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STORMWATER UTILITY FEASIBILITY STUDY

PREPARED BY RUTGERS UNIVERSITY

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The purpose of this Feasibility Study is to provide the New Jersey Meadowlands Commission (NJMC) management and staff with information related to stormwater management within the Meadowlands District. The study is available to individuals on a CONFIDENTIAL basis. Reproduction of this document in whole or in part is illegal without expressed written permission from the NJMC.

I. EXECUTIVE SUMMARY

Since the 19th century the Hackensack River watershed has been altered as a result of human activities. These alterations have changed the natural flow patterns of waters moving within and through the Hackensack Meadowlands District (hereafter the "District"). Extensive ditching, diking, and damming activities have taken place in the District, in combination with the placement of millions of cubic yards of fill materials, which now support an extensive impervious infrastructure. These multiple changes have reduced functional ability of the system to absorb even low volumes of precipitation. The inability to store, and then gradually release water during storm events currently produces extensive flooding, both within the District and in adjacent municipalities.

Flooding in the District causes major transportation and economic disruptions, and these disruptions threaten the economic vitality of the District and the surrounding region. The purpose of this study was to investigate the feasibility of addressing the District's flooding issues through creation of a Stormwater Utility. The New Jersey Meadowlands Commission (NJMC) has recently completed a hydrological engineering analysis of the District. Using this hydrological data, in conjunction with District land use data and a review of existing NJ statutes, Rutgers University prepared this report.

The hydrological engineering review highlights the current lack of consistent oversight to keep the District's stormwater infrastructure maintained. This lack of regular maintenance has contributed to a broken or non-functional stormwater infrastructure, including tide gates, drainage ditches, pipes, etc., that produces a system which floods even during small storm events. These flooding problems increase dramatically during large storm events and when storms or sea surges occur in combination with high tidal cycles. The current estimated cost to repair the District's damaged infrastructure is

$24,177,151 dollars, a sum that is most probably beyond the financial means of the District municipalities working on an individual basis. In addition to the infrastructure repairs needed, many of the current flooding problems would be preventable with a program of dedicated District-wide infrastructure maintenance and oversight.

To provide the infrastructure improvements needed in the District, to finance routine operation, maintenance, and management of stormwater flows, and to cover the administrative costs associated with these activities, a predictable revenue stream is required. Generating the revenues required to accomplish these objectives is quite probably beyond the scope of any individual District municipality. Based upon a review of the models provided by over 400 Stormwater Utilities currently operating in the U.S., this report describes two possible fee structure approaches that could be used to finance a District-wide Stormwater Utility.

The primary goal in creating a fee structure is to equate the conditions found on a property with the amount of stormwater the property generates, and to use this relationship as the basis for any fee(s) charged. A financial analysis based upon land use parcels within the District boundaries (15% of the total watershed) is included in this study. A parcel analysis was also conducted for the remaining portions of four District municipalities (8% of the total watershed) that are beyond the District boundaries (Addendum I). Because the size of this non-District drainage area is 50% as large as the total District drainage area, the stormwater generated in portions of the municipalities that are outside the District boundary can have a direct effect on District flooding events, and based on the size of this out of District drainage area, we estimate that approximately one-third of the runoff flowing into the District during flood events may come from non-District areas.

The specifics of setting fees and generating the revenues required to manage a District-

wide Stormwater Utility need to be determined in conjunction with public input. Issues raised by this feasibility study that need to be addressed through a Public stakeholder process include determining the appropriate fee structure components for a District Stormwater Utility, and deciding how to address stormwater generated in portions of the District municipalities that lie outside District boundaries.

After review of the legal authority delegated to NJ municipalities, it appears that with fairly minor modifications to the current regulations, there is legal justification for the creation of a Stormwater Utility within the District. Based on its legislative mandate, a Stormwater Utility could conceivably be administered by the NJMC within the Meadowlands District. Although the NJMC is authorized to provide improvements supported by fees or assessments within the District, the conservative course of action would be for the Legislature to amend the current regulations to grant the NJMC specific authority to operate a Stormwater Utility.

Given the high costs associated with addressing the District's flooding problems, the disruption of the District transportation infrastructure during flood events, the number of alterations to both the watershed and the District's natural hydrological patterns, and the hydrologic connections between District municipalities, it would be highly desirable to have a central authority capable of dealing with these multiple issues. A District-wide Stormwater Utility would support the region's economic vitality through reduction of business interruption from avoidable flood-related downtime. Such an authority would provide a reliable, continual funding system for identified flood control projects, and could independently rank proposed projects based on their importance to the economic needs of the District. A District Stormwater Utility would be uniquely suited to provide these services, as well as to expedite interactions required between the appropriate regulatory and permitting agencies when improving the District's flood-related infrastructure. A Meadowlands District-wide Stormwater

Utility would also be able to initiate long-term strategies to deal proactively with the stormwater and flooding issues facing the District.

BACKGROUND

A. HACKENSACK RIVER HYDROLOGICAL HISTORY

The Hackensack Meadowlands District (hereafter the "District") has undergone significant hydrological alteration and ecological degradation during the last two hundred years. Beginning in the 19th century Dutch salt hay farmers began ditching and diking portions of the vast salt marshes in the New Jersey Meadowlands to "reclaim" land for the purpose of growing flax, grain, and vegetables (Quinn 1997). The Paterson-Hudson Railroad, the first railroad linking New York and New Jersey, was built through the middle of the Meadowlands marshes in 1832. Other railroads and roadways followed, all being built on elevated beds with little or no consideration of how these beds disrupted natural hydrologic flows, or fragmented the floodplain and marsh ecosystems. Construction of the Oradell Dam, 22 miles upriver of Newark Bay in the early 20th century, resulted in diversion of virtually the entire freshwater flow of the Hackensack River (USACE 2004). Currently rising sea levels, combined with construction of the reservoir system in the northern upper reaches of the Hackensack River has shifted the estuary from a basically freshwater tidal ecosystem to a brackish tidal system.

The filling and diking of salt marshes accelerated in the 20th century when the Mosquito Control Commissions were created by the New Jersey General Health Act. By 1906 these Commissions had authorized the New Jersey State Agricultural Experiment Station to develop drainage plans and specialized ditching tractors to reclaim the State's marshlands. Between 1904 and 1945 the Bergen County Mosquito Control Commission installed one million feet of drainage ditches through salt marshes and another 500,000 feet of upland ditches (USACE 2004).

In 1928 the Meadowlands Reclamation Commission was appointed by the New Jersey

State Legislature. This Commission worked with the Bergen County Chamber of Commerce to develop a plan to "reclaim" 30,360 acres of Meadowlands marshes for industrial development through the addition of 172 million cubic yards of fill. Over the next half-century large tracts of the Hackensack Meadowlands were filled with household and municipal waste, dredge spoils, and other fill materials. Industrial and residential development took place on this "reclaimed" low-lying land, as well as on the higher ground in the surrounding Hackensack River watershed. As a result, the Hackensack River watershed became more impermeable, producing greater volumes of water running off more rapidly, at a time when the vast flood storage capacity of the Hackensack Meadowlands was simultaneously being eliminated. Bulkheads were built along the banks of the river and its tributaries, preventing water from easily spilling onto the flood plains. The inevitable result of these multiple alterations was increased flooding within the District.

The District is located within the lower drainage area of the Hackensack River, which flows into the northern end of Newark Bay. The Hackensack Meadowlands drain an area of approximately 193 square miles (522 square kilometers), which includes the Hackensack River, Overpeck Creek, numerous smaller tributaries, as well as direct runoff from the basin (USFWS 1997). The District includes both tidal and adjacent palustrine wetlands and the uplands adjacent to these water bodies. Wetland elevations within the District range from sea level to about 10 feet (3 meters) above sea level, and average District tidal range (NAVD88) is from –3 ft. at mean low water (MLW) to +2 ft. or more at mean high water (MHW); storm surges in the District can reach 6 ft. or higher (Meadowlands Floodplain Management Plan 2005).

B. THE MEADOWLANDS DISTRICT

The thirty-two square mile Hackensack Meadowlands District was created by the New

Jersey State legislature as a special planning region in 1969, and the District is managed by the New Jersey Meadowlands Commission (hereafter the "NJMC"). The District encompasses portions of two counties, Bergen and Hudson, and is composed of either all, or a part of, fourteen separate municipalities (Carlstadt, East Rutherford, Jersey City, Kearny, Little Ferry, Lyndhurst, Moonachie, North Arlington, North Bergen, Ridgefield, Rutherford, Secaucus, South Hackensack, Teterboro). At the time of the District's formation, the NJMC had three mandates: 1) to promote orderly development; 2) to manage solid waste; and 3) to preserve ecological balance. These considerations drove development in the District for over thirty years.

The District today is situated at the heart of the urban industrialized center of the New York/New Jersey metropolitan region. The location of the District and the extreme degree of surrounding urbanization produce high levels of human activity related to commercial, industrial, residential, and transportation needs and interests. In spite of this high degree of urban activity, the District contains over 8,000 acres of tidal wetlands, which provide habitat for over 260 bird and 39 fish species (USACE 2004, NJMC Fish Resource Inventory 2005, respectively). The District also contains three superfund sites (USACE 2004 and references therein). Industrial discharges (61), power generating plants (3), sewage treatment plants (3), combined sewer overflows (29), an active (1) and inactive (26) landfills located within the District contribute to District-wide water quality and quantity disturbances (WMA5 2006).

The historical alterations in the natural hydrologic patterns within the Hackensack River estuary have affected the ecosystem's functional ability to store and gradually release water inputs during storm events. The District's low lying elevations, the extensive presence of historic fill material coupled with extensive changes to the basin's natural hydrology and the high degree of urbanization, have resulted in an inability to

absorb even low volumes of precipitation. This means that many locations in the District regularly experience significant flooding events (Figs. 1 & 2). These events disrupt, and in some cases halt, business activities within the District and the surrounding urban areas, as well as passage on major transportation corridors. Stormwater negatively affects District residents, due to both residential flooding and through the discharges into the Hackensack River of untreated sewage from outdated combined sewer overflow (CSO) wastewater systems.

Fig. 1. Flood event on Rt. 7 in Kearny NJ, July 2006.

Fig. 2. Flood event in Moonachie NJ, March 2007.

Stormwater management infrastructure within the District currently includes dry detention basins, vegetated channels, drainage ditches, stormwater sewers, levees, pump stations, and tide gates. These structures vary in age, states of repair and functionality. In many District sub-watersheds these devices have not been properly serviced, resulting in predictable flooding events (Meadowlands Floodplain Management Plan 2005). The system as it is currently structured and maintained cannot prevent serious flooding, which occurs at government (Fig. 3), industrial, and commercial buildings (Fig. 4), residences, on major highway connectors (Meadowlands Parkway, Rt. 7, Secaucus Rd.), and in recreational areas (Meadowlands Floodplain

Management Plan 2005).

To deal with these local flooding issues, a number of tide gates and pump stations have been installed in a piecemeal fashion by various agencies and organizations. As of 2006, there were 34 water control structures in place within the boundaries of the District, and these structures were in varying states of functionality. In the recently completed NJMC assessment, just over half of these systems (19 of 34) were found to be "fully functional" (NJMC 2006).

Fig. 3. Moonachie NJ, DPW, March 2007

Fig. 4. Moonachie NJ, March 2007

C. CURRENT FLOOD ISSUES WITHIN THE NJ MEADOWLANDS DISTRICT

The District suffers from both regional and local flooding. According to the Federal Emergency Management Agency (FEMA) Flood Insurance Study for Bergen County (2005), major flooding can occur during any season of the year, although the worst storms tend to occur during the late summer and early fall, typically the hurricane and tropical storm season. According to the U.S. Army Corps of Engineers, the storm surge from a Category I hurricane could flood 80-90% of the land area within the District (USACE Philadelphia 2005). Until the nor'easter of April 2007, the previous flood of record for the Hackensack River occurred September 16, 1999 during Hurricane Floyd,

which had been downgraded to a Tropical Storm by the time it reached New Jersey.

There are significant areas within the Meadowlands District that are chronically flooded by nor'easter storms or large thunderstorms. From 1980 to 1998, the New Jersey coast has been affected by 12 major nor'easters. A comparison of these storm events with storms of previous decades shows an increase in storm frequency and intensity since 1980 (Psuty & Ofiara 2002). Annual precipitation in northern NJ has totaled above normal levels for the years 2002 through 2006 (Fig. 5). The most recent nor'easter in April 2007, when over 8" of rain coincided with a high spring tidal cycle, was one of the wettest ever recorded. The recently released Intergovernmental Panel on Climate Change (IPCC) report (2007) predicts that this type of intense storm will continue to increase in severity for the foreseeable future as a result of global warming. These storm-related flooding events currently disrupt the District's major commercial transportation corridors, including Routes 3, 7, and 17, causing significant commercial and residential property damage annually.

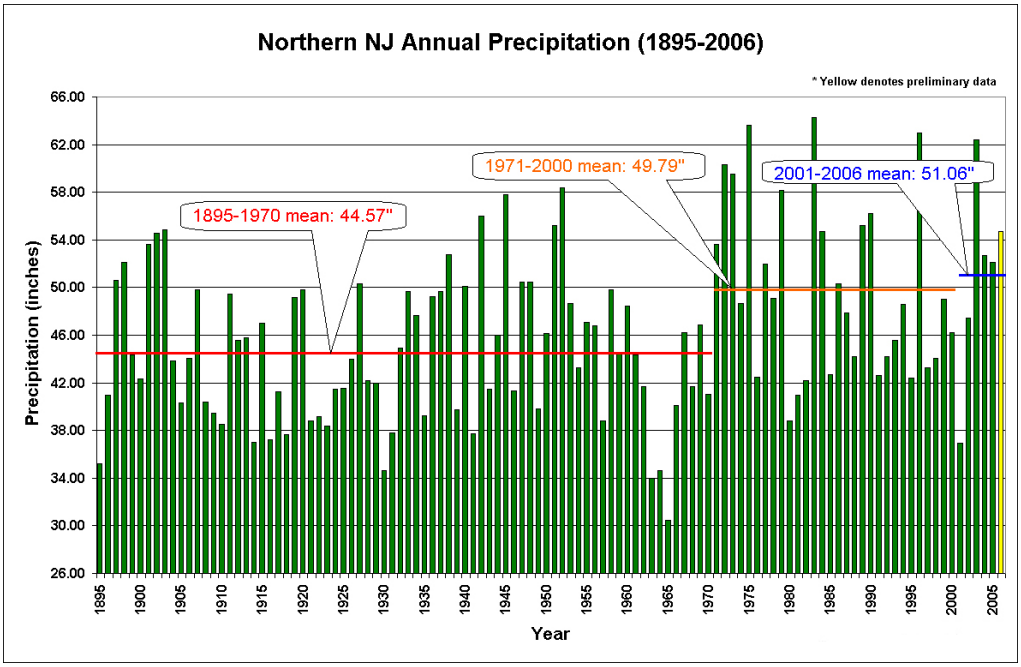


Fig. 5. Mean and annual precipitation in northern NJ since 1895 (http://climate.rutgers.edu/stateclim).

Most of the District lies within the 100-year flood plain as mapped by FEMA (reference: FEMA maps Appendix 1). The NJMC recently completed an in-depth study using FEMA guidelines, and has developed a Floodplain Management Plan that identifies thirty specific areas within the District where localized flooding occurs (NJMC 2005). These areas include commercial, residential, and municipal properties, as well as County and State roadways served by both public and private stormwater infrastructure.

The NJMC study found that much of the District's infrastructure is in poor condition and is not being maintained or serviced on a regular basis. Based on measurements and modeling conducted by the U.S. Army Corps of Engineers as part of their Hackensack Meadowlands Project, the major sources that contribute to regional flooding are tidal flows entering the Hackensack River from Newark Bay and, to a lesser degree, freshwater flows from the Hackensack River watershed. Because of the very high proportion of impervious cover in the majority of the Meadowlands region and the shallow groundwater table, relatively little rainfall infiltrates, so virtually all precipitation becomes surface runoff. The high groundwater table also affects the capacity and functionality of both water quantity and water control systems District-wide. When the storm surge from a major storm coincides with the high tidal cycle, major District flooding results.

1. CONTRIBUTING FACTORS

Under low volume storm conditions the Oradell Dam mitigates the contribution from the upper reaches of the watershed to flooding in the lower Hackensack estuary, but when the reservoir is full the dam can overtop. This has occurred at least 5 times since 1972 (NJMC 2005). Generally, the flooding from the upper Hackensack via the Oradell

Reservoir lags the local flood peaks below the dam.

While the primary contributors to regional flooding are major storms and their backwater tidal effects, localized flooding frequently occurs during smaller storms. This flooding is due to either the inability of the local stormwater infrastructure systems to transport stormwater flows as a result of sedimentation or other blockages, or is related to tidal effects (discussed below). In the chronically flooded areas identified by the Meadowlands Floodplain Management Plan (NJMC 2005) blockage of catch basins, ditches filled with vegetation or debris, and sedimentation of sewer pipes were found to be the major factors contributing to flooding in virtually every location.

Tidal Influences

The tidal regime of the Hackensack River has a significant effect on the severity of flooding within the District. Major storms that generate a storm surge, which coincides with a high tide(s) cause the most damage. Storms that last over multiple tidal cycles are especially harmful since they can produce several flood stages, which affect large areas.

Even smaller storms that in themselves do not generate a storm surge can cause flooding that is tidally dependant. Because so much of the District land area is only a few feet above sea level, many of the storm sewers that drain these low areas are barely above sea level and are equipped with tide gates that control the discharge from the pipes. If a significant runoff event such as an intense summer thunderstorm happens to occur near high tide, the sewers may simply be unable to drain until the tide recedes and there is positive head between the flood levels and the invert of the stormwater sewers. This tidal backwater effect can be present even with completely functional tide gates. If the tide gates are malfunctioning or blocked the flooding problems are exacerbated and may persist over multiple tide cycles.

D. STORMWATER MANAGEMENT WITHIN THE NJ MEADOWLANDS DISTRICT

1. Stormwater Management

To address flooding related problems such as those experienced in the Meadowlands District, many communities across the country have considered the option of forming a utility specifically for the purpose of managing their stormwater. Although the concept of a "Stormwater Utility" was first proposed in the 1970s it is within the last ten years that the growth of such utilities, with a specific mandate to manage stormwater, has increased rapidly. These utilities perform various services, which may include overseeing the collection, treatment, and disposal of stormwater, and in some cases, assuming the responsibility for maintenance of the stormwater collection systems. These Stormwater Utilities are typically funded through a dedicated revenue stream. As of May 2005 there were over 400 utilities operating throughout the U.S. to manage stormwater flows, but to date, no municipality or county within New Jersey has created such a utility (NJDEP 2005).

Municipal stormwater discharges are regulated as point sources under the Clean Water Act (1972). However, control of stormwater is often extremely difficult in urban environments such as the Meadowlands District. Uncontrolled stormwater flows pose a danger to both constructed and natural environments, and the collection and rapid routing of water through urban stormwater infrastructure results in problems related to both water quantity and quality. The difficulties encountered in managing urban stormwater are due to both the large volumes of stormwater generated, as well as the physical space constraints.

Municipal surface water runoff in urban areas is typically collected in storm sewer systems and conveyed to the nearest receiving water body. The volume of the runoff, the rate of flow, and the quality of the runoff are determined by the amount of the

watershed's impervious surface, modifications of the original landscape, and the natural drainage patterns and topography within a drainage basin. Older storm sewer systems were designed to rapidly route stormwater out of developed areas to the discharge point. As previously undeveloped land is transformed with impervious covers such as blacktop, rooftop, and concrete the volume of stormwater runoff increases.

While original stormwater systems were built to efficiently move water downstream, today's modern approach views stormwater as an important component in the management of integrated urban water resources. Current strategies are multi-dimensional, and consider both water quantity and quality issues, multiple-use facilities, riparian corridors, wetland preservation and creation, and groundwater recharge (NSFMA 2006). In forward-looking communities stormwater is considered a resource, and the management of stormwater is viewed as an important function of local government, on a par with oversight of the drinking water supply and sewage treatment operations.

Today stormwater management includes planning, design, construction, operation, and maintenance of specific water control structures and dedicated financial resources required to support these activities. The benefits of successful stormwater management include handling of excess drainage, protection of transportation systems, protecting property values, reduction of the damage caused by flooding, providing long term system maintenance, and environmental enhancement (NSFMA 2006). ***However, the costs of construction, operation, and maintenance of flood control measures is typically beyond the financial resources available to individual property owners, and in many cases, individual municipalities.***

2. STORMWATER UTILITY FEASIBILITY STUDY

In July 2006 the NJMC entered into a Memorandum of Understanding with the School of Environmental & Biological Sciences, Rutgers University to determine the feasibility of establishing a Stormwater Utility to address the issues related to flooding within the Meadowlands District. The NJMC has acquired a significant data set, which describes flooding events, District infrastructure, CSO discharges, and District land use. The purpose of this study was to analyze the existing data sets to evaluate whether a Stormwater Utility could be beneficial in managing District storm waters to alleviate flooding. We were also asked to provide recommendations to the NJMC with respect to implementation issues, and to comment on the legality of establishing a Stormwater Utility given the current regulations governing the Meadowlands District.

This feasibility analysis includes a Hydrological and Engineering Assessment, which evaluates the existing District infrastructure and the infrastructure maintenance issues. Based on the engineering assessment and recommendations, a financial analysis was conducted. This analysis discusses various financial options to support the maintenance of the stormwater management infrastructure. A legal review of existing regulations related to stormwater utilities, and recommendations for NJ regulatory changes with respect to stormwater management in the Meadowlands District complete this feasibility study.

