SPUR

STORMWATER FEES

An Equitable Path to a Sustainable Wastewater System

SPUR REPORT

The SPUR Board of Directors reviewed, debated and adopted this report as official policy on November 14, 2012.

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SUMMARY

The San Francisco Public Utilities Commission's (SFPUC) current water and sewer rate structure covering fiscal years 2010 to 2014 is drawing to a close and a new multi-year rate study is in progress. To create a more equitable system in which ratepayers become responsible for the impact their properties have on sewer infrastructure and the environment, SPUR recommends:

- The SFPUC should reallocate wastewater rates to include a stormwater fee beginning in the 2014 rate cycle. The fee may be based upon factors such as parcel size, impervious surface, and land use - options illustrated by case studies in this memo.
- The SFPUC should create an incentive program to support the installation of sustainable on-site stormwater management practices, to help customers reduce stormwater management fees and to create environmental benefits.

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WATER AND SEWER RATES IN SAN FRANCISCO

The San Francisco Public Utilities Commission's (SFPUC) current water and sewer rate structure covering fiscal years 2010 to 2014 is drawing to a close and a new multi-year rate study is in progress. Starting in spring 2014, the new rate structure will reflect necessary revenue requirements to help cover everyday operating costs as well as increased budgetary needs for capital improvement programs like the upcoming Sewer System Improvement Program (SSIP), an estimated $7 billion endeavor which will be primarily paid for by gradual increases in sewer rates over thirty years.

SFPUC retail customers currently pay water rates based upon the size of their water meter and overall water consumption. Wastewater rates are based on discharge units which are calculated by multiplying the customer's metered water use by the customer's flow factor, which is the quantity of metered water use returned to the sewer system as wastewater. However, this wastewater rate structure only captures a portion of what actually enters the sewer system. Since San Francisco has a combined sewer system (CSS), stormwater runoff from impervious surfaces like streets, rooftops, and parking lots mixes with wastewater and travels through miles of underground tunnels to one of the city's three wastewater treatment facilities. Accommodating stormwater is a major element of the system's overall infrastructural design and capacity, yet there is currently no economic mechanism for private properties to reduce stormwater flows into the combined system.[1] While an average of 20 percent of annual inflows to the CSS consist of stormwater, the SFPUC's wastewater rates do not currently separate out stormwater charges.

In light of the projected future rate increases and rate study underway, SPUR is renewing its longstanding recommendation[2] that the SFPUC reallocate a portion of the wastewater rate to reflect stormwater flows coming off of the individual ratepayer's parcel, paired with an incentive program for onsite stormwater management practices. This amended structure would have many benefits; it would not only provide a stable revenue stream to help pay for expensive infrastructure updates, but it also would more equitably charge customers for their properties' impact to the sewer system. In addition, a properly designed stormwater rate structure would create incentives for customers to install on-site green infrastructure, or Low Impact Development (LID) techniques, such as permeable pavement, raingardens, rainwater cisterns, or green roofs. LID not only decreases and/or treats stormwater flows into the CSS, but it also beautifies our city through smart landscape design.

STORMWATER PROBLEMS AND SOLUTIONS

Combined sewer systems are designed to collect and treat both wastewater and stormwater. The inherent variability in the intensity and duration of storms makes it impossible to fully treat the combined flows generated in all rainstorms. San Francisco's system can hold more than 160 million gallons of wet weather flows in large transport and treatment boxes that surround the City. The storage capacity is exceeded an average six times a year on the westside and eleven times a year on the Bayside, but can happen more frequently during particularly rainy years. [3] When there is no more storage available, a mix of stormwater and highly diluted wastewater is released from one of thirty-six combined sewer discharge

[1] For new construction and major retrofits disturbing 5,000 square feet or more of the ground surface, projects must retain or detain a certain quantity of stormwater (defined by a "design" storm of a certain size and recurrence interval). For more information on the 2010 Stormwater Management Ordinance and Stormwater Design Guidelines (a tool to help developers comply with the ordinance), visit http://www.sfwater.org/index.aspx?page=446.

