R3 CONSULTING GROUP, INC.
RESOURCES · RESPECT · RESPONSIBILITY

June 28, 2024

Amanda Booth
Environmental Program Manager
City of San Pablo
submitted via email: AmandaB@sanpabloca.gov

SUBJECT: Solid Waste Franchise Fee Study – R3 Report

Dear Ms. Booth,

R3 Consulting Group, Inc. (R3) is pleased to submit the attached report of Solid Waste Franchise Fee Study (Study) to the City of San Pablo (City). This Report presents our analytical methodology, results and findings, and recommendations regarding the solid waste Franchise Fee paid by the City's contracted solid waste collection service provider, Republic Services (Contractor), per the Franchise Agreement for Residential, Multi-Family, and Commercial Discarded Materials Management Collection Services (Agreement) between the City and the Contractor.

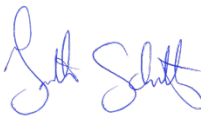
The purpose of this Study was to comprehensively analyze and calculate the following:

- **City's Costs:** The annual costs to the City for performing its management, administration, regulatory compliance and enforcement, solid waste collection and clean-up, and other obligations associated with the Contractor's Agreement and the sanitation system.
- **Property Use Charges:** The annual use charge to the Contractor for its special and lasting access to use government property in the public right-of-way for placement of solid waste containers and collection of the solid waste contents.
- **Pavement Impacts:** The annualized costs for pavement repair, maintenance, and rehabilitation resulting from the unique impacts to City street pavement caused by the Contractor's solid waste collection vehicles during the course of providing sanitation service.

We then compared the calculated values to the annual Franchise Fee paid by the Contractor to the City per the Agreement. We found that the City's current and projected Franchise Fee revenues are less than the sum of the City's Costs and government Property Use Charges calculated in this Study. Based on these results, we conclude that the City's fee amount is not more than necessary to cover the City's reasonable costs in managing and administering the Agreement and the sanitation system plus the reasonable value of the Contractor's use of the public right-of-way.

We appreciate the opportunity to be of service to the City. If you have any questions regarding this report or need additional information, please contact me.

Sincerely,



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Background

The City's Agreement with the Contractor is for the collection, processing, and disposal of solid waste from covered waste generators in the City. The Agreement provides the Contractor with the exclusive right to provide critical aspects of the City's sanitation system, including solid waste collection and the other services and programs included in the Agreement. The Agreement specifies that the Contractor will charge solid waste service subscribers, with the Contractor billing and collecting revenues from subscribers and the City authorizing the maximum rates that the Contractor may charge pursuant to the rate adjustment methodology included in the Agreement.

Per the Agreement, the Contractor pays the City a Franchise Fee to cover the costs incurred by the City in managing, administering, enforcing, and supplementing the services provided in the Agreement, as well as the charge for the use of the public right-of-way for the special and lasting access to use it for set-out and collection of solid waste containers, along with the proportionate costs of the unique impacts to pavement caused by the Contractor's solid waste collection vehicles during the course of providing sanitation service.

Purpose

The purpose of this Study is to identify the amounts that may be reasonably recovered through the Franchise Fee and Administration Fee paid by the Contractor to the City are exempt from consideration as taxes. In terms of the applicable legal framework, this analysis seeks to quantify whether amounts that may be reasonably recovered through the Franchise Fee and Administration Fee paid by the Contractor to the City fall within an exemption to the definition of a tax per Article XIII C, Section 1(e) of the California Constitution ("Proposition 26").

There are three primary exceptions to the Proposition 26 definition of tax that are relevant:

- **Exception 1:** "A charge imposed for a specific benefit conferred or privilege granted directly to the payor that is not provided to those not charged, and which does not exceed the reasonable costs to the local government of conferring the benefit or granting the privilege."
- **Exception 2:** "A charge imposed for a specific government service or product provided directly to the payor that is not provided to those not charged, and which does not exceed the reasonable costs to the local government of providing the service or product."
- **Exception 3:** "A charge imposed for the reasonable regulatory costs to a local government for issuing licenses and permits, performing investigations, inspections, and audits, enforcing agricultural marketing orders, and the administrative enforcement and adjudication thereof."
- **Exception 4:** "A charge imposed for entrance to or use of local government property, or the purchase, rental, or lease of local government property."

The Franchise Fee is a fee with three components. The first component includes the City's proportionate costs (City's Costs) and is a legal fee per Exceptions 1, 2 and 3. The second component includes the proportionate charges for the Contractor's use of the public right-of-way (Property Use Charges) and is a legal fee per Exception 4. The third component includes the City's proportionate costs associated with pavement impacts (Pavement Impacts) and is a legal fee per Exception 1.

Methodology and Findings

To complete this Study, R3 reviewed and analyzed information provided by the City and the Contractor pertaining to the City's Costs, Property Use Charges, and Pavement Impacts. Using that information, we then calculated the proportionate amounts necessary to cover the City's costs, including staffing and other costs; use of government property in the public right-of-way; and pavement repair, maintenance, and rehabilitation costs caused by the Contractor's solid waste collection vehicles during the course of providing sanitation service.

All calculated amounts in this Study are in current Fiscal Year (FY) 2023-24 dollars.

City's Costs

The annual costs for management, administration, regulatory compliance and enforcement, solid waste collection and clean-up, and other obligations associated with the Contractor's Agreement and the sanitation system includes: staffing salary and benefits, contracted services, capital and equipment depreciation, operations and maintenance, supplies, and overhead for distributed costs including but not limited to property, utilities, insurance, human resources, payroll administration, accounts payable and receivable, and other finance functions.

Staffing costs are calculated based on estimated time allocations (based on historical experience) and other costs are calculated based on estimated share allocations associated with the sanitation system, with distributed overhead applied to both.

- The calculation results are $608,138 in staffing costs and $550,871 in other costs, for annual proportionate City's Costs totaling **$1,159,008.**

Property Use Charges

The annual charge to the Contractor for use of government property in the public right-of-way is calculated as a function of estimates for the number of solid waste accounts setting out solid waste collection containers in the right-of-way, the set-out area used, the amount of time it is used, and the market value for the per square foot use of the public right-of-way.