III. ENGINEERING ANALYSIS

The magnitude of the potential flooding problems faced by the District is illustrated in Table 1. While the Mean High Water Spring (MHWS) varies a bit with distance from Newark Bay, the Meadowlands District MHWS is in the range of 2.4 to 3.0 feet above sea level (NAVD88). It should be noted that spring tides occur at least twice each month just before the new and full moons, so are a common occurrence. With a storm surge from a 25-year storm (the storm with a 4% probability of occurring in any given year), flood levels can reach 5.7 to 6.5 feet. According to the FEMA maps for the District (FEMA Firm Panels, Appendix 1), the 100-yr flood (the storm with a 1% probability of occurring in any give year) has an elevation in the range of 8-9 feet.

It is important to recognize that over time these basic hydrologic variables will change. Recent studies predicting the effects of climate change on sea levels along the New Jersey Coast (Cooper et al. 2005) estimate that by the end of this century sea level is likely to rise between 0.31 and 1.10 meters (1.02 - 3.63 ft). Shorter-term predictions estimate a 25 cm (10 in) rise in sea level by the 2020s (Columbia University 2007). This sea level rise has the potential to transform the ***daily*** high tide levels in the Meadowlands to the equivalent of today's 25-year storm (see discussion of Sea Level Rise Addendum 2). The effects of climate change on the hydrology of the District should clearly be studied further. If today's 25-year storm surge becomes a daily occurrence, the creation of a regional utility with the resources to proactively manage stormwater flows in the District will be of critical importance.

Table 1. Key Hydrologic Variables and Elevations (NAVD88). Referenced from the NJMC Floodplain Management Plan 2005. Intensities assume a time of concentration of ten minutes.

Elevations NAVD88	Berry's Creek Carlstadt	Hackensack River Little Ferry Ridgefield	Hackensack River Route 3 /Secaucus	Hackensack River Amtrak/Kearny
25-Year Rainfall Total	6.3 inches/hour	6.3 inches/hour	6.2 inches/hour	6.2 inches/hour
25-Year Rainfall Intensity	5.6 inches/hour	5.6 inches/hour	5.6 inches/hour	5.6 inches/hour
Mean High Water (MHW)	2.4 feet	2.1 feet	2.1 feet	2.0 feet
Mean High Water Spring (MHWS)	3.0 feet	2.7 feet	2.6 feet	2.4 feet
Mean Low Water (MLW)	-3.2 feet	-3.3 feet	-3.1 feet	-3.5 feet
25-Year Flood Surge Elevation	5.7 feet	6.1 feet	6.1 feet	6.5 feet
Category 1 Hurricane	4.1 feet	6.0 feet	5.6 feet	7.1 feet
Category 2 Hurricane	6.1 feet	7.3 feet	6.6 feet	8.4 feet
Category 3 Hurricane	8.0 feet	9.0 feet	8.6 feet	11.5 feet

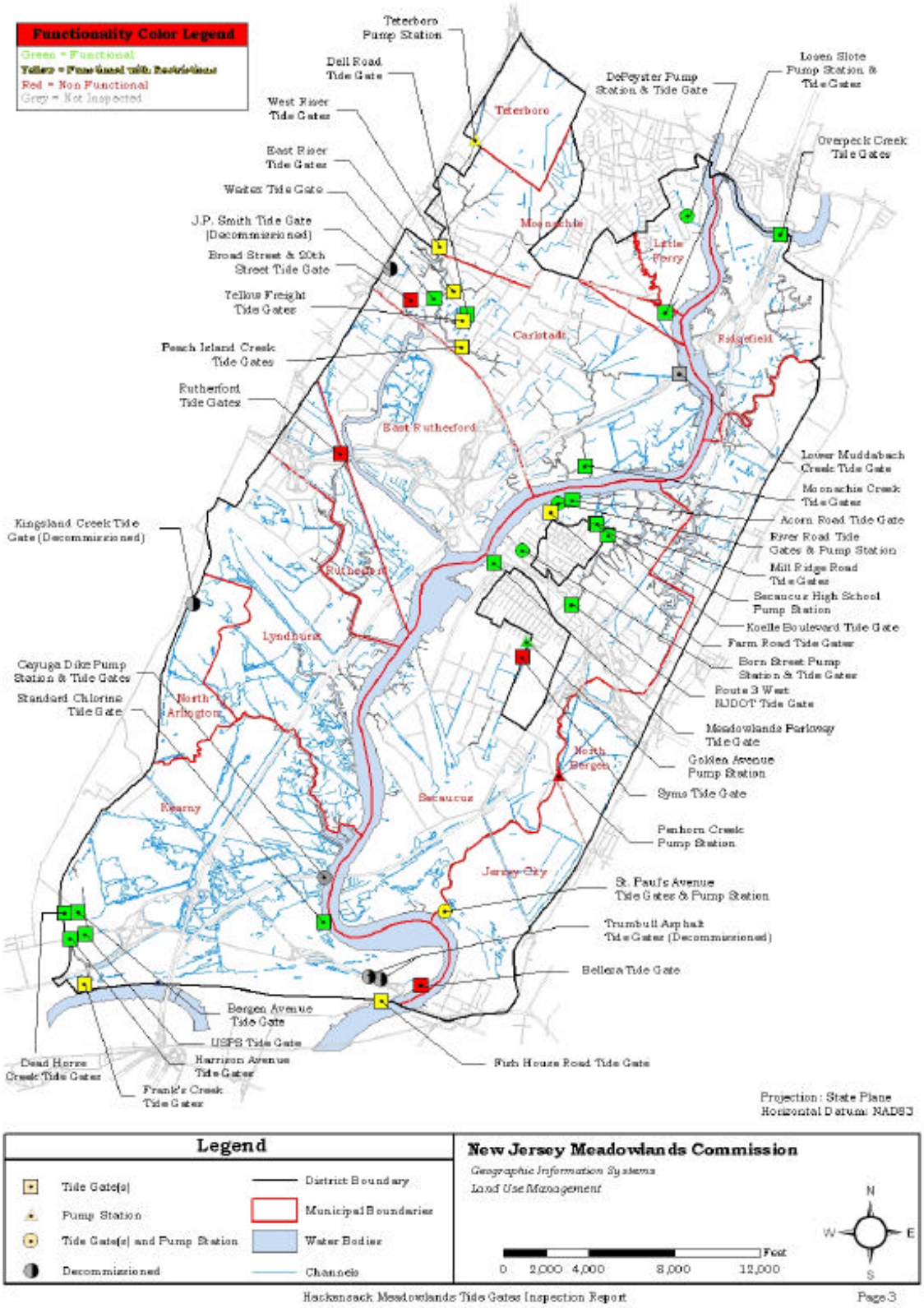
A. SUMMARY OF CURRENT DISTRICT FLOOD WATER CONTROLS

During the preparation of the Floodplain Management Plan the NJMC, in conjunction with the various municipal public works officials, inspected almost all the current floodwater controls within the District and prepared a comprehensive report on existing conditions (NJMC 2006). A few, mostly privately owned structures, could not be inspected due to restricted site access. The 34 flood control structures within the District that were inspected include 25 tide gates and 9 pump stations. Of these, just over half (14 of 25 tide gates and 5 of 9 pump stations were assessed as fully functional (Fig. 6). Some of the structures (7 tide gates, 2 pump stations) were functional with restrictions but 4 tide gates and 2 pump stations were assessed as "non-functional," 5 tide gates and 2 pump stations were identified as needing immediate repair or replacement, and 6 additional tide gates and 2 pump stations were assessed as requiring repair. All flood control structures require ongoing inspections and routine maintenance to ensure proper functioning. Appendix 1 contains a summary reproduced from the Tide Gate Inspection Report (Pg 6-9 of Section 3) that contains additional information. Repair of the highest priority item, the Rutherford Tide Gates, is currently underway by the U.S. Army Corps of Engineers (USACE).

B. DISTRICT STORMWATER INFRASTRUCTURE MANAGEMENT

The NJMC owns none of the District's stormwater infrastructure, and currently has no regulatory responsibility for either the stormwater infrastructure maintenance or for management of the District's stormwater. Infrastructure associated with State and Federal highways is owned and maintained by the New Jersey Department of Transportation (NJDOT). Similarly, infrastructure associated with county roadways (storm sewers and catch basins) is owned by either Bergen or Hudson County. Hudson County maintains their infrastructure, while Bergen County relies on the individual

Fig. 6. Water control structures within the New Jersey Meadowlands District (NJMC 2006).



municipalities within the county for infrastructure maintenance. The fourteen individual District municipalities own and maintain the stormwater infrastructure associated with municipal roadways and sidewalks. Infrastructure such as detention basins or catch basins located on private property is owned and maintained by the individual property owners.

C. CURRENT STORMWATER MANAGEMENT ACTIVITIES

Although not charged with responsibility for District stormwater management or infrastructure maintenance, the NJMC is currently responding to flooding emergencies through preparation of detailed reports describing the flooding events that are occurring within the District. The NJMC is also undertaking small- and medium-scale interim repairs and clean-outs, while aggressively pursuing a program to complete the needed repairs and clean outs of the District's water control infrastructure. The Commission is also coordinating the interagency response (see below) to infrastructure issues raised in the FEMA Floodplain Management Study (2005).

A number of stormwater management activities throughout the District are being undertaken by both the NJMC and the various District municipalities and counties. The NJMC has recently completed a comprehensive Floodplain Management Plan in accordance with FEMA guidelines (NJMC 2005). To produce the District Plan a committee was formed with representatives from the 14 District municipalities and an interagency committee comprised of representatives from 16 different regulators and agencies involved in flood control. This group worked with the various municipalities and the general public to assess flooding issues within the District and to develop and prioritize the action plan for implementation. As part of this process, the NJMC developed a database for recording and investigating flood incidents. This database is

maintained by the NJMC in order to identify new areas that are flooding, as well as to provide documentation for future grant or loan applications. The NJMC has also integrated floodplain management into their master planning process, and the changes proposed by the NJMC to help mitigate flood hazards have been approved and are now incorporated into the Meadowlands Zoning Regulations.

The major goals of the Floodplain Management Plan are listed below. Additional information can be found in the Plan itself (NJMC 2005, Appendix 1, and available online at www.rerc.rutgers.edu/Stormwater Management/Publications):

1. Restore, replace, or decommission the 34 regional tide gate, levee, and pump stations within the District.

2. Prepare the permitting necessary for the cleanout of the Asia Place, Gotham Parkway, and Barell Avenue stormwater drainage systems.

3. Address each of the affected watersheds that are not improved by the above actions in accordance with the priority score developed in Section 6 of the Plan.

4. Update the New Jersey Hurricane Evacuation Study's Storm Surge Map of the District in coordination with USACE, Philadelphia District.

5. Develop and implement a District Flood Hazard Warning System that utilizes both real-time rainfall and stream elevation data collection systems deployed by the NJMC in the District, as well as real-time systems upstream of the District.

6. Assemble the Floodplain Management Plan and Interagency Committees on a quarterly basis.

7. Assume responsibility from the NJDEP for approving Stream Encroachment Permits for flood control projects within the District in non-tidal (tide separated) waters.

8. Continue to provide data to the Committees and the general public via the NJMC website.

In order to begin the process of implementing the first goal of the Floodplain Management Plan, the NJMC evaluated the functionality of all the tide gates and pump stations within the District, developed maintenance recommendations, and prepared a prioritized list of repairs. The NJMC has also evaluated the condition of other drainage infrastructure such as storm sewers and drainage ditches in the District's flood-prone areas, and has prepared recommendations for needed repairs. Table 2 summarizes the projected cost of the prioritized plan (N. Agnoli, personal communication) for the next five years (additional detail is contained in Appendix 1). The 23 repairs identified below total **$24,277,150** through 2012, although we note that these costs are based on estimates available at the time the prioritized list was prepared, and so may be subject to revision.

In addition to the District-wide efforts discussed above, the fourteen municipalities and two counties comprising the District have their own stormwater maintenance programs as summarized in Table 3. These programs are largely restricted to street sweeping and catch basin cleaning. The work is performed by the various public works departments in additional to their many other non-stormwater related duties, and as a result, receives varying degrees of priority. Since all the municipalities comprising the District also contain at least some property outside the District boundaries, municipal out of District needs may compete with the stormwater management needs of the District.

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Table 2. Projected Costs to Repair Malfunctioning District Stormwater Infrastructure.

Rank/Project Name	Design/Construction Management			Construction	Sub-Total	20% Contingency	Total Project
	In-House	Consultants	Permit Fee	Estimated Budget			
1. Rutherford/East Rutherford Drainage Ditch System Restoration, Bergen County	$22,512	$304,900	$20,000	$400,000	$747,412	$149,482	$896,894
2. Rutherford Tide Gates Restoration Project, Rutherford, Bergen County	$36,190	$126,300	$20,000	$1,000,000	$1,182,490	$236,498	$1,418,988
3. Route 17 Stormwater System Improvement Project Rutherford, East Rutherford, Bergen County	$34,818	$293,150	$20,000	$2,400,000	$2,747,968	$549,594	$3,297,562
4. Asia Place/Kero Road Drainage Ditch Restoration, Carlstadt, Bergen County	$14,808	$5,000	Completed	$290,000	$309,808	$61,962	$371,770
5. Polito Avenue Elevation & Storm Sewer Restoration Concept Design	$17,178	$68,250	$7,000	$400,000	$492,428	$98,486	$590,914
6. Carol Place Storm Sewer System Investigation and Restoration Project, Carlstadt, Bergen County	$26,271	$75,150	$7,000	$150,000	$258,421	$51,684	$310,105
7. Broad Street & 16th Street Tide Gate Replacement Project, Carlstadt, Bergen County	$26,271	$65,900	$7,000	$100,000	$199,171	$39,834	$239,005
8. Bellmans Creek/Wolf Creek Regional Tide Gate/Pump Station Study - H&H Analysis ONLY	$12,474	$37,000	$0	$0	$49,474	$9,895	$59,369

9. NJ Route 7 Regional Flood Mitigation Study, Kearny, Hudson County	$45,486	$216,200	$25,000	$2,000,000	$2,286,686	$457,337	$2,744,023
10. Murray Hill Parkway Storm System Study - H&H Analysis ONLY, East Rutherford, Bergen County	$4,795	$27,750	$0	$0	$32,545	$6,509	$39,054
11. East Riser Tide Gates Restoration Project, Moonachie, Bergen County	$29,603	$117,600	$14,000	$1,500,000	$1,661,203	$332,241	$1,993,444
12. West Riser Tide Gates Restoration Project, Moonachie, Bergen County	$65,609	$135,600	$14,000	$1,000,000	$1,215,209	$243,042	$1,458,251
13. Meadowlands Parkway Drainage System Investigation and Restoration Project, Secaucus, Hudson County	$21,861	$77,200	$7,000	$300,000	$406,061	$81,212	$487,273
14. Fish House Road Flood Mitigation Project, Kearny, Hudson County	$19,572	$116,600	$14,000	$1,000,000	$1,150,172	$230,034	$1,380,206
15. Penhorn Creek Regional Tide Gate/Pump Station Study, Secaucus, Hudson County	$35,812	$208,650	$14,000	$2,500,000	$2,758,462	$551,692	$3,310,154
16. Michelle Place Drainage System Investigation & Restoration Project, Carlstadt, Bergen County	$24,416	$68,500	$7,000	$500,000	$599,916	$119,983	$719,899

17. Peach Island Creek Tide Gates Restoration Project, Carlstadt, Bergen County	$26,719	$108,350	$7,000	$1,000,000	$1,142,069	$228,414	$1,370,483
18. DePeyster Creek Drainage Ditch Restoration Project - H&H Analysis ONLY, Little Ferry, Bergen County	$18,914	$0	$7,000	$100,000	$125,914	$25,183	$151,097
19. Barell Avenue Drainage Ditch Restoration Project, Carlstadt, Bergen County	$27,454	$100,300	$7,000	$750,000	$884,754	$176,951	$1,061,705
20. Farm Road Flood Mitigation Project - H&H Analysis and Stream Encroachment Permit, Secaucus, Hudson County	$24,416	$36,750	$7,000	$500,000	$568,166	$113,633	$681,799
21. Maiden Lane Flood Investigation Project, Little Ferry, Bergen County	$3,703	$0	$0	$0	$3,703	$741	$4,444
22. Yellow Freight Tide Gates Restoration Project, Carlstadt, Bergen County	$26,208	$100,300	$7,000	$1,000,000	$1,133,508	$226,702	$1,360,210
23. Belezza Tide Gate Restoration Project - H&H Analysis and Stream Encroachment Permit, Kearny, Hudson County	$16,835	$18,250	$7,000	$150,000	$192,085	$38,417	$230,502
TOTAL PROJECTED COSTS	**$581,925**	**$2,307,700**	**$218,000**	**$17,040,000**	**$20,147,625**	**$2,729,526**	**$24,177,151**

Table 3. Routine Stormwater Maintenance Schedules in the Meadowlands District.

Municipality	Phone Number	Contact Name	Frequency of Cleanout	Street Sweeping Frequency	Equipment Owned
Carlstadt	201-939-2850	(Main Line) Paul Ritchie	Annual cleanout of all catch basins	Entire Town - *Once a week*	1 Vac Truck / 2 Sweepers
Moonachie	201-935-2344	Henry Van Saders	1/3 of town's catch basins cleaned annually	Entire Town - *Once a week*	1 Vac Truck / 1 Sweeper
Kearny	201-998-3700	Paul Carratura	Periodically / As-Needed	Residential - *Once a week* Industrial Zone - *4 Times a Week*	1 Sweeper
North Arlington	201-955-5665	Jim McCabe	Annual cleanout of all catch basins	Entire Town - *Once a week*	2 Sweepers / 1 Vac Truck / 1 Sewer Truck
North Bergen	201-392-2161	Frank Gargiulo	Annual cleanout of all catch basins	Entire Town - *Bi-Weekly* County Roads - *Once a week*	1 Vac Truck / 6 Large Sweepers / 12 Sidewalk size Sweepers
Rutherford	201-460-3040	Chris Seidler	3/4 of town's catch basins cleaned annually	Entire Town - *Once a week*	1 Vac Truck / Jet Truck / 2 Sweepers
East Rutherford	201-933-3444	(Main Line) Alan De Rosa	Annual cleanout of all catch basins	Entire Town - *Twice a week*	1 Vac Truck / 2 Sweepers / 1 small sidewalk sweeper
Secaucus	201-330-2080	Michael Gonnelli	Annual cleanout of all catch basins at times bi-annual	Entire Town - *Once a week*	4 Sweepers / 1 Vac Truck
Teterboro	201-288-0628	John Fantacone	Periodically / As-Needed / With the use of NJMC Vac Truck	Entire Town - *Once a week*	1 Sweeper
Little Ferry	201-641-0023	(Main Line) William Holley	Annual cleanout of all catch basins	Entire Town - *Bi-Monthly*	1 Vac Truck / 1 Sweeper
Ridgefield	201-945-5319 / 201-741-8807 (Cell)	Nick Gambardella	Annual cleanout of all catch basins	Entire Town - *Once a week*	1 Vac Truck / 2 Sweepers
Jersey City	201-547-4402	John Yurchak	Periodically / As-Needed	Entire Town - *Once a week*	1 Vac Truck / 26 Sweepers
South Hackensack	201-440-1815 or 440-3283 (direct)	(Main Line) Lawrence Paladino-ext 119	Annual cleanout of all catch basins	Entire Town - *Every three weeks*	1 combination Vactor/sweeper truck
Lyndhurst	201-438-5478	Matthew Ruzzo	Annual cleanout of all catch basins	Entire Town - *Once a week*	1 Vac Truck / 2 Sweepers
Bergen County Roads Department	201-646-2813	Mike Berk	Left to municipalities / County owns a vac truck and its in use when needed or by complaint	Local D.P.W.'s sweep individual municipalities. However if needed, County will assist.	1 Vac Truck / 2 Sweepers available to municipalities
Hudson County Roads Department	201-915-1374	Michael LoPresti	County has over 5000 catch basins - daily cleanouts as needed and/or when a repair is requested	Local D.P.W.'s sweep individual municipalities. However if needed, County will assist.	2 Sweepers / Backhoe / New Vac Truck is expected soon

D. OUT OF DISTRICT FACTORS

There are a number of factors outside the District that have a direct and significant effect on stormwater management within the District. The total watershed of the Hackensack River that drains into the District is approximately 193 square miles (123,520 acres). Of this total acreage, only 18,860 acres are actually within the District boundaries. This means that only 15.3% of the watershed that drains into the District is actually under the regional planning authority of the NJMC. Another 10,083 acres (8.2% of the total watershed) drain into the District from those portions of District municipalities that are outside the District boundaries (Fig. 7). While the runoff from the upper portions of the watershed is generally not as important a factor in District flooding as the tidal flows from Newark Bay, stormwater practices outside the District can still have a significant effect on both the quantity and quality of runoff that drains into the District (See Addendum 1). Key factors that can significantly affect the amount of stormwater in the District are the volume of water flowing or released over the Oradell Dam and/or water volume discharging into the Hackensack River from the combined sewer overflows (CSOs) in Kearny, Ridgefield, Jersey City, and North Bergen.