[2] November 2006, *Integrated Stormwater Management*; May 2008, *Getting Sustainability Out of the Gutters*.

[3] San Francisco Public Utilities Commission adopted Levels of Service and Goals for the Sewer System Improvement Program (SSIP), August 2012.

(CSD) points. Although the large transport and treatment boxes remove trash and some solids, they do not provide full treatment or disinfection. The SFPUC complies with all federal and state permits designed to protect water quality but major rain events still release some raw sewage and urban pollution into the Bay and ocean. These major rain events also can cause localized flooding, which potentially results in public exposure to pollution and property damage.

Under the current rate structure, wastewater rates cover stormwater costs to the sewer system. This combined bill/rate approach may create an inequitable fee distribution depending upon property type. For example, big box stores with large roofs and parking lots generally produce great quantities of stormwater runoff but pay relatively little in wastewater fees since their water usage is low. Meanwhile, hotels and high-rise buildings pay high wastewater fees due to usage but have a relatively smaller impervious footprint, therefore producing little stormwater runoff. In addition, residential parcels make up 43 percent of San Francisco's land use. On a whole, these rooftops, driveways, and setbacks contribute massive quantities of stormwater to the sewer system but customer wastewater bills do not separately account for the respective volumes of stormwater contributed by individual properties.

To create a more equitable system in which ratepayers become responsible for the impact their properties have on the sewer infrastructure and environment, SPUR recommends that the SFPUC reallocate wastewater rates to include a stormwater fee beginning in the 2014 rate cycle. The fee may be structured based on factors such as parcel size, impervious surface, and land use—case studies below illustrate how each of these may be implemented. SPUR also recommends that implementation of a new fee structure be paired with an incentive program to support the installation of sustainable on-site stormwater management practices.

Proposition 218

In California, there are complex legal issues surrounding how fees may be charged for stormwater treatment, due to Proposition 218 (1996). Under Prop 218, certain new and increased property-related fees are subject to noticing requirements and a vote. Charges for water, sewer, and refuse collection fees are not subject to the vote requirement, but are subject to a notice and protest procedure of greater than 50 percent of the property owners. Since stormwater fees would be a reallocation of wastewater rates, they could be considered a component of wastewater fees and would be subject to the protest procedure. Although Prop 218 is not specific about stormwater fees, but stormwater is a component of a combined sewer system, it is possible that stormwater fees may fall under the sewer category of Prop 218 and be exempt from voter approval.

While it complicates the ease of separating stormwater rates in California, ultimately Prop 218 is a form of ratepayer and taxpayer assurance. The below case studies from cities outside of California may have faced other legal hurdles, but these cities did not have to clear the specific and high bar of Prop 218.

Case Studies

There are approximately 1,100 cities in the United States that have integrated stormwater fees into their wastewater utility. Each city has uniquely designed their program according to their infrastructural, economical, and environmental characteristics, but in general there are three models San Francisco should examine to base a new stormwater rate structure upon:

- Gross Area and Impervious Area of parcel, under which the fee is based on the ratio of the impervious surface area to the site's total area;
- Impervious Area Charge based on Equivalent Residential Units, under which the fee is based on an average residential property's ratio of impervious-to-gross surface area;
- Land Use and Property Area, under which the fee is based on the average percentage of impervious area for the property's type of land use.

Gross Area and Impervious Area: Philadelphia, Pennsylvania

In July 2010, the Philadelphia Water Department (PWD) implemented a stormwater fee and green infrastructure incentive program to complement its federally required *Green City, Clean Waters* program, which is designed to restore and protect the health of regional rivers and streams. Philadelphia, like San Francisco, has a combined sewer system.

