Sewerage and Water Board
of
New Orleans, Louisiana

Drainage System Funding Feasibility Analysis

June, 2016

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Contents

Executive Summary

The City of New Orleans currently spends about $48.4 million per year on drainage and stormwater operations and maintenance, plus capital projects and debt service. Almost all of this is collected by the Sewerage and Water Board through three dedicated tax millages, and is spent on the largest drainage infrastructure in the City – those drainage system components like canals, box culverts, and large pumps, collectively known as the major drainage system. This effort will remain necessary in perpetuity.

The current annual millage revenues will fall well short of funding growing needs to meet steeply mounting drainage system costs driven by legacy system operation and maintenance plus several new efforts as follows:

- Repayment of local share portion of Southeast Louisiana Flood Control Program (SELA) infrastructure built by the US Army Corps of Engineers (approximately $8.7 to 12.9 million per year for 30 years)
- Major infrastructure operation and maintenance for new infrastructure (approximately $11 to $14 million per year)
    - Southeast Louisiana Urban Flood Control Project (SELA) canals
    - Permanent pump stations at Lake Pontchartrain
- Minor (street-related and smaller than 36" diameter) drainage system operation, maintenance, and capital (approximately $8.5 to $27.4 million per year), a limited portion of which is provided for in the City's public works maintenance budget.
- Increased operation and maintenance of legacy major drainage system components (approximately $4 to $6 million per year)
- Groundwater management and green infrastructure (up to $3 million per year or more, depending on policy choices made in the near future)

Using a "best professional judgment" estimate for each of these identified costs, and adding the existing costs to these, future stormwater management costs perhaps ten years out will be about $103.5 million per year, creating a shortfall compared with current funding levels of about $50.7 million per year going forward. In the near-term, this gap is much smaller because the program and spending would ramp up over time, and also because some temporary funding of drainage system maintenance and repairs is expected form FEMA settlement monies.

To fund this gap with millages like the existing costs are funded would require that the millage rates approximately double from the current level of 15.71 mills to 31.11 mills, and would ignore the fact that much of the causations for these costs are stormwater peak runoff rates and stormwater runoff volumes, which are both related more to hard surface area (impervious area) than they are related to the tax value of real property in the City.

In the interest of equity and affordability, the project team recommends (1) that the existing millages be kept in place as they have been a consistent funding mechanism for city-wide drainage management; (2) that these new costs be funded with a stormwater fee; and (3) that the fee be based on the impervious area on individual land parcels. Fees such as this are common across the US because they tend to be more equitable than other funding methods, and the fees can be structured to offer credits and incentives for development practices and retrofit efforts by ratepayers that aid the City in stormwater management service provision. A stormwater fee based on impervious area can include a simplified rate structure for residential ratepayers as well, and the project team recommends that residential rates be set at three flat rate "tiers" to improve the equity of the rate structure.

The rate base of impervious area in New Orleans was estimated as part of this project. Based on a near-term "ramp-up" revenue need of approximately $14 million per year in new revenues, and based on the recommended rate structure and the estimated rate base, the stormwater fee for a typical single family residential property in New Orleans would be in the range of $9 per month. As the funding gap widened and the program ramped up, these rates would need to increase to ultimately fund the $50.7 million requirement and that would drive rates to approximately $31 per month for a typical home.

Under the recommended rate structure, large residential properties with much more impervious area than the average would pay more, as a "large tier" ratepayer, and small residential properties with much less impervious area than the average would pay less, as a "small tier" ratepayer. All non-residential ratepayers would pay based on measured impervious area. For example, a commercial property with ten times as much impervious area as a typical residential property would be charged ten times what the typical residential ratepayer was charged. Like many other utilities, all properties would be required to pay the fee, regardless of their tax status.

Implementing a stormwater fee may require a vote of the people of the City of New Orleans. A legal opinion was rendered by the State Attorney General Opinion No.99-24, attached, that a vote would be required. However, the time it would take to go through the steps to implement a stormwater fee is not appreciably influenced by whether a vote is required or not. Implementation efforts would require additional finance and rate modeling, a significant amount of public outreach and education, and a number of data, systems, and process changes to append a stormwater fee to the Sewerage & Water Board's utility billing system. A well-crafted, well-publicized fee could be implemented as soon as January, 2019, coinciding with the latest date when the additional funds will be needed.

Introduction

In July 2013, Raftelis Financial Consultants (RFC) was retained by the Sewerage and Water Board of New Orleans (S&WB or Board) to perform a drainage fee feasibility analysis. The firm completed a Financial Plan and Rate study in 2011 for the Board in which RFC forecasted cost increases for the operation, maintenance, and capital needs of the S&WB. In that report RFC advised that significant new costs and impending rising costs for the operation and maintenance of the existing drainage system will force the Sewerage and Water Board to find additional funding. In addition, in an effort to manage the drainage system in a more holistic manner, establishing a funding strategy for the minor drainage system, which is operated by the City of New Orleans' Department of Public Works, would be of critical importance.

According to the National Association of Flood and Stormwater Management Agencies, the most common methods of consistent and stable revenue generation are a property tax increase or the implementation of a drainage fee. This report considers both options, includes the following components, and establishes a framework for a more detailed effort to establish a drainage fee should this path be chosen:

- Description of the existing stormwater management program
- Discussion of emerging stormwater management needs

- Evaluation of stormwater management funding options
- Discussion of a fee rate structure
- Description of rate base and rate estimate
- Estimation of millages required to fully fund the program with millages
- Evaluation of cost and staffing implications for account maintenance and customer service needs driven by a fee
- Development of an outreach and public relations plan for implementation phase
- Development of a project plan for the implementation phase

The Existing Stormwater Management Program

The City of New Orleans was first established on the high ground adjacent to the Mississippi River, only 14 feet above sea level. This location presents several unique challenges. The city's topography—resting between the Mississippi River and Lake Pontchartrain and including large areas of land below sea-level—results in frequent flooding and high groundwater. In addition, the city experiences an average of 64" of annual rainfall, one of the highest annual rainfall totals in the US.[1] These issues produce daunting stormwater management and drainage challenges experienced by very few in the world.

With a very limited supply of land at higher elevations, development in the City of New Orleans spread into areas lower in elevation than the river and the lake. The city's expansion from the 1700's onward relied in part on draining groundwater and changing the flow of the river to create land to develop and accommodate the growth. The City built levees to hold out water from the river and lake and constructed a network of canals and pump stations to move water out of the city. The efforts of city leaders and planners to keep New Orleans free of flooding, to maintain a sanitary sewer system, and to supply the city with clean water led to the formation of a master drainage plan and the creation of the Sewerage and Water Board in 1893. In 1903, the City consolidated the drainage, sewer, and water operations into one responsible entity to form the Sewerage and Water Board structure that exists today.

In the area of drainage system management, the Sewerage and Water Board is responsible for the capital improvements as well as operation and maintenance for the pumping stations and the drainage pipes greater than 36" diameter including canals and other conduits that can convey the same or greater flow as that of a 36" diameter pipe. The Board has 22 pumping stations, which have a combined pumping capacity of 29 billion gallons of water per day. There are also 13 underpass stations, each with two

[1] http://www.usclimatedata.com/climate/new-orleans/louisiana/united-states/usla0338

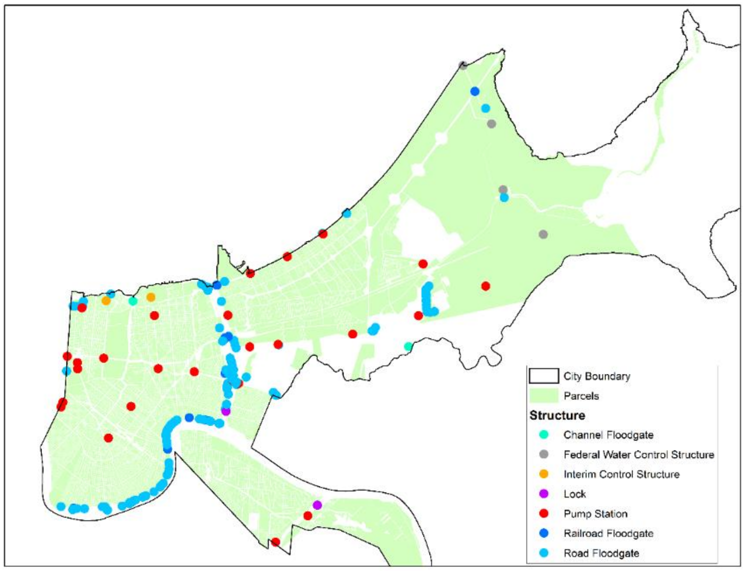

Figure 1: Locations of Major Drainage Infrastructure.
Project information courtesy of the Orleans Regional Planning Commission.

or three pumps, which are automatically triggered by rising water. There are approximately 100 miles of open canals and 100 miles of subsurface pipes or box culverts. Figure 1 identifies the locations of some of the S&WB's major infrastructure.

All parts of the public drainage system that are smaller than 36" diameter pipes or carry a smaller flow than a 36" diameter pipe can carry are called the minor drainage system. This system, integrally tied to the road network, is managed by the City's Department of Public Works. Sewerage and Water Board previously maintained the minor drainage system on behalf of the City through a Cooperative Endeavor Agreement funded by a two-mill tax, and continued to perform that service for five years after the millage expired in 1992. Since 1997, maintenance on the minor drainage system has been extremely limited due to lack of funding. Localized flooding occurs where the minor drainage system has failed or no longer performs at designed levels.

All of this is exacerbated by the effect of climate change. In the last twenty years, there have been 61 major weather events in New Orleans. From the City of New Orleans Resiliency Strategy: "*Our environment is changing. Climate change is accelerating it. Shocks like hurricanes are compounded by daily stresses on the city's natural and built environment. The rapid loss of coastal wetlands puts extra stress on the city's flood protection system, while hard surfaces that do not absorb water and sinking urban soils exacerbate flood risk from regular rainfall. Sea level rise and a projected increase in frequency and intensity of storm events are expected to accelerate coastal land loss, adding greater stresses to our levee and flood protection system, while more extreme heat will directly threaten other infrastructure systems and the health of our residents. We are already facing many climate change–related challenges in advance of other cities and regions around the world due to our unique geography*." From the State's Coastal Masterplan, we expect that Louisiana will see rise in sea level of 0.43 - 0.83 meters over the next 50 years while the average storm intensity is expected to increase by 10%-15% over that same period[2].

