

# Baseline Trash Load and Short-Term Trash Load Reduction Plan

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**Submitted by:**

**City of San Mateo**

**330 W. 20<sup>th</sup> Avenue**

**San Mateo, CA 94403**

*In compliance with Provisions C.10.a(i) and C.10.a(ii) of Order R2-2009-0074*

**Version 1.0**  
**January 26, 2012**

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**CITY OF SAN MATEO  
SHORT-TERM TRASH LOAD REDUCTION PLAN**

**CERTIFICATION STATEMENT**

"I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted, is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

**Signature by Duly Authorized Representative:**

A handwritten signature in black ink, appearing to read "Larry A. Patterson", written over a horizontal line.

Larry A. Patterson, P.E.

January 26, 2012

Public Works Director, City of San Mateo

# TABLE OF CONTENTS

<b>CERTIFICATION STATEMENT .....</b>	<b>III</b>
<b>TABLE OF CONTENTS.....</b>	<b>IV</b>
<b>LIST OF TABLES .....</b>	<b>VI</b>
<b>LIST FIGURES.....</b>	<b>VI</b>
<b>ABBREVIATIONS.....</b>	<b>VII</b>
<b>PREFACE .....</b>	<b>VIII</b>
<b>1.0 INTRODUCTION .....</b>	<b>1</b>
BASELINE TRASH GENERATION RATES PROJECT .....	1
TRASH LOAD REDUCTION TRACKING METHOD SUMMARY.....	2
SHORT-TERM TRASH LOAD REDUCTION PLAN .....	2
<b>2.0 BASELINE TRASH LOADING ESTIMATE .....</b>	<b>4</b>
PERMITTEE CHARACTERISTICS.....	4
DEFAULT TRASH GENERATION RATES (REGIONAL APPROACH) .....	5
JURISDICTIONAL AND EFFECTIVE LOADING AREAS .....	5
PERMITTEE-SPECIFIC BASELINE TRASH LOADING RATES .....	6
<i>Baseline Street Sweeping</i> .....	6
<i>Baseline Storm Drain Inlet Maintenance</i> .....	7
<i>Baseline Stormwater Pump Station Maintenance</i> .....	7
BASELINE TRASH LOADING ESTIMATE.....	7
<b>3.0 TRASH LOAD REDUCTION CALCULATION PROCESS .....</b>	<b>10</b>
STEP #1: EXISTING ENHANCED STREET SWEEPING.....	10
STEP #2: TRASH GENERATION REDUCTION CONTROL MEASURES.....	11
STEP #3: ON-LAND INTERCEPTION CONTROL MEASURES.....	11
STEP #4: CONTROL MEASURES THAT INTERCEPT TRASH IN THE MS4 .....	12
STEP #5: CONTROL MEASURES THAT INTERCEPT TRASH IN WATERWAYS .....	12
STEP #6: COMPARISON TO BASELINE TRASH LOAD .....	12
<b>4.0 PLANNED ENHANCED TRASH CONTROL MEASURES.....</b>	<b>13</b>
CR-2: POLYSTYRENE FOAM FOOD SERVICE WARE POLICY .....	14
<i>Baseline Level of Implementation</i> .....	14
<i>Enhanced Level of Implementation</i> .....	14
<i>Percent Reduction from Enhancements</i> .....	14
CR-3: PUBLIC EDUCATION AND OUTREACH PROGRAMS .....	15
<i>Baseline Level of Implementation</i> .....	15
<i>Enhanced Level of Implementation</i> .....	16
<i>Percent Reduction from Enhancements</i> .....	19
CR-4: REDUCTION OF TRASH FROM UNCOVERED LOADS .....	20
<i>Baseline Level of Implementation</i> .....	20
<i>Enhanced Level of Implementation</i> .....	20
<i>Percent Reduction from Enhancements</i> .....	21
CR-5: ANTI-LITTERING AND ILLEGAL DUMPING ENFORCEMENT ACTIVITIES .....	22
<i>Baseline Level of Implementation</i> .....	22
<i>Enhanced Level of Implementation</i> .....	22
<i>Percent Reduction from Enhancements</i> .....	23
CR-6: IMPROVED TRASH BIN/CONTAINER MANAGEMENT.....	24

*Baseline Level of Implementation* ..... 24

*Enhanced Level of Implementation* ..... 24

*Percent Reduction from Enhancements* ..... 25

QF-1: ENHANCED ON-LAND TRASH CLEANUPS (VOLUNTEERS AND/OR MUNICIPAL) ..... 26

*Baseline Level of Implementation* ..... 26

*Enhanced Level of Implementation* ..... 26

*Percent Reduction from Enhancements* ..... 27

QF-3: PARTIAL-CAPTURE TREATMENT DEVICES ..... 28

*Baseline Level of Implementation* ..... 28

*Enhanced Level of Implementation* ..... 28

*Percent Reduction from Enhancements* ..... 29

QF-5: FULL-CAPTURE TREATMENT DEVICES ..... 31

*Baseline Level of Implementation* ..... 31

*Enhanced Level of Implementation* ..... 31

*Percent Reduction from Enhancements* ..... 31

QF-6: CREEK/CHANNEL/SHORELINE CLEANUPS ..... 38

*Baseline Level of Implementation* ..... 38

*Enhanced Level of Implementation* ..... 38

*Percent Reduction from Enhancements* ..... 39

**5.0 SUMMARY OF TRASH CONTROL MEASURE ENHANCEMENTS..... 40**

    5.1 ANNUAL REPORTING AND PROGRESS TOWARDS TRASH LOAD REDUCTION GOAL(S) ..... 42

    5.2 CONSIDERATIONS OF UNCERTAINTIES ..... 42

**6.0 IMPLEMENTATION SCHEDULE..... 43**

**7.0 REFERENCES ..... 45**

## LIST OF TABLES

Table 1-1.	Trash control measures for which load reduction credits or quantification formulas were developed to track progress toward trash load reduction goals.....	3
Table 2-1.	Regional Default Annual Trash Generation Rates by Land Use Category.....	5
Table 2-2.	Jurisdictional areas and effective loading areas in the City of San Mateo by land use categories identified by ABAG (2005) .....	6
Table 2-3.	Preliminary Trash baseline load for the City of San Mateo .....	8
Table 4-1.	Trash control measures that will be implemented by the City of San Mateo to reach the 40 percent trash load reduction .....	13
Table QF-3-1.	Partial capture treatment devices installed or planned to be installed within the City of San Mateo prior to July 1, 2014.....	30
Table QF-5-1.	Trash full-capture treatment devices within the jurisdictional boundaries of the City of San Mateo that are planned for installation by July 1, 2014.....	32
Table 5-1.	Planned enhanced trash control measure implementation within the jurisdictional boundaries of the City of San Mateo and associated trash load reduction.....	41
Table 6-1.	Preliminary implementation schedule for enhanced trash control measures in the City of San Mateo .....	44

## LIST FIGURES

Figure 2-1.	Estimated trash baseline loading rates for geographical areas in the City of San Mateo.....	9
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## ABBREVIATIONS

BASMAA	Bay Area Stormwater Management Agencies Association
BID	Business Improvement District
CalRecycle	California Department of Resources Recycling and Recovery
Caltrans	California Department of Transportation
CASQA	California Stormwater Quality Association
CDS	Continuous Deflection Separator
CEQA	California Environmental Quality Act
CY	Cubic Yards
EIR	Environmental Impact Report
EPA	Environmental Protection Agency
GIS	Geographic Information System
MRP	Municipal Regional Stormwater NPDES Permit
MS4	Municipal Separate Storm Sewer System
NGO	Non-Governmental Organization
NPDES	National Pollutant Discharge Elimination System
PIP	Public Information and Participation (SMCWPPP Program)
PSA	Public Service Announcement
Q	Flow
SFRWQCB	San Francisco Bay Regional Water Quality Control Board
SMCWPPP	San Mateo Countywide Stormwater Pollution Prevention Program
SWRCB	State Water Resource Control Board
TMDL	Total Maximum Daily Load
USEPA	United States Environmental Protection Agency
Water Board	San Francisco Bay Regional Water Quality Control Board
WDR	Waste Discharge Requirements

## **PREFACE**

This Baseline Trash Load and Short-Term Trash Load Reduction Plan (Plan) is submitted in compliance with provision C.10.a(i) and C.10.a(ii) of the Municipal Regional Stormwater NPDES Permit (MRP) for Phase I communities in the San Francisco Bay (Order R2-2009-0074). This Plan was developed using a regionally consistent format developed by the Bay Area Stormwater Management Agencies Association (BASMAA). Based on new information that becomes available during the implementation of this Short-Term Plan (e.g., revisions to baseline loading estimates or load reduction credits or quantification formulas), the City of San Mateo may choose to amend or revise this Plan. If revisions or amendments are necessary, a revised Short-Term Plan will be submitted to the Water Board via the City of San Mateo's annual reporting process.