Previous to the rate change, PWD customers paid stormwater fees based solely on metered water usage. The new parcel-based stormwater rate structure is based on gross area and impervious area surfaces. Phased in over a four-year period to give property owners time to comply, residential property owners with five units or more and non-residential properties owners' sewer fees will decrease by 25 percent increments annually. Meanwhile, their new stormwater fees are implemented in 25 percent increments annually. The rate structure is a simple equation:

(Gross Area x Gross Area Rate) + (Impervious Area x Impervious Area Rate) = monthly fee

The GA rate is $0.528/500 square feet and the IA rate is $4.169/500 square feet.[4] For properties of 5,000 square feet or more, the PWD figures GA and IA with aerial GIS imaging and for smaller properties the IA is estimated as 85 percent of total property area if the site is developed and 25 percent if the site is undeveloped.

The PWD also created an incentive program for customers who retrofit their properties with green infrastructure like rain cisterns, bioretention basins, green roofs, and permeable pavement. Property owners who manage the entire first inch of stormwater runoff over their entire site can apply for nearly 100 percent in rate credits. The monthly minimum $13 charge prevents stormwater fees from being reduced 100 percent.

While the new stormwater rate structure was debated and analyzed for several years with citizen advisory groups and policy and financial analysts, there has been some backlash from customers who have been hit especially hard with high stormwater fees. Forty thousand new bills were created under this structure by accounts like parking lots and vacant lots that did not previously have water service. Customers who historically had low water usage but owned property with extensive impervious area and gross area saw

[4] GA and IA rates are calculated by figuring the costs associated with the wet weather share volume in relation to all wastewater flows.

increases in their monthly bill of hundreds to thousands of dollars. To alleviate the financial burden some customers faced, the PWD created two new programs: the Stormwater Assistance Phase-In Program (SWAPP), and the Stormwater Management Incentive Program (SWIP).

For properties that are financially impacted with monthly bill increases of more than 10 percent or $100 during the second phase-in year, the SWAPP allows eligible properties that apply for assistance to have their stormwater fees capped at a 10 percent increase per year. SWAPP funding for FY 2012 was $6,500,000 and for FY 2013, $13,000,000.

The SWIP Grant is financial assistance for green infrastructure retrofits for non-residential property owners who want to manage their stormwater onsite and receive bill credits. $3.2 million was awarded in June 2012 for a total of 65 planned acres of stormwater mitigation projects like rainwater harvesting, bioretention, and depaving.

Impervious Area Charge Based on Equivalent Residential Units: Washington, D.C.

Like many older east coast cities, Washington, D.C. has a combined sewer system. In 2004, Washington, D.C. implemented its *Clean Rivers Project* as part of a federally mandated Long Term Control Plan (LTCP) to reduce combined sewer overflows into nearby water bodies by 96 percent, via the construction of three diversion and storage tunnels.[5] Although the LTCP was required under the Clean Water Act, this ambitious plan was not initially earmarked for funding therefore the $2.6 billion project was designed to be funded solely by ratepayers through 2025.

Before the *Clean Rivers Project*, Washington, D.C. water and sewer customers paid one volumetric sewer fee to cover sewer and wastewater service provided by the city utility and the District of Columbia Water and Sewer Authority (DC Water). DC Water was created in 1996 with congressional authority as an independent agency to provide regional services. Once the LTCP was approved, DC Water was given authority to manage, operate, and finance the Clean Rivers Project. As an independent agency, DC Water's finances are not tied to the District's citywide budget therefore all revenue raised is reinvested into the operating and capital costs of their program.

In 2009, to more equitably finance the LTCP, DC Water reduced the volumetric sewer fee and added a new Impervious Area Charge (IAC). The IAC is based on equivalent residential units (ERU), a figure that represents the statistical average and median impervious surface area of all single family residential properties. In D.C. the average impervious area of a single family home equals 1000 square feet. DC Water figured that the costs associated with managing stormwater over 1000 square feet of impervious surface equals $6.64, therefore 1 ERU = $6.64. When the structure was first implemented, all residential customers paid one ERU. But responding to customer feedback regarding the overly simplified ERU factor, DC Water changed the ERU charge to a tiered system that they felt was a more equitable fee based on a residential property's actual impervious surface. For residential customers, the tiered structure is as follows:

[5] DC's combined sewer system has a total of 60 CSO outfall locations along the Rock Creek and Anacostia and Potomac Rivers which feed the Chesapeake Bay. A 2002 report by DC Water and Sewer Authority, *WASA's Recommended Combined Sewer System Long Term Control Plan*, predicted average precipitation year CSOs to be 179 or a total of 2,490 million gallons per year.