[2] https://www.ncdc.noaa.gov/stormevents/listevents.jsp?eventType=%28C%29+Flash+Flood&eventType=%28Z%29+Flood&eventType=%28C%29+Heavy+Rain&eventType=%28Z%29+Hurricane+%28Typhoon%29&eventType=%28Z%29+Tropical+Depression&eventType=%28Z%29+Tropical+Storm&beginDate_mm=01&beginDate_dd=01&beginDate_yyyy=1996&endDate_mm=01&endDate_dd=01&endDate_yyyy=2016&county=ORLEANS%3A71&hailfilter=0.00&tornfilter=0&windfilter=000&sort=DT&submitbutton=Search&statefips=22%2CLOUISIANA

Existing Stormwater Management Program Costs and Escalation

The S&WB's portion of the existing drainage system is funded almost exclusively through three millage rates, which are included as part of the annual property tax bill for taxable real property within New Orleans. In 2015 these millage rates generated about $49.7 million in revenues. Of that, the S&WB spent approximately $31.3 million in operating and maintenance expenses for this infrastructure. The remaining approximately $18.4 million was used for debt service and for pay-as-you-go capital construction projects. Growth in the City, reassessments, and millage rollbacks and roll-forwards have some impacts on these revenues each year, and during the current fiscal year these same millages are expected to generate $52.8 million.

Despite the revenue growth, according to the General Superintendent's Office, the need to address expenses that were deferred in the past is driving up the Sewerage and Water Board's baseline operations and maintenance costs more rapidly than the millage revenues are increasing. As a result, baseline operations and maintenance costs are expected to exceed that portion of the millage revenues significantly, and will be in the $4 million to $6 million range each year going forward. This is simply the operations and maintenance gap for existing infrastructure, and does not include the costs for any new services. During the decade following Hurricane Katrina, construction and maintenance on the major drainage system has focused on rebuilding damaged facilities, providing redundant power supplies, and stormproofing. Routine maintenance has been deferred while the facilities were rebuilt, but will need to resume at a significantly increased level.

Emerging Stormwater Management Needs

In addition to the major capital project challenges, the City of New Orleans faces exceptional, ongoing stormwater management and drainage system operation and maintenance challenges. These challenges include those associated with the pumping of floodwaters (pump station infrastructure and subsidence) and the maintenance of other system components (box culverts, canals, inlets, pipes). These components include the minor drainage system. Although not managed by the S&WB, the minor drainage system and its interaction with street curb and gutter drains and inlets is critical to holistic management of the drainage system and is a key to maintaining the public streets in good working order. Maintenance activities on the minor drainage system have been limited, however, and large portions of this system do not function as originally designed. In order to improve the operating condition of the minor drainage system, including street conditions, significant additional investment will be required.

Further, and at the request of the City of New Orleans to assist with efforts of flood and storm surge prevention, the federal government authorized several extensive capital projects designed to prevent flooding from heavy rainfall and storm surge that moves up the Mississippi River. These programs are the Southeast Louisiana Urban Flood Control Program (SELA) and the Permanent Pump Stations at Lake Pontchartrain.

Both of these projects are critical to the long-term success, function, and sustainability of drainage management in New Orleans. The federal government provided funding in excess of one billion dollars for these capital projects, with some cost-sharing from the Sewerage and Water Board for select projects, which has, to date, come from the millage revenues. Once the construction of these projects is completed, the Board will assume control over all of this infrastructure, and will be responsible for operation and maintenance of each facility, which will be a costly obligation.

Efforts Required and Estimated Costs

Southeast Louisiana Flood Control Program

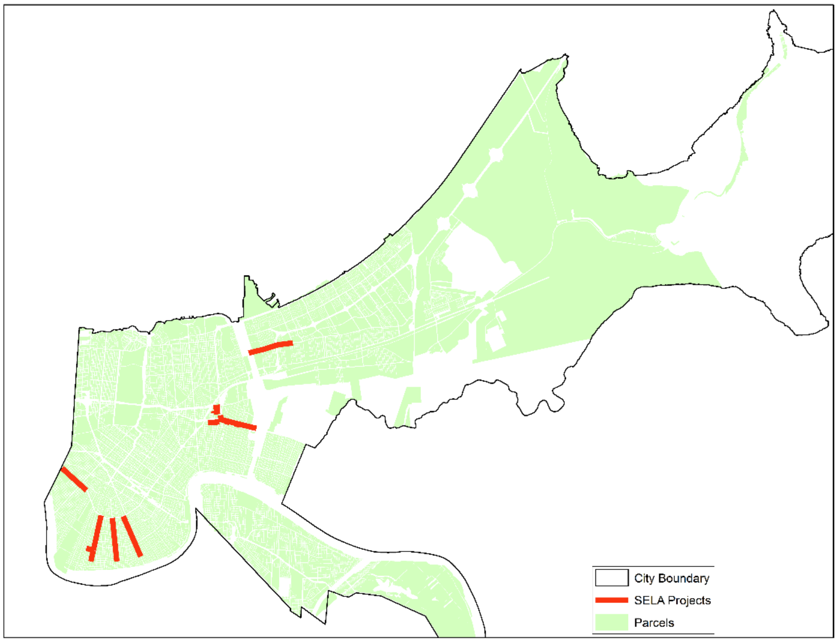

Figure 2: Location of SELA Projects.
Project information courtesy of the Orleans Regional Planning Commission.

In 1996, Congress authorized the Southeast Louisiana Urban Flood Control Program (SELA). The program includes the construction of several new capital projects and improvements to existing capital infrastructure as a means to reduce damages resulting from flooding from rainfall to the City of New Orleans and surrounding Parishes.[3] The proposed work in the City of New Orleans is located on the east bank of the Mississippi River. In Orleans Parish, most of the projects are in the uptown area of the city because of the repeat incidences of flooding in those areas. The plans include improving twelve major drainage canals, adding pumping capacity to one pump station, and constructing two new pump stations. The projects are being completed by the Army Corps of Engineers. The map in Figure 2 illustrates the locations of the SELA projects around New Orleans.

The total amount appropriated to Orleans Parish for the completion of the projects is approximately $800 million. The funds are being shared at 65% Federal and 35% Board with payback via a 30-year plan granted by the federal government. The Board is obligated to begin to pay back its cost shares for these projects upon completion of the construction work in each drainage basin and this is estimated at $8.7 to $12.9 million per year. The exact repayment amount will vary by the amount of expenditures by the Sewerage and Water Board during construction that are approved and credited towards the repayment, as well as by the interest rate in effect when the projects are concluded.

Once these efforts are completed, the Board will assume full responsibility for continued operation and maintenance and the corresponding costs thereof. Engineering estimates from the Army Corps of Engineers show these projects will add new operation and maintenance costs of $3 to $4 million per year going forward, although the initial cost could be lower, perhaps about $2 million per year.

[3] http://www2.mvn.usace.army.mil/pd/projectslist/home.asp?projectID=165

Permanent Pump Stations at Lake Pontchartrain

In March 2010, the State of Louisiana and the Army Corps of Engineers signed a Project Partnership Agreement for the Permanent Canal Closures and Pump Stations at the three outfall canals. The temporary gates and pumps at the three outfall canals will be replaced by permanent facilities intended to prevent storm surge entering from Lake Pontchartrain and provide removal of rainwater from the canals. Upon completion of the project, the Board will assume responsibility for ongoing operation and maintenance of the structures. The Sewerage and Water Board has operated large pump stations similar in size to these stations. And has developed engineering estimates of the long-term operation and maintenance costs for this infrastructure at $8 to $10 million annually. However, because the infrastructure is new and in excellent condition today, this cost is likely to be lower at first and ramp up over time. During the initial ramp-up period these costs could be as low as $2 million per year.

Minor Drainage System

The City's Department of Public Works (DPW) manages the minor drainage system, consisting of infrastructure smaller than 36 inches. The department maintains approximately 1,500 miles of streets, 150 bridges, 68,000 catch basins and 1,600 miles of drainage pipes. The City funds all of the operation and maintenance for this infrastructure through the general fund. Currently, DPW spends approximately $200,000 per year on operation and maintenance for the minor drainage system, which includes the catch basins. It is widely recognized that this amount is far too little, but budget limitations and keen competition for limited general fund revenues have prevented more robust funding in recent years. The minor drainage system suffers greatly from the dual effects of subsidence, which causes pipe joint separations and structural settlement, and from sediment buildup in the pipes and structures. Because many of the pipes are laid on very flat slopes, water travels through the pipes slowly, which in turn allows sediments that are suspended in the water to settle out and over time clog the system.

An important component of the City's overall stormwater management and drainage costs, going forward, will be a more robust minor drainage system operation and maintenance program, and an associated capital rehabilitation and replacement program for that infrastructure in order to meet the ten-year storm objective set in the City's drainage master plan. One temporary funding source for a portion of these needs is the $50 million in FEMA settlement funds expected to be available for minor drainage system operation, maintenance, and capital improvement. In a later section of this report this funding stream is described in greater detail.

A recent engineering estimate for stepped up monitoring and maintenance of the minor drainage system and an assumed range of capital improvements to minor drainage system components was developed by the Sewerage and Water Board. This estimate shows a range of increased annual costs for minor drainage infrastructure from $8.5 million to $27.4 million, with a near-term floor of $4 million per year and a best judgment required funding level of $19.7 million per year. The level of service corresponding to these cost estimates includes the following tasks: line cleaning, catch basin cleaning, CCTV inspection, visual inspections, and an assumed range of expenditure for capital projects. Foundational to the $8.5 million annual operation and maintenance cost estimate, which is a bit more than $5,000 per mile of pipe per year, is the assumption that the minor system drainage infrastructure is properly sized at present, and functioning as designed other than blockages caused by sediment and debris. This may be an overly optimistic assumption and is one reason the best judgment annual funding need is expected to be much higher than $8.5 million.

As a comparison check, the RFC team looked at storm drainage infrastructure spending in Houston and Tampa which, while facing somewhat different changes, were chosen because they have somewhat similar terrain and rainfall potentials as New Orleans. The comparison found that the City of Houston spends about $6,000 per mile of pipe per year, while the City of Tampa spends about $2,100 per pipe mile per year. Even though these cities are similar to New Orleans in some ways, there are significant differences also. Notably, much of the drainage infrastructure in Tampa and Houston is quite new, having been installed as part of developments that have been built in the past 20 years. In fact, since 2000, Houston has grown approximately 26%[4]. Meanwhile, since Hurricane Katrina, New Orleans has experienced a significant population decrease, and is currently only back up to about 80% of pre-Katrina levels[5]. Also of note is the fact that subsidence and differential settlement, and the storm drainage infrastructure damage that comes with it, have not plagued these two cities to much extent, unlike New Orleans. For these reasons, the per pipe mile operation and maintenance costs expended annually by the cities of Tampa and Houston tend to support the expectation that New Orleans needs much more than $5,000 per pipe mile per year for operation and maintenance, remedial repair, and some capital investment in the minor drainage system. More robust funding for the minor drainage system will help the entire connected drainage infrastructure function better and will help keep the streets in better condition as well.