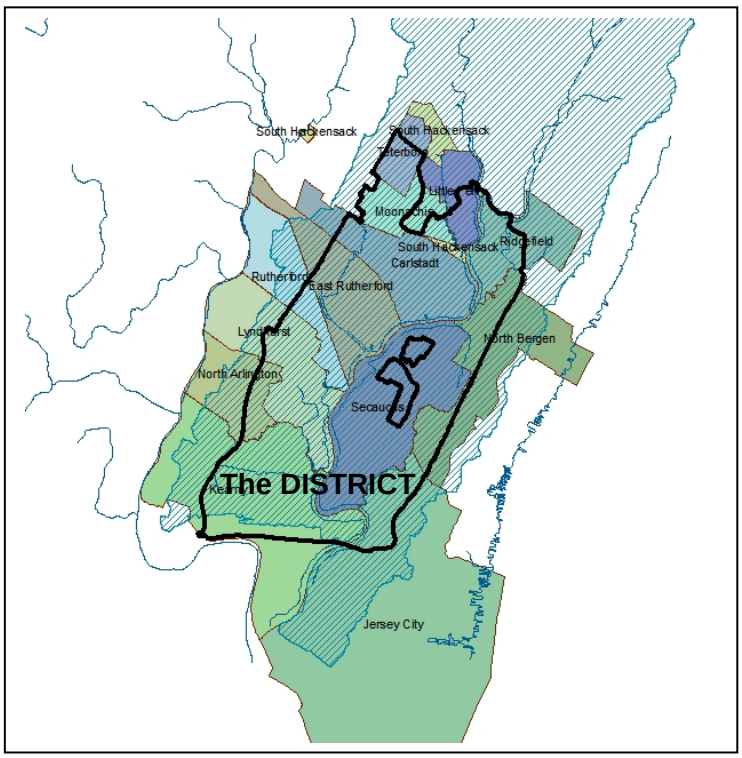

Fig. 7. Boundaries of the Hackensack Meadowlands District

Another key factor is the local priority placed on municipal stormwater programs affecting the District. Within four of the fourteen municipalities that comprise the Meadowlands District, the portion of upland area inside the District boundary varies considerably. Additionally, stormwater related tasks are just one aspect of the many responsibilities that the municipal public works directors must perform. Routine maintenance of stormwater catch basins is often the last item on a list of Municipality priorities. Several public works directors admitted that their stormwater maintenance program was essentially "as needed" to resolve flooding complaints.

E. PROPOSED STORMWATER MANAGEMENT ACTIVITIES

1. Rationale

Flooding within the District is a complex and serious problem. There is no simplistic solution that will easily resolve all the issues related to the District's flooding events. The tidal regime and the complexity of the District's hydrology means that virtually all major District flood control maintenance projects require coordination between the NJMC, NJDEP and the USACE. Depending on the issue at hand, i.e., tides vs. storms, either the USACE New York or Philadelphia Districts will be involved. The individual municipalities may lack the unique expertise necessary to successfully navigate both state and federal bureaucracies simultaneously. ***Piecemeal solutions from fourteen different municipalities are unlikely to be successful in solving flood-related issues on a District-wide level.***

What is necessary is a highly coordinated and centralized program that is capable of addressing flood-related issues in a comprehensive fashion. Having a single entity perform this role can significantly streamline the required permitting and interagency processes. A strong centralized maintenance program that is rigorously carried out by stormwater experts will contribute to the economic vitality of the District and will pay for itself in the long run. Malfunctioning systems such as clogged catch basins routinely result in ponding in and around roadways. In addition to the disruption caused to

major transportation corridors, this ponding softens and erodes the subgrade, the adjacent drainage ditches, and the material that supports the pavement edge. As a result of routine stormwater infrastructure maintenance, major road repairs would be required on a much less frequent basis.

We therefore recommend the formation of a specialized and highly focused Stormwater Project Team, which would be devoted to both stormwater management and maintenance of the District's stormwater infrastructure. This team should be given the authority to develop structural and non-structural remedies to alleviate the number of flood events, as well as the financial resources needed to implement these remedies. The Stormwater Project Team should be responsible for:

1. Routine stormwater infrastructure inspection and maintenance including development of inspection standards and schedules
2. As-needed repair and improvement of stormwater facilities and infrastructure including development of GIS infrastructure databases to document and monitor conditions of the system
3. Development of major and minor capital improvement plans, including the pursuit of various funding mechanisms such as grants or infrastructure loan programs
4. Planning and implementation for flood control management including integration into the master planning process to ensure preservation of wetlands and acquisition of open space to enhance natural water storage capabilities
5. Serving as a local resource by providing proactive development of public education programs, including providing technical advice, BMPs, and assistance to private landowners and District Municipalities
6. Coordination with FEMA, USACE, NJDEP, and other potential regulating or funding agencies to develop effective regulations and responsibility for obtaining funding for infrastructure improvements
7. Planning and implementation of water quality programs including NJPDES permitting and coordination with CSO communities

8. Coordination with NJDOT to ensure state and federal highway and bridge drainage issues are addressed

In the capital spending described in the Financial Analysis (Section IV), we examined three potential cost scenarios for management of the District's stormwater (these cost estimates were derived from publicly available information provided by Stormwater Utilities in other sections of the U.S., and would be subject to revisions should a Stormwater Utility be established in the NY/NJ region). The first option is essentially a bare bones routine maintenance program that includes semiannual cleanout of catch basins, minor cleaning of ditches and culverts, weekly street sweeping, annual inspection of tide gates and pump stations, and remedial repair of culverts and catch basins as complaints are received (Appendix 1, Table A). The second option includes all of the above maintenance plus the addition of more sophisticated inspection equipment, a more aggressive sewer replacement program, and the replacement and/or major overhaul of one large water control structure (tide gate or pump station) per year (Appendix 1, Table B).

The third option includes the first two scenarios plus the addition of a much more sophisticated planning team that would oversee the implementation of all the required maintenance actions identified in the Floodplain Management Plan (Appendix 1, Table C). This option also includes a "Flood Control Team" that would work with both municipal officials and private property owners to inspect sites and present a detailed list of recommendations to improve the ability of the municipality and/or the specific property owner to deal with stormwater flows.

It is envisioned that this team would function like the energy audit teams employed by some power companies, which perform a free audit of a property and leave a detailed list of recommendations to be implemented. As a cost saving measure, these audits could be prepared for a collective group of properties at any given time. Implementation of best management practices (BMPs) that reduce the stormwater generated by a property could become the basis for "Credits" awarded to a property owner that would reduce the property's Stormwater Utility fee.

As an example of this process, the Rutgers hydrology team visited many of the sites identified in the FEMA Flood Management Plan (2005). At the Broad Street location in Carlstadt one property owner had recently implemented improvements that would have a positive effect on the amount of stormwater the property was generating (NJMC 2005):

1. Increased the hydraulic capacity of inlet grates,
2. Added a high-power pump with backup,
3. Redirected roof water away from parking areas,
4. Installed a one-way valve on the system outlet,
5. Constructed a flood wall around critical properties to the 10 year surge elevation,
6. Repaved the lot to reduce the amount of grit entering the pump chamber.

Additional measures that could be taken on this property to further reduce stormwater runoff volume include:

1. Converting some of the area between the buildings to a detention pond that could hold water at least through a tide cycle or two (this would take cooperation between adjacent property owners, but would benefit all),
2. Installing several large cisterns to capture roof runoff that would be released at low tide,
3. Installation of additional one-way valves in local drains,
4. Repair of the Broad St. & 20th St. Tide Gate,
5. Cleanout of all catch basins and drainage ditches, and
6. Installation of additional pump stations.

The above are given as examples of the type of recommendations that the "FLOOD CONTROL TEAM" could provide.

2. TIDAL INFLUENCES

As discussed previously, tidally influenced conditions and flows play a significant role in flooding events within the Meadowlands District. This means that flooding solutions for low lying areas of the District need to provide physical and mechanical protections, including flood walls, pumps, levees, and check valves.

Natural opportunities for temporary storage of stormwater in the District also need to be identified. Some of this storage capacity could come from utilization of existing open space within the District. An example of this natural approach is considering the feasibility of developing an extensive wetland system as part of the Richard P. Kane Natural Area mitigation/restoration activities. The large open space of the Richard P. Kane Natural Area may be suitable for the creation of a wetland system that could contribute to the District's flood storage capacity, while at the same time helping to reduce stormwater sediment loadings. Another example of this approach is utilization of space near the Kearny Marsh (adjacent to the Keegan Landfill) to construct a water storage wetland. Such a system could contain flood waters that are currently associated with the Frank's Creek drainage area, while simultaneously contributing to significantly improved water quality. Additional study is necessary to flesh out these and other opportunities to mitigate flood surges through utilization of the District's +8,000 acres of wetlands.

F. FUTURE NEEDS

One of the key advantages of having a dedicated group of professionals responsible for dealing with stormwater issues is the enhanced ability to do comprehensive planning in order to identify, anticipate and deal proactively with emerging needs. There are a number of obvious situations contributing the current flooding events that will need to be addressed, and professionals dealing with the District's flood issues on a daily basis will quickly identify others.

For example, one of the key issues that will need to be resolved is how to deal with stormwater issues on private property. If a property owner is paying a fee that is identified specifically for stormwater management, they will quickly feel a sense of entitlement and begin demanding solutions for their problems. This visibility is a double-edged sword. While it can be a positive factor in helping to identify issues that are causing problems, it also creates expectations and adds to work backlog. In reality, there are limits to what can be done on private property. In general, public money cannot be used for improvements to private property. Mechanisms such as the Flood-Proofing team described above can help identify solutions and provide recommendations, but it is generally up to the individual property owner to implement (and pay for) them.

On the other hand, a Stormwater Utility team could provide help to identify potential funding mechanisms such as FEMA grant or loan programs for which the property owner may be eligible and provide assistance in applying for those programs. The utility could potentially maintain a list of qualified engineers and contractors who could perform stormwater BMP work, perhaps even administering some type of certification program. The team could develop and staff a monitoring/inspection program for stormwater management measures and BMPs within the District, and provide input into the Utility's fee-reduction Credit Program. The team could apply for grants that benefit the District as a whole, such as funding from the USACE to repair major flood control infrastructure or funding from the USEPA or NJDEP to improve water quality under the 319(h) program. The utility could partner with groups such as the Bergen County Utilities Authority (BCUA) or the Passaic Valley Sewerage Commission (PVSC) to pursue water quality programs such as the PVSC's floatables removal program. Natural Resource Damage Assessment (NRD) funds could be applied for to support these and other programs.

The basic hydrologic variables that affect stormwater and flooding are changing. By the end of the 21st century, sea level along the New Jersey Coast is predicted to rise between 0.31 and 1.10 meters (12 to 44 inches, respectively) due to the effect of climate change (Cooper et al. 2005). The shorter-term projection for sea level rise is an additional 25 cm (8″) by the 2020s decade (Columbia University 2007). A rise in sea level of this magnitude has the potential to transform the ***daily*** high tide levels in Newark Bay to the equivalent of today's 25-year storm (See Addendum 2). Additionally, the intensification of the hydrologic cycle will lead to larger and more intense storms becoming more frequent. While beyond the scope of this study, the local effects of climate change should clearly be studied further. Dealing with this critical issue makes an even stronger case for a dedicated Stormwater Utility so the District can be proactive in developing solutions.

III. LEGAL ANALYSIS

There are several distinct legal issues related to the creation and operation of stormwater utilities. At the outset there must be the legal authority to create a utility. Once that threshold is crossed, any program must be structured to ensure that the utility rate is not vulnerable to legal challenges. This section discusses the relevant legal principles.

A. AUTHORITY

1. MUNICIPAL AND COUNTY AUTHORITY TO ESTABLISH UTILITIES

The New Jersey Legislature has specifically delegated the authority to establish utilities to municipalities and counties.[1] This law, dating from 1957 and overhauled several times between 1977 and 1984, has detailed provisions for the creation of local utilities, the construction of infrastructure, and the calculation, assessment and collection of fees. At the time this law was passed, the Legislature clearly had in mind the creation of water and sewage disposal authorities, which is the title of the chapter as codified. Existing law now authorizes four types of governmental "utility systems": water systems, solid waste systems, sewerage systems, or hydroelectric systems.[2]

One could argue that the definition of utility is more elastic, and that the existing categories could encompass stormwater controls. The statement of purpose, for example, is quite broad:

[1] Municipal and County Utilities Authorities Law, N.J.S.A. 40:14B-1 et seq. See also Sewerage Authorities Law, N.J.S.A 40:14A-1 et seq.

[2] N.J.S.A. 40:14B-3(10). As the Senate County and Municipal Government Committee explained, the 1984 amendments broadened the authorization beyond sewer and water utilities by amending the definition section to authorize "water, sewerage, utility and solid wastes systems." Senate Statement No. 1284 to L. 1984, c.178.

> to foster and promote by all reasonable means the provision and distribution of an adequate supply of water for the public and private uses of counties and municipalities and their inhabitants, the collection, disposal and recycling of solid waste, including sewage sludge, in an environmentally sound manner, the relief of lands and waters in or bordering the State from pollution, from domestic, industrial and other sources, including pollution derived from chemical and hazardous wastes, and thus the reduction and ultimate abatement of the menace to the public health resulting from such pollution, . . . by
>
> (1) . . . works for the collection, treatment, purification or disposal of sewage or other wastes . . . ;
>
> * * *
>
> (5) . . . granting to counties and municipalities and to such municipal authorities discretionary powers to provide for utility services designed to provide or distribute such a supply of water, to recycle or dispose of solid waste, to relieve pollution of such waters in or bordering the State . . . .[3]

These broad purposes are buttressed by the definition of "sewerage system" as all facilities for the "collection . . . or disposal in a sanitary manner of any sewage, liquid or solid wastes, night soil or industrial wastes"[4] and "solid waste" as "other waste materials, including . . . liquids . . . ."[5] In addition, the Legislature recently defined "wastewater treatment" as encompassing stormwater controls.[6]

A broad interpretation of the law makes sense on several levels. On a conceptual level, a stormwater utility, like a sewer utility (or garbage utility), removes harmful

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[3] N.J.S.A. 40:14B-2; see also N.J.S.A. 40:14B-19, N.J.S.A. 40:14A-6.

[4] N.J.S.A. 40:14B-3(9).

[5] Id. at -3(29).

[6] P.L. 1999 Ch. 23, Sec. 15(37) (amending N.J.S.A. 40A:11-15).

substances from a property.[7] On a practical level, in many of the cities and older urban areas of New Jersey, the sewer and stormwater systems are combined, leading to the problem of combined sewer overflows (CSOs) when sewage treatment plants become overwhelmed during precipitation events. The implementation of a stormwater utility would be eased if it could be combined with a sewer system because the public would better understand the benefit provided by a stormwater system that is similar to sewer services, and a separate line item for stormwater bills would allow comparison of rates. These are policy arguments, however, and may not overcome the arguably narrow scope of the authorizing statutes.

Property owners will likely argue that that the Legislature would have to grant municipalities specific authority to establish stormwater authorities and that the Legislature would again have to authorize stormwater utilities through an express statutory amendment. For example, in 1977 the Legislature recognized the need to amend the Utilities Law to reflect the additional dictates of the Solid Waste Management Act, rather than assuming that existing categories could be interpreted to include solid waste utilities. Although a little farther afield, the Legislature similarly enacted a statute to provide specific authority for the creation of fire districts.[8] Challengers could support their argument by noting that flood control and drainage are excluded from the specific list of utility purposes in the "public" utility law governing

[7] In at least one matter, the BPU has approved the ability of a municipality to contract out the operation of its water, sewer and stormwater systems. In re Application Between the City of Orange Township and U.S. Water L.L.C. for Approval of an Operating Agreement, BPU Dkt. No. WO 03080614 (Apr. 28, 2004). That decision refers to the operation of Orange's stormwater system by the Essex County Improvement Authority and the East Orange Water Commission under the rubric of the "water system." Id., p. 3. The transaction was governed by enabling legislation to allow municipalities to enter into partnerships with private entities to provide water supply services. L. 1993, c.381; N.J.S.A. 58:28-1 et seq.

[8] L.1991, c.223, N.J.S.A. 40A:14-70 et seq.

investor-owned utilities.[9] A recent New Jersey Supreme Court case strictly interpreted authorizing legislation and held that an innovative fee arrangement (Environmental Investment Charges) to pay bonds issued for a solid waste incinerator was not authorized under the Municipal and Counties Utilities Authorities Law or under general authorization for a local finance board.[10]

With regard to authorized local utilities, a fee may be imposed upon "the owner or occupant . . . of any real property which directly or indirectly . . . has been supplied or furnished such use, products or services [provided by the utility]" as long as the fees are "as nearly as the municipal authority shall deem practicable and equitable [and] uniform throughout the district for the same type, class and amount of use, products or services."[11] Fees may be set by actual consumption or by proxies such as the number of plumbing fixtures, and may also include the costs of treatment and initial connections.[12] Procedural protections include advance notice of charges and a hearing.[13]

If the utility option is not available, counties and municipalities have other powers to create a stormwater system supported by separate assessments rather than tax revenues. Counties have the general authority to construct and maintain public improvements or works.[14] These powers include the provision of "public facilities" for

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[9] N.J.S.A. 48:2-13.

[10] In re Passaic County Utilities Authority, 164 N.J. 270 (2000) (rejecting charge on non-users of incinerator that was never built after flow-control regimes were declared unconstitutional).

[11] See N.J.S.A. 40:14B-21 (water charges), -22 (sewerage charges), -22.1 (solid waste charges).

[12] Id.

[13] N.J.S.A. 40:14B-23.

[14] N.J.S.A. 40:23-14; County Improvements Law. N.J.S.A. 40:37A-44 et seq.

any "governmental purpose" including "garbage and solid waste disposal systems" but the main thrust of the law is for the construction of facilities that will aid economic development.[15] Separate statutes authorize the creation of Joint Flood Control Commissions[16] and flood control improvements financed by special assessments on benefited property owners.[17] Similarly, County Pollution Control Financing Authorities

may finance needed pollution control facilities.[18] Municipalities also have powers to make improvements, which are defined to include drains and drainage systems[19] and to assess costs to real estate benefited by the improvements, subject to procedural and other protections for such funds.[20] As with all special assessments, those for drainage must be linked to some benefit to the landowner, and New Jersey courts have closely looked at the particular facts of each case.[21]

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[15] N.J.S.A.40:37A-54.

[16] N.J.S.A. 40:14-18.

[17] N.J.S.A. 40A:27-1 et seq.; see generally N.J.S.A. 40:56-1(I).

[18] N.J.S.A. 40:37C-1 et seq.

[19] Local Improvements Law, N.J.S.A. 40:56-1(i).

[20] N.J.S.A. 40:56-52.

[21] See, e.g., Twp. of Maplewood v. Smith, 112 N.J. L. 233 (1934) (gutter did not specifically benefit one adjoining property where waters carried to a drain further along, but assessment could be levied against properties along brook through which water was increased because they benefited by drain that improved main outlet of drainage system, which in turn improved the passage of waters); Deamer v. Borough of Bergenfield, 8 N.J. Misc. 627 (1930); see generally St. Vincent's Church, Madison v. Borough of Madison, 86 N.J.L. 567 (1914) (lands within sewerage area benefited indirectly from sewer facilities and could be assessed costs). Many older cases dating to the 1800s denied assessments for indirect benefits.

Municipalities also have general nuisance abatement powers,[22] and municipalities are required to prepare storm water management plans and ordinances.[23] Stormwater plans are an integral part of any master plan[24] and must conform to applicable State laws.[25] New State of NJ regulations encourage the creation of regional stormwater management plans that may include "innovative stormwater measures and strategies."[26]

2. IMPLIED AUTHORITY

We are unaware of any direct statutory authority allowing the NJMC to establish a utility, and property owners can be expected to challenge any utility for lack of authority.[27] Indeed, many utility services in the Meadowlands are provided by municipal utilities (e.g., sewer by the Bergen County Utilities Authority) or private companies that are regulated by the Board of Public Utilities (e.g., water by United Water, gas and electric by PSE&G, phone by Verizon). A reviewing court is likely to look to analogous statutory authority of the NJMC, the general statutory authority for municipalities and counties to establish utilities, and the implied powers necessary for a utility's operation. We address each of these in turn.

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[22] N.J.S.A. 40:48-2.12f.

[23] N.J.S.A. 40:55D-93.

[24] N.J.S.A. 40:55D-94. The master plans at issue are authorized by the Municipal Land Use Law, N.J.S.A. 40:55D-94.

[25] N.J.S.A. 40:55D-95.

[26] N.J.A.C. 7:8-3.3(b)(2).

[27] See, e.g., Densmore v. Jefferson County, 813 So.2d 844 (Ala. 2001); Hospitality Ass'n of S.C. Inc. v. County of Charleston, 464 S.E.2d 113, 118 (1995); City of Witchita, Kansas v. Kansas Taxpayers Network, 874 P.2d 667 (Kan. 1994).

Analogous NJMC Authority The Legislature has authorized the NJMC to make improvements that are supported by fees or special assessments.[28] With special assessments, charges are limited to "the cost of improvements from the increase of property values attributable to such improvements."[29] Separately, and more generally, the Legislature has authorized the NJMC "to fix and revise from time to time and to charge and collect rates, fees and other charges for the use of any facilities operated and maintained by the [NJMC]."[30] The capital cost of improvements may be funded through bonds payable from the income and revenues of the improvement and bonding resolutions may include covenants setting the rates of fees to be charged.[31] The NJMC may contract with municipalities, counties or other public agencies for the operation of improvements.[32]

One might assume that the nature of assessments and improvements might imply a project of limited duration, as opposed to a perpetual public works project. This is not necessarily the case [and we are not aware of any cases in New Jersey that imposed any time limit on assessments for benefits]. In one older case, property owners in Belleville,

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[28] See N.J.S.A. 13:17-3(p) (defining "improvement" to include curbing, guttering, constructing drains and drainage systems), -3(v) (defining "special assessment" to include "benefits accruing from the construction of improvements by or at the direction of" NJMC).

[29] N.J.S.A. 13:17-6(l).

[30] N.J.S.A. 13:17-6(m).

[31] N.J.S.A. 13:17-23.

[32] N.J.S.A. 13:17-80.

New Jersey challenged assessments for a project that started in 1920 and was completed in 1931. The challengers argued that the assessments, which were first levied at the completion of construction, "must be made within a reasonable time after the work is done." The New Jersey Supreme Court, following courts in other states, found "this is a matter for legislative action and the courts will not impose a limit where the legislature does not."[33] Indeed, the general rule is that assessments cannot be levied or enforced until the benefit is fully conferred upon property, which may pose problems for financing the initial costs of construction.[34]

Special assessments are also governed by a stand-alone article in the statute that authorized the formation of improvement districts, the levy of special assessments, and the creation of a revolving fund.[35] As with all actions that proceed through resolution, NJMC must give public notice and hold a hearing, followed by a second resolution authorizing the special assessment.[36] The substantive limitation on this power is that assessments shall "be as nearly as may be in proportion to and not in excess of the benefit, advantage or increase in value which respective lots and parcels of land shall be deemed to receive by reason of such improvement."[37] Unpaid assessments are given priority as a first lien on the land, paramount to all prior or later encumbrances.[38]

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[33] Vanderbilt v. Belleville, 11 N.J. Misc. 775, 776 (N.J. Sup. Ct. 1933).

