water Permits Division
Office of Environmental Services
Department of Environmental Quality
P. O. Box 4313
Baton Rouge, LA 70821-4313

PART VI
STANDARD PERMIT CONDITIONS

A. Duty to Comply

1. The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Clean Water Act and the Louisiana Environmental Quality Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application.

2. Penalties for Violations of Permit Conditions.

LA. R.S. 30:2025 provides for civil penalties for violations of these regulations and the Louisiana Environmental Quality Act. LA. R.S. 30:2076.2 provides for criminal penalties for violation of any provisions of the LPDES program or any order or any permit condition or limitation issued under or implementing any provisions of the LPDES program.

Any person may be assessed an administrative penalty by the State Administrative Authority under LA R.S. 30:2025 for violating a permit condition or limitation implementing any of the requirements of the LPDES program in a permit issued under the regulations or the Louisiana Environmental Quality Act. (Penalties are listed in their entirety in Subtitle II of Title 30 of the Louisiana Revised Statutes.)

a. Criminal Penalties

i. Negligent Violations. The Louisiana Revised Statutes LA. R.S. 30:2076.2 provides that any person who negligently violates any provision of the LPDES, or any order issued by the Secretary under the LPDES, or any permit condition or limitation implementing any such provision in a permit issued under the LPDES by the Secretary, or any requirement imposed in a pretreatment program approved under the LPDES is subject to a fine of not less than $2,500 nor more than $25,000 per day of violation, or by imprisonment for not more than 1 year, or both. If a conviction of a person is for a violation committed after a first conviction of such person, he shall be subject to a fine of not more than $50,000 per day of violation, or imprisonment of not more than two years, or both.

ii. Knowing Violations. The Louisiana Revised Statutes LA. R.S. 30:2076.2 provides that any person who knowingly violates any provision of the LPDES, or any permit condition or limitation implementing any such provisions in a permit issued under the LPDES, or any requirement imposed in a pretreatment program

approved under the LPDES is subject to a fine of not less than $5,000 nor more than $50,000 per day of violation, or imprisonment for not more than 3 years, or both. If a conviction of a person is for a violation committed after a first conviction of such person, he shall be subject to a fine or not more than $100,000 per day of violation, or imprisonment of not more than six years, or both.

iii. Knowing Endangerment. The Louisiana Revised Statutes LA. R.S. 30:2076.2 provides that any person who knowingly violates any provision of the LPDES, or any provision of the LPDES, or any order issued by the Secretary under the LPDES, or any permit condition or limitation implementing any such provisions in a permit issued under the LPDES by the Secretary, and who knows at that time that he thereby places another person in imminent danger of death or serious bodily injury, shall, upon conviction, be subject to a fine of not more than $250,000, or by imprisonment for not more than 15 years, or both. A person, which is an organization, shall, upon conviction of violating this Paragraph, be subject to a fine of not more than one million dollars. If a conviction of a person is for a violation committed after a first conviction of such person under this Paragraph, the maximum punishment shall be doubled with respect to both fine and imprisonment.

iv. False Statements. The Louisiana Revised Statutes LA. R.S. 30:2076.2 provides that any person who knowingly makes any false material statement, representation, or certification in any application, record, report, plan or other document filed or required to be maintained under the LPDES or who knowingly falsifies, tampers with, or renders inaccurate, any monitoring device or method required to be maintained under the LPDES, shall upon conviction, be subject to a fine of not more than $10,000, or by imprisonment for not more than 2 years, or both. If a conviction of a person is for a violation committed after a first conviction of such person under this subsection, he shall be subject to a fine of not more than $20,000 per day of violation, or by imprisonment of not more than 4 years, or both.

b. Civil Penalties

The Louisiana Revised Statutes LA. R.S. 30:2025 provides that any person found to be in violation of any requirement of this Subtitle may be liable for a civil penalty, to be assessed by the Secretary, an Assistant Secretary, or the court, of not more than the cost to the state of any response action made necessary by such violation which is not voluntarily paid by the violator, and a penalty of not more than $32,500 for each day of violation. However, when any such violation is done intentionally, willfully, or knowingly, or results in a discharge or disposal which causes irreparable or severe damage to the environment or if the substance discharged is one which endangers human life or health, such person may be liable for an additional penalty of not more than one million dollars.

B. Continuation of the Expired General Permit

This permit expires five years after the effective date. If the permit is not reissued or replaced prior to the expiration date, this Office will administratively extend the permit to discharge, for permittees that were covered prior to the expiration date, until such time that a new general permit is issued. Upon reissuance or replacement of this permit, the permittee must comply with the requirements for obtaining coverage under the new permit to maintain authorization to discharge.

C. Need to Halt or Reduce Activity not a Defense

It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

D. Duty to Mitigate

The permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment. The permittee shall also take all reasonable steps to minimize or correct any adverse impact on the environment resulting from noncompliance with the permit, including such accelerated or additional monitoring as necessary to determine the nature and impact of the noncomplying discharge.

E. Duty to Provide Information

The permittee shall furnish to the State Administrative Authority, within a reasonable time, any information which the administrative authority may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish to the State Administrative Authority, upon request, copies of records required to be kept by this permit.

F. Other Information

When the permittee becomes aware that it failed to submit any relevant facts in a permit application or submitted incorrect information in the Notice of Intent or in any other report to the State Administrative Authority, the permittee shall promptly submit such facts or information.

G. Signatory Requirements

All storm water management plans, storm water pollution prevention plans, reports, certifications or information either submitted to the State Administrative Authority or that this permit requires be maintained by the permittee, shall be signed and certified.

All reports required by the permit and other information requested by the State Administrative Authority shall be signed by a person described in LAC 33:IX.2503.A, or by a duly authorized representative of that person. A person is a duly authorized representative only if:

1. The authorization is made in writing by a person described in LAC 33:IX.2503.A;

2. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity such as the position of plant manager, operator, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company, (a duly authorized representative may thus be either a named individual or an individual occupying a named position); and,

3. The written authorization is submitted to the State Administrative Authority.

4. **Changes to authorization**. If an authorization under Section D.10.b. is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of Section D.10.b. must be submitted to the state administrative authority prior to or together with any reports, information, or applications to be signed by an authorized representative.

5. **Certification.** Any person signing documents under Part VI.G shall make the following certification:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

H. Laboratory Accreditation

LAC 33:I.Subpart 3, Chapters 45-59 provide requirements for an accreditation program specifically applicable to commercial laboratories, wherever located, that provide chemical analyses, analytical results, or other test data to the department, by contract or by agreement, and the data is:

1. Submitted on behalf of any facility, as defined in La. R.S.30:2004;
2. Required as part of any permit application;
3. Required by order of the department;
4. Required to be included on any monitoring reports submitted to the department;
5. Required to be submitted by contractor
6. Otherwise required by department regulations.

The department laboratory accreditation program, Louisiana Environmental Laboratory Accreditation Program (LELAP) is designed to ensure the accuracy, precision, and reliability of the data generated, as well as the use of department-approved methodologies in generation of that data. Laboratory data generated by commercial environmental laboratories that are not (LELAP) accredited will not be accepted by the department. Retesting of analysis will be required by an accredited commercial laboratory.

Where retesting of effluent is not possible (i.e. data reported on DMRs for prior month's sampling), the data generated will be considered invalid and in violation of the LPDES permit.

Regulations on the Louisiana Environmental Laboratory Accreditation Program and a list of labs that have applied for accreditation are available on the department website located under DIVISIONS → PERMIT SUPPORT SERVICES → LABORATORY ACCREDITATION at the following link:

http://www.deq.louisiana.gov

Questions concerning the program may be directed to (225) 219-3247.

I. Penalties for Falsification of Reports

The Louisiana Revised Statutes LA.R.S.30:2076.2 provides that any person who knowingly makes any false material statement, representation, or certification in any application, record, report, plan or other document filed or required to be maintained under the LPDES or who knowingly falsifies, tampers with, or renders inaccurate, any monitoring device or method required to be maintained under the LPDES, shall, upon

conviction, be subject to a fine of not more than $10,000, or imprisonment for not more than 2 years, or both. If a conviction of a person is for a violation committed after a first conviction of such person under this subsection, he shall be subject to a fine of not more than $20,000 per day of violation, or by imprisonment of not more than 4 years, or both.

J. Oil and Hazardous Substance Liability

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under Section 311 of the Clean Water Act.

K. Property Rights

This permit does not convey any property rights of any sort, or any exclusive privilege, nor does it authorize any injury to private or public property, nor any infringement of federal, state, or local laws or regulations.

L. Severability

If any provision of these rules and regulations, or the application thereof, is held to be invalid, the remaining provisions of these rules and regulations shall not be affected, so long as they can be given effect without the invalid provision. To this end, the provisions of these rules and regulations are declared to be severable.

M. Requiring an Individual Permit or an Alternative General Permit

1. The State Administrative Authority may require any person authorized by this permit to apply for and/or obtain either an individual LPDES permit or an alternative LPDES general permit. Any interested person may petition the State Administrative Authority to take action under this paragraph. Where the State Administrative Authority requires a discharger authorized to discharge under this permit to apply for an individual LPDES permit, the State Administrative Authority shall notify the discharger in writing that a permit application is required. This notification shall include a brief statement of the reasons for this decision, an application form, a statement setting a deadline for the discharger to file the application, and a statement that on the effective date of issuance or denial of the individual LPDES permit or the alternative general permit as it applies to the individual permittee, coverage under this general permit shall automatically terminate unless otherwise specified by the State Administrative Authority. Applications shall be submitted as indicated in Part II of this permit. The State Administrative Authority may grant additional time to submit the application upon request of the applicant. If a discharger fails to submit in a timely manner an individual LPDES permit

application as required by the State Administrative Authority under this paragraph, then the applicability of this permit to the individual LPDES permittee is automatically terminated at the end of the day specified by the State Administrative Authority for application submittal.

2. Any discharger authorized by this permit may request to be excluded from the coverage of this permit by applying for an individual permit. In such cases, the permittee shall submit an individual application in accordance with the requirements of LAC 33:IX.2515.B.3.c, with reasons supporting the request, to the State Administrative Authority at the address indicated in Part II.C of this permit. The request may be granted by issuance of an individual permit or an alternative general permit if the reasons cited by the permittee are adequate to support the request.

3. When an individual LPDES permit is issued to a discharger otherwise subject to this permit, or the discharger is authorized to discharge under an alternative LPDES general permit, the applicability of this permit to the individual LPDES permittee is automatically terminated on the effective date of the individual permit or the date of authorization of coverage under the alternative general permit, whichever the case may be. When an individual LPDES permit is denied to an owner or operator otherwise subject to this permit, or the owner or operator is denied for coverage under an alternative LPDES general permit, the applicability of this permit to the individual LPDES permittee is automatically terminated on the date of such denial, unless otherwise specified by the State Administrative Authority.

N. State Environmental Laws

1. Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable State law or regulation under authority preserved by Section 510 of the Clean Water Act.

2. No condition of this permit shall release the permittee from any responsibility or requirements under other environmental statutes or regulations.

O. Proper Operation and Maintenance

1. The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the

conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of backup or auxiliary facilities or similar systems which are installed by a permittee only when the operation is necessary to achieve compliance with the conditions of the permit.

2. The permittee shall provide an adequate operating staff which is duly qualified to carry out operation, maintenance and other functions necessary to ensure compliance with the conditions of this permit.

P. Inspection and Entry

Upon the presentation of credentials and other documents as may be required by law, the permittee shall allow the State Administrative Authority, the EPA**,** or an authorized representative (including an authorized contractor acting as a representative of the Administrator), or, in the case of a construction site which discharges through a municipal separate storm sewer, an authorized representative of the municipal operator of the separate storm sewer receiving the discharge, to do any of the following:

1. Enter upon the permittee's premises where a regulated facility or activity is located or conducted or where records must be kept under the conditions of this permit. Enter upon the permittee's premises where a discharge source is or might be located or in which monitoring equipment or records required by a permit are kept for inspection or sampling purposes. Most inspections will be unannounced and should be allowed to begin immediately, but in no case shall begin more than thirty (30) minutes after the time the inspector presents his/her credentials and announces the purpose(s) of the inspection. Delay in excess of thirty (30) minutes shall constitute a violation of this permit. However, additional time can be granted if the inspector or the Administrative Authority determines that the circumstances warrant such action;

2. Have access to and copy at reasonable times, any records that the department or its authorized representative determines are necessary for the enforcement of this permit. For records maintained in either a central or private office that is open only during normal office hours and is closed at the time of inspection, the records shall be made available as soon as the office is open, but in no case later than the close of business the next working day;

3. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices or operations regulated or required under this permit; and

4. Sample or monitor at reasonable times, for the purpose of assuring permit compliance or as otherwise authorized by the Clean Water Act or the Louisiana Environmental Quality Act, any substances or parameters at any location.

Q. Upset Conditions

1. Upset - an exceptional incident in which there is unintentional and temporary noncompliance with technology based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

2. Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with such technology-based permit effluent limitations if the requirements of Part VI.P.3 are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review.

3. Conditions necessary for a demonstration of upset. A permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:

a. An upset occurred and that the permittee can identify the cause(s) of the upset;

b. The permitted facility was at the time being properly operated;

c. The permittee submitted notice of the upset as required by LAC 33:IX.2701.L.6.b.ii and Part III.C.1, III.C.2, and III.C.3.; and

d. The permittee complied with any remedial measures required by Part III.A.

4. Burden of proof. In any enforcement proceeding, the permittee seeking to establish the occurrence of an upset has the burden of proof.

R. Anticipated Noncompliance

The permittee shall give advance notice to the state administrative authority of any planned changes in the permitted small MS4 or activity which may result in noncompliance with permit requirements.

S. Bypass of Treatment Facilities

1. ***Bypass***. The intentional diversion of waste streams from any portion of a treatment facility.

2. Bypass not exceeding limitations. The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of Section S.3 and S.4 of these standard conditions.

3. Notice

a. Anticipated bypass. If the permittee knows in advance of the need for a bypass, it shall submit prior notice to the Office of Environmental Services, Water Permits Division, if possible at least ten days before the date of the bypass.

b. Unanticipated bypass. The permittee shall submit notice of an unanticipated bypass as required in LAC 33:IX.2701.L.6 (24-hour notice).

4. Prohibition of bypass

a. Bypass is prohibited, and the state administrative authority may take enforcement action against a permittee for bypass, unless:

(1) Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;

(2) There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and,

(3) The permittee submitted notices as required by Section B.4.c of these standard conditions.

b. The state administrative authority may approve an anticipated bypass after considering its adverse effects, if the state administrative authority determines that it will meet the three conditions listed in Section B.4.d(1) of these standard conditions.

T. Removed Substances

Solids, sewage sludges, filter backwash, or other pollutants removed in the course of treatment or wastewater control shall be properly disposed of in a manner such as to prevent any pollutant from such materials from entering waters of the state, and in accordance with environmental regulations.

U. Prohibition for Tampering: Penalties

LA R.S. 30:2025 provides for punishment of any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit.

LA R.S. 30:2076.2 provides for penalties for any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or non compliance.

V. Permit Re-opener Clause

This permit may be modified, revoked and reissued, or terminated for cause in accordance with LAC 33:IX.2903, 2905, 2907, 3105 and 6509. The filing of a request for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition. This Office reserves the right to reopen and modify this permit to conform to those standards necessary to maintain the water quality in order to support uses of the receiving water bodies.

W. Availability of Reports

All recorded information (completed report forms, permit application forms, fact sheets, draft permits, or any public document) not classified as confidential information under R.S. 30:2030(A) and 30:2074(D) and designated as such in accordance with these regulations (LAC 33:IX.2323 and LAC 33:IX.6503) shall be made available to the public

for inspection and copying during normal working hours in accordance with the Public Records Act, R.S. 44:1 et seq.

Claims of confidentiality for the following will be denied:

a. The name and address of any permit applicant or permittee;

b. Permit applications, permits, and effluent data;

c. Information required by LPDES application forms provided by the State Administrative Authority under LAC 33:IX.2501 may not be claimed confidential. This includes information submitted on the forms themselves and any attachments used to supply information required by the forms.

X. Permit Actions

This permit may be modified, revoked and reissued, or terminated for cause in accordance with LAC 33:IX.2903, 2905, 2907, 3105 and 6509. The causes may include, but are not limited to the following:

(a) Noncompliance by the permittee with any condition of the permit;

(b) The permittee's failure in the application or during the permit issuance process to disclose fully all relevant facts, or the permittee's misrepresentation of any relevant facts at any time;

(c) A determination that the permitted activity endangers human health or the environment and can only be regulated to acceptable levels by permit modification or termination;

(d) A change in any condition that requires either a temporary or a permanent reduction or elimination of any discharge;

(e) Failure to pay applicable fees under the provisions of LAC 33:IX. Chapter 13; or

(f) Change of ownership or operational control.

The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any permit condition.

Y. Permit Transfers

Transfers of permit coverage **are not allowed** for this general permit.