- The calculation result for the use of the public right-of-way is a proportionate annual total Property Use Charge of **$261,947.**

Pavement Impacts

The annualized costs for pavement repair, maintenance, and rehabilitation is calculated based on the proportionate impact to pavement from solid waste collection vehicles compared to other sources of impacts. This calculation accounts for annual repair costs, five-year projections for capital improvement costs, and five-year projections for growth in deferred maintenance. The calculation also accounts for the high loading and slow speed impacts on pavement associated with solid waste collection vehicles.

- The calculation result for the proportionate Pavement Impacts caused by Contractor's solid waste collection vehicles during the course of providing sanitation service is an annualized total repair, maintenance, and rehabilitation cost of **$254,319**.

Conclusions

Franchise Fee

The FY 2022-23 Franchise Fee paid Contractor to the City was $543,543 and the projection for FY 2023-24 is $556,163. The sum of FY 2023-24 annual City's Costs and Property Use Charges, and Pavement Impacts calculated in this Study is **$1,675,274**, which is $1,104,111 higher than the projected FY 2023-24 Franchise Fee payments.

- The amount of the Franchise Fee is therefore not more than necessary to cover the City's costs incurred in managing and administering the Agreement and the sanitation system plus the value of the Contractor's use of the public right-of-way and the impacts of Contractor's solid waste collection vehicles used in providing sanitation services in the City.

Reasonableness of Estimates and Assumptions

In performing calculations, it was necessary to estimate certain values for which information could not be attained, and for which reasonable ranges exist. Where assumptions were necessary for completing calculations, our objective was to apply assumptions on the lower end of the reasonable range.

Had we used other higher assumptions, the results of this Study would have been higher calculated Franchise Fee amounts. Therefore, we conclude that the calculated fee amounts are not higher than necessary to cover the City's reasonable costs plus the reasonable value of the Contractor's use of the public right-of-way.

Limitations

This Study relies on information provided by the City and the Contractor, which we have reviewed and analyzed for reasonableness and accuracy but did not independently audit or verify.

As stated above, it was necessary to estimate certain values for which information could not be attained, and for which reasonable ranges are known to exist. Though changes to estimates and other underlying assumptions may materially change the calculations, we have elected to apply estimates on the low end of reasonable ranges, thus minimizing the potential that changes in calculations would result in different findings. We have reviewed all estimates and assumptions with City staff and legal counsel and have mutual concurrence on applicability and reasonableness of all such values in this Study.

Finally, the methodology employed by this Study calculates the reasonable values for the Franchise Fee within the context of current laws, regulations, and court rulings. Changes in the legal framework may require revisions to the methodology and findings contained in this Study.

2. METHODOLOGY & CALCULATIONS

City's Costs

Methodology

R3 reviewed and analyzed information provided by the City pertaining to the General Fund costs incurred for management, administration, regulatory compliance and enforcement, solid waste collection and clean-up, and other obligations associated with the Contractor's Agreement and the sanitation system.

These costs include any may not be limited to:

- Staffing costs, including salaries and benefits.
- Contracted services.
- Capital and equipment depreciation.
- Capital and equipment operations and maintenance.
- Supplies and materials.
- Overhead for distributed costs such as property, utilities, insurance, human resources, payroll administration, accounts payable and receivable, and other finance functions.

Using the total annual salary, benefit, and other cost information provided by the City, we estimated the proportion of costs associated with management and administration of the agreement and the sanitation system. We then calculated the proportionate totals and categorized them by the functions listed in the sections below.

Variables, Estimates and Assumptions

Staffing Costs

Variables associated with salaries and benefits include the allocation of time that positions are dedicated to management and administration of the Agreement and the sanitation system (including time supervising others with primary responsibility for these duties), the amount by which funding of salaries and benefits is paid by the General Fund (assumed at 50% for each staff person – this figure can be updated pending better information from the City) and the applicable amount of General Fund overhead.

The estimated time allocation by position category used in this Study (and based on historical experience) is shown in **Table 1**, below and on the following page, along with the explanation for the allocation values.

Table 1: Allocations of Staffing Time by Position

Positions	Time Allocation	Explanation
City Manager, Public Works Director.	1.1-1.5%	Calculated allocation based on the percentage of City's Costs plus Property Use Charges plus Pavement Impacts divided by FY 2023-24 General Fund Budget.
Environmental Program Manager.	50%	Estimated allocation based on job duties for management and administration of the Agreement and the sanitation system.

Positions	Time Allocation	Explanation
Environmental Program Analyst.	50%	Estimated allocation based on job duties for management and administration of the Agreement and the sanitation system.
Maintenance Supervisor, Maintenance Worker 2.	45-67.4%	Estimated allocation based on proportion of waste generation in City.
Police Dispatcher	2.5%	Estimated allocation based on job duties for illegal dumping response, clean-up, mitigation, and prevention.
Police Lieutenant	2.5%	Estimated allocation based on job duties for illegal dumping response, clean-up, mitigation, and prevention.
Police Sergeant	4.9%	Estimated allocation based on job duties for illegal dumping response, clean-up, mitigation, and prevention.
Engineering Technician	10.0%	Estimated allocation based on job duties for management and administration of the Agreement and the sanitation system.
Admin Clerk I & II	15-50%	Estimated allocation based on job duties for management and administration of the Agreement and the sanitation system.
Management Analyst	5%	Estimated allocation based on job duties for management and administration of the Agreement and the sanitation system.

R3 verified with City staff that the salaries and benefits included in this Study are paid by the General Fund – any non-General Fund portions of positions included in Table 1 have been excluded from the calculations. A General Fund overhead rate of 17% (provided by the City) is also applied to the total allocated costs.

Other Costs

Variables associated with the City's other (i.e., non-salary and benefit) costs include the proportionate allocation of those costs that are for management and administration of the Agreement and the sanitation system, the amount by which these costs are paid by the General Fund, and the applicable amount of General Fund overhead.