## 1.0 INTRODUCTION

The Municipal Regional Stormwater NPDES Permit for Phase I communities in the San Francisco Bay (Order R2-2009-0074), also known as the Municipal Regional Permit (MRP), became effective on December 1, 2009. The MRP applies to 76 large, medium and small municipalities (cities, towns and counties) and flood control agencies in the San Francisco Bay Region, collectively referred to as Permittees. Provision C.10 of the MRP (Trash Load Reduction) requires Permittees to reduce trash from their Municipal Separate Storm Sewer Systems (MS4s) by 40 percent by July 1, 2014.

Required submittals to the San Francisco Bay Regional Water Quality Control Board (Water Board) by February 1, 2012 under MRP provision C.10.a (Short-Term Trash Load Reduction) include:

1. (a) Baseline trash load estimate, and (b) description of the methodology used to determine the load level.
2. A description of the Trash Load Reduction Tracking Method that will be used to account for trash load reduction actions and to demonstrate progress and attainment of trash load reduction levels.
3. A **Short-Term Trash Load Reduction Plan** that describes control measures and best management practices that will be implemented to attain a 40 percent trash load reduction from its MS4 by July 1, 2014;

This Short-Term Trash Load Reduction Plan (Short-Term Plan) is submitted by the City of San Mateo in compliance with the portions of MRP provision C.10.a identified as submittals 1(a) and 3 above. In compliance with 1(b), BASMAA submitted a progress report on behalf of Permittees that briefly describes the methodologies used to develop baseline trash loads (BASMAA 2011a). These methods are more fully described in BASMAA (2011b, 2011c). Lastly, the *Trash Load Reduction Tracking Method Technical Report* (BASMAA 2012a) was submitted by BASMAA on behalf of Permittees in compliance with submittal 2 described above. The Baseline Loading Rates and Tracking Method projects are briefly described below.

### Baseline Trash Generation Rates Project

Through approval of a BASMAA regional project, Permittees agreed to work collaboratively to develop a regionally consistent method to establish baseline trash loads from their MS4s. The project, also known as the *BASMAA Baseline Trash Generation Rates Project* assists Permittees in establishing a baseline to demonstrate progress toward MRP trash load reduction goals (i.e., 40 percent). The intent of the project was to provide a scientifically-sound method for developing (default) baseline trash generation rates that can be adjusted based on Permittee/site-specific conditions, and used to develop baseline loading rates and loads. Baseline loads form the reference point for comparing trash load reductions achieved through control measure implementation.

Baseline trash loading rates are quantified on a volume per unit area basis and are based on factors that significantly affect trash generation (e.g., land use, population density, and economic profile). The method used to establish baseline trash loads for each Permittee builds off “lessons learned” from previous trash loading studies conducted in urban areas (Allison and Chiew 1995; Allison et al. 1998; Armitage et al. 1998; Armitage and Rooseboom 2000; Lippner et al. 2001; Armitage 2003; Kim et al. 2004; County of Los Angeles 2002, 2004a, 2004b; Armitage 2007). The method is based on a conceptual model developed as an outgrowth of these studies (BASMAA 2011b). Baseline trash loading rates were

developed through the quantification and characterization of trash captured in Water Board-recognized full-capture treatment devices installed in the San Francisco Bay area. Methods used to develop trash baseline loading rates are more fully described in BASMAA (2011b, 2011c, and 2012b).

## Trash Load Reduction Tracking Method Summary

The trash load reduction tracking method, described in the *Trash Load Reduction Tracking Method Technical Report*, assists Permittees in demonstrating progress toward reaching trash load reduction goals defined in the MRP (e.g., 40 percent). The tracking method is based on information gained through an extensive literature review and Permittee experiences in implementing stormwater control measures in the San Francisco Bay Area. The literature review was conducted to evaluate quantification methods used by other agencies to assess control measure effectiveness or progress towards quantitative goals. Results are documented in the *Trash Load Reduction Tracking Method: Technical Memorandum # 1 – Literature Review* (BASMAA 2011d).

Tracking methods attributable to specific trash control measures fall into two categories: 1) trash load reduction quantification formulas; and 2) trash load reduction credits (BASMAA 2012a). Quantification formulas were developed for those trash control measures that were deemed feasible and practical to quantify load reductions at this time. Load reduction credits were developed for all other control measures included in the methodology development. Both categories of methods assume that as new or enhanced trash control measures are implemented by Permittees, a commensurate trash load reduction will occur. Progress toward trash load reduction goals will be demonstrated through comparisons to established baseline trash load estimates developed through the BASMAA *Baseline Generation Rates Project*.

## Short-Term Trash Load Reduction Plan

The purpose of this Short-Term Plan is to describe the current level of implementation of control measures and best management practices, and identify the type and extent to which new or enhanced control measures and best management practices will be implemented to attain a 40 percent trash load reduction from a Permittee's MS4 by July 1, 2014. The Short-Term Plan was developed using a template created by BASMAA through a regional project. New and enhanced trash control measures (i.e., best management practices) that Permittees may implement to demonstrate trash load reduction goals are included in Table 1-1. This list was developed collaboratively through the BASMAA Trash Committee, which included participation from Permittees, stormwater programs, Water Board and non-governmental organization (NGO) staff. The list of control measures is based on: 1) the potential for Permittees to implement; 2) the availability of information required to populate formulas and develop credits; and 3) the expected benefit of implementation. Load reductions associated with each control measure are demonstrated either through reduction credits (CR) or a quantification formula (QF) as described in the *Trash Load Reduction Tracking Method Technical Report* (BASMAA 2012a).

In efforts to reduce trash discharged from MS4s, Permittees may choose to implement control measures that are not included in Table 1-1 or described more fully in BASMAA (2012a). If a Permittee chooses to do so, methods specific to calculating trash load reductions for that control measure would need to be developed. Additionally, at that point, consideration should be given to updating this Short-Term Plan.

Additionally, based on new information that becomes available during the implementation of this Short-Term Plan (e.g., revisions to baseline loading estimates or load reduction credits or quantification

formulas), the City of San Mateo may amend or revise this Plan. If revisions or amendments are necessary, a revised Short-Term Plan will be submitted to the Water Board via the City of San Mateo’s annual reporting process.

**Table 1-1. Trash control measures for which load reduction credits or quantification formulas were developed to track progress toward trash load reduction goals.**

<b>Load Reduction Credits</b>
CR-1: Single-Use Carryout Plastic Bag Ordinances
CR-2: Polystyrene Foam Food Service Ware Ordinances
CR-3: Public Education and Outreach Programs
CR-4: Reduction of Trash from Uncovered Loads
CR-5: Anti-Littering and Illegal Dumping Enforcement
CR-6: Improved Trash Bin/Container Management
CR-7: Single-Use Food and Beverage Ware Ordinances
<b>Quantification Formulas</b>
QF-1: On-land Trash Cleanups (Volunteer and/or Municipal)
QF-2: Enhanced Street Sweeping
QF-3: Partial-Capture Treatment Devices
QF-4: Enhanced Storm Drain Inlet Maintenance
QF-5: Full-Capture Treatment Devices
QF-6: Creek/Channel/Shoreline Cleanups (Volunteer and/or Municipal)

This Short-Term Plan is organized into the following sections:

- Section 1.0: Introduction;
- Section 2.0: Baseline Trash Loading Estimate;
- Section 3.0: Trash Load Reduction Calculation Process;
- Section 4.0: Planned Implementation of New or Enhanced Control Measures;
- Section 5.0: Summary of Trash Control Measure Enhancements;
- Section 6.0: Implementation Schedule; and
- Section 7.0: References.

