City of San Diego Metro Wastewater System Functional-Design Based Billing Framework

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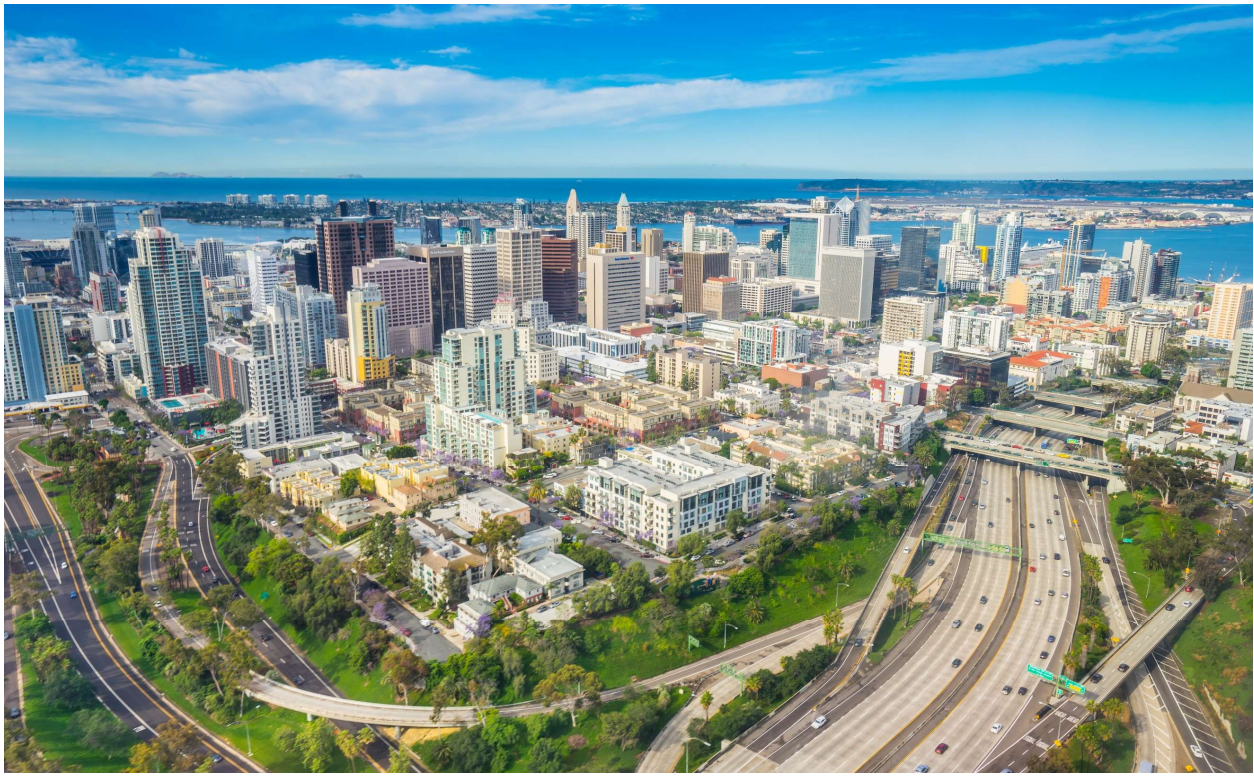

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Table of Contents

Executive Summary ..... **iii**
Definitions ..... **xi**
1 Introduction **1**
1.1 Project Background 2

2 Approach & Methodology **4**
2.1 Functional-Design Based Cost Allocation 4
2.2 Development of Metro System Allocation Factors 5
2.2.1 Allocation Framework Workshop 6

3 Allocation Factors **7**
4 Cost Distribution to Billed Components **10**
4.1 Updated Billing Parameters 11
4.2 Capital Cost Allocations 13
4.3 Flow, RSDP and Incremental Peak Capacity Allocation Framework 13
4.4 RSDP Cost Allocation and RSDP Cost Adjustment Factor 14
4.5 Resulting Cost Distribution to Billed Components 16

5 Fixed and Variable Charges **17**
6 Agency Bill Impacts **21**

List of Tables

Table 3-1: North City Water Reclamation Plant Functional Allocations 8
Table 3-2: South Bay Water Reclamation Plant Functional Allocations 8
Table 3-3: Point Loma Wastewater Treatment Plant Functional Allocations 8
Table 3-4: North City Water Reclamation Plant Design Allocations 9
Table 3-5: South Bay Water Reclamation Plant Design Allocations 9
Table 3-6: Point Loma Wastewater Treatment Plant Design Allocations 9
Table 4-1: Ownership and Use Billing Parameters 12

List of Figures

Figure 1-1: Current Direct Allocation Factors for Metro System Facilities 2
Figure 4-1: Cost Allocations to Strength and Flow-Related Parameters 14
Figure 4-2: Functional Cost Distribution to Billed Components (Based on FY 2019 Flows & Loadings) 16
Figure 4-3: Design Cost Distribution to Billed Components (FY 2019 Flows & Loadings) 17
Figure 5-1: Breakdown of Fixed and Variable Cost Recovery by Allocation Parameter (2024 Expenses and estimated 2024 Billing Units) 20
Figure 5-2: Breakdown of Fixed and Variable Cost Recovery by Allocation Parameter (2024 Expenses and estimated 2027 Billing Units) 21
Figure 6-1: Share of Total Costs by Agency under SBB and FAB Systems (FY 2024 Expenses and FY 2024 Estimated Billed Units) 24
Figure 6-2: Share of Total Costs by Agency under SBB and FAB Systems (FY 2024 Expenses and FY 2027 Estimated Billed Units) 24

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List of Appendices

Appendix A: Exhibit G
Appendix B: Exhibit B and FY 2019 SBB Table C

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Executive Summary

The City of San Diego's (City) Metropolitan Wastewater System (System) serves approximately 2.2 million residents through a regional network of sewage collection, treatment, and disposal facilities. Key infrastructure includes the Point Loma Wastewater Treatment Plant (PLWTP), North City Water Reclamation Plant (NCWRP), South Bay Water Reclamation Plant (SBWRP), the Metropolitan Biosolids Center (MBC), major pumping stations, interceptor pipelines, and ocean outfalls.

Governance is structured under the Amended and Restated Agreement (ARA) between the City and twelve Participating Agencies (PAs), forming the Metro Wastewater Joint Powers Authority (JPA). The City operates the System and bills PAs based on their wastewater flow and strength (measured by Total Suspended Solids (TSS) and Chemical Oxygen Demand (COD)), using a Strength Based Billing (SBB) framework established in 1998. This framework also included a fixed Existing Capacity Charge (ECC), used to recover the debt service costs associated with the expansion of the PLWTP, and discontinued in 2003 when the debt was defeased.

Due to evolving system dynamics, the City and Metro JPA initiated a comprehensive update to the billing methodology. Key drivers include:

- **System Evolution**: The Pure Water Program is transforming PLWTP's role and introducing potable reuse capabilities at NCWRP, changing cost allocations and facility functions.
- **Changes in Flows and Loads**: Shifts in population, water conservation, industrial activity, and new local treatment facilities are altering wastewater volumes and characteristics.
- **Need for a Dynamic Billing System**: The legacy SBB model lacks flexibility to reflect current and future usage patterns and infrastructure roles.

To address these changes, Stantec Consulting Inc. (Stantec) led the development of a new Functional-Design Allocation framework. This modernized approach introduces updated allocation factors, distinguishes fixed and variable costs, and incorporates new billing parameters such as reject streams from demineralization processes (RSDP) at advanced water purification facilities and Incremental Peak Capacity.

The City's updated Functional-Design Based billing framework introduces the Functional Allocation Billing (FAB) system, a modernized cost allocation approach that builds upon the legacy Strength-Based Billing (SBB) model. The FAB system employs a functional-design cost allocation methodology, widely used in wastewater cost-of-service (COS) analysis, to proportionally distribute both operating and capital costs among system users. A summary of the functional and design based allocation perspectives and uses are described below:

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- **Functional Allocations**: Applied to Operating & Maintenance (O&M) costs, these allocations reflect the function of the facilities during daily operations—such as pumping, treatment, and solids handling—and are driven by measurable parameters like Metered Flow and Strength loadings (e.g., COD and TSS).
- **Design Allocations**: Applied to capital costs, these reflect infrastructure sizing to meet peak conditions (e.g., wet-weather flows). They emphasize capacity needs and design drivers such as Average Annual Daily Flow and Incremental Peak Flow, as well as Strength loadings.

This dual-perspective approach enables costs to be assigned based on both actual usage and long-term infrastructure needs, providing a balanced and technically sound framework.

To develop an updated set of cost allocation factors, the project team convened a multi-disciplinary Allocation Framework Workshop, bringing together:

- City operations and engineering staff
- Consulting engineers
- Metro JPA finance and engineering consultants
- Financial advisors

Participants collaboratively evaluated unit processes at each facility (e.g., influent pumping, aeration, filtration) and estimated their relative asset values. These were then mapped to Flow, COD, and TSS parameters based on operational and design characteristics.

The result of this collaborative process is a set of allocation matrices that quantify each facility's cost contributions to Flow, COD, and TSS. These matrices form the foundation of the FAB system, enabling cost assignments that are proportional, reflecting actual system usage, and updated based on the latest information regarding System facilities and their cost drivers.

Updated Billing Parameters

While the SBB system used solely Metered Flow, COD and TSS to allocate costs and bill PAs for their use of the System, the FAB system will modify this approach with additional billing parameters. These modifications to the billing parameters will, a) include RSDP and Incremental Peak Capacity as billing parameters, and b) establish two distinct sets of billing parameters – Ownership parameters used to bill fixed charges, and Use parameters used to bill variable charges. These modifications allow the FAB system to more accurately reflect the cost drivers of the System without disincentivizing development of additional advanced water purification facilities in the region. This resulted in the development of an updated Table C of billing parameters for the City and PAs. The approach to integrating RSDP and Incremental Peak Capacity into the FAB system are described further below.

Capital Cost Allocations

The SBB system had used a single set of allocation factors, unchanged since 1998, for all capital cost allocations. The FAB framework will apply the facility-specific design-based allocation factors described above to future projects completed at each facility. This is a fundamental shift from a largely static allocation framework to a more detailed and dynamic approach.

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Integration of RSDP into FAB

The FAB framework explicitly recognizes RSDP at advanced water purification facilities as a distinct factor (commonly referred to as "brine" but explicitly defined as RSDP to avoid confusion with other sources of brine from retail customers, like industrial facilities, golf courses, breweries, etc.). This was an important addition to the cost allocation framework as the prior framework treated all wastewater uniformly, and there was no way to assign any costs specifically to RSDP from regional advanced water purification facilities. As the City and the East County agencies implement advanced water purification, and as a result begin to produce significant volume of high-strength sources of RSDP, a separate allocation factor was needed to handle the associated costs. It should be noted that costs allocated to RSDP are limited to solely a portion of costs at Pump Station 2 (PS2) and the PLWTP as these are the only facilities that will handle RSDP flows.

Integration of Incremental Peak Capacity into FAB

Additionally, the FAB framework incorporates peak flow capacity needs as part of the allocation and billing calculation. This update is an important modification as it recognizes that System costs are driven by more than simply the annual flows and loadings, and many of the costs (particularly capital costs) are driven by capacity needs during peak events. As a result, a new cost allocation category for Incremental Peak Capacity was added to the framework to account for each agency's overall capacity needs, regardless of actual annual flows. Including this allocation category allows the FAB framework to recover fixed costs associated with handling these peak flows, specifically at PS2 and PLWTP. This is especially important as agencies develop water reuse facilities that will greatly reduce average annual flows into the System, but capacity is still needed in the System for peak event discharges from those same agencies.

The resulting functional and design allocation factors, combined with the modifications to the billing components under FAB are presented below in Figure ES-1 and Figure ES-2, respectively.