Table 1. Washington, D.C. Stormwater Rate Structure

Impervious Area (sq ft)	Equivalent Residential Units (ERU)	ERU Rate (FY 2012)	Monthly Cost
100-600	0.6	$6.64	$3.98
700-2,000	1.0	$6.64	$6.64
2,100-3,000	2.4	$6.64	$15.94
3,100-7,000	3.8	$6.64	$25.23
7,100-11,000	8.6	$6.64	$57.10
11,100 and more	13.5	$6.64	$86.64

Source: District of Columbia Water and Sewer Authority

All non-residential customers pay based upon their property's total impervious surface area in ERUs per thousand square feet; for example a property with 10,000 square feet of impervious surface pays 10 ERU, or $66.40 per month.

The Impervious Area Charge was seen as a revenue neutral method of reallocating wastewater charges to pay for the $2.6 billion infrastructure project. Since the volumetric sewer charges were reduced and IAC charges added, residential customers have seen little difference in their monthly charges. Commercial properties with large amounts of impervious surface, though, have seen increases in monthly bills since they contribute more stormwater to the system.

Since green infrastructure is not their area of expertise, DC Water is working with the District Department of the Environment (DDOE) to create a stormwater fee credit program to incentivize residential and non-residential parcels to adopt LID techniques. Proposed designs have called for credits up to 55 percent for retrofits that would retain the equivalent volume of stormwater created by a 1.2 inch storm event. At this time there is no approved incentive program but the DDOE is currently drafting a plan with recent public comment taken into account.

One challenge is that a successful incentive program would not only mean less stormwater making its way into the CSS, but also less revenue for DC Water's IAC program which must still fund the LTCP. It is too early to predict what the impact may be but a report by the Brookings Institution concludes that ratepayers would make up for the revenue with increased rates.[6] Regardless of the possible fiscal impacts of an incentive program cutting into needed revenue, DC Water estimates that ERU rates could increase to $28.99 for fiscal year 2019 to keep up with the costs of the LTCP. Rate increases of this nature discredit the notion that this is a revenue neutral program by reallocation of wastewater rates. 2019 rates could become a financial burden for many DC Water customers. To date, $153.5 million has been appropriated to the Clean Rivers Program by the federal government, but DC Water has been clear that more federal funding is necessary to keep rates affordable.

[6] Brookings Institution, *Cleaner Rivers for the National Capital Region: Sharing the Cost*, 2012

Land Use and Property Area: Cincinnati, Ohio

Cincinnati's Stormwater Management Utility (SMU) provides sole management and financing of the separate stormwater system and is funded by stormwater fees, which are based on stormwater runoff on all properties in Cincinnati, except undeveloped land and streets. One and two unit residential properties are charged a flat fee based on the size of their property and the remaining properties are charged a variable fee according to land use and property area.

One and two unit residences under 10,000 square feet pay $37.92 annually, while one and two unit residences over 10,000 square feet pay $53.04 annually. All other properties including multi-unit residential, commercial, industrial, institutional, and agricultural pay a variable stormwater charge according to the following formula:

(Area Range Number) x (Intensity Development Factor) x (charge per 1 Equivalent Runoff Unit)

The Area Range Number (ARN) is based on a parcel's total square footage and corresponds to storm drainage service charges. Any parcel area size between 0 and 2,000 square feet has an ARN of 1, from 2,001 to 4,000 square feet has an ARN of 2, and continues in two thousand foot increments. The Intensity Development Factor (IDF) indicates a parcel's percentage of impervious surface based upon its land use. For example, commercial properties have an IDF of 0.85, industrial is 0.75, and multi-family is 0.60. The Equivalent Runoff Unit (ERU) is a value that represents the costs of stormwater management associated with one unit of stormwater runoff. The SMU has determined the ERU to be $37.92 annually. This formula calculates annual charges, and customers are billed quarterly or monthly.