Legacy Infrastructure Maintenance and Groundwater Management

Many of the v-shaped canals that make up portions of the major drainage system have become partially clogged with sediment, and although sediment removal has been deferred until now, these canals need dredging and will need maintenance attention in the future. Similarly, several of the Board's more aged pump stations now have a pent-up demand for additional maintenance and repair that has been deferred. As an ongoing cost for the foreseeable future, <u>stepped up maintenance on these portions of the major drainage system is estimated to cost $4 to $6 million annually, although in the near-term, as part of an overall ramping up in service, the cost could be $3 million per year</u>.

The deleterious effects of subsidence on the drainage infrastructure were mentioned earlier in this report. Subsidence also causes significant damage to building foundations and roadways in New Orleans, and a major cause of the subsidence and differential settling is the combination of dense development and vigorous stormwater pumping. The dense development, in the form of highly impervious land cover, exacerbates the problems from subsidence because the larger the percentage of direct runoff that moves into the drainage system, the smaller the amount of water is available for soil moisture replenishment and for ground-water storage.[6] The City's vigorous stormwater pumping strategy is focused on quickly drawing down any rising waters, and returning the water elevation in the canals to minimums in order to retain capacity. As that water is pumped back down to the bottom elevation of the canals, the surrounding groundwater may be drawn down with it, drying out the soil and potentially contributing to the subsidence.

In order for the City to reduce subsidence and with it reduce the harmful and expensive effects that it has on public and private infrastructure, a means using green infrastructure to store more stormwater

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[4] http://www.houstontx.gov/abouthouston/houstonfacts.html

[5] http://www.wwltv.com/news/Forbes-New-Orleans-Is-Americas-Fastest-Growing-City--212824771.html

[6] Leopold, Luna B. Hydrology for Urban Land Planning—A Guidebook on the Hydrologic Effects of Urban Land Use. Geological Survey Circular 554. US Department of the Interior. 1968 pg. 2

runoff during at least smaller storm events, and amended practices for stormwater pumping that are less vigorous will be needed. Changes to the pumping practices may require additional capacity in some portions of the system, and also may require some automated controls and rainfall gaging capabilities be added. The new cost for these changes that would empower the City to amend its pumping strategies, in concert with some new costs to preserve or restore green areas that allow natural infiltration of rainwater into the soil, is expected to be up to $3 million annually, depending on water management practice choices that have not yet been made. An assumption of green infrastructure capital spending being roughly 5% of gray infrastructure capital spending was used in developing this figure. Furthermore, similar to other costs estimated in this section of the report, it would be expected that a ramping up period would occur before these costs were fully realized; in the near-term, the costs could be in the range of $1 million annually.

Summary of Revenue Requirements

The following table summarizes the estimated future operation, maintenance, and capital costs described above for the S&WB.

Table 1: Revenue Requirements

PROGRAM COMPONENT	DRAINAGE SYSTEM COMPONENTS	REVENUE REQUIREMENT SOURCE	LOWER ESTIMATE ANNUAL FUNDING (MILLIONS)	HIGHER ESTIMATE ANNUAL FUNDING (MILLIONS)	BEST PROFESSIONAL JUDGMENT ANNUAL FUNDING (MILLIONS)	INITIAL RAMP UP ANNUAL FUNDING (MILLIONS)
Existing Drainage O&M	Major	S&WB Budget	40.4	40.4	40.4	40.4
Existing Drainage Capital (net of CIAC)	Major	S&WB Budget, History	8.0	49.4	16.0	8.0
Repayment of Local Share Portion of SELA Infrastructure	Major	USACOE	8.7	12.9	9.4	9.4
Operation and Maintenace of SELA Infrastructure	Major	S&WB Engineering	3.0	4.0	3.0	2.0
O&M of Permanent Pump Stations at Lake Pontchartrain	Major	S&WB Engineering	8.0	10.0	8.0	4.0
O&M, Repair, Capital for the Minor Drainage System	Minor	S&WB Engineering	8.5	27.4	19.7	4.0
Stepped up O&M for Legacy Infrastructure	Major	S&WB Engineering	4.0	6.0	5.0	3.0
Groundwater Management and Green Infrastructure	Both	5% of CIP + 20% for O&M	0.0	3.0	2.0	1.0
		TOTALS	**80.6**	**153.1**	**103.5**	**71.8**

This table shows that existing spending is about $48.4 million per year, while near-term spending needs are (during an initial ramp-up period) about $71.8 million and expected to rise to about $103.5 million within a few years.

Existing Revenues

The existing funding for major system operation and maintenance plus capital spending net of CIAC comes from three dedicated millages as shown here. The exact millage rate for these three taxes varies from year to year based on valuations and whether roll backs and roll forwards occur with reassessments. Importantly, the three mill tax is slated to expire at the end of calendar year 2016 unless it is reauthorized. Similarly, the six mill tax is slated to expire in 2026 and the nine mill tax is slated to expire in 2031. The six mill tax is primarily pledged to debt service for the outstanding drainage system bonds. Remaining funds from the six mill tax plus the proceeds from the three and nine mill taxes are used for the construction, operations, and maintenance of the major system. DPW receives a very small amount of annual funding for minor system drainage maintenance, in the range of $200,000 per year. Lastly, as mentioned above, there is an expectation that about $50 million of the FEMA settlement monies might be dedicated to minor system repairs. For the purposes of identifying the overall funding shortfall, this revenue stream is estimated to be $5 million annually for the next ten years.

Table 2. Existing Revenues in Millions

FUNDING SOURCE	2016 Expected Revenue
Three mill tax -- Revised Statute 33:4124	15.4
Six mill tax -- Revised Statute 33:4137	15.5
Nine mill tax -- Revised Statute 33:4147	21.9
Total -->	52.8

Funding Shortfall

The funding shortfall can be computed by comparing expected costs to expected revenues. In the tabular form of this comparison (Table 3, shown here), the three millages are assumed to remain in force into the future, in part by reauthorization of the three mill tax before it expires. This table shows the funding shortfall to be $14.0 million initially, rising to $45.7 million per year by about 2022 as the ramped up operation and maintenance programs and capital spending efforts mature. This is unadjusted for inflation, but it should be noted that eventually any FEMA settlement monies spent on drainage infrastructure will be exhausted. Since these are modeled at $5 million per year for the next ten years, in the long run, the funding shortfall, unadjusted for inflation, is likely to be about $50.7 million per year. It is critically important to note that the reauthorization of the three

Table 3. Funding Shortfall

Cost or Revenues Type	Initial Ramping Up Period (2017)	Best Professional Judgment at Fully Ramped Up State (2022)
Existing Costs	48.4	56.4
New Costs	23.4	47.1
Total Costs	**71.8**	**103.5**
Millage Revenues	52.8	52.8
FEMA Settlement Revenues	5	5
Total Revenues	**57.8**	**57.8**
Funding Shortfall	**14.0**	**45.7**

mill tax remains uncertain at this time. If the millage is not renewed, then the funding shortfall for the initial ramping up period increases by $15.4 million to $29.4 million in 2017 and increases to $61.1 million in 2022.

Stormwater Management Funding Options

Table 3 shows the annual stormwater management funding shortfall, unadjusted for inflation, is about $14 million currently, and is expected to rise to more than $45 million by 2022, then to more than $50 million per year once the FEMA settlement monies dedicated to drainage are exhausted. There are really only two stable sources that can generate this amount of ongoing funding: a tax rate increase or the introduction of a stormwater management user fee.

Tax Funding

Funding stormwater needs through tax revenue or general revenue appropriations is a very common stormwater funding method. The prevalence of the tax-funded stormwater program is in part because substantial technical analysis is not needed to calculate the amount of demand each property contributes to the drainage system. In addition, raising the property tax to accommodate the revenue requirement usually does not demand as much legal or technical work as is necessary to create a stormwater ordinance and utility. These factors contribute to the popularity of raising property taxes as a means to pay for a drainage program.[7] All but a very small portion of the existing annual stormwater management funding of approximately $52.8M comes from the three dedicated millage rates on the New Orleans tax bills.

Despite ease of implementation advantages, there are several disadvantages to using property taxes for stormwater revenue generation. First, the inclusion of the stormwater charge as part of the property tax bill may obscure the relationship between what the additional tax for stormwater management is being charged for, and what they taxpayer is receiving as a service. The property tax is based on the economic value of the property and the improvements, a fact of which stormwater management efforts and costs are often independent. In addition, properties that are tax-exempt, such as schools, universities, non-profits, and city-owned properties, are not required to pay property tax. Thus, they would not pay any money for the stormwater program, even though these properties might exhibit a significant demand for the use of the drainage infrastructure, and they receive the services from improved infrastructure.[8] A factor that further exacerbates this discontinuity is the relatively high proportion of tax exempt properties in New Orleans. As this proportion increases, the stormwater management burden does not decrease, and under a tax funding approach the cost burden is spread across a smaller base. Based on a review of 2013 appraisal data, approximately 20% of the land and improvement value within the City of New Orleans is exempt from taxation.

Additionally, a disparity exists between the types of properties and the amount of property taxes they pay, and the demand those properties place on the drainage infrastructure. For example, warehouses, retail stores, and parking lots may have large expanses of property with often a relatively low tax valuation. However, the impervious surface on these properties contributes a significant demand on the major and minor drainage system since all or most of the rain that falls on these properties needs to

[7] Cyre, Hector. Chapter 2 Sources of Funding. Guidance for Municipal Stormwater Funding. National Association of Flood and Stormwater Management Agencies. January 2006.
[8] *Ibid.*

enter the drainage system. Conversely, residential condominium towers and high-rise office buildings may have little quantities of impervious area, but have high property tax valuations. Thus, the property tax dollar increase that could be used to fund drainage system infrastructure operation and maintenance does not, on a property-by-property accounting, relate particularly well to the demand those properties place on the drainage system.[9]

That said, one option to generate the needed *additional* revenues for stormwater management is to raise property taxes through additional millages. The analysis to estimate the requisite tax increase that would be required is based on information obtained on the millage rates and homestead exemptions.[10] To generate the initial $14.0 million funding shortfall, a new millage of about 4.3 mills would be required. As the revenue requirement rises to $45.7 then $50.7 million per year, that millage would need to increase to approximately 13.9 mills then 15.4 mills to continue to close the funding gap, assuming tax valuations and inflation track together. Of course, any property that is tax exempt would not be charged. The relationship between a property's demand for stormwater operation and maintenance services (generally that property's runoff potential in smaller storms) and what that property would pay for stormwater service under a tax funding scheme is more highly variable than that with large storms and flooding events, where a stronger case can be made that demand for service and value track together.