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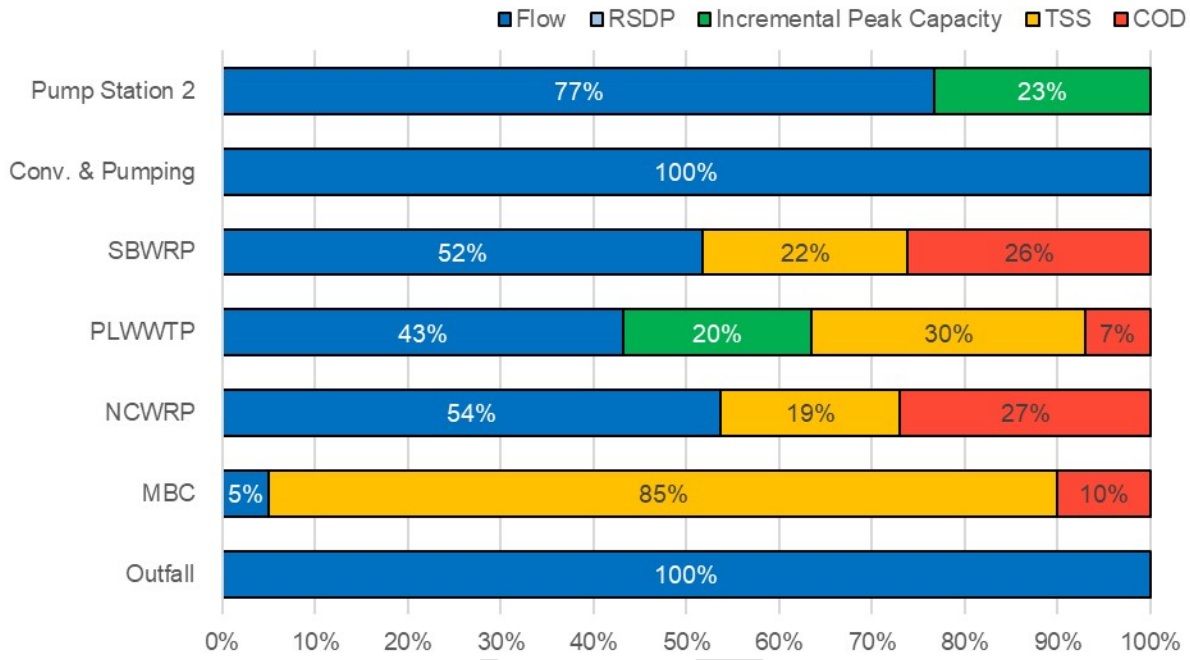

Figure ES-1: Functional Cost Allocation Factors (Based on FY 2019 Flows & Loadings)

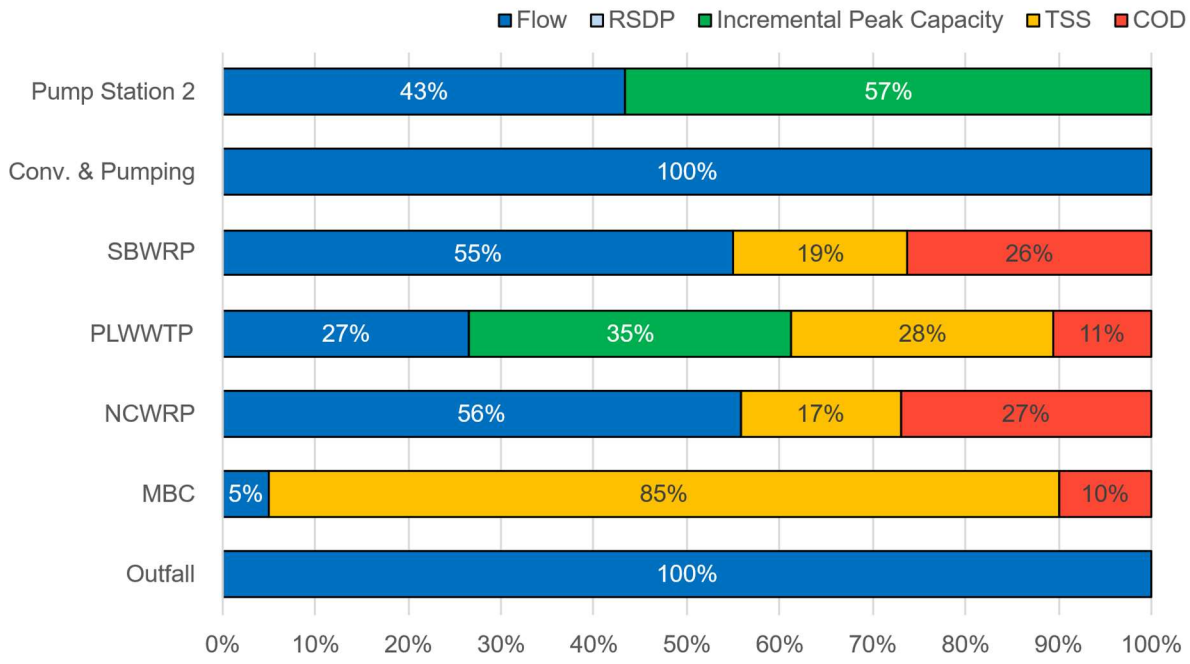

Figure ES-2: Design Cost Allocation Factors (Based on FY 2019 Flows & Loadings)

The FAB framework also introduces a modernized and proportional approach to distributing System costs among all parties. Four key changes were incorporated into the FAB system to enhance proportionality and to create a dynamic framework that can adapt as the region and System dynamics evolve over time.

After allocating costs to the billing parameters, the FAB system introduces a clear distinction between fixed and variable charges for the PAs and the City. Previously, under the Strength-Based Billing (SBB) system, nearly all costs were treated as variable and allocated annually based on each agency's wastewater Flow and Strength. The FAB system modernizes this approach by:

- **Establishing Fixed Charges:**
  Fixed costs—primarily capital investments and debt service—are now allocated based on long-term capacity needs, including Average Annual Daily Flow, average RSDP (Reject Stream from Demineralization Process) flow, Incremental Peak Capacity, and average COD/TSS strength. These allocations are based on projected 2050 capacity requirements established in Exhibit B of the SARA. Fixed billing units, termed "Ownership" units, represent each agency's reserved share of system capacity and form the basis for fixed charges.

- **Defining Variable Charges:**
  The vast majority of O&M costs, including variable costs and many O&M costs that are largely fixed in nature, are allocated annually based on actual Metered Flow and Strength. These "Use" units fluctuate year-to-year according to each agency's system usage.

- **Adaptive Framework:**
  The FAB system is designed to accommodate new facilities and evolving usage patterns without requiring fundamental changes to the billing structure. If an agency reduces its flow contribution (e.g., by developing its own treatment facilities), its variable charges decrease, but it continues to pay its share of fixed costs unless capacity is formally reallocated. This enhances stability and proportionality, preventing cost shifts that could disadvantage other agencies.

- **Components of Fixed Charges:**
  Fixed charges cover all capital costs (excluding certain legacy debt service), and select O\&M expenses, specifically:

    - Outfall O&M: Costs for ocean monitoring and regulatory compliance, which are completely fixed in nature and do not vary with the amount of flow in the System are recovered entirely through fixed charges.

    - Fixed O&M at PS2 and PLWTP: A portion of O&M at these facilities, particularly the maintenance portion responsible for handling peak flow events, are allocated to Incremental Peak Capacity and recovered through fixed charges.

- **Allocation Process for Determining Fixed Charges at PS2 and PLWTP:**
  O&M costs at PS2 and PLWTP are split into fixed and variable components. Variable costs (chemicals, energy, utilities) are allocated to Metered Flow and RSDP and recovered through variable rates. Fixed costs are distributed among Metered Flow, RSDP, and Incremental Peak Capacity billing units, proportional to each unit's share of facility capacity. Only the portion of fixed O&M costs attributable to Incremental Peak Capacity is recovered through fixed charges.

This approach aligns the billing framework with contemporary cost-of-service principles, enhances financial stability, and enhances proportional cost-sharing based on both usage and capacity rights. The FAB system

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is more adaptive and transparent, supporting future system changes and proportional cost recovery for all agencies.

The implementation of the FAB system will change how costs are distributed among the City and the PAs. Under the FAB framework, agencies will now see their bills divided into fixed and variable components, bringing greater predictability to annual billing, as agencies pay a stable base amount for their reserved capacity, reducing the volatility that previously resulted from year-to-year fluctuations in system usage, and volatility that would have been further exacerbated as flows are diverted from the System to new treatment facilities.

The introduction of Incremental Peak Capacity charges enables agencies to be billed not only for their Average Annual Daily Flows and Metered Flows, but also for their share of the system's readiness to handle peak events. This approach incentivizes agencies to invest in measures that reduce excessive stormwater intrusion as reducing peak flow needs can directly reduce future billing allocations. Even agencies that divert base flows to local reuse facilities will continue to pay for the standby capacity that must be maintained for them, supporting overall system resilience.

The introduction of RSDP as a billing parameter will enable only agencies that produce these unique waste streams to bear the associated costs, increasing transparency and ensuring that cost responsibility is assigned proportionally. It also allows for solely costs at System facilities involved in handling RSDP (i.e., PS2 and PLWTP) to be allocated to the RSDP billing component. As more agencies consider implementing advanced water purification projects, the FAB framework is designed to adapt, allowing for future adjustments to RSDP allocations and cost factors as new data becomes available.

Based on the findings and outcomes of this Study, and the proposed changes to the billing framework, agencies will see changes in their typical bills. Figure ES-3 presents the distribution of costs to each agency in percentage terms under the SBB and FAB system based on 2024 expenses and 2024 billed units. Figure ES-4 presents the same comparison, but based on 2024 expenses and estimated 2027 billed units, after the City and East County RSDP flows begin entering the system. Note that the City's share of RSDP-related costs are billed to the water utility, and are reflected in Figure ES-4 in the category "SD Water."

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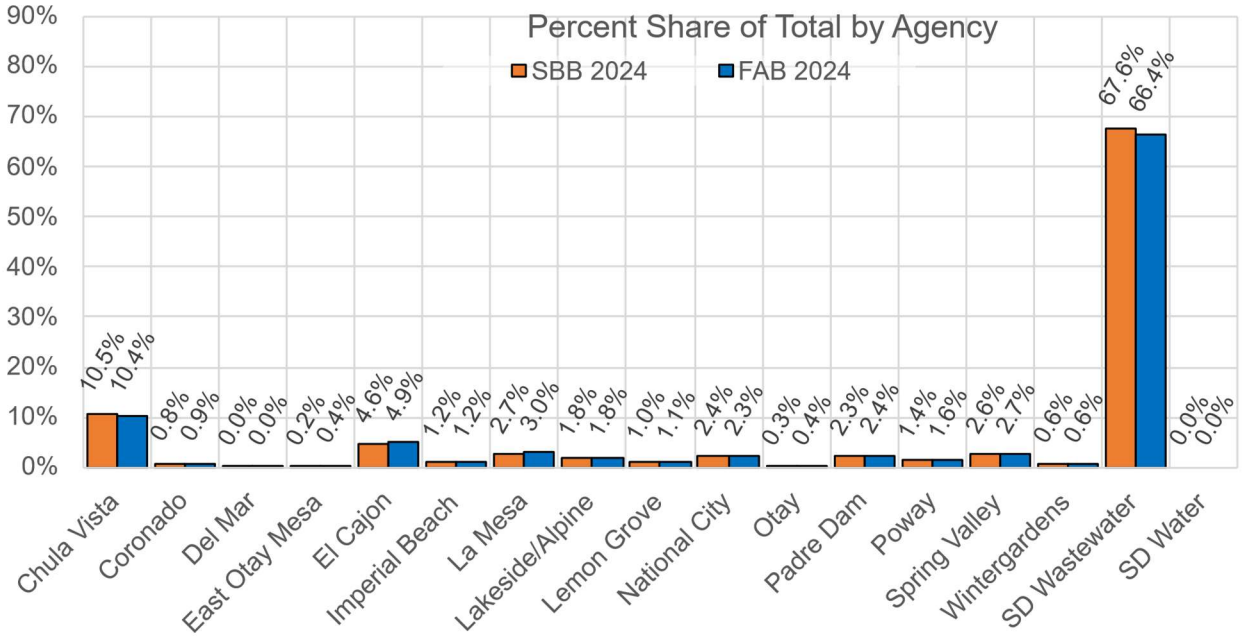

Figure ES-3: Share of Total Costs by Agency under SBB and FAB Systems (FY 2024 Expenses and FY 2024 Estimated Billed Units)

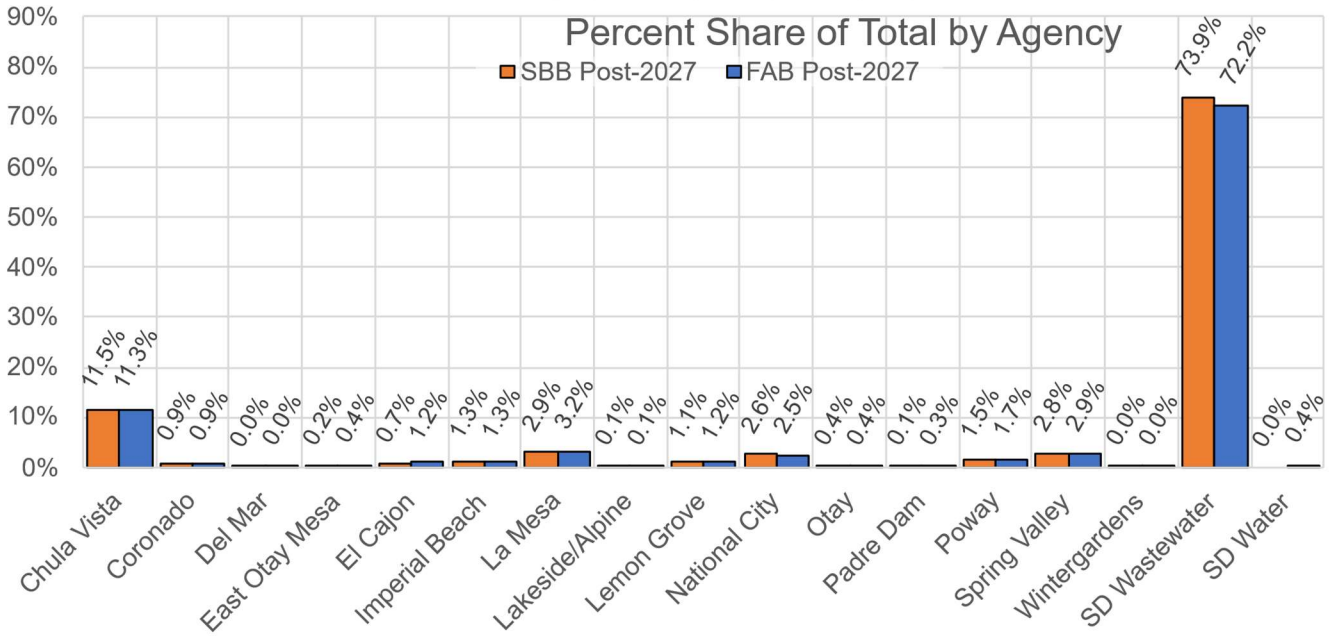

Figure ES-4: Share of Total Costs by Agency under SBB and FAB Systems (FY 2024 Expenses and FY 2027 Estimated Billed Units)

Overall, the FAB system moderates the impact of these changes, with most agencies experiencing only modest adjustments to their total bills. The framework is structured to avoid extreme increases or decreases, easing the transition and ensuring that cost recovery remains proportional to both average use and peak demand. By aligning billing practices with contemporary cost-of-service principles, the FAB system supports financial sustainability, fairness, and adaptability for the City of San Diego and its regional partners.