[34] Green v. Town of Montclair, 125 N.J.L. 19 (1940).

[35] N.J.S.A. 13:17-39, -52

[36] N.J.S.A. 13:17-43 to -45.

[37] N.J.S.A. 13:17-46.

[38] N.J.S.A. 13:17-53, -54.

(footnote continued)

The NJMC also has extensive general land use authority, including the power to prepare and implement a Master Plan and "to adopt and enforce codes and standards for the effectuation of such plan"; to adopt a building code with drainage provisions, and to regulate plans for development within the Meadowlands District.[39] The NJMC is a political subdivision of the State and as such may exercise "public and essential governmental functions, and the exercise by the commission of the powers . . . shall be deemed and held to be an essential governmental function of the State."[40] These powers are likely very limited, and impact development fees have been upheld only in very limited circumstances involving the limited context of constitutional fair housing rights and only upon the promulgation of regulatory guidelines.[41]

3. CONCLUSIONS

The New Jersey Meadowlands Commission has several options to find the authority to create a Stormwater Utility using existing authorities. The Commission may be able to obtain an opinion from the Attorney General's office about whether it has the authority to create a Stormwater Utility. The Commission may attempt to characterize a stormwater system as an "improvement" that can be supported by special assessments. Special assessment generally must benefit a narrow class of property owners and might be more complex and burdensome to establish than fees. The Commission may try to coordinate a regional stormwater utility made up of municipalities and counties that do have clear statutory authority to create utilities. Under this approach, the municipal

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[39] N.J.S.A. 13:17-6(i), -6(k), -6(r).

[40] N.J.S.A. 13:17-5(a).

[41] Holmdel Builders Ass'n v. Twp of Holmdel, 121 N.J. 550 (1990).

and county parties would have to be comfortable with the argument that existing statutes authorize the creation of a stormwater utility.

The most conservative approach would be to obtain specific statutory authority from the Legislature for the NJMC, or for the counties and municipalities on an individual or regional basis, to establish a stormwater utility. If such specific statutory authority is sought, it would also provide a good opportunity to clarify the permissible basis of charges, and thereby to defuse the inevitable litigation over whether the charges are an impermissible tax. After a decade of litigation over the propriety of connection fees to municipal utilities, for example, the Legislature provided a statutory formula.[42]

B. CLASSIFICATION OF THE INCOME STREAM – TAX VERSUS FEE

In general, payments made by citizens to the government are classified as taxes, fees or special assessments. These categories are somewhat flexible and depend on fact-specific factors about the degree to which the payment arises from one's status as a property owner or as a user of services. Nevertheless, the legal categories give rise to separate legal implications and may have separate procedural and substantive requirements that could be raised in any legal challenge brought by property owners. The ultimate categorization of the stormwater charge is crucial to the program.

We assume that the NJMC would not want to impose an additional tax for stormwater disposal for a number of reasons. As a practical matter, taxes cannot be imposed on churches, schools, federal government installations and other tax-exempt properties, which although tax exempt nonetheless generate stormwater. A tax-based program

[42] See L. 1985, c.526; N.J.S.A. 40:14A-8, 40:14A-23.

would therefore raise less money – or fall upon fewer payors – than a fee-based program. More fundamentally, the NJMC has no general taxing authority.[43]

1. GENERAL CONSIDERATIONS

Financing a stormwater utility can raise issues not typically found in the financing of other utilities such as sewer, power and drinking water utilities. This is because the benefits being paid for may not be immediately apparent to the citizen. That perceived "unfairness" has lead to legal challenges to municipalities' right to charge stormwater fees, when the same citizen does not challenge water or sewer fees. To help insure a stormwater utility charge is upheld if challenged in the courts consideration should be given to how the charge will be characterized.

Taxes. Like taxes levied at the state and federal level, local taxes are general charges to raise revenue for the operational costs of government. Taxes are assessed against all who are within the scope of the government's taxing authority, and without consideration of whether the individual taxpayer will benefit from the services to be funded by the tax. In this matter the cost of services is collectivized and spread over the

[43] The general rule is that political subdivisions of the State do not have the power to tax except as delegated by the legislature. See generally N.J. Const. Art. IV, § I, para. 1 (State may not delegate taxing power to an agency that does not exercise the power of self-government); Robinson v. Cahill, 62 N.J. 473, cert. denied, 4141 U.S. 976 (1973); Local Tax Authorization Act of 1970, N.J.S.A. 40:48C-6. The Hackensack Meadowlands Reclamation and Development Act, L. 1968, c. 404, codified at N.J.S.A. 13:17-1 et seq. (the "Act"), only provides the Commission authority to determine a municipality's tax-sharing obligation under the inter-municipality tax sharing provision at N.J.S.A. 13:17-60 to -76 and to allot proceeds from that fund. See Meadowlands Regional Development Agency v. State, 112 N.J. Super. 89, 115-16 (Chancery Div. 1970) (Commission lacks direct power to levy taxes), aff'd, 63 N.J. 35, 42 (1973). Municipalities and counties, on the other hand, have the power to raise taxes to pay for improvements. N.J.S.A. 40:48-7, 40:23-7.

entire taxable population. New Jersey municipalities have limited taxing power that does not extend to a stormwater tax, which would be overturned on appeal. Even in municipalities having the legal authority to assess taxes there are advantages to the charge being regarded as a fee as opposed to a tax. Based on our research of other jurisdictions, organizations that are exempt from paying taxes such as Federal or State government facilities, schools, religious and charitable institutions, would not be exempt from paying stormwater utility fees. These entities pay water and sewer fees under statutes that specifically define "persons" who own property subject to fees or assessments as including the State and its subdivisions.[44] A number of New Jersey courts have upheld such fees charged on public entities.[45]

Assessments. In some instances, the government, or residents themselves, seek to install or construct an improvement for which the benefited group can be narrowly and precisely drawn. For example if one street of residents wants sidewalks, the municipality may decide it unfair for the general tax revenues to pay for such improvements that will be bestowed on a single narrowly defined group. A special assessment allows the sponsor to recoup the cost of projects directly from those who benefit, preserving general tax revenues to be spent for the more generalized welfare of the community. In most jurisdictions that we have researched, special assessments must satisfy two court-imposed criteria: (1) they must provide a special benefit to the

[44] N.J.S.A. 40:14A-3; N.J.S.A. 40:14B.

[45] Jersey City Sewerage Authority v. Housing Authority of City of Jersey City, 40 N.J. 145 (1963); Camden County v. Pennsauken Sewerage Authority, 15 N.J. 456 (1954); Middlesex County Sewerage Authority v. Borough of Middlesex, 74 N.J.Super. 591, (L. Div. 1962), affirmed 79 N.J. Super. 24, certification denied 40 N.J. 501. We note that the NJMC's authorization for charging for improvements does not carve out state agencies. N.J.S.A. 13:17-6(l), (m).

property assessed and (2) the amount of the assessment imposed can be no greater than the value of that special benefit to the payer.

Fees. Fees are imposed on a regulated individual, entity, property, or business in order to offset the cost of services or regulatory programs. Courts in various states have expanded, rejected, or restricted differently the criteria for fees, but the common factor is that there is some benefit to the property owner, which is ***based on and proportional to*** the fee. The criteria for designating payments to be fees are similar to the requirements for special assessments. However, fees may be levied to recoup the cost of a government service or to pay for the implementation of a governmental regulatory program, and are not limited to structural or physical improvements. Therefore, fees potentially apply to a greater scope of governmental services then assessments and in the case of funding a Stormwater Utility are the better option.

New Jersey courts follow the above distinctions, and have adopted a rather forgiving test. As long as a charge bears a reasonable relationship to the cost incurred by the government to regulate it is a fee; only if the primary purpose of a charge is to raise general revenue is it a tax.[46]

Stormwater Fees. We are not aware of any New Jersey case that has involved user charges for stormwater utilities, but there are several decisions from the courts of other states (see Appendix 1, Table D). In general those courts have upheld charges that could be considered a fee based on the presence of the three "fee factors" set forth below. While there have been a handful of successful challenges to stormwater fees, where courts have rejected charges that were determined to be taxes and that violated procedural or substantive limitations on the taxing power, typically this occurred when

[46] In New Life Gospel Church v. State, 257 N.J. Super. 241, 246 (App. Div. 1992).

one of the three "fee factors" was ignored. It is worth noting that some of the cases discussed below are outlier cases that describe the extreme bounds of the law on unlawful taxes. In general, a stormwater utility rate is valid if it is designed to defray the costs of the service provided by the municipality and is roughly proportional to the amount of runoff generated by a property owner.

The Criteria for Stormwater Fees: Benefit to Landowner. The party paying a fee must benefit from the governmental service being funded or the regulatory program being implemented. Benefits do not have to be precisely quantifiable, and any property in a particular watershed can be said to have derived an indirect benefit from a stormwater system if there is an overall improvement in health, comfort, convenience and enhanced property values.[47]

In contrast, a tax does not require that the payor receive any particular benefit. A Michigan court found a stormwater utility charge to be a tax and not a fee because seventy-five percent of the property owners were already paying a charge for a stormwater utility and the challenged charge was for a new stormwater utility to serve the other twenty-five percent of the city.[48] The new charge was a tax because it applied to all and not only those who would benefit from the stormwater system.

The Criteria for Stormwater Fees: Proportionality. Fees must relate to the payer's contribution to a problem and/or the costs of addressing the problem. In this case, the problem is stormwater runoff, and the closer a fee comes to the amount of runoff generated, the better. In California, a stormwater fee was invalidated because it was

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[47] Kentucky River Auth. v. City of Danville, 932 S.W.2d 374, 377 (Ky. App. 1996); Long Run Baptist Ass'n Inc. v. Louisville and Jefferson County Metro. Sewer Dist., 775 S.W.2d 520, 522 (1989).

[48] Bolt v. City of Lansing, 459 Mich. 152. (Mich. 1998)

applicable to "each and every developed parcel of land within the City" and was not directly based on or measured by use.[49]

A service charge that generates excess funds will most likely be considered a tax that is not proportional to use, especially if the excess is put toward other purposes. In North Carolina, a stormwater fee was invalidated because the charges were not completely directed towards, nor used for maintaining, planning or implementing a stormwater facility. There the court found that "little of the program's emphasis is on the maintenance and construction of a structural and natural stormwater and drainage system [and] instead focuses on educational programs, guidance manuals, used oil recycling, household hazardous waste collection, and enforcement efforts against illegal dumping of hazardous materials" such that sixty-eight percent of the total budget was used for things other then stormwater utility maintenance.[50] In other jurisdictions, stormwater rates may generate surplus funds as long as the excess money is not diverted for other purposes.[51]

The Criteria for Fees: Voluntariness. Fees are voluntary, at least to some degree. Courts have abandoned a strict test for voluntariness, whereby a user can opt out of a fee entirely by not using a service. Rather than use municipal water, for example, a farmer might decide to continue to use well water. It is harder to opt-out entirely from stormwater impacts, and courts have greatly diluted the requirements to show that a

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[49] Howard Jarvis Taxpayers Ass'n v. City of Salinas, 98 Cal. App. 4th 1351 (2002). The California Constitution, Art. XIIID, § 6, required the city to subject the proposed storm drainage fee to a vote by the property owners or the voting residents of the affected area. The city claimed the fee was a user fee, comparable to the metered use of water, and not a fee for a property-related service, and was therefore exempt from the vote.

[50] Smith Chapel Baptist Church v. City of Durham, 350 N.C. 805, 814-815 (1999).

[51] City of Wooster v. Grains, 52 Ohio St.3d 180, 183, 556 N.E. 2d 1163, 1166 (1990).

fee is voluntary. Generally, voluntariness is present if a property owner can reduce their fee by voluntary methods. In the stormwater context, voluntariness is present if a landowner can show that he or she has reduced the amount of runoff by removal of impervious surfaces, by systems such as infiltrating catch basins, or by cistern-type collection systems.

In the Michigan case discussed above, the court also found the fee charged for stormwater utility usage was not voluntary because property owners had no choice whether to use the service and were unable to affect the level of their fee except by building less on their land.[52] Similarly, an Oregon tax court rejected stormwater fees that were based on the amount of impervious surfaces on a property, where owners could only avoid the fee by removing the impervious surfaces.[53]

In sum, the propriety of a stormwater utility rate depends on a connection between the fee and the ongoing need for stormwater management services, i.e., the amount of runoff contributed by existing users. Stormwater fees should be used only for stormwater-related services and not other uses, or they may be construed as general taxes. Eligible stormwater services include tangible benefits such as necessary capital improvements and services to maintain existing structures, as well as intangible benefits. Such benefits include an enforcement system, studies of flooding and runoff, and even educational efforts, that are designed to benefit the current and near future stormwater system. A comprehensive stormwater plan with detailed budgets for capital and operational expenses is crucial in articulating the benefits from the stormwater services provided to the existing stormwater users, and especially for linking the intangible services provided to real benefits of the stormwater system. For example,

[52] Bolt v. City of Lansing, 459 Mich. 152,(Mich. 1998)

[53] Dennehy v. Gresham, 12 OTR 194, 197 (Or. T.C. 1992)

educational efforts and technical assistance may bolster a credit program or lower the maintenance or both. In addition, any stormwater system must include a credit system so that users may take steps to reduce their rate, which stands in contrast to their inability to affect their level of taxation.

Lessons from New Jersey Sewage Connection Fee Cases: We have examined several New Jersey sewage connection fee cases for insights into how this State's courts might rule in a stormwater utility fee case.

Several New Jersey cases have involved the reasonableness of fees. In one New Jersey case involving a challenge to sewage system rate schedules and connection charges, the court found that a township and municipality could include a capital-cost-recovery item in utility ratemaking, subject to the overall requirement that the rates be free from patent unreasonableness.[54] One important element of the reasonableness was found in N.J.S.A. 40:56-27, which states that special assessments must "be as nearly as may be in proportion to and not in excess of the peculiar benefit, advantage or increase in value which the respective lots and parcels of real estate shall be deemed to receive by reason of such improvement." [55]

Another New Jersey case involved two sewage system districts: one was a preexisting system funded by general taxes, and the newer one was to be funded solely by fees in that part of the newly formed sewer district. [56] Residents of the new district argued that the dual system was unconstitutional because those in the old district paid only general taxes for sewer services while those in the new district had to pay both taxes and a fee for the same service. The court held that the action of the municipality was

[54] Meglino v. Twp. Comm. of Eagleswood, 103 N.J. 144, 161 (1986).

[55] N.J. Stat. § 40:56-27.

[56] Airwick Indus. v. Carlstadt Sewerage Auth., 57 N.J. 107, 117 (1970).

constitutional because the classification of the plaintiffs' lands rested on real and not feigned differences: the newly created district was industrial while the existing was residential, and the lands covered in the newly created district were marshlands requiring a more expensive system then the existing one. The court went on to say that the statute authorizing the sewage authority to charge fees (N.J.S.A. § 40:14A-8(b)), need not be read to require precise mathematical equality, but rather to contemplate rough equality, keeping in mind that we are in an area in which, as with respect to other tax impositions, absolute equality is neither feasible nor constitutionally vital. [57]
In a third sewage fee case, a court upheld as having a rational basis a rate schedule that classified single-family dwellings and one- and two-bedroom apartments together with multi-family dwellings, and the rate structure was formulated using one of the methods available under N.J. Stat. Ann. § 40:14A-8(b). [58]

We are aware of at least one New Jersey case that has decided whether charges are taxes or fees. [59] The issue was whether assessments on real property in a municipal Special Improvement District were unconstitutional because residential properties were excluded. The court found that whether the special assessments should be deemed real property taxes depended in part on the nature of the benefits received by the properties within the Special Improvement District as well as the method of determining the amount assessed. It held that the special assessments did not violate the State constitution because they were not taxes, because the fees benefited specific properties, and were not clearly out of relation to the amount assessed. The court went on to distinguish special assessments from taxes, stating that "traditionally, the differences between an assessment and a tax include: an assessment supports local improvements,

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[57] Id at 122.

[58] Phoenix Associates, Inc. v. Edgewater Park Sewerage Authority, 178 N.J. Super. 109, 121-122 (App. Div. 1981).

[59] 2nd Roc-Jersey Assocs. v. Town of Morristown, 158 N.J. 581 (1999).

while a tax finances general operations; an assessment is a one-time charge, while a tax is annual; and an assessment requires that the benefit be direct, while a tax requires no such direct benefit. The improvement must benefit the assessed property, and that benefit must be special and local, that is, the benefit to the specific property must be substantially greater than to the public in general. The benefit can be measured by increased market value or by the overall economic effect of the improvement. Lastly, the benefit must be certain rather than speculative, although it may arise in the future."[60]

All assessments levied under this chapter for any local improvement shall in each case be as nearly as may be in proportion to and not in excess of the peculiar benefit, advantage or increase in value which the respective lots and parcels of real estate shall be deemed to receive by reason of such improvement. [61]

C. REGULATORY RECOMMENDATIONS

A 2005 report prepared for the Morris County Planning Board identifies the municipal and county laws applicable to the formation of a Stormwater Utility in the State of New Jersey.[62] We agree with the statutory amendments proposed by the Morris County Planning Board to existing authority for municipal and county improvements and

[60] Id. at 606.

[61] N.J.S.A. § 40:56-27.

[62] CDM and Morris County Planning Board, Recommendations for Stormwater Utility Implementation in New Jersey, Table 1 (Sept. 2005) (available at http://www.rerc.rutgers.edu/). Our assessment of the potential applicability of existing authority to make "improvements" is more optimistic than CDM's assessment. However, we agree that improvements must be funded by special assessments, which are not a dependable or long-term source of ongoing funds.

utilities.[63] These suggestions should be augmented with appropriate language to make clear that an entity such as the NJMC can coordinate the efforts of municipalities and counties.

Additional statutory changes would clarify that the NJMC itself has the authority to create and operate a Stormwater Utility. Any comprehensive statutory amendment would consist of several parts and would be similar to the multi-section authorization for special assessments at N.J.S.A. 17:17-39 to -59. However, the following short amendments may be sufficient.

Alternatively, NJMC could examine the statutes of other jurisdictions (e.g., Fla. Stat. § 403.0893 or 403.031, or enabling legislation in Texas or some other jurisdiction), pick one that best suits its needs, and urge the wholesale adoption of a New Jersey version of that statute.

Suggested Statutory Changes

If NJMC chooses to seek a package of amendments to existing laws to clarify its authority under existing law to establish a Stormwater Utility, we suggest the following changes:

N.J.S.A. 13:17-3(p): amend definition of "improvement" to include "stormwater management systems."

General powers in N.J.S.A. 13:17-6 (new section highlighted):

[63] CDM and Morris County Planning Board, Recommendations for Stormwater Utility Implementation in New Jersey, Appendix A (Sept. 2005) (available at http://www.rerc.rutgers.edu).

The commission shall have perpetual succession and shall have the following powers:

* * *

(g) To acquire in the name of the commission by purchase, lease as lessee, or otherwise, on such terms and conditions and in such manner as it may deem proper, or by the exercise of the power of eminent domain, any land or interest therein and other property, including land under water and riparian lands, land or highways held by any municipality or other governmental subdivision of the State, or any fee simple absolute in, easements upon, or the benefit of restrictions upon abutting property, that it may determine is reasonably necessary for the performance of any of its duties under this act; provided that the power of eminent domain shall not be exercised by the commission to acquire any property owned or used by a non-stormwater public utility, as defined in section 48:2-13 of the Revised Statutes, in furnishing any commodity or service which by law it is authorized to furnish;

* * *

(k) To establish engineering standards for land reclamation, including the type of fill, drainage, stormwater management and grading, and to promulgate a building code specifying the maximum weight, size and density of all buildings and structures to be placed on any land within its jurisdiction according to the method of reclamation employed and the load-bearing quality of the reclaimed land;

(l) To recover by special assessments or user fees the cost of improvements from the increase of property values attributable to such improvements;

(m) Generally to fix and revise from time to time and to charge and collect rates, fees and other charges for the use of any facilities operated and maintained by the commission, including without limitation user fees for stormwater facilities;

(x) To provide stormwater management facilities for the collection, treatment and disposal of stormwater, to create a utility to construct and maintain those facilities and to conduct any necessary planning, and to fund those facilities through user fees that are rationally related to the use of the facilities.

N.J.S.A. 13:17-10.1 (new section)

(a) Within 6 months of the effective date of this act the commission shall undertake and complete a survey of the district to determine the total amount of stormwater created and discharged in the district for appropriate time periods and storm events.

(b) The commission is hereby authorized, empowered and directed to guarantee that stormwater facilities sufficient to treat and dispose of the total amount of stormwater determined by its survey shall be available or be provided by the commission, provided that such facilities meet all applicable requirements promulgated and enforced by the New Jersey Department of Environmental Protection.

c) In providing the stormwater facilities, which it is hereby authorized, empowered and directed to provide, the commission may:

(1) Acquire or construct any such facilities as an improvement, and may recover the cost of such acquisition or construction in the same manner and pursuant to the same procedure provided for any other improvement undertaken by the commission pursuant to this act;

(2) Operate and maintain any such facilities and generally fix and collect rates, user fees or other charges for any such facilities in the same manner

and pursuant to the same procedure provided for any other facilities operated and maintained by the commission; or as part of a stormwater utility; or lease as lessor or lessee any such facilities, or provide by agreement or contract with any person for the operation of any such facilities.

(3) Join and participate in any agency, instrumentality or authority created by the State, or by any political subdivision or subdivisions thereof, for the purpose of treating or disposing of stormwater in which it may be authorized by law to join and participate, under any terms or conditions, subject to any duties and entitled to any rights and powers provided by such law.