## 2.0 BASELINE TRASH LOADING ESTIMATE

*Note: Tables and information presented in this section are subject to change based on the results of a third monitoring event of the BASMAA Baseline Trash Generation Rates Project. Therefore, this section of the Short-Term Plan may be updated with revised trash generation rates, baseline loading rates, and baseline loads.*

This section provides the estimated annual baseline trash load from the City of San Mateo's Municipal Separate Storm Sewer System (MS4). In compliance with Provision C.10.a.ii of the MRP, the City of San Mateo worked collaboratively with other MRP Permittees through BASMAA to develop data and the process necessary to establish a baseline trash loading estimate from our MS4. The collaborative project was managed through the BASMAA Trash Committee and included a series of steps described in BASMAA (2012b) and listed below. The approach was intended to be cost-effective and consistent, but still provide an adequate level of confidence in trash loads from MS4s, while acknowledging that uncertainty in trash loads still exists. The approach entailed the following steps:

1. Conduct a literature review;
2. Develop a conceptual model;
3. Develop and implement a sampling and analysis plan;
4. Test the conceptual model;
5. Develop and apply default trash **generation rates** to Permittee effective loading areas;
6. Adjust default trash generation rates based on baseline levels of control measure implementation by the Permittee to develop trash **baseline loading rates**; and,
7. Calculate a Permittee-specific annual trash **baseline load**.

Through the collaborative BASMAA project, default baseline trash generation rates (volume per area) were developed for a finite set of categories, based on factors that significantly affect trash loads (e.g., land use). These trash generation rates were then applied to effective loading areas in applicable jurisdictional areas within the City of San Mateo. Trash generation rates were then adjusted based on baseline street sweeping, storm drain inlet maintenance, and stormwater pump station maintenance conducted in each applicable area. The sum of the trash loads (i.e., rate multiplied by area) from each effective loading area represents the City of San Mateo's baseline trash load from its MS4. A full description of the methods by which baseline trash loads were developed is included in BASMAA (2012a) and is summarized below.

### Permittee Characteristics

Incorporated in 1894, the City of San Mateo covers 8,083 acres in Santa Mateo County, and has a jurisdictional area of 6,522 acres. According to the 2010 Census, it has a population of 97,207, with a population density of 8,013.7 people per square mile, and an average household size of 2.51. Of the 97,207 who call the City of San Mateo home, 20.8% are under the age of 18, 7.1% are between 18 and 24, 31.7% are between 25 and 44, 26.0% are between 45 and 65, and 14.4% are 65 or older.

Top employers in the City of San Mateo include San Mateo County Community College District, San Mateo Medical Center, San Mateo-Foster City School District, and Franklin Templeton Investments. The

United States headquarters of Capcom are also located in the City of San Mateo. The median household income was \$64,757 in 2000.<sup>1</sup>

## Default Trash Generation Rates (Regional Approach)

A set of default trash generation rates was developed via the BASMAA regional collaborative project (BASMAA 2012a). Default generation rates were developed based on a comparison between trash characterization monitoring results, land uses, economic profiles, and other factors that were believed to possibly affect trash generation. Three trash characterization monitoring events were scheduled via the *Trash Generation Rates Project*. Due to the compliance timeline in the MRP, only two of three trash characterization monitoring events were used to develop trash generation rates described in BASMAA (2012a) and presented in this section. Following the completion of the third characterization event (Winter 2011/12), this section of the Short-Term Plan may be updated to reflect the most up-to-date trash generation and loading rates available. Trash generation rates based on the results of two of the three characterization events are shown in Table 2-1 for each trash loading category.

**Table 2-1: Regional Default Annual Trash Generation Rates by Land Use Category.**

Land Use Category	Generation Rates (Gallons/Acre)
Retail and Wholesale	29.99
High Density Residential	17.04
K-12 Schools	13.14
Commercial and Services/ Heavy, Light and Other Industrial	7.08
Urban Parks	2.14
Low Density Residential	1.25
Rural Residential	0.17

## Jurisdictional and Effective Loading Areas

Default trash baseline generation rates presented in Table 2-1 were applied to effective loading areas with **jurisdictional areas** within the City of San Mateo. The City of San Mateo’s jurisdictional areas includes all urban land areas within the City of San Mateo boundaries that are subject to the requirements in the MRP. Land use areas identified by a combination of the ABAG 2005 land use dataset and Permittee knowledge that were not included within the City’s jurisdictional areas include:

- Federal and State of California Facilities and Roads (e.g., Interstates, State Highways, Military Bases, Prisons);
- Roads Owned and Maintained by Santa Mateo County;
- Colleges and Universities (Private or Public);
- Non-urban Land Uses (e.g., agriculture, forest, rangeland, open space, wetlands, water);

<sup>1</sup> From the 2000 Census. The median household income for the City of San Mateo from the 2010 Census is not currently available.

- Communication or Power Facilities (e.g., PG & E Substations);
- Water and Wastewater Treatment Facilities; and
- Other Transportation Facilities (e.g., airports, railroads, and maritime shipping ports).

Once the City of San Mateo’s jurisdictional area was delineated, an effective trash loading area was developed by creating a 200-foot buffer around all streets within the City’s jurisdictional area. The purpose of the effective loading area is to eliminate land areas not directly contributing trash to the City’s MS4 (e.g., large backyards and rooftops). Both the jurisdictional and the effective loading areas for the City of San Mateo are presented in Table 2-2.

**Table 2-2: Jurisdictional areas and effective loading areas in the City of San Mateo by land use categories identified by ABAG (2005).**

Land Use Category	Jurisdictional Area (Acres)	Effective Loading Area (Acres)	% of Effective Loading Area
High Density Residential	887	807	14
Low Density Residential	3,722	3,614	64
Rural Residential	27	18	<1
Commercial and Services/ Heavy, Light and Other Industrial	781	575	10
Retail and Wholesale	406	311	5
K-12 Schools	276	163	3
Urban Parks	423	186	3
<b>TOTAL</b>	<b>6,522</b>	<b>5,675</b>	<b>100%</b>

## Permittee-Specific Baseline Trash Loading Rates

Regional default trash generation rates developed through the BASMAA regional collaborative project were applied to effective loading areas within the City of San Mateo based on identified land uses. These generation rates were then adjusted based on the calculated effectiveness of baseline street sweeping, storm drain inlet maintenance and pump station maintenance implemented by the City. These adjustments were conducted in GIS due to the site specificity of baseline generation rates and baseline control measure implementation. The following sections describe the baseline level of implementation for these three control measures. A summary of trash baseline generation and loading rates for the City of San Mateo is provided in Table 2-3, and loading rates for geographical areas in the City of San Mateo are illustrated in Figure 2-1.

### **Baseline Street Sweeping**

A "baseline" street sweeping program is defined as the sweeping frequency and parking enforcement implemented by the City of San Mateo prior to the effective date of the MRP. Baseline street sweeping differs from "enhanced" street sweeping, which includes increased parking enforcement and/or

sweeping conducted at a frequency greater than baseline ceiling (i.e., once per week for retail land uses and twice per month for all other land uses). The baseline ceiling was created so as not to penalize implementers of enhanced street sweeping programs prior to the effective date of the MRP. For those Permittees that sweep less frequently than the baseline ceiling, their current sweeping frequency serves as their baseline.