The estimated time allocation by cost category used in this Study is shown in **Table 2**, below, along with the explanation for the allocation values.

Table 2: Allocations of Other Costs by Category

Cost Category	Cost Allocation	Explanation
Contractor, equipment and capital costs for Catch Basin Waste Removal, Public Solid Waste Receptacles, Full Trash Capture devices, and Illegal Dumping Clean-up.	80%	Estimated allocation based on proportion of waste generation in City.
Consulting costs for direct management and administration of Agreement and sanitation system.	100%	All these costs are directly associated with management and administration of the Agreement and the sanitation system.
Service agreement costs for direct management and administration of Street Sweeping agreement.	80%	All these costs are directly associated with management and administration of the Street Sweeping Agreement.
Public Works costs for equipment, capital, and supply/materials costs for Pavement Repair, Maintenance, and Rehabilitation.	100%	Estimated allocation based on proportion of street maintenance attributed to solid waste collection vehicles.
CalRecycle & SB 1383 Compliance	100%	All these costs are directly associated with implementation and enforcement of SB 1383 regulations.

R3 verified with City staff that the other costs included in this Study are paid by the General Fund – any non-General Fund portions of these costs as included in Table 2 have been excluded from the calculations. A General Fund overhead rate of 17% (provided by the City) is also applied to the total allocated costs.

Analysis

Direct Management and Administration

This category includes City staffing and consulting costs for direct management and administration of the Agreement and the sanitation system. Staffing costs include allocated costs for the Environmental Program Manager and Environmental Program Analyst, for a calculated $205,050 in annual staffing costs.

Other costs include solid waste consulting services provided by R3 for this Study, which amortizes the $30,000 cost for the Study over 5 years, $50,000 for bin enclosure grants, $25,000 for transfer station vouchers, with 17% applied to all costs for General Fund overhead for a total cost of $94,770. The total calculated cost for this category is **$299,820.**

Indirect Management and Administration

This category includes City staffing costs for indirect management and administration, including supervision of those responsible for direct management and administration of the Agreement and the sanitation system and associated responsibilities. Allocated costs for the City Manager, Public Works Director, Maintenance Supervisors, Maintenance Workers, Management Analyst, Admin Clerks I & II, and Engineering Technician are calculated for total annual costs in this category of **$316,835.**

Other costs include the annual Earth Team contract, Neighborhood Champions program, vehicle maintenance, Private Lands ordinance (amortized over 10 years), and Hauler ordinance (amortized over 10 years), for a total cost of $44,226 including applying 17% for General Fund overhead. The total calculated cost for this category is **$361,061.**

CalRecycle and SB 1383 Compliance

This category includes City staff costs and other costs for various activities associated with the City's need to implement Senate Bill 1383 (Short-Lived Climate Pollutants Act) as well as annual reporting to the State agency CalRecycle. These costs include procurement of recycled-content paper and recovered organic waste products such as compost or mulch, with a combined cost of **$106,256.**

Code Enforcement

This category would include City staffing costs for enforcing the solid waste provisions of the City's Municipal Code, which includes illegal solid waste accumulations, illegal dumping, littering, improper waste collection setouts, nuisances, and the associated investigations, warnings, notices of violation, and administration of penalties. The costs for this category were included in other overlapping categories, so costs were not included for Code Enforcement specifically.

Street Sweeping

When the Contractor or individual waste generators do not properly manage the collection of solid waste, that mismanaged solid waste tends to end up in the public right-of-way and on streets, where it must be removed by the City. Street sweeping captures solid waste that ends up in public streets because of improper collection. Most, if not all, of the solid waste that ends up in the streets is generated by properties that receive solid waste collection services from the Contractor.

For the purposes of this Study, we do not assume that all mismanaged solid waste that ends up on the City's streets is generated by properties receiving solid waste services. Rather, because there is the possibility that some solid waste collected by street sweeping operations was originally generated by other sources, this Study estimates that only 80% of the solid waste collected by street sweepers was generated by properties receiving solid waste services. This assumption is consistent with other studies conducted by R3 (e.g., for the cities of Garden Grove and San Bruno) wherein street sweeping activities were allocated between 77.4% and 90% to the sanitation system.

This category includes outside contractor staffing, capital equipment, and operations and maintenance costs for the City's street sweeping operations. The allocated and annualized costs for capital equipment and operations and maintenance costs are calculated to be a total of **$190,008** annually for this category**.**

Catch Basin Waste Removal

As with street sweeping, solid waste that is not properly managed by waste generators or the Contractor, and not otherwise captured by street sweeping operations, accumulates in catch basins and other trash capture devices in the City's storm drain system. As with the street sweeping category, we do not assume that all mismanaged solid waste that ends up in catch basins or trash capture devices is generated by properties that receive solid waste services; the 80% estimate used for street sweeping costs is also applied here, and for the same reasons.

The costs for this category were included in other overlapping categories, so costs were not included for Catch Basin Waste Removal specifically.

Illegal Dumping Clean-up

The City's Public Works maintenance crews also clean up solid waste materials that are illegally dumped throughout the City. As with street sweeping and catch basin waste removal, an 80% waste generation allocation is applied.

This category includes City staffing costs for illegal dumping clean-up as well as costs for outside contractors and service providers for clean-up of un-housed encampments. The costs for staff including Police Dispatchers, Police Lieutenants, and Police Sergeants are calculated to be $23,074 annually and other costs for annual litter removal contract, SOS Richmond encampment cleanup, and Sequoia Creek cleanup are calculated to be $44,928 annually, for a calculated total in this category of **$68,002.**

Public Waste Containers

This category includes City staff costs and other costs for collection of waste deposited in public waste containers in the public right-of-way and other public locations in the City. The allocated costs for public waste containers including full trash capture devices are calculated to be a total of **$70,682** annually for this category**.**

Waste Collection at City Events

This category includes City staff costs and other costs for collection of waste generated and disposed of at City public events. The allocated costs for staff overtime at Dumpster Days are calculated to be a total of **$63,180** annually for this category**.**

Tree Trimming for Vehicle Access to Public Right-of-Way

This category would include City staff costs and other costs for trimming of the City's street trees to provide safe clearance for collection vehicles to collect solid waste from the public right-of-way. There were no allocated costs calculated for this category**.**

Annual Total of City's Costs

Table 3, on the following page, shows the total of the City's Costs for management and administration of the Agreement and the sanitation system as calculated in this Study, by category.