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Definitions

Annual Average Daily Flow is the number, in millions of gallons of wastewater per day ("**MGD**"), calculated by dividing total Flow on a fiscal year basis by the number of days in the applicable year, which is a term used for billing purposes.

Contract Capacity is the contractual right possessed by each Participating Agency to discharge wastewater into the Metro System pursuant to this Agreement up to the limits set forth in **Exhibit B**, **Distribution of Wastewater System Capacity Rights**

Fixed Capacity shall mean the capacities for Monthly Average Daily Flow, Incremental Peak Flow, RSDP, COD and TSS for each agency as set forth in Exhibit B.

Fixed Capacity Charge shall mean the charges set forth in Exhibit B that are identified as "Fixed Capacity Charges" that represent the Parties' proportional charges for maintaining the Metro System. Items such as debt service are also included in the Fixed Capacity Charges.

Flow shall refer to the flow of wastewater discharged by the City and/or one or more Participating Agency/ies into the Metro System.

Functional Allocated Billing or **FAB** shall mean the method for distributing all capital, operations, and maintenance Metro System Costs and Revenues on an annual basis by grouping expenses according to their purposes and the current approved Functional-Design Methodology.

Functional-Design Methodology shall mean the process of allocating fixed and variable Operation and Maintenance Costs and Capital Improvement Costs to Flow, RSDP and Strength parameters recognizing the benefits of both the design criteria and the primary function of a unit process.

Incremental Peak Flow shall mean the Peak Flow minus the Monthly Average Daily Flow.

Metered Flow shall mean the amount or volume of wastewater captured by meters that exist throughout the Metro System, estimates from unit count areas, or agreed upon estimates of flows where unit counts are not appropriate. When meters are out of service, estimates can be used to fill in data gaps. These meters, which may or may not be owned by the City, are further defined in **Exhibit F, Metro System Flow Formulas and Sampling Locations**, which may be amended from time to time.

Monthly Average Daily Flow is the number, in MGD, calculated by dividing total Flow on a monthly basis by the number of days in that month.

Peak Flow represents the wastewater flow in millions of gallons of wastewater per day that is captured in the highest 1-hour period in a fiscal year.

Reject Stream from Demineralization Process or **RSDP** is a flow reject stream and treatment byproduct from a demineralization process at a potable reuse facility. Separately conveyed, it bypasses all secondary wastewater treatment processes. This flow primarily contains liquid and salts.

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Strength means the measurement of Total Suspended Solids and Chemical Oxygen Demand within the Flow and any other measurement required by law after the date of this Agreement or necessary for the Functional Design Methodology.

Variable Costs shall refer to the portion of the Functional Design Methodology costs that are allocated based on Metered Flow and Strength.

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1 Introduction

The Metropolitan Wastewater System (System) of the City of San Diego (City) is a regional sewage collection, treatment, and disposal network serving approximately 2.2 million people in the San Diego region. This system includes major facilities such as the Point Loma Wastewater Treatment Plant (PLWTP), an advanced primary cornerstone treatment facility with a permitted capacity around 240 million gallons per day, two water reclamation plants, the North City Water Reclamation Plant (NCWRP) (approximately 30 MGD capacity), and South Bay Water Reclamation Plant (SBWRP), (approximately 15 MGD capacity) that produce reclaimed water, the Metropolitan Biosolids Center (MBC) for sludge processing, two large pumping stations and interceptor pipelines, and two ocean outfall pipelines for treated effluent discharge into the Pacific Ocean.

The City and Metro Wastewater Joint Powers Authority (JPA) relationship is governed by the Amended and Restated Agreement (ARA). The City owns and operates the System and provides treatment services to both City residents and twelve other Participating Agencies (PAs) in the region. These participating agencies (neighboring cities and special districts) collectively form the Metro Wastewater JPA. The JPA member agencies deliver their wastewater to the System and in return pay their proportionate share of the system's costs. The arrangement allows the regional partners to share the benefits and costs of large-scale treatment facilities: The City acts as the regional service provider and the Metro Wastewater Commission enables each agency to have an advisory voice in oversight and management.

The terms governing the PAs use of the City's wastewater treatment system are provided for in a Regional Wastewater Disposal Agreement between the City and the PAs. The City charges the PAs for use of its wastewater treatment facilities to recover the operating and capital costs associated with that use, and those charges are based on the strength and flow of wastewater from each PA. These expenses are allocated through a functional design method that allocates facilities' costs to the strength and flow characteristics according to their function. In addition, the capital costs and associated debt service for the Phase 1 construction project are allocated as fixed charges based on Exhibit G to the ARA. Exhibit G is provided in Appendix A. At present, the majority of annual charges to PAs, except those associated with Phase 1 construction, are entirely based on the flow amount and strength of wastewater that they send to the City for treatment.

The City is also in the process of implementing the Pure Water Program, which will allow for the treatment of wastewater to potable levels to allow for beneficial reuse. Several PAs are implementing similar programs as well, which will impact the strength and flow of wastewater they send to the City for treatment.

The City and the PAs are currently adopting the Second Amended and Restated Regional Wastewater Disposal Agreement (SARA), which calls for the City to consider in good faith alternative billing methodologies for Metro System Costs. As a result, the City contracted with Stantec to review and update the allocation factors used in the current functional-design approach for existing and planned wastewater facilities, to review the existing billing system for appropriateness, and to propose potential alternative billing systems that include fixed charges to PAs for ongoing and future use or capacity rights to the System. This report summarizes the background, approach, methodology, and results of the *City of San Diego Metro Wastewater System Functional-Design Based Billing Framework* study (Study).

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1.1 Project Background

In 1998, the City and PAs established a "strength-based" cost allocation framework as part of the Regional Wastewater Disposal Agreement (referred to as the Strength Based Billing, or SBB system). Under the SBB framework – which formed the basis of Metro System billing for over two decades – all regional wastewater treatment and disposal costs were allocated among the City and PAs in proportion to each agency's contributed flow volume and wastewater strength, specifically the loadings of Total Suspended Solids (TSS) and Chemical Oxygen Demand (COD). This SBB system of charges was developed through an engineering analysis of each Metro facility's function and design drivers. A Functional-Design Methodology was applied in 1998 to determine what fraction of each process's costs were attributable to treating flow vs. removing pollutants. For example, pumping stations and ocean outfalls (pure conveyance/disposal facilities) were deemed 100% flow-dependent and thus their costs were assigned entirely based on Metered Flow, while treatment processes were split between Metered Flow and strength according to their primary role. These individual process allocations were used to derive overall cost-sharing percentages for the System and PAs. Each PA's annual bill can be calculated by applying these factors to its share of total Metered Flow (mgd) and Strength (pounds of TSS and COD) for the period. This approach was intended to charge each agency in proportion to how much it "used" the regional facilities, reflecting both hydraulic loading and treatment demand. The framework was codified in the 1998 Agreement and included provisions for continuous monitoring of Flow and periodic sampling of wastewater Strength, annual audits, and year-end adjustments to ensure agencies paid their fair share based on actual usage. These allocation factors have not been updated since their creation in 1998. Figure 1-1 presents a breakdown of the direct allocation factors under the existing SBB system.

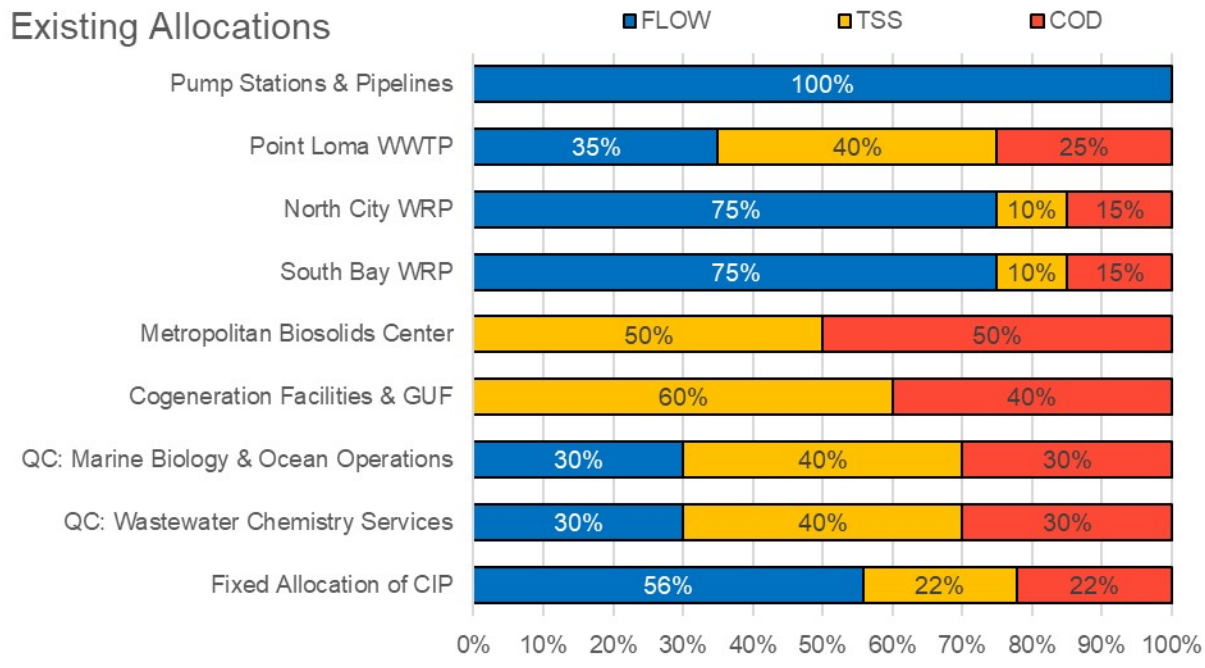

Figure 1-1: Current Direct Allocation Factors for Metro System Facilities

In addition to the flow and strength (i.e., SBB) charges established under the 1998 Regional Wastewater Disposal Agreement to recover Operations and Maintenance (O&M) and Capital Costs, an additional fixed capacity charge—known as the *Existing Capacity Charge (ECC)*—was implemented.

The ECC was calculated based on each Participating Agency's allocated capacity as identified in Exhibit B of the Agreement. Its purpose was to recover the cost of debt service associated with the expansion of the Point Loma Wastewater Treatment Plant and other regional improvements constructed to accommodate the Participating Agencies' flows.

This charge remained in effect until 2003, at which time the related debt service obligations were fully defeased and the ECC was discontinued.

As significant time has passed since the existing billing framework was developed, and with notable changes having occurred and expected to occur within both the System and the surrounding region, an update through a new rate study has become necessary. The major changes driving this update are highlighted below:

- **System Evolution:** The City is currently in Phase 1 of the Pure Water Program to construct a potable reuse system at the NCWRP. One of the key factors that led the City to move forward with its Pure Water Program was a mandate to the City from the Regional Water Quality Control Board to upgrade the PLWTP from advanced primary, operated through a waiver of the Clean Water Act, to secondary treatment standards. Rather than upgrade PLWTP to full secondary standards, the City determined it could address the water quality issues through a reuse system that would divert flows away from PLWTP, and produce a new source of drinking water. This is a continuation of earlier trends to produce Title 22 recycled water as a way to offload PLWTP discharges, which was the major program that shaped the adoption of the 1998 Agreement. As a result, a portion of the Pure Water Program costs are allocable to the Metro Wastewater System as wastewater-related costs. This will also fundamentally change PLWTP's role in the System as it transitions from a major treatment facility with an ocean outfall for nearly all wastewater from the region, to primarily serving as a treatment plant for peak storm events and regional sources of discharge from advanced water purification facilities.

- **Changes in Flows and Loads:** The volumes of wastewater and the pollutant concentrations from each participating agency have shifted over time due to population growth, water conservation efforts, industrial/commercial changes, and planned diversions. Additionally, some agencies are planning to divert a portion of their Flow to new local facilities, including the East County agencies (consisting of El Cajon, Lakeside/Alpine, Padre Dam, and Wintergardens) who are constructing their own advanced water purification plant. This affects the Metered and Annual Average Daily Flows and Strength coming from these agencies after the facilities are constructed, and the Peak Flow of each agency in the System.

- **Need for a Dynamic Billing System:** After two decades, the billing framework was due for an update that would align costs to the billing parameters based on current and future conditions. This not only necessitated an update to the existing allocation factors, but also required a new system that could be updated over time to adjust to evolving conditions in the System and within the region. The updated methodology is designed to continue aligning costs with actual system usage, while

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also recognizing the costs associated with maintaining capacity for all Participating Agencies—including those that may divert a significant portion of their flows from the System, while avoiding disincentivizing future potable reuse projects.