(4) Permit, by contract or agreement, any agency, instrumentality or authority created by the State, or by any political subdivision or subdivisions thereof, for the purpose of treating or disposing of stormwater to acquire, construct, or operate and maintain any stormwater facilities which such agency, instrumentality or authority is authorized by law to acquire, construct, or operate and maintain. Any such facilities acquired, constructed, or operated and maintained by any such agency, instrumentality or authority may be located either within the district or without the district but within the jurisdiction of such agency, instrumentality or authority.

(d) In order to acquire or construct any solid waste disposal facility the commission is authorized to issue bonds and notes and to pay or redeem said bonds and notes from revenue derived from the user fees, special assessments and other charges collected for such facilities. Any cost incurred by the commission in providing any stormwater facilities shall be charged by the commission to the persons using such facilities, and nothing herein contained

shall be interpreted as requiring the commission to bear the cost of any stormwater facility provided by the commission pursuant to this act.

N.J.S.A. 13:17-23(m) (new section): clarify that bonding resolutions may include covenants setting the rates of user fees to be charged through a stormwater facility.

IV. FINANCIAL ANALYSIS

In creating a stormwater utility, there are many financial and business considerations that must be addressed. Some of the obvious considerations include program costs, operating expenses, funding options, fee methodologies, rates, timing, and program policies. A comprehensive Business Plan will need to be developed that incorporates all of these issues, and that also includes a long-term financial forecast. Several aspects, namely legal and engineering program costs, have been addressed in previous sections of this study. This section of the feasibility study focuses on two primary financial aspects. They are the:

a) ***Fee methodology:*** Evaluating fee methodologies includes analyzing property data, considering the various fee structure components, estimating the revenue potential of the fee structure, and commenting on enhancements to the fee structure such as base fees, credit programs, and other revenue sources.

b) ***Preliminary financial analysis:*** This entails a review of property data and an estimate of potential rates based on the projected stormwater program cost assumptions of the three operating and capital spending scenarios presented in Engineering Section III.

The choice to consider a fee for stormwater management services is based on the assumption that other potential revenue sources are not sufficient or as practical. While stormwater services could be funded by taxpayer general funds, in practice these funds are typically used for other municipal purposes, such as public safety, health, and education. With the increase in the number of Federal and State stormwater regulations, stormwater service costs have increased significantly, making it difficult for many municipalities' general funds to cover stormwater operating expenses, or to make the capital investments required to comply with the new regulations. Other funding

alternatives, such as local or special assessments, increasing permit/license fees, development contributions and penalty fees can be used to fund stormwater services. However, these are not consistent sources of revenue, and in all probability would not generate the level of financing needed to address the stormwater issues facing the Meadowlands District.

A. FEE METHODOLOGY

1. Balancing Fairness & Efficiency

Over 400 stormwater utilities throughout the country charge "user service fees" to generate revenue (NJDEP 2005). The flooding history of a property is not the determinant for charging a stormwater fee. User fees are based on the legal principle that the costs of providing stormwater management services are directly related to the conditions found on an individual property, and all properties have conditions that affect the amount, peak rate, and pollutant loading of stormwater runoff. These characteristics include the property size, the degree of impervious cover, the soil type, topography, and intensity of the site development. All properties use municipal stormwater programs and systems such as storm drains, drainage basins, gutters, and other structures, and benefit from regional infrastructure such as tide gates.

USER FEE METHODOLOGIES

A fee methodology incorporates one or more factors, which are used in a formula that determines a calculated fee per user. Examples of such factors are gross square footage, impervious square footage, a runoff co-efficient, a base fee rate, or a flat fee rate.

The goal in designing a fee structure is to maximize fairness for an acceptable level of administrative efficiency – to balance the ease of implementation and the fairness or equality of the methodology (Figure 8). Typically, the easier it is to administer the fee (as in a flat rate for all users) the less equality or fairness the methodology provides (PVPC 1999).

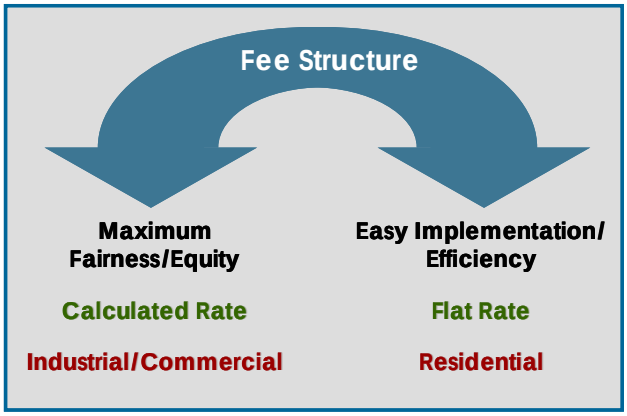


Figure 8. Fairness versus ease of implementation.

Conversely, the more factors used to calculate the fee, greater "fairness" may be achieved by refining the relationship between a property's individual conditions and the effect these specific conditions have on the stormwater runoff generated by that property. However, adding multiple factors into the fee structure has two important negative consequences. First, the administration costs can increase significantly, because a more complex fee structure requires collecting, processing and storing more property data. Results from other utilities show that administration costs can increase from $1 to $6 per account by increasing the parameters in the fee methodology from one to two. The amount of the increase will vary based on the type of factor(s) added (AMEC, 2002).

Second, the more complicated the fee structure, the harder it is for the public to understand and support the system, especially the residential customers. It is important to remember that all costs of the utility are ultimately billed back to the users, so customers may prefer a simpler fee structure to avoid the higher administrative costs entailed in a more complicated fee structure.

There are many types of fee structures, but more than half the stormwater utilities in the United States base their fee on some measure of impervious coverage (Black & Veatch, 2001-2002). Impervious coverage can include parking lots, buildings, driveways, patios, sheds, etc., and is widely used as a fee base, because imperviousness has a direct

correlation to stormwater runoff contributions in terms of both water quantity and quality. The optimal fee structure for a District Stormwater Utility should satisfy the following criteria.

STORMWATER UTILITY FEE CRITERIA (NAFSM 2006, AMEC 2002)

1. Achieve the maximum amount of fairness given the need to maintain an efficient and cost-effective administrative structure
2. Balance rates with the desired level of service and operating costs
3. Provide financial sustainability by ensuring long-term revenue stability and funding source(s) for implementation, administration, maintenance and operations, capital spending, and contingencies
4. Provide accurate and technically defendable data to support the fee structure on an on-going basis
5. Be compatible with existing rate policies and other local financing
6. Comply with existing and anticipated federal, state and local regulations
7. Provide flexibility in operations and financing

2. Components of Fee Structures

Before reviewing possible fee structures, an understanding of the various potential fee components is helpful. The best fee components relate individual property conditions to the stormwater runoff that directly affects the municipal system(s). Components can be used either independently or in combination with other factors in constructing a fee methodology. The principal test for whether or not a fee structure is defendable is that it ***"must be fair and reasonable and the resulting charges must have a substantial relationship to the cost of providing the services and facilities"*** (AMEC 2002). This is commonly referred to as the ***"rational nexus"*** test. It is also important to note that any fee structure or policy must not discriminate among customers based on gender, age, religion, race, ethnicity or other arbitrary attributes.

- **Flat Rates** involve charging one rate for property owners within the same land use category, and are typically used when the variances between the parcels (size, imperviousness, etc.) are insignificant. Often residential parcels have homogeneous property conditions, justifying a flat rate approach. Given the wide diversity of residential, industrial, commercial, and other property types in the District, a flat fee would provide the lowest level of "fairness." This factor would only make sense for the residential single family detached units, but these properties account for less than 10% of all parcels in the District (See Figure 10). While the clear advantage to flat fees is the low administration cost, the trade off in fairness is typically unacceptable when land use is not homogeneous.

- **Gross Parcel Area** achieves more "fairness" than the flat rate, because it takes into account the size of the property, but this approach is weak in linking parcels to the amount of stormwater runoff generated. Using gross parcel area only, particularly in the Meadowlands District, would unfairly charge properties containing large areas of open space, while undercharging the many small highly developed properties. This approach would also provide property owners little incentive to preserve open spaces that enhance stormwater storage capacity.

- **Impervious Coverage Area** is an essential component in constructing an equitable fee structure, because the amount of impervious coverage has a direct and profound effect on the amount of stormwater runoff a property generates. The amount of impervious coverage can be determined through tax records or aerial interpretation of Geographical Information Systems (GIS) maps, which are available through the NJMC and the NJDEP.

- **Intensity Development Factor (IDF)** is typically measured as the amount of impervious coverage relative to the total gross square footage of a parcel. As with impervious coverage, this factor is a meaningful measure of a property's contribution to stormwater runoff. When using an IDF, parcels are typically

grouped into land use categories when applying rates. IDF may be used in combination with some other factors, but not with comparable measures (such as a runoff coefficient), because this would result in duplicating like factors.

- **Runoff Coefficient** measures the quantity of runoff based on the multiple conditions of a specific property. Complex engineering models are used as the basis for this calculation. While this rate method can achieve a high amount of "fairness" in the fee structure, collecting and maintaining the data is expensive. This fee component is not as easily explained to the average customer as the other fee factors. Like the IDF component, this measure would be used to categorize the parcels by land use, and then group rates would be applied. This method could not be used in conjunction with an IDF methodology, because the factors duplicate each other.

- **Fixed Base Amount** can be used to recover the basic administration costs of operating a stormwater utility. Similar to the base rates of other types of utilities, this fee would be charged to all properties equally in combination with other fee components that would vary by the amount of runoff a property contributed. Since the public is familiar with fixed base amounts, this could be a way of covering fixed administrative costs, as well as other operating costs that support all properties, such as GIS data management.

- **Billing Units:** Regardless of the components that comprise a stormwater utility fee formula, a "billing unit" is needed. Other service utilities have billing units, such as the price per kilowatt, the price per gallon, or the price per household. Similarly, a stormwater utility should have a suitable billing unit.

Equivalent Residential Unit (ERU) or *"average single family unit"* is a common billing unit for stormwater utilities throughout the country. ERU is unique in every community, varying in its calculation from one utility to another. The ERU is commonly

used for three reasons: 1) it is usually based on the smallest size of all property types, serving as a common denominator; 2) single family homes typically have homogeneous property conditions that are related to the amount of stormwater runoff generated; and 3) the available property data is often not sufficiently complete or accurate to use more precise measurements, such as the size of impervious cover or a runoff coefficient.

Through analysis of single family properties, either in total or by random sampling, a standard unit of impervious area is calculated. This standard unit, or ERU, is associated with a rate for all detached single family homes, and is then used as a basis for charging all other land use classes. For example, if the ERU was 1 for every 2,000 square feet of impervious coverage, then a commercial property with 10,000 square feet of impervious coverage would pay 5 times the ERU rate. A major benefit to using an ERU is that the concept is easy to communicate to rate-payers and it simplifies the fee administration and any rate changing processes.

Despite the advantages of using an ERU, it is not necessarily the most practical approach in highly urban environments that contain a high concentration of multiple dwelling properties, such as apartment mid/high rise dwellings, condos, townhouses, and garden apartments. These various housing types are typically classified in the land use code as Residential High Density or Multiple Dwelling In the Meadowlands District the High Density Residential category represents 25% of land use. Residential Single Family parcels are a significantly smaller component of land use, accounting for only 9% (Table 4).

Table 4. Types of District residential units.

District Residential Unit Types

	# of Parcels	% of Total Parcels
Residential High Density / Multiple Dwellings	926	25%
Residential Single Family / Medium Density	346	9%
Total District [1]	3,702	100%

[1] Assumes the NJ Turnpike is a single parcel.

The question is whether to determine fees for high density residential properties on the basis of a property's total imperviousness, or relate each property type to an ERU. Both approaches have been used. If the different types of multiple dwellings are treated as a single parcel, the fee would be calculated on the entire development and then divided among the residences.[64] This approach has been found to be effective in creating fairness for multi-storied housing, such as apartment buildings.

Alternatively, the different multiple dwelling types could be treated as individual land use classes. An average of the impervious coverage of each multiple dwelling type, e.g. apartments, condos, townhouses, etc., would be determined, and then related to the ERU. The weakness of this approach is that conditions on multiple dwelling properties in the District vary significantly, far more than those of single family detached residences. This makes using an "average" rather meaningless, raising questions about the fairness of such an approach. As the number and type of multiple dwellings in the District increases, so does the potential for inequality. Given the large amount of multiple dwelling properties in the Meadowlands, an attempt to relate these properties to a single family unit would most likely create significant inequalities. In order to use the ERU billing unit in the District, the type and number of units on each multiple dwelling parcel would need to be evaluated.

Other Billing units (such as impervious cover or the volume of runoff) can also be established with a defined value. If sufficient and accurate property data are available, then such a measurement would be preferred as the basis for a billing unit. Some stormwater utility fees are based on a fixed dollar amount for a set amount of impervious area. As an example, if the billing rate was $10.00 per 1,000 impervious square feet, and a property had 4,000 square feet of impervious coverage, the owner would pay $40.00 per year. This factor can be applied regardless of land use and in combination with other fee components. Since high quality impervious data is available

[64] A single bill for a multiple dwelling property would not be evenly prorated among residential units if impervious areas such as *(footnote continued)*

for the District, this approach could be useful to directly correlate stormwater runoff with a specific property.

To determine which factors to use in this feasibility study, numerous reports and studies of other stormwater utilities as well as industry data were reviewed (see bibliography in Appendix II). Two reports are worth noting, because they relate to the development of stormwater utilities in the State of New Jersey. Both reports emphasize the importance of ***impervious coverage*** in designing a fee structure.

- **Recommendations for Stormwater Utility Implementation in New Jersey (2005):** was commissioned by the NJDEP through the Morris County Planning Board. The report recommends adopting "… a model user service fee system that can be implemented to fund stormwater management…." and that such fees "…identify a system that connects the fee charged to the general amount of ***impervious surface*** on a property that generates stormwater runoff."
- **Guidance For Municipal Stormwater Funding (2006)**: This document was prepared by the National Association of Flood and Stormwater Management Agencies under a grant provided by the USEPA. This comprehensive document covers various aspects of establishing a stormwater utility. The report notes: "Empirical studies have demonstrated that ***impervious surface area*** on a property is the single most significant factor influencing [stormwater] impacts. Impervious area is also relatively easy to identify and quantify numerically and is the most common parameter used in stormwater service fee calculations."

In a National Urban Runoff Program studying stormwater quality, impervious coverage also was characterized as the dominant factor in runoff pollutant loadings (Florida Stormwater Association 2003). Thus impervious coverage has significant impact on water quality as well as runoff quantity and rates.

parking were assigned to units in their property deeds. In these cases, the deed boundaries would be used to allocate the cost.

3. Comparison of Fee Structures

As part of this feasibility study, we were asked to present alternative fee methodologies. Numerous fee structures were considered and two were chosen, which could provide an acceptable level of ***1) user fairness, 2) ease of communicating to users,*** and ***3) reasonable administration costs.*** These methodologies are summarized in Table 5.

Table 5. Comparison of Rate Methodologies

Fee Methodology	Fairness for Property Owners	Ease Of Communicating To Users	Administration Costs
ONE FACTOR Standard billing unit ($/1,000 sq.ft. impervious cover)	Fairness for all users	Very Good	Medium to Low
TWO FACTORS Intensity Density Factor Intervals with standard billing unit ($/1,000 sq.ft. impervious cover)	Achieves fairness for most users	Good	Medium

Both fee methodologies are based on the amount of impervious coverage on each parcel as the basis for a billing unit. Because impervious cover has a direct and significant impact on the generation of stormwater runoff and water quality, it is an ideal factor to measure relative stormwater service costs for a property. These approaches also take advantage of the high quality property data compiled using GIS maps, and provided by the NJMC and NJDEP. Although all data needs to be field-verified in the implementation process, our assumption is that the gross acreage and impervious data is relatively reliable for parcels in the District.

One Factor - Standard Billing Unit uses a standard ***billing unit per 1,000 impervious square feet[65] of coverage*** (Table 6). Since each property is charged relative to the amount of impervious area, this method provides a high level of fairness. Its simplicity avoids confusion among parcel classifications and it is relatively easy to administer and communicate to the public.

Table 6. Flat rate standard billing

Flat Rate Standard Billing Unit Methodology Illustration

$$\text{Flat \$ Amount} \times \frac{\text{Impervious Sq.Ft.}^2}{\text{Standard Billing Unit (1000 sq.ft.)}} = \text{\$ Annual Fee}$$

Sample Property	$10.00	X	2,500 / 1,000	=	$25.00

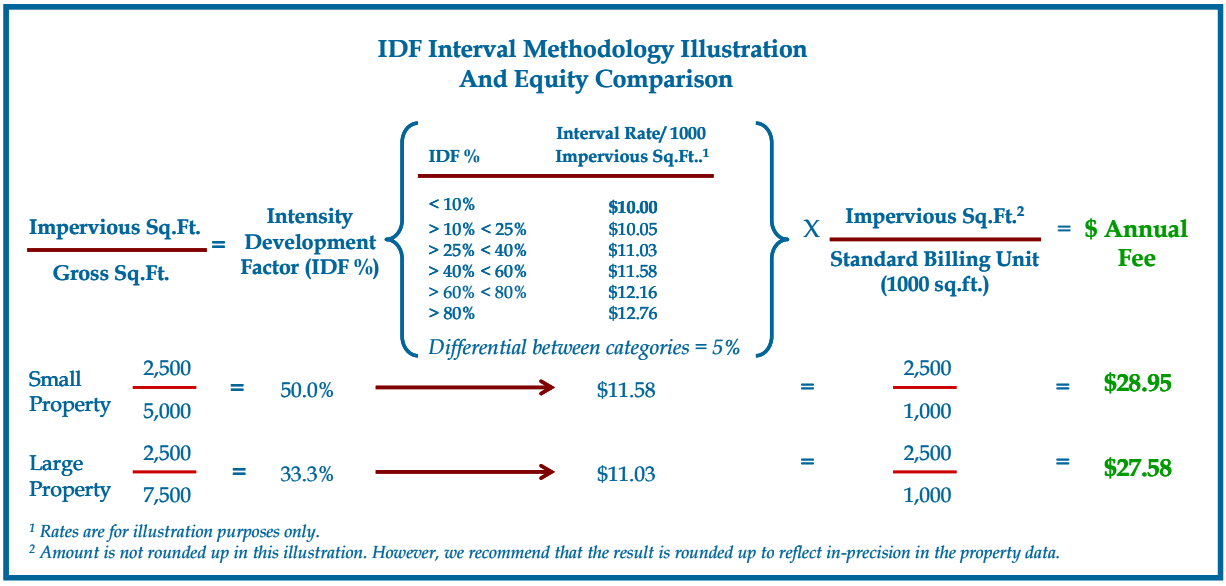
[1] *Rates are for illustration purposes only.*
[2] *The amount is not rounded up in this illustration. However, we recommend that the result is rounded up to reflect in-precision in the property data.*

Two Factors - Standard Billing Unit and Intensity Development Factor (IDF) adds an Intensity Development Factor (IDF) to the fee structure. IDF is defined as the ratio of a property's impervious area to the total parcel area.

To demonstrate this methodology, we created six intervals as shown in Table 7. Actual setting of intervals and rates will require a formal stakeholder process, and it is conceivable that more or fewer intervals could be used. Although adding a second component such as and IDF into a rate formula can increase the administration costs, this methodology has an important advantage. It provides incentives for property owners to reduce their amount of impervious cover by relating the utility fee to the intensity of a property's development. The higher the ratio of impervious cover, the greater the fee; conversely the lower the ratio of impervious cover, the lower the fee. Mathematically, however, this method penalizes small properties with a high percentage of impervious cover, which is common in the residential properties found in highly urbanized residential areas.

[65] The size of the Standard Billing Unit can be larger or smaller, depending upon the precision of the property data. For this feasibility analysis, we selected 1,000 square feet, assuming reasonable data accuracy of the data.

Table 7. Methodology utilizing an IDF Interval comparing small and large properties.



As seen in Table 7, a small property with a 50% IDF would pay more than a larger property with a 33% IDF, assuming both properties had 2,500 square feet of impervious cover. Other rate charges that contribute to fairness, such as "flood risk" surcharges, would have to be supported by data that demonstrate a property contributed to greater demands on the stormwater management system.

4. CREDIT PROGRAMS

A District Stormwater Utility should include credit programs, as incentives for property owners to adopt Best Management Practices (BMPs) that reduce the impact of stormwater runoff on the public stormwater infrastructure. These types of programs reduce the fee charged to the user in exchange for measurable improvements in stormwater management. Such Credit Programs emphasize the importance of good stormwater management practices, offer monetary incentives, and make clear to the property owners that they can take voluntary, proactive steps to reduce their fee.

The following examples of credit programs are organized by the type of stormwater benefit they provide – ***reduce quantity, reduce rate and improve quality***. In addition to the activities listed, credits could also be available for programs that educate property

owners on Best Management Practices (BMPs) that reduce stormwater quantity and improve stormwater quality.

Stormwater Fee Reduction Credit Program Components

1. ***Reduction of the quantity of stormwater runoff:***
    a. Natural area conservation such as preservation of wetlands
    b. Creation of infiltration structures such as rain gardens
    c. Improvement of groundwater recharge on the property
    d. Alteration of the slope of a property
    e. Disconnection of Rooftop Runoff
    f. Disconnection of Non-Rooftop Runoff

2. ***Reduction of the rate of stormwater runoff:***
    a. Water detention areas
    b. Natural area buffers e.g. stream buffers, grass channels
    c. Incorporation of wetland areas into water flow paths

3. ***Improvements in runoff water quality:***
    a. Decouple stormwater and sewerage systems
    b. Natural area buffers e.g. stream buffers, grass channels
    c. Increase water residence time in wetland areas

The above credit system would be a crucial component in the fee structure of any utility whose rate is based upon the amount of impervious cover or an IDF. If however, the fee structure utilized a runoff-coefficient factor, such a credit program would not be appropriate. Under this rate methodology, the above factors would already be reflected in the fee charged, because any property runoff improvements would reduce the value of the coefficient. However, maintaining runoff co-efficient values for all District properties could be cost prohibitive.

