

201 N. Civic Drive, Suite 230
Walnut Creek, California 94596
Telephone: 925/977-6950
www.hfh-consultants.com

Robert D. Hilton, Emeritus
John W. Farnkopf, PE
Laith B. Ezzet, CMC
Richard J. Simonson, CMC
Marva M. Sheehan, CPA
Robert C. Hilton, CMC

TECHNICAL MEMORANDUM

This technical memorandum examines the current options available to fund stormwater programs, discusses the results of the survey HF&H Consultants conducted of Bay Area stormwater agencies, and compares stormwater rate structure elements.

1. Executive Summary

Stormwater infrastructure historically has been an underfunded municipal system. With aging infrastructure and growing environmental permitting requirements, agencies are realizing the importance of maintaining and updating these systems. Unfortunately, funding these system improvements presents a new hurdle. As utility rate experts, HF&H Consultants has seen an increase in client questions focused on funding stormwater programs. To assess the present trends of stormwater funding in the Bay Area, we conducted a survey of Bay Area agencies. To establish further context, we compared these results to well-known national stormwater agency surveys, including those conducted by Black & Veatch (2021) and Western Kentucky University (2019).

In their 2021 annual survey, Black & Veatch found funding adequacy, public awareness and support, and aging infrastructure made up the top three most important issues for participants. These three issues share a symbiotic relationship. To raise additional revenues to address aging infrastructure, the public needs to connect the importance of stormwater infrastructure in order to accept their role to help fund future improvements. There are multiple avenues available for agencies to pursue funding for their stormwater programs.

This memorandum is organized into four parts: 1) review of potential stormwater program funding sources; 2) examination of the results from surveying Bay Area agency stormwater funding; 3) discussion of recently adopted stormwater rate design; and 4) comparison of rate structure design elements for consideration.

2. Potential Funding Sources

The common funding sources that are available to stormwater programs are quite varied, which is commensurate with the fact that stormwater service is a multi-faceted activity. Funding sources can be categorized as either those sources that are subject to or that are not subject to Proposition 218. Each of these groups is described below. **Figure 2-1** provides an overview of funding sources within this section.

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Figure 2-1 Funding Source Summary

Document Section	Funding Source	Subject to Proposition 218
2.1.1.	Related Utility Services (Wastewater, Water, Solid Waste)	Yes ¹
2.1.2.	Fees, Assessments and Taxes	Yes ²
2.1.3.	Reimbursements for General Fund Services	Yes ¹
2.2.1.	Developer Impact Fees/Contributions	No
2.2.2.	Regulatory Fees	No
2.2.3.	Grants	No

¹Subject to Proposition 218 protest hearing only.

²Subject to Prop 218 protest hearing and ballot approval process.

2.1 Funding Sources Subject to Proposition 218

Proposition 218 places certain substantive requirements on creating new or increasing existing property-related fees and charges.¹

- (1) Revenues derived from the fee or charge *shall not exceed the funds required* to provide the property related service.
- (2) Revenues derived from the fee or charge *shall not be used for any purpose* other than that for which the fee or charge was imposed.
- (3) The amount of a fee or charge imposed upon any parcel or person as an incident of property ownership *shall not exceed the proportional cost of the service* attributable to the parcel.

Proposition 218 also places certain procedural requirements on adopting property-related fees and charges. Fees and charges for wastewater, water, and solid waste services are required to undergo a notification and protest process. If less than 50% of the affected parcels submit protests, the new fees and charges may be adopted. For all other fees and charges, voter approval is required. Achieving voter approval is clearly more difficult than the protest process.

There are three subgroups of funding sources that are subject to Proposition 218. Two of these subgroups - funding from related services and General Fund reimbursements - do not require voter approval because

¹ Article XIID, Section 6b of the California Constitution

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their funding is derived from wastewater, water, or solid waste fees and charges. These two subgroups are discussed below, followed by the third subgroup that requires some form of voter approval.