The City of San Mateo's baseline street sweeping program includes sweeping most streets in residential areas twice per month, most streets in the downtown areas once a week, and sweeping most arterial roads, including El Camino Real, twice per month. The City's current street sweeping program includes sweeping most streets in residential areas twice per month, the downtown areas three times per week, arterial roads twice per month, and El Camino Real once every two weeks.

Posting of parking enforcement signs for street sweeping occurs in some residential areas, primarily streets between the railroad tracks and US 101. Parking enforcement equivalent occurs primarily in commercial areas west of the railroad tracks, sometimes extending into adjacent high density residential areas. The estimated trash load reduced via baseline street sweeping is presented in Table 2-3.

### ***Baseline Storm Drain Inlet Maintenance***

Within the City, storm drain inlets were cleaned at a baseline level of one time per year prior to the effective date of the MRP. Based on this baseline frequency and the effectiveness rating developed in BASMAA (2012b), the baseline storm drain maintenance program in the City of San Mateo has an annual effectiveness rating of 5%. The estimated trash load reduced via baseline storm drain inlet maintenance is presented in Table 2-3.

### ***Baseline Stormwater Pump Station Maintenance***

The City of San Mateo owns and maintains nine stormwater pump stations. Of these stations, eight have trash racks that capture trash and allow for removal during maintenance. For those pump stations with trash racks, the estimated volume of trash removed annually from each pump station prior to the effective date of the MRP is considered the baseline level of implementation. To determine the baseline volume of trash removed from pump stations, an effectiveness rating of 25% removal of the baseline trash load attributable to the area draining to the pump station is assumed. This effectiveness rating is based on methods developed in BASMAA (2012b). The estimated trash load reduced via baseline pump station maintenance is presented in Table 2-3.

## **Baseline Trash Loading Estimate**

The estimated baseline trash load from the City of San Mateo was calculated as the sum of the loads from the City's effective loading area, adjusted for baseline implementation of street sweeping, storm drain inlet maintenance, and pump station maintenance. The preliminary annual trash baseline load for the City of San Mateo is presented in Table 2-3. Preliminary baseline trash loading rates are presented in Figure 2-1 to provide a geographical illustration of areas with estimated low, moderate, and high trash loading rates.

**Table 2-3: Preliminary Trash baseline load for the City of San Mateo**

<b>Category</b>	<b>Load (gallons)</b>
Preliminary Baseline Trash Generation Load	34,226
Load Removed via Baseline Street Sweeping	12,765
Load Removed via Baseline Storm Drain Inlet Maintenance	1,073
Load Removed via Baseline Stormwater Pump Station Cleaning	4,519
<b>Preliminary Baseline Trash Load</b>	<b>15,869</b>

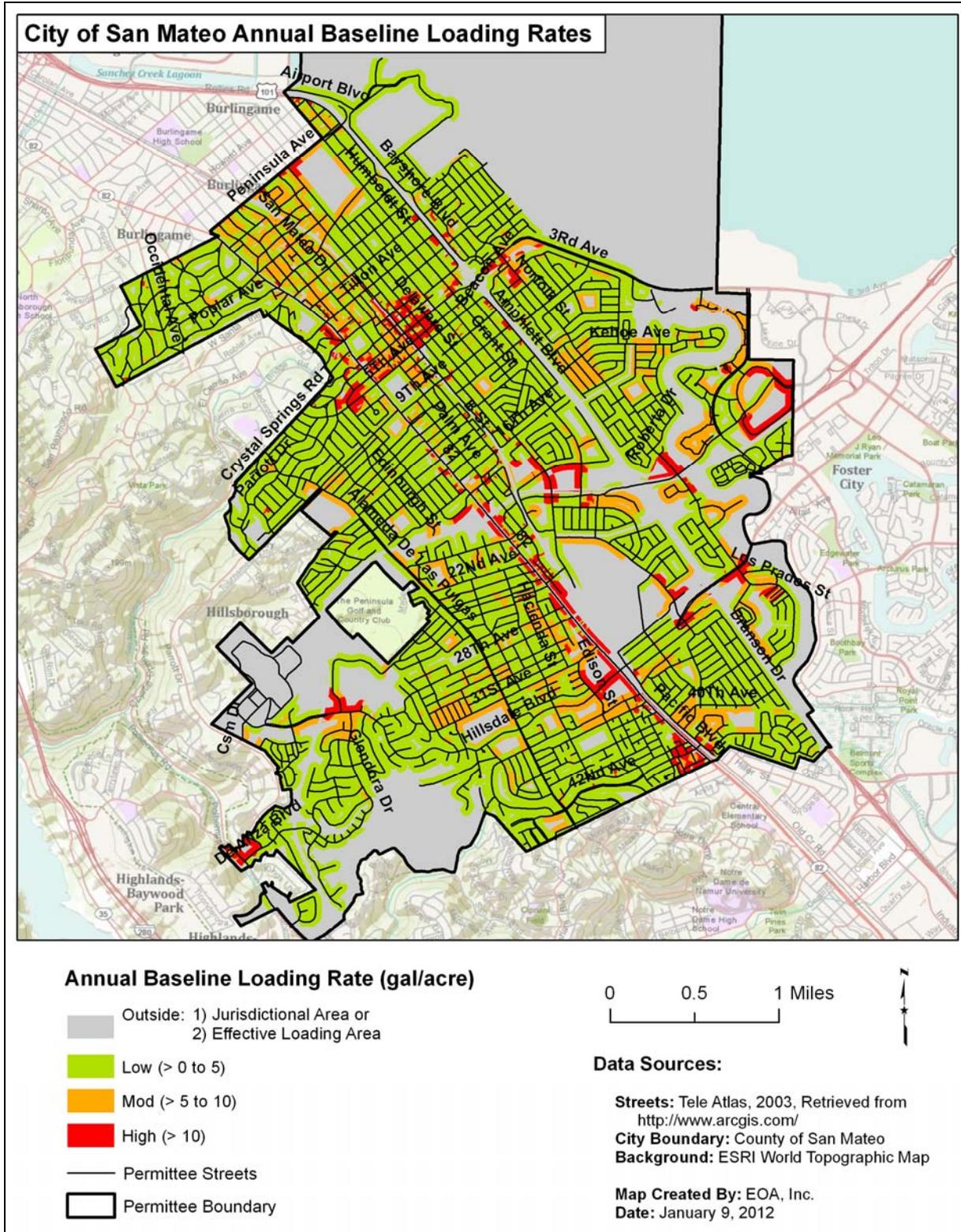


Figure 2-1. Estimated trash baseline loading rates for geographical areas in the City of San Mateo.

## 3.0 TRASH LOAD REDUCTION CALCULATION PROCESS

Using the guiding principles and assumptions described BASMAA (2012a), a stepwise process for calculating trash load reductions was developed collaboratively through BASMAA. This process is fully described in the Trash Load Reduction Tracking Method Technical Report (BASMAA 2012a) and is briefly summarized in this section. The process takes into account at what point in the trash generation and transport process a trash control measure: 1) prevents trash generation; 2) intercepts trash in the environment prior to reaching a water body; or 3) removes trash that has reached a water body. In doing so, this process avoids double-counting of trash load reductions associated with specific control measures.

To demonstrate trash load reductions, baseline trash loading rates will be adjusted using the following process:

- Step #1:** Existing Enhanced Street Sweeping
- Step#2:** Trash Generation Reduction
- Step #3:** On-land Interception
- Step #4:** Trash Interception in the Stormwater Conveyance System
- Step #5:** Trash Interception in Waterways
- Step #6:** Comparison to Baseline Trash Load

Reductions calculated in Steps 2 and 5 are assumed to be implemented at a constant rate on an “area-wide” basis. For example, if a new region-wide public education strategy is implemented within the San Francisco Bay Area, all Permittees can apply load reduction credits associated with this control measure. In contrast, Steps 1, 3 and 4 are “area-specific” reductions that only apply to specific areas within a Permittee’s jurisdiction. Area-specific control measures include full-capture treatment devices and enhanced street sweeping. Area-specific reductions may require the use of a Geographic Information System (GIS) to calculate.