Payments in Lieu of Taxes

Payments in lieu of taxes, or PILOTS, are a mechanism by which a tax exempt entity can make payments to an underlying jurisdiction or agency to compensate that jurisdiction or agency for revenues that would have been collected through taxes had the entity (property) been taxable. In most cases PILOTS are voluntary payments. If the Sewerage and Water Board could cause tax exempt properties to make payments equivalent to what they would have had they been taxable, the revenues would be about 20% higher than current under all millage scenarios. For example, the initial revenue gap of $14.0 million would shrink to about $4 million if PILOTS were made by all tax exempt properties, because the current millage revenues would increase by about $10 million.

Fee Funding

A stormwater fee-funded system would be based on the philosophy that customers should pay in relation to the demands they impose on the services and facilities—known as the "user-pays" approach. According to the book, Guidance for Municipal Stormwater Funding, the most successful utilities are those that have clearly established and documented the rationale for linking their service fees to the costs of providing services and facilities. This system is primarily established in conjunction with the creation of a stormwater utility.[11] There are several advantages for using a stormwater fee to fund drainage system operation and maintenance.

First, a stormwater fee is a dedicated, stable form of revenue. The stormwater fee could be established within the confines of a stormwater utility, and thus the revenue would be used consistently for the

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[9] *Ibid.*

[10] http://www.mynolahome.com/custom10.shtml

[11] Debo, Thomas N. and Reese, Andrew J. Municipal Stormwater Management. 2nd Ed. Lewis Publishers. 1995 p. 134.

operation and maintenance of drainage system infrastructure in the same way that water and wastewater revenues are utilized by the Sewerage and Water Board.

Second, a stormwater fee is a very flexible type of revenue structure. The flexibility of the fee allows the fee to be based on variables that better reflect and correlate with the actual *causes* of the stormwater costs that the City and Board incur. For example, if the estimated $19.7 million "best professional judgment" annual need for minor drainage system operation, maintenance, and capital improvements is caused by stormwater runoff from smaller rainstorms during which a well-functioning minor system could handle the runoff (presumably the minor system would be overwhelmed in very large storms, so large storms are not expected to be accommodated by the minor system), then properties that generate a lot of runoff in small storms would, under a well-designed stormwater fee, pay proportionately more toward the $19.7 million revenue requirement than those that do not. A number of factors might contribute to a property's runoff generation in smaller storms, but none is as significant as impervious surface area.

For other kinds of stormwater costs the *causes* of the costs may be different, and other rate factors might better correlate charges to demand for service. These factors could include gross lot area, type of impervious area, elevation of the property, quality of the vegetated land cover, or potentially other factors. The chosen rate structure could ultimately rely on one or more variables and could be tied to cost causation by carefully evaluating the services that the stormwater management program offers or will offer.

Another important aspect for the flexibility of choosing a fee-based funding method is the ability for the stormwater utility to implement a credit system for those properties that treat or manage the stormwater runoff on their own property. This is often a critically important issue in deciding a funding approach, because a system of credits may be the only practical way that a local government can incentivize development practices that aid the proper function of the drainage system, or acknowledge through fee reductions any stormwater-beneficial practices that have already been put into place by property owners and developers. These Best Management Practices (BMPs), often described as green infrastructure, can be implemented to provide on-site storage and infiltration during and after rainfall events.[12] Since BMPs reduce the demand of drainage service for the particular property on which they are installed, the system of credits would create financial incentives that encourage property owners to install these BMPs, which could offset possibly prohibitive expenses of the construction and maintenance of the BMPs by the City.

A stormwater fee is a more equitable method of funding because it associates the fee that a property pays for drainage management with the demand for service that property places on the drainage system. The methodology of this user fee system is structured similarly to the metered rate structures of water and sewer fees. The best utility rate structures generate charges that clearly and simply relate to the services and facilities being provided.[13]

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[12] Urban Storm Water Preliminary Data Summary. Water.epa.gov. http://water.epa.gov/scitech/wastetech/guide/stormwater/upload/2006_10_31_guide_stormwater_usw_b.pdf

[13] Cyre, Hector. Chapter 2 Sources of Funding. Guidance for Municipal Stormwater Funding. National Association of Flood and Stormwater Management Agencies. January 2006. p. 2-24

One disadvantage of fee-based funding is the cost of the fee development effort, fee implementation steps, and customer service and database maintenance that are required to keep the charges accurate over time. Once a rate structure is chosen, data must be assembled about parcels and the characteristics of the parcels that impact the stormwater charge for each, and a process by which this information can be tied to the utility billing system must be developed.

One component of the process to set up a stormwater utility and a subsequent fee would be the required public approval process. In 1999, the City of New Orleans sought the opinion of the State Attorney General on the ability of the City to levy a tax or fee for the sole purpose of funding operations of the S&WB without seeking voter approval. The City's Charter governing the S&WB does not expressly indicate if the S&WB has the power to levy fees; therefore, it was expedient to obtain the Attorney General's Opinion (Number 99-24).

Citing state statutes LSA-R.S. 33, regarding the creation and operation of the S&WB, the Attorney General stated that the S&WB under LSA-R.S. 33:4094 is funded through ad valorem taxes. Under Sections 4096 and 4198 the Board is able to levy charges for water, drainage, and sewerage service as long as these charges are reasonably related to the cost of services provided to the user. However, the authorization for the S&WB to create its own fees, or the authorization for the City to raise revenues for the use and benefit of the S&WB is absent from the City Charter and from State Statutes.

The Attorney General stated that the State of Louisiana actually authorized the creation of the S&WB, deeming the tasks of managing drainage, sewer, and water outside the ordinary functions of the City. As a result, the Attorney General declared that the City does not have the authority to levy a fee or tax without voter approval.[14]

The Attorney General also stated that based on the City Charter and State law, the City has the ability to impose ad valorem taxes on real estate but only by first obtaining voter approval. As a result of the Attorney General Opinion, and unless a different ruling was rendered, it appears the City will need a majority public approval in order to pass the drainage fee. The fee will need to be approved by a majority of the qualified electors voting in a special election, held for the purpose of approving the fee (RS 33:130.105A, 155A).[15]

Recommended Funding Source for Emerging Stormwater Management Needs

The approximate $14.0 to $45.7 then $50.7 million in upward trending annual unmet revenue requirement can only be generated sustainably through taxes or fees. Because of the flexibility of fee-based funding and the equity of fee-based funding, we recommend this approach for closing the gap. Although it will require significant effort to implement a stormwater management fee, there are also significant advantages to this approach that outweigh the effort. These include the following:

- Fee-based funding for the newer revenue requirements (the unmet needs), combined with continued millage-based funding for legacy programs and efforts establishes a mixture of revenue streams that, going forward, may be the most tolerable to ratepayers and taxpayers, particularly given the enormity of stormwater management needs and costs in New Orleans as compared to most other jurisdictions in the US

[14] Attorney General Opinion Number 99-24.
[15] *Ibid.*

- Fee-based funding will allow the rate structure to be chosen to tie ratepayer bills to demand for service through a cost causation analysis, resulting in a maximally fair treatment of ratepayers
- Fee-based funding will allow the rate structure to incentivize or reward green infrastructure and best management practices that reduce demand placed on the City's infrastructure by infiltrating or storing runoff during wet periods

Selecting a Stormwater Management Fee Structure

It is best practice to select a stormwater management fee structure so that the fees are fair and tied to cost causation, and also so that the fees are as simple and understandable as possible and the effort required to maintain the billing, collections, customer service, and database maintenance processes is kept as low as possible.

Cost Causation and Rate Structure Variables

Different components of the City's overall stormwater management program have different root causes of cost, and an optimized rate structure will address these through a proper choice or choices of rate variables like impervious area, gross lot area, elevation, and others. In this section each variable is explored to arrive at a recommended rate structure and chosen variable(s) that meet the best practice definition.

Impervious Surface Area

Impervious surfaces prevent or inhibit rainfall's natural ability to infiltrate and absorb into the ground. As a result, water that falls onto impervious surfaces quickly becomes runoff and enters the drainage system.

In *Hydrology for Urban Land Planning—A Guidebook on the Hydrologic Effects of Urban Land Use* by Luna Leopold, the author discusses that both the total volume of runoff and peak runoff rate are primarily influenced by the infiltration characteristics of the land and that increased impervious area increases flood peaks during storm periods. [16] A study of four counties in the greater Baltimore, MD area declared, "When porous land is converted to impervious cover, a greater fraction of annual rainfall is converted to surface runoff, and a smaller volume recharges the groundwater. This increased surface runoff volume causes higher peak flows."[17]

Another effect of impervious surfaces is the degree to which runoff pollution levels correlate to imperviousness. According to the Nationwide Urban Runoff Program (NURP), density and impervious area significantly contribute to pollutant levels in bodies of water, regardless of the volume of stormwater. [18] In addition, the program found that the concentrations of pollutants in urban runoff are directly related to the degree of development within the watershed.[19]

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[16] Leopold, Luna B. Hydrology for Urban Land Planning—A Guidebook on the Hydrologic Effects of Urban Land Use. Geological Survey Circular 554. US Department of the Interior. 1968

[17] Cappiella, K. Brown. 2001. Impervious Cover and Land Use in the Chesapeake Bay Watershed. Center for Watershed Protection, Ellicott City, MD. pg 28.

[18] National Service Center for Environmental Publications. "Results of the Nationwide Urban Runoff Program: Executive Summary." *nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=500025BS.TXT*

[19] Urban Storm Water Preliminary Data Summary. water.epa.gov/scitech/wastetech/guide/stormwater/upload/2006_10_31_guide_stormwater_usw_b.pdf p. 9

Thus, peak runoff rate, total runoff volume, and stormwater pollution levels have all been found to correlate strongly with impervious area. To the degree that components of the City's stormwater management program have root cost causes driven by any of these three items, a rate structure heavily reliant on impervious surface area as the rate metric would be equitable.

One additional consideration that may be more significant in New Orleans than in many jurisdictions is, when considering the cost causation of a program component and choosing a rate variable, to ask "what kinds of storms is this program component or funded infrastructure handling?" For example, the minor drainage system that is tied to the street network and managed by DPW may be designed in many cases to accommodate a one- or two-year design storm before being overwhelmed by the runoff. More rainfall than that amount, during a short period of time, would lead to minor system flooding. Runoff from land areas during a one- or two-year storm will mostly come from impervious areas because, for the most part, in small storms such as these the pervious areas do not have time to become fully saturated and contribute much runoff to the drainage system. For this reason, a good rate structure for funding operation and maintenance, as well as capital improvements for the minor system would focus on impervious area as the rate metric.