In light of these drivers, the City, working with the Metro Wastewater JPA (Metro JPA), initiated a comprehensive study to revise the billing framework. The objective of the project was to develop a *Functional-Design Allocation* framework that reflects modern system operations and assigns costs based on the functions and capacities of each component of the System. Stantec was engaged as a consultant to perform this analysis jointly with City staff, and JPA staff and consultants. The outcome of this effort is a new cost allocation approach that will replace the old strength-based formula for future billing periods. This report summarizes the new framework, its underlying logic, the differences from the prior method, the allocation factors determined for each part of the system, and the resulting impacts on agency cost shares using 2024 data (as well as a projected 2027 scenario).

2 Approach & Methodology

Both the existing SBB system, and the proposed billing framework are based on the "functional-design" based allocation methodology. The proposed billing framework is referred to as the "Functional Allocation Billing" (FAB) system. This section describes this methodology and explains how the approach was applied in this specific Study.

2.1 Functional-Design Based Cost Allocation

The functional-design cost allocation methodology is a common approach used in wastewater cost-of-service (COS) analysis to recognize that costs are driven by both the day-to-day operation of facilities and the long-term design of infrastructure to meet system capacity requirements. The functional-design cost allocation methodology addresses this by combining two complementary perspectives—functional allocation and design allocation—enabling both operating and capital costs to be assigned to customers in a proportional and technically defensible way.

- **Functional Allocations:**
    - Functional allocations are generally applied to operating and maintenance (O&M) costs to reflect the daily operations of the different facilities in the system. Costs are distributed according to the actual functions performed, such as collection, pumping, treatment, and solids handling. For example, many treatment plant operating costs—chemicals, electricity for pumps, and energy for blowers—are primarily driven by flow and strength. Biological treatment processes require continuous aeration, and chemical addition for disinfection or nutrient removal is proportional to the volume and strength of wastewater treated. Because these costs are tied to ongoing system use, functional allocations typically rely on factors such as flow and strength (i.e., COD and TSS).

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- **Design Allocations:**
    - Design allocations are typically applied primarily to capital costs, which reflect the investment required to build and replace/rehabilitate facilities sized to meet peak conditions. Wastewater treatment plants, pump stations, and interceptors are designed to handle peak wet-weather flows, infiltration and inflow, and other extreme loading conditions that may occur intermittently. For example, while flow largely determines certain elements of daily operations, peak hydraulic capacity often dictates the size (and therefore design and construction cost) of treatment basins, clarifiers, and conveyance facilities. As a result, design-based allocations typically place a greater emphasis on capacity needs and the factors influencing the design of the system.

By combining these approaches, the functional-design cost allocation methodology employed in this Study allows for differentiation between allocation factors based on the two views of the system, and provides a balanced framework for wastewater cost allocation, as follows:

- **O&M costs** are allocated on a functional basis, reflecting Metered or Average Annual Daily Flow and pollutant Strength (i.e., COD and TSS loadings) that drive daily operation.
- **Capital costs** are allocated on a design basis, reflecting the system's Average Annual Daily Flow, Incremental Peak Flow, and average Strength loadings to reliably convey and treat wastewater during peak events.

This dual-basis allocation allows for nuance between facilities, and between cost types to ultimately allocate System costs to users based on their use and needs of the System.

2.2 Development of Metro System Allocation Factors

A critical component of the COS analysis was the development of system allocation factors that assign costs to the appropriate parameters of flow, COD, and TSS across the City's wastewater treatment facilities. The goal of this effort was to ensure that both operating and capital costs could be allocated in a manner that accurately reflects how each facility and process contributes to system operations and capacity.

The analysis began with a detailed review of the City's asset register data. The intent was to allocate each category of assets directly to the allocation factors. In theory, this approach would allow a high-resolution mapping of system value by tracing specific asset categories (e.g., pumping equipment, treatment basins, and disinfection systems) to the functional or design drivers associated with Flow and Strength; however, upon completing a first draft set of allocation factors using this approach, it became clear that the level of detail and consistency in the asset data varied significantly between facilities over time, because accounting standards became more stringent after the original facilities were brought online. Some new facilities had highly detailed asset records that could be mapped directly to treatment processes, while others had aggregated or incomplete data that limited comparability. Because of these inconsistencies, the asset-register-driven approach could not be used as the primary method for developing allocation factors.

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2.2.1 Allocation Framework Workshop

Recognizing the challenges associated with consistent asset data across System facilities, the project team pivoted to a more practical and collaborative approach, relying on a multi-disciplinary team of experts with a broad base of knowledge regarding the design and operations of the System. To achieve this, an all-day workshop was convened that brought together:

- City operations staff,
- City engineers,
- Consulting engineers engaged by the City,
- Metro JPA finance and engineering consultants,
- City finance staff, and
- The City's financial consultants.

This workshop served as the central forum for building consensus around allocation methodologies and specific allocation factors for the billing framework.

During the workshop, participants first reviewed the unit processes at each treatment facility, including the MBC (note: digesters at PLWTP are combined with MBC facilities for purposes of cost allocations as the digesters serve a similar role in the treatment process and solids handling as the facilities at MBC). For each facility, staff and consultants estimated the relative value of each major unit process at the facilities in percentage terms. These included the following categories (not all categories were applicable to all facilities):

- Influent pumping,
- Screening,
- Grit removal,
- Primary sedimentation,
- Aeration,
- Secondary clarification,
- Digesters,
- Chemical systems,
- Tertiary filtration, and
- Post-clarifier.

The relative value of each unit process could then be calculated based on the total asset value of each treatment plant, distributed across each unit process using the estimated percentages.

Once the relative process values were estimated, the group proceeded to map each unit process to the parameters of flow, COD, and TSS. For example, influent pumping was assigned 100% to flow, while grit removal was split between 75% to flow and 25% to TSS (in the design-based allocations). This exercise was repeated for all major treatment facilities. It should be noted that MBC was treated as one unit process given the facility's specific role in handling biosolids. The allocation factors for MBC vary over time as the City's Pure Water Phase 1 and Phase 2 are expected to change the nature of the solids treated at MBC, as the system as a whole shifts from advanced primary (TSS removal focused) to more advanced treatment (BOD removal increased).

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Functional vs. Design Perspectives

To provide balance and detail, the allocation process incorporated both functional-based and design-based perspectives:

- **Functional allocations** drew heavily on the input of operations staff, who understand the day-to-day drivers of chemical use, energy consumption, and labor needs at each process stage.
- **Design allocations** relied on the expertise of engineering staff and consulting engineers, who focused on the design capacity requirements of facilities and how system sizing relates to peak loadings and long-term infrastructure needs.

The outcome of this collaborative process was a set of allocation matrices that quantify the share of each facility's value attributable to the categories of Flow, COD, and TSS. These matrices, developed through a combination of operational insights and engineering judgment, were then aggregated to produce a single set of allocation factors for each facility. These factors establish the approved Functional-Design Allocation methodology and form the foundation for assigning costs to Flow, COD, and TSS within the proposed FAB system.

3 Allocation Factors

Based on the approach and methodology described in Section 2 and the specific outcomes from the cost allocation workshop discussed in Section 2.2.1, allocation factors were developed for each major facility of the System. Under the SBB system, a high-level set of factors was applied uniformly to allocate costs for most facilities in the System. For example, the SBWRP and NCWRP had identical allocation factors under the SBB system. The Functional-Design Allocation framework replaces this with facility-specific allocations based on the unit processes at each facility.

This initial step of determining allocation factors for each System facility creates the set of factors to distribute costs to the general parameters of Flow, COD and TSS. The tables below present the percent distribution of each treatment facility's asset value across the unit processes, and the functional and design allocations of each unit process to the allocation parameters of Flow, TSS and COD. The final row of each table represents the overall allocation factors for costs associated with each treatment facility. These cost categories are further dissected into different flow-related components, and into fixed and variable units for purposes of distributing costs to set of billable units to ultimately calculate charges to the City and each PA. These details of the FAB system are discussed in Section 4 and 5.

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Table 3-1: North City Water Reclamation Plant Functional Allocations

Processes	Cost Weight	Flow	COD	TSS
Influent Pump Station	**5%**	100%	0%	0%
Screening	**3%**	90%	0%	10%
Grit Removal	**7%**	50%	0%	50%
Primary Sedimentation	**25%**	50%	0%	50%
Aeration	**40%**	50%	50%	0%
Secondary Clarification	**20%**	50%	35%	15%
Tertiary Filtration	**0%**	50%	0%	50%
North City Water Reclamation Plant Functional Allocation	**100%**	**53.7%**	**27.0%**	**19.3%**

Table 3-2: South Bay Water Reclamation Plant Functional Allocations

Processes	Cost Weight	Flow	COD	TSS
Influent Pump Station	**0%**	100%	0%	0%
Screening	**5%**	85%	0%	15%
Grit Removal	**10%**	50%	0%	50%
Primary Sedimentation	**25%**	50%	0%	50%
Aeration	**35%**	50%	50%	0%
Secondary Clarification	**25%**	50%	35%	15%
Tertiary Filtration	**0%**	50%	0%	50%
South Bay Water Reclamation Plant Functional Allocation	**100%**	**51.8%**	**26.3%**	**22.0%**

Table 3-3: Point Loma Wastewater Treatment Plant Functional Allocations

Processes	Cost Weight	Flow	COD	TSS
Screening	**10%**	90%	0%	10%
Grit Removal	**15%**	50%	0%	50%
Primary Clarifier	**50%**	60%	10%	30%
Chemical Systems	**20%**	60%	10%	30%
Post-Clarifier	**5%**	100%	0%	0%
Point Loma Wastewater Treatment Plant Functional Allocation	**100%**	**63.5%**	**7.0%**	**29.5%**

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Table 3-4: North City Water Reclamation Plant Design Allocations

Processes	Cost Weight	Flow	COD	TSS
Influent Pump Station	**5%**	100%	0%	0%
Screening	**3%**	100%	0%	0%
Grit Removal	**7%**	75%	0%	25%
Primary Sedimentation	**25%**	50%	0%	50%
Aeration	**40%**	50%	50%	0%
Secondary Clarification	**20%**	50%	35%	15%
Tertiary Filtration	**0%**	50%	0%	50%
North City Water Reclamation Plant Design Allocation	**100%**	**55.8%**	**27.0%**	**17.3%**

Table 3-5: South Bay Water Reclamation Plant Design Allocations

Processes	Cost Weight	Flow	COD	TSS
Influent Pump Station	**0%**	100%	0%	0%
Screening	**5%**	100%	0%	0%
Grit Removal	**10%**	75%	0%	25%
Primary Sedimentation	**25%**	50%	0%	50%
Aeration	**35%**	50%	50%	0%
Secondary Clarification	**25%**	50%	35%	15%
Tertiary Filtration	**0%**	50%	0%	50%
South Bay Water Reclamation Plant Design Allocation	**100%**	**55.0%**	**26.3%**	**18.8%**

Table 3-6: Point Loma Wastewater Treatment Plant Design Allocations

Processes	Cost Weight	Flow	COD	TSS
Screening	**10%**	100%	0%	0%
Grit Removal	**15%**	75%	0%	25%
Primary Clarifier	**50%**	50%	15%	35%
Chemical Systems	**20%**	50%	15%	35%
Post-Clarifier	**5%**	100%	0%	0%
Point Loma Wastewater Treatment Plant Design Allocation	**100%**	**61.3%**	**10.5%**	**28.3%**

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Several important overarching themes guided the development of the allocation factors presented in the prior tables.:

- The two water reclamation plants include unit processes for tertiary filtration; however, because those assets are associated with producing non-potable recycled water and Pure Water, the costs associated with tertiary filtration are not included in the calculation of allocation factors and are instead charged to the City's water utility.
- Design allocations at the two water reclamation plants are weighted slightly more heavily toward flow, and slightly less toward TSS compared to the functional allocations. This reflects the key factors influencing the design and sizing of these facilities versus the day-to-day operations, including the fact that the amount of flow handled at these facilities is more closely linked to the design and resulting size of the facilities than the amount of TSS removed.
- Differences between functional and design allocations at PLWTP vary slightly across the unit processes, and the overall allocations lean a little more heavily toward COD removal in the design allocations.

In addition to the allocation factors for each treatment facility, allocation factors were also established for the following categories of expenses:

- Conveyance pipelines, PS2, and other conveyance and pumping assets are allocated 100% to Flow.
- Outfall related expenses, which include regulatory compliance and ocean monitoring costs, are allocated 100% to Flow.
- All existing System debt for Clean Water debt financing occurring prior to the development of the new framework will be allocated based on the capital cost allocation factors from the SBB system.

4 Cost Distribution to Billed Components

Building on the general approach, methodology and cost allocation workshop described in Section 2, and the allocation factors presented in Section 3, costs must be further distributed to the components used to assess charges to the City and PAs under the FAB system. Several important changes to allocating costs and distributing costs to billable components were proposed in transitioning to the FAB system:

- **Updated Billing Parameters:** The SBB system used solely Metered Flow, COD and TSS to allocate costs and bill PAs for their use of the System. The FAB system will modify this approach to, a) include reject streams from demineralization processes (RSDP) at advanced water purification facilities and Incremental Peak Capacity as billing parameters, and b) establish two sets of billing parameters – Ownership parameters used to bill fixed charges, and Use parameters used to bill variable charges. These billing parameters and the distribution of each among each PA and the City is documented in Table C, distributed as part of the yearly budget estimate in January and reconciled as part of the annual audit by City staff, which is included in Appendix B for FY24.