2.1.1 Funding from Related Utility Services

Providing funding from water, wastewater, or solid waste fees and charges for stormwater programs does not require voter or property owner approval but must comply with Proposition 218's procedural and substantive requirements. The amount of funding provided for stormwater programs must be proportional to the benefits received by water, wastewater, and solid waste rate payers. There should be a clear cost nexus between the benefits received and the level of funding.

Wastewater Fees

Stormwater programs typically include the operating and capital costs associated with drainage facilities. These facilities are designed to convey runoff to receiving waters, which reduces the amount of stormwater that could enter the sanitary sewer system as surface inflow or as subsurface infiltration (I&I). Inflow of surface runoff into sanitary sewers produce much higher than average flows at wastewater treatment facilities during wet weather episodes. Infiltration from groundwater begins as surface runoff that percolates into the water table before it can be drained away. Infiltration occurs steadily throughout the year in areas where sewer mains are below the water table.

Wastewater collection and treatment facilities must be sized to convey and treat I&I as well as sewage discharged by customers. Wastewater customers benefit from stormwater drainage facilities that reduce the amount of I&I. The amount of stormwater that is drained away from the sanitary sewers reduces the cost of wastewater service. In return for this benefit, it is justifiable for wastewater fees and charges to contribute toward the cost of stormwater drainage facilities.

Water Fees

Any stormwater that can enter a current or potential water supply source poses a water quality risk. Water customers of stormwater-influenced water supplies therefore benefit from stormwater programs that protect water quality or improve water supplies. In addition to stormwater programs that protect water quality, there are closely related watershed protection regulations that agencies must comply with. Funding a portion of the costs of water quality protection measures found in stormwater programs from water rate revenue is similarly justifiable.

Solid Waste Fees

The overlap between stormwater and solid waste programs occurs with street maintenance programs. Solid waste collection produces street litter when trash cans are lifted and dumped by the automated arm of garbage trucks. Without street sweeping, this litter would fill catch basins and drain into United States waters, in violation of the Clean Water Act. Therefore, in order to comply with Clean Water Act requirements, solid waste utilities are required to either clean catch basins or prevent the accumulation of catch basin debris with street sweeping. Because of the benefits from stormwater programs received by solid waste customers, it is justifiable under Proposition 218 that solid waste fees fund those portions of stormwater programs related to streets.

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Figure 2-2 summarizes funding sources from services that are related to stormwater and that do not require voter or property owner approval. The figure indicates the advantages and disadvantages of each funding source.

Figure 2-2. Summary of Funding From Related Services

Funding Sources	Advantages	Disadvantages
Wastewater rates fund I&I	<ul style="list-style-type: none"> • Comparative ease of legal adoption. • Often small incremental impact on wastewater customers. 	<ul style="list-style-type: none"> • Billing through wastewater service provider required. • Will increase wastewater rates.
Water rates fund water quality measures	<ul style="list-style-type: none"> • Comparative ease of legal adoption. • Often small incremental impact on water customers. 	<ul style="list-style-type: none"> • Billing through water service provider required. • Will increase water rates.
Solid waste rates fund street sweeping	<ul style="list-style-type: none"> • Comparative ease of legal adoption. • Often small incremental impact on garbage customers. 	<ul style="list-style-type: none"> • Billing through solid waste collection service required. • Will increase solid waste rates.

2.1.2 Fees, Assessments, and Taxes

The previous discussion was related to the subgroup of funding sources that is subject to Proposition 218's procedural requirements calling for a majority protest process but not voter approval. A third subgroup is subject to Proposition 218's voter approval requirement. Pursuant to Article XIID of the California Constitution, voter approval of any property-related fee or charge requires approval by a majority vote of the property owners subject to the fee or a two-thirds vote of the electorate residing in the affected area. Because achieving voter approval is a more difficult process, it is advisable to first try to achieve as much funding as possible from the preceding subgroup.