In contrast to this, the major system infrastructure components are usually designed to handle much larger storms, perhaps those as large as 50- or 100-year storms. In storms this large, and in particular when these large storms have longer durations, runoff is contributed to the drainage infrastructure from all land area, because even green areas will have become fully saturated and are generating runoff prior to the cessation of precipitation. Because of this, a rate structure focused on funding the largest infrastructure in the City might more optimally be based on gross land area than only focused on impervious area. That said, yet another important consideration in rate structure choice for funding infrastructure designed to handle large storms is that the purpose of handling the runoff from large storms safely may be in great part to protect manmade structures like homes and commercial buildings from flooding. To the extent that is true, a system of charges based on the value of the asset protected can have some merit. Of course, that is to some degree how the millage-based funding strategy works now, except that it excludes from the charges those properties that are tax exempt, regardless of the value of the assets.

Measuring impervious area to be used in conveying stormwater fees that rely on this type of rate structure, and maintaining that impervious area data as construction and demolition occur in the City over time, will create ongoing cost. One way to reduce that cost is to adopt a simplified rate structure for residential ratepayers. This is quite common in stormwater fees and, given the overall similarity of residential properties in most jurisdictions and in New Orleans, can be done in ways that do not appreciably reduce the inherent fairness of the rate structure.

Gross Land Area

A rate component based on the burden that the gross lot area places on the drainage system is an occasionally used practice, and it would charge larger properties more than smaller properties. Essentially, in large, long duration storms, a larger land parcel could allow for more runoff than a smaller land parcel since runoff can occur from any (impervious or pervious) surface. However, this type of rate structure tends to allocate more of the cost burden to lightly developed and large undeveloped properties than methodologies that are strictly based on impervious area. For this reason, in most cases where gross lot area is used as a rate structure it is not the sole rate variable.

Finding the right mix of components for charging for impervious area and gross area can be done in two ways: 1) by applying weighting factors to gross and impervious area, often derived from experience or judgment; or, 2) by allocating certain costs of service to each parameter. Units of gross area might be charged a basic rate, with a surcharge applied to units of impervious coverage, or the cost of service can be assigned between the impervious area and the gross area instead of assigning costs to each parameter. For example, 80% of the charge could be allocated to impervious area and 20% to gross area.[20] In fact, the City of Philadelphia relies on a rate structure that allocates 80% of cost to impervious area and the remaining 20% of cost to gross lot area.

Figure 3: Houses with parcel lines. Image courtesy of Orleans Regional Planning Commission.

One additional consideration is that the vast majority of residential land parcels in New Orleans have very similar gross lot areas. For this reason, a rate metric based on gross lot area will have little impact on relative rates for any likely classes of residential ratepayers. The figure at left shows an example of a typical residential area that is common in the City and where the land parcels are similarly sized.

Lot Elevation or Floodplain Charge

Preliminary discussions of drainage infrastructure needs and funding approaches considered the possibility of differentiating charges to ratepayers based on the absolute or relative elevation of their land parcel(s). This concept is often viewed quite differently by various parties. For example, some observers would suggest a property that is particularly low-lying should pay less in stormwater fees than another because the property is “low enough” to become a temporary storage area for rainwater during storms. The provided detention might aid the City’s efforts in managing runoff. Others would argue that a low-lying area demands more service from the City (in the form of managing runoff carefully to avoid flooding of the low land) and should thus pay more in stormwater fees compared to an identical property that is at a higher elevation. The aid provided to the City by detention or the increased demand placed on the City to protect low-lying areas is actually quite variable and not so simple as to index to property elevation alone. Because of this, differentiating fees for properties based on their elevation is likely more appropriately handled through a system of credits and incentives where individual site conditions can be taken into account than through a rate structure.

Recommended Rate Structure for Generating New Revenues

Based on the above research and analysis, <u>the project team recommends a rate structure based on measured impervious area existing on a property</u>. Impervious area is the most significant factor in the amount of stormwater runoff, peak flow runoff, and water quality degradation. Basing a fee on the amount of impervious area on each property indexes well to the cost causation for most of the new costs the City faces, and continued millage-based funding for the other costs is important and provides a good balance of funding going forward. <u>The team also recommends a robust system of credits and incentives be offered to ratepayers who reduce their demand on the drainage system by various means,</u>

[20] *Ibid.*

and recommends the use of a simplified (tiered) residential rate structure. Details of these nuances are provided below.

Credits and Incentives

The option to implement a credits and incentives program is available when using a fee-based funding method. A credits program can be built into the rate structure and is normally used to provide incentives or relief from utility fees, for the implementation of certain best management practices (BMPs).[21] When a BMP is installed on a property, it may not remove impervious area, but it does install some infrastructure that reduces peak flow, pollution, or runoff volume. By installing the BMP, the property has materially reduced its demand on the drainage system infrastructure. By reducing the demand on the infrastructure, presumably, the City's infrastructure will last longer (perhaps remain adequately sized for longer) and/or may need to be maintained less frequently, due to the decreased demand associated with the installation of the BMP. Thus, in the *future* the actions of ratepayers who install and maintain BMPs will save the City money through reduced maintenance and less frequently replaced infrastructure. This savings can be monetized immediately, and the result of the mathematical savings can be offered back to ratepayers as incentives or credits even though the City's costs may not instantly be reduced as a result of the action. Potentially this system of credits and incentives could be developed to apply to areas that are low-lying and lightly developed since those may provide a detention benefit.

In most jurisdictions, the most commonly used BMP measure is the installation of approved retention or detention BMPs. These BMPs are intended to replicate pre-development conditions, reduce the peak flow, or assist with the capacity of the drainage infrastructure. [22] A credits program could also include installation of semi-pervious materials or tree-planting. Another commonly used credit is for schools or businesses to begin education programs for students or employees on the importance of stormwater management.

The Board and the City of New Orleans could use a credits program to incentivize the implementation of green infrastructure. In turn, the green infrastructure could assist in reducing peak flows and the absorption of rainfall into the ground. Both of these factors would lessen the burden on the drainage infrastructure, and importantly they could also help assuage some of the negative consequences from subsidence.

In an effort to estimate the immediate effect that a credits and incentives program would have on potential fee revenue, revenue losses that come from the issuance of credits and incentives were estimated to be an additional 15% of the program revenue requirement per year. Although in the long-term the BMPs associated with these credits and incentives will help drive down the City's stormwater management costs, this is not so true in the very short term.

Simplified Residential Rates, Equivalent Residential Units (ERUs), and Tiers

An important consideration in implementing a rate structure based on impervious area is selecting the base unit of impervious area for computations and billing. For example, most water utilities select either 100 cubic feet of water or 1,000 gallons of water as the unit for measurement and billing. A key

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[21] http://water.epa.gov/infrastructure/greeninfrastructure/upload/region3_factsheet_funding.pdf p. 3

[22] Cyre, Hector. Chapter 2 Sources of Funding. Guidance for Municipal Stormwater Funding. National Association of Flood and Stormwater Management Agencies. January 2006. p. 2-34

driver in making this selection is to balance the fairness of the unit size against the cost to collect and manage the data. So, in the example of the water utility, selecting a unit that is quite small, say a unit of one gallon, would result in the need to have very accurate water meters and would result in a nearly infinite range of charges for water, including the fact that charges for customers who are essentially steady-state users would vary in every billing cycle. The cost, effort, and confusion associated with such a rate structure would not result in happier customers or any appreciable improvement in fairness of the rates. The reverse is also true in that a selection of a very large unit, say 10,000 gallons, would remove form the rate structure the pricing signals designed to encourage conservation, and would appreciably reduce the overall fairness of the approach.

As with water utilities, a unit of impervious area must be chosen in order to implement the rate structure. Because the cost to measure impervious area is not insignificant, and because the aerial imagery used for such measurement cannot always provide a clear picture of on-the-ground conditions in areas of tree cover or shadow, selecting a unit that is quite small, say ten square feet of impervious area, is not advisable. Similarly, selecting a unit of impervious area as large as one acre of impervious area (43,560 square feet of impervious area) would result in nearly all properties in the City being charged an identical stormwater fee, which, although simple from a measurement point of view, is not very fair.

Most stormwater utilities use the equivalent residential area (ERU) as the unit of impervious area in calculating a stormwater fee.[23] The ERU is the amount of impervious area on a typical residential property. To calculate the ERU, a representative sample of residential properties is taken and the impervious area on each property is measured. Then, the median measured impervious area is calculated and used as the ERU. The median is used for calculating the ERU as it is best representative of the actual impervious area on a typical property. Largely, because the median is less likely to be skewed by the outlier properties that have considerable larger or smaller amounts of impervious area.

A major advantage to choosing the ERU in New Orleans is that it strikes a balance between cost to measure and maintain and fairness in the fees, while also creating rate equivalence between customer classes. Specifically, in this type of rate structure if a typical home is charged for one ERU of impervious area, a small business with a much impervious area as three typical residential properties would pay for three ERUs of impervious area; this is a very fair approach.

Within the residential rate class, we recommend breaking the ratepayers into three flat rate classes, with the middle class centered on the ERU impervious area. By utilizing this approach, similar residential properties would be charged similarly, rate equivalence between rate classes could be maintained, and a very appropriate balance between fairness and cost to measure and maintain data can be maintained.

Rate Base Estimate and Rate Estimate

A potential fee estimate is possible through estimating the ERU then identifying all the properties in the city and estimating the impervious area on each property. Collectively these data are known as the rate base. <u>The project team completed this analysis to estimate a billable unit of impervious area (the ERU) to be 2,550 square feet</u>, the median measured impervious area from a sample of residential properties

[23] Funding Stormwater Programs. EPA 833-F-07-012. January 2008. http://water.epa.gov/infrastructure/greeninfrastructure/upload/region3_factsheet_funding.pdf

whose impervious area was measured. Through additional sampling and sophisticated estimation techniques the team then estimated the total number of ERUs of impervious area within the City and falling onto real property (that is to say, not in street rights of way) to be about 198,000.

Applying the estimated annual revenue requirement to this rate base estimate, adding an allowance for credits and incentives as described previously, and allowing for a few assumptions about the cash flow, collections, and other factors yields a "phase-in" rate estimate of about $9 per month for the typical residential home. This would rise to more than $30 per month by the time the revenue requirements reached $50.7 million. Were the millages that now generate about $52.8 million per year not in place and all funding then generated through ERU rates, the rates would swell to more than $60 per month for a typical house. The details of this estimate are shown in Table 4.

Table 4. Rate Estimate

	Revenue Requirements (millions per year)		
Item	**Initial Ramp Up Phase**	**Full Funding Phase**	**Full Funding Post Settlement Phase**
Base Annual Revenue Requirement	$14.0	$45.7	$50.7
15% Allowance for Credits, Incentives	$2.1	$6.9	$7.6
Total Annual Revenue Requirement	$16.1	$52.6	$58.3
Rate Base (ERUs)	198,000	198,000	198,000
Collection Rate Estimate	80%	80%	80%
Collectible Rate Base	158,400	158,400	158,400
Monthly Rate Estimate per ERU	$9	$28	$31

Under the residential tiering approach that is recommended, this range of approximate fees would apply to residential single family parcels with typical amounts of impervious area on them. For those with significantly less impervious area, the fee would be lower (the low tier fee), and for those with significantly more impervious area on them, the fee would be higher (the high tier fee). The details of how best to set the tiers are discussed later in this report.