Table 2. Cincinnati Land Use Intensity Development Factor (IDF)

Land Use	IDF
Commercial	0.85
Industrial	0.75
Multi-family	0.60
Transportation	0.50
Institutional	0.40
Residential up to 10,000 sq ft	0.25
Residential 10,001 sq ft or larger	0.20
Agriculture	0.08
Park	0.05
Undeveloped	0.00

Source: Metropolitan Sewer District of Greater Cincinnati

There is no evidence of plans for an incentive program at this time.

Table 3. Summary of Stormwater Fee Case Studies

Program Parameters	Philadelphia, PA	Washington, D.C.	Cincinnati, OH
Stormwater Fee Rationale	Green City, Clean Waters watershed plan to incentivize green infrastructure	Finance tool for Clean Rivers Project's Long Term Control Plan: $2.6 billion combined sewer infrastructure project	Finance tool for combined sewer system operation and maintenance
Basis of Fee	Gross area and impervious area	Impervious area based upon equivalent residential units (ERU)	Land use and impervious area
Residential Model	(GA x GAR) + (IA x IAR) = monthly stormwater fee	Tiered rate based upon impervious area using ERUs as metric	1 & 2 unit under 10,000 sq. ft. pay $37.92 annually; 1 & 2 unit over 10,000 sq. ft. pay $53.04 annually
Non-Residential Model	Same as above	Total impervious area using ERUs as metric	(ARN) x (IDF) x (charge per 1 ERU)
Incentive Program	Yes, rebates up to nearly 100% of monthly stormwater fee for approved LID retrofits	No, but plans in progress	No

GREEN INFRASTRUCTURE RETROFIT FINANCING

The environmental benefits of restructuring wastewater rates to account for stormwater will be realized sooner if they are accompanied by financial incentives for on-site stormwater management (beyond savings incentivized by the rates themselves). The benefits of green infrastructure retrofits are numerous. LID techniques not only reduce the amount of stormwater entering the sewer system but also help remove pollutants by filtering stormwater through different media and vegetation. In addition, LID techniques such as rainwater harvesting, green roofs, bioretention, and permeable pavement provide ancillary environmental assistance—they decrease urban heat-island effect, conserve water resources, create new habitat for animals and insects, and recharge groundwater.

Green infrastructure retrofit price estimates vary depending upon materials used, installation practices, and design. Cost ranges listed below reflect the management of 1 inch of stormwater runoff from 1 square foot of impervious area:

Table 4. Green Infrastructure Costs

LID Retrofit	Installation Cost Per Square Foot
Basins or Ponds	$0.17 – $0.37
Created Wetlands	$0.25 – $0.50
Bioswales	$1.08
Tree planting	$1.09
Rain gardens	$1.42 - $1.45
Subsurface infiltration	$1.16 – $2.24
Rainwater harvesting	$2.95
Flow-through planters	$5.30
Porous pavements	$2.10 – $20.96
Green roofs	$31.43

Source: Philadelphia Water Department

Restructuring wastewater rates to include a fee for stormwater, regardless of how it is calculated, could create a new incentive for property owners to implement green infrastructure. The key to creating such an incentive is for utilities to allow property owners to receive a reduced fee or rate by implementing qualifying onsite stormwater management retrofits. To spur these on the ground changes, utilities can make financing options available, or at least information readily accessible for customers who want to see a reduction in their stormwater fees. The Natural Resource Defense Council's 2012 paper, *Financing Stormwater Retrofits in Philadelphia and Beyond*, examined several financing models, four of which are summarized below.[7]