1. Change of Coverage from One Operator to a Different Operator (e.g., a different operator assumes control over the operation and maintenance of the storm water drainage system)
   The new owner/operator must complete and file an NOI in accordance with Part I.F at least 30 days prior to taking over operational control of the facility. The permitted owner/operator shall submit a letter to the LDEQ Office of Environmental Services, Water Permits Division, requesting termination of permit coverage following the issuance of permit authorization of operational control to the new owner/operator.

2. Simple Name Changes of the Permittee (e.g., Public Entity "… Waterworks District A" changes name to "… Sewer and Waterworks District X")
   The permittee is required to submit a name change request to the Environmental Assistance Division either prior to or no later than 45 days after the name of a permitted operator changes. The request must be made on the official LDEQ form NOC-1 which is available on the LDEQ website at: www.deq.louisiana.gov/portal/Portals/0/assistance/NOC-1%20FORM%20Jan%2025,%202006.pdf. Any questions related to initiating a permit transfer should be directed to the Application Verification Group at (225) 219-3292.

   All storm water permits are non-transferable; therefore, the NOC-1 form can only be used for operator name changes for storm water permits.

   Should a new public entity become the owner and/or operator of a permitted MS4, the permittee and the new owner shall follow the procedures outlined above in Part VI.W.1 to obtain permit coverage. The public entity relinquishing permit coverage shall follow the procedures described in Part VI.W.1 to terminate permit coverage.

PART VII
DEFINITIONS

"Allowable Non-Storm Water" means a non-storm water discharge that does not need to be effectively prohibited but must be controlled to the Maximum Extent Practicable (MEP) to protect water quality under CWA 402(p)(3)(B)(iii) in order to be allowed as part of the MS4 discharge.

"Best Management Practices" ("BMPs") means schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the discharge of pollutants to waters of the United States. BMPs also include treatment requirements, operating procedures, and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

"Clean Water Act (Water Quality Act)" - formerly the Federal Water Pollution Control Act or Federal Water Pollution Control Act Amendments of 1972. Public Law 92-500; 33 U.S.C. § 1251 eq seq.; legislation which provides statutory authority for the NPDES program. Also known as the Federal Water Pollution Control Act.

"Conduit" means any channel or pipe used to transport flowing water.

"Control Measure" as used in this permit, refers to any Best Management Practice or other method used to prevent or reduce the discharge of pollutants to waters of the United States.

"Conveyance" as used in this permit means the process of moving water from one place to another.

"Co-permittee" as used in this permit means a permittee to a LPDES permit that is only responsible for permit conditions relating to the discharge for which it is the operator.

"CWA" means the Clean Water Act or the Federal Water Pollution Control Act, 33 U.S.C §1251 et seq.

"Detention" means a storm water system that delays the downstream progress of storm water runoff in a controlled manner. This is typically accomplished using temporary storage areas and a metered outlet device.

"Discharge" when used without a qualifier, means the discharge of a pollutant.

"Discharge of Storm Water Associated with Construction Activity" as used in this permit, refers to a discharge of pollutants in storm water runoff from areas where soil disturbing activities (e.g., clearing, grading, or excavation, etc.), construction materials or equipment storage or maintenance (e.g., fill piles, borrow areas, concrete truck washout, fueling, etc.), or other industrial storm water directly related to the construction process (e.g., cement/concrete or asphalt batch plants) are located. (See LAC 33:IX.2511.B.14.j and LAC 33:IX.2511.B.15 for the two regulatory definitions of regulated storm water associated with construction sites).

"Erosion" occurs when land is diminished or worn away due to wind, water, or glacial ice. Often the eroded debris (silt or sediment) becomes a pollutant via storm water runoff. Erosion occurs naturally but can be intensified by land clearing activities such as farming, development, road-building, and timber harvesting.

"Excavation" is the process of removing earth, stone, or other materials from land.

"Flood Control" is defined as the specific regulations and practices that reduce or prevent the damage caused by storm water runoff.

"Grading" is defined as the cutting and/or filling of the land surface to a desired slope or elevation.

"Illicit Connection" means any man-made conveyance connecting an illicit discharge directly to a municipal separate storm sewer system.

"Illicit Discharge" is defined as any discharge to a municipal separate storm sewer that is not composed entirely of storm water, except discharges authorized under an LPDES permit (other than the LPDES permit for discharges from the MS4) and discharges resulting from fire fighting activities.

"Incorporated place" as used in this permit means a city, town, township, or village that is incorporated under the laws of the state in which it is located.

"Industrial Activity" is defined as any activity which is directly related to manufacturing, processing or raw materials storage areas at an industrial plant.

"Large and Medium Municipal Separate Storm Sewer System" means all municipal separate storm sewers that are either:

(i) located in an incorporated place (city) with a population of 100,000 or more as determined by the 1990 Decennial Census by the Bureau of Census (these cities are listed in Appendices F and G of LAC 33:IX); or

(ii) located in the counties with unincorporated urbanized populations of 100,000 or more, except municipal separate storm sewers that are located in the incorporated places, townships or towns within such counties (these counties are listed in Appendices H and I of LAC 33:IX); or

(iii) owned or operated by a municipality other than those described in paragraph (i) or (ii) and that are designated by the State Administrative Authority as part of the large or medium municipal separate storm sewer system.

"Louisiana Pollutant Discharge Elimination System (LPDES)" means those portions of the Louisiana Environmental Quality Act and the Louisiana Water Control Law and all regulations promulgated under their authority which are deemed equivalent to the National Pollutant Discharge Elimination System (NPDES) under the Clean Water Act in accordance with Section 402 of the Clean Water Act and all applicable federal regulations.

"Maximum Extent Practicable (MEP)" is defined as the technology-based discharge standard for Municipal Separate Storm Sewer Systems to reduce pollutants in storm water discharges that was established by CWA 402(p). Section 402(p)(3)(B)(iii) of the Federal Clean Water Act requires "controls to reduce the discharge of pollutants to the maximum extent practicable, including management practices, control techniques and system, design and engineering methods, and such other provisions as the Administrator or the State determines appropriate for the control of such pollutants." A discussion of MEP as it applies to small MS4s is found at 40 CFR 122.34.

"MS4" is the acronym for municipal separate storm sewer system and is used to refer to either a Large, Medium or Small Municipal Separate Storm Sewer System. The term is used to refer to either the system operated by a single entity or a group of systems within an area that are operated by multiple entities.

"Municipal Separate Storm Sewer System (MS4)" is a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains):

(a) owned or operated by the United States or by a state, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to state law) having jurisdiction over disposal of sewerage, industrial wastes, storm water, or other wastes, including special districts under state law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under Section 208 of the CWA that discharges to waters of the state;
(b) designed or used for collecting or conveying storm water;
(c) which is not a combined sewer; and
(d) which is not part of a Publicly Owned Treatment Works (POTW) as defined at LAC 33:IX.2313.

"National Pollutant Discharge Elimination System (NPDES)" means the national program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements, under Sections 307, 318, 402, and 405 of the Clean Water Act.

"Notice of Intent (NOI)" is an application to notify the permitting authority of a facility's intention to be covered by a general permit and is the mechanism used to "register" for coverage under a general permit.

"Office" means the Office of Environmental Services within the Department of Environmental Quality.

"Open space" means an undeveloped piece of land adding ecological, scenic or recreational value to an urban area. Open spaces are generally large pervious areas that are free from paving, buildings, structures, etc., except for basic improvements that are complementary, necessary or appropriate to the use and enjoyment of the open area. Open space can be public or private. Open space includes any area that is characterized by natural scenic beauty or whose condition or quality is such that it will enhance the present or potential value of surrounding developed lands, or enhance the conservation of natural or scenic resources. Examples include forests, marshes, wildlife sanctuaries, stream corridors, wetlands, agricultural lands, pasture land, pathways, walking and riding trails, groves, wooded areas, fields, parkland, watersheds, and retention/detention areas and floodways and floodplains. Preserving open space is one of the principles of Smart Growth. Visit the EPA website to learn more about open space and principles of Smart Growth.

"Outfall" is the point where a municipal separate storm sewer discharges to waters of the state and does not include open conveyances connecting two municipal separate storm sewers, or pipes, tunnels or other conveyances which connect segments of the same stream or other waters of the state and are used to convey waters of the state.

"Permitting Authority" is the NPDES-authorized state agency which in the State of Louisiana is the Louisiana Department of Environmental Quality (LDEQ).

"Person" is any individual, municipality, public or private corporation, partnership, firm, the United States Government and any agent or subdivision thereof, or any other juridical person which shall include, but is not limited to, trusts, joint stock companies, associations, the State of Louisiana, political subdivisions of the state, commissions, and interstate bodies.

"Physically interconnected" means that one MS4 is connected to a second MS4 in such a way that it allows for direct discharges into the second system.

"Point Source" means any discernible, confined, and discrete conveyance, including but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, landfill leachate collection system, vessel or other floating craft from which pollutants are or may be discharged. This term does not include return flows from irrigated agriculture or agricultural storm water runoff.

"Pollutants of Concern" include biological oxygen demand (BOD), sediment or a parameter that addresses sediment (such as total suspended solids, turbidity or siltation), pathogens, oil and grease, and any pollutant that has been identified as a cause of impairment in any water body to which the MS4 discharges.

"Retrofit" means the modification of storm water management systems through the construction and/or enhancement of wet ponds, wetland plantings, or other BMPs designed to improve water quality.

"Runoff" means drainage or flood discharge that leaves an area as surface flow or as pipeline flow, or drainage or flood discharge that has reached a channel or pipeline by either surface or sub-surface routes.

"Sanitary Sewer" is a system of underground pipes that carries sanitary waste or process wastewater to a treatment plant.

"Sediment" is defined as soil, sand, and minerals washed from land into water, usually after rain. Sediment can destroy fish-nesting areas, clog animal habitats, and cloud waters so that sunlight does not reach aquatic plants.

"Site Plan" means a graphical representation of a layout of buildings and facilities on a parcel of land.

"Site Runoff" means any drainage or flood discharge that is released from a specified area.

"Small Municipal Separate Storm Sewer System (Small MS4)" is defined at 40 CFR 122.26(b)(16) and refers to all separate storm sewers that are owned or operated by the United States, a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, storm water, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the CWA that discharges to waters of the United States, but is not defined as a "large" or "medium" municipal separate storm sewer system. This term includes systems similar to separate storm sewer systems in municipalities, such as systems at military bases, large hospital or prison complexes, and highways and other thoroughfares. This term does not include separate storm sewers in very discrete areas, such as individual buildings.

"Smart Growth Principles": (1) Create a range of housing opportunities and choices; (2) Create walkable neighborhoods; (3) Encourage community and stakeholder collaboration; (4) Foster distinctive, attractive places with a strong sense of place; (5) Make development decisions predictable, fair and cost effective; (6) Mix land use; (7) Preserve open space, farmland, natural beauty, and critical environmental areas; (8) Provide a variety of transportation choices of smart growth; (9) Strengthen and direct development toward existing communities; and (10) Take advantage of compact building design.

"Stakeholder" means an entity that holds a special interest in an issue or program -- such as the storm water program -- since it is or may be affected by it.

"State Administrative Authority" means the Secretary of the Department of Environmental Quality or his designee or the appropriate assistant secretary or his designee.

"Storm Water" means storm water runoff, snow melt runoff, and surface runoff and drainage.

"Storm Water Associated with Industrial Activity" is defined at LAC 33:IX.2511.B.14 and incorporated here by reference.

"Storm Water Discharge Associated with Small Construction Activity" is defined at LAC 33:IX.2511.B.15. This includes discharges of storm water from construction activities including clearing, grading and excavating that result in land disturbance of equal to or greater than one acre and less than five acres. Small construction activity also includes the disturbance of less than one acre of total land area that is part of a larger common plan of development or sale if the larger common plan will ultimately disturb equal to or greater than one acre but less than five acres. Small construction activity does not include routine maintenance that is performed to maintain the original line and grade, hydraulic capacity, or original purpose of the facility.

"Storm Water Management" is defined as functions associated with planning, designing, constructing, maintaining, financing, and regulating the facilities (both constructed and natural) that collect, store, control, and/or convey storm water.

"Storm Water Management Program (SWMP)" refers to a comprehensive program to manage the quality of storm water discharged from the municipal storm sewer system. The storm water management program required by this permit must include the minimum control measures described in LAC 33:IX.2523.B and satisfy all of the requirements set forth in LAC 33:IX.2523.

"Storm Water Pollution Prevention Plan (SWPPP)" is a plan that describes a process whereby a facility thoroughly evaluates potential pollutant sources at a site and selects and implements appropriate measures designed to prevent or control the discharge of pollutants in storm water runoff.

"Surface Water" is defined as all lakes, bays, rivers, streams, springs, ponds, impounding reservoirs, wetlands, swamps, marshes, water sources, drainage systems and other surface water, natural or artificial, public or private within the state or under its jurisdiction that are not part of a treatment system allowed by state law, regulation, or permit.

"Total Maximum Daily Loads (TMDLs)" are water quality assessments that determine the source or sources of pollutants of concern for a particular waterbody, consider the maximum amounts of pollutants the waterbody can assimilate, and then allocate to each source a set level of pollutants that it is allowed to discharge (i.e., a "wasteload allocation").

"Upset" means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

"Urban Runoff" is storm water from urban areas, which tends to contain heavy concentrations of pollutants from urban activities.

"Urbanized Area (UA)" is a Bureau of the Census determination of a central place (or places) and the adjacent densely settled surrounding area -- urban fringe -- that together have a minimum residential population of 50,000 people and an overall population density of 1,000 people/square mile. It is a calculation used by the Bureau of the Census to determine the geographic boundaries of the most heavily developed and dense urban areas.

"Waste Load Allocation (WLA)" means that portion of the assimilative capacity of the receiving water apportioned to a specific discharger in such a way that water quality standards are maintained under design conditions.

"Waters of the State" for the purposes of the Louisiana Pollutant Discharge Elimination System, all surface waters within the state of Louisiana and, on the coastline of Louisiana and the Gulf of Mexico, all surface waters extending there from three miles into the Gulf of Mexico. For purposes of the LPDES, this includes all surface waters that are subject to the ebb and flow of the tide, lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, natural ponds, impoundments of waters within the state of Louisiana otherwise defined as Waters of the United States in 40 CFR 122.2, and tributaries of all such waters. Waters of the State does not include wastewater treatment systems, including treatment ponds or lagoons designed to meet the requirements of the Clean Water Act, 33 U.S.C. 1251 et seq.

"Watershed" is that geographical area which drains to a specified point on a water course, usually a confluence of streams or rivers (also known as drainage area, catchment, or river basin).

"Wet Weather Discharge" or "Storm Water Discharge", for monitoring purposes, is a discharge of storm water resulting from a storm event that is greater than 0.1 inch and at least 72 hours from the previously measurable (greater than 0.1 inch rainfall) storm event. Where feasible, the variance in the duration of the event and the total rainfall of the event should not exceed 50 percent from the average or median rainfall event in that area.

"You" and "Your" as used in this permit is intended to refer to the permittee, the operator, or the discharger as the context indicates and that party's responsibilities (e.g., the city, the county, the flood control district, and U.S. Air Force, etc.)

Appendix B

Urbanized Area Stormwater Maps

(Maps produced by St. Tammany Parish Government)

St. Tammany Parish
Digital Elevation Model

236 - 240	171 - 175	106 - 110	41 - 45
231 - 235	166 - 170	101 - 105	36 - 40
226 - 230	161 - 165	96 - 100	31 - 35
221 - 225	156 - 160	91 - 95	26 - 30
216 - 220	151 - 155	86 - 90	21 - 25
211 - 215	146 - 150	81 - 85	16 - 20
206 - 210	141 - 145	76 - 80	11 - 15
201 - 205	136 - 140	71 - 75	6 - 10
196 - 200	131 - 135	66 - 70	1 - 5
191 - 195	126 - 130	61 - 65	-9 - 0
186 - 190	121 - 125	56 - 60	-19 - -10
181 - 185	116 - 120	51 - 55	-27 - -20
176 - 180	111 - 115	46 - 50	

St. Tammany Parish Government
P.O. Box 628
Covington, LA 70434

Legend

- Parish Detention/Retention Ponds
- Stormwater Discharge
- Streets
- Streams
- Major Roads
- UA 1 Mile Buffer
- STP Urbanized Areas 2010
- Parish Boundary
- Parish Land Boundary

2 0 2 Miles

This map was produced by St. Tammany Parish Information Services.
Note: This map is for planning purposes only. It is not a legally recorded plan, survey, official tax map or engineering schematic, and it is not intended to be used as such. Map layers were created from different sources at different scales, and the actual or relative geographic position of any feature is only as accurate as the source information. Copyright (c) 2013. St. Tammany Parish, Louisiana. All rights reserved.