Reductions are generally applied in the sequence of steps as described below, although some reductions may be applied “in-parallel” and calculated during the same sub-step in the process.

### Step #1: Existing Enhanced Street Sweeping

Trash load reductions due to existing enhanced street sweeping implemented prior to the effective date of the MRP and conducted at levels above baseline levels are not incorporated into each Permittee’s trash baseline load. Therefore, load reductions associated with existing enhanced street sweeping are accounted for first in the trash load reduction calculation process. Existing enhanced street sweeping includes street sweeping conducted at a frequency greater than **1x/week** for streets within retail land use areas or greater than **2x/month** for streets in all other land use areas. The result of adjustments made to trash baseline loads due to the implementation of existing enhanced street sweeping is a set of **current baseline loading rates** and a **current baseline load**.

## Step #2: Trash Generation Reduction Control Measures

Trash generation reduction control measures prevent or greatly reduce the likelihood of trash from being deposited onto the urban landscape. They include the following area-wide control measures:

- CR-1: Single-Use Carryout Plastic Bag Ordinances
- CR-2: Polystyrene Foam Food Service Ware Ordinances
- CR-3: Public Education and Outreach Programs
- CR-4: Reduction of Trash from Uncovered Loads
- CR-5: Anti-Littering and Illegal Dumping Enforcement
- CR-6: Improved Trash Bin/Container Management
- CR-7: Single-Use Food and Beverage Ware Ordinances

Load reductions associated with trash generation reduction control measures are applied on an area-wide basis.<sup>2</sup> Therefore, reductions in current baseline loading rates are adjusted uniformly based on the implementation of the control measure and the associated credit claimed.

Baseline loading rate adjustments for all generation reduction control measures implemented may be applied in-parallel, but should be applied prior to calculating on-land interception measures discussed in Step #3. The result of adjustments to trash baseline loading rates due to the implementation of these enhanced control measures will be a set of **street loading rates**. The **street load** is the volume of trash estimated to enter the environment and available for transport to the MS4 if not intercepted via on-land control measures described in Step #3.

## Step #3: On-land Interception Control Measures

Once trash enters the environment, it may be intercepted and removed through the following control measures prior to reaching the stormwater conveyance system:

- QF-1: On-land Trash Cleanups (Volunteer and/or Municipal) (Area-wide)
- QF-2: Enhanced Street Sweeping (Area-specific)

Since on-land trash cleanups can affect the amount of trash available to street sweepers, load reductions associated with their implementation will be quantified first, followed by street sweeping enhancements. On-land trash cleanups will be applied as an area-wide reduction and all effective loading rates will be adjusted equally. Enhanced street sweeping, however, is an area-specific control measure and only those effective loading rates associated with areas receiving enhancements will be adjusted. Due to the spatial nature of enhanced street sweeping, GIS may be needed to conduct this step.

The result of adjustments to effective loading rates due to the implementation of these enhanced control measures will be a set of **conveyance system loading rates**. The **conveyance load** is the volume of trash estimated to enter the stormwater conveyance system (e.g., storm drains).

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<sup>2</sup> The only exception to this statement is the load reduction associated with the establishment of Business Improvement Districts (BIDs) or equivalent, which are specific to geographic areas and considered "area-specific".

## Step #4: Control Measures that Intercept Trash in the MS4

Control measures that intercept trash in the stormwater conveyance system are area-specific. Therefore, they only apply to land areas and associated trash loads reduced. Conveyance system loading rates developed as a result of Step #3 should be adjusted in-parallel for the following control measures:

- QF-3a: Partial-capture Treatment Devices: Curb Inlet Screens (Area-specific)
- QF-3b: Partial-capture Treatment Devices: Stormwater Pump Station Trash Rack Enhancements (Area-specific)
- QF-4: Enhanced Storm Drain Inlet Maintenance (Area-specific)
- QF-5: Full-Capture Treatment Devices (Area-specific)

Load reductions for these control measures are calculated in-parallel because they are applied to independent geographical areas. Reductions from all control measures described in this step are area-specific and may require the use of GIS to calculate a set of **waterway loading rates**. Once waterway loading rates have been determined, a **waterway load** will be developed and used as a starting point for calculating load reductions associated with trash interception in waterways, discussed in Step #5.

## Step #5: Control Measures that Intercept Trash in Waterways

The load of trash that passes through the stormwater conveyance system without being intercepted may still be removed through interception in waterways. There are two control measures associated with interception in waterways:

- QF-3c: Partial-capture Treatment Devices: Litter Booms/Curtains (Area-wide)
- QF-7: Creek/Channel/Shoreline Cleanups (Volunteer and/or Municipal) (Area-wide)

As these control measures are implemented, load reduction estimates can be calculated in-parallel for these two measures.

## Step #6: Comparison to Baseline Trash Load

Applying the five steps described in the processes above will provide an estimated trash load (volume) remaining after trash control measures are implemented. As depicted in the following equation, the relative percent difference between the baseline load and the load remaining after control measures are implemented is the percent reduction that will be used to assess progress toward MRP trash load reduction goals.

$$\frac{\text{Baseline Load} - \text{Remaining Load}}{\text{Baseline Load}} \cdot 100 = \% \text{ Reduction}$$

## 4.0 PLANNED ENHANCED TRASH CONTROL MEASURES

This section describes the new or enhanced trash control measures planned for implementation by the City of San Mateo. The enhanced control measures described are designed to achieve a 40 percent trash load reduction by July 1, 2014. New and enhanced control measures that will be implemented by the City of San Mateo include those listed in Table 4-1.

**Table 4-1. Trash control measures that will be implemented by the City of San Mateo to achieve the 40 percent trash load reduction.**

<b>Control Measure</b>
CR-2: Polystyrene Foam Food Service Ware Ordinances
CR-3: Public Education and Outreach Programs
CR-4: Reduction of Trash from Uncovered Loads
CR-5: Anti-Littering and Illegal Dumping Enforcement
CR-6: Improved Trash Bin/Container Management
QF-1: On-land Trash Cleanups (Volunteer and/or Municipal)
QF-3: Partial-Capture Treatment Devices
QF-5: Full-Capture Treatment Devices
QF-6: Creek/Channel/Shoreline Cleanups (Volunteer and/or Municipal)

## **CR-2: Polystyrene Foam Food Service Ware Policy**

Polystyrene foam is used as food ware in the food service industry. According to the USEPA, floatable debris in waterways, such as products made of polystyrene, is persistent in the environment and has physical properties that can have serious impacts on human health, wildlife, the aquatic environment and the economy (USEPA 2002). Due to its properties, polystyrene foam used as food ware is typically not recycled. Since 1990, over 100 government agencies within the United States, including over twenty within the Bay Area, have enacted full or partial bans on polystyrene foam food service ware.

### **Baseline Level of Implementation**

Prior to adoption of the MRP, over twenty agencies within the Bay area enacted full or partial bans on polystyrene foam food service ware. To avoid penalizing these early implementers, an applicable control measure implemented by a Permittee prior to the effective date of the MRP will be credited equally to a control measure implemented after the effective date. Therefore, the baseline level of implementation is not applicable for this control measure.

### **Enhanced Level of Implementation**

The City of San Mateo will adopt a resolution prohibiting the distribution of polystyrene foam food and beverage ware at City-sponsored events or on City-owned property and implement this policy by July 1, 2014. The percent trash reduction from the MS4 as a result of implementing a City-wide polystyrene foam food ware policy will be reported in the Annual Report submitted each September.

### **Percent Reduction from Enhancements**

The City of San Mateo will receive a 2 percent reduction credit for implementing the specific enhanced control measure described in the *Enhanced Level of Implementation* section above. The 2 percent reduction credit will be applied to the City of San Mateo's baseline trash load. This percent reduction credit is consistent with methods presented in the BASMAA (2012a). A summary of all load reductions anticipated through the implementation of this plan is included in Section 5.0.