DRAFT

- **Capital Cost Allocations:** The SBB system had used a single set of allocation factors, unchanged since 1998, for all capital cost allocations. The FAB framework will apply the facility-specific design-based allocation factors from Section 3 to future projects completed at each facility and associated debt. This is a fundamental shift from a largely static allocation framework to a more detailed and dynamic approach.

- **Integration of Additional Cost Parameters:** The FAB framework incorporates peak flow capacity needs as part of the allocation and billing calculation. This update is an important modification as it recognizes that System costs are driven by more than simply the annual flows and loadings, and many of the costs (particularly capital costs) are driven by capacity needs during peak events. As a result, a new cost allocation category for **Incremental Peak Capacity** was added to the framework to account for each agency's overall capacity needs, regardless of actual annual flows. Including this allocation category allows the FAB framework to recover fixed costs associated with handling these peak flows, specifically at PS2 and PLWTP. This update is especially important as agencies develop water reuse facilities that will greatly reduce average annual flows into the System, but capacity is still needed in the System for peak event discharges from those same agencies. The approach to allocating costs to Incremental Peak Capacity is discussed further in Section 4.3.

  Additionally, the FAB framework explicitly recognizes **RSDP at advanced water purification facilities** as a distinct factor (commonly referred to as "brine" but explicitly defined as RSDP to avoid confusion with other sources of brine from retail customers, like industrial facilities, golf courses, breweries, etc.). This was an important addition to the cost allocation framework as the prior framework treated all wastewater uniformly, and there was no way to assign any costs specifically to RSDP from regional advanced water purification facilities. As the City and the East County agencies implement advanced water purification, and as a result begin to produce significant volume of high-strength sources of RSDP, a separate allocation factor was needed to handle the associated costs. It should be noted that costs allocated to RSDP are limited to solely a portion of costs at Pump Station 2 (PS2) and the PLWTP as these are the only facilities that will handle RSDP flows. The approach to incorporating RSDP into the billing framework is further described in Section 4.4.

In summary, the move to the FAB framework represents a modernization of the cost-sharing approach. It moves from a generalized allocation to one that is detailed and reflective of actual system use and each agencies capacity needs. New factors (including the RSDP and Incremental Peak Capacity) have been incorporated to reflect current and projected system conditions and financial needs, and the SBB allocation percentages have been revised based on the most recent system operation. These changes are intended to better reflect costs and enable cost-sharing to remain proportional and adaptive to future changes in the System or in each agency's level of use.

4.1 Updated Billing Parameters

The current SBB framework allocates costs to variable billing units summarized by agency in "Table C" of the billing calculations. As stated previously, the current Table C currently allocates the majority of capital and O&M costs based on the variable parameters of Metered Flow and Strength of TSS and COD that

serve as the basis to allocate costs in each cost category to each agency. In addition, Table C allocates the Phase 1 construction costs based upon Exhibit G fixed capacity charges. This approach required modifications for three primary reasons:

1. As RSDP becomes a significant waste stream in the System, the FAB system needed to include a RSDP billing parameter to enable charges to be assessed based on RSDP flows. Details on the approach to charging for RSDP are provided in Sections 4.3 and 4.4.

2. In recognition of the fact that wastewater systems and their costs are partially linked to the size of the System and the total System capacity, Incremental Peak Capacity was added as a billing parameter to the to allow each PA and the City to be charged based on their needs for capacity in the System. Details regarding the approach to charging for Incremental Peak Capacity are provided in Section 4.3.

3. In order to meet the objective of developing a set of fixed charges as part of the FAB update, Table C was updated to include two sets of billing parameters. These include billing parameters that are largely fixed, represented by “Ownership” units, and billing parameters that will vary each year, represented by “Use” units. The Ownership units will serve as the basis for fixed charges, discussed further in Section 5.

The details regarding billing for RSDP and Incremental Peak Capacity are described in subsequent sections of the report. Focusing on the Ownership and Use billing parameters, these are established to acknowledge that many of the System costs do not vary based on annual fluctuations in Flow and Strength. Ownership units for each PA and the City are based on projected 2050 Average Annual Daily Flow and Strength contributions into the System, and projected 2050 Peak Capacity needs. While these are largely fixed, the SARA includes provisions to allow PAs to modify these billing units under specific conditions. Table 4-1 outlines the Ownership and Use billing parameters included in the FAB system. The updated Table C is provided in Appendix B

Table 4-1: Ownership and Use Billing Parameters

Ownership Units	Use Units
Average Annual Daily Flow	Metered Flow
Average RSDP Flow	Metered RSDP Flow
Incremental Peak Capacity	
Average COD Strength	Measured COD Strength
Average TSS Strength	Measured TSS Strength

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4.2 Capital Cost Allocations

As described above, the prior framework has used the same allocation factors to allocate capital costs since the SBB system's creation in 1998. These allocation factors were based on the projected value of assets and functional-design allocation methodology at the time. These allocation factors were used to allocate all capital costs, including debt service and pay-as-you-go (PAYGO) capital, from 1998 to present day.

One key change in the FAB framework is increased specificity in capital cost allocations. Under the FAB framework, capital costs will be allocated based on the facility where actual projects are completed each year and the funding mechanisms for those projects. For example, all PAYGO projects completed each year will be documented, and the allocation factors from the corresponding facilities at which the projects were completed will be assigned to those project costs. These allocated project costs can then be summed by allocation category to calculate a unique allocation of PAYGO capital costs each year. The same process will be repeated for projects financed with bonds, loans, and grants (grants would represent negative expenses, or capital cost offsets in this case) to allocate future debt service payments. Unique sets of allocation factors will be determined for each bond issuance with the understanding that bonds typically fund multiple projects, potentially at multiple System facilities. This will allow a distinct calculated set of allocation factors to be assigned to the debt service for each issuance based on the projects funded so the associated payments can continue to be allocated accordingly over the term of the debt.

4.3 Flow, RSDP and Incremental Peak Capacity Allocation Framework

As discussed previously, a key change in the FAB framework is the addition of Incremental Peak Capacity as a cost allocation category. A significant portion of any wastewater utility's costs are fixed in nature and do not vary with daily or annual wastewater flows. These include capital costs, which are directly tied to the design criteria of each element of the System infrastructure, and which are driven primarily by capacity needs rather than average flows. Additionally, maintenance costs are often more closely related to the size of the infrastructure being maintained than the amount of flow handled by the System on a daily or annual basis. As such, the introduction of an Incremental Peak Capacity component into the FAB system enhances the equitability of the billing structure to enable costs related to owning, operating and maintaining a system designed and built to handle peak flow events to be partially billed based on PA's Incremental Peak Capacity needs.

This is of particular importance at this time as agencies prepare to construct large upstream water reuse facilities that will ultimately divert wastewater flows away from the System on an average daily basis. While these reuse facilities will reduce the average daily and annual flows, they are not designed to be capable of handling peak storm events. As a result, these agencies will require a greater share of the peak capacity in the System as compared to their share of Average Annual Daily or Metered Flow.

To incorporate these Peak Flow elements into the FAB system, costs that are allocated to the Flow component of the allocation framework described in Section 3 are to be further distributed to the three billing components related to all flow-related costs, which are Flow (Average Annual Daily Flow or Metered

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Flow), RSDP, and Incremental Peak Capacity. Costs allocated to the "flow" category of allocation factors can then be allocated to the individual components of Flow, RSDP and Incremental Peak Capacity based on the percentage share each of those components represent within the total System capacity. This approach of beginning with a generalized Flow allocation category, followed by further dissection into components of all flow in the System, allows the FAB framework to be dynamic to changing usage and capacity needs from the City and PAs over time as the distribution of costs to the components of Flow, RSDP and Incremental Peak Capacity are based on system usage and can be adjusted as appropriate. Figure 4-1 presents a summary of this allocation framework, and the relationship between the three cost allocation factors and the flow-related billing components.

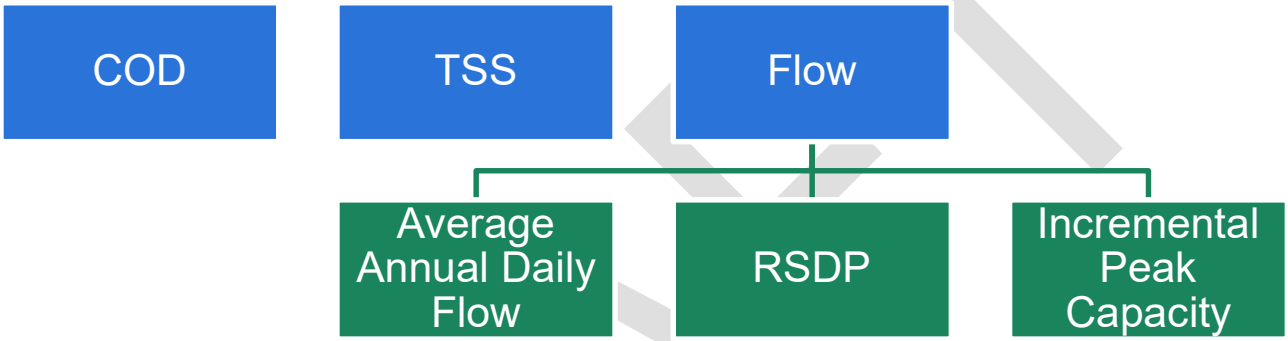

Figure 4-1: Cost Allocations to Strength and Flow-Related Parameters

The framework presented in Figure 4-1 would be used to allocate fixed flow-related costs based on Average Annual Daily Flow, Average Annual Daily RSDP and Incremental Peak Capacity. The framework is the same for variable costs, but would exclude Incremental Peak Capacity and would allocate flow-related costs based on Metered Flow and Metered RSDP. The only modification on this calculation is the weighting of RSDP flows with the RSDP cost adjustment factor discussed in Section 4.4. Allocations to RSDP and Incremental Peak Capacity will be limited to costs associated with PS2 and PLWTP as these are the facilities that will directly handle Peak Flows and RSDP. The allocations to the Incremental Peak Category will be solely recovered through the fixed charge, which is discussed further in Section 5.

As stated above, this approach will make the billing structure dynamic over time and able to evolve as agencies' wastewater flows, RSDP flows, and capacity needs change. Additionally, this will provide a financial incentive to agencies to implement measures to reduce their share of the capacity needs through inflow & infiltration (I&I) reduction and stormwater runoff control efforts.

4.4 RSDP Cost Allocation and RSDP Cost Adjustment Factor

Given the introduction of RSDP as a new and distinct component in the flows managed and treated in the Metro System, it was important that this new waste stream be factored into the FAB system. Two important factors guided the approach to allocating costs for RSDP: meet the objectives of the framework and the

City's billing system while balancing the needs for proportional allocation of costs, detail, and ease of implementation in the billing system. The approach further avoids disincentivizing future water reuse programs, aligning with the region's long-term strategic water management objectives. The charges for RSDP discharges will be calculated based on two key factors: the Average Annual Daily Flow and the Metered Flow of RSDP discharges. Additionally, RSDP allocations are only applied to costs associated with PS2 and PLWTP as these are the System facilities directly involved with handling and treating RSDP. This enables the City to charge for RSDP discharges without significantly increasing the complexity of the system, and avoiding major changes to the monitoring and sampling needs to allow for billing.

As discussed in Section 4.3, cost allocations for RSDP at PS2 and PLWTP are incorporated into the FAB system as a flow-related parameter and used to allocate costs at these two facilities between Flow, RSDP, and Incremental Peak Capacity. Recognizing RSDP has different pollutant characteristics from the other sources of wastewater, a RSDP cost adjustment factor is applied to the volume of RSDP to effectively weight the allocation of costs to RSDP differently from the allocations to Flow and Incremental Peak Capacity. This RSDP cost adjustment factor is expected to be greater than 1.0, leading to a heavier weighting of costs toward RSDP than to Average Annual Daily Flow and Incremental Peak Capacity, and a heavier weighting toward Metered RSDP than Metered Flow. This is done in recognition of the fact that RSDP is expected to have a disproportionate impact on the costs of the System relative to other wastewater flows. The cost adjustment factor is to be based on volume of RSDP rather than a loading-based calculation to balance the competing needs for an proportional, cost-driven basis with the need for a straightforward approach that can be easily implemented, updated, and maintained into the future of the billing system.

This RSDP cost adjustment factor will initially be based on engineering research conducted specifically for the Pure Water program, and technical expertise of the City's in-house and consulting engineers. [1] Based on preliminary research conducted during the development of the City's Pure Water Program, an initial RSDP cost adjustment factor of 1.1 was implemented during the development of the FAB framework. This 1.1 factor was based on studies indicating that treatment efficiency at the PLWTP will decrease as the relative share of RSDP in the plant influent increases.

These RSDP allocations are only used for the PLWTP and PS2 cost categories as those are the facilities expected to receive AWT RSDP discharges. This approach allows the system to adapt as RSDP discharges change in the future as, for example, Phase 1 of the City's Pure Water system comes online, and as the City or other PAs construct additional AWT facilities in the future. While there is uncertainty in the precise value for the RSDP cost adjustment factor, implementing this element into the billing framework will allow the City to continue to monitor treatment efficiency and costs at PLWTP, and adjust the factor as RSDP begins to enter the system and more information becomes available.