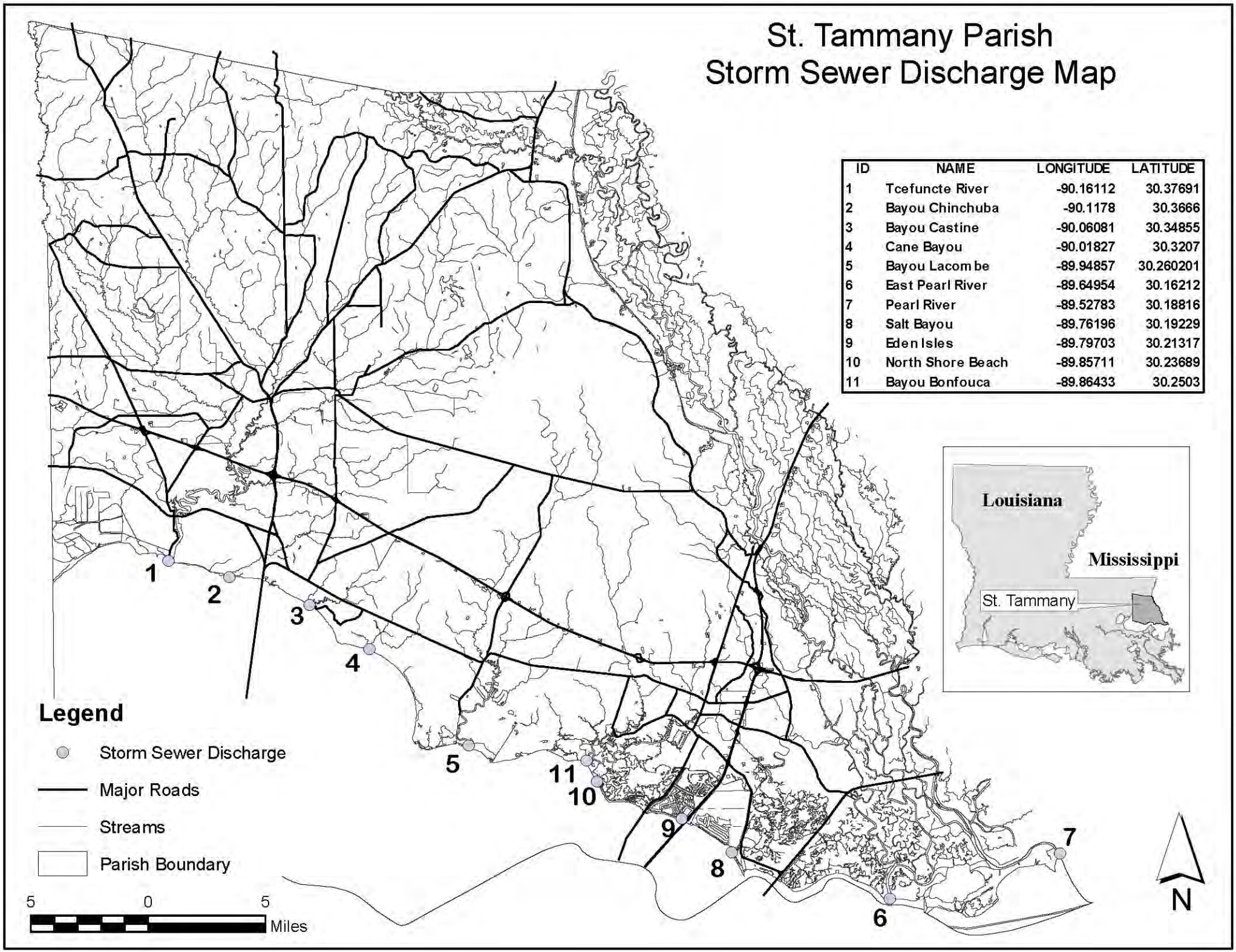
Map ID: aka2013-91
Creation Date: 04/18/2013

Appendix C

Storm Sewer System & Site Location Map

(Produced by St. Tammany Parish)

St. Tammany Parish
Storm Sewer Discharge Map



ID	NAME	LONGITUDE	LATITUDE
1	Tcefuncte River	-90.16112	30.37691
2	Bayou Chinchuba	-90.1178	30.3666
3	Bayou Castine	-90.06081	30.34855
4	Cane Bayou	-90.01827	30.3207
5	Bayou Lacombe	-89.94857	30.260201
6	East Pearl River	-89.64954	30.16212
7	Pearl River	-89.52783	30.18816
8	Salt Bayou	-89.76196	30.19229
9	Eden Isles	-89.79703	30.21317
10	North Shore Beach	-89.85711	30.23689
11	Bayou Bonfouca	-89.86433	30.2503

Appendix D
TMDL Action Plan

Appendix E
Annual Evaluation Checklist

2014 Annual Comprehensive Site Evaluation Checklist

St. Tammany Parish

Evaluation Issue	Yes	No
1. Have inspections been completed as required?	X	
2. If required, has stormwater sampling been completed as required?	N/A	
3. Were the BMPs implemented for the year effective?	X	
4. Do new stormwater sources or pollutant exposures indicate a need for additional BMPs?	X	
5. Has this Plan been updated to include recommended changes resulting from previous inspections or annual evaluation?	X	
6. If sampling required, were pollutants in stormwater sampling data present above LPDES permit limitations?	N/A	
7. Are additional BMPs warranted? If yes, describe below:		X
BMPS OR BMP Improvements Needed		
TMDLs are completed for St Tammany and there are likely to be several recommendations for STP SW program changes as a result of the TMDLs.		
A major revision of the SWMP is planned in this permit cycle, 2013-2018, to accommodate TMDLs.		
Additional revisions to the STP Stormwater Ordinance may also be necessary to accommodate the TMDLs.		
Notes: Completed evaluation form should be retained in the STP Department of Engineering.		

2014 MS4 Annual Report Appendix: Stormwater Ordinance

Section 7-042.00, (5)

(5) **Construction Sites - Storm Water Runoff**

a. A permit shall be required for the clearing, grubbing, grading, displacement or removal of dirt (hereafter referred to as “dirt work”) for any properties not specifically exempted as per Paragraph (c) of this Section. This permit shall be in the form of an approval of the “Culvert Data Sheet”, the “Permit Data Review Sheet”, a general work order or land clearing permit presently required for construction activity to occur. The ordinance shall be administered by Department of Engineering or any other parish personnel that should be necessary.
b. A detailed description of dirt work, boundaries of the areas to be disturbed and the proposed sediment retention measures must accompany the building permit or development proposal and be reviewed by the Department of Engineering before approval of the Culvert Data Sheet or the Permit Data Tracking Sheet or the issuance of a general work order.
c. Exemptions

1. Agricultural land management practices and construction of agricultural structures as defined in the St. Tammany Parish Land Use Ordinance No. 523;
2. Mining, quarrying, processing of rock, sand, gravel, aggregate or clay where established and provided for by law;
3. Activities undertaken on forest land in the production and harvesting of timber when approved via an agricultural clearing, timber harvesting or rural clearing permit in accordance with St. Tammany Parish Land Use Ordinance No. 523;
4. Single family residences, and related accessory structures or uses, when the disturbed area comprises of less than 50% of the lot or parcel and is located at least 10 feet from all property lines.
5. Requirements
6. The owner, builder or developer of a construction project shall cause the placement of a required sediment control measure for all side slope and down slope boundaries of a construction area, unless a sedimentation basin designed to accommodate 3600 cubic feet of water and sediment for each acre of disturbed property is provided .
7. The owner, builder or developer will further cause the placement of said sediment control measure around all drainage structure inlets which flow into a public drainage system, or a drainage system which is intended to be dedicated to the public.

8. Sediment Retention Measures
9. The following measures are sediment retention measures, subject to review and approval of each application based upon the characteristics of the work and site being permitted. A detailed description of the application, design criteria and limitations of each is outlined in Appendix A.
    1. Mulching
    2. Erosion Control Mats
    3. Vegetation
    4. Silt Fencing
    5. Straw Bale Dikes
    6. Diversion Dikes
    7. Interceptor Swales
10. Inlet Protection
11. Any other functionally equivalent technology or method deemed appropriate by the Director of the Department of Engineering.

f. A blanket permit may be issued for large scale developments when the developer provides the required sediment control measures for the development as a whole. The appropriateness of these measures will be determined by the Director of the Department of Engineering.

g. Provision of sediment retention measures on site does not release the builder/developer from responsibilities as outlined in Section 40-071.01of Appendix B (Subdivision Regulations) of the St. Tammany Parish Code of Ordinances should the retention measures fail to prevent sediment runoff. The Director of the Department of Engineering may release the builder/developer from the provisions of this Section if it is determined that the failure of sediment control measures is not attributable to faulty installation or maintenance of the required retention measures.

1. Enforcement

Violations will be processed by the appropriate Code Enforcement, Department of Engineering or Permit Inspections personnel using standard code violation protocol.

(Subsection 5 per Ord. 99-3156, adopted 10/21/99)

ST. TAMMANY PARISH COUNCIL

ORDINANCE

ORDINANCE CALENDAR NO._____ ORDINANCE COUNCIL SERIES NO._____
COUNCIL SPONSOR: GOULD/BRISTER PROVIDED BY: COUNCIL ATTORNEY
INTRODUCED BY:_____ SECONDED BY:_____
ON THE ___DAY OF___2015

ORDINANCE AMENDING THE ST. TAMMANY PARISH CODE OF ORDINANCES TO ENACT CHAPTER 24 ST. TAMMANY PARISH STORMWATER ORDINANCE AND TO REPEAL PARAGRAPH (5) OF SECTION 7-042.00.

WHEREAS, the Clean Water Act of 1972 established the basic structure for regulating discharges of pollutants into the waters of the United States as well as the quality standards for surface waters; and

WHEREAS, the United States Environmental Protection Agency is the federal agency charged with establishing pollutant control programs, which are often implemented and enforced through state agencies, such as Louisiana Department of Environmental Quality; and

WHEREAS, in an effort to comply with the water quality standards and requirements established by United States Environmental Protection Agency and Louisiana Department of Environmental Quality, St. Tammany Parish Government is taking steps to address water quality as a whole by evaluating current water quality conditions, programming infrastructure improvements, and reviewing existing policies and procedures; and

WHEREAS, St. Tammany Parish Government is automatically permitted by Louisiana Department of Environmental Quality as the owner of the Parish's Small Municipal Separate Storm Sewer System, which is a conveyance or system of conveyances that is owned by a public entity that discharges to waters of the US and is used to collect or convey stormwater (including storm drainages, pipes, ditches, etc.); and

WHEREAS, in order to maintain the Municipal Separate Storm Sewer System permit status, St. Tammany Parish Government must develop a Stormwater Management Program that addresses six minimum control measures: Public Education/Outreach; Public Participation / Involvement, Illicit Discharge Detection and Elimination, Construction Site Runoff Control, Post-Construction Runoff Control, Pollution Prevention/ Good Housekeeping; and

WHEREAS, of the six minimum control measures addressed in the Stormwater Management Program, the Louisiana Department of Environmental Quality requires local legislation be enacted specifically for three of the measures: Illicit Discharge Detection and Elimination, Construction Site Runoff Control, Post-Construction Runoff Control; and

WHEREAS, the St. Tammany Parish Stormwater Ordinance shall address these three minimum control measures and establish methods to control the introduction of pollutants into the MS4.

THE PARISH OF ST. TAMMANY HEREBY ORDAINS that the St. Tammany Parish Code of Ordinances is hereby amended to enact Chapter 24 St. Tammany Parish Stormwater Ordinance pursuant to LAC 33:IX and 40 CFR § 122 to provide therein the following regulations that are applicable thereto, and to otherwise provide as follows:

CHAPTER 24 – ST. TAMMANY PARISH STORMWATER ORDINANCE

ARTICLE I GENERAL PROVISIONS

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SECTION 24-001.00 ABBREVIATION OF TERMS
The following abbreviations when used in this Ordinance shall have the designated meanings:

BMP - Best Management Practices
CFR - Code of Federal Regulations
EPA – United States Environmental Protection Agency
LAC- Louisiana Administrative Code
LDEQ - Louisiana Department of Environmental Quality
LPDES - Louisiana Pollutant Discharge Elimination System
MS4 - Municipal Separate Storm Sewer System
NOI - Notice of Intent
NPDES - National Pollutant Discharge Elimination System
STPG - St. Tammany Parish Government
SWMP – Stormwater Management Plan
SWPPP - Stormwater Pollution Prevention Plan
TMDL – Total Maximum Daily Load
WLA - Waste Load Allocation

SECTION 24-002.00 DEFINITIONS
Unless a provision explicitly states otherwise, the following terms and phrases, as used in this Ordinance, shall have the meanings hereinafter designated:

~~ADMINISTRATOR- shall mean the MS4 Administrator or delegated authority by STP.~~ All references to this already say MS4 administrator except one. Remove definition and change the one to say MS4 administrator
BACKWASH- shall mean the rinsate resulting from the cleaning of equipment, vehicles, tools, containers, cartridges, filters, etc. Only one reference in body of document – remove and explain with reference?
BMP MAINTENANCE AGREEMENT- shall mean a permit to ensure routine inspections and maintenance are performed on permanent and/or structural BMPs for adherence to original design criteria. This is only referenced in one section. Remove definition and explain purpose in section
~~BMPs~~ BEST MANAGEMENT PRACTICES (BMP) - shall mean schedules of activities, prohibitions of practices, maintenance procedures, treatment requirements, operating procedures, and other practices used to prevent or reduce contaminated discharges or runoff.
~~BMPS FOR COASTAL LOUISIANA ZONE MANUALS- shall mean the technical manuals prepared by the Coastal Nonpoint Pollution Control Program for the Louisiana Coastal Zone to demonstrate BMPs. The manuals are to be used as a guide for developers, builders, and engineering firms for BMP selection during the design and construction phase of development.~~ Only one reference in body – remove and explain in section
~~CODE ENFORCEMENT OFFICER- shall mean any person duly authorized by the Parish, for the enforcement of this Ordinance.~~ Not referenced anywhere else in document. Remove
COMMENCEMENT OF CONSTRUCTION- shall mean the initial disturbance of soils associated with clearing, grading, excavating, filling, and other construction activities. Do we need this phrase defined if we already define construction?
COMMERCIAL- shall mean any activity pertaining to a business, industry, corporation, or organization.
CONSTRUCTION- shall mean any human activity that includes clearing, grading, excavation, filling, or other placement, movement, removal, or disposal of soil, rock, organic materials, or earth minerals.
CONTAMINATED- shall mean containing a harmful quantity of any pollutant.
CONVEYANCE- shall mean any roadway, ditch, pipe, canal, or waterway that moves water in the Parish.
DISCHARGE- shall mean any stormwater or wastewater whatsoever introduced into the MS4, drainage infrastructure, conveyances, ditches, or waterways of the Parish, or into waters of the United States.
DISCHARGER- shall mean any person who causes, allows, or is otherwise responsible for a discharge. Is this a thing or a person? Referenced both ways.
DRAINAGE INFRASTRUCTURE- shall mean any roadway ditch, pipe, manmade or natural water body/waterway that moves water in STP. How is this different than conveyance?