The table above shows that the project team estimated the collection rate to be 80%. Because the impervious area across the City would all be billed under this type of rate structure, but in fact some properties with impervious area are abandoned, the team assumed this collection rate to account for this fact. This is a critical estimate and would require additional consideration during an implementation phase as part of the rate study.

Implementation Issues

Administration Implications

Adding a new drainage fee to the existing legacy billing system or to the new planned billing system, and accommodating the processes that go with such a fee will add some to the Board's cost of doing business. The jurisdictions of similar size and population as New Orleans, upon implementation of a new stormwater utility fee, have increased staff size in critical areas such as customer service and information technology to meet the future service needs.

The Board would likely need to add two new customer service representatives. These staff members would be trained in explaining the mapping and impervious area characteristics of the drainage fee to inquiring customers. Perhaps one additional IT staff member would also be needed to accommodate the stormwater fee with the Board's planned Cogsdale system. Metered services and systems such as water and wastewater are not immediately parallel to non-metered systems such as stormwater. The new IT staff member would work on the continued integration of the stormwater fee and the subsequent system maintenance.

Project Timeline

A past legal opinion suggested that a vote of the people of the City would be needed for the Board to implement a stormwater fee. The amount of time that it would take to implement a fee is similar whether this remains the case or not. In fact, the project team believes that assuming a quick start during the summer of 2014, it would take until January of 2016 to prepare for and implement such a fee. Much of the effort to put such a fee in place would revolve around public outreach, data and systems manipulation, and financial and rate related computations. The following chart provides some detail on the efforts that would be involved, and the relative timing of each.

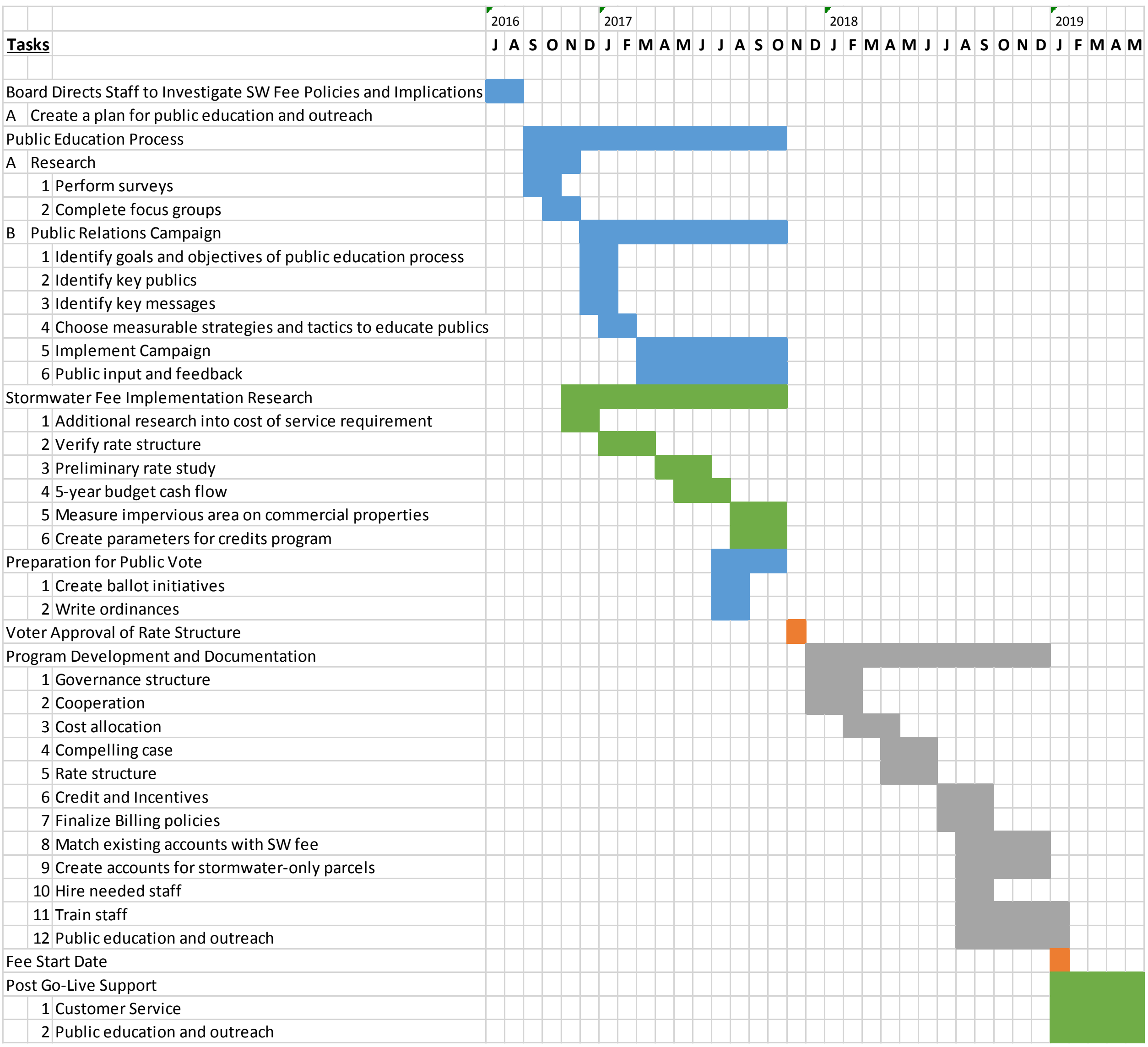

Figure 4: Project Timeline

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Appendix A – Estimating the Rate Base

As part of this project and toward the goal of estimating the rate base for a stormwater fee, much information was gathered on land parcels, impervious features, and building characteristics. In many cases, samples were taken and later extrapolated. In this appendix details of the rate base estimation process and the residential tiering options are explained.

Data Acquisition and Manipulation to Support the Estimates

Accurate and applicable data to assist in the estimation and potential creation of a drainage fee is critical in obtaining accurate calculations. The project team acquired spatial imagery, geographic parcel data, and real property tax data from various sources. The team used this data to define property classes, measure impervious area, obtain the most recent address information and property characteristics, and calculate a fee estimate. The spatial, parcel and tax data are all critical to estimating a fee, because the data establishes the relationship between the tabular tax and parcel data and the existing property characteristics.

First, the team received GIS imagery from the New Orleans Regional Planning Commission. The commission provided 6-inch imagery taken in 2010 and 1-foot imagery taken in 2012. Even though the 2010 imagery has higher resolution, the project team used the most recent imagery from 2012 to reflect more accurately the current state of the property. Upon request, the commission also provided GIS information on the SELA project locations and canals.

The project team obtained parcel data, building outlines, addresses, and zoning data from publicly available data sources and from the City's website, data.nola.gov. This website is managed by the City of New Orleans and is a catalog of database information, much of which is geographic in nature. Each of these datasets helped to determine the size of buildings on the property, the property class, and address and other relevant information. At the time of the analysis, the most recent updates to the obtained data were made in July and September 2013.

Using the parcel and address databases, the project team was able to obtain additional information for each property programmatically via the City's tax assessor website. The tax assessor data provided information on tax values, property improvements, property tax information, property classification, and more accurate address information. All of this data assisted in the estimation of the rate base.

Once the data was received, it was necessary to adjust minor characteristics and perform a general analysis of the state and functionality of the data. Information obtained during this process was used to adjust minor details such as street spellings so that uniformity existed amongst all the datasets.

Part of this process was ensuring that each parcel has a unique identifying feature to refer to when seeking data about a specific parcel. The team confirmed that this unique identifying feature was the GEOPIN associated with each parcel.

We then used the parcel information in GIS to intersect the parcel dataset against the building outlines and the zoning data to verify how properties were classified and to compute the amount of building area (from the outlines) that fell on each land parcel. We made visual comparisons of property classification and GIS data to ensure the classifications of residential, commercial, and exempt were valid and consistent. This analysis included the discovery that the City classifies multi-family parcels as commercial properties, a common practice, but an important factor in characterizing the rate base and in calculating a stormwater fee. If a property did not have a classification, the property was designated as commercial for this analysis in order to maintain consistency. We then separated residential and non-residential properties into two databases for ease of proceeding with the analysis.

Sampling and Computations

In order to find the median amount of impervious area on the residential properties, we created a sample of 400 residential properties. These sample properties were selected based on the distribution of parcel size and city geography. This process was done to ensure the sample is representative of the entire population. The residential sample was used to estimate the ERU. The project team also measured a sample of 200 non-residential properties and used that sample to estimate the number of ERUs on non-residential parcels citywide.

The following map identifies the location of the sample residential and commercial properties. As shown, the properties are of various size and spatial location. This sample is designed to be an accurate representation of the entire population.