[1] Adelman, M. J., Newman, R. P., Seshan, H., Zare Afifi, M., Dornfeld, M., Oppenheimer, J., & Quicho, J. (2021). Understanding and mitigating effects of brine discharge to wastewater on primary sedimentation. AWWA Water Science, e1229. https://doi.org/10.1002/aws2.1229

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4.5 Resulting Cost Distribution to Billed Components

Based on the updates described above, the cost allocations from Section 3 are further distributed to the distinct parameters used for billing, namely Flow, RSDP, Incremental Peak Capacity, TSS and COD. Figure 4-2 and Figure 4-3 present the full list of direct functional and design allocation factors, respectively. The split between Flow and Incremental Peak Capacity is based on contract capacity. It should be noted that these allocations do not include the distinction between Ownership and Use billed units. The Ownership and Use billed units are used to develop fixed and variable charges and are described further in Section 5. These figures do not show an allocation to RSDP because the allocation to RSDP is dependent upon RSDP being discharged into the system, and these figures are based on FY 2019 flows and loadings. RSDP is not expected to begin entering the system until 2027.

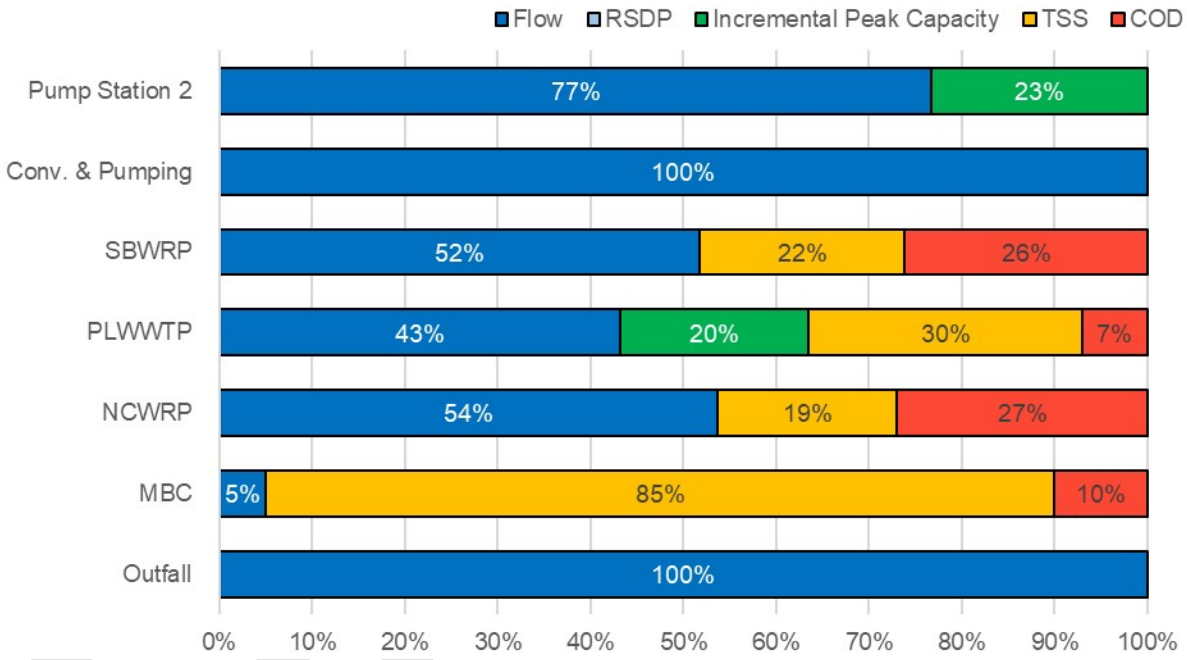

Figure 4-2: Functional Cost Distribution to Billed Components (Based on FY 2019 Flows & Loadings)

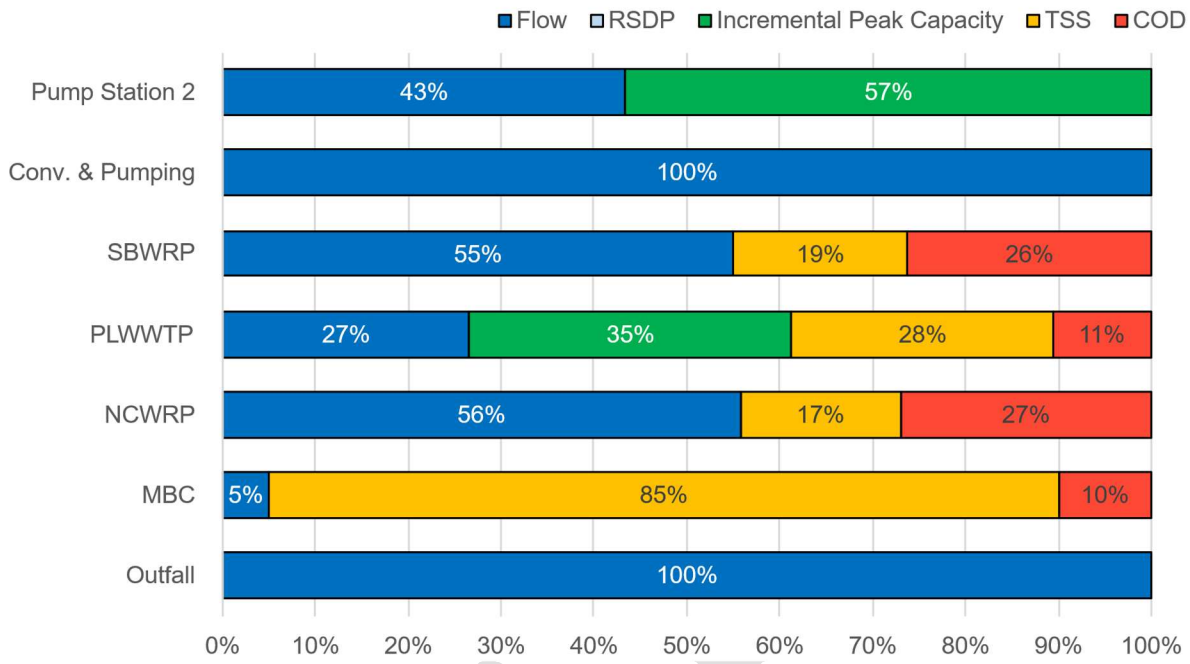

Figure 4-3: Design Cost Distribution to Billed Components (FY 2019 Flows & Loadings)

In addition to the allocations to the billed units presented in Figure 4-2 and Figure 4-3, some costs cannot be directly allocated based on specific System facilities. These include administrative costs, business management, and other overhead and support functions. These costs are allocated using indirect allocation percentages based on the breakdown of expenses from all directly allocated costs. Three broad-based categories of indirect allocations are calculated based on solely functionally allocated costs, solely design allocated costs, and the sum of all directly allocated costs. These indirect allocations will vary by year. As an example, functional indirect cost allocations are based on directly allocated O&M costs using the allocation factors from Figure 4-2 applied to the associated O&M costs for each facility/category. The resulting cost allocation percentages from these direct allocations can then be applied to administrative costs, for example, to allocate those costs in proportion to all directly allocated O&M costs.

Two additional indirect allocation categories specific to solely the treatment facilities (i.e., excluding PS2, Conveyance and Pumping, and Outfall expenses) are also developed and are referred to as "Treatment Functional Indirect" and Treatment Design Indirect." Allocation factors for these two categories are calculated in the same way as the previously discussed indirect allocations, but are based solely on the directly allocated costs at the facilities involved in treatment of wastewater.

5 Fixed and Variable Charges

The final goal of developing the FAB system was to develop a new set of charges that included a "fixed charge" in the billing framework. The SBB system has not included a fixed charge since the discontinuation of the ECC in 2003, as previously discussed in Section 1.1. Essentially all costs were treated as variable under the SBB system, except for the Phase 1 construction costs (which were already defined under the

existing ARA), and they were allocated based on yearly Flow and Strength proportions. The new FAB system establishes a clear separation between fixed and variable costs.

Fixed costs, largely corresponding to capital investments and debt service, are allocated based on capacity needs, as well as Average Annual Daily Flow and corresponding Strength. Variable costs, corresponding to ongoing operations, are allocated based on Metered Flow and Strength each year. This means each participating agency will now pay a “fixed” annual charge for its share of infrastructure capacity and long-term average needs, plus a variable charge that is adjusted each year for the Metered Flow and Strength of its wastewater. This change brings the framework in line with standard COS rate design, addressing an element that was mostly absent from the current SBB system, and reflecting the evolution in contemporary rate design.

These fixed charges allocate costs to agencies based on fixed billing parameters of Average Annual Daily Flow, Average Annual Daily RSDP flow, Incremental Peak Capacity, and average COD and TSS Strength, all based on projected 2050 capacity needs. The actual billed amount will vary from year to year based on that year’s costs, but the billed units used to allocate costs to agencies will remain fixed unless adjusted based on a change in an agency’s capacity needs. This requires that Table C be expanded to include both fixed and variable billing parameters, as discussed previously in Section 4.1. Fixed billing units are collectively referred to as “Ownership” units as they represent long-term projected usage and the share of System capacity reserved by each PA and the City. These Ownership units form the basis for the fixed charges. Variable billing units are collectively referred to as “Use” units as they vary from year to year based on each agency’s annual use of the system. These Use units form the basis for the variable charges.

The FAB framework is designed to seamlessly integrate new facilities or shifting usage patterns without needing fundamental billing system changes. In particular, it builds on the original agreement and SBB to incorporate the Pure Water Phase 1 facilities and costs into the cost pool with defined allocation rules. Allocations for Pure Water Phase 1 will maintain the same approach developed under the SBB, but the FAB framework itself will lend itself to future updates for new facilities. Moreover, if the City or a PA significantly changes its flow contribution in the future (for instance, by developing its own treatment facilities and reducing Flow to the Metro System), the new allocation will automatically adjust that agency’s variable cost charges downward; however, that agency will continue to pay its share of fixed costs for existing infrastructure unless or until capacity is formally reallocated. This contrasts with the SBB approach, where such a change could have unfairly shifted costs to other PAs and the City because there is no current fixed cost mechanism representing average Flow and Strength, and Peak Capacity needs. As a result, the FAB system enhances stability to the City and PAs. In summary, the FAB framework is more adaptive as it handles additions like the Pure Water program and potential future departures or reductions (such as East County’s diversion) in a structured way, rather than through ad-hoc fixes. Fixed charges allow for a proportional split of costs based on capacity rights.

Costs recovered in the fixed charge are limited to all capital costs, excluding Clean Water debt service for financing occurring prior to implementation of the FAB framework, as well as a select set of O&M expenses, as outlined below:

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- **Outfall O&M** – These costs represent ocean monitoring, regulatory compliance, and other costs associated with ensuring discharges from the City's ocean outfalls meet the necessary standards. These costs are 100% fixed in nature, and are therefore recovered through the fixed charge.

- **Fixed O&M Costs at PS2 and PLWTP** – In recognition of the fact that PS 2 and PLWTP are the primary facilities handling peak flow events, a portion of the O&M at these two facilities is allocated to the Incremental Peak Capacity category. These portions of the O&M costs are recovered through the fixed capacity charges as outlined in the proposed Exhibit B. Determination of the share of costs to be recovered through the allocation to Incremental Peak Capacity Ownership is determined in a three-step process.

    1. O&M costs at PS2 and PLWTP are broken down into fixed and variable costs, with variable costs consisting of chemicals, energy, and utilities.

    2. All variable costs are allocated to the Metered Flow billing parameter to be recovered through variable rates.

    3. All fixed costs are allocated between the Average Flow, RSDP and Incremental Peak Capacity billing units based on the percentage each make up of the facilities' total capacities.

    This approach ultimately results in only the portion of fixed O&M costs at PLWTP and PS2 allocable to the Incremental Peak Capacity billing parameter being recovered through the fixed charges.

Based on the allocations outlined in Sections 3 and 4, and the split of these allocated costs between fixed and variable charges, the resulting fixed and variable cost recovery is shown in the figures below based on FY 2024 expenses, and using FY 2024 billing units (Figure 5-1) and estimated 2027 billing units (Figure 5-2).