## CR-3: Public Education and Outreach Programs

Permittees in the San Francisco Bay Area have implemented public education and outreach programs to inform residents about stormwater issues relating to pollutants of concern, watershed awareness and pollution prevention. Public education and outreach efforts include developing and distributing brochures and other print media; posting messages on websites and social networking media (Facebook, Twitter etc.), attending community outreach events, and conducting media advertising. In recent years, some municipal agencies have implemented anti-litter campaigns to increase public awareness about the impacts of litter on their communities and water quality and to encourage the public to stop littering.

### Baseline Level of Implementation

The City of San Mateo implemented numerous trash-related public education and outreach control measures prior to the effective date of the MRP that are ongoing, including the following:

- The City participates in outreach efforts sponsored by the San Mateo Countywide Stormwater Pollution Prevention Program (SMCWPPP) Public Information and Participation (PIP) subcommittee. The PIP subcommittee assists municipalities, including the City of San Mateo, with outreach to school-age children and hosted educational booths at various events. The City continues active participation on the SMCWPPP PIP subcommittee.
- The City of San Mateo has sponsored the local Bayfront Cleanup (on Coastal Cleanup Day) since 1985. In 2011, on the 27<sup>th</sup> anniversary of the event, more than 800 volunteers participated in the cleanup and removed 900 pounds of recyclable materials and 5,600 pounds of garbage.
- Outreach materials are distributed to City Hall visitors, including residents and customers from various types of businesses, at the Finance Department and Public Works Department counters. Brochures detailing stormwater pollution prevention Best Management Practices (BMPs) are also periodically made available to the public from display racks located in City Hall.
- City staff presents stormwater pollution prevention information at the City Services Academy, which is a program typically offered twice each year to those who work or live in the City. Participants are given the opportunity to learn firsthand how the City of San Mateo is managed and operated. This is accomplished through case studies, site tours, class discussions, and hands-on experience. Participants interact with Department Heads (e.g., City Manager, Public Works Director) and City Council members to learn how new programs or ideas are implemented.
- Staff contributes articles on stormwater pollution prevention topics to the “Citygram” employee newsletter, issued 26 times each year to coincide with payroll. The newsletter is distributed City-wide via email and is posted on the City’s Intranet.
- Brochures that describe pollution prevention BMPs are routinely provided to businesses during business inspections.
- Storm drain catch basins are labeled with the “NO DUMPING – DRAINS TO BAY” message.

## Enhanced Level of Implementation

The City of San Mateo will implement the following public education and outreach control measures prior to July 1, 2014:

### **Litter Reduction Advertising Campaign(s)**

#### ***BASMAA Youth Outreach Campaign (Regional)***

Through participation in and funding of the regional **BASMAA Youth Outreach Campaign**, the City of San Mateo will implement an outreach campaign designed to reduce littering from the target audience in the Bay Area. The Youth Outreach Campaign was launched in September 2011 (post-MRP effective date) and aims to increase the awareness of Bay Area youths (ages 16-24) on litter and stormwater pollution issues, and eventually change their littering behaviors. Combining the ideas of Community-Based Social Marketing with traditional advertising, the Youth Campaign aims to engage youths to enable the peer-to-peer distribution of Campaign messages. The Campaign will run from at least FY 11-12 through FY 13-14. A brief description of the Campaign activities is as follows:

- **Raise Awareness**: The Campaign will begin by raising awareness of the target audience on litter and stormwater pollution issues. Partnerships with youth commissions, high schools, and other youth-focused organizations will be developed to reach the target audience. Messages targeted toward youths will be created and distributed via paid advertising, email marketing, Campaign website and social networking sites (e.g., Facebook and Twitter).
- **Engage the Youth** - The advertisements will encourage the audience to participate in the Youth Campaign by joining a Facebook page, entering a contest, taking an online quiz, etc., and providing their contact information. At the beginning of FY 12-13, a video contest will be launched to get Bay Area youths further involved in the Campaign. An online voting system will be used to select the winning entry. Media advertising will be conducted to promote the winning entry.
- **Change Behaviors**: To move the audience along the behavior change continuum, the Campaign will use electronic platforms such as email marketing and social networking sites to encourage participants to engage in increasingly more difficult behavior changes, such as participating in a clean-up, organizing a clean-up, etc.
- **Maintain Engagement**: The Campaign will continue to interact with the target audience through email marketing and social media websites.

The Youth Campaign will include a pre- and post-campaign survey to evaluate the effectiveness of outreach. The pre-campaign survey will be conducted in FY 11-12 and the post-campaign survey in FY 13-14. Other evaluation mechanisms, such as website hits, number of youths engaged in the Campaign's social networking website, etc., will also be used to evaluate Campaign effectiveness in increasing awareness and changing behavior.

## **Outreach to School-age Children or Youths**

### ***Countywide Programs***

Through participation in and funding of SMCWPPP, the City of San Mateo plans to continue to implement litter reduction outreach to school-age children and youths. SMCWPPP currently oversees two contracts to provide direct outreach to grades K-12 in a school setting on behalf of all Permittees. The contract for grades K-5 is currently held by the Banana Slug String Band, which performs a presentation called “We All Live Downstream.” Through songs and interactive exercises, the message of not putting anything in the storm drains (including trash) is delivered, along with basic concepts of the water cycle and the impact of pollution on aquatic life. The second contract is held by Rock Steady Science, which presents “Water Pollution Prevention and Your Car” to high school students. A portion of this presentation is dedicated to watershed and storm drain education, and the impact of litter on local creeks and waterways. Both contracts are managed to ensure that schools in each community in the County are reached. For communities without High Schools, the feeder schools in neighboring communities are specifically targeted for presentations. In addition to outreach at the school sites, a number of student activity guides and coloring books related to watershed health and littering are provided to children who attend outreach events. Schools are also directly targeted in promotion of Coastal Cleanup Day.

In addition to the programs described above, *Recycleworks*, a branch of San Mateo County Public Works dedicated to promotion of recycling solid waste, plans to continue to conduct litter reduction activities. These include participating in the green schools program in which a school gets certified by achieving goals set from a menu of categories, one of which is litter reduction. In addition, *Recycleworks* conducts school assemblies and field trips focusing on litter reduction and recycling. *Recycleworks* conducts staff outreach events at schools and conducts waste audits at schools to encourage waste reduction. The SMCWPPP Public Information and Participation Program (PIP) is exploring the possibility of teaming up with *Recycleworks* to continue outreach to junior high and high school students after June 2012, when the current contract with Rock Steady Science expires.

## **Media Relations**

### ***BASMAA Regional Media Relations Project (Regional)***

Through participation in and funding of the **BASMAA Regional Media Relations Project**, the City of San Mateo plans to continue to implement a media relations project partially designed to reduce littering from target audiences in the Bay Area. The goal of the BASMAA Media Relations Project is to generate media coverage that encourages individuals to adopt behavior changes to prevent water pollution, including littering. At least two press releases or Public Service Announcements (PSAs) focus on litter issues each year (e.g., creek cleanup activities, preventing litter by using reusable containers, etc.).

### ***Coastal Cleanup Day Promotion (Countywide)***

On the Countywide level, SMCWPPP also issues annual press releases for Coastal Cleanup Day and uses Twitter to promote cleanup events. These releases are intended to gain support and assistance for cleanup events conducted each September in local water bodies.

## **Community Outreach Events**

### ***Countywide Programs***

SMCWPPP, through its PIP program, plans to continue to conduct community outreach events on behalf of Permittees who request support. In addition to the children's materials listed above under Outreach to School-age Children or Youth, outreach materials related to litter are distributed, including a promotional sign and pocket ashtrays for cigarette smokers to discourage cigarette litter. A general stormwater pollution prevention flyer in English and Spanish that includes litter reduction in its messaging is distributed. In addition to table outreach events conducted for specific Permittees, PIP also conducts a Countywide Event aimed at reaching residents from throughout the County. PIP manages an online calendar which promotes cleanup events by non-profit organizations throughout the County. In FY 2011, PIP completed its 6<sup>th</sup> year acting as the County coordinator for Coastal Cleanup Day. During that time, volunteer participation increased by 400%, and trash removal increased by 300%.