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~~EPA – shall mean the United States Environmental Protection Agency.~~ Already in abbreviations. Remove?
FACILITY- shall mean any building, structure, installation, process, or activity from which there is or may be a discharge of a pollutant. Is this necessary?
FERTILIZER- shall mean any substance that contains essential plant nutrients in a form available to plants and is used primarily for promoting or stimulating growth of a plant or improving the quality of a crop.
FILLING- shall mean the deposition of soil and other inert materials on the land to raise its grade and/or smooth its features. Define filling but not fill??
FINAL STABILIZATION- shall mean a uniform perennial vegetative cover with a density of 70% coverage is established or an equivalent permanent stabilization measure (such as the use of riprap, gabions, or geo-textiles) is employed. Only referenced once? Move to section?
~~HAZARDOUS MATERIAL OR SUBSTANCE- shall mean any of the following: Any substance determined to be hazardous according to 49 CFR § 171.8, or listed in Table 302.4 of 40 CFR § 302 or Section 311(b) (2) (A) of the Clean Water Act [33 USC § 1317 (a) and 1321 (b) (A)].~~ Not used anywhere in document
HAZARDOUS WASTE- shall mean any substance identified or listed as a hazardous waste by the EPA pursuant to 40 CFR § 261.
HERBICIDE- shall mean a substance used to defoliate, desiccate, destroy, inhibit or regulate vegetation.
~~HOUSEHOLD HAZARDOUS WASTE- shall mean any material generated in a household by a consumer that is classified as a hazardous waste under 40 CFR § 261.~~ See hazardous waste above. Remove
ILLICIT DISCHARGE- any unauthorized and/or unpermitted discharge that is not composed entirely of stormwater.
~~LDEQ - shall mean the State of Louisiana agency by that name.~~ Remove – already handled in abbreviations
LPDES PERMIT OR NPDES PERMIT- shall mean the permit issued by the LDEQ or the USEPA, under authority delegated pursuant to 33 USC § 1342(b) that authorizes the discharge of pollutants to waters of the United States. Both agencies identified in abbreviations. Need to define permit?
~~MS4~~ MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) - shall mean roadside drainage systems, catch basins, curbs, gutters, ditches, man-made channels, or storm drains used for collecting and/ or conveying stormwater in STP.
NON-STORMWATER DISCHARGE- any unpermitted discharge not entirely composed of stormwater.
~~NOI~~ NOTICE OF INTENT (NOI) - shall mean the Notice of Intent that is required by the Construction General Permit, the Multi-Sector General Permit, or other General Permit for the discharge of stormwater.
OPERATOR- shall mean the person or persons who, either individually or taken together, has operational control over the facility; or has day-to-day operational control over those activities at the facility necessary to ensure compliance with pollution prevention requirements and any permit conditions.
OWNER- shall mean the person who owns the property or a facility. Necessary?
PARISH- shall mean St. Tammany Parish in the State of Louisiana.
PERSON- shall mean any individual, partnership, firm, company, corporation, association, trust, estate, entity, or any legal representative, agent, or assignee. Necessary?
PESTICIDE- shall mean a substance used to prevent, destroy, repel, or mitigate any pest.
POLLUTANT- shall mean dredged spoil, solid waste, sewage, garbage, sludge, chemical waste, biological materials, radioactive materials, heat, rock, soil, sediment, or industrial waste discharged into waters of the state and/or the MS4, drainage infrastructure, conveyances, or waterways of STP.
POLLUTION- shall mean the contamination of the physical, thermal, chemical, or biological quality of waters that renders the water harmful, detrimental, injurious to humans, animal life, vegetation, or impairs the usefulness for the public enjoyment of the water for any lawful or reasonable purpose.
RELEASE- shall mean any spilling, leaking, pumping, pouring, discharging, injecting, leaching, dumping, or disposing, directly or indirectly, into the MS4, drainage infrastructure, conveyances, or waterways of the Parish.
SANITARY SEWAGE- shall mean the domestic sewage and/or industrial waste that is discharged into the sanitary sewer system and passes through the sanitary sewer system to any sewage treatment plant utilized in the Parish for treatment.
SANITARY SEWER (OR SEWER)- shall mean the system of pipes, conduits, and other conveyances which carry industrial waste and sanitary sewage from residential dwellings, commercial buildings, industrial and manufacturing facilities, and institutions, whether treated or untreated, to any sewage treatment plant.
SEDIMENT- shall mean soil, sand, clay, and minerals washed from land into roadways, drainage infrastructure,

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and waterways, usually during or after a rain. Sediment may cause a reduction in storage capacity, impede drainage, destroy fish-nesting areas, clog animal habitats, and cloud waters to such an extent as to prevent sunlight from reaching aquatic biota.
SEPTIC TANK WASTE- shall mean any sanitary sewage from holding tanks such as vessels, chemical toilets, campers, trailers, and septic tanks. No definition of septic tank needed?
SITE- shall mean the land or water area where any facility or activity is physically located or conducted, including adjacent land used in connection with the facility or activity. Necessary?
SOLID WASTE- shall mean any garbage, sludge, solid, semi-solid, discarded material, or debris resulting from construction, industrial, municipal, commercial, mining, or agricultural operations. This is only a reference in the definition of pollutant, not in body. Needed?
STATE- shall mean the State of Louisiana.
STORMWATER- shall mean stormwater runoff, surface runoff and drainage runoff.
STORMWATER AGREEMENT- shall mean the agreement utilized by the Parish and signed by the contractor, developer, land owner, or agent to ensure all required permits are in place and the implementation of BMPs will be used to control erosion and sedimentation and reduce the pollutants in stormwater discharges associated with excavation, grading, filling, and other construction projects. Define here or in section?
~~STORMWATER DISCHARGE ASSOCIATED WITH INDUSTRIAL ACTIVITY- shall mean the release of stormwater that drains from an industrial facility that meets the criteria listed in 40 CFR § 122.26(b)(14).~~ Not used anywhere
~~SWPPP~~ STORMWATER POLLUTION PREVENTION PLAN (SWPPP) - shall mean a plan required by the Construction General Permit, the Industrial General Permit, or the Multi-Sector General Permit and which describes and ensures the implementation of practices that are to be used to reduce the pollutants in stormwater discharges associated with construction or other industrial activity at the facility.
~~TMDL~~ TOTAL MAXIMUM DAILY LOAD (TMDL) - shall mean the water quality assessment that determines the source(s) of pollutants of concern for a particular water body; considers the maximum amount of pollutants the waterbody is able to assimilate; and then allocates to each source a set level of pollutants that is allowed to discharge.
UNCONTAMINATED- shall mean not containing a harmful quantity of any pollutant. Necessary if contaminated is defined?
USED OIL OR USED MOTOR OIL- shall mean any refined or synthetic oil that, as a result of use, storage, or handling, has become unsuitable for its original purpose because of impurities or the loss of original properties, but that may be suitable for reuse and recycling in compliance with state and federal law. Necessary?
WASTEWATER- shall mean any water or other liquid, other than uncontaminated stormwater, discharged from a facility.
WATER QUALITY STANDARD- shall mean the designation of a body of surface water for desirable uses and the narrative and numerical criteria deemed by the state to be necessary to protect those uses. Maybe just define water quality? Or is this phrase specific reference to an established standard?
~~WATERS OF THE STATE- shall mean any groundwater, lake, bay, pond, reservoir, spring, river, stream, creek, estuary, marsh, inlet, canal, or gulf, inside the territorial limits of the State, and all other bodies of water, natural or artificial, navigable or non-navigable, and including the beds and banks of all water courses and bodies of surface water, that are wholly or partially inside or inside the jurisdiction of the State.~~ Not referenced in body
WATERS OF THE UNITED STATES- shall mean any waters within the federal definition of "waters of the United States" as defined in 40 CFR § 122.2. KEEP?? WOTUS?
WETLAND- shall mean an area that is frequently inundated or saturated by water and is sufficient to support a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.
~~WLA~~ Waste Load Allocation (WLA) - shall mean that portion of the assimilative capacity of the receiving water apportioned to a specific discharger in such a way that water quality standards are maintained under design conditions.

SECTION 24-003.00 PURPOSE
The purposes and objectives of this Ordinance are to establish policies and procedures for the permitting,

monitoring, and/or enforcement regarding Illicit Discharge Detection and Elimination, Construction Site Runoff Control, and Post-Construction Runoff Control. In doing so, the ordinance will allow the Parish to:

A. Comply with the MS4 Permit, all state, federal, and local regulations applicable to stormwater and non-stormwater discharges.
B. Manage stormwater impacts at their source and prevent contaminated stormwater and non-stormwater discharges into the MS4, drainage infrastructure, conveyances, and waterways within the Parish.
C. Provide for proper operations and maintenance of all permanent stormwater management BMPs that are implemented within the Parish.
D. Provide review procedures and performance standards for stormwater planning and management.
E. Facilitate compliance with state and federal water quality standards, limitations, and permits by owners and operators of industrial activities and construction sites within the Parish.

SECTION 24-004.00 ADMINISTRATION

The Parish MS4 Administrator shall administer, implement, and enforce the provisions of this Ordinance. Any powers granted to or duties imposed upon the MS4 Administrator shall be carried out by the Administrator or may be delegated to other authorized personnel.

A. The Parish may adopt, by council action, reasonable stormwater fees for reimbursement of costs related to administration of the stormwater ordinance, MS4 compliance costs, TMDL implementation, and costs related to the stormwater management program as required by the USEPA or LDEQ.
B. Methods utilized to cover the costs associated with the stormwater program may include, but is not limited to fees for:
    1. Permitting, monitoring, inspection, and surveillance procedures;
    2. Stormwater plan review;
    3. Stormwater public education events;
    4. Complaint response, spill/pollution response, and clean-up;
    5. Stormwater utility fees calculated on percent of impervious area on a site; and
    6. Processes necessary to carry out the requirements of this ordinance.

ARTICLE II NON-STORMWATER AND ILLICIT DISCHARGES

SECTION 24-021.00 PROHIBITED NON-STORMWATER ILLICIT DISCHARGES

A. GENERAL PROHIBITION:

No person shall introduce or cause to be introduced into the MS4, drainage infrastructure, conveyances, or waterways of the Parish any illicit discharge that is not composed entirely of stormwater, except as provided in Article II Section 24-022.00 of this ordinance.

1. No person shall introduce or cause to be introduced into the MS4, drainage infrastructure, conveyances, or waterways of the Parish any discharge that causes or contributes to causing the Parish to violate a water quality standard, the Parish LPDES permit, or any state issued discharge permit for discharges from its MS4.
2. No person shall connect an interior drain or any other source of wastewater to the MS4, drainage infrastructure, conveyances, or waterways of the Parish, or allow such a connection to continue.
3. Any person that causes a spill, release, or other discharge of a prohibited substance or other pollutant in the Parish is solely responsible for the cleanup and removal of the substance. Where the person that caused the spill, release, or discharge to the Parish is unknown, the owner of the property on which the spill, release, or discharge occurred is responsible for the cleanup or removal of the substance.
4. Sanitary sewer overflows to the MS4, drainage infrastructure, conveyances, or waterways of the Parish shall be prevented. In the event of an overflow the owner, operator, or person otherwise having control of the sanitary sewer shall notify the Parish and remove all sewage to the maximum extent practical.
5. Items that are stored for collection, disposal, recycling or reuse shall be stored in a manner that

prevents contamination of stormwater. Drums shall be covered, closed, not leaking, and in good condition.
6. Spills and leaks of hazardous substances or pollutants shall be cleaned up immediately after the spill occurs or the leak is detected. Any absorbent material used for clean-up must be disposed of properly. Surface soil contaminated by the spill or leak must be removed or otherwise protected from contact with stormwater.
7. Drip pans, absorbent mats, or equivalent controls shall be used to collect and properly dispose of leaking fluids from motor vehicles that are parked outside during maintenance and repairs or while waiting for repairs at commercial repair facilities.
8. Used engines, transmissions, radiators, and other vehicle components that have automotive fluids in, or on them, shall be stored in a manner that prevents pollutants from contaminating stormwater runoff.
9. Any person or establishment that causes a spill, release, or other discharge of any prohibited substance or other pollutant to the MS4, drainage infrastructure, conveyances, or waterways of the Parish is solely responsible for notifying the Parish of the unauthorized release.
10. Trash, litter, grass clippings, leaves, and other debris shall not be discarded in drainage ditches or drainage inlets. Such material shall be disposed of and shall not be allowed to enter the MS4, drainage infrastructure, conveyances, or waterways of the Parish.
11. Refer to Article III Section 24-032.00 for non-stormwater discharge prohibitions associated with construction.

B. SPECIFIC PROHIBITIONS

No person shall dump, spill, leak, pump, pour, emit, empty, discharge, leach, dispose, or otherwise introduce or cause, allow, or permit to be introduced any of the following substances into the MS4, drainage infrastructure, conveyances, or waterways of the Parish:

1. Any used motor oil, antifreeze, hydraulic fluid, or other motor vehicle fluid;
2. Any industrial or hazardous waste, including household hazardous waste;
3. Any untreated sanitary sewage or septic tank waste;
4. Any grease trap waste, or grit trap waste;
5. Any trash or other debris material;
6. Any untreated wastewater from a commercial car wash facility; or from any washing, cleaning, of any commercial or public service vehicle, including heavy equipment;
7. Any contaminated wastewater or wash water from commercial cleaning, power, or pressure wash processes;
8. Any wastewater from the clean-up following a release of hazardous waste or pollutants;
9. Any discharge from a commercial or industrial cooling tower, condenser, compressor, or boiler;
10. Any concrete, mortar, ceramic, or asphalt base material;
11. Any discharge or wash down water from an animal, fowl, or livestock containment area;
12. Any unpermitted stormwater discharge associated with an industrial activity;
13. Any substance or material that will damage, block, or clog the MS4, drainage infrastructure, conveyances, or waterways of the Parish;
14. Any construction debris or other waste building material resulting from construction or demolition;
15. Any sediment, silt, earth, soil, or other material associated with clearing, grading, excavation, filling, or other construction activities;
16. Any direct discharge of pesticide, herbicide, and/or fertilizer;
17. Any discharge that contributes to or causes the Parish to violate a water quality standard.
18. The following restrictions apply to discharges associated with discharges from pools, hot tubs, spas, and filter backwash:
    a. Uncontaminated discharge shall be limited to that which cannot be retained and utilized on site for irrigation and other uses. For uncontaminated discharge that cannot be retained on site, a gradual, metered discharge is required;
    b. Discharge shall not drain or back-up onto adjacent properties;

    c. Discharge shall not cause erosion or sediment transport;
    d. Discharge shall not cause an accumulation of water in roadways or along curblines and shall not cause adverse impacts to drainage infrastructure, waterways, roadways, or adjacent properties.

SECTION 24-022.00 ALLOWABLE NON-STORMWATER DISCHARGES

A. The following discharges have not been identified by the Parish as significant contributors of pollutants to the MS4 or surface waters of the Parish and therefore are allowable non-stormwater discharges:
    1. A discharge authorized by, and in full compliance with, an NPDES or LPDES permit;
    2. Discharges from firefighting activities;
    3. An uncontaminated discharge of fire protection water;
    4. Agricultural stormwater runoff;
    5. Potable water sources including dechlorinated water line and fire hydrant flushing;
    6. A discharge from lawn watering, or landscape irrigation;
    7. A discharge or flow from a diverted stream flow or natural spring;
    8. A discharge or flow from uncontaminated groundwater;
    9. Uncontaminated discharge from foundation drains, crawl spaces, or footing drains;
    10. A discharge or flow from a riparian habitat or wetland;
    11. Wash water from individual residential and non-profit car washing;
    12. A discharge of air conditioning condensate and
    13. A discharge or flow of water used in street, parking lot, or structure cleaning that is not contaminated with soaps, detergents, emulsifiers, dispersants, or other pollutants.

B. In the event that STP determines that any of the discharges identified in Subsection A significantly contribute to pollution of surface waters of the Parish, or is so notified by LDEQ, the Parish will notify the responsible person to cease the discharge.

C. Nothing in this Section shall affect a discharger's responsibility under state or federal law. *(ARTICLE II pursuant to LAC 33:IX.2511.B-C & 33:IX.2523.B.3, 40 CFR § 122.26(b)(2&12), LPDES Industrial SW Permit LAR050000 § 1.2, LPDES MS4 Permit LAR041024 § I.C-D, & § IV.D.3)*

ARTICLE III PARISH PERMITTING - CONSTRUCTION

Discussion point - We need to discuss how we'd like to handle this. Stormwater agreement vs Notice of Intent vs DEQ permit at building permit? Require stormwater site plan at permitting?

SECTION 24-031.00 STP STORMWATER AGREEMENT AND STORMWATER SITE PLAN

Any development or improvement project within unincorporated St. Tammany Parish that involves excavation, grading, filling, cutting, draining cutting, draining, paving or earthwork will be required to provide an executed Annual Stormwater Agreement and a Stormwater Site Plan upon building permit application.

A. APPLICABLE PROJECTS TYPES

Unless otherwise stated, no person(s) shall perform any clearing, excavation, dirt work, grading, filling, construction, or development within the Parish without first providing the Annual Stormwater Agreement and Stormwater Site Plan. No person(s) shall be issued any Parish permit or work order for a construction project without first having obtained an approved Stormwater Agreement. This requirement applies to the following project types:

1. New construction, residential, commercial, institutional, industrial, utility or other activities;
2. New construction of accessory buildings greater than 100 square feet;

3. Additions or renovations greater than 500 square feet;
4. Excavation, grading, filling, cutting, draining, or paving of lots, parcels, or other areas;
5. Land clearing;
6. Pool installation or pond excavation;
7. Flatwork, parking lot, and road installation;
8. Subdivision/Minor Subdivision development;
9. Stockpiling fill material;
10. Any soil disturbance immediately adjacent to, on, or in, a waterway;
11. Reroute, deepen, widen, or alter in any way an existing drainage system or feature and
12. Any development which may significantly increase or decrease the rate and/or quantity of surface water runoff, degrade water quality, adversely affect the MS4, drainage infrastructure, conveyances, or waterways.

The following project types are exempt from the requirement for an Annual Stormwater Agreement and Stormwater Site Plan:

1. Any building permit for a less than 500 sq. ft. addition to an existing structure, an interior remodel, a less than 100 sq. ft. accessory structure, or a commercial build-out of an existing shell;
2. Capital projects or infrastructure improvement projects by Parish personnel. (Such projects shall comply with all other state, federal, and local stormwater permit requirements.) This exemption does not apply to private contractors working on Parish projects; ???
3. Any emergency activity that is immediately necessary for the protection of life, property, or natural resources;
4. Septic system installation, repair, and/or alteration;
5. Excavation of graves in cemeteries;
6. Agricultural practices such as plowing, cultivation, tree cutting, logging operations that leave the stump and root mat intact, and cultivated sod operations. Agricultural projects shall comply with all other state, federal, and local stormwater and water quality requirements and
7. Minor landscaping and sprinkler installation.