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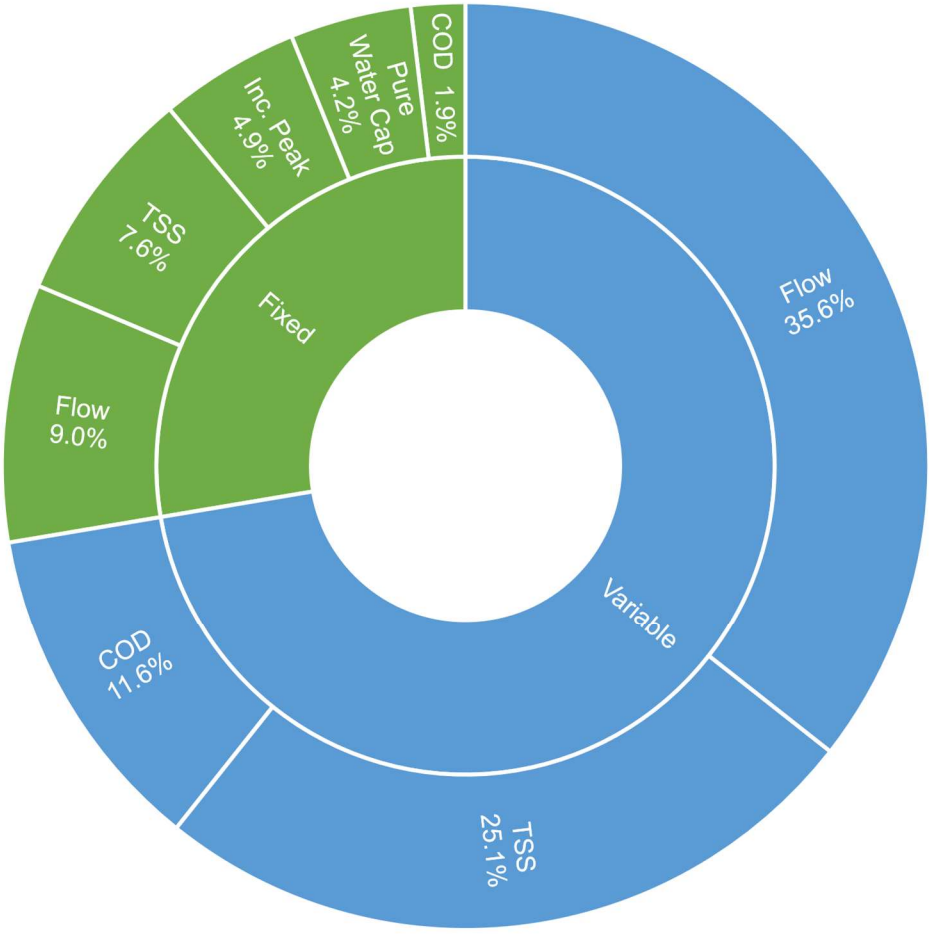

Figure 5-1: Breakdown of Fixed and Variable Cost Recovery by Allocation Parameter (2024 Expenses and estimated 2024 Billing Units)

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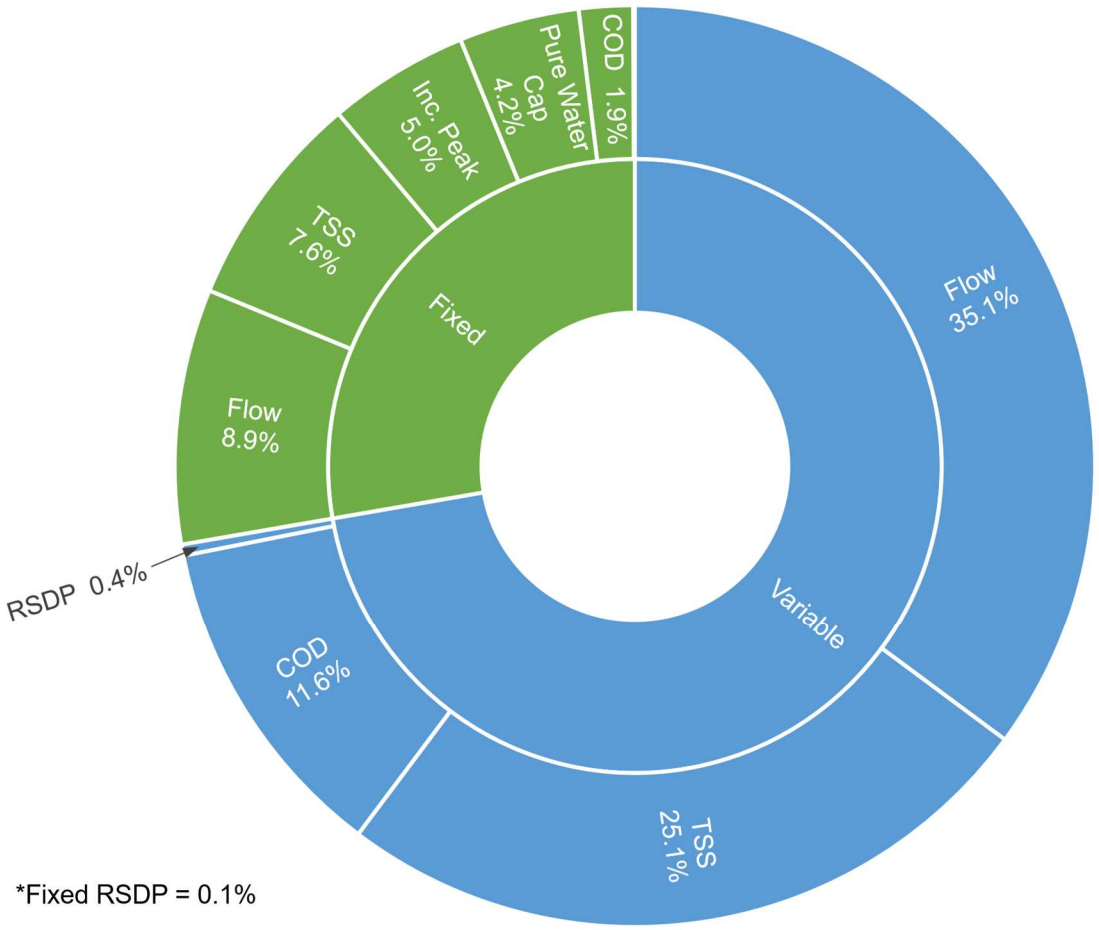

Figure 5-2: Breakdown of Fixed and Variable Cost Recovery by Allocation Parameter (2024 Expenses and estimated 2027 Billing Units)

6 Agency Bill Impacts

The adoption of the new FAB framework redistributes system costs among the City and PAs, primarily through three major changes to the billing methodology. These changes – introducing a fixed capacity charge, adding an Incremental Peak Capacity Allocation, and charging for RSDP – enable each agency's bill to more closely reflects its actual use of system capacity and unique burdens on the treatment system. The impacts on agency costs are summarized below.

- **Fixed Charges** – Agencies now pay a portion of the bill based on fixed billing parameters of average flow, incremental peak capacity, average TSS and COD loadings, and average RSDP flow.
- **Incremental Peak Capacity** – New charges for peak capacity needs mean agencies will pay a portion of their bill based on the incremental peak capacity above average flows to reflect capacity needs during peak storm events, and to recover costs associated with handling these peak flows specifically at PS2 and PLWTP.

- **RSDP Charges** – Costs at PS2 and PLWTP associated with handling RSDP from regional AWT facilities will be recovered through a dedicated RSDP charge with both a fixed and variable component based on average RSDP flow and metered RSDP flow, respectively.

Impact of Fixed Capacity Charges

Under the new framework, each agency pays a fixed charge tied to its long-term capacity rights and typical usage of the Metro system. This fixed charge covers capital costs and other fixed expenses (e.g. debt service, outfall monitoring) and is calculated from each agency's committed capacity (flow and load) in the system. The introduction of this charge has several impacts:

- **Stable Cost Obligations:** Agencies now contribute a predictable base amount each year for the infrastructure capacity reserved for them. This makes the cost distribution more stable, reducing a portion of the variability in cost allocations across agencies from year to year.
- **Proportional Cost Recovery:** The fixed-charge mechanism aligns with standard COS principles by having all participants contribute to the fixed costs of shared assets. This change improves proportionality and financial sustainability: every agency helps fund long-term capital needs, and the City, as the primary system owner, has a stable revenue stream for capital recovery.

Overall, the fixed charge moderates bill impacts in future years as the City and other agencies pursue potable reuse and water recycling efforts to bolster local water supplies. Because a portion of costs is now allocated on fixed factors, most agencies see only modest changes in their total bill initially. No agency experiences an extreme increase or decrease from one year to the next, easing the transition to the new system.

Impact of Incremental Peak Capacity Charges

The FAB framework also introduces a charge for each agency's share of peak wet-weather flow capacity, reflecting the design criterion that the system must handle infrequent but intense surges during storms events. Agencies will be billed for the for the Incremental Peak Capacity they require during peak events, not just their average annual flow. The effects include:

- **Costs Linked to Peak Demand:** Agencies with disproportionately high wet-weather peaking factors (for instance, those with significant I&I in their sewer systems) will bear a higher portion of capacity-related costs. The FAB system provides a means to charge for relatively higher shares of reserved capacity, even if an agency's billed flows are low relative to other agencies. This means agencies that historically paid only based on annual volume might see a slight increase if they rely on the System to accommodate large flows from peak storm events.
- **Incentive for I&I Reduction:** Charging for peak capacity creates a financial incentive to reduce excessive stormwater intrusion. Agencies can potentially lower their fixed capacity charges over time by implementing I&I controls, knowing that verifiably reducing their peak flow needs will be reflected in future billing allocations.
- **Ensuring Readiness:** For agencies planning to divert base flows to local reuse, the Incremental Peak Capacity charge ensures they continue contributing to the standby capacity that must be maintained for them in the System. For example, by 2027, the East County agencies' Average Annual Daily Flow to the System will be minimal, but the System must be ready to accept their flows during peak events or if their plant is offline. The Incremental Peak Capacity allocation

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charges the East County agencies for that readiness. In this example, the impact is still a bill reduction as base flow costs drop, but not a complete elimination of costs. This mechanism avoids shifting the burden of capacity-related costs entirely onto remaining agencies.

In summary, the billing for Incremental Peak Capacity needs provides a mechanism to proportionally recover costs associated with building and maintaining a system sized to handle peak flows, and supports system resilience by funding capacity for all parties. Agencies with relatively small peaking factors will see smaller changes from the implementation of this billing factor, whereas those with sharp peaks pay a greater share of the fixed costs. This change reinforces the principle that cost responsibility should reflect both average use and peak demand on the system.

Impact of RSDP (Reject Stream) Charges

With the introduction of potable reuse facilities in the region, the System now receives concentrated RSDP that was not present, nor billed for, under the SBB framework. The new FAB methodology adds RSDP as a dedicated billing parameter. Only agencies that discharge these RSDP streams are allocated RSDP-related costs. Key impacts of this change are:

- **Specificity in Allocation and Charges for RSDP:** Under the FAB system, the agencies producing RSDP will bear the costs of handling and treating this waste stream at System facilities, specifically at PS2 and PLWTP. These costs would have been blended into overall Flow and Strength charges shared by all agencies under the SBB, whereas the RSDP allocation directly assigns RSDP-related costs to the agencies responsible in recognition of the fact that RSDP is a unique waste stream with distinct properties and cost impacts. This approach also allows for only costs at PS2 and PLWTP to be allocated to the RSDP charge which reduces the overall unit cost for RSDP. Without this change, or if the FAB system were to treat RSDP as Metered Flow, RSDP would have no differentiation from all other flows and would have recovered costs associated with all System facilities, thereby resulting in a higher unit cost for every unit of RSDP discharge compared to the RSDP unit cost developed under the proposed FAB framework.
- **Future Applicability:** The RSDP charge sets a precedent as more reuse projects come online. If other agencies or additional facilities begin discharging RSDP in the future, they will likewise assume their proportional share of RSDP costs. The FAB framework can adjust the RSDP allocations and RSDP cost adjustment factor in the future as more information of its cost impacts become known.

Overall, the introduction of RSDP billing has increased transparency in cost allocation, acknowledging that not all wastewater is the same: RSDP flows increase the chemical costs at PLWTP, but PLWTP only affects PLWTP and PS2 due to the construction of the regional brine line.

Bill Impacts

Based on the findings and outcomes of this Study, and the proposed changes to the billing framework, agencies will see changes in their typical bills. Figure 6-1 presents the distribution of costs to each agency in percentage terms under the SBB and FAB system based on 2024 expenses and 2024 billed units. Figure 6-2 presents the same comparison, but based on 2024 expenses and estimated 2027 billed units, after the City and East County RSDP flows begin entering the system. Note that the City's share of RSDP-related costs are billed to the water utility, and are reflected in Figure 6-2 in the category "SD Water."

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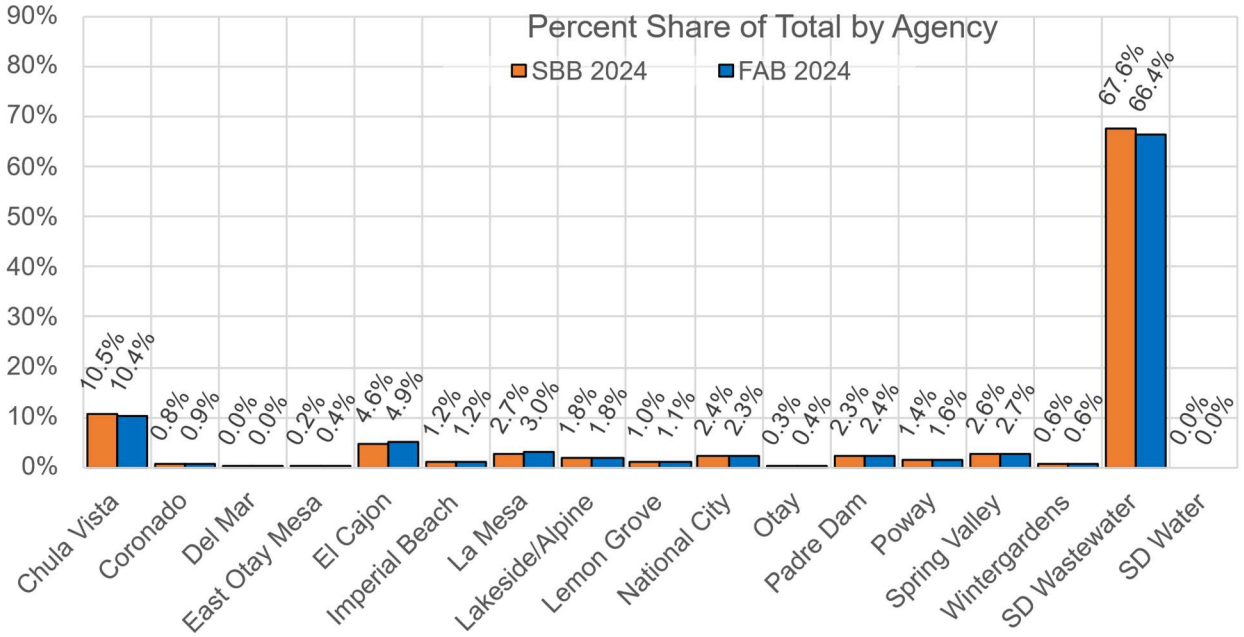