However, in 2017, SB 231 (Hertzberg) became law introducing the potential to adopt a stormwater fee without the voter approval requirement in the same way that water, sewer, and solid waste rates are adopted. This law defines "sewer" as the following:

"Sewer" includes systems, all real estate, fixtures, and personal property owned, controlled, operated, or managed in connection with or to facilitate sewage collection, treatment, or disposition for sanitary or **drainage purposes**, including lateral and connecting sewers, interceptors, trunk and outfall lines, sanitary sewage treatment or disposal plants or works, **drains, conduits, outlets for surface or storm waters**, and any and all other works, property, or structures necessary or convenient for the collection or disposal of sewage, industrial waste, or **surface or storm waters**.²

² Government Code Section 53750(k). Emphasis added.

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“[S]ewer” should be interpreted to include services necessary to collect, treat, or dispose of sewage, industrial waste, or **surface or storm waters, and **any entity that collects, treats, or disposes of any of these necessarily provides sewer service.**³**

By defining “sewer” to include both sanitary and stormwater sewer systems, SB 231 presents the opportunity to adopt storm sewer rates following the same procedural requirements that have always applied to sanitary sewer rates under Proposition 218, which includes a protest process without the need for voter approval. SB 231 simplifies the process by eliminating voter approval so that adopting a storm sewer rate is procedurally comparable to adopting water, sanitary sewer, and refuse rates. However, SB 231 is recent legislation, and we are not attorneys. Our opinions should not be construed as legal advice. We recommend all parties consult an attorney for their opinion.

2.1.3 Reimbursements For General Fund Services

Realigning funding to the General Fund from the utilities and other enterprises can be utilized regardless of whether stormwater funding is an issue. The utilities and other enterprises should be reimbursing for services they receive from the General Fund for which they receive benefits. This results in more General Fund revenues that can be made available for stormwater costs.

Governmental Overhead

All utilities and other enterprise funds can reimburse the General Fund for governmental overhead. Such reimbursements are derived in overhead cost allocation plans that most cities conduct regularly. These cost allocation plans allocate the costs from a broad range of governmental overhead including those associated with the City Council, City Manager, City Attorney, Finance, Human Resources, etc. The cost allocations are typically based on relatively simple measures of benefit that achieve proportionate allocations among the utilities and other enterprises.

Public Safety Services

Police and fire services are provided to protect private and public property and lives. Owners of private property pay taxes that are the principal source of funding for public safety services. Tax-exempt entities do not pay property taxes and, as a result, do not pay for the protection they receive. Utilities and other enterprises can reimburse General Funds for services provided by police and fire.

Use of Governmental Facilities

Cities provide governmental facilities such as city hall and corporation yards that are used by all city departments to conduct their affairs. In some cases, like corporation yards, which may be used exclusively by the utilities and other enterprises, the enterprises may have borne the entire cost with no contribution by the General Fund. In other cases, like a city hall, they may have funded the entire cost and never sought reimbursement through an overhead cost allocation plan.

³ Government Code Section 53751(m). Emphasis added.

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Right-of-Way Maintenance

Providing water, wastewater, and solid waste service requires the use of public rights-of-way. Infrastructure is buried within the rights-of-way and rely on structurally sound streets and sidewalks for protection, as well as for access through valves, vaults, manholes, and cleanouts. The cost of pavement repair at the time buried infrastructure is installed is typically included in the cost of construction. However, periodic pavement repair, necessitated by both surface and subsurface conditions, is an additional cost of right-of-way maintenance that is typically handled by Public Works.

2.1.4 Summary

Figure 2-3 summarizes funding sources from the utilities in return for the services they receive from the General Fund. By providing this funding, the General Fund is able to apply the equivalent funding to meet the needs of other services, such as the stormwater program.

Figure 2-3. Summary of Funding From Reimbursements To General Fund

Funding Sources	Advantages	Disadvantages
Utilities reimburse for: <ul style="list-style-type: none"> • governmental overhead • public safety services • governmental facilities • right-of-way maintenance 	<ul style="list-style-type: none"> • General fund revenues are freed up for use on stormwater. • Often small incremental impact on utility customers. 	<ul style="list-style-type: none"> • Increases to utility rates • Adoption via the Proposition 218 process

2.2 Funding Not Subject to Prop 218

There are some minor sources of funding for stormwater programs that are not subject to both Proposition 218's substantive and procedural requirements.