During the term of the MRP, new outreach materials are also being considered for dissemination to the public, including reusable shopping bags to encourage a reduction in the use of single-use plastic carryout bags. In addition, spring cleanups taking place in individual jurisdictions are planned to be promoted under one theme by PIP, which will assist by directing volunteers to cleanup events in their communities. SMCWPPP is planning to conduct a total of 10-12 outreach events on behalf of various jurisdictions within the County in the 2011-12 fiscal year. SMCWPPP will also continue maintaining an online calendar of cleanups on a monthly basis.

### ***Additional Community Outreach Events (Local)***

In addition to participation in the outreach programs described above to fulfill MPR requirements, the City of San Mateo will coordinate and promote an annual spring cleanup event beginning in 2012. The spring cleanup event will be scheduled to coincide with other spring events occurring throughout the County. As described in the previous section, the SMCPPP PIP is planning to promote this event under one theme on behalf of other jurisdictions in the Countywide Program. The City will also promote the spring cleanup at City-owned facilities (i.e., libraries, recreation centers, etc.) and on the City's website. For this event, on-land cleanup opportunities will be promoted in addition to in-creek/channel cleanups.

The primary focus of the City's annual Bayfront Cleanup event is on removing trash from along the shoreline near the Bayfront Trail. However, in recent years, increased volunteer participation has motivated several groups of volunteers focus cleanup efforts upstream on the San Mateo Creek Watershed and along the Marina Lagoon shoreline for in-creek/channel cleanups. The City typically provides transportation to and from upstream/inland sites during the Bayfront Cleanup to facilitate trash removal at those locations. The City will continue to coordinate and facilitate inland in-creek/channel cleanups and will promote on-land cleanups as well during this event. Volunteer feedback from the Spring Event may inform the selection of specific on-land sites to target during the Bayfront Cleanup event. As in previous years, the City will advertise the event in conjunction with California Coastal Commission and Countywide Program campaigns. As with the Spring Cleanup, advertising done by the City for the Bayfront Cleanup will include information on cleanup opportunities at on-land sites in addition to in-creek/channel sites.

The City of San Mateo's outreach efforts will also target local Homeowners Associations, service organizations and schools to announce opportunities for volunteer-led cleanups and provide information on stormwater BMPs.

Outreach efforts will also target specific types of businesses that may be contributing to the trash load but that aren't currently addressed through the City's Business Inspection Plan. Such businesses will be added to the existing facilities database, and additional business types will be addressed as the need arises.

Additional outreach will be conducted internally to City Council members, City management and City employees on a department-by-department basis to provide information on general MRP requirements and stormwater pollution prevention BMPs. Additionally, the City's website and intranet will be updated to include a more comprehensive collection of information on MRP requirements and stormwater pollution prevention BMPs.

### **Percent Reduction from Enhancements**

The City of San Mateo will receive an 8 percent reduction credit for implementing specific enhanced control measures described in the *Enhanced Level of Implementation* section above. The 8 percent reduction credit will be applied to the City of San Mateo's baseline trash load. This percent reduction credit is consistent with methods presented in the BASMAA (2012a). A summary of all load reductions anticipated through the implementation of this plan are included in Section 5.0.

## CR-4: Reduction of Trash from Uncovered Loads

Although it is currently illegal to operate a vehicle that is improperly covered and from which its contents escapes<sup>3</sup>, vehicles remain a significant trash source to MS4s and local waterways. Specifically, vehicles that do not secure or cover their loads when transporting trash and debris have a high risk of contributing trash to MS4s. Land areas that generate trash from vehicles include roads, highways (on/off ramps, shoulders or median strips) and parking lots. To help address the dispersion of trash from unsecured or uncovered vehicles destined for landfills and transfer stations, Permittees may require municipally-contracted trash haulers to cover or secure loads or work with municipal or private landfill and transfer station operators to educate waste haulers on securing loads and/or to enhance enforcement of existing regulations.

### Baseline Level of Implementation

The baseline trash load described in Section 2.0 assumes that prior to adoption of the MRP, the City of San Mateo had not adopted control measures to reduce trash from vehicles with uncovered loads. Therefore, implementation of any of the control measures described in this section is considered to be enhanced implementation.

### Enhanced Level of Implementation

The City of San Mateo has implemented the following enhanced control measures to reduce trash from vehicles with uncovered loads:

- Language in the City’s hauling service contracts includes the requirement for contracted trash and construction debris haulers to cover loads when transporting trash and debris to municipally-owned or privately-owned landfills and transfer stations.
- Section 7.32.020 of the San Mateo Municipal Code, entitled “VEHICLE—COVER REQUIRED”, states the following: “No person shall use any vehicle for the conveyance or removal of solid waste unless such vehicle is staunch, tight and closely covered with a wooden or metal cover so as wholly to prevent leakage or smell. No person shall use any vehicle for the conveyance or removal of solid waste unless such vehicle is provided with a cover securely fastened over the top thereof, and be so constructed as to prevent the deposit of such solid waste, or any portion thereof, in or upon the street through which such vehicle may be driven.” The City of San Mateo Police Department enforces California Vehicle Code Sections 23114 and 23115 prohibiting the operation of a vehicle that is improperly covered, thereby enforcing the City ordinance. Outreach to the Police Department will include a discussion on the importance of enforcement for reducing the trash load from vehicles with uncovered loads.

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<sup>3</sup> In accordance with the California Vehicle Code Sections 23114 and 23115, it is against the law to operate a vehicle on the highway which is improperly covered, constructed, or loaded so that any part of its contents or loads spills, drops, leaks, blows, or otherwise escapes from the vehicle. Exempted materials include hay and straw, clear water and feathers from live birds. Additionally, any vehicle transporting garbage, trash, or rubbish, used cans or bottles, waste papers, waste cardboard, etc. must have the load covered to prevent any part of the load from spilling on the highway (CVC 2011). Significant fines are possible for non-compliance.

### **Percent Reduction from Enhancements**

The City of San Mateo will receive a 5 percent reduction credit for implementing specific enhanced control measures described in the *Enhanced Level of Implementation* section above. The 5 percent reduction credit will be applied to the baseline trash load to urban creeks from the municipal separate storm sewer system (MS4) owned and operated by the City of San Mateo. This percent reduction credit was obtained from the *Trash Load Reduction Tracking Method Report* (BASMAA 2012a) and is presented in the Trash Load Reduction Summary Table included in Section 5.0.

## CR-5: Anti-Littering and Illegal Dumping Enforcement Activities

Successful anti-littering and illegal dumping enforcement activities include laws or ordinances that make littering or dumping of trash illegal. Laws are enforced by various municipal agency staff (e.g., police, sheriff and Public Works Department staff) who issue citations in response to citizen complaints or other enforcement methods (e.g., surveillance cameras, signage and/or physical barriers installed at illegal dumping hot spots). In some California jurisdictions, the minimum fine for littering is \$500 and the maximum penalty for highway littering is \$1000 (City of San Francisco 2001). However, it is difficult to enforce small littering events unless they are witnessed or solid proof exists linking the offender to the litter. As a result, enforcement tends to focus on larger scale illegal dumping activities.

### Baseline Level of Implementation

The baseline trash load described in Section 2.0 assumes that the City of San Mateo has adopted a basic anti-littering and illegal dumping enforcement program that entails receiving and responding to complaints from citizens as resources allow. Program elements are described in the *Enhanced Level of Implementation* section below.