Figure 6-1: Share of Total Costs by Agency under SBB and FAB Systems (FY 2024 Expenses and FY 2024 Estimated Billed Units)

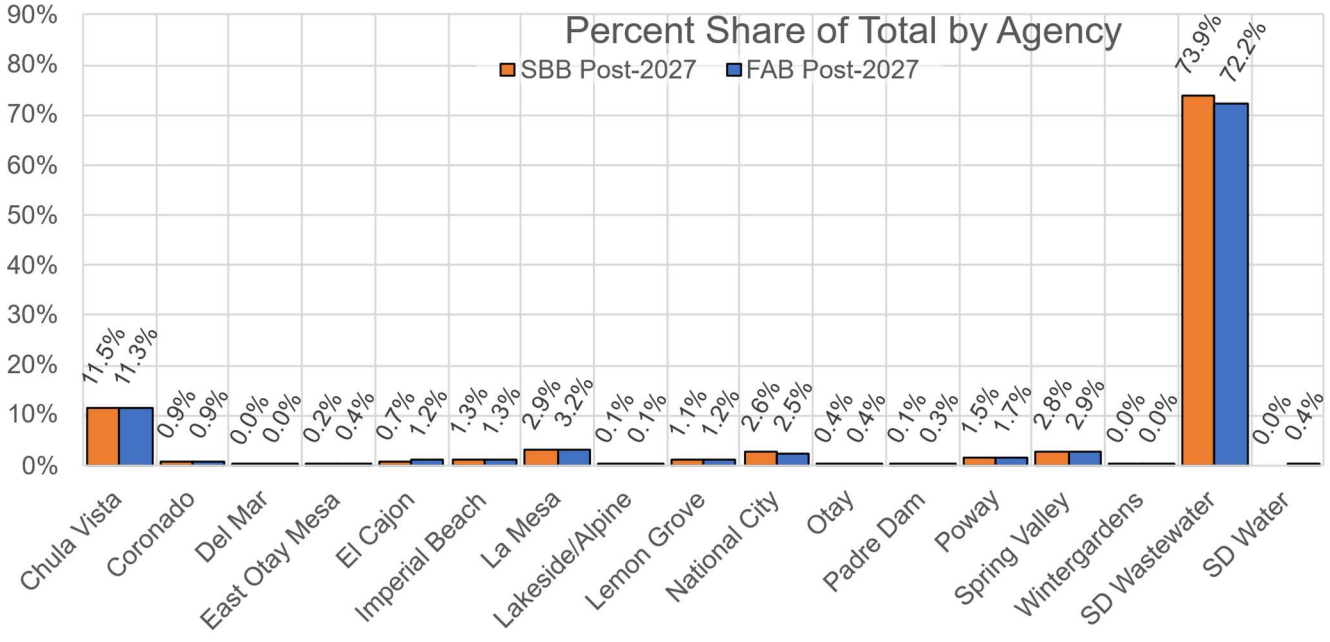

Figure 6-2: Share of Total Costs by Agency under SBB and FAB Systems (FY 2024 Expenses and FY 2027 Estimated Billed Units)

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Appendices

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Appendix A Exhibit G

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EXHIBIT G

PURE WATER CAPITAL BILLING TABLE

1	2	3	4	5	6	7	8	9	10	11	12
Agency	Estimated Average Daily Flow (MGD)	Net Offload For Padre Dam Project (MGD)	Projected Metro Flow 2050 (MGD)		COD Applied to 2050 Flows (mg/l)	COD Applied to 2050 Flows (lb/day)	Percent COD Contributed	SS Applied to 2050 Flows (mg/l)	SS Applied to 2050 Flows (lb/day)	Percent SS Contributed	Pure Water Capital Melded Percentage[3]
			Flow	%							
Chula Vista	18.33	0	18.33	11.601%	701.947	107377.684	11.889%	250.011	38244.530	11.701%	11.699%
Coronado	1.9	0	1.9	1.202%	587.457	9314.884	1.031%	241.493	3829.176	1.172%	1.152%
Del Mar	0.031	0	0.031	0.020%	542.195	140.270	0.016%	305.112	78.935	0.024%	0.020%
East Otay Mesa (County)[1]	1.788	0	1.788	1.132%	621.049	9267.041	1.026%	240.016	3581.421	1.096%	1.096%
El Cajon	7.8	7.0	0.805	0.510%	650.914	4373.460	0.484%	236.265	1587.450	0.486%	0.497%
Imperial Beach	2.473	0	2.473	1.565%	540.757	11160.249	1.236%	205.193	4234.820	1.296%	1.411%
La Mesa	5.03	0	5.03	3.183%	523.099	21958.348	2.431%	197.537	8292.107	2.537%	2.823%
Lakeside/Alpine (County)[1]	4.619	4.4	0.260	0.165%	638.686	1387.995	0.154%	197.667	429.570	0.131%	0.153%
Lemon Grove	2.4	0	2.4	1.519%	593.836	11893.920	1.317%	203.567	4077.236	1.247%	1.395%
National City	4.65	0	4.65	2.943%	685.192	26589.642	2.944%	219.881	8532.740	2.611%	2.852%
Otay Water District	0.38	0	0.38	0.240%	1442.632	4574.952	0.507%	818.053	2594.253	0.794%	0.457%
Padre Dam	2.486	1.8	0.696	0.441%	696.892	4049.236	0.448%	251.288	1460.088	0.447%	0.444%
Poway	3.101	0	3.101	1.963%	563.551	14584.185	1.615%	243.460	6300.522	1.928%	1.869%
Spring Valley (County)[2]	6.231	0	6.231	3.944%	597.292	31059.332	3.439%	235.079	12224.151	3.740%	3.765%
Wintergardens (County)[1]	0.979	0.9	0.074	0.047%	633.136	392.817	0.043%	208.768	129.526	0.040%	0.044%
San Diego	109.855	0	109.855	69.526%	703.556	645009.168	71.419%	252.229	231239.253	70.751%	70.323%
Total	172.053	14.048	158.005	100%	10722.190	903133.183	100%	4305.618	326835.778	100%	100%

[1] Subareas of the San Diego County Sanitation District

[2] Includes Otay Ranch (0.87 mgd) and Spring Valley (5.361 mgd). Flow from Otay Ranch that would flow to Metro through Chula Vista pipelines.

[3] These fractions used to calculate the melded percentage: (Based on 5 year average and not subject to change except by agreement of the parties.)

FLOW	SS	COD
0.482	0.275	0.243

EXHIBIT G

Appendix B Exhibit B and FY 2019 SBB Table C

Note: This appendix reflects the data used in the development of the FAB framework and to represent allocations and bill impacts for the current billed units.

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EXHIBIT B

DISTRIBUTION OF WASTEWATER SYSTEM CAPACITY RIGHTS							
AGENCY	ANNUAL FIXED CAPACITY RIGHTS[1]						
	1	2	3	4	5	6	7
	Average Flow[2], MGD	Incremental Peak Flow[3], MGD	RSPD[4], MGD	Total Allowable Flow[3], MGD	TSS[2], 1,000 lbs.	COD[2], 1,000 lbs.	Pure Water Phase 1[5]
Chula Vista	18.33	19.52	0	37.85	22,082	38,419	11.699%
Coronado	1.90	3.03	0	4.93	2,089	3,336	1.152%
Del Mar	0.00	0.30	0	0.30	0	0	0.020%
East Otay Mesa	1.79	3.48	0	5.27	1,915	3,336	1.096%
El Cajon	1.29	19.93	0.602	21.82	2,196	3,052	0.497%
Imperial Beach	2.47	4.48	0	6.95	2,045	3,844	1.411%
La Mesa	5.29	23.90	0	29.19	4,668	9,636	2.823%
Lakeside/Alpine	0.07	1.67	0.310	2.05	238	293	0.153%
Lemon Grove	2.40	4.51	0	6.91	2,289	4,387	1.395%
National City	4.65	3.07	0	7.72	4,562	9,161	2.852%
Otay	0.38	0.57	0	0.95	984	835	0.457%
Padre Dam	0.44	6.54	0.364	7.34	632	890	0.444%
Poway	3.10	8.80	0	11.90	3,113	5,073	1.869%
Spring Valley	5.74	5.05	0	10.79	6,039	10,597	3.765%
Wintergardens	0.02	1.08	0.080	1.18	65	80	0.044%
SUBTOTAL	**47.9**	**105.9**	**1.356**	**155.1**	**52,916**	**92,938**	**29.677%**
San Diego							
Wastewater	124.05	136.16	0	260.21	130,032	252,818	70.323%
Water	0	0	14.3	0.00	0	0	0
SUBTOTAL	**124.1**	**136.2**	**14.3**	**260.2**	**130,032**	**252,818**	**70.323%**
Metro I&I	-	82	-	82	-	-	-
TOTAL	**171.9**	**324.1**	**15.7**	**497.4**	**182,948**	**345,756**	**100%**

1. Currently based on 2050 projected flows and strengths.
2. Based on monthly average flow and strength.
3. Based on hourly average flow.
4. Reject Stream from Demineralization Process
5. Pure Water Phase 1 Capital Melded Percentages as established in Exhibit G of the "Amended and Restated Regional Wastewater Disposal Agreement Between the City of San Diego and the Participating Agencies in the Metropolitan Sewerage System" memorialized here only for use in billing Pure Water Phase 1 capital expenses. The following fractions were used to calculate the Melded Percentage (Based on 5 year average and not subject to change except by agreement of the parties.)

FLOW	SS	COD
0.482	0.257	0.243

Exhibit B represents the latest information as of July 18, 2025, and most current update as of January 5, 2026.

TABLE C

CITY OF SAN DIEGO - PUBLIC UTILITIES DEPARTMENT
SYSTEM WASTEWATER CHARACTERISTICS - FISCAL YEAR 2019
SYSTEM STRENGTH LOADINGS INCLUDED

AGENCY	WASTEWATER CHARACTERISTICS			UNADJUSTED ANNUAL USE			ADJUSTED ANNUAL USE				
	AVERAGE FLOW - mgd (a)	SS mg/l (b)	COD mg/l (b)	2019 FLOWS million gallons	SS thousand pounds	COD thousand pounds	2019 FLOWS million gallons	Flow Difference (c)	FY 2019 Billing Flows	SS thousand pounds	COD thousand pounds
CHULA VISTA	16.324	311	767	5,958.400	15,480	38,148	6,377.591	(189.058)	6,188.533	21,049	36,622
CORONADO	1.284	284	643	468.698	1,111	2,513	501.672	(14.872)	486.801	1,511	2,413
DEL MAR	0.046	297	488	16.663	41	68	17.835	(0.529)	17.306	56	65
EAST OTAY MESA	0.263	277	683	96.149	222	548	102.913	(3.051)	99.862	302	526
EL CAJON	6.865	405	813	2,505.574	8,459	16,993	2,681.848	(79.501)	2,602.347	11,503	16,313
IMPERIAL BEACH	2.180	214	569	795.626	1,419	3,778	851.601	(25.245)	826.356	1,929	3,627
LA MESA	4.704	228	667	1,716.832	3,270	9,559	1,837.617	(54.475)	1,783.142	4,446	9,177
LAKESIDE/ALPINE	3.134	286	709	1,144.067	2,735	6,767	1,224.556	(36.301)	1,188.255	3,718	6,497
LEMON GROVE	1.735	246	669	633.344	1,302	3,536	677.902	(20.096)	657.806	1,771	3,395
NATIONAL CITY	3.910	254	721	1,427.182	3,020	8,588	1,527.589	(45.284)	1,482.304	4,106	8,245
OTAY	0.400	669	804	146.161	816	981	156.444	(4.638)	151.806	1,110	942
PADRE DAM	2.084	889	1,486	760.788	5,645	9,433	814.312	(24.140)	790.172	7,676	9,056
POWAY	2.409	259	599	879.414	1,904	4,395	941.284	(27.904)	913.380	2,589	4,219
SPRING VALLEY	4.216	272	675	1,538.935	3,490	8,673	1,647.204	(48.830)	1,598.374	4,745	8,326
WINTERGARDENS	0.963	324	676	351.441	951	1,983	376.166	(11.151)	365.015	1,293	1,904
SUBTOTAL PARTICIPATING AGENCIES	50.519	324	754	18,439.276	49,866	115,964	19,736.533	(585.073)	19,151.460	67,805	111,327
SAN DIEGO	110.379	271	746	40,288.277	91,075	250,810	43,122.675	(1,278.336)	41,844.340	123,840	240,779
REGIONAL SLUDGE RETURNS	11.320	285	173	4,131.656	9,822	5,951					
FLOW DIFFERENCE	(5.105)			(1,863.409)	40,882	(20,620)					
TOTAL	167.112	377	692	60,995.800	191,644	352,105	62,859.209	(1,863.409)	60,995.800	191,644	352,105

Table C represents flows and loadings from FY 2019, the most recent audited records at the time of development for the FAB framework.

Stantec

Stantec is a global leader in sustainable engineering, architecture, and environmental consulting. The diverse perspectives of our partners and interested parties drive us to think beyond what's previously been done on critical issues like climate change, digital transformation, and future-proofing our cities and infrastructure. We innovate at the intersection of community, creativity, and client relationships to advance communities everywhere, so that together we can redefine what's possible.

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