On-Bill Financing

Generally, utilities can make financing for LID retrofits available in two ways: a small charge on each customer bill that is pooled among ratepayers; or a pool financed by external private investment. In these models, the customer applies to the program and the utility determines the best retrofit package that can be financed with available funds, according to projected customer savings and property characteristics. The utility oversees the upgrade at no additional cost and the customer meter is set at a fixed monthly charge until paid in full. This model may be best for smaller residential retrofits so that pooled charges or private investment dollars are not exhausted from expensive large-scale retrofits. However, Proposition 218 in California may prevent utilities from administering a finance charge on customer bills without

[7] http://www.nrdc.org/water/files/StormwaterFinancing-report.pdf

voter approval. But there are three models of self-financed retrofits that could be readily implementable in San Francisco:

Property-owner financed

This option could be used for large and small retrofit projects. In this model, the owner pays out of pocket for any costs associated with the installation of retrofit plans that are approved by the utility. On one hand, this type of financing may be beneficial because the property owner does not become indebted to another party, but it could also tie up a large portion of the property owner's capital, especially for larger retrofits.

Debt financed

In this model, which makes more sense for large-scale upgrades, a property owner contributes a portion of capital for investment but the majority of funds are borrowed from a financial institution. While the property owner must make monthly payments to the financial institution, they also see savings in their monthly stormwater fees to help offset costs. In general, the rate of return for debt financed property improvements is better compared to self-financed projects.

Off-balance sheet financed

This model is best for large-scale upgrades, especially commercial, where an owner is not able to burden balance sheets with additional debt. A third party project developer provides 100 percent of the retrofit costs, but is repaid by the property owner with a service fee equal to a specified portion of the stormwater fee savings. This fee could be hundreds to thousands of dollars for large retrofits. This model benefits the customer by being net cash flow positive from day one of the project. It also provides a fixed rate of return for the third party developer.

Comparing the financial models

For a stormwater rate structure like Philadelphia's, NRDC compared property owner financed, debt financed, and off-balance sheet financed models to determine which one has the most favorable internal rate of return (IRR) and payback period. For a large industrial property, NRDC made the following project assumptions:

- The project consists of three stormwater detention basins that manage runoff from 439,088 square feet (10 acres) of impervious area.
- The total cost of retrofit investment is $200,000.
- The retrofit generates a stormwater fee savings of $36,000 per year over a four year period, with increased savings as stormwater fees rise over time.
- All loans are a 12-year term at 6 percent interest.

Table 5. Comparing Stormwater Retrofit Financing Models

Financial Model	Owner Investment	Owner Debt	Third Party Investment	Third Party Debt	IRR	Payback Period
Property Owner Financed	100%	None	n/a	n/a	5.8%	9 years
Debt Financed	20%	80%	n/a	n/a	13.8%	6 years
Off-balance sheet financed	None	None	20%	80%	20.5% (3rd party)	No data

Source: Natural Resource Defense Council, *Financing Stormwater Retrofits in Philadelphia and Beyond*, 2012

IMPLEMENTATION CONSIDERATIONS

An economic analysis of how property owners will be affected by different stormwater fee models is an important component of a stormwater rate study. Philadelphia relied on the opinions and results of community advisory councils to implement its gross area and impervious area model without performing a thorough economic analysis. In hindsight, PWD officials wish they would have taken the time to analyze the impact of new fees on a wide range of customers. While they were able to implement grant and financial assistance programs within a few years of the program's start, better economic planning would have prepared the PWD for the onslaught of complaints from customers whose bills had increased considerably.