Table 3: City's Annual Costs by Category and in Total

Category	Staffing Costs	Other Costs	Total
Direct Management and Administration	$205,050	$94,770	**$299,820**
Indirect Management and Administration	$316,835	$44,226	**$361,061**
Street Sweeping	-	$190,008	**$190,008**
Illegal Dumping Clean-up	$23,074	$44,928	**$68,002**
Public Waste Containers	-	$70,682	**$70,682**
Waste Collection at City Events	$63,180	-	**$63,180**
Total Annual City's Costs	**$608,138**	**$550,871**	**$1,159,008**

Property Use Charges

Methodology

R3 reviewed and analyzed information provided by the City and the Contractor pertaining to Property Use Charges for Contractor's use of the public right-of-way for collection of solid waste collection containers. They then calculated the annual Property Use Charges based on:

- The setout area used for collection of solid waste containers (in square feet).
- The amount of time that the area is used.
- The market value for use of the public right-of-way (in dollars per square foot).
- The number of solid waste subscribers setting out collection containers in the public right-of-way.

Using these values, we calculated the market value for the Contractor's use of government property in the City.

Variables, Estimates, and Assumptions

Setout Area

Standard residential solid waste collection setouts include three solid waste collection containers, usually carts with wheels and lids, with one each for garbage, recycling, and organics waste streams. The setout area needed for placement of these containers is inclusive of the width of each container (typically two feet) as well as minimum required space between the containers and other objects such as cars (minimum of one feet). The set-out area also takes up available parking space and is, thus, assumed to extend six feet out from the curb. Taken altogether, the area for residential setouts is calculated as three

containers that are each two feet wide, plus one foot between each container and other objects, for a total area ten feet wide times six feet in depth. The result is 60 square feet of setout area used for collection of solid waste containers in residential areas.

The amount of area used for commercial setouts (in this Study, use of the term commercial also always includes multi-family) can vary widely, as there is no standard commercial subscription size profile – each commercial solid waste subscriber can select from a range of container sizes, with most of them being larger than the containers used in residential areas. Given this complexity, this Study assumes that the average commercial setout area is twice that of the residential setout area, for 120 square feet. This estimate is likely lower than the average setout area needed in commercial areas and is, therefore, conservative.

Setout Time Usage

Standard residential solid waste collection is performed once weekly. Most residential containers are set out the evening prior to collection and are removed from the public right-of-way the following afternoon. Thus, for the purposes of this Study, we assume that collection containers are in the public right-of-way for an average of 18 hours per day, one day per week, which amounts to approximately 10.71% of the time (18 hours divided by 24 per day divided by 7 days per week).

Commercial solid waste subscription setout times can vary widely – just as there is no standard commercial subscription size profile, likewise there is no standard collection frequency. Commercial solid waste subscribers can select collection frequency between once and six times per week, and with different frequencies for different waste streams. Given this complexity, this Study assumes that the average commercial collection frequently is twice weekly, for 21.42% of the time. As with the setout area, this estimate is likely lower than the average commercial collection frequency and is, therefore, conservative.

Market Value for Use of Public Right-of-Way

To establish the market value for use of the public right-of-way, R3 conducted an online survey of recent purchases of bare land in the City and locally in Contra Costa County. R3 sampled more than thirty recent sales of bare land in the City, which were sold for an average of $24.21 per square foot. To that value, R3 added the per square foot value of the City's street pavement, which is calculated as a function of the total replacement value of the City's streets ($123,461,000) divided by the area of the streets in square feet (8,171,447) both of which are contained in the City's 2023 Pavement Management Budget Options Report (PMBOR) (see next section).

The resultant value of the street improvements is $15.11 per square foot, which, when added to the $24.21 market value of bare land, yields $39.32 per square foot. This value is then divided by a rental realization rate of 4.55, established via survey of 18 parking space rental rates in and around the City, for a total annual per square foot use charge for the public right-of-way of $8.64.

Number of Subscriptions Setting Out Containers

The Contractor reports that there are 5,104 residential and 612 commercial solid waste service subscribers in the City. However, not all subscribers set out their containers in the public right-of-way for collection all the time. To account for non-setouts (either because subscribers don't have waste materials to set out or because they receive on-premises service) we assume that only 90% of residential solid waste subscribers set out containers on a regular basis, for a resulting total of 4,594 average residential setouts. It is also understood that most commercial subscribers do not set out containers in the public right-of-way, and therefore we conservatively assume that only 5% of commercial subscribers set out containers on a regular basis, for a resulting total of 31 average commercial setouts.

Analysis and Total Annual Property Use Charges

Calculating the total annual Property Use Charges using the variables, estimates, and assumptions from the prior section is a function of multiplication, as shown in **Table 4**, below.

Table 4: Calculation of Total Annual Property Use Charges

Variable Category	Residential	Commercial	Grand Total Annual Property Use Charge
Setout Area	60 SF	120 SF	
Setout Time Usage	10.71%	21.42%	
Annual Use Charge	$8.64 per SF	$8.64 per SF	
Number of Setouts	4,594	31	
Total Annual Property Use Charges	**$255,062**	**$6,885**	**$261,947**

Pavement Impacts

Methodology

R3 reviewed and analyzed information provided by the City pertaining to Pavement Impacts from the Contractor's solid waste collection vehicles. We then calculated estimates of the proportionate share of the average annual pavement repair, maintenance, and rehabilitation costs associated with solid waste collection vehicles based on the proportionate impact to pavement from solid waste collection vehicle compared to other sources of impacts.