2.2.1 Development Impact Fees/Developer Contributions

Development impact fees are imposed on new development to fund capital improvements attributable to growth. They are one-time fees paid at the time of development or connection to facilities. They must comply with the Mitigation Fee Act (Gov. Code 66000). The key requirements are that the fee must be proportionate to benefits received and cannot be used to fund operations and maintenance (O&M) expenses. Many agencies levy impact fees for a broad array of infrastructure facilities that benefit growth, including stormwater, wastewater, water, schools, roads, and public safety facilities.

It is a common practice as a condition of development to require developers to install stormwater facilities, such as detention and retention basins, which are of local benefit to the development and which mitigate the impact of urban runoff associated with the development. In some cases, developers are required to make capital or other financial contributions to mitigate their impact on non-local facilities that are constructed by others. These capital contributions can be netted out of development impact fees.

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2.2.2 Regulatory Fees

Regulatory fees are imposed under police powers granted by cities to regulate, conduct, and defray actual or anticipated adverse effects of the fee payer's behavior or use of facilities. Such fees are not subject to Proposition 218 but should still demonstrate that the same rate-making standards required under Proposition 218 are met, namely: (1) fee revenue does not exceed funding requirements, (2) fee revenue is used for the purpose collected, and (3) the fee is proportionate to cost of service. Following these standards will establish the fees at cost and improve their defensibility, if challenged.

An example of a regulatory fee associated with stormwater is the litter abatement fee enacted by the City of Oakland to cover the additional cost of emptying garbage receptacles and other litter clean-up associated with fast food business. The regulatory fee was charged as a percent of business sales. The revenue from this fee could also be used for cleaning drainage inlets and filters.

2.2.3 Grants

Grant funding from federal and state sources is periodically available. The possibility of grant funding projects is problematic because funds must be advanced by the applicant; not all costs are eligible for reimbursement; and little, if any, grant funding for stormwater projects is currently available to jurisdictions that are not economically disadvantaged. In some instances, there is no guarantee of receiving the grant, and unwanted restrictions or conditions may apply.

2.2.4 Summary

Figure 2-4 summarizes the sources of funding not subject to Proposition 218. Although these funding sources are not subject to Proposition 218 and are thereby considered the easiest options to implement, funding the full cost of a stormwater program from any or all of them is unlikely.

Figure 2-4. Summary of Funding Sources Not Subject to Proposition 218

Funding Sources	Advantages	Disadvantages
Developer impact fees/developer contributions	<ul style="list-style-type: none"> • Ease of legal adoption. 	<ul style="list-style-type: none"> • May be perceived as unfriendly to development.
Regulatory fees	<ul style="list-style-type: none"> • Ease of legal adoption. • Allocates costs of businesses and customers. 	<ul style="list-style-type: none"> • May be perceived as unfriendly to business.
Grants	<ul style="list-style-type: none"> • Ease of legal adoption. 	<ul style="list-style-type: none"> • Lack of availability of grant funds.

3. Survey Discussion

In 2020, HF&H surveyed Bay Area agencies to assess the budgeted range of stormwater programs, how existing stormwater programs are funded, and the rate structure of any assessments used to fund a

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stormwater program. The results of the survey were compared to data from national surveys previously conducted by Black & Veatch in 2021 and Western Kentucky University in 2019.

The following includes a brief discussion of our survey results and common rate structure elements employed by Bay Area agencies funding stormwater programs via charges.

3.1 HF&H Bay Area Stormwater Survey

Our survey showed a plurality of respondents who stated their current stormwater charge was adopted prior to 1996. In contrast, 69% of participants in the most recent nation-wide Black and Veatch survey indicated they had increased their stormwater charges in the last five years. This highlights the judicial roadblock placed in agencies' paths to increase revenues for stormwater programs in California. While SB 231 provides opportunity for jurisdictions to charge a stormwater charge via the Proposition 218 process, just as they do for water and wastewater services, the threat of legal challenge has created a stalemate. Bay Area jurisdictions with existing stormwater charges maintain the existing levels of fees, offsetting funding through other means, to avoid an anticipated lawsuit.