These exemptions do not relieve the owner, operator, or other legal representative of the responsibility of installing and properly maintaining the erosion, sedimentation, or pollution control measures or any other liability resulting from such activities.

B. STORMWATER AGREEMENT

1. It shall be the responsibility of the property owner or his designee to acquire and comply with an LDEQ permit in order to proceed with an improvement project. In lieu of requiring the LDEQ permit at the time of building permit application, the Parish shall require an approved annual Stormwater Agreement for any development or improvement project that involves excavation, grading, filling, cutting, draining, paving or related earthwork. This agreement, which is pre-prepared document provided by STPG, will serve as a signed contract with the Parish stating that the property owner or his designee agrees to obtain an LDEQ permit for construction and comply with all applicable LDEQ regulations during the term of the project.
2. The duration of the annual Stormwater Agreement is one fiscal year, from January 1st through December 31st. The annual agreement covers an unlimited number of projects per fiscal year for a single owner, developer, or contractor. A single use Stormwater Agreement is valid only for the duration of the single project it was purchased to accompany. Any additional permits for a single developer would require an additional single use agreement.
3. Fees may be utilized by the Parish to recover expenses associated with the stormwater program. These expenses consist primarily of administration, inspection, and enforcement activities. The fees for the annual Stormwater Agreement are pursuant to Chapter 2 of the Parish Code of Ordinances, Article I, Section 2-009.00, Parish Fees and Service Charges.

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C. STORMWATER SITE PLAN

1. A Stormwater Site Plan is a component of the SWPPP as required by LDEQ. In an effort to insure the owner, developer or contractor has a sufficient plan to address necessary stormwater controls before the commencement of construction, the Parish shall require a copy of the Stormwater Site Plan at the time of building permit application. Option to combine with fill plan?
2. An approved stormwater site plan is required with submittal of any applicable STP development, construction, building permit, or general work order. The site plan shall contain the following:
   a. The property owner's name, address, date, legal description of parcel, lot number, and a boundary survey indicating the location, and dimensions of the lot;
   b. The shape, size, and location of all existing and proposed buildings or other structures;
   c. The location and approximate dimension of driveways, entrances, and all points of access to a public street or road;
   d. Locations of areas subject to flooding or limits of floodplain, if applicable;
   e. Total land area;
   f. The locations of all existing and proposed streets, alleys, utilities, stormwater conveyances, drainage features, sanitary sewers and drainage, utility, or access easements/servitudes;
   g. All existing and proposed impervious area;
   h. Natural or man-made watercourses;
   i. All existing and proposed slopes, terraces, bulkheads, or retaining walls;
   j. Erosion and sedimentation control plans or SWPPP;
   k. Drainage and/or fill calculations as required by permit and/or ordinance;
   l. Direction of flow indicators and
   m. Receiving water for the ultimate discharge of stormwater from the site.
3. When a Stormwater Site plan is required to obtain a Parish permit, it shall be submitted to the Department of Engineering for review. The Stormwater Site Plan, including any Engineering approved revisions, is valid for the duration of the project.
4. The submittal process for the commercial development Stormwater Site Plan shall be in accordance with Chapter 7 of the Parish Code of Ordinances, Section 7-050.0 Drainage and Paving Plan (Commercial, Industrial, Institutional Developments, and Certain Multi-family Developments).
5. For subdivisions, a stormwater site plan shall be submitted for all tentative, preliminary, final, and minor subdivision developments. The stormwater site plan will focus on stormwater management, water quality, and receiving waters. The submittal process for the tentative subdivision stormwater site plan shall be in accordance with Appendix B, Chapter 40 of the Parish Code of Ordinances, Subdivision Regulatory Ordinance 499, Section 40-050.0, Subdivision Review.

ARTICLE IV CONSTRUCTION AND POST-CONSTRUCTION ACTIVITIES

SECTION 24-032.00 STORMWATER DISCHARGES FROM CONSTRUCTION ACTIVITIES

A. GENERAL REQUIREMENTS

1. All appropriate Parish permits shall be obtained before the commencement of construction.
2. All operators of construction sites shall use BMPs, to control discharge to waterways and conveyances of the Parish. Pollutants such as silt, sediment, mud, clay, and other construction materials associated with clearing, filling, grading, excavation, and construction shall be controlled to the maximum extent practical.
3. Operators shall refer to guidance manuals such as the *BMPs for Coastal Louisiana Zone* for BMP definitions, selection, applicability, planning considerations, recommended specifications and maintenance.

B. SPECIFIC REQUIREMENTS

1. Existing vegetation shall be preserved, where feasible, and disturbed portions of the site shall be

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stabilized immediately upon the temporary or permanent cessation of construction activities. In no case shall disturbed soil remain destabilized for more than 14 days.
2. Structural BMPs shall be utilized, where feasible, to divert flow away from exposed soil, store stormwater, or otherwise reduce runoff and the discharge of pollutants from the construction site.
3. Installation, inspection, and maintenance of erosion and sediment BMPs shall be consistent with the effective operating conditions on the site. Operators are responsible for the installation and maintenance of stormwater BMPs until warranty obligations are met and/or occupancy certificates are issued.
   a. As required by LDEQ permits, operators shall be responsible for overseeing self-inspections of all BMPs at construction sites as noted in the LDEQ permit.
   b. Based on the results of the inspections, BMPs shall be maintained, revised, repaired, or replaced as necessary but prior to a future storm event;
   c. The SWPPP or SW Site Plan shall be updated with any BMP revisions.
   d. Any BMP modifications shall be recorded in the SWPPP and/or SW Site Plan within (7) calendar days and implemented on site as soon as is practical.
   e. The owner, contractor, and/or operator of a construction site is responsible for compliance with the requirements of this Ordinance;
   f. The Parish may hold occupancy certificates related to a site until approval of the final stormwater inspection with a determination that any required stormwater controls are in place.
4. The SWPPP, stormwater site plan, and stormwater self-inspection reports shall be made available on site for inspections.
   a. Per LDEQ, a copy of the NOI and SWPPP is required on large projects on 5 or more acres. This requirement includes any lot or parcel that is part of a larger common plan of development.
   b. Per LDEQ, a SWPPP is required (but not an NOI) for all projects 1 acre or greater, but less than 5 acres, if not part of a larger common plan of development.
5. A stabilized construction entrance/exit pad shall be utilized to minimize the tracking of mud, clay, sediment, and other construction materials onto roadways and streets.
6. The discharge of construction or building materials, including cement, concrete, lime, mortar, slurries, and paints is prohibited. On-site containment or off-site disposal is required.
7. Good housekeeping measures shall be employed to prevent, contain, and clean up spills of paints, solvents, fuel, sewage, and any hazardous chemicals and pollutants associated with construction.
8. Proper waste disposal and management of construction materials, construction debris, paints, solvents, chemicals and construction waste, etc. shall be utilized to prevent stormwater contamination.

D. SITE APPLICABILITY

1. All construction activity, including clearing, grading, filling, and excavation shall comply with the requirements of this stormwater Ordinance.
2. All new subdivision development, minor subdivision development, residential construction, commercial construction, and roadway construction shall comply with the requirements of this Ordinance. (this or other ordinances??)

E. PARISH STORMWATER INSPECTIONS AND RE-INSPECTIONS

Discussion point - We need to discuss our inspection program.

Routine stormwater inspections will be performed by Parish stormwater inspectors, as stipulated in the Stormwater Agreement and/or any applicable STP permit or work order.

1. The first stormwater inspection for each project shall be scheduled at the commencement of construction with the preliminary drainage inspection and the final stormwater inspection shall be scheduled at the completion of construction with the drainage final inspection.
2. Unscheduled stormwater inspections and drainage inspections may be performed by the Parish at any point during the construction process.

3. Any hold on occupancy related to drainage and/or stormwater inspections shall be released upon approval of the final drainage inspection and/or final stormwater inspection.
4. There is no charge for scheduled or unscheduled stormwater inspections, with the exception of re-inspections following a failed inspection.
5. Drainage and stormwater inspections may be performed at the same time, or separately, as necessary.
6. Re-inspections are pursuant to Chapter 2 of the Parish Code of Ordinances, Article I, Section 2-009.00, Parish Fees and Service Charges.
7. Failure to correct inadequacies following a failed drainage and/or stormwater inspections shall be considered a violation requiring enforcement action.

F. PHASED SUBDIVISION DEVELOPMENT

Site disturbance shall be phased, when applicable, to limit soil erosion and sediment excursion. Final stabilization shall be accomplished before continuing to the next phase. When a phased development is proposed, the Stormwater Agreement shall be submitted and processed in accordance with Appendix B, Chapter 40 of the Parish Code of Ordinances, Subdivision Regulatory Ordinance 499, Section 40-050.0.

G. MASTER PLAN SUBMITTAL

A master plan shall be submitted for review, if the subdivision is to be developed in phases. A valid Stormwater Agreement and Stormwater Site Plan shall be maintained throughout each phase of the project. The master plan for phased development shall be prepared with emphasis on the relationship of phasing with respect to the entire property to be developed and potential water quality impacts.

SECTION 24-033.00 POST CONSTRUCTION STORMWATER REQUIREMENTS

A. PERMANENT STORMWATER BMPs shall include both structural and non-structural BMPs.

1. STRUCTURAL BMPS shall include, but are not limited to, retention/detention ponds, stormwater diversion structures, and filtration devices.
   a. Installation of permanent structural measures to control stormwater pollutants after the subdivision development, and shall be in accordance with Appendix B, Chapter 40 of the Parish Code of Ordinances, Subdivision Regulatory Ordinance 499, Section 40.
   b. Erosion, sedimentation, and pollutants shall be controlled after completion of the development process in accordance with the *BMPs for Coastal Louisiana Zone* manuals and/or current LDEQ and USEPA guidelines for structural BMPs.
   c. Regularly scheduled self-inspections and routine maintenance of structural BMPs are required to determine the BMPs continue to function as designed and stormwater discharges from the BMP continue to meet design standards. All water quality monitoring reports and/or inspection reports shall be made available to the Parish upon request.
   d. For the protection of water quality, each development subject to performance standards shall meet the criteria and shall implement structural water quality controls set forth in the Ordinance.
   e. Structural stormwater controls for residential and commercial development shall continue to meet the performance standards as stipulated in the original design and approved by the Parish. At a minimum, annual inspections shall be required to monitor the structural stormwater controls and maintenance performed, as necessary, to ensure the stormwater control continues to perform as designed.

2. NON-STRUCTURAL BMPs may include, but are not limited to buffer zones, riparian buffers, and/or green space
   a. Buffer zones, riparian buffers, and/or green space shall be established in accordance with all applicable state, federal, and local requirements.
   b. Non-structural BMPs such as buffer zones, riparian buffers, and green space areas shall be

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adequate to prevent water quality impacts to waterways and wetlands.

B. STORMWATER BMP MAINTENANCE AGREEMENT

A BMP Maintenance Agreement shall be required for any structural stormwater control of the developer, or his assignee, upon fulfillment of the performance and warranty obligations and final acceptance of the subdivision in accordance with Appendix B, Chapter 40 of the Parish Code of Ordinances, Subdivision Regulatory Ordinance 499, Section 40-071.01 Warranty and Performance Obligations.

1. In the event that the landowner, maintenance association, or the Home Owners' Association does not accept the assignment, the developer shall remain subject to the terms of the Stormwater BMP Maintenance Agreement until acceptance into the Parish maintenance system occurs.
2. The assignee may request that retention and/or detention ponds be taken into the Parish maintenance system in accordance with Appendix B, Chapter 40 of the Parish Code of Ordinances, Subdivision Regulatory Ordinance 499, Section 40-037.02, Residential Retention/Detention Ponds.

C. The Stormwater BMP Maintenance Agreement Duration

The fee for the Stormwater BMP Maintenance Agreement is used to assist the Parish with monitoring the condition of permanent structural and non-structural BMPs.

1. The duration of a long-term BMP Maintenance Agreement is five (5) years
2. The duration of an optional short-term BMP Maintenance Agreement is one (1) year.
3. It is the responsibility of the permit holder to renew the permit prior to permit expiration.
4. Upon renewal of the BMP Maintenance Agreement, an inspection report with shall be required from a civil engineer to certify the stormwater BMP is functioning in a manner consistent with design specifications.

D. Regular inspections are included in the Stormwater BMP Maintenance Agreement fee. There is no additional charge for inspections, with the exception of re-inspections following a failed inspection.

E. BMP Maintenance Agreement fees and/or re-inspection fees are pursuant to Chapter 2 of the Parish Code of Ordinances, Article I, Section 2-009.00, Parish Fees and Service Charges.

F. Failure to correct inadequacies following failed inspections shall be considered a violation requiring enforcement action. *(ARTICLE III pursuant to LAC 33:IX.2511.B.15, 2515.A.1 & 2523.B4&5; 40 CFR § 122.26(a)(9) & (b)(5); 40CFR § 122.34(b)(5); LPDES Construction Permits LAR100000 & 200000; and LPDES MS4 Permit LAR041024 § IV.D.4-5.)*

ARTICLE IV PUBLIC PARTICIPATION AND INVOLVEMENT

SECTION 24-041.00 OWNER AND/OR OPERATOR REPORTING REQUIREMENTS

The operator and/or the owner of any commercial or industrial activity shall report any prohibited discharges, spills, releases, illicit discharges, and unauthorized connections into the MS4, drainage infrastructure, conveyances, or waterways in the Parish and any other violation of this Ordinance for which they are responsible. Reports shall be made to STP in accordance with Parish policy.

A. A hazardous and/or toxic material spill or release shall be immediately reported to the St. Tammany Parish Fire Department and LDEQ;
B. Other instances where pollutants are discharged into the MS4, drainage infrastructure, conveyances, or waterways of the Parish by spill, release, illicit connections or other means shall be reported to LDEQ and the Parish; and
C. The owner of any commercial or industrial facility with a spill or release of pollutants, hazardous materials, or toxins is responsible for proper notification of the incident to all appropriate local, state, and federal agencies.

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SECTION 24-042.00 CITIZEN COMPLAINT REPORTS

All citizens may report any spills, releases, illicit connections, or other instances of anyone discharging pollutants into the MS4, drainage infrastructure, conveyances or waterways of the Parish and any other violation of this Ordinance to the MS4 Administrator or any person designated by the Parish to receive such citizen reports.

A. Citizen stormwater complaints may be made verbally or in writing. A written record of each citizen report to the Parish will be prepared and kept on file for a period of three years. Upon request, the Parish will inform the reporting citizen of any action taken in response to the citizen's report.
B. When applicable, the Parish will report citizen complaints to the appropriate local, state, or federal agencies if a violation is confirmed upon investigation by STP.

(ARTICLE IV pursuant to LAC 33:IX.2523.B.1-2 , 40 CFR § 122.34(b)(1-2), and LAR041024 § IV.D.1-2.)

ARTICLE V PARISH ENFORCEMENT AND REMEDIES

SECTION 24-051.00 ENFORCEMENT OF STORMWATER VIOLATIONS

Whenever it appears that a person has violated, or continues to violate, any permit or provision of this Ordinance, enforcement proceedings may proceed in accordance with Chapter 1 of the Parish Code of Ordinances. Enforcement action may include, but is not limited to fines or fees, issuance of a notice of violation or cease and desist order, a citation to appear for an administrative hearing, and/or prosecution for a violation.

SECTION 24-052.00 REMEDIES NONEXCLUSIVE

The remedies provided for in this Ordinance are not exclusive of any other remedies that the Parish may have under state, federal, or local law. The Parish may take any, all, or any combination of these actions against a violator. The Parish is empowered to take more than one enforcement action against any violator. These actions may be taken concurrently.

(ARTICLE XI pursuant to LAC 33:IX.2523.B.1-6 , 40 CFR § 122.34(b)(1-6), and LAR041024 § IV.D.1-6.)