The calculation accounts for the City's annual repair costs, five-year projections for capital improvement costs, and five-year projections for annualized growth in deferred maintenance. The calculation also accounts for the high loading and slow speed impacts on pavement associated with solid waste collection vehicles.

The calculation proportionately allocates the average annual pavement management costs to solid waste vehicles based on:

- The equivalent single-axle load and proportionate impacts from speed for those vehicles compared to other vehicles.
- The number of vehicle trips on City streets.
- The proportion of vehicle trips that are made by trucks versus automobiles.[1]

Variables, Estimates, and Assumptions

The weight, loading, slow speed, and frequent stops that characterize solid waste collection vehicle operations impose unique and quantifiable impacts on the City's street pavement. It is important to understand that, while calculation of vehicle impacts to pavement can be precise for individual vehicles, out of necessity we made certain assumptions about overall blended pavement impacts associated with several categories of vehicle types for the purposes of this Study. This is because we sought to calculate estimated impacts to all street pavement in the City, covering all vehicle uses, and precise traffic

[1] *Our analysis accounts for the distribution of vehicles among the 13 Federal Highway Administration vehicle classifications, which include passenger cars, SUVs/pick-ups, buses, and multiple truck and truck/trailer axle combinations.*

information at that scale is not currently available. Thus, we make informed assumptions regarding several variables necessary for this Study.

For each of these variables, there is a range of potentially reasonable values that may be used. We have selected values at the low end of the reasonable range to present findings that conservatively calculate estimated values of the pavement impacts associated with the Contractor's solid waste collection vehicles during the course of providing sanitation service.

Assumptions used are described in the following subsections, which reference sources supporting the summary provided here. We must note that changes in assumptions may result in material changes in calculation results and findings.

Factors Impacting Pavement Conditions

Street pavement repair, maintenance, and rehabilitation needs and their resulting costs are affected by several factors, including vehicle usage and trench cuts and subsurface activities related to underground utilities.

Environmental conditions such as light and water also contribute to pavement repair, maintenance, and rehabilitation needs in combination with the primary impacts from vehicles, trench cuts, and subsurface activities. This Study only focuses on the impacts to street pavement from vehicles, and the proportion of those impacts that are attributable to the Contractor's solid waste collection vehicles as they perform sanitation service.

City's Costs for Pavement Repair, Maintenance and Rehabilitation

The City regularly projects its costs for repair, maintenance, and rehabilitation of pavement resulting from degradation due to use. These projections, and the basis for them, are documented in PMBOR reports which the City commissions with engineering consultants.[2]

Per the City's March 2023 PMBOR report, the City's projected average annual pavement maintenance and rehabilitation costs from 2023 through 2027 for its entire street network are approximately $650,000. Also, per the PMBOR, deferred pavement maintenance on the City's streets[3] (which is the result of degrading pavement conditions associated with the impacts of vehicles) is projected to increase by $252,626 between 2023 and 2027.[4]

Axle Loading

Our methodology for calculating the proportionate amount of pavement maintenance, and rehabilitation impacts for the Contractor's vehicles is grounded in the fact that all vehicles, including solid waste collection vehicles, degrade pavement during use. Measurement of that impact – also known as "vehicle loading" – can be estimated, quantified, and expressed as an Equivalent Single Axle Load (ESAL), which is a function of the vehicle's weight and the distribution of that weight over the vehicle's axles.

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2 *The City's current PMBOR report dated March 2023 was prepared by Capitol Asset & Pavement Services, Inc., a consulting firm with expertise in pavement engineering. Broadly speaking, a PMBOR is designed to provide objective information and useful data for analysis so that managers can make more consistent, cost-effective, and defensible decisions related to the preservation of a pavement network.*

3 *Deferred maintenance is planned maintenance that gets delayed and backlogged because of a lack of funding. Deferred maintenance costs remain on the books until they are funded and the work is completed and recategorized in the City's PMBOR.*

4 *Our analysis assumes funding based on the City's budgeted pavement maintenance costs as presented in the PMBOR under Scenario 2 "Current Investment Level".*

It is important to note that heavier vehicles have more impacts on pavement and have a higher vehicle loading ESAL value. It is also important to note that ESAL values are associated with vehicle loading only, and not the speed of the vehicle; it is therefore assumed that relative ESAL values between vehicle types are based on vehicles travelling at the same rate of speed.

For this analysis, R3 used the vehicle categories and average ESAL values shown in Table 5, below. Table 5 explains and cites supporting information for how the ESAL for each vehicle type was determined.

Table 5: ESAL Value Assumptions by Vehicle Type

Vehicle Type	ESAL Value	Source
Automobiles (Passenger Cars)	0.0008	AASHTO (American Association of State Highway and Transportation Officials) Design Guide with ESALs by Vehicle Type
Average of All Other Trucks[5]	0.0171	Calculated Value Using AASHTO Design Guide with ESALs by Vehicle Type, Federal Highway Administration ESALs by Vehicle Type, Comparative Traffic Counts
Solid Waste Vehicle (Garbage)	1.0000	Calculated Values by Type Using Example Axle Weights and AASHTO Axle Load Equivalency Factors
Solid Waste Vehicle (Organics)	1.0000	
Solid Waste Vehicle (Recycling)	0.7500	

Given the assumed ESAL values in Table 5, a solid waste vehicle collecting garbage has 1,250 times the impact of an automobile. We are aware of other research concluding that the impacts of solid waste collection vehicles may be as high as 8,000-9,000 times the impact of passenger cars; thus, our assumed ESAL of "1" for garbage collection vehicles is on the low end of the reasonable range of ESALs for such vehicles.