### Enhanced Level of Implementation

The City of San Mateo has implemented the following enhanced anti-littering and illegal dumping enforcement control measures:

- Reports of illegal dumping are routed to a Recycling Coordinator, who conducts a thorough investigation of each report of illegal dumping. The Recycling Coordinator inspects the dumpsite for evidence of the responsible party's identity (i.e., mail, business cards), takes photographs of the dumped material, and depending on the location of the dumpsite, interviews nearby residents or businesses for eyewitness information that may help identify the responsible party.
- The investigator follows up on evidence recovered from the dumped material by contacting persons or businesses whose names or contact information appear on the evidence recovered.
- Enforcement procedures, including citations (where warranted) are implemented in the event that the responsible party is located. Such cases are referred to Code Enforcement and/or the City's Police Department for follow-up.
- A list of dumpsite locations and items dumped at each site is sent to the City's contracted waste hauler twice each week. The waste hauler picks up illegally dumped material throughout the City twice each week.

By July 1, 2014, City staff will prepare a fact sheet or written standard operating procedure that documents the City's anti-littering and illegal dumping enforcement protocols. For instances where the responsible party is identified, the Recycling Coordinator handling the case will document follow-up enforcement activities undertaken.

### **Percent Reduction from Enhancements**

The City of San Mateo will receive a 2 percent reduction credit for implementing specific enhanced control measures described in the *Enhanced Level of Implementation* section above. The 2 percent reduction credit will be applied to the baseline trash load to urban creeks from the municipal separate storm sewer system (MS4) owned and operated by the City of San Mateo. This percent reduction credit was obtained from the *Trash Load Reduction Tracking Method Report* (BASMAA 2012a) and is presented in the Trash Load Reduction Summary Table included in Section 5.0.

## CR-6: Improved Trash Bin/Container Management

Receptacles used to place/store trash or recyclables prior to collection by a public agency or private waste hauler reduce the potential for littering and trash loading to stormwater conveyance systems and receiving waters (City of Los Angeles 2004). For the purposes of assigning trash load reduction credits, receptacles fall into the following two categories:

- **Private Trash/Recycling Bins:** A receptacle for placing trash or recyclables generated from a household, business, or other location that is serviced by a trash hauler. Bins are specifically-designed, heavy-duty plastic wheeled containers with hinged lids; or large multi-yard metal or plastic containers rectangular in shape.
- **Public Area Trash Containers:** A receptacle for placing incidental trash generated in public spaces that provides people with a convenient and appropriate place to dispose of trash. The design and size of public area trash containers vary widely, depending on their setting and use.

The effectiveness of containers and bins in reducing trash in the environment is likely dependent upon the location and density of the receptacles, size of the bin/container in relationship to the size needed to service users, frequency of maintenance, and the ability of the bin/container to capture and contain the trash deposited.

### Baseline Level of Implementation

The baseline trash load described in Section 2.0, assumes that the City of San Mateo has not implemented enhanced trash bin/container management practices prior to effective date of the MRP. The solid waste & recycling program currently in place is summarized below in the *Enhanced Level of Implementation* section below.

### Enhanced Level of Implementation

#### Ordinance and Franchise Agreement

The City's Garbage Ordinance (Section 7.32 of the San Mateo Municipal Code) requires residences and business to obtain and maintain adequate trash/recycling service, and watertight trash receptacles are required for any premises that accumulate solid waste. The Franchise Agreement between the City and the contracted solid waste hauler also requires that all containers must be watertight and have hinged lids. The Agreement requires the contracted waste hauler to replace carts that have been stolen, lost, damaged, or destroyed within 5 business days of receiving notification. The Recycling Coordinator and the City's contracted waste hauler work together to identify non-compliant residents and businesses and resolve such incidents. Violations of the City's Solid Waste Ordinance are referred to Code Enforcement for follow-up, which may include citations or administrative fees. Code Enforcement issues Public Service Announcements that list types of violations for which citations are issued, including no garbage service, the accumulation of garbage, litter and debris, and refuse containers stored in public view. Complaints regarding violations and inadequate service are received by the Recycling Coordinator and the contracted waste hauler and are resolved as described above.

### **Ensuring Adequate Private and Public Trash Service**

The City has implemented a program that identifies businesses and households that have inadequate trash service (i.e., insufficient trash collection or use of bins which are too small). Implementation of this program element is initiated through (1) complaints received from local residents, (2) regular inspections conducted throughout the City by the Recycling Coordinator, and (3) feedback received by the City's contracted waste hauler. Businesses or households that fail to obtain adequate trash service are referred to the City's Code Enforcement Department for follow-up, which may include citations and/or administrative fees.

City staff identifies whether public area trash containers are sufficiently located in high trash generating areas and are adequately designed to manage trash types and amounts that typically are generated from activities occurring in these areas. Trash containers located throughout public areas within the City are numbered, and an inventory of numbered containers and their physical location is maintained in a database. City staff identifies problem areas through (1) complaints received from local residents, (2) regular inspections conducted throughout the City by the Recycling Coordinator, and (3) feedback received by the City's contracted waste hauler. Based on such feedback, trash containers that are in need of more frequent maintenance are scheduled for more frequent service by the City's contracted waste hauler. The City's program thus identifies where an increased level of inspection and maintenance of public area trash containers is needed at high trash generating sites; adjustments to inspection and maintenance frequencies are coordinated with and implemented by the City's contracted waste hauler.

### **Strategic Plan for Public Area Trash Containers**

The City of San Mateo will develop a Strategic Plan for Public Area Trash Containers to document activities described in the *Baseline Level of Implementation* section above, as well as activities described in this section. The Strategic Plan will include consideration of installing specialty trash bins/containers (e.g., bins for cigarette filters) in specific locations to eliminate or reduce the prevalence of these items in stormwater, as the need arises.

The City previously evaluated the use of new technologies (e.g., Big Belly Solar Trash Compactors) with a view toward reducing trash in stormwater and reducing the cost of adding public area trash containers. City staff concluded that the use of such equipment is inconsistent with the City's approach toward recycling since such equipment would discourage recycling efforts.

### **Percent Reduction from Enhancements**

The City of San Mateo will receive a 6 percent reduction credit for implementing specific control measures described in the *Baseline Level of Implementation* and *Enhanced Level of Implementation* sections above. The 6 percent reduction credit will be applied to the baseline trash load to urban creeks from the MS4 owned and operated by the City of San Mateo. This percent reduction credit was obtained from the *Trash Load Reduction Tracking Method Report* (BASMAA 2012a) and is presented in the Trash Load Reduction Summary Table included in Section 5.0.

## **QF-1: Enhanced On-Land Trash Cleanups (Volunteers and/or Municipal)**

On-land cleanups conducted by Permittees and volunteers have been successful in removing trash from identified trash hot spots and engaging local citizenry in improving their communities. Permittees have several programs in place to address on-land trash. Municipal efforts relate to ongoing beautification of impacted areas and coordination of cleanup events. Volunteer on-land cleanups involve the meeting of individuals, creek and watershed groups, civic organizations, businesses and others at designated or adopted on-land sites to remove trash. On-land trash cleanups are conducted as single-day or throughout the year.

### **Baseline Level of Implementation**

The City of San Mateo implemented the following on-land cleanup activities prior to the effective date of the MRP. These control measures are considered baseline because they were accounted for in the preliminary trash generation rates established through the BASMAA *Baseline Trash Loading Rates Project*.

**Only trash that has the potential of entering the MS4 will be tracked.** As a result, large items (e.g., appliances, shopping carts, furniture, mattresses, televisions, tires, lumber, etc.) that will be removed during on-land trash cleanups are not part of the volume determination since they do not have the potential to enter the MS4.

### **Illegal Dump Site Response and Abatement**

The City of San Mateo has implemented an efficient program for responding to reports of illegal dumping. As discussed under control measure CR-5, Recycling Coordinators coordinate twice-weekly debris pickups throughout the City with the City's contracted waste hauler. Debris removed from dump sites typically includes furniture, mattresses, TVs and appliances, strollers and car seats, bags of trash, and construction debris. Smaller trash items having the potential to enter the storm drain system are picked up at