BE IT FURTHER ORDAINED that Article II St. Tammany Parish Flood Hazard Area Ordinance, Division 5 Provisions for Flood Hazard Reduction, is hereby amended to repeal paragraph (5) of Section 7-042.00 Specific Standards, all as specifically set forth immediately herein after, to-wit:

ARTICLE II ST. TAMMANY PARISH FLOOD HAZARD AREA ORDINANCE

DIVISION 5 PROVISIONS FOR FLOOD HAZARD REDUCTION

SEC. 7-042.00 Specific Standards

~~(5) Construction Sites - Storm Water Runoff~~

~~a. A permit shall be required for the clearing, grubbing, grading, displacement or removal of dirt (hereafter referred to as "dirt work") for any properties not specifically exempted as per Paragraph (c) of this Section. This permit shall be in the form of an approval of the "Culvert Data Sheet", the "Permit Data Review Sheet", a general work order or land clearing permit presently required for construction activity to occur. The ordinance shall be administered by Department of Engineering or any other parish personnel that should be necessary.~~

~~b. A detailed description of dirt work, boundaries of the areas to be disturbed and the proposed sediment retention measures must accompany the building permit or development proposal and be reviewed by the Department of Engineering before approval of the Culvert Data Sheet or the Permit Data Tracking Sheet or the issuance of a general work order.~~

~~c. Exemptions~~

~~1. Agricultural land management practices and construction of agricultural structures as defined in the St. Tammany Parish Land Use Ordinance No. 523;~~
~~2. Mining, quarrying, processing of rock, sand, gravel, aggregate or clay where established and provided for by law;~~
~~3. Activities undertaken on forest land in the production and harvesting of timber when approved via an agricultural clearing, timber harvesting or rural clearing permit in accordance with St. Tammany Parish Land Use Ordinance No. 523;~~
~~4. Single family residences, and related accessory structures or uses, when the disturbed area comprises of less than 50% of the lot or parcel and is located at least 10 feet from all property lines.~~
~~5. Requirements.~~
~~6. The owner, builder or developer of a construction project shall cause the placement of a required sediment control measure for all side slope and down slope boundaries of a construction area, unless a sedimentation basin designed to accommodate 3600 cubic feet of water and sediment for each acre of disturbed property is provided.~~
~~7. The owner, builder or developer will further cause the placement of said sediment control measure around all drainage structure inlets which flow into a public drainage system, or a drainage system which is intended to be dedicated to the public.~~
~~8. Sediment Retention Measures.~~
~~9. The following measures are sediment retention measures subject to review and approval of each application based upon the characteristics of the work and site being permitted. A detailed description of the application, design criteria and limitations of each is outlined in Appendix A.~~

~~1. Mulching~~
~~2. Erosion Control Mats~~
~~3. Vegetation~~
~~4.Silt Fencing~~
~~5. Straw Bale Dikes~~
~~6. Diversion Dikes~~
~~7. Interceptor Swales~~
~~10. Inlet Protection~~
~~11. Any other functionally equivalent technology or method deemed appropriate by the Director of the Department of Engineering.~~

~~f. A blanket permit may be issued for large-scale developments when the developer provides the required sediment control measures for the development as a whole. The appropriateness of these measures will be determined by the Director of the Department of Engineering.~~

~~g. Provision of sediment retention measures on site does not release the builder/developer from responsibilities as outlined in Section 40-071.01of Appendix B (Subdivision Regulations) of the St. Tammany Parish Code of Ordinances should the retention measures fail to prevent sediment runoff. The Director of the Department of Engineering may release the builder/developer from the provisions of this Section if it is determined that the failure of sediment control measures is not attributable to faulty installation or maintenance of the required retention measures.~~

~~1. Enforcement~~

~~Violations will be processed by the appropriate Code Enforcement, Department of Engineering or Permit Inspections personnel using standard code violation protocol.~~

(Subsection 5 per Ord. 99-3156, adopted 10/21/99)

REPEAL: All ordinances or parts of ordinances in conflict herewith are hereby repealed.

SEVERABILITY: If any provision of this Ordinance shall be held to be invalid, such invalidity shall not affect any other provision herein which can be given effect without the invalid provision and to this end the provisions of this Ordinance are hereby declared to be severable.

EFFECTIVE DATE: This ordinance shall become effective fifteen (15) days after adoption

MOVED FOR ADOPTION BY:_____ SECONDED BY:_____

WHEREUPON THIS ORDINANCE WAS SUBMITTED TO A VOTE AND RESULTED IN THE FOLLOWING:

YEAS:

NAYS:

ABSTAIN:

ABSENT:

THIS ORDINANCE WAS DECLARED DULY ADOPTED AT A REGULAR MEETING OF THE COUNCIL HELD ON THE ____DAY OF_____ , 20__, AND BECOMES ORDINANCE COUNCIL SERIES NO._____.

_____
MARTIN W. GOULD, JR., COUNCIL CHAIRMAN

ATTEST:

_____
THERESA L. FORD, COUNCIL CLERK

_____
PATRICIA BRISTER, PARISH PRESIDENT

Published introduction: _____, 2012
Published adoption on:_____, 201__
Delivered to Parish President:_____, 20__ @_____
Returned to Council Clerk:_____, 20__ @_____

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ST. TAMMANY PARISH COUNCIL

ORDINANCE

ORDINANCE CALENDAR NO._____ ORDINANCE COUNCIL SERIES NO._____
COUNCIL SPONSOR: GOULD/BRISTER PROVIDED BY: COUNCIL ATTORNEY
INTRODUCED BY:_____ SECONDED BY:_____
ON THE ___DAY OF___2015

ORDINANCE AMENDING THE ST. TAMMANY PARISH CODE OF ORDINANCES TO ENACT CHAPTER 24 ST. TAMMANY PARISH STORMWATER ORDINANCE AND TO REPEAL PARAGRAPH (5) OF SECTION 7-042.00.

WHEREAS, the Clean Water Act of 1972 established the basic structure for regulating discharges of pollutants into the waters of the United States as well as the quality standards for surface waters; and

WHEREAS, the United States Environmental Protection Agency is the federal agency charged with establishing pollutant control programs, which are often implemented and enforced through state agencies, such as Louisiana Department of Environmental Quality; and

WHEREAS, in an effort to comply with the water quality standards and requirements established by United States Environmental Protection Agency and Louisiana Department of Environmental Quality, St. Tammany Parish Government is taking steps to address water quality as a whole by evaluating current water quality conditions, programming infrastructure improvements, and reviewing existing policies and procedures; and

WHEREAS, St. Tammany Parish Government is automatically permitted by Louisiana Department of Environmental Quality as the owner of the Parish's Small Municipal Separate Storm Sewer System, which is a conveyance or system of conveyances that is owned by a public entity that discharges to waters of the US and is used to collect or convey stormwater (including storm drainages, pipes, ditches, etc.); and

WHEREAS, in order to maintain the Municipal Separate Storm Sewer System permit status, St. Tammany Parish Government must develop a Stormwater Management Program that addresses six minimum control measures: Public Education/Outreach; Public Participation / Involvement, Illicit Discharge Detection and Elimination, Construction Site Runoff Control, Post-Construction Runoff Control, Pollution Prevention/ Good Housekeeping; and

WHEREAS, of the six minimum control measures addressed in the Stormwater Management Program, the Louisiana Department of Environmental Quality requires local legislation be enacted specifically for three of the measures: Illicit Discharge Detection and Elimination, Construction Site Runoff Control, Post-Construction Runoff Control; and

WHEREAS, the St. Tammany Parish Stormwater Ordinance shall address these three minimum control measures and establish methods to control the introduction of pollutants into the MS4.

THE PARISH OF ST. TAMMANY HEREBY ORDAINS that the St. Tammany Parish Code of Ordinances is hereby amended to enact Chapter 24 St. Tammany Parish Stormwater Ordinance pursuant to LAC 33:IX and 40 CFR § 122 to provide therein the following regulations that are applicable thereto, and to otherwise provide as follows:

CHAPTER 24 – ST. TAMMANY PARISH STORMWATER ORDINANCE

ARTICLE I GENERAL PROVISIONS

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SECTION 24-001.00 ABBREVIATION OF TERMS
The following abbreviations when used in this Ordinance shall have the designated meanings:

BMP - Best Management Practices
CFR - Code of Federal Regulations
EPA – United States Environmental Protection Agency
LAC- Louisiana Administrative Code
LDEQ - Louisiana Department of Environmental Quality
LPDES - Louisiana Pollutant Discharge Elimination System
MS4 - Municipal Separate Storm Sewer System
NOI - Notice of Intent
NPDES - National Pollutant Discharge Elimination System
STPG - St. Tammany Parish Government
SWMP – Stormwater Management Plan
SWPPP - Stormwater Pollution Prevention Plan
TMDL – Total Maximum Daily Load
WLA - Waste Load Allocation

SECTION 24-002.00 DEFINITIONS
Unless a provision explicitly states otherwise, the following terms and phrases, as used in this Ordinance, shall have the meanings hereinafter designated:

~~ADMINISTRATOR- shall mean the MS4 Administrator or delegated authority by STP.~~ All references to this already say MS4 administrator except one. Remove definition and change the one to say MS4 administrator
BACKWASH- shall mean the rinsate resulting from the cleaning of equipment, vehicles, tools, containers, cartridges, filters, etc. Only one reference in body of document – remove and explain with reference?
BMP MAINTENANCE AGREEMENT- shall mean a permit to ensure routine inspections and maintenance are performed on permanent and/or structural BMPs for adherence to original design criteria. This is only referenced in one section. Remove definition and explain purpose in section
~~BMPs~~ BEST MANAGEMENT PRACTICES (BMP) - shall mean schedules of activities, prohibitions of practices, maintenance procedures, treatment requirements, operating procedures, and other practices used to prevent or reduce contaminated discharges or runoff.
~~BMPS FOR COASTAL LOUISIANA ZONE MANUALS- shall mean the technical manuals prepared by the Coastal Nonpoint Pollution Control Program for the Louisiana Coastal Zone to demonstrate BMPs. The manuals are to be used as a guide for developers, builders, and engineering firms for BMP selection during the design and construction phase of development.~~ Only one reference in body – remove and explain in section
~~CODE ENFORCEMENT OFFICER- shall mean any person duly authorized by the Parish, for the enforcement of this Ordinance.~~ Not referenced anywhere else in document. Remove
COMMENCEMENT OF CONSTRUCTION- shall mean the initial disturbance of soils associated with clearing, grading, excavating, filling, and other construction activities. Do we need this phrase defined if we already define construction?
COMMERCIAL- shall mean any activity pertaining to a business, industry, corporation, or organization.
CONSTRUCTION- shall mean any human activity that includes clearing, grading, excavation, filling, or other placement, movement, removal, or disposal of soil, rock, organic materials, or earth minerals.
CONTAMINATED- shall mean containing a harmful quantity of any pollutant.
CONVEYANCE- shall mean any roadway, ditch, pipe, canal, or waterway that moves water in the Parish.
DISCHARGE- shall mean any stormwater or wastewater whatsoever introduced into the MS4, drainage infrastructure, conveyances, ditches, or waterways of the Parish, or into waters of the United States.
DISCHARGER- shall mean any person who causes, allows, or is otherwise responsible for a discharge. Is this a thing or a person? Referenced both ways.
DRAINAGE INFRASTRUCTURE- shall mean any roadway ditch, pipe, manmade or natural water body/waterway that moves water in STP. How is this different than conveyance?

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~~EPA – shall mean the United States Environmental Protection Agency.~~ Already in abbreviations. Remove?
FACILITY- shall mean any building, structure, installation, process, or activity from which there is or may be a discharge of a pollutant. Is this necessary?
FERTILIZER- shall mean any substance that contains essential plant nutrients in a form available to plants and is used primarily for promoting or stimulating growth of a plant or improving the quality of a crop.
FILLING- shall mean the deposition of soil and other inert materials on the land to raise its grade and/or smooth its features. Define filling but not fill??
FINAL STABILIZATION- shall mean a uniform perennial vegetative cover with a density of 70% coverage is established or an equivalent permanent stabilization measure (such as the use of riprap, gabions, or geo-textiles) is employed. Only referenced once? Move to section?
~~HAZARDOUS MATERIAL OR SUBSTANCE- shall mean any of the following: Any substance determined to be hazardous according to 49 CFR § 171.8, or listed in Table 302.4 of 40 CFR § 302 or Section 311(b) (2) (A) of the Clean Water Act [33 USC § 1317 (a) and 1321 (b) (A)].~~ Not used anywhere in document
HAZARDOUS WASTE- shall mean any substance identified or listed as a hazardous waste by the EPA pursuant to 40 CFR § 261.
HERBICIDE- shall mean a substance used to defoliate, desiccate, destroy, inhibit or regulate vegetation.
~~HOUSEHOLD HAZARDOUS WASTE- shall mean any material generated in a household by a consumer that is classified as a hazardous waste under 40 CFR § 261.~~ See hazardous waste above. Remove
ILLICIT DISCHARGE- any unauthorized and/or unpermitted discharge that is not composed entirely of stormwater.
~~LDEQ - shall mean the State of Louisiana agency by that name.~~ Remove – already handled in abbreviations
LPDES PERMIT OR NPDES PERMIT- shall mean the permit issued by the LDEQ or the USEPA, under authority delegated pursuant to 33 USC § 1342(b) that authorizes the discharge of pollutants to waters of the United States. Both agencies identified in abbreviations. Need to define permit?
~~MS4~~ MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) - shall mean roadside drainage systems, catch basins, curbs, gutters, ditches, man-made channels, or storm drains used for collecting and/ or conveying stormwater in STP.
NON-STORMWATER DISCHARGE- any unpermitted discharge not entirely composed of stormwater.
~~NOI~~ NOTICE OF INTENT (NOI) - shall mean the Notice of Intent that is required by the Construction General Permit, the Multi-Sector General Permit, or other General Permit for the discharge of stormwater.
OPERATOR- shall mean the person or persons who, either individually or taken together, has operational control over the facility; or has day-to-day operational control over those activities at the facility necessary to ensure compliance with pollution prevention requirements and any permit conditions.
OWNER- shall mean the person who owns the property or a facility. Necessary?
PARISH- shall mean St. Tammany Parish in the State of Louisiana.
PERSON- shall mean any individual, partnership, firm, company, corporation, association, trust, estate, entity, or any legal representative, agent, or assignee. Necessary?
PESTICIDE- shall mean a substance used to prevent, destroy, repel, or mitigate any pest.
POLLUTANT- shall mean dredged spoil, solid waste, sewage, garbage, sludge, chemical waste, biological materials, radioactive materials, heat, rock, soil, sediment, or industrial waste discharged into waters of the state and/or the MS4, drainage infrastructure, conveyances, or waterways of STP.
POLLUTION- shall mean the contamination of the physical, thermal, chemical, or biological quality of waters that renders the water harmful, detrimental, injurious to humans, animal life, vegetation, or impairs the usefulness for the public enjoyment of the water for any lawful or reasonable purpose.
RELEASE- shall mean any spilling, leaking, pumping, pouring, discharging, injecting, leaching, dumping, or disposing, directly or indirectly, into the MS4, drainage infrastructure, conveyances, or waterways of the Parish.
SANITARY SEWAGE- shall mean the domestic sewage and/or industrial waste that is discharged into the sanitary sewer system and passes through the sanitary sewer system to any sewage treatment plant utilized in the Parish for treatment.
SANITARY SEWER (OR SEWER)- shall mean the system of pipes, conduits, and other conveyances which carry industrial waste and sanitary sewage from residential dwellings, commercial buildings, industrial and manufacturing facilities, and institutions, whether treated or untreated, to any sewage treatment plant.
SEDIMENT- shall mean soil, sand, clay, and minerals washed from land into roadways, drainage infrastructure,

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and waterways, usually during or after a rain. Sediment may cause a reduction in storage capacity, impede drainage, destroy fish-nesting areas, clog animal habitats, and cloud waters to such an extent as to prevent sunlight from reaching aquatic biota.
SEPTIC TANK WASTE- shall mean any sanitary sewage from holding tanks such as vessels, chemical toilets, campers, trailers, and septic tanks. No definition of septic tank needed?
SITE- shall mean the land or water area where any facility or activity is physically located or conducted, including adjacent land used in connection with the facility or activity. Necessary?
SOLID WASTE- shall mean any garbage, sludge, solid, semi-solid, discarded material, or debris resulting from construction, industrial, municipal, commercial, mining, or agricultural operations. This is only a reference in the definition of pollutant, not in body. Needed?
STATE- shall mean the State of Louisiana.
STORMWATER- shall mean stormwater runoff, surface runoff and drainage runoff.
STORMWATER AGREEMENT- shall mean the agreement utilized by the Parish and signed by the contractor, developer, land owner, or agent to ensure all required permits are in place and the implementation of BMPs will be used to control erosion and sedimentation and reduce the pollutants in stormwater discharges associated with excavation, grading, filling, and other construction projects. Define here or in section?
~~STORMWATER DISCHARGE ASSOCIATED WITH INDUSTRIAL ACTIVITY- shall mean the release of stormwater that drains from an industrial facility that meets the criteria listed in 40 CFR § 122.26(b)(14).~~ Not used anywhere
~~SWPPP~~ STORMWATER POLLUTION PREVENTION PLAN (SWPPP) - shall mean a plan required by the Construction General Permit, the Industrial General Permit, or the Multi-Sector General Permit and which describes and ensures the implementation of practices that are to be used to reduce the pollutants in stormwater discharges associated with construction or other industrial activity at the facility.
~~TMDL~~ TOTAL MAXIMUM DAILY LOAD (TMDL) - shall mean the water quality assessment that determines the source(s) of pollutants of concern for a particular water body; considers the maximum amount of pollutants the waterbody is able to assimilate; and then allocates to each source a set level of pollutants that is allowed to discharge.
UNCONTAMINATED- shall mean not containing a harmful quantity of any pollutant. Necessary if contaminated is defined?
USED OIL OR USED MOTOR OIL- shall mean any refined or synthetic oil that, as a result of use, storage, or handling, has become unsuitable for its original purpose because of impurities or the loss of original properties, but that may be suitable for reuse and recycling in compliance with state and federal law. Necessary?
WASTEWATER- shall mean any water or other liquid, other than uncontaminated stormwater, discharged from a facility.
WATER QUALITY STANDARD- shall mean the designation of a body of surface water for desirable uses and the narrative and numerical criteria deemed by the state to be necessary to protect those uses. Maybe just define water quality? Or is this phrase specific reference to an established standard?
~~WATERS OF THE STATE- shall mean any groundwater, lake, bay, pond, reservoir, spring, river, stream, creek, estuary, marsh, inlet, canal, or gulf, inside the territorial limits of the State, and all other bodies of water, natural or artificial, navigable or non-navigable, and including the beds and banks of all water courses and bodies of surface water, that are wholly or partially inside or inside the jurisdiction of the State.~~ Not referenced in body
WATERS OF THE UNITED STATES- shall mean any waters within the federal definition of "waters of the United States" as defined in 40 CFR § 122.2. KEEP?? WOTUS?
WETLAND- shall mean an area that is frequently inundated or saturated by water and is sufficient to support a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.
~~WLA~~ Waste Load Allocation (WLA) - shall mean that portion of the assimilative capacity of the receiving water apportioned to a specific discharger in such a way that water quality standards are maintained under design conditions.