The SFPUC completed its own preliminary economic analysis of proxy San Francisco properties using Philadelphia's stormwater fee model. They chose several different property types with a wide range of pervious surface area, and compared historical wastewater bills with what projected bills would look like under a wastewater/stormwater rate regime. The SFPUC assumed wet weather flows to be 18 percent of the total annual wastewater cost. They then figured gross area and impervious area rates similar to Philadelphia's model but applied them to San Francisco costs. The formula is as follows:

Stormwater Fee = (Gross Area x Gross Area Rate) + (Impervious Area x Impervious Area Rate)

Gross Area Rate = $0.3172/500 square feet
Impervious Area Rate is $1.9007/500 square feet

These metrics provide the following results:

Table 6. Applying the Philadelphia Stormwater Fee Model to Proxy San Francisco Properties

Property Type	Surface Area (sq. ft.)	Percent Pervious	Current Combined Monthly Bill (Historical Average)[8]	Wastewater Share (Meter-Based)[9]	Split Bill Method Stormwater Share[10]	Total Monthly Bill (Wastewater + Stormwater)	Amount Change in Total Monthly Billing	Percent Change in Total Monthly Billing	Stormwater Share as a Proportion of Property Area ($/500 sq. ft.)
Big Box Store	225,825	0.2%	$3,956	$3,244	$1,000	$4,244	$288	7.3%	$2.22
Parking Lot	29,775	3.7%	$0	$0	$128	$128	$128	N/A	$2.15
High School	235,067	37.7%	$1,451	$1,190	$706	$1,896	$445	30.7%	$1.50
Hospital	934,515	28.4%	$86,851	$71,218	$3,137	$74,354	($12,496)	(14.4%)	$1.68
Hotel	18,865	0.9%	$12,084	$9,909	$83	$9,992	($2,092)	(17.3%)	$2.20
Single-Family Residence, Low Wastewater Bill	3,035	44.19%	$17.03	$13.96	$8.36	$22.33	$5.30	31.1%	$1.38
Single-Family Residence, High Wastewater Bill	3,035	44.19%	$90.77	$74.44	$8.36	$82.80	($7.98)	(8.79%)	$1.38
Multi-Family Residence (4-unit apt.)	2,750	5.22%	$88.78	$72.80	$11.65	$84.45	($4.33)	(4.87%)	$2.12

Source: San Francisco Public Utilities Commission, 2012

[8] Sample billing data was taken over a span of 3-5 years, between 2006 and October 2011.
[9] Wastewater share is expected to be 82 percent of the current bill, based on a preliminary SFPUC study estimating 18% of capital costs and annual operations and maintenance costs attributable to wet weather flows
[10] Stormwater fee calculated using the formula above.

The parcel-based stormwater model produces some interesting results. In general, properties with low water use relative to parcel size, such as the high school or single-family low wastewater bill examples, experience an overall increase in their total bill once stormwater fees are assessed separately. Properties with high water and wastewater bills relative to parcel size, such as hospitals and hotels, tend to save money under the Philadelphia model. Stormwater fees, per square foot, are highest for the parcels that have the lowest percentage of pervious area. Of these examples, the big box store, the hotel, the parking lot, and the multifamily residence pay more per square foot for stormwater service, and all of these properties are more than 90 percent impervious.

SPUR compared the stormwater fee models of Philadelphia, Cincinnati, and Washington, D.C. to the above San Francisco parcel types to see how they would fare under different scenarios. Each model represents a unique way to calculate an equitable rate structure that internalizes the costs of a parcel's contribution to stormwater runoff. Some property types pay higher stormwater fees under one model type than another. The main lesson in comparing these models is that a one-size-fits-all approach to a stormwater rate structure may not be best for San Francisco's array of property types. But the status quo is also not a sustainable or equitable option. A multi-tiered or hybrid-type structure could be investigated.

Table 7. Monthly Fees of Three Stormwater Fee Models Applied to San Francisco Property Types

Property Type	Surface Area (sq. ft.)	Percent Pervious	Gross Area + Impervious Area[11]	Impervious Area Charge (IAC)[12]	Land Use + Property Area[13]
Big Box Store	225,825	0.2%	$1,000	$1496	$301
Parking Lot	29,775	3.7%	$128	$1904	Unknown
High School	235,067	37.7%	$706	$972	$98
Hospital	934,515	28.4%	$3,137	$4443	$590
Hotel	18,865	0.9%	$83	$114	$24
Single-Family Residence, Low Wastewater Bill	3,035	44.19%	$8.36	$6.64	$3.16
Single-Family Residence, High Wastewater Bill	3,035	44.19%	$8.36	$6.64	$3.16
Multi-Family Residence (4-unit apartment)	2,750	5.22%	$11.65	$17.31	$3.79