We anticipated survey results would demonstrate that most existing fees were adopted prior to 1996 and therefore, wanted to focus more on the existing rate structures employed in current stormwater charges. Our survey focused on how charges were billed and how fees were calculated.

In our survey, the majority of respondents indicated existing stormwater charges are billed annually via the tax roll. However, this is not commensurate with the national trend. Responses to the Black & Veatch 2021 survey showed that 78% of these agencies include stormwater charges in either the water or sewer bill. Billing via the tax roll provides two infusions of cash flow throughout the year. However, at current stormwater rates, it is likely these assessment revenues offset only a small portion of existing stormwater program budgets. While more frequent billing of stormwater charges is desirable, changing billing frequency would require ballot approval or an unprecedented attempt to pass new stormwater rates via the Proposition 218 process.

Our research and survey results found the most consistent approach to stormwater charges is to bill residential parcels. The largest portion of Bay Area survey respondents cited their residential charges are based on a parcel's area using either gross area or impervious area only. Responses from the Western Kentucky University 2019 survey concur with this approach. The most widely used method of calculating a charge relied on the average impervious area on a single-family parcel. Similarly, the overwhelming response from 89% of participants in the Black & Veatch 2021 survey indicated their stormwater charges are based on some form of parcel area, such as gross and/or impervious area. However, when asked how the impervious area is calculated, only 28% of participants stated impervious area was calculated from building footprints. Our survey of Bay Area agencies provided similar results. Only one response indicated that first floor building footprint was used to calculate impervious area. Instead, a larger number of responses cited runoff factors or land use-based coverage ratios as the primary method to calculate impervious area. Building footprint data provides a more specific level of analysis per parcel, as opposed to runoff factors and coverage ratios, which rely on established ranges per parcel.

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Our team was curious to look at the ranges of stormwater program budgets. Responses that we received indicated a range from \$150,000 to \$3,000,000. Stated in a different light, the minimum annual stormwater budget per capita was \$10.78, while the maximum was \$43.51. National survey responses in the Black & Veatch 2021 survey provided a greater range from a minimum of \$3.20 per capita to \$200.00 per capita, and an average of \$63.00 per capita of funding generated. Bay Area surveyed responses fell within the national range.

It's clear from our results that Bay Area agency stormwater programs echo national trends exhibited by previous surveys. Levels of stormwater program budgets rival national averages. Most residential stormwater charges are predicated on parcel size, and most calculations for agency charges, national or Bay Area, calculate impervious area via land use runoff factors or coverage ratios.

Bay Area agencies differ from nationwide trends in the frequency of billing for stormwater charges. It is far more common for agencies outside of California to charge stormwater charges via utility bills, increasing the frequency of when revenues are received. In contrast, Bay Area agencies most often bill stormwater charges via the tax roll. Existing fees billed via the tax roll provide a small measure of funding, ease of billing, and revenue stability.

Our team identified fees for San Mateo County jurisdictions prior to releasing the survey. The following provides a more detailed look at existing San Mateo County stormwater charges and recent stormwater ballot initiative results.

4. Common Bay Area Rate Structures

Rate structure design for stormwater rates is similar to rate design for water and wastewater services. These rates charge on the basis of the units of service that rate payers receive. There is often a fixed charge per account that covers costs that are common to all customers regardless of the amount of service that is received. Combined with the fixed charge is a variable charge based on the service that is received. For water and sewer service, the variable charge covers the costs that fluctuate depending on the amount of service provided, including the volume of water that is consumed and the volume of wastewater that is produced. For stormwater service, the volume of runoff that must be collected and safely conveyed to receiving waters free of pollution is the service that is received.

Because the volume of runoff that is produced is directly related to the surface area of land (as well as other characteristics of the land), surface area is the unit of service. Designing stormwater rates requires terrestrial data. The complexity of the rate structure depends on the availability of this data. Historically, data on individual parcels sizes was not as readily available, which led to simpler rate structures. Databases are now available that provide total parcel size and first-floor area, which allows for rate designs that equitably account for the key differences in parcels that lead to a more accurate estimate of the runoff produced by individual parcels.