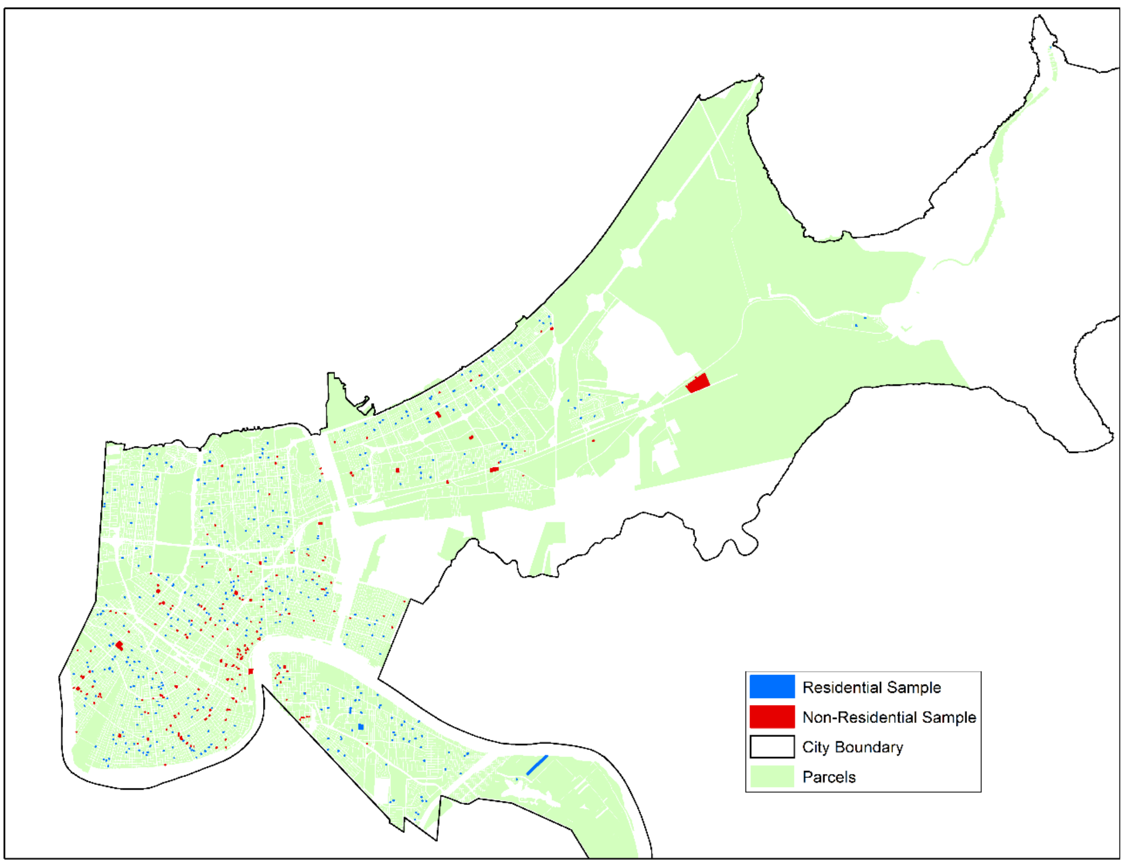
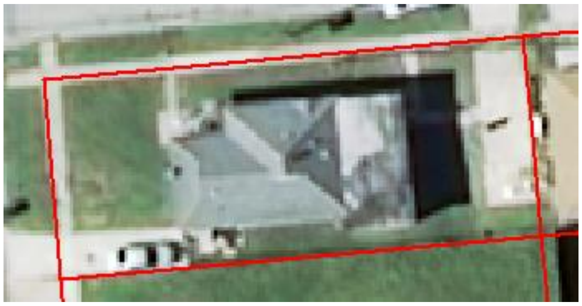


Figure 5: Location of Sample Properties

Once the 400 residential and 200 commercial sample properties were measured they were digitized using GIS tools. As an example of the process, the following figures illustrate the RFC-digitized impervious surface area of a single family home at 5359 Cameron Boulevard. This parcel size is 6,041 sf, which is slightly larger than the city's average parcel size but relatively typical. The figure shows the aerial imagery with the house visible, and with the overlain parcel boundaries highlighted in red.

Figure 6: House with Parcel Boundary



Building outline data shown in Figure 7 was publicly available from the data.nola.gov website. The building outlines were useful in estimating impervious area.

Figure 7: House with Building Outline Shown in Pink Color

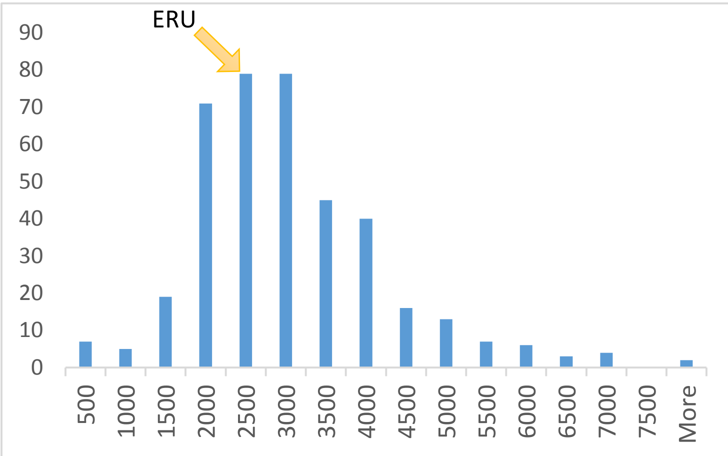
Figure 8 shows the measured impervious surface area can be drawn and measured with GIS tools. The impervious area on this property is 2,815 sf, which is an estimated coverage rate of over 45%.

Figure 8: House with Measured Impervious Area Shown in Green Color

Because runoff from these surfaces drive most of the emerging program costs, the area of impervious surface on each parcel is at the foundation of the recommended rate structure.

From the overall sample of 400 residential parcels the team calculated a median impervious area. The ERU is this median impervious area amount found on these properties and was approximately 2,550 square feet (sf) of impervious area. This ERU of 2,550 was used for the fee calculation estimates. The histogram in Figure 9 illustrates the distribution of measured impervious area (the X axis) of the sampled properties. The ERU is also identified.

Figure 9: Histogram of Measured Sample of Impervious Area with ERU



The total impervious area on residential parcels in the City is thus deemed to be one ERU for each of these parcels (as long as the parcel does have a home on it). The application of three flat rate classes (tiering) would result in charges for less than one ERU of impervious area for the small tier, and charges for more than one ERU of impervious area for the large tier, but in aggregate across all three classes, the tally of ERU charges would equal or very nearly equal the count of residential parcels if the tiering were undertaken in a mathematically rigorous way. With just more than 123,000 residential parcels with homes extant in New Orleans, the residential rate base is thus estimated to be about 123,000 ERUs.

The next step in the team's estimation process was to estimate the impervious area on each non-residential property in the city. The measured impervious area, building outlines, and gross area from the sample properties were used to predict the totality of impervious area throughout the whole city.

For the 200 non-residential properties that were measured, the project team determined that the median impervious area to building footprint area ratio was 124.5% and the mean ratio was 128.0% per parcel. Since the building footprints were available as source data, the non-residential impervious area estimate was developed as a function of building footprint and the team used the average of the median and the mean. Applying this estimate to the properties in the City on a per-class basis resulted in Table 5, our estimated rate base.

Table 5: Rate Base Description

Classification	Number of Parcels	ERUs
Residential	123,412	123,412
Commercial	7,244	26,520
Exempt	8,697	24,501
Unknown	9,615	22,742
Total	**148,968**	**197,715**

Potential Residential Tiering Approaches

A tiered residential rate structure provides more equity amongst the residential properties. The two key issues of inequality in a single, flat-rate structure are income inequality and size disparity; that is, a large impervious area house paying the same as a small impervious area house. Because of these reasons, the project team finds tiering an attractive option for New Orleans.

The first tiering analysis was calculated using the same sample properties on which the impervious area was measured. Starting with the median impervious area, or ERU of 2,550 sf, an iterative process was performed to find a mathematically optimal tiering structure. This process involves several variables. First, the median of the entire sample remains the median of the middle tier. Second, the middle tier contains the most similarly-sized properties and the other tiers retain a proportionately smaller number of properties.

The process resulted in the following rate structure. Tier 1: 400-2,000 square feet of impervious area to be billed at 2/3 ERU. Tier 2: 2,000-3100 square feet of impervious area with a median equal to one ERU and thus to be billed at 1 ERU. Tier 3: greater than 3,100 square feet of impervious area and to be billed at 1.5 ERU. The following table shows this potential tiered rate structure, the number of properties in each tier and the billing amounts per ERU.

Table 6: Sample Tiering Example

	Max SF Tiers	% of Prop. in Tier	Median	Billed ERU
Tier1	2,000	25.8%	1,733.7	0.67
Tier2	3,100	42.2%	2,550.0	1.00
Tier3		32.1%	3,770.0	1.50

Following this approach, or one that is similar but based on more detailed analysis that would occur during the rate study would result in approximately 25%of the residential ratepayers paying the low residential rate, while about 42% paying the middle rate and the remaining 33% paying the high rate. Each rate would go with an impervious area range as the table shows.

Gross Parcel Area as a Rate Metric

As described in the main body of this report, a gross area fee component was considered and rejected from consideration as a recommended rate structure. Although the main reason for this is that most of the cost causation for the emerging program needs more closely correlate to impervious area, another reason is that gross lot area in New Orleans is less variable than in many other jurisdictions.

The project team performed a statistical analyses on the size of each parcel in the City and found that most parcels were between 3,000 and 8,000 square feet. Less than 10% of parcels were larger than 10,000 square feet, and the largest of those parcels were vacant land, located to the eastern most regions of the city where elevation and flood potential allows for little additional development. When comparing this to other jurisdictions that have instituted a fee component consisting of a gross area charge, it was discovered that the parcel size in New Orleans is much more uniform, and this fact further diminishes the potential value of gross lot area as a rate metric. These findings are shown in the following histogram.

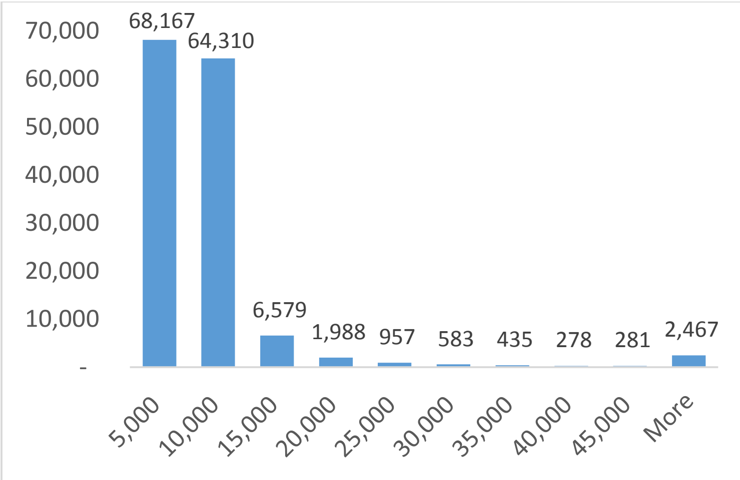


Figure 10: Gross Area Size Histogram

This thematic map, derived from the GIS data the project team utilized for the effort, also illustrates how most of the properties in New Orleans are similar in size. The map is color coded according to the gross area classification similar to the above table.