5. Base Fee

A base fee in the rate structure can be used to fund "fixed" overhead costs. Typically, a base fee is a relatively small amount, charged to all customers regardless of land use class, property size, or contribution to stormwater runoff. It is considered the base cost

of offering the utility's services, including administration, billing, basic planning functions, etc. While a base fee was not included in the two example methodologies used in this study, it should be considered during the stakeholder and rate setting process. The NJMC has regulated regional land use, solid waste, and environmental research activities for decades, and has significant experience in assessing the administrative costs of services within the 14 municipalities it serves. Given its relatively long history and known operating costs, the NJMC is well-positioned to participate in defining minimum overhead costs required for operating an independent Stormwater Utility.

6. Other Revenue Sources

Consideration should be given to other sources of revenue that can supplement the revenues derived from service fees. Other revenue sources may include local/special assessments, developer contributions or impact fees, and various one-time fees for permits, licenses, and penalties. Local or special assessments are appropriate for capital projects that benefit only a specific group of properties, such as an on-site detention basin. While these sources are not sufficient or reliable to fund the on-going costs of a utility, they contribute to a utility's financial stability and provide incentives to use best development practices.

While not a source of revenue, user fees could be off-set with possible property tax reductions. A District Stormwater Utility could assume some responsibilities of local municipalities, such as street sweeping, cleaning of catch basins, and routine stormwater infrastructure maintenance. Municipalities would enjoy significant costs savings by transferring these stormwater management responsibilities to a utility, and therefore could consider property tax relief.

7. Billing Options

The NJMC has established financial arrangements with the 14 District municipalities, which it serves. As part of the implementation process, the Commission should evaluate its existing processes and other billing alternatives. As requested by the NJMC, the evaluation of billing options and the related costs were not part of the scope of this study.

B. FINANCIAL ANALYSIS

1. Overview

The following financial analysis is based on preliminary reviews of property data, secondary research, and documents made available by the NJMC for the purposes of providing this feasibility study. Before creating a District Stormwater Utility, stakeholders throughout the District need to make key service and policy decisions that would affect the ultimate rates and spending levels of such a utility. Once these decisions are made, a formal Business Plan needs to be prepared and approved, including a 5-year financial forecast that identifies specific revenues, operating costs, capital spending and funding sources. This approach mirrors a long-term business planning process, which will be important to support the Stormwater Utility rate-setting process and ensure compliance with due diligence standards.

In lieu of comprehensive forecast assumptions, this financial analysis is based on the following costs of the three program service levels presented in Engineering Section III:

Scenario 1 - Operation and Maintenance (O&M) Only ($1.8 million)

Scenario 2 – O&M Plus Minor Capital Expenditures ($4.0 million)

Scenario 3 - O&M Plus Major Capital Expenditures ($6.7 million)

These program costs include only estimated costs for routine maintenance, operation, and capital expenditures, and an overall estimate of administration and other overhead

costs. As part of a rate study and business plan, all potential costs related to creating a District Stormwater Utility will need to be evaluated in detail (See Appendix II).

Estimated user rates were derived by equating the potential revenue with program costs, based on specific property data for the District (see Table 11). The total number of properties in the District is 3,702 and the total District impervious cover is 215 million square feet. Using available property data, and various annual program costs of $1.8 to $6.7 million, user rates per billing unit would range from $8.44 to $31.06 per year. This is equivalent to an average single family household fee of $20.54 to $75.57 per year. To account for future additional costs, sensitivity analyses estimated the affect of increasing program costs on user rates. For every $100,000 in program expenditures, the average dollar increase in the standard billing unit rate would be about $0.50, or just over $1.00 per single family household per year.

The two proposed fee structures were applied to the District property data. The "Flat Fee" aligned the program costs in equal proportions for those properties having impervious area. Within the District, the industrial properties bear the majority of the program costs, representing 58%. Using the "IDF Interval Rate" methodology shifts the program costs to more intensely developed properties. District properties with an IDF over 60% assume nearly 75% of the program costs.

2. Program Cost Analysis

Three different levels of program spending were examined in order to evaluate potential estimated costs of operating a Stormwater Utility (excluding some administration, financing and start-up costs that were not part of this study). The first scenario provides basic operation and maintenance services only, essentially utilizing the existing infrastructure; the second scenario adds minor capital improvements; and the third scenario adds major capital improvements, proactive planning, and complete implementation of the Floodplain Management Plan (2005). In all three scenarios it was

assumed that new equipment was purchased, owned and maintained by the Stormwater Utility, and that salaries for stormwater personnel were paid for by the utility.

However, there is a large market in used equipment and so considerable savings could potentially be achieved in the capital budget. If the Stormwater Utility took over responsibilities now being carried out by municipalities within the District, some of their equipment could be made available to the utility to significantly reduce the capital costs. It should be emphasized that these cost scenarios were developed for feasibility and scoping analysis and are ***estimates only***. More in-depth studies would need to be done to further refine these estimates prior to implementation.

Scenario 1. Operation and Maintenance only - $1.8 million

In this scenario, only basic operations and maintenance (O+M) are performed, including periodic catch basin cleaning and weekly street sweeping. Repairs are performed on an as-needed basis in a reactive fashion. This scenario essentially calls for what is currently being required of the public works departments of the Counties or the District municipalities, but adds some inspections and increases the cleanout frequency. For this analysis it was assumed that the Stormwater Utility would be cleaning 5,000 catch basins twice a year. Studies (Mineart & Singh 1994) have shown that in most situations cleaning catch basins twice a year is significantly more effective than once a year. In areas of high sedimentation, even more frequent cleaning may be warranted. With semi-annual cleaning and twice a day disposal, the typical 10-15 cubic yard vactor truck should be sufficient to clean 750-1,000 catch basins each (CASQA 2003) per year. No costs were included for disposal of sediments on the assumption that collected material would disposed of at minimal charge in one of the District landfills.

This program cost option assumes annual inspection of tide gates, pump stations, and other water control structures, but does not include a budget for repairs. It was assumed that catch basins and sewers would be repaired in a reactive fashion as

complaints were received and that ditches would be cleaned when they became clogged or obstructed. Capital equipment was amortized over a ten year period. This scenario includes 17 full time personnel, 6 vactor trucks, 10 large sweepers and 4 smaller sweepers. The estimated costs are provided in more detail in Table A in Appendix I. This scenario requires an annual budget of approximately $1.8 million per year.

Scenario 2. Maintenance Plus Critical Improvements – "Minor Capex" $4.0 million

This scenario includes everything describe in Scenario 1, and adds critical annual capital improvements, including the replacement of one major water control structure (tide gate or pump) per year. It also adds more sophisticated equipment, such as a video camera inspection unit and a jet truck, as well as additional maintenance equipment, such as dump trucks, pickup trucks, and a backhoe. This option assumes the reconstruction or replacement of deteriorated catch basins and critical storm sewers totaling $55,000 per year. This scenario funds an additional five personnel, some with specialized skills in the maintenance and repair field, and includes a professional planner. This second scenario requires an annual budget of approximately $4.0 million. Additional details regarding this scenario can be found in Table B in Appendix I.

Scenario 3. Maintenance Plus Critical Improvements Plus Plan – "Major Capex" $6.7 million

The third scenario examined includes everything in the first two programs and adds the complete implementation of the Floodplain Management Plan over a ten-year period. It also includes implementing the "Flood Control" Team discussed in Engineering Section III, as well as in-depth planning and coordination. This scenario funds an additional five people, at least one whose primary duties include researching and applying for grants to implement capital projects and various education and outreach programs. It also includes some water quality specialists to oversee water quality programs. The annual budget for this program scenario is approximately $6.7 million, much of which

is outsourced to repair major water control structures. Additional details can be found in Table C in Appendix I. These three program spending scenarios ("service levels") are summarized in Table 8.

Table 8. Stormwater Utility costs to support three service levels.

Program Costs By Service Level

	Scenario 1 - Maintenance Only	Scenario 2 - Maintenance + Minor Capex	Scenario 3 - Maintenance + Major Capex
Program Operating Costs			
Salaries & Benefits	$1,073,310	$1,425,760	$1,784,860
Repairs & Maintenance	$35,000	$1,555,000	$3,555,000
Equipment Operating	$270,000	$321,500	$343,500
Administration / Overhead	$181,257	$400,418	$666,707
Equipment Capex	$2,530,000	$3,015,000	$3,170,000
Depreciation %	10%	10%	10%
Annual Depreciation $	$253,000	$301,500	$317,000
Annual Program Operating Costs	**$1,812,567**	**$4,004,178**	**$6,667,067**
Program Services:			
Number of personnel	**17**	**22**	**27**
Cleaning catch basins	**X**	**X**	**X**
Storm sewer and ditch repair	**X**	**X**	**X**
Street sweeping	**X**	**X**	**X**
Minor road maintenance	**X**	**X**	**X**
Number of tide gate repairs	**0**	**1**	**1-3**
Annual inspection of tide gates and pumps		**X**	**X**
Planning and coordination		**X**	**X**
FEMA research and reporting		**X**	**X**
Implement 10 -year flood control plan			**X**

3. Revenue Analysis

As part of the revenue analysis, major assumptions are first detailed, including the area studied, land use exclusions and the standard billing unit.

Major Assumptions:

- **Areas Studied:** Properties within the NJMC boundaries, including parts of 14 municipalities, were included as ratepayers with minimal exclusions (see "Land Use

Exclusions" below). Portions of the four District municipalities that are beyond the District boundaries ("District-Plus") were evaluated separately for two reasons. First, the stormwater runoff from these areas ultimately affects flooding within the District. And second, the entire municipality would benefit from receiving stormwater utility services. However, the decision to consider a stormwater management plan beyond the District border is one for stakeholders, government and the general public (See Addendum II).

- **Land Use Exclusions**: In all revenue calculations wetlands, waterways, forests, and *Phragmites*-covered areas were excluded from the potential population of ratepayers. Other stormwater utilities typically excluded such areas from paying service fees, because they contain little to no impervious coverage and actually serve as buffers in stormwater systems. Major roads and bridges, except the NJ Turnpike, were excluded because they are viewed as common areas to all users within the District. The NJ Turnpike is included as a potential rate payer, because the primary turnpike users do not own property in the District.

  The NJMC has identified about 5% of District land use as Public/Quasi Public Use.[66] Public areas, such as parks, office buildings, police and fire stations were ***not*** excluded from the analysis. Other land uses that should be reviewed are cemeteries, altered lands, undeveloped lands, and schools. Since a stormwater utility user fee is not a tax, ***no user is excluded automatically***. Policies must be developed through the stakeholder process to determine which types of land uses would be excluded from paying stormwater utility fees. Any additional fee-exempted land uses, not in this analysis, would reduce the number of potential ratepayers and thus increase the fee paid by the remaining property owners.

[66] NJMC Master Plan, Figure 3.2 page 3-5.

- **Standard Billing Unit:** Both proposed fee methodologies use a Standard Billing Unit. For illustration purposes, a dollar figure was chosen per 1,000 impervious square feet, an area that could be determine using existing GIS capabilities. As part of the public comment process other amounts of impervious cover should be considered to ensure fairness and to reflect the accuracy of the available GIS data.

District Financial Analysis:

Most important to estimating user rates is the cost analysis of the stormwater management program, which drives the rate analysis. Stormwater utility revenues may support all aspects of stormwater management programs, including start-up costs, administration, regulatory, financing, operating, maintenance costs and capital expenditures. The following two sections present an analysis for the District, including: ***a) land use, b) parcel data, c) revenue analysis*** and ***d) methodology application.*** The user rate was estimated by equating the program costs to revenue potential, based on user data provided by the NJDEP and the NJMC.

Land Use: The New Jersey Meadowlands Master Plan combines significant preservation of wetlands and waterways within a highly urbanized landscape (Figure 9). With over 8,000 acres of wetlands and waterways, these areas represent about 44% of the District land use. Urban gross acres also account for 44%, forest 9% and barren land 5%.

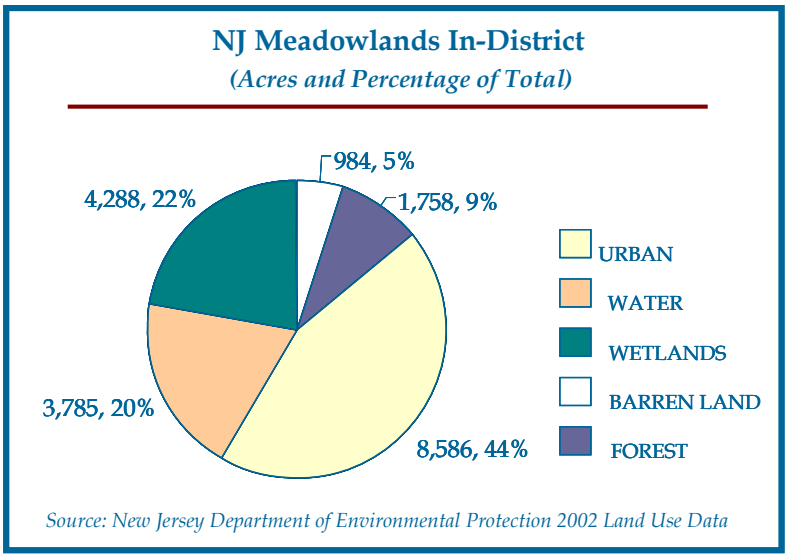


Fig. 9. Meadowlands District land use components.

Parcel Analysis: The number of parcels included in the District analysis is 3,702.[67] The largest proportion of parcels by land use is industrial (44.4%), followed by residential high density (25.0%), residential single units (9.3%), transportation/ communication/utilities (8.7%), commercial (7.2%), other urban (2.5%), and all others (2.8%). However, when analyzing ***impervious*** area, three land use categories increase in significance (Figure 10): the industrial segment rises to 58.4%, transportation/ communication/utilities doubles to 15.6%, stadiums/cultural facilities increases to 7.4% and the NJ Turnpike 7.4%. Other segments remain about the same or decline, commercial/services 7.0%, residential high density 2.9%, all other 1.3%.

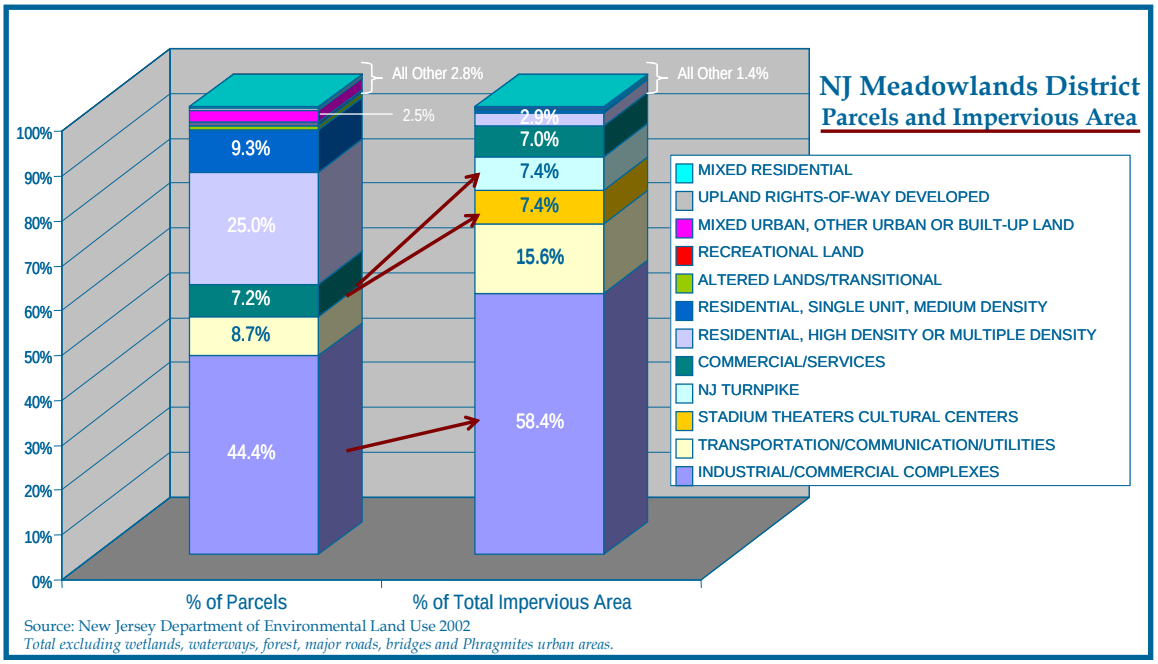


Fig. 10. Meadowlands District impervious cover by land use.

Revenue Analysis: User rates were estimated by equating the potential utility revenue to the three different annual program costs, based on specific market data. Rate paying District parcels totaled 3,702 and impervious square feet totals 215 million, resulting in estimated user rates/billing unit ranging from about $8.44 to $31.06, varying by service

[67] Total number of parcels treats the NJ Turnpike as one parcel.

level (Table 9). Additional capital projects would increase these rates by approximately $4.52, assuming a 25-year average project life.[68]

Table 9. Stormwater utility operating costs by service level and estimated District rates.

Program Costs & Estimated Rates District

	Scenario 1 - Maintenance Only	Scenario 2 - Maintenance + Minor Capex	Scenario 3 - Maintenance + Major Capex
Annual Program Operating Costs = Annual Utility Revenue	**$1,812,567**	**$4,004,178**	**$6,667,067**
Potential District Rates:			
District - parcels	3,702	3,702	3,702
District - impervious sq.ft.	214,679,411	214,679,411	214,679,411
Estimated Average Annual Rate			
Rate/1,000 Sq. Ft.[1]	$8.44	$18.65	$31.06
Rate Increase/Additional $100,000 costs [2]	$0.47	$0.47	$0.47
Average Single Family Household (sq.ft.) [3]	2,433	2,433	2,433
Rate/Average SFH	$20.54	$45.39	$75.57
Rate Increase/Additional $100,000 costs [2]	$1.13	$1.13	$1.13

[1] The estimated rates are based on program engineering, operating and capital costs only. Additional costs, operating assumptions and policy decisions must be considered further in a comprehensive rate study. For example, other operating assumptions may include development growth rates in the region, alternative financing available, annual cost increases, other assets and liability assumptions. (Also see footnote 2.)
[2] The estimated rate will increase if estimated costs are too low. Administrative and overhead costs, such as billing, legal, accounting, supplies, education, consulting, insurance, and utilities were estimated by the NJMC at 10% of total program costs.
[3] The average impervious square feet of an average Single Family Household (SFH) is calculated by dividing the total impervious square feet for the NJDEP land use category "1120 Residential, Single Unit, Medium Density" by the total parcels in that category. This does not include potential single family residences in other land use categories, for simplicity.

The standard billing rate would increase by about $.50 for every additional $100,000 in program costs, or approximately $1.13 for a single family household. This relationship is crucial in viewing the estimated rates, because the program costs in this study are only preliminary estimates. Administration costs, for example, were estimated in aggregate at 10% of total program costs. These expenses, such as professional services (e.g. legal, accounting, and consulting), administration and billing costs, supplies, insurance, utilities, marketing, and contingency reserves, need to be analyzes in more

[68] We estimated 25-year average project life, although project life spans can vary from 10 to 70 years.

detailed. In addition, these projected rates could vary significantly depending upon stakeholder polices and future market and operating assumptions, including the rate of future development, cost increases, alternative financing sources, interest rates, utility rate increases and other assets and liabilities (See Appendix II). Rates can also increase significantly with increases in costs (Figure 11). This illustration emphasizes the importance of conducting a comprehensive rate study that considers all costs, policies and future market, and operating assumptions.

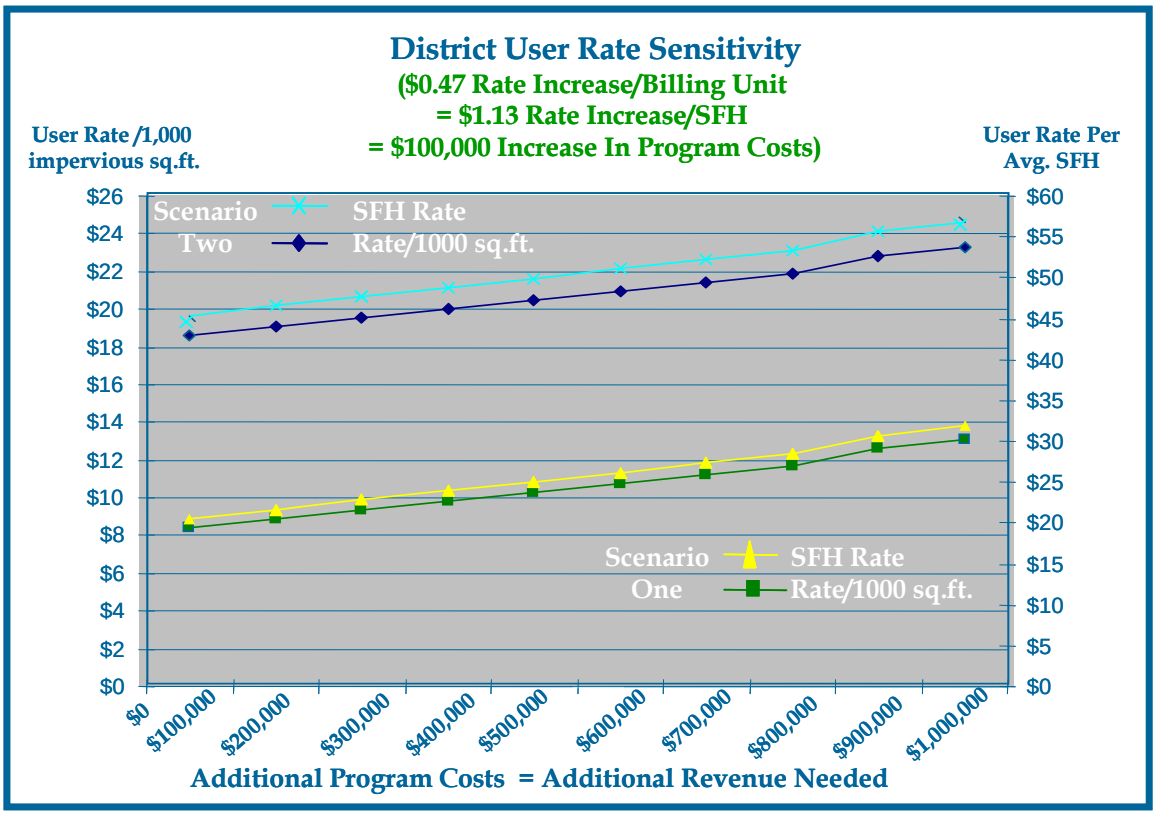


Fig. 11. Affect of Stormwater Utility program costs on rates.