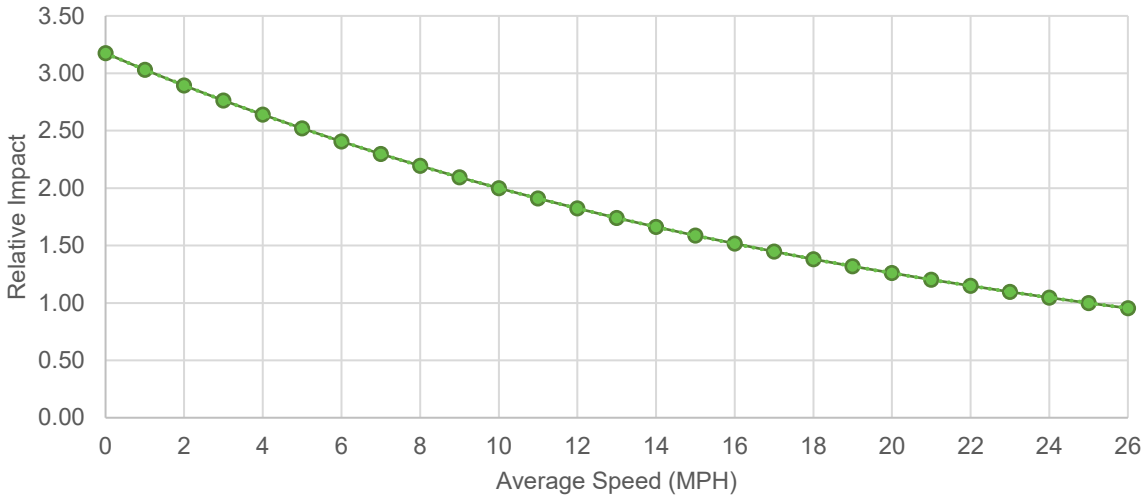
Speed Impact

Impacts to flexible pavements (which are typical for residential streets) are also influenced by vehicle speeds, with impacts being exponentially higher when a load carrying vehicle is moving at a very slow speed.[6] This is demonstrated in **Chart 1**, on the following page.

[5] *"All other trucks" means all vehicles with high loading and impact on street pavement other than solid waste vehicles.*

[6] *Effect of truck speed on the response of flexible pavement systems to traffic loading; International Journal of Pavement Engineering, July 2020; Michael R. S. Mshali and Wynand JvdM. Steyn.*

Chart 1: Exponential Relationship Between Speed and Pavement Impacts



Unlike typical traffic on residential streets, which tends to travel at or near the posted speed limit (25 miles per hour [mph] in the City), solid waste vehicles slow and stop for collection in front of each household, averaging approximately 4 mph to 8 mph.[7] At these low speeds, and as shown in Chart 1, vehicles have approximately 2.2 to 2.6 times the impact to the pavement than they would travelling only at the 25 mph speed limit.

In this Study we conservatively assume that solid waste vehicles in the City may be travelling at a faster 10 mph average speed, and we thus assume that the relative impact of speed is a factor of 2, not the higher 2.2 to 2.6 factors corresponding with slower speeds as noted above. We apply this speed factor of 2 as a multiplier to the ESAL loading for solid waste collection vehicles in our analysis of impacts to residential streets only; the factor is not applied to the ESAL loading for arterial and collector streets, as those streets are not typically comprised of flexible pavements, solid waste collection vehicles stop less frequently on those streets (and thus have a higher average speed).

Vehicle Passes Per Day

By estimating the number and type of vehicles (i.e., solid waste collection vehicles, automobiles, and all other trucks) that travel on a street, and the average pavement impacts (measured in ESAL loading) associated with each vehicle type (described in the prior subsection), the total impacts that the pavement will experience can be estimated in a mathematical calculation. Our analysis makes informed assumptions about the number of vehicle passes (meaning trips down streets) by type for the two major types of streets identified by the City in its PMBOR. Those two types of streets are: high-traffic-volume streets (namely arterial and collector streets) and low-traffic-volume streets (residential streets). Specific data for the City relating to the number of vehicle passes per day and the proportion of those passes that are comprised of trucks was not available for this Study.

For the low-traffic residential streets, we used an estimate of 1,500 vehicle passes per day. We also estimated that 5% of residential traffic trips were made by trucks.

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7 *Real-world activity, fuel use, and emissions of heavy-duty compressed natural gas refuse trucks; Science of the Total Environment 761, 2021; Gurdas S. Sandhu, H. Christopher Frey, Shannon Bartelt-Hunt, Elizabeth Jones.*

For arterial and collector streets, we used an estimate of 15,000 passes per day. For the percentage of those trips that are trucks, we used a calculated value based on comparative traffic counts from the City of Torrance in 2023 and which is the same dataset that we used to estimate the average ESAL for "All other trucks" in Table 5. That dataset calculates the average daily traffic counts for all vehicles on commercial streets in that city, with 87.7% of the average daily traffic count being comprised of passenger cars and motorcycles and the remaining 12.3% being comprised of trucks.

For the purposes of this Study, we have assumed an even higher percentage of arterial and collector street traffic being trucks, at 15% of the average daily traffic. As with the prior assumptions, this value is conservative in that it returns a low proportionate value for the impacts to streets from the Contractor's solid waste vehicles. **Table 6**, below, is a summary of the assumptions used in this Study related to average daily vehicles passes and the percentage that are trucks assumptions used in this Study.

Table 6: Vehicle Passes Per Day by Street Type

Street Type	Vehicle Passes Per Day	Percentage of Vehicle Passes That Are Trucks
Residential	1,500	5%
Arterial and Collector	15,000	15%

Vehicle Passes By Vehicle Type

The variables described in the prior subsection provide the overall number of vehicle passes per day, and the percentage of those passes that are trucks. To isolate the vehicle loading impacts to pavement associated with solid waste collection vehicles, we need to determine the number of passes that those vehicles make per day. This is a relatively simple calculation based on the weekly schedule of collections for solid waste collection services.

For the low-traffic residential streets, solid waste collection operations are on a weekly schedule. Since weekly collections are on both sides of the street, each street is driven twice (once in each direction) by a minimum of one of each type of solid waste collection vehicle. For the purposes of this Study, we assume that each solid waste collection vehicle makes two passes per week, or 0.286 passes per day, on residential streets. This value does not account for the fact that some streets are driven on during non-route days so that collection vehicles can access streets on a given route, meaning that the actual average passes per week in the City must be higher than stated above.