SECTION 24-003.00 PURPOSE
The purposes and objectives of this Ordinance are to establish policies and procedures for the permitting,

monitoring, and/or enforcement regarding Illicit Discharge Detection and Elimination, Construction Site Runoff Control, and Post-Construction Runoff Control. In doing so, the ordinance will allow the Parish to:

A. Comply with the MS4 Permit, all state, federal, and local regulations applicable to stormwater and non-stormwater discharges.
B. Manage stormwater impacts at their source and prevent contaminated stormwater and non-stormwater discharges into the MS4, drainage infrastructure, conveyances, and waterways within the Parish.
C. Provide for proper operations and maintenance of all permanent stormwater management BMPs that are implemented within the Parish.
D. Provide review procedures and performance standards for stormwater planning and management.
E. Facilitate compliance with state and federal water quality standards, limitations, and permits by owners and operators of industrial activities and construction sites within the Parish.

SECTION 24-004.00 ADMINISTRATION

The Parish MS4 Administrator shall administer, implement, and enforce the provisions of this Ordinance. Any powers granted to or duties imposed upon the MS4 Administrator shall be carried out by the Administrator or may be delegated to other authorized personnel.

A. The Parish may adopt, by council action, reasonable stormwater fees for reimbursement of costs related to administration of the stormwater ordinance, MS4 compliance costs, TMDL implementation, and costs related to the stormwater management program as required by the USEPA or LDEQ.
B. Methods utilized to cover the costs associated with the stormwater program may include, but is not limited to fees for:
    1. Permitting, monitoring, inspection, and surveillance procedures;
    2. Stormwater plan review;
    3. Stormwater public education events;
    4. Complaint response, spill/pollution response, and clean-up;
    5. Stormwater utility fees calculated on percent of impervious area on a site; and
    6. Processes necessary to carry out the requirements of this ordinance.

ARTICLE II NON-STORMWATER AND ILLICIT DISCHARGES

SECTION 24-021.00 PROHIBITED NON-STORMWATER ILLICIT DISCHARGES

A. GENERAL PROHIBITION:

No person shall introduce or cause to be introduced into the MS4, drainage infrastructure, conveyances, or waterways of the Parish any illicit discharge that is not composed entirely of stormwater, except as provided in Article II Section 24-022.00 of this ordinance.

1. No person shall introduce or cause to be introduced into the MS4, drainage infrastructure, conveyances, or waterways of the Parish any discharge that causes or contributes to causing the Parish to violate a water quality standard, the Parish LPDES permit, or any state issued discharge permit for discharges from its MS4.
2. No person shall connect an interior drain or any other source of wastewater to the MS4, drainage infrastructure, conveyances, or waterways of the Parish, or allow such a connection to continue.
3. Any person that causes a spill, release, or other discharge of a prohibited substance or other pollutant in the Parish is solely responsible for the cleanup and removal of the substance. Where the person that caused the spill, release, or discharge to the Parish is unknown, the owner of the property on which the spill, release, or discharge occurred is responsible for the cleanup or removal of the substance.
4. Sanitary sewer overflows to the MS4, drainage infrastructure, conveyances, or waterways of the Parish shall be prevented. In the event of an overflow the owner, operator, or person otherwise having control of the sanitary sewer shall notify the Parish and remove all sewage to the maximum extent practical.
5. Items that are stored for collection, disposal, recycling or reuse shall be stored in a manner that

prevents contamination of stormwater. Drums shall be covered, closed, not leaking, and in good condition.
6. Spills and leaks of hazardous substances or pollutants shall be cleaned up immediately after the spill occurs or the leak is detected. Any absorbent material used for clean-up must be disposed of properly. Surface soil contaminated by the spill or leak must be removed or otherwise protected from contact with stormwater.
7. Drip pans, absorbent mats, or equivalent controls shall be used to collect and properly dispose of leaking fluids from motor vehicles that are parked outside during maintenance and repairs or while waiting for repairs at commercial repair facilities.
8. Used engines, transmissions, radiators, and other vehicle components that have automotive fluids in, or on them, shall be stored in a manner that prevents pollutants from contaminating stormwater runoff.
9. Any person or establishment that causes a spill, release, or other discharge of any prohibited substance or other pollutant to the MS4, drainage infrastructure, conveyances, or waterways of the Parish is solely responsible for notifying the Parish of the unauthorized release.
10. Trash, litter, grass clippings, leaves, and other debris shall not be discarded in drainage ditches or drainage inlets. Such material shall be disposed of and shall not be allowed to enter the MS4, drainage infrastructure, conveyances, or waterways of the Parish.
11. Refer to Article III Section 24-032.00 for non-stormwater discharge prohibitions associated with construction.

B. SPECIFIC PROHIBITIONS

No person shall dump, spill, leak, pump, pour, emit, empty, discharge, leach, dispose, or otherwise introduce or cause, allow, or permit to be introduced any of the following substances into the MS4, drainage infrastructure, conveyances, or waterways of the Parish:

1. Any used motor oil, antifreeze, hydraulic fluid, or other motor vehicle fluid;
2. Any industrial or hazardous waste, including household hazardous waste;
3. Any untreated sanitary sewage or septic tank waste;
4. Any grease trap waste, or grit trap waste;
5. Any trash or other debris material;
6. Any untreated wastewater from a commercial car wash facility; or from any washing, cleaning, of any commercial or public service vehicle, including heavy equipment;
7. Any contaminated wastewater or wash water from commercial cleaning, power, or pressure wash processes;
8. Any wastewater from the clean-up following a release of hazardous waste or pollutants;
9. Any discharge from a commercial or industrial cooling tower, condenser, compressor, or boiler;
10. Any concrete, mortar, ceramic, or asphalt base material;
11. Any discharge or wash down water from an animal, fowl, or livestock containment area;
12. Any unpermitted stormwater discharge associated with an industrial activity;
13. Any substance or material that will damage, block, or clog the MS4, drainage infrastructure, conveyances, or waterways of the Parish;
14. Any construction debris or other waste building material resulting from construction or demolition;
15. Any sediment, silt, earth, soil, or other material associated with clearing, grading, excavation, filling, or other construction activities;
16. Any direct discharge of pesticide, herbicide, and/or fertilizer;
17. Any discharge that contributes to or causes the Parish to violate a water quality standard.
18. The following restrictions apply to discharges associated with discharges from pools, hot tubs, spas, and filter backwash:
    a. Uncontaminated discharge shall be limited to that which cannot be retained and utilized on site for irrigation and other uses. For uncontaminated discharge that cannot be retained on site, a gradual, metered discharge is required;
    b. Discharge shall not drain or back-up onto adjacent properties;

    c. Discharge shall not cause erosion or sediment transport;
    d. Discharge shall not cause an accumulation of water in roadways or along curblines and shall not cause adverse impacts to drainage infrastructure, waterways, roadways, or adjacent properties.

SECTION 24-022.00 ALLOWABLE NON-STORMWATER DISCHARGES

A. The following discharges have not been identified by the Parish as significant contributors of pollutants to the MS4 or surface waters of the Parish and therefore are allowable non-stormwater discharges:
    1. A discharge authorized by, and in full compliance with, an NPDES or LPDES permit;
    2. Discharges from firefighting activities;
    3. An uncontaminated discharge of fire protection water;
    4. Agricultural stormwater runoff;
    5. Potable water sources including dechlorinated water line and fire hydrant flushing;
    6. A discharge from lawn watering, or landscape irrigation;
    7. A discharge or flow from a diverted stream flow or natural spring;
    8. A discharge or flow from uncontaminated groundwater;
    9. Uncontaminated discharge from foundation drains, crawl spaces, or footing drains;
    10. A discharge or flow from a riparian habitat or wetland;
    11. Wash water from individual residential and non-profit car washing;
    12. A discharge of air conditioning condensate and
    13. A discharge or flow of water used in street, parking lot, or structure cleaning that is not contaminated with soaps, detergents, emulsifiers, dispersants, or other pollutants.

B. In the event that STP determines that any of the discharges identified in Subsection A significantly contribute to pollution of surface waters of the Parish, or is so notified by LDEQ, the Parish will notify the responsible person to cease the discharge.

C. Nothing in this Section shall affect a discharger's responsibility under state or federal law. *(ARTICLE II pursuant to LAC 33:IX.2511.B-C & 33:IX.2523.B.3, 40 CFR § 122.26(b)(2&12), LPDES Industrial SW Permit LAR050000 § 1.2, LPDES MS4 Permit LAR041024 § I.C-D, & § IV.D.3)*

ARTICLE III PARISH PERMITTING - CONSTRUCTION

Discussion point - We need to discuss how we'd like to handle this. Stormwater agreement vs Notice of Intent vs DEQ permit at building permit? Require stormwater site plan at permitting?

SECTION 24-031.00 STP STORMWATER AGREEMENT AND STORMWATER SITE PLAN

Any development or improvement project within unincorporated St. Tammany Parish that involves excavation, grading, filling, cutting, draining cutting, draining, paving or earthwork will be required to provide an executed Annual Stormwater Agreement and a Stormwater Site Plan upon building permit application.

A. APPLICABLE PROJECTS TYPES

Unless otherwise stated, no person(s) shall perform any clearing, excavation, dirt work, grading, filling, construction, or development within the Parish without first providing the Annual Stormwater Agreement and Stormwater Site Plan. No person(s) shall be issued any Parish permit or work order for a construction project without first having obtained an approved Stormwater Agreement. This requirement applies to the following project types:

1. New construction, residential, commercial, institutional, industrial, utility or other activities;
2. New construction of accessory buildings greater than 100 square feet;

3. Additions or renovations greater than 500 square feet;
4. Excavation, grading, filling, cutting, draining, or paving of lots, parcels, or other areas;
5. Land clearing;
6. Pool installation or pond excavation;
7. Flatwork, parking lot, and road installation;
8. Subdivision/Minor Subdivision development;
9. Stockpiling fill material;
10. Any soil disturbance immediately adjacent to, on, or in, a waterway;
11. Reroute, deepen, widen, or alter in any way an existing drainage system or feature and
12. Any development which may significantly increase or decrease the rate and/or quantity of surface water runoff, degrade water quality, adversely affect the MS4, drainage infrastructure, conveyances, or waterways.

The following project types are exempt from the requirement for an Annual Stormwater Agreement and Stormwater Site Plan:

1. Any building permit for a less than 500 sq. ft. addition to an existing structure, an interior remodel, a less than 100 sq. ft. accessory structure, or a commercial build-out of an existing shell;
2. Capital projects or infrastructure improvement projects by Parish personnel. (Such projects shall comply with all other state, federal, and local stormwater permit requirements.) This exemption does not apply to private contractors working on Parish projects; ???
3. Any emergency activity that is immediately necessary for the protection of life, property, or natural resources;
4. Septic system installation, repair, and/or alteration;
5. Excavation of graves in cemeteries;
6. Agricultural practices such as plowing, cultivation, tree cutting, logging operations that leave the stump and root mat intact, and cultivated sod operations. Agricultural projects shall comply with all other state, federal, and local stormwater and water quality requirements and
7. Minor landscaping and sprinkler installation.

These exemptions do not relieve the owner, operator, or other legal representative of the responsibility of installing and properly maintaining the erosion, sedimentation, or pollution control measures or any other liability resulting from such activities.

B. STORMWATER AGREEMENT

1. It shall be the responsibility of the property owner or his designee to acquire and comply with an LDEQ permit in order to proceed with an improvement project. In lieu of requiring the LDEQ permit at the time of building permit application, the Parish shall require an approved annual Stormwater Agreement for any development or improvement project that involves excavation, grading, filling, cutting, draining, paving or related earthwork. This agreement, which is pre-prepared document provided by STPG, will serve as a signed contract with the Parish stating that the property owner or his designee agrees to obtain an LDEQ permit for construction and comply with all applicable LDEQ regulations during the term of the project.
2. The duration of the annual Stormwater Agreement is one fiscal year, from January 1st through December 31st. The annual agreement covers an unlimited number of projects per fiscal year for a single owner, developer, or contractor. A single use Stormwater Agreement is valid only for the duration of the single project it was purchased to accompany. Any additional permits for a single developer would require an additional single use agreement.
3. Fees may be utilized by the Parish to recover expenses associated with the stormwater program. These expenses consist primarily of administration, inspection, and enforcement activities. The fees for the annual Stormwater Agreement are pursuant to Chapter 2 of the Parish Code of Ordinances, Article I, Section 2-009.00, Parish Fees and Service Charges.

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C. STORMWATER SITE PLAN

1. A Stormwater Site Plan is a component of the SWPPP as required by LDEQ. In an effort to insure the owner, developer or contractor has a sufficient plan to address necessary stormwater controls before the commencement of construction, the Parish shall require a copy of the Stormwater Site Plan at the time of building permit application. Option to combine with fill plan?
2. An approved stormwater site plan is required with submittal of any applicable STP development, construction, building permit, or general work order. The site plan shall contain the following:
   a. The property owner's name, address, date, legal description of parcel, lot number, and a boundary survey indicating the location, and dimensions of the lot;
   b. The shape, size, and location of all existing and proposed buildings or other structures;
   c. The location and approximate dimension of driveways, entrances, and all points of access to a public street or road;
   d. Locations of areas subject to flooding or limits of floodplain, if applicable;
   e. Total land area;
   f. The locations of all existing and proposed streets, alleys, utilities, stormwater conveyances, drainage features, sanitary sewers and drainage, utility, or access easements/servitudes;
   g. All existing and proposed impervious area;
   h. Natural or man-made watercourses;
   i. All existing and proposed slopes, terraces, bulkheads, or retaining walls;
   j. Erosion and sedimentation control plans or SWPPP;
   k. Drainage and/or fill calculations as required by permit and/or ordinance;
   l. Direction of flow indicators and
   m. Receiving water for the ultimate discharge of stormwater from the site.
3. When a Stormwater Site plan is required to obtain a Parish permit, it shall be submitted to the Department of Engineering for review. The Stormwater Site Plan, including any Engineering approved revisions, is valid for the duration of the project.
4. The submittal process for the commercial development Stormwater Site Plan shall be in accordance with Chapter 7 of the Parish Code of Ordinances, Section 7-050.0 Drainage and Paving Plan (Commercial, Industrial, Institutional Developments, and Certain Multi-family Developments).
5. For subdivisions, a stormwater site plan shall be submitted for all tentative, preliminary, final, and minor subdivision developments. The stormwater site plan will focus on stormwater management, water quality, and receiving waters. The submittal process for the tentative subdivision stormwater site plan shall be in accordance with Appendix B, Chapter 40 of the Parish Code of Ordinances, Subdivision Regulatory Ordinance 499, Section 40-050.0, Subdivision Review.

ARTICLE IV CONSTRUCTION AND POST-CONSTRUCTION ACTIVITIES

SECTION 24-032.00 STORMWATER DISCHARGES FROM CONSTRUCTION ACTIVITIES

A. GENERAL REQUIREMENTS

1. All appropriate Parish permits shall be obtained before the commencement of construction.
2. All operators of construction sites shall use BMPs, to control discharge to waterways and conveyances of the Parish. Pollutants such as silt, sediment, mud, clay, and other construction materials associated with clearing, filling, grading, excavation, and construction shall be controlled to the maximum extent practical.
3. Operators shall refer to guidance manuals such as the *BMPs for Coastal Louisiana Zone* for BMP definitions, selection, applicability, planning considerations, recommended specifications and maintenance.