To ensure the reasonableness of the District rate estimates, rate data from a study of over 380 stormwater utilities throughout the United States (Black and Veatch 2001-2002) was considered. We compared rates only to test the plausibility of the fee estimates in our analysis. It is also important to note that rates were compared to averages, but the range of the rates varies significantly across the U.S.

Other stormwater utilities quote user rates in terms of a single family household (SFH). In the District an "average SFH" (assuming an average impervious cover of 2,433 sq. ft.) would receive an annual Stormwater Utility bill ranging from $21 to $75, depending upon the service level (Table 10). In the national study, the average annual SFH rate was between $41 and $67 (Black & Veatch 2001-2002). These amounts translate into about $17 to $27 per 1,000 impervious sq. ft., comparable to the rates calculated for the District.

Table 10. Comparison of U.S. Stormwater Utility rates and estimated District rates.

Stormwater Utility Rate Comparison

(District Single Family Unit 2,433 impervious sq. ft.)

	$ SFU/Year Average Range At 95% Confidence Interval		$/1000 sq.ft. Impervious/ Year		$/1000 sq.ft. Impervious/ Year
Study[1] of 386 Utilities $/SFU [2]	**$40.97**	**$45.65**	$16.84	-	$18.76
Study[1] of 162 Utilities $/1000 sq.ft.	$47.27	$66.51	**$19.43**	**-**	**$27.33**
District SFU Estimates (Low to High)	$20.54	$75.57	**$8.44**	**-**	**$31.06**

Represents given amounts =

[1] *Black & Veatch national study, 2001-2002.*

[2] *SFU represents single family unit, which is synonymous with equivalent residential unit or ERU.*

Applying the Methodologies: Table 11 illustrates the two proposed fee structures for the District: 1) a flat rate for a standard billing unit ("Flat Fee") and 2) an IDF (impervious area/gross area) Interval rate times a standard billing unit ("IDF Interval Rates.") For illustration purposes, the program costs of Scenario 2 ($4.0 million for operation and maintenance plus minor capital expenditures) were used to estimate user rates.

Given program costs of $4.0 million, the estimated "Flat Fee" per the standard billing unit would be about $18.65. Industrial properties would pay the highest percentage of

revenues, because they represent 58% of impervious area. The "Flat Fee" approach results in a one-to-one correlation with the amount of impervious area.

In the second fee methodology, "IDF Interval Rates", some of the program costs are shifted to the more intensely developed properties. In this example, the rates between intervals were increased by 5%, creating a range of rates from $15.27 to $19.49 per billing unit. Although the interval rates in this methodology vary, the average user rate equals $18.65 – the same as the "Flat Fee." Using this methodology, nearly 75% of the program costs are born by properties with an IDF percentage greater than 60%, with just over 50% having an IDF percentage greater than 80%. This example is for illustration purposes only. Rates will change based on stakeholder policy decisions and other financial and operating assumptions.

Table 11. Comparison of estimated District rates using a flat rate versus an IDF Interval rate methodology.

NJMC - District Flat Rate Standard Billing Unit Methodology

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Land Use Codes	Land Use Label	# of Parcels	Gross Parcel Area (sqft)	Gross Impervious (sqft)	Weighted Impervious/ Parcel	% of Total Impervious Area	Est. Fee $/1,000 Sq. Ft.	Estimated Amount of Fees / Year	% of Total Revenue	Est. Fee / Unit	Monthly $/1,000 Sq.Ft.
1110	RESIDENTIAL, HIGH DENSITY OR MULTIPLE DENSITY	926	13,973,121	6,194,376	44.3%	2.9%	$18.65	$115,537	2.9%	$125	$1.55
1120	RESIDENTIAL, SINGLE UNIT, MEDIUM DENSITY	346	3,821,934	841,932	22.0%	0.4%	$18.65	$15,704	0.4%	$45	$1.55
1150	RESIDENTIAL MIXED	5	108,467	18,430	17.0%	0.0%	$18.65	$344	0.0%	$69	$1.55
1300/1500	INDUSTRIAL/COMMERCIAL COMPLEXES	1,643	230,234,172	125,367,700	54.5%	58.4%	$18.65	$2,338,345	58.4%	$1,423	$1.55
1400/1440	TRANSPORTATION/COMMUNICATION/UTILITIES	322	173,808,654	33,481,627	19.3%	15.6%	$18.65	$624,496	15.6%	$1,939	$1.55
1410	NJ TURNPIKE	1	16,860,738	15,927,510	94.5%	7.4%	$18.65	$297,078	7.4%	$297,078	$1.55
1810	STADIUM THEATERS CULTURAL CENTERS	3	30,421,487	15,887,966	52.2%	7.4%	$18.65	$296,341	7.4%	$98,780	$1.55
1200	COMMERCIAL/SERVICES	266	38,123,104	15,041,553	39.5%	7.0%	$18.65	$280,553	7.0%	$1,055	$1.55
7400/7500	ALTERED LANDS/TRANSITIONAL	36	23,612,802	734,929	3.1%	0.3%	$18.65	$13,708	0.3%	$381	$1.55
1800	RECREATIONAL LAND	30	9,694,229	698,813	7.2%	0.3%	$18.65	$13,034	0.3%	$434	$1.55
1600/1700	MIXED URBAN, OTHER URBAN OR BUILT-UP LAND	94	21,974,585	459,870	2.1%	0.2%	$18.65	$8,577	0.2%	$91	$1.55
1462/1463	UPLAND RIGHTS-OF-WAY DEVELOPED	30	13,313,193	24,705	0.2%	0.0%	$18.65	$461	0.0%	$15	$1.55
	TOTAL [2]	**3,702**	**575,946,486**	**214,679,411**	**37.3%**	**100.0%**	**$18.65**	**$4,004,178**	**100.0%**	**$1,082**	**$1.55**

Source: New Jersey Department of Environmental Land Use 2002

[1] *Grand Total excluding wetlands, waterways, forest, major roads (except the NJ Turnpike), bridges and phragmites urban areas.*

NJMC - In-District IDF Interval Rate Methodology

4/26/07

Intensity Development Factor Intervals	Parcels	Gross Parcel Area (sqft)	Gross Impervious (sqft)	Weighted Impervious/ Parcel	% of Total Impervious Area	Est. Fee $/1,000 Sq. Ft.	Estimated Amount of Fees / Year	% of Total Revenue	Est. Fee / Unit	Monthly $/1,000 Sq.Ft.
< 10%	456	236,938,699	4,993,775	2.1%	2.3%	**$15.27**	$76,274	1.9%	$167	$1.27
> 10% < 25%	166	43,864,924	7,284,094	16.6%	3.4%	$16.04	$116,819	2.9%	$704	$1.34
> 25% < 40%	525	44,047,858	14,495,605	32.9%	6.8%	$16.84	$244,098	6.1%	$465	$1.40
> 40% < 60%	954	58,350,052	28,950,820	49.6%	13.5%	$17.68	$511,892	12.8%	$537	$1.47
> 60% < 80%	460	66,242,871	46,903,739	70.8%	21.8%	$18.57	$870,791	21.7%	$1,893	$1.55
> 80%	1,141	126,502,082	112,051,378	88.6%	52.2%	$19.49	$2,184,304	54.6%	$1,914	$1.62
TOTAL [1]	**3,702**	**575,946,486**	**214,679,411**	**37.3%**	**100.0%**	**$18.65**	**$4,004,178**	**100.0%**	**$1,082**	**$1.55**

Source: New Jersey Department of Environmental Land Use 2002

[1] *Grand Total excluding wetlands, waterways, forest, major roads (except the NJ Turnpike), bridges and phragmites urban areas.*

Amount differential between residential categories = 5%

V. RECOMMENDATIONS

Given the major flooding problems currently facing the municipalities of the Meadowlands District, and the potential for an increase in the number of flooding issues in the future, we conclude that it would be beneficial to establish an independent Stormwater Utility to manage District-wide stormwater flows.

A. BENEFITS OF A STORMWATER UTILITY IN THE DISTRICT

A Stormwater Utility would benefit the Meadowlands District by:

1. Improving the region's economic vitality through reduction of business interruption due to commercial downtime resulting from avoidable flooding events

2. Dealing more effectively and efficiently with stormwater flows on a District-wide basis and providing BMP information to municipalities and property owners

3. Providing more frequent maintenance for the District's existing stormwater infrastructure to ensure it is in consistent operational condition

4. Establishing the ability to obtain funding required for needed long-term capital improvements in the District's stormwater infrastructure

5. Providing a stable and dedicated funding stream to pay for District stormwater infrastructure improvements, and by independently ranking District-wide infrastructure priorities

6. Having a single entity with the ability to coordinate with the appropriate regulatory agencies and permitting authorities, thus improving the District's ability to respond to flooding issues

7. Establishing a long-term planning process to address flooding issues, which will potentially become more complicated if sea levels continue to rise

B. ISSUES TO BE ADDRESSED IN ESTABLISHING A STORMWATER UTILITY

Major questions to be addressed in forming a District Stormwater Utility include:

1. Determining the controlling authority(s) - should the NJMC be the controlling authority, and if so, what regulatory changes, if any, would be prudent?

2. Formulation of an appropriate fee structure for the variety of District land use types, including a Credit Program and determination of whether there are any properties exempted from the utility fee

3. Deciding whether and/or how to integrate portions of District municipalities, which lie outside of the District boundaries, into the activities and/or fee structure of a District Stormwater Utility

4. ***CSOs -*** Municipal initiatives to separates the existing CSOs should be integrated with existing stormwater infrastructure to ensure that changes in hydrological flows post-separation have no negative affects on the District flood problems.

C. FINANCIAL PLANNING ISSUES

This feasibility study was performed to provide preliminary guidance to the NJMC to engage in stakeholder discussions about organizing a Stormwater Utility for the Meadowlands District. To implement this feasibility study most effectively the following recommendations are important:

1. ***Development of Key Policies***: The final acceptable rate methodology will depend on policies developed through in-depth stakeholder meetings. Critical questions to be decided include: should any category of properties be excluded from Stormwater Utility fees, definition of user categories, adoption of a rate formula, approval of a fee-reduction Credit Program, determination of penalty situations and fees.

2. ***Verification of Parcel Information***: Before a final fee methodology and rates can be determined, individual parcel information would need to be fully verified. It is standard procedure to verify parcel information in the field when implementing a Stormwater Utility. Information utilized in this study was provided by the NJMC and the NJDEP based on GIS and partial tax code data.

3. ***Conduct an In-Depth Rate Study***: As noted in this report, the estimated revenue and resulting rates were simply based on preliminary estimates of service costs. As part of the implementation process, an in-depth rate study needs to be conducted to properly assess revenue capacity. This should include: stakeholder involvement to establish rate and service policies; identification of secondary funding sources; definition of the service area and verification of property data (See Appendix 2).

4. ***Research & Secure Funding Sources***: Identifying alternative funding sources will be important to provide support for needed capital projects and the start-up costs of a Stormwater Utility in the District. Alternative funding can help mitigate the cost burden on the District rate payers.

5. ***Assess Billing Options & Costs***: While excluded by the NJMC from the scope of this Feasibility Study, the costs for administration and billing options of a stormwater utility need to be evaluated in detail. The NJMC has established financial systems with the 14 District municipalities for other purposes, and these existing systems should be considered for billing purposes, as well as other billing alternatives customary in the industry.

VI. BACKGROUND, ENGINEERING, & FINANCIAL REFRENCES CITED

1. AMEC. Town of Chapel Hill Stormwater Management Program Funding Analysis, Cost of Service and Rate Analysis. Section 5 Rate Study pg. 50.

2. Black and Veatch Corporation, "Stormwater Utility Survey, 2001-2002." Data complied by AMEC.

3. CASQA. California Stormwater Quality Association, 2003. California Stormwater BMP Handbook. January, 2003.

4. Columbia University 2007. http://www.ccsr.columbia.edu/information/hurricanes

5. Cooper, Matthew J.P, M.D. Beevers, and M. Oppenheimer. Future Sea Level Rise and the New Jersey Coast- Assessing Potential Impacts and Opportunities. Science, Technology and Environmental Policy Program, Woodrow Wilson School of Public and International affairs, Princeton University, November 2005

6. Debo, Thomas N. and Andrew Reese, 2002. Municipal Stormwater Management. CRC Press, November 2002

7. Florida Stormwater Association. "Establishing a Stormwater Utility in Florida. 2003.

8. Institute for Water Resources, a division of the American Public Works Association, "Urban Stormwater Management," 1991.

9. Lenhart, James H. and R. Harbaugh, 2000. *Maintenance of Stormwater Quality Treatment Facilities.*, http://www.stormwaterinc.com/pdfs/maintenance_facil.pdf, September 13, 2000.

10. Mineart, P. and S. Singh, 1994. Storm Inlet Pilot Study. Alameda County Urban runoff Clean Water Program, Oakland, CA.

11. NAVD88. North American Vertical Data of 1988. USGS.

12. New Jersey Department of Environmental Protection, Recommendations for Implementation of a Stormwater Utility in New Jersey, 2005

13. New Jersey Meadowlands Commission, Hackensack Meadowlands Tide Gates Inspection Report, March 27, 2006

14. New Jersey Meadowlands Commission, Hackensack Meadowlands Floodplain Management Plan, October 24, 2005

15. New Jersey Meadowlands Commission. A Fishery Resource Inventory of the Lower Hackensack River within the Hackensack Meadowlands District: A Comparative Study 2001-2003 vs. 1987-1988.

16. National Association of Flood and Stormwater management Agencies (NSFM), "Guidance for Municipal Stormwater Funding," 2006.

17. Pioneer Valley Planning Commission (Massachusetts). "How to Create a Stormwater Utility," 1999.

18. Psuty, N. P. and Ofiara, D. D.: 2002, coastal hazard Management, Lessons and Future Directions from New Jersey, Rutgers University Press, New Brunswick, NJ.

19. Quinn, John R., Fields of Sun and Grass, An artist's Journal of the New Jersey Meadowlands. Rutgers University Press, 1997

20. USACE. Hudson-Raritan Estuary Environmental Restoration Feasibilty Study -Newark Bay Hackensack River/Passaic River Study Area Report. U.S. Army Corps of Engineers New York District, June 2004

21. USACE. New Jersey Hurricane Evacuation Study Draft Storm Surge Map U.S. Army Corps of Engineers Philadelphia District, June 2005

22. USACE. Hackensack Meadowlands Project Fact Sheet. U.S. Army Corps of Engineers New York District, November 2005

23. US Fish & Wildlife. Significant Habitats and Habitat Complexes of the New York Bight Watershed. 1997. http://training.fws.gov/library/pubs5/begin.htm.

24. WMA5. 2006. Watershed Management Area 5 Characterization and Assessment Final Report. Bergen County Department of Health Services. Paramus, NJ.

25. References, parcel data, GIS data, and stormwater utility reports and studies utilized for this study are available on the web site www.rerc.rutgers.edu.

VII. APPENDICES

APPENDIX 1.

A. FEMA MAPS (Firm Panels 245, 252-254, 256-259, 261, 263-264, 266-268, 307, 331-332)

B. HACKENSACK MEADOWLANDS TIDEGATE INSPECTION REPORT (PAGES 6-9, SECTION 3)

Summary of Conditions for all Water Control Structures						
	Overall Functionality			Maintenance Required		
	Fully Functional	Functional with Restrictions	Non-Functional	Immediate	Repair	Continued Upkeep
District	19	9	6	7	8	19
Carlstadt[1,2]	3	3	1	3	1	3
Kearny[3]	5	2	2	1	3	5
Little Ferry	2	0	0	0	1	1
Moonachie	0	1	0	0	1	0
North Arlington[4]	0	0	0	0	0	0
Ridgefield	1	0	0	0	0	1
Rutherford	0	0	1	1	0	0
Secaucus[5]	8	2	2	2	2	8
Teterboro	0	1	0	0	0	1
Total	19	9	6	7	8	19

Notes:

1. Lower Muddabach Creek Tide Gate inspection pending acceptable weather conditions.
2. J.P. Smith Tide Gate may be removed from inspection schedule. Please refer to its corresponding section for memo.
3. Trumbull Asphalt Tide Gate may be removed from inspection schedule. Please refer to its corresponding section for memo.
4. Kingsland Creek Tide Gate may be removed from inspection schedule. Please refer to its corresponding section for memo.
5. Golden Avenue Pump Station was not inspected. Please refer to its corresponding section for memo.

Summary of Conditions for all Water Control Structures

	Overall Functionality			Maintenance Required			Comments
	Fully Functional	Functional with Restrictions	Non-Functional	Immediate	Repair	Continued Upkeep	
Carlstadt							
Broad Street & 20th Street Tide Gate			X	X			Area is prone to flooding
Dell Road Tide Gate	X					X	
East Riser Tide Gates		X		X			Will be in Army Corps' scope of work in 2006
J.P. Smith Tide Gate							Decommissioned
Lower Muddabach Tide Gate							Inspection pending acceptable weather conditions
Moonachie Creek Tide Gates	X					X	
Peach Island Creek Tide Gates		X		X			Gate 2 and 4 are not seating properly. Will be in Army Corps' scope of work in 2006
Waitex Tide Gate	X					X	
Yellow Freight Tide Gates		X			X		Will be in Army Corps' scope of work in 2006
Kearny							
Belezza Tide Gate			X		X		Tide gate jammed open; debris throughout area
Bergen Avenue Tide Gate	X					X	
Cayuga Dike Pump Station & Tide Gates			X	X			Please see inspection report.
Dead Horse Creek Tide Gates	X					X	
Fish House Road Tide Gate		X			X		
Frank's Creek Tide Gates		X			X		Debris jamming tide gate open
Harrison Avenue Tide Gate	X					X	
Standard Chlorine Tide Gate	X					X	
Trumbull Asphalt Tide Gate							Decommissioned
USPS Tide Gate	X					X	
Little Ferry							
DePeyster Creek Pump Station & Tide Gate	X					X	
Losen Slote Pump Station & Tide Gates	X				X		

Summary of Conditions for all Water Control Structures

	Overall Functionality			Maintenance Required			Comments
	Fully Functional	Functional with Restrictions	Non-Functional	Immediate	Repair	Continued Upkeep	
Moonachie							
West Riser Tide Gates		X			X		Part of the tide gate's foundation is undermining; Will be in Army Corps' scope of work in 2006
North Arlington							
Kingsland Creek Tide Gate							Tide gate have been removed; Decommissioned
Ridgefield							
Overpeck Creek Tide Gate	X					X	
Rutherford							
Rutherford Tide Gates			X	X			Currently in design phase with Army Corps
Secaucus							
Acorn Road Tide Gate	X					X	
Born Street Pump Station & Tide Gates	X					X	
Farm Road Tide Gate		X			X		Tide gate is not seating properly
Golden Avenue Pump Station	n/a	n/a	n/a	n/a	n/a	n/a	Currenly under construction; no inspection completed
Koelle Boulevard Tide Gate	X					X	
Meadowlands Parkway Tide Gate	X					X	
Mill Ridge Road Tide Gates	X					X	
Penhorn Creek Pump Station			X	X			Primer pipe must be replaced
River Road Tide Gates & Pump Station	X					X	
Route 3 West DOT Tide Gate	X					X	
Secaucus High School Pump Station	X					X	
St. Paul's Avenue Tide Gates & Pump Station		X			X		New pumps are needed.
Syms Tide Gate			X	X			Flap gate is not seating properly
Teterboro							
Teterboro Pump Station		X				X	New pump station is currently under construction

Summary of Conditions for Tide Gate Structures						
	Overall Functionality			Maintenance Required		
	Fully Functional	Functional with Restrictions	Non-Functional	Immediate	Repair	Continued Upkeep
District	14	7	4	5	6	14
Carlstadt[1,2]	3	3	1	3	1	3
Kearny[3]	5	2	1	0	3	5
Little Ferry	0	0	0	0	0	0
Moonachie	0	1	0	0	1	0
North Arlington[4]	0	0	0	0	0	0
Ridgefield	1	0	0	0	0	1
Rutherford	0	0	1	1	0	0
Secaucus	5	1	1	1	1	5
Teterboro	0	0	0	0	0	0
Total	14	7	4	5	6	14

Summary of Conditions for Pump Station Structures						
	Overall Functionality			Maintenance Required		
	Fully Functional	Functional with Restrictions	Non-Functional	Immediate	Repair	Continued Upkeep
District	5	2	2	2	2	5
Carlstadt	0	0	0	0	0	0
Kearny	0	0	1	1	0	0
Little Ferry	2	0	0	0	1	1
Moonachie	0	0	0	0	0	0
North Arlington	0	0	0	0	0	0
Ridgefield	0	0	0	0	0	0
Rutherford	0	0	0	0	0	0
Secaucus[5]	3	1	1	1	1	3
Teterboro	0	1	0	0	0	1
Total	5	2	2	2	2	5

Notes:

1. Lower Muddabach Creek Tide Gate inspection pending acceptable weather conditions.
2. J.P. Smith Tide Gate may be removed from inspection schedule. Please refer to its corresponding section for memo.
3. Trumbull Asphalt Tide Gate may be removed from inspection schedule. Please refer to its corresponding section for memo.
4. Kingsland Creek Tide Gate may be removed from inspection schedule. Please refer to its corresponding section for memo.
5. Golden Avenue Pump Station was not inspected. Please refer to its corresponding section for memo.