Using the lower passes per week is conservative in that it returns a lower result for the street impacts from the Contractor's solid waste vehicles. For the high-traffic arterial and collector streets, which are primarily commercial, the schedule for solid waste collection can vary. Solid waste collection services may be provided up to five or six times a week for larger waste generators, and may be as low as weekly for smaller generators. Additionally, because solid waste generators in commercial areas are not all on the same collection schedules as residential accounts are, vehicles in commercial areas pass over the same streets multiple times to serve accounts with different collection schedules.

For the purposes of this Study, for arterial and collector streets, we assume that solid waste collection vehicles collecting garbage for landfill disposal pass over each street two times per day (once in each direction), while solid waste collection vehicles for organics and recycling pass over each street once per day (one half in each direction). Total passes for organics and recycling collection vehicles are less because it is generally the case that service levels for garbage are at least twice those of the

corresponding organics or recycling service level. As with the number of passes on residential streets, this value does not account for the fact that some streets are driven on during non-route days so that collection vehicles can access streets on a given route, meaning that the actual average passes per week in the City must be higher than stated above. Using the lower passes per week is conservative in that it returns a lower result for the pavement impacts from the Contractor's solid waste vehicles.

The number of passes per day for the remaining vehicle types – automobiles and other trucks – are simply calculated as a function of the total number of daily passes, the total number of those that are trucks (based on the percentages discussed in the prior section), and the number of passes for solid waste collection vehicles. For example, for the City's residential streets, given the assumed 1,500 passes per day and 5% (75) of those being trucks, there are 1,425 automobile passes per day (1,500 x 95%). With three types of solid waste collection vehicles each passing 0.286 times per day (as described above), the total passes per day are 0.857 (3 x 0.286). The number of passes for all other trucks is 74.143 (150 minus 0.857). **Table 7**, below, provides a summary of vehicle passes per day by street type.

Table 7: Vehicle Passes Per Day by Vehicle Type and Street Type

Vehicle Type	Residential Streets	Arterial and Collector Streets
Automobiles (Passenger Cars)	1,425.000	12,750.000
Average of All Other Trucks	74.142	2,247.143
Solid Waste Vehicle (Garbage)	0.286	1.429
Solid Waste Vehicle (Organics)	0.286	0.714
Solid Waste Vehicle (Recycling)	0.286	0.714
Total	**1,500**	**15,000**

Percentage of Streets by Type

A final variable that needs to be addressed in the percentage of streets by type. This information is included in the City's PMBOR, including the relative area by street type, as shown in **Table 8**, below.

Table 8: Percentage of Streets by Type

Street Type	Area (Square Feet)	Percentage of Area
Residential	4,242,213	51.9%
Arterial	2,521,668	30.9%
Collector	1,407,566	17.2%
Total	**8,171,447**	**100%**

Analysis

Percentage Impact for Solid Waste & Street Sweeping Vehicles by Street Type

With the variables for ESAL by vehicle type, the multiplication factor for the relative impacts of speed for solid waste collection vehicles on residential streets, and the number of passes by vehicle type established, we then calculate the relative percentage impact associated with each vehicle type. This is calculated as a function of ESAL multiplied by speed factor (residential streets only) multiplied by the number of weekly passes, multiplied by ESAL, with the product being the total vehicle loading pavement impact by vehicle type per week.

Totaling the weekly total vehicle loading by vehicle types yields the total estimated loading experienced by each street type (residential vs. arterial and collector). From there, we calculate the percentage contribution to total vehicle loading for solid waste collection vehicles, which is the total weekly ESAL loading associated with solid waste collection vehicles divided by the total ESAL loading for the street. **Table 9**, below, and **Table 10**, on the following page, show these calculations and the results.

Table 9: Calculation of Solid Waste Pavement Impacts – Residential Streets

	A	B	C	D	E	F
Vehicle Type	**Average ESAL / Vehicle** *(Per Table 5)*	**Relative Impact from Speed**	**Passes / Day / Vehicle Type** *(Per Table 7)*	**Passes / Week / Vehicle Type** *(C x 7)*	**Total Weekly ESAL Loading** *(A x B x D)*	**Percent of Total ESAL Loading** *(E / 27.85)*
Automobiles	0.0008	1x	1,425.00	9,975	7.98	28.65%
All Other Trucks	0.0171	1x	74.14	519	8.87	31.87 %
Garbage Vehicles	1.0000	2x	0.286	2	4.00	14.36%
Organic Material Vehicles	1.0000	2x	0.286	2	4.00	14.36%
Recycling Vehicles	0.7500	2x	0.286	2	3.00	10.77%
Total			**1,500**	**10,500**	**27.85**	**100%**

As shown in Table 9, for the City's residential streets we calculated the percentage impacts for solid waste vehicles to be 39.49% of total impacts to residential street pavement (14.36% times 2 plus 10.77%).

Table 10: Calculation of Solid Waste Vehicle Impacts – Arterial and Collector Streets

	A	B	C	E	F
Vehicle Type	**Average ESAL / Vehicle** *(Per Table 5)*	**Passes / Day / Vehicle Type** *(Per Table 7)*	**Passes / Week / Vehicle Type** *(B x 7)*	**Total Weekly ESAL Loading** *(A x C)*	**Percent of Total ESAL Loading** *(E / 359.13)*
Automobiles	0.0008	12,750.00	89,250	71.4	19.88%
All Other Trucks	0.0171	2,247.14	15,730	268.98	74.9%
Garbage Vehicles	1.0000	1.429	10	10.00	2.78%
Organic Material Vehicles	1.0000	0.714	5	5.00	1.39%
Recycling Vehicles	0.7500	0.714	5	3.75	1.04%
Total		**15,000**	**105,000**	**359.13**	**100%**

For the City's arterial and collector streets, Table 10 calculates the percentage impact from solid waste vehicles to be 5.22% of the total impacts (2.78% plus 1.39% plus 1.04%, with rounding).

Average Annual Pavement Expenses

Per the PMBOR report, the City is projected to spend $650,000 per year on pavement repair, maintenance, and rehabilitation.