The three following figures summarize the stormwater fees charged by the cities in San Mateo County. All 19 of these cities charge a San Mateo County fee of either \$3.44 or \$7.10 per residential parcel. These

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County charges were adopted without voter approval prior to the passage of Proposition 218 in 1996. For eight of these cities, the County charge is their only stormwater fee, as shown in **Figure 4-1**. Ten of the cities also charge city-wide fees ranging from \$7.34 to \$46.16 per residential parcel, which were also adopted prior to Proposition 218's passage, as shown in **Figure 4-2**. The City of Burlingame charges a fee that was adopted with voter approval after 1996, see **Figure 4-3**.

Figure 4-1. San Mateo County Stormwater Rates – Cities with County Charge Only

City	Annual Charge For City Stormwater Program		County Charge
	Residential	Non-Residential	
Pre- 1996 Measure County Charge Only			
Atherton	None	None	\$7.10
Colma	None	None	\$3.44
East Palo Alto	None	None	\$7.10
Foster City	None	None	\$7.10
Half Moon Bay	None	None	\$7.10
Portola Valley	None	None	\$7.10
Redwood City	None	None	\$7.10
San Mateo	None	None	\$3.44

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Figure 4-2. San Mateo County Stormwater Rates – Cities with City & County Charges

City	Annual Charge For City Stormwater Program		County Charge
	Residential	Non-Residential	
Pre- 1996 Measure City and County Charges			
Belmont	\$30 plus \$30 per additional acre exceeding 1 acre (ac)	<ul style="list-style-type: none"> • Condominium - \$30.00 per unit • Duplex & Multi-Family - \$30.00 * 2/3 * units • Commercial - \$30.00 * 20 * ac • Institutional/Undeveloped - \$30.00 * ac 	\$7.10
Brisbane	\$9.48	<ul style="list-style-type: none"> • Multi-Family - \$21.64 • Commercial/Industrial - \$19.94 or \$254.20 depending on location • Vacant Land < 1 ac - \$18.34 • Vacant Land 1-5 ac - \$55.16 • Vacant Land 5-20 ac - \$212.18 • Vacant Land >20 ac - \$927.80 	\$3.44
Daly City	\$9.80	Varies based on surface area; rate unknown	\$7.10
Hillsborough	\$7.34	\$7.34	\$7.10
Menlo Park	\$0.005/ sq ft of impervious area	\$0.005/ sq ft of impervious area	\$7.10
Millbrae	Single-Family - \$25.66 Low Density Single family - \$91.60	<ul style="list-style-type: none"> • Multi-Family - \$58.50 • Commercial, Industrial - \$223.23 	\$7.10
Pacifica	\$14.00	<ul style="list-style-type: none"> • Multi-Family - \$28.00 • Commercial - \$28.00 • Institutional - \$14.00 • Vacant - \$7.00 	\$7.10
San Bruno	\$46.16	Not available	\$7.10
San Carlos	\$20.00	Varies based on surface area; rate unknown	\$7.10
South SF	\$8.00 to \$10.00 range	Not available	\$7.10

Figure 4-3. San Mateo County Stormwater Rates – City with Post 1996 City & County Charge

City	Annual Charge For City Stormwater Program		County Charge
	Residential	Non-Residential	
Post 1996 City Charge			
Burlingame [a]	\$0.042/sq ft of impervious area	\$0.042/sq ft of impervious area	\$7.10

[a] Approved by voters in 2009.

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4.1 Recently Adopted Stormwater Rates

Since 2009, several California jurisdictions have successfully implemented new stormwater rates. **Figure 4-4** lists the specific jurisdictions, their rates, and the year rates were adopted. While some jurisdictions were successful, others were not able to adopt new stormwater rates through the voter approval process. These jurisdictions have also been included for context.