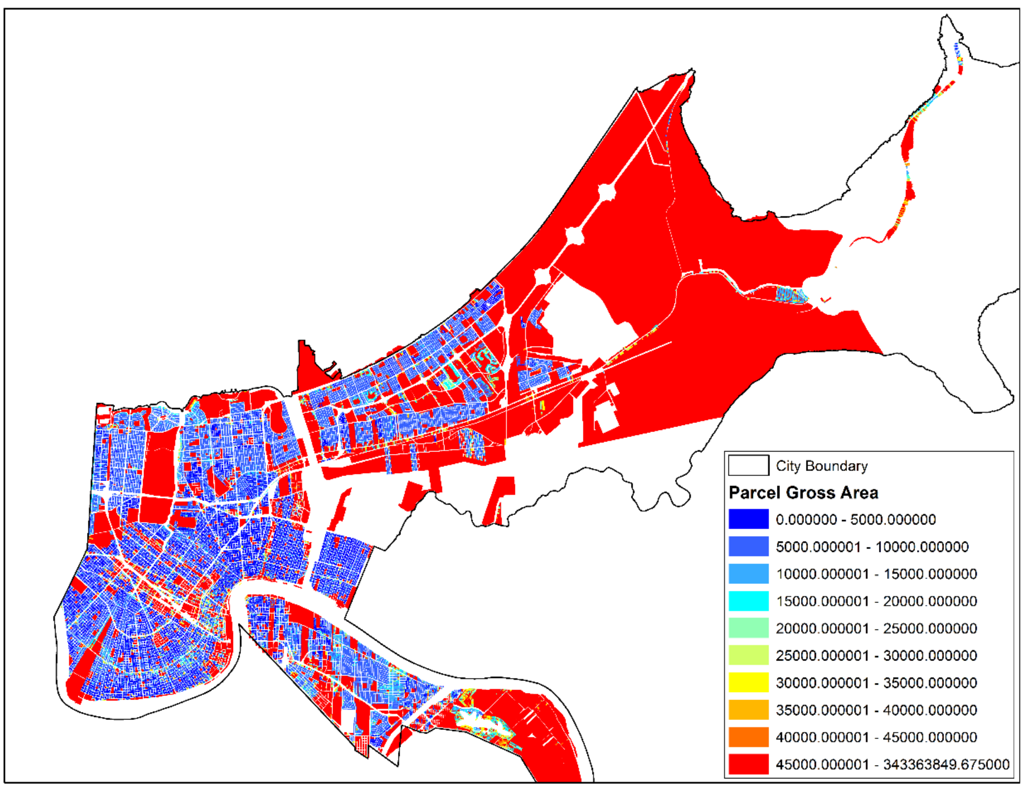


Figure 11: Gross Area Thematically Mapped

Property Elevation or Floodplain Condition as a Rate Metric

As mentioned in the main report body, another rate metric that has been considered is property elevation, or perhaps in a more ordinal way, the floodplain condition of a property. The idea behind this varies widely, but essentially, some observers would suggest a property that is particularly low-lying should pay less in stormwater fees than another because the property is "low enough" to become a temporary storage area for rainwater during storms. The provided detention might aid the City's efforts in managing runoff. Others would argue that a low-lying area demands more service from the City (in the form of managing runoff carefully to avoid flooding of the low land) and should thus pay more in stormwater fees compared to an identical property that is at a higher elevation.

Because floodplain maps are available and were compiled as part of this effort, the project team evaluated the elevations and distributions of properties across the City and found that more than 2/3 of the land parcels in New Orleans fall within the current 100-year FEMA floodplain. The following histogram and map illustrates this analysis, which is included for completeness only since the project team rejected property elevation as a rate metric.

Figure 12: Properties in 100-year Floodplain

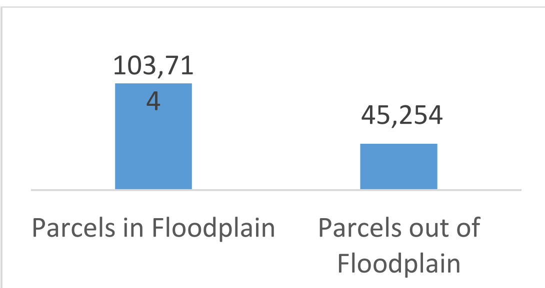
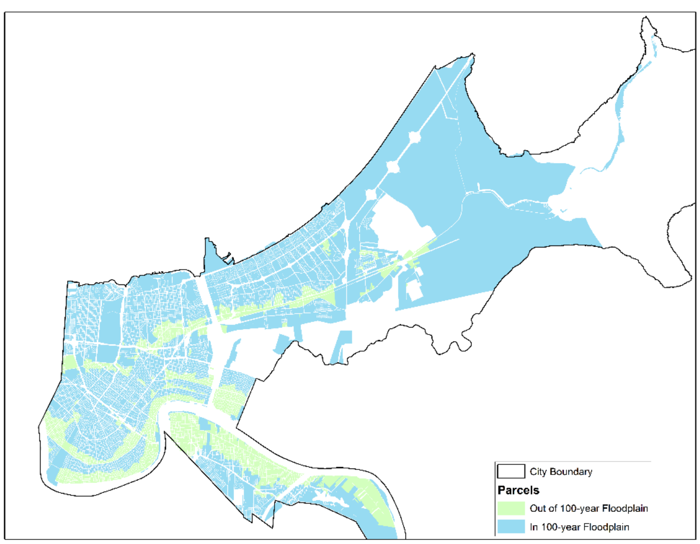


Figure 13: Thematic Map – New Orleans Properties in Floodplain



Appendix B – State Attorney General Opinion No.99-24

January 27, 1999
OPINION NUMBER 99-24

Honorable Sherman N. Copelin, Jr.
Honorable Charles Emile Bruneau, Jr.
Louisiana House of Representatives
P. O. Box 94062
Baton Rouge, Louisiana 70804

Dear Representatives Copelin and Bruneau:

This office is in receipt of your recent request for an Attorney General's Opinion regarding the regulatory authority delegated to the City of New Orleans (the "City"), by the Legislature, over the New Orleans Sewerage and Water Board (the "S&WB"), to levy a tax or fee on real property without submitting it for approval by the electorate. Specifically, you have asked this office to address the following questions:

1. Does the regulatory authority delegated to the City by the Louisiana Legislature over the S&WB, a body corporate, permit the City to levy taxes, fees or charges, not otherwise permitted under its Charter, for the sole use of the S&WB?

2. Does the legislative authority delegated to the City by the Louisiana Legislature over the S&WB, a body corporate, permit the City to levy a new one billion dollar tax or fee affecting real property without submitting it for approval by a majority of the qualified electors of the City?

Before responding to your first question, we must point out that this office has not undertaken an examination of the City's Charter, and we rely upon your advice regarding its contents. Since, as you state, the City's Charter does not permit it to levy taxes, fees or charges for the sole use of the S&WB, it is the opinion of this office that such authority, if it exists, can only arise from the State Constitution or statutes.

The legislative authority creating the S&WB is found at LSA-R.S. 33:4071, et seq. These provisions clearly define, but at the same time limit, the authority of the S&WB to raise funds to provide for the water, drainage and sewerage needs of the City of New Orleans. In the absence of specific legislative authorization, the S&WB has no authority to levy fees, taxes, or charges.

For example, LSA-R.S. 33:4094 permits an assessment of *ad valorem* taxes to fund the operation of the S&WB. LSA-R.S. 33:4096, as well as LSA-R.S. 33:4198 provide for the issuance of revenue bonds to supplement *ad valorem* tax revenue. Under the authority of Sections 4096 and 4198, the S&WB is authorized to levy charges for water, drainage and sewerage service. Under the statutory scheme of Sections 4096 and 4198, the rates charged for these services must be reasonably related to the cost of services provided to the user. Only the S&WB under these enactments has the statutory authority to fix rates sufficient to operate and maintain its water system and service its bonded indebtedness. *Civello v. Sewerage and Water Board of New Orleans*, 349 So.2d 404 (4th Cir. 1977).

The role of the City in the operation of the S&WB is similarly defined and limited by LSA-R.S. 33:4071, et seq. The City's role, taking the statute as a whole, is as a regulator, approving the rates which may be charged by the S&WB for its services pursuant to LSA-R.S. 33:4096 as well as LSA-R.S. 33:4198. As a regulator, the City cannot exercise the legislative powers granted the S&WB since the S&WB is a separate, distinct body politic. See, *State ex rel. Sanders v. Kohnke*, 33 S. 793 (1903), holding that the S&WB of New Orleans has all the attributes of a corporation.

Conspicuously absent from these legislative enactments creating the S&WB is any authority granted to the City to raise revenues for the use and benefit of the Sewerage and Water Board as a consequence of its regulatory authority. Thus, to the extent that the City seeks to enact charges or levies pursuant to its regulatory authority over the S&WB, those charges or levies are not authorized or permitted under the laws of the State of Louisiana.

In response to your second question, we note that the authority of the City to levy taxes is clearly limited and defined by both State law and its Charter.

With regard to state imposed limitations, we note that the constitution and laws of the State of Louisiana authorizes the City to impose ad valorem taxes on real estate, but only upon approval of the voters and based upon valuation. The Legislature further provided in LSA-R.S. 33:4093 pertaining to the S&WB that:

> "…and the city of New Orleans shall be hereafter relieved of the duty of providing in its annual budget or otherwise for the maintenance and operation of the sewerage and water systems; and the said board shall be authorized to use the collections from water rates charged to private consumers for the maintenance and operation of the public water system, and the public and private supply therefrom, and the cost of maintenance and operation of the public sewerage system, and the creation of a sinking fund for an ultimate renewal of said systems…"

Act 6 of the Extraordinary Session of 1899 authorizing water, sewerage and drainage systems for New Orleans was made part of the 1899 constitution. It is the State of Louisiana which has the right under its police powers to create, supervise, and define the role and power of the Sewerage and Water Board of the City of New Orleans. *State ex rel. Porterie v. Walmsley*, 1935, 183 La. 139, 162 So. 826, appeal dismissed 56 S. Ct. 141,296 U.S. 540, 80 L. Ed. 384, rehearing denied 56 S.Ct. 246, 2196 U.S. 663, 80 L.Ed 473. As a municipal corporation, the operation of a board controlling sewerage, drainage and water was not an "ordinary governmental function of municipal government." *State ex rel. Porterie, supra*. Thus, to the extent that the City would propose to raise funds for the use and benefit for the S&WB, such activity would be outside of the proper governmental function of the City of New Orleans.

Any other charge on real estate is subject to the Home Rule Charter of the City of New Orleans which you have advised provides, at Section 3-101, that "…no specific tax or service charge effecting real property or motor vehicles shall be levied unless approved…by the voters of the City of New Orleans."

Thus, to the extent that the City of New Orleans, under its authority as a municipal corporation seeks to impose levies, charges, or fees on real property in the absence of voter approval, such levy, charge, or fee is illegal.

We trust the foregoing to be of assistance. Should you need any further information, please do not hesitate to contact this office.

Yours very truly,

RICHARD P. IEYOUB
ATTORNEY GENERAL

BY: ______________________________
JEANNE-MARIE ZERINGUE BARHAM
Assistant Attorney General

RPI:JMZB:jv

OPINION NUMBER 99-24

71 MUNICIPALITIES
148 TAXATION - PROPERTY TAXES

R. S. 33:4071, ET SEQ

Pertains to taxes and fees imposed by the City of New Orleans for the benefit of the Sewerage and Water Board.

Honorable Sherman N. Copelin, Jr.
Honorable Charles Emile Bruneau, Jr.
Louisiana House of Representatives
P. O. Box 94062
Baton Rouge, Louisiana 70804

DATE RECEIVED: 1/25/99
DATE RELEASED:

JEANNE-MARIE ZERINGUE BARHAM,
ASSISTANT ATTORNEY GENERAL