Average Annualized Deferred Maintenance

In addition to contributing to annual pavement maintenance and rehabilitation costs, solid waste vehicles also contribute to deferred maintenance. The PMBOR report projects that deferred maintenance will increase by $252,626 from 2023 to 2027, which is $63,161 annually.

Reduction for Pavement Subsurface Impacts

Expenditures for pavement maintenance repair impacts to pavement caused by vehicles, trench cutting, and subsurface activities, as well as the environmental impacts associated with those same sources of primary impacts.

We roughly estimate the impacts of trench cutting and subsurface activities on the City's streets to be 10% of all pavement repair, maintenance, and rehabilitation costs. This leaves 90% of the average annual pavement management costs and average annualized deferred maintenance needs associated with vehicle impacts. This is demonstrated in **Table 11**, on the following page.

Table 11: Average Annual Pavement Impacts from Vehicles

Category	Amount of Impacts from All Sources	Reduction for Subsurface Activities	Amount of Impacts from Vehicles
Average Annual Pavement Expenses	$756,619	-10%	$680,957
Average Annualized Deferred Maintenance	$63,157	-10%	$56,841
Total	**$819,775**	**-10%**	**$737,798**

Table 12, below, shows the breakdown of the average annual pavement impacts from all vehicles by street type, using the total from Table 11.

Table 12: Total Pavement Impacts from Vehicles by Street Type

Variable	Residential	Arterial and Collector	Total
Percentage of Streets by Type (From Table 8)	51.9%	48.1%	100%
Total	**$383,028**	**$354,770**	**$737,798**

Total Annual Pavement Impacts

Calculating the total annual Pavement Impacts using the variables, estimates, and assumptions from the prior section is a function of multiplication, as shown in **Table 13**, below.

Table 13: Calculation of Total Pavement Impacts from Contractor's Vehicles

Variables	Residential	Arterial and Collector	Grand Total
Annual Pavement Impacts from Vehicles (From Table 12)	$383,028	$354,770	
Percentage Impacts from Contractor's Vehicles (From Tables 9 and 10)	39.49%	5.22%	
Total	**$151,259**	**$18,522**	**$169,781**

3. FINDINGS & CONCLUSIONS

Franchise Fee

- The FY 2022-23 Franchise Fee paid to the City was $543,543 and the projection for FY 2023-24 is $556,163.
- R3 calculated estimates of the City's Costs and Property Use Charges based on actual and estimated cost information provided by the City, and with conversative assumptions for estimated values. The sum of FY 2023-24 annual City's Costs $1,159,008 and Property Use Charges $261,947 amounts calculated in this Study is $1,420,955.
- R3 also calculated estimates of the Pavement Impacts from Contractor's solid waste collection vehicles based on quantifiable impacts from such vehicles. The amount of Pavement Impacts calculated in this Study is $254,319.
- Altogether, the sum of City's Costs, Property Use Charges, and Pavement Impacts calculated by this Study are $1,675,274.
- The calculated amounts bear a reasonable relationship to the Contractor's burdens on the City resulting from the management and administration of the Agreement and the sanitation system, and the reasonable value of the Contractor's use of the public right-of-way.
- The City's Costs have been reviewed and confirmed by City staff as being representative of the actual time and costs incurred for these activities. Amounts of Property Use Charges are proportionately allocated to the Contractor with due recognition of the realities of the Contractor's operations.
- The amount calculated Pavement Impacts bear a reasonable relationship to the Contractor's burdens on the City resulting from the pavement impacts caused by Contractor's solid waste collection vehicles. Calculations of Pavement Impacts have been proportionately allocated to the Contractor with due recognition of the impacts from loading, speed, number of trips, and other causes of pavement repair, maintenance, and rehabilitation needs.
- The amounts calculated in this Study are $1,104,111 higher than the projected FY 2023-24 Franchise Fee payments. It is highly unlikely, given the justification provided herein, that FY 2023-24 Franchise Fee payments will exceed the amounts calculated in this Study. Likewise, it is also unlikely that Franchise Fee payments in future years, even via a new Agreement, will exceed the amounts calculated in this Study.
- The projected FY 2023-24 Franchise Fee is less than would be justified by the calculations in this Study.
- The Franchise Fee therefore is not more than necessary to cover the City's costs incurred in managing and administering the Agreement and the sanitation system plus the value of the Contractor's use of the public right-of-way.

4. RECOMMENDATIONS

Annual Adjustments

All values calculated in this Study are in current FY 2023-24 dollars. Given that the City's Costs, Property Use Charges, and Pavement Impacts will all tend to change over time in response to changing staffing, benefits, and other costs, it would be appropriate for the City to implement an annual adjustment to the Franchise Fee.

» R3 recommends the City consider including an automatic annual adjustment that would change the fee in proportion to the percentage change in the Consumer Price Index (CPI). We recommend the CPI for All Urban Consumers (CPI-U) for the San Francisco Bay Area (U.S. Bureau of Labor Statistics series ID: CUURS49BSA0).

Sources and Uses Accounting

Currently, the City's Costs and Property Use Charges are not tied to Franchise Fee revenues in the City's accounting system. The City could implement project code accounting and/or enterprise fund accounting for the Franchise Fee to better track source revenues and their uses. In either case, allocated and/or direct staffing and other costs could be tied to source revenues, while the Property Use Charges could be transferred out for general use.

» R3 recommends the City consider implementing sources and uses accounting practices for Franchise Fee revenues, City's Costs, and Property Use Charges.

Periodic Recalculation

Over time, the City's Costs associated with the Agreement and the sanitation system, the value of Property Use Charges for use of the public right-of-way, and the annualized costs associated with Pavement Impacts from the Contractor's solid waste collection vehicles may change in ways that vary from the annual change in the CPI. Additionally, changes in City policies, programs, procedures, organization, geopolitical boundaries, laws, regulations, court rulings, and/or other factors may also trigger a need for recalculating fees.

» R3 recommends the City consider updating this Study periodically (e.g., every five years) or more frequently if needed to recalculate fees in response to other factors.