Figure 4-4. Examples of Recent Stormwater Rate Measures

City or County	Approved	Ann Avg Residential Charge Per Parcel	Estimated Residential Cost Per Sq Ft [a]
Successful Voter Approval			
Burlingame	2009	\$150.91	\$0.042
Palo Alto	2017	\$163.80	\$0.066
Berkeley	2018	\$42.89	\$0.020
Los Angeles County	2018	\$62.50	\$0.025
Alameda	2019	\$78.00	\$0.016
Cupertino	2019	\$44.42	\$0.011
Davis	2020	\$157.20	\$0.021
Unsuccessful Voter Approval			
Moraga	2018	\$120.38	\$0.048
Los Altos	2019	\$88.00	\$0.035
Average		\$108.17	\$0.035

[a] Per square feet of estimated impervious surface area.

Figure 4-4 provides a range of the average annual charge of adopted stormwater measures. Adopted measures ranged from \$42.89 to \$163.80 and Bay Area cities comprised the majority of these successful measures. However, the unsuccessful rate measures also fell within this range and were attempted in Bay Area cities. These results may imply that while voters care about the amount of the charge they will pay for stormwater services, additional factors influence whether a proposed measure is successful. One of those factors is the simplicity by which it can be explained to ratepayers and whether ratepayers feel rates are equitable.

Each of the above jurisdictions utilize the impervious surface area to calculate the charge per parcel. In Los Angeles County, the current charge uses a flat rate charge per parcel based on impervious area per

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parcel. Stormwater rates for other agencies listed employ impervious surface area-based calculations according to land use. Residential parcels are assigned to prescribed ranges of parcel sizes. Each range of parcel size assumes a specific percentage of impervious surface area. Based on these assumptions, a rate is developed according to parcel size. This approach provides a straight-forward method to calculate rates, but the rates based according to a range of parcel sizes may cause ratepayers to wish for a more equitable calculation, specific to each parcel.

This prescribed approach has recently helped jurisdictions adopt new stormwater rates but there are other methods that can be used in stormwater rate design. The next section explores stormwater rate structure elements.

5. Comparison of Rate Structure Elements

Stormwater rate design is evolving. Setting equal charges per parcel was a long-standing practice when the charge per parcel was nominal. As funding requirements have increased, the need to equitably differentiate charges among individual parcels has led to structures based on parcel size. Although rain falls on all land and runoff is produced by both impervious and pervious surfaces, it is a common industry practice to base the charge only on impervious surface area because impervious area produces significantly more runoff than pervious surface area of an equivalent size. For communities with a comparatively narrow range of parcel sizes, equity can be achieved using either total parcel size or just impervious area.

Figure 5-1 outlines the most common elements of stormwater rate structures ranging from charges per parcel to charges per surface area and a combination of both elements.

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Figure 5-1. Stormwater Rate Structure Elements

Rate Structure	Advantage	Disadvantage
A. Charges Per Parcel		
1. All charges equal per parcel	Simplest structure of all (basis for current charges).	One size fits all may be imprecise if class is not homogeneous.
2. Residential charges equal per parcel within size categories: small, medium, large.	Requires only gross parcel size data to sort by category.	No need for categories if parcel size data is available to calculate charges individually.
B. Charges Per Surface Area Per Parcel		
1. Gross area of each parcel a. Can be weighted by runoff coefficient or pollutant loads for each land use	Simplest of structures that use surface area.	Requires weighting factors to reflect different runoff characteristics.
2. Impervious area only a. Can be weighted by pollutant load for each land use	Common industry practice.	Relies on accurate impervious area data or on estimates. Ignores runoff from pervious areas.
3. Impervious and pervious area a. Can be weighted by runoff coefficient or pollutant loads for each land use	Improves equity when parcel sizes vary significantly.	Large parcels require special attention.
C. Combination of Charges		
1. Equal charge per parcel a. Covers costs common to all parcels PLUS	Equitable allocation of costs that are <u>not</u> related to parcel size.	None.
2. Charge per surface area per parcel a. Covers costs related to drainage capacity b. Either B1, B2, or B3 above	Equitable allocation of costs that are related to parcel size.	Most complex of structure.