B. SPECIFIC REQUIREMENTS

1. Existing vegetation shall be preserved, where feasible, and disturbed portions of the site shall be

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stabilized immediately upon the temporary or permanent cessation of construction activities. In no case shall disturbed soil remain destabilized for more than 14 days.
2. Structural BMPs shall be utilized, where feasible, to divert flow away from exposed soil, store stormwater, or otherwise reduce runoff and the discharge of pollutants from the construction site.
3. Installation, inspection, and maintenance of erosion and sediment BMPs shall be consistent with the effective operating conditions on the site. Operators are responsible for the installation and maintenance of stormwater BMPs until warranty obligations are met and/or occupancy certificates are issued.
   a. As required by LDEQ permits, operators shall be responsible for overseeing self-inspections of all BMPs at construction sites as noted in the LDEQ permit.
   b. Based on the results of the inspections, BMPs shall be maintained, revised, repaired, or replaced as necessary but prior to a future storm event;
   c. The SWPPP or SW Site Plan shall be updated with any BMP revisions.
   d. Any BMP modifications shall be recorded in the SWPPP and/or SW Site Plan within (7) calendar days and implemented on site as soon as is practical.
   e. The owner, contractor, and/or operator of a construction site is responsible for compliance with the requirements of this Ordinance;
   f. The Parish may hold occupancy certificates related to a site until approval of the final stormwater inspection with a determination that any required stormwater controls are in place.
4. The SWPPP, stormwater site plan, and stormwater self-inspection reports shall be made available on site for inspections.
   a. Per LDEQ, a copy of the NOI and SWPPP is required on large projects on 5 or more acres. This requirement includes any lot or parcel that is part of a larger common plan of development.
   b. Per LDEQ, a SWPPP is required (but not an NOI) for all projects 1 acre or greater, but less than 5 acres, if not part of a larger common plan of development.
5. A stabilized construction entrance/exit pad shall be utilized to minimize the tracking of mud, clay, sediment, and other construction materials onto roadways and streets.
6. The discharge of construction or building materials, including cement, concrete, lime, mortar, slurries, and paints is prohibited. On-site containment or off-site disposal is required.
7. Good housekeeping measures shall be employed to prevent, contain, and clean up spills of paints, solvents, fuel, sewage, and any hazardous chemicals and pollutants associated with construction.
8. Proper waste disposal and management of construction materials, construction debris, paints, solvents, chemicals and construction waste, etc. shall be utilized to prevent stormwater contamination.

D. SITE APPLICABILITY

1. All construction activity, including clearing, grading, filling, and excavation shall comply with the requirements of this stormwater Ordinance.
2. All new subdivision development, minor subdivision development, residential construction, commercial construction, and roadway construction shall comply with the requirements of this Ordinance. (this or other ordinances??)

E. PARISH STORMWATER INSPECTIONS AND RE-INSPECTIONS

Discussion point - We need to discuss our inspection program.

Routine stormwater inspections will be performed by Parish stormwater inspectors, as stipulated in the Stormwater Agreement and/or any applicable STP permit or work order.

1. The first stormwater inspection for each project shall be scheduled at the commencement of construction with the preliminary drainage inspection and the final stormwater inspection shall be scheduled at the completion of construction with the drainage final inspection.
2. Unscheduled stormwater inspections and drainage inspections may be performed by the Parish at any point during the construction process.

3. Any hold on occupancy related to drainage and/or stormwater inspections shall be released upon approval of the final drainage inspection and/or final stormwater inspection.
4. There is no charge for scheduled or unscheduled stormwater inspections, with the exception of re-inspections following a failed inspection.
5. Drainage and stormwater inspections may be performed at the same time, or separately, as necessary.
6. Re-inspections are pursuant to Chapter 2 of the Parish Code of Ordinances, Article I, Section 2-009.00, Parish Fees and Service Charges.
7. Failure to correct inadequacies following a failed drainage and/or stormwater inspections shall be considered a violation requiring enforcement action.

F. PHASED SUBDIVISION DEVELOPMENT

Site disturbance shall be phased, when applicable, to limit soil erosion and sediment excursion. Final stabilization shall be accomplished before continuing to the next phase. When a phased development is proposed, the Stormwater Agreement shall be submitted and processed in accordance with Appendix B, Chapter 40 of the Parish Code of Ordinances, Subdivision Regulatory Ordinance 499, Section 40-050.0.

G. MASTER PLAN SUBMITTAL

A master plan shall be submitted for review, if the subdivision is to be developed in phases. A valid Stormwater Agreement and Stormwater Site Plan shall be maintained throughout each phase of the project. The master plan for phased development shall be prepared with emphasis on the relationship of phasing with respect to the entire property to be developed and potential water quality impacts.

SECTION 24-033.00 POST CONSTRUCTION STORMWATER REQUIREMENTS

A. PERMANENT STORMWATER BMPs shall include both structural and non-structural BMPs.

1. STRUCTURAL BMPS shall include, but are not limited to, retention/detention ponds, stormwater diversion structures, and filtration devices.
   a. Installation of permanent structural measures to control stormwater pollutants after the subdivision development, and shall be in accordance with Appendix B, Chapter 40 of the Parish Code of Ordinances, Subdivision Regulatory Ordinance 499, Section 40.
   b. Erosion, sedimentation, and pollutants shall be controlled after completion of the development process in accordance with the *BMPs for Coastal Louisiana Zone* manuals and/or current LDEQ and USEPA guidelines for structural BMPs.
   c. Regularly scheduled self-inspections and routine maintenance of structural BMPs are required to determine the BMPs continue to function as designed and stormwater discharges from the BMP continue to meet design standards. All water quality monitoring reports and/or inspection reports shall be made available to the Parish upon request.
   d. For the protection of water quality, each development subject to performance standards shall meet the criteria and shall implement structural water quality controls set forth in the Ordinance.
   e. Structural stormwater controls for residential and commercial development shall continue to meet the performance standards as stipulated in the original design and approved by the Parish. At a minimum, annual inspections shall be required to monitor the structural stormwater controls and maintenance performed, as necessary, to ensure the stormwater control continues to perform as designed.

2. NON-STRUCTURAL BMPs may include, but are not limited to buffer zones, riparian buffers, and/or green space
   a. Buffer zones, riparian buffers, and/or green space shall be established in accordance with all applicable state, federal, and local requirements.
   b. Non-structural BMPs such as buffer zones, riparian buffers, and green space areas shall be

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adequate to prevent water quality impacts to waterways and wetlands.

B. STORMWATER BMP MAINTENANCE AGREEMENT

A BMP Maintenance Agreement shall be required for any structural stormwater control of the developer, or his assignee, upon fulfillment of the performance and warranty obligations and final acceptance of the subdivision in accordance with Appendix B, Chapter 40 of the Parish Code of Ordinances, Subdivision Regulatory Ordinance 499, Section 40-071.01 Warranty and Performance Obligations.

1. In the event that the landowner, maintenance association, or the Home Owners' Association does not accept the assignment, the developer shall remain subject to the terms of the Stormwater BMP Maintenance Agreement until acceptance into the Parish maintenance system occurs.
2. The assignee may request that retention and/or detention ponds be taken into the Parish maintenance system in accordance with Appendix B, Chapter 40 of the Parish Code of Ordinances, Subdivision Regulatory Ordinance 499, Section 40-037.02, Residential Retention/Detention Ponds.

C. The Stormwater BMP Maintenance Agreement Duration

The fee for the Stormwater BMP Maintenance Agreement is used to assist the Parish with monitoring the condition of permanent structural and non-structural BMPs.

1. The duration of a long-term BMP Maintenance Agreement is five (5) years
2. The duration of an optional short-term BMP Maintenance Agreement is one (1) year.
3. It is the responsibility of the permit holder to renew the permit prior to permit expiration.
4. Upon renewal of the BMP Maintenance Agreement, an inspection report with shall be required from a civil engineer to certify the stormwater BMP is functioning in a manner consistent with design specifications.

D. Regular inspections are included in the Stormwater BMP Maintenance Agreement fee. There is no additional charge for inspections, with the exception of re-inspections following a failed inspection.

E. BMP Maintenance Agreement fees and/or re-inspection fees are pursuant to Chapter 2 of the Parish Code of Ordinances, Article I, Section 2-009.00, Parish Fees and Service Charges.

F. Failure to correct inadequacies following failed inspections shall be considered a violation requiring enforcement action. *(ARTICLE III pursuant to LAC 33:IX.2511.B.15, 2515.A.1 & 2523.B4&5; 40 CFR § 122.26(a)(9) & (b)(5); 40CFR § 122.34(b)(5); LPDES Construction Permits LAR100000 & 200000; and LPDES MS4 Permit LAR041024 § IV.D.4-5.)*

ARTICLE IV PUBLIC PARTICIPATION AND INVOLVEMENT

SECTION 24-041.00 OWNER AND/OR OPERATOR REPORTING REQUIREMENTS

The operator and/or the owner of any commercial or industrial activity shall report any prohibited discharges, spills, releases, illicit discharges, and unauthorized connections into the MS4, drainage infrastructure, conveyances, or waterways in the Parish and any other violation of this Ordinance for which they are responsible. Reports shall be made to STP in accordance with Parish policy.

A. A hazardous and/or toxic material spill or release shall be immediately reported to the St. Tammany Parish Fire Department and LDEQ;
B. Other instances where pollutants are discharged into the MS4, drainage infrastructure, conveyances, or waterways of the Parish by spill, release, illicit connections or other means shall be reported to LDEQ and the Parish; and
C. The owner of any commercial or industrial facility with a spill or release of pollutants, hazardous materials, or toxins is responsible for proper notification of the incident to all appropriate local, state, and federal agencies.

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SECTION 24-042.00 CITIZEN COMPLAINT REPORTS

All citizens may report any spills, releases, illicit connections, or other instances of anyone discharging pollutants into the MS4, drainage infrastructure, conveyances or waterways of the Parish and any other violation of this Ordinance to the MS4 Administrator or any person designated by the Parish to receive such citizen reports.

A. Citizen stormwater complaints may be made verbally or in writing. A written record of each citizen report to the Parish will be prepared and kept on file for a period of three years. Upon request, the Parish will inform the reporting citizen of any action taken in response to the citizen's report.
B. When applicable, the Parish will report citizen complaints to the appropriate local, state, or federal agencies if a violation is confirmed upon investigation by STP.

(ARTICLE IV pursuant to LAC 33:IX.2523.B.1-2 , 40 CFR § 122.34(b)(1-2), and LAR041024 § IV.D.1-2.)

ARTICLE V PARISH ENFORCEMENT AND REMEDIES

SECTION 24-051.00 ENFORCEMENT OF STORMWATER VIOLATIONS

Whenever it appears that a person has violated, or continues to violate, any permit or provision of this Ordinance, enforcement proceedings may proceed in accordance with Chapter 1 of the Parish Code of Ordinances. Enforcement action may include, but is not limited to fines or fees, issuance of a notice of violation or cease and desist order, a citation to appear for an administrative hearing, and/or prosecution for a violation.

SECTION 24-052.00 REMEDIES NONEXCLUSIVE

The remedies provided for in this Ordinance are not exclusive of any other remedies that the Parish may have under state, federal, or local law. The Parish may take any, all, or any combination of these actions against a violator. The Parish is empowered to take more than one enforcement action against any violator. These actions may be taken concurrently.

(ARTICLE XI pursuant to LAC 33:IX.2523.B.1-6 , 40 CFR § 122.34(b)(1-6), and LAR041024 § IV.D.1-6.)

BE IT FURTHER ORDAINED that Article II St. Tammany Parish Flood Hazard Area Ordinance, Division 5 Provisions for Flood Hazard Reduction, is hereby amended to repeal paragraph (5) of Section 7-042.00 Specific Standards, all as specifically set forth immediately herein after, to-wit:

ARTICLE II ST. TAMMANY PARISH FLOOD HAZARD AREA ORDINANCE

DIVISION 5 PROVISIONS FOR FLOOD HAZARD REDUCTION

SEC. 7-042.00 Specific Standards

~~(5) Construction Sites - Storm Water Runoff~~

~~a. A permit shall be required for the clearing, grubbing, grading, displacement or removal of dirt (hereafter referred to as "dirt work") for any properties not specifically exempted as per Paragraph (c) of this Section. This permit shall be in the form of an approval of the "Culvert Data Sheet", the "Permit Data Review Sheet", a general work order or land clearing permit presently required for construction activity to occur. The ordinance shall be administered by Department of Engineering or any other parish personnel that should be necessary.~~

~~b. A detailed description of dirt work, boundaries of the areas to be disturbed and the proposed sediment retention measures must accompany the building permit or development proposal and be reviewed by the Department of Engineering before approval of the Culvert Data Sheet or the Permit Data Tracking Sheet or the issuance of a general work order.~~

~~c. Exemptions~~

~~1. Agricultural land management practices and construction of agricultural structures as defined in the St. Tammany Parish Land Use Ordinance No. 523;~~
~~2. Mining, quarrying, processing of rock, sand, gravel, aggregate or clay where established and provided for by law;~~
~~3. Activities undertaken on forest land in the production and harvesting of timber when approved via an agricultural clearing, timber harvesting or rural clearing permit in accordance with St. Tammany Parish Land Use Ordinance No. 523;~~
~~4. Single family residences, and related accessory structures or uses, when the disturbed area comprises of less than 50% of the lot or parcel and is located at least 10 feet from all property lines.~~
~~5. Requirements.~~
~~6. The owner, builder or developer of a construction project shall cause the placement of a required sediment control measure for all side slope and down slope boundaries of a construction area, unless a sedimentation basin designed to accommodate 3600 cubic feet of water and sediment for each acre of disturbed property is provided.~~
~~7. The owner, builder or developer will further cause the placement of said sediment control measure around all drainage structure inlets which flow into a public drainage system, or a drainage system which is intended to be dedicated to the public.~~
~~8. Sediment Retention Measures.~~
~~9. The following measures are sediment retention measures subject to review and approval of each application based upon the characteristics of the work and site being permitted. A detailed description of the application, design criteria and limitations of each is outlined in Appendix A.~~

~~1. Mulching~~
~~2. Erosion Control Mats~~
~~3. Vegetation~~
~~4.Silt Fencing~~
~~5. Straw Bale Dikes~~
~~6. Diversion Dikes~~
~~7. Interceptor Swales~~
~~10. Inlet Protection~~
~~11. Any other functionally equivalent technology or method deemed appropriate by the Director of the Department of Engineering.~~

~~f. A blanket permit may be issued for large-scale developments when the developer provides the required sediment control measures for the development as a whole. The appropriateness of these measures will be determined by the Director of the Department of Engineering.~~

~~g. Provision of sediment retention measures on site does not release the builder/developer from responsibilities as outlined in Section 40-071.01of Appendix B (Subdivision Regulations) of the St. Tammany Parish Code of Ordinances should the retention measures fail to prevent sediment runoff. The Director of the Department of Engineering may release the builder/developer from the provisions of this Section if it is determined that the failure of sediment control measures is not attributable to faulty installation or maintenance of the required retention measures.~~

~~1. Enforcement~~

~~Violations will be processed by the appropriate Code Enforcement, Department of Engineering or Permit Inspections personnel using standard code violation protocol.~~

(Subsection 5 per Ord. 99-3156, adopted 10/21/99)

REPEAL: All ordinances or parts of ordinances in conflict herewith are hereby repealed.

SEVERABILITY: If any provision of this Ordinance shall be held to be invalid, such invalidity shall not affect any other provision herein which can be given effect without the invalid provision and to this end the provisions of this Ordinance are hereby declared to be severable.

EFFECTIVE DATE: This ordinance shall become effective fifteen (15) days after adoption

MOVED FOR ADOPTION BY:_____ SECONDED BY:_____

WHEREUPON THIS ORDINANCE WAS SUBMITTED TO A VOTE AND RESULTED IN THE FOLLOWING:

YEAS:

NAYS:

ABSTAIN:

ABSENT:

THIS ORDINANCE WAS DECLARED DULY ADOPTED AT A REGULAR MEETING OF THE COUNCIL HELD ON THE ____DAY OF_____ , 20__, AND BECOMES ORDINANCE COUNCIL SERIES NO._____.

_____
MARTIN W. GOULD, JR., COUNCIL CHAIRMAN

ATTEST:

_____
THERESA L. FORD, COUNCIL CLERK

_____
PATRICIA BRISTER, PARISH PRESIDENT

Published introduction: _____, 2012
Published adoption on:_____, 201__
Delivered to Parish President:_____, 20__ @_____
Returned to Council Clerk:_____, 20__ @_____

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2014 MS4 Annual Report Appendix: Certification Statement

St. Tammany Parish Stormwater 2014 Annual Report & Stormwater Management Plan Certification Statement

PERMIT # LAR041024
AGENCY INTEREST # 108405

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, I certify that the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name: Patricia P. Brister

Title: St. Tammany Parish President

Signature: Patricia P Brister Date: 3-9-15