C. FEMA FLOODPLAIN MANAGEMENT (PAGES 194-196, SECTION 6)

Revisions to Meadowlands Zoning Regulations

As detailed in Section 3.2, the NJMC has proposed changes to the District Zoning Regulations, N.J.A.C. 19:4. These changes were prompted by New Jersey's NFIP Coordinator at the Bureau of Dam Safety and Flood Control, as well as comments from the Plan and Interagency Committees. These proposed changes are awaiting approval via the New Jersey Office of Administrative Law (OAL).

6.1.1. N.J.A.C. 19:4-4.4

A subsection has been proposed that requires the submission of the elevation to which floodproofing is provided in structures that require such measures. Additionally, a subparagraph has been proposed to clarify the requirement for a submittal of a licensed-professional's certification regarding the floodproofing methods used in nonresidential structures. These changes were proposed to be consistent with FEMA's model flood plain management regulations.

6.1.2. N.J.A.C. 19:4-8.6

The proposed changes include a revision to allow the use of vegetated channels to convey stormwater runoff. This proposed additional language provides greater flexibility to design professionals and, by permitting surface stormwater collection and conveyance systems, serves to improve the quality of stormwater runoff and to increase the likelihood of proper maintenance. Grass swales and other vegetated channels have a reported capacity to reduce the level of suspended solids in stormwater runoff.

The proposed revision more specifically defines what hydrologic and hydraulic studies are necessary to verify the capacity of receiving stormwater collection systems. This proposed revision provides for uniformity in the level of detail required of design professionals to demonstrate that proposed stormwater systems will not increase downstream flooding when using an existing collection system. This revision also allows the design professional the option of not completing a capacity study provided that peak flows do not increase.

An important revision mentioned in Section 3.2 is a clarification on the requirement that new development or redevelopment shall maintain existing drainage patterns. Specifically, construction may not block existing drainage systems or overland flow patterns to the detriment of neighboring properties for storms of up to the 25-year event.

Specific design criteria have also been proposed to more specifically define the expectations of the NJMC regarding the methodologies employed in submitted stormwater hydrologic and hydraulic analyses. These criteria include the following:

1. Language is clarified to specify the source of the rainfall data to be used for the development of rainfall intensities and/or rainfall depths for the 25-year design storm and the NJDEP Water Quality Storm. There is no change to the storms that must be addressed; rather, this addition is meant to assist design professionals in locating the required sources of rainfall design data.
2. The proposed description of the appropriate use of the Rational and Modified Rational Method for peak flow and peak runoff volume determination has been revised to conform with the description of in the guidance manual

"Standards for Soil Erosion and Sediment Control" promulgated by the New Jersey State Soil Conservation Committee. Specifically, an antecedent precipitation factor has been incorporated into the runoff coefficient and is also included in Figure 8-2. This multiplier accounts for soil saturation during larger storms, such as the 25-year event. This change will have no impact to impervious lots as the multiplier only impacts pervious cover.

3. The proposed description of allowable methodologies for developing the time of concentration for watersheds has been updated to reflect the maximum sheet flow length of 150 feet dictated by the NJDEP and the federal Natural Resources Conservation Service (NRCS). This proposed revision is minor and merely clarifies the maximum sheet flow length that was established by the NRCS in 1993. The clarification differentiates between a maximum sheet flow length of 150 feet for paved surfaces and 100 feet for vegetated surfaces.

4. Language is proposed regarding pressure flow. Specifically, stormwater pipe is not typically designed to carry stormwater under pressure, as pipe joints may open up. The proposed addition states that stormwater pipe systems may not operate under pressure unless justified by the design professional and approved by the NJMC.

5. Language is added to clarify the hydraulic calculations required when a stormwater outfall is in tidal waters. Specifically, a statement has been added that the backwater condition generated by the mean high water (MHW) in tidally-influenced waters needs to be analyzed. This statement clarifies to the design professional the appropriate tailwater elevation to be analyzed in conjunction with tidal areas that require tide gates.

6.2 Open Space Priorities

The NJMC reviewed the location of vacant lands in the District in conjunction with the 25-year floodplain. The data nodes from the 2005 Bergen County Flood Insurance Study, effective September 30, 2005, include only the 10-year, 50-year, 100-year and 100-year tidal surge elevations. As such, a regression was performed on each of the study's nodes by the NJMC following receipt of the report from FEMA to interpolate, as accurately as possible, the 25-year surge elevation. The data was then converted from NGVD29 to NAVD88.

These data points were then modified, with high-resolution digital topographic data and ArcMap GIS software, into a boundary map of the extents of the 25-year flood area. A layer of the vacant lands was projected through the above boundaries to identify Properties of Interest (POI).

POIs that were eliminated included sites smaller in size that 0.15 acres, properties owned by the NJMC, and isolated properties. The findings are presented below in Table 6-x. Note that this table represents the initial step in identifying properties beneficial to the goals listed in Section 5.0 and will need to be further refined and updated with this Plan on a regular basis.

Preference should be placed on wetland areas and properties bordering established wetlands based upon the demonstrated ability of such features to reduce flooding, provide critical habitat, and improve overall water quality. Note that the NJMC adopted a Master Plan in January 2004 that protects 8,400 undeveloped acres of wetlands within the District.

TABLE A.

NJMC - Est. Stormwater Operating & Maintenance Costs

4/26/07

O+M of Existing

Staff Salaries	No. People	Salary	Salary	Fringe	Annual Costs
Director	1	$100,000	$100,000	33%	$133,000
Supervisory Stormwater Engineer	1	$90,000	$90,000	33%	$119,700
Stormwater Engineer	1	$65,000	$65,000	33%	$86,450
Stormwater Engineer	0	$0	$0	33%	$0
Flood proof expert	0	$0	$0	33%	$0
Flood proof assistant	0	$0	$0	33%	$0
GIS Specialist	1	$45,000	$45,000	33%	$59,850
Maintenance specialist	0	$0	$0	33%	$0
Maintenance specialist	0	$0	$0	33%	$0
Equipment operator	9	$38,000	$342,000	33%	$454,860
Technician	2	$30,000	$60,000	33%	$79,800
Administrative Assistant	1	$45,000	$45,000	33%	$59,850
Accounting Manager	1	$60,000	$60,000	33%	$79,800
Contract administrator	0	$0	$0	33%	$0
Total	17		$807,000		$1,073,310

Administration / Overhead	10.0% [b]	$181,257

Repairs and Maintenance	No. of Units	Cost/unit	
Catch basins			$15,000
Stormsewer repair			$20,000
Tide gates			$0
Implement Flood Control			$0
Total			$35,000

Equipment Operating & Maintenance	No. of Units	Cost/unit	
Vactor Truck O&M	6	$15,000	$90,000
Lg. Sweeper O&M	10	$15,000	$150,000
Sm. Sweeper O&M	4	$7,500	$30,000
Video Camera Truck O&M	0	$0	$0
Jet Truck O&M	0	$0	$0
Backhoe O&M	0	$0	$0
Dump Truck O&M	0	$0	$0
Pickup Truck O&M	0	$0	$0
Total			$270,000

Equipment Capex	No. of Units	Vehicle Cost	
Vactor Trucks	6	$150,000	$900,000 [a]
Large sweepers (regenerative air)	10	$150,000	$1,500,000
Small sweepers	4	$30,000	$120,000
Portable Pumps	4	$2,500	$10,000
Video camera truck	0	$0	$0
Jet truck	0	$0	$0
Backhoe	0	$0	$0
Dump Truck	0	$0	$0
Pickup Truck	0	$0	$0
Total			$2,530,000
Annual Capitalization	10	years	$253,000

Total Annual Cost	$1,812,567

Assumptions

Semi-Annual cleanout of catchbasins	5,000	NJMC owns and operates equipment
Weekly street sweeping		Annual inspection of tide gates and pumps
Development acres	10,000	Repair of catch basins
(a) Assumes 750-1000 catch basins		Repair of sewers and ditch cleaning
cleaned per year per truck.		Replacement/repair of 1+ tide gate or pump per year
(b) Estimate from the NJMC April 2007.		

TABLE B.

NJMC - Est. Stormwater Operating & Maintenance Costs

4/26/07

O+M of Existing Plus Minimum Capital Expenditures

Staff Salaries	No. People	Salary	Salary	Fringe	Annual Costs
Director	1	$100,000	$100,000	33%	$133,000
Supervisory Stormwater Engineer	1	$90,000	$90,000	33%	$119,700
Stormwater Engineer	1	$75,000	$75,000	33%	$99,750 [b]
Stormwater Engineer	1	$65,000	$65,000	33%	$86,450
Flood proof expert	0	$0	$0	33%	$0
Flood proof assistant	0	$0	$0	33%	$0
GIS Specialist	1	$45,000	$45,000	33%	$59,850
Maintenance specialist	1	$60,000	$60,000	33%	$79,800
Maintenance specialist	1	$50,000	$50,000	33%	$66,500
Equipment operator	9	$38,000	$342,000	33%	$454,860
Technician	3	$30,000	$90,000	33%	$119,700
Administrative Assistant	1	$45,000	$45,000	33%	$59,850
Accounting Manager	1	$60,000	$60,000	33%	$79,800
Contract administrator	1	$50,000	$50,000	33%	$66,500
Total	22		$1,072,000		$1,425,760

Administration / Overhead	10.0% [c]	$400,418

Repairs and Maintenance	No. of Units	Cost/unit	
Catch basins			$25,000
Stormsewer repair			$30,000
Tide Gates			$1,500,000
Implement Flood Control			$0
Total			$1,555,000

Equipment Operating & Maintenance	No. of Units	Cost/Unit	
Vactor Truck O&M	6	$15,000	$90,000
Lg. Sweeper O&M	10	$15,000	$150,000
Sm. Sweeper O&M	4	$7,500	$30,000
Video Camera Truck O&M	1	$10,000	$10,000
Jet Truck O&M	1	$12,000	$12,000
Backhoe O&M	1	$7,500	$7,500
Dump Truck O&M	1	$10,000	$10,000
Pickup Truck O&M	2	$6,000	$12,000
Total			$321,500

Equipment Capex	No. of Units	Cost/Unit	
Vactor Trucks	6	$150,000	$900,000 [a]
Large sweepers (regenerative air)	10	$150,000	$1,500,000
Small sweepers	4	$30,000	$120,000
Portable Pumps	4	$2,500	$10,000
Video camera truck	1	$75,000	$75,000
Jet truck	1	$150,000	$150,000
Backhoe	1	$110,000	$110,000
Dump Truck	1	$100,000	$100,000
Pickup Truck	2	$25,000	$50,000
Total			$3,015,000
Annual Capitalization	10	years	$301,500

Total Annual Cost	$4,004,178

Assumptions

Semi-Annual cleanout of catchbasins	5,000	NJMC owns and operates equipment
Weekly street sweeping		Annual inspection of tide gates and pumps
Development acres	10,000	Repair of catch basins
(a) Assumes 750-1000 catch basins cleaned per year per truck.		Repair of sewers and ditch cleaning
(b) Planning and coordination		Replacement/repair of 1+ tide gate or pump per year
(c) Estimate from the NJMC April 2007.		

TABLE C.

NJMC - Est. Stormwater Operating & Maintenance Costs — 4/26/07

O+M of Existing Plus Maximum Capital Expenditures

Staff Salaries	No. People	Salary	Salary	Fringe	Annual Costs
Director	1	$100,000	$100,000	33%	$133,000
Supervisory Stormwater Engineer	1	$90,000	$90,000	33%	$119,700
Stormwater Engineer	1	$75,000	$75,000	33%	$99,750 (b)
Stormwater Engineer	2	$65,000	$130,000	33%	$172,900 (c)
Flood proof expert	1	$75,000	$75,000	33%	$99,750
Flood proof assistant	1	$50,000	$50,000	33%	$66,500
GIS Specialist	1	$45,000	$45,000	33%	$59,850
Maintenance specialist	1	$60,000	$60,000	33%	$79,800
Maintenance specialist	2	$50,000	$100,000	33%	$133,000
Equipment operator	9	$38,000	$342,000	33%	$454,860
Technician	4	$30,000	$120,000	33%	$159,600 (c)
Administrative Assistant	1	$45,000	$45,000	33%	$59,850
Accounting Manager	1	$60,000	$60,000	33%	$79,800
Contract administrator	1	$50,000	$50,000	33%	$66,500
Total	27		$1,342,000		$1,784,860

Administration / Overhead	10.0% (d)	$666,707

Repairs and Maintenance	No. of Units	Cost/unit	
Catch basins			$25,000
Stormsewer repair			$30,000
Tide Gates			$0
Implement Flood Control			$3,500,000
Total			$3,555,000

Equipment Operating & Maintenance	No. of Units	Cost/Unit	
Vactor Truck O&M	6	$15,000	$90,000
Lg. Sweeper O&M	10	$15,000	$150,000
Sm. Sweeper O&M	4	$7,500	$30,000
Video Camera Truck O&M	1	$10,000	$10,000
Jet Truck O&M	1	$12,000	$12,000
Backhoe O&M	1	$7,500	$7,500
Dump Truck O&M	2	$10,000	$20,000
Pickup Truck O&M	4	$6,000	$24,000
Total			$343,500

Equipment Capex	No. of Units	Cost/Unit		
Vactor Trucks	6	$150,000	$900,000	(a)
Large sweepers (regenerative air)	10	$150,000	$1,500,000	
Small sweepers	4	$30,000	$120,000	
Portable Pumps	6	$2,500	$15,000	
Video camera truck	1	$75,000	$75,000	
Jet truck	1	$150,000	$150,000	
Backhoe	1	$110,000	$110,000	
Dump Truck	2	$100,000	$200,000	
Pickup Truck	4	$25,000	$100,000	
Total			$3,170,000	
Annual Capitalization	10	years	$317,000	

Total Annual Cost	$6,667,067

Assumptions

Semi-Annual cleanout of catchbasins	5,000	NJMC owns and operates equipment
Weekly street sweeping		Annual inspection of tide gates and pumps
Development acres	10,000	Repair of catch basins
(a) Assumes 750-1000 catch basins cleaned per year per truck.		Repair of sewers and ditch cleaning
(b) Planning and coordination		Replacement/repair of 1+ tide gate or pump per year
(c) Includes a water quality specialist.		Implementation of Flood control Plan over 10 years
(d) Estimate from the NJMC April 2007.		

TABLE D.

Relevant Caselaw from Other States

Caveat: this is not an exhaustive review of the decisional law in all 50 states, and of course does not address the arguably more relevant statutory law.

Case	State	Year	Criteria Distinguishing Tax vs. Fee	Holding
Carson v. City of Fort Lauderdale, 244 So.2d 485 (Fla. App. 1971)	Florida	1971	Benefit to Landowner	In consolidated cases, the court held that (1) assessments for sanitary sewers were imposed on all property in the sanitary sewer district on a square-foot basis was proper and the assessments did not exceeded the benefits to the property and (2) assessments for stormwater facilities were valid because all properties in the assessment district benefited, even those that benefited indirectly because they were on higher ground that had good percolation.
Long Run Baptist Ass'n Inc. v. Louisville and Jefferson County Metro. Sewer Dist, 775 S.W.2d 520 (Ky. App. 1989)	Kentucky	1989	Benefit to Landowner	The court held that stormwater sewer charge was not a tax but was a valid fee for services. Benefits do not have to be precisely quantifiable; any property in a particular watershed can be said to have derived an indirect benefit from the stormwater system if there is an overall improvement in health, comfort, convenience and enhanced property values. Service charges do not have to be uniform.
City of Wooster v. Graines, 556 N.E.2d 1163 (Ohio 1990)	Ohio	1990	Proportionality	The court held that stormwater rates may generate surplus funds as long as the excess money is not diverted for other purposes.

City of Boca Raton v. State, 595 So.2d 25 (Fla. 1992)	Florida	1992	Benefit to Landowner; Proportionality	The court found that stormwater fee was not an illegal tax, because cities having home rule authority in Florida are not necessarily limited to statutory procedure for imposing special assessments, but could devise their own systems by local ordinance. With that preliminary issue out of the way, the court upheld the validity of an assessment for the costs of a redevelopment district, measured by the increase in the assessed property value as a result of the project.
Dennehy v. City of Gresham, 12 OTR 194 1992 WL 89901 (Or. Tax 1992)	Oregon	1992	Voluntariness	The court found the fee invalid because owners could only avoid the fee by removing all impervious surfaces.
Sarasota County v. Sarasota Church of Christ, Inc., 667 So. 2d 180 (Fla. 1995)	Florida	1995	Voluntariness; Proportionality; Benefit to Landowner	The Court found the stormwater fees were not taxes and that all of the specially-assessed properties, including the Church, "burdened" the stormwater system. The court concluded that stormwater utility services provided special benefit to developed properties within service area of stormwater facility, and that assessment was valid because it applied to those that contributed most of the stormwater runoff and not to undeveloped property, and the properties assessed received a benefit from the service. NB: This case blurs the historic distinction between user fees (commensurate with burden) and special assessments (commensurate with benefit).

Kentucky River Auth. v. City of Danville, 932 S.W. 2d 374 (Ky. App. 1996).	Kentucky	1996	Benefit to Landowner	The court held that fee assessed by Authority was not unconstitutional tax. It was related to benefit received by city through efforts of Authority to preserve Kentucky River water basin, and benefits do not have to be precisely quantifiable. Any property in a particular watershed can be said to have derived an indirect benefit from the stormwater system if there is an overall improvement in health, comfort, convenience and enhanced property values.
Harris v. Wilson, 693 So.2d 945 (Fla. 1997)	Florida	1997	Benefit to Landowners; Proportionality	In a challenge involving an assessment for solid waste collection from an unincorporated part of a town, the court rejected claim that it was an invalid tax, and held that assessed properties specially benefited from assessment, and assessment was properly apportioned.
Lake County v. Water Oak Management Corp., 695 So.2d 667 (Fla. 1997)	Florida	1997	Benefit to Landowner	The court upheld a special assessment for fire protection services because the properties assessed received a special benefit through lower insurance premiums and enhanced property values.
Bolt v. City of Lansing, 587 N.W. 2d 264 (Mich. 1998)	Michigan	1998	Benefit to Landowner; Voluntariness	The court rejected a new stormwater charge, holding that it was an invalid tax because it applied to all owners and not only those who would benefit from the stormwater system. Property owners had no choice whether to use the service and were unable to affect the level of their fee except by building less on their land.

Smith Chapel Baptist Church v. City of Durham, 517 S.E. 2d 874 (N.C. 1999)	North Carolina	1999	Proportionality; Use of Fees	The court rejected a stormwater fee as invalid because the charges were not completely directed towards or used for maintaining, planning or implementing a stormwater facility.
Collier County v. State, 733 So.2d 1012 (Fla. 1999)	Florida	1999	Benefit to Landowner	The court rejected fees for general government services as an invalid tax because the general services were provided to all other citizens and properties and hence there was no "special" assessable benefit. The "interim government services fee" in question was designed to recoup the costs of services to newly-developed property during the period (often more than a year) before property taxes can be collected. The "fee" was clearly designed to substitute for lost taxes and was applied to many municipal services.
City of Gainesville v. State of Florida Department of Transportation, 778 So. 2d 519 (Fla. App. 2001)	Florida	2001	Benefit to Landowner; Voluntariness	The court rejected a claim by the state that a municipality's stormwater utility ordinance imposed a "special assessment" from which state properties are exempt. Rather, the voluntary nature of the charges was characteristic of user fees, which are not subject to sovereign immunity.

Densmore v. Jefferson County, 813 So. 2d 844 (Ala. 2001)	Alabama	2001	Benefit to Landowner	The court upheld a stormwater fee even for those not receiving a direct benefit from the stormwater system because "the pollution of [public] waters and the beneficial results to be obtained by the elimination of the pollution will be a public benefit to the entire community." The county's fee to fund storm water management program was not a "tax" designed to raise revenue.
Howard Jarvis Taxpayers Ass'n v. City of Salinas, 121 Cal. Rptr.2d 228 (Cal. App. 2002)	California	2002	Voluntariness	The court rejected a stormwater charge that applied to every developed piece of land and was. Not measured by usage. The fee was not a "fee related to sewer and water services," and thus did not fall into the exception to the voter-approval requirements for new taxes.
City of Gainesville v. State, 863 So.2d 138 (Fla. 2003)	Florida	2003	Voluntariness; Proportionality	The court upheld the application of a stormwater charge to the State and Department of Transportation because it was a user fee, not a special assessment. The charges were on a monthly basis and depended on usage. The court also found that the fee structure was reasonable, as it was based on the amount of impervious area on each property.
McLeod v. Columbia County, 599 S.E.2d 152 (Ga. 2004)	Georgia	2004	Benefit to Landowner; Proportionality	The court upheld a stormwater charge. It is not a tax because it applies to residential and non-residential developed property, but not to undeveloped property. The properties charged received a benefit from the services, and the charge was properly apportioned based primarily on impervious surface.

APPENDIX 2.

A. FINANCIAL ASSUMPTIONS NEEDED

List of financial and operating assumptions requiring further analysis to prepare a long-term financial forecast and compatible rate study:

1. Program policies regarding land use class exclusions, credit programs, surcharges, fee methodology, included territories, base rate, etc.

2. Program growth rates, such as the amount of development and impervious area, as well as, inflation and increased regulation

3. Other operating expenses, such as professional services (e.g. legal, accounting, consulting), administrative, billing, insurance, utilities, supplies, education, marketing and bad debt expenses

4. Alternative financing sources available and relative funding costs (i.e. issuance and interest costs)

5. Contingency reserves, mandatory fund balances, and maintenance funds

6. Utility rate increase policies

7. Revenue reductions from Credit Programs