Source: SPUR analysis of data from DC Water, Cincinnati SMU, and SFPUC

[11] Gross Area & Impervious Area are figured using SFPUC costs. IAC and Land Use models are figured using the costs from Washington DC and Cincinnati since SFPUC has not yet applied their costs to those models.
[12] DC Water classifies multi-family residential of four or more as non-residential

Should a parcel-based model like Philadelphia's advance in San Francisco, SPUR encourages the SFPUC to include in its calculation of parcel size those parts of a property that extend into the public right of way. This way, building green infrastructure, such as sidewalk gardens, in areas of the streetscape that may be currently paved over may 'count' toward reducing the adjacent property's stormwater fee. Green infrastructure located in the public realm more significantly reduces loading to the wastewater treatment system than such systems located in backyards and other areas not directly connected to storm drains.

Stormwater fees need to be in a special zone where they are not so expensive as to harm a customer's economic viability, but high enough to spur green infrastructure investment. A robust grant program can also incentivize LID retrofits. The SFPUC already has a head start with their Urban Watershed Stewardship Grant Program which funds small scale retrofits with the idea that small projects add up to large benefits to the environment and sewer system. SPUR recommends that as a part of implementing a separate rate for stormwater, that the SFPUC expand this program or create a new grant program to make funding available for more and larger-scale retrofits.

Implementing stormwater rates into a utility's wastewater and sewer fee schedule involves much more than economic and policy analyses. A new fee structure with an incentive program creates the need for new organization of internal systems and additional staffing in the areas of administration, public outreach, customer outreach, and inspection and enforcement.

For customer assistance, a user-friendly webpage is essential. It should detail the program's rationale and parameters, rate and billing specifications, LID techniques and costs, native plant palettes, possible project developers and landscape companies, financing options, on-line applications, grant opportunities, and successful planned and completed projects. In other words, a new stormwater fee program must develop tools that assist and inform the customer via an easy-to-understand, easy-to-use, one-stop website.

Customer outreach campaigns are another vital component. Educating the public on the deleterious environmental and infrastructural effects of stormwater and beneficial impacts of LID is crucial to the efficacy and acceptability of new stormwater rates. Web, print, TV, and in-person outreach campaigns are all valuable tools to educate the most customers. They require additional capital but can be built into the SFPUC's outreach system already in place.

To verify the implementation and efficacy of approved LID retrofits for an incentive program, inspection and enforcement guidelines must be established. The SFPUC's Stormwater Design Guidelines already outline a clear inspection and enforcement protocol for stormwater management on qualifying new development and redevelopment projects. This system could be easily replicated for a new stormwater rate and incentive program. The guidelines state that the SFPUC or Port, whichever has jurisdiction, performs or oversees periodic inspections to verify that retrofits are properly maintained and provide effective treatment. Inspections fall under three types—post construction, annual self-certification by the property owner, and triennial inspections. If maintenance requirements prescribed by the SFPUC or Port are not completed accordingly, enforcement procedures will ensue.

CONCLUSION

In sum, while there are administrative and political hurdles associated with enacting a stormwater fee and incentive program, we believe that the environmental and equity benefits of implementing such a program are worth the challenge. San Francisco's current wastewater structure does not realize the true costs of property-related stormwater runoff. The Sewer System Improvement Program that will address aging infrastructure, seismic deficiencies, increased operating budgets, and environmental protection will cost ratepayers $7 billion. Since an average of 20 percent of annual wastewater flows are composed of stormwater, and a principal design criterion for the sewer system is retaining stormwater flows, new wastewater rates should be reallocated to reflect this. San Francisco would not be reinventing the wheel when it comes to a stormwater fee program. The SFPUC can choose from a number of models, or itself create a hybrid model tailored to San Francisco's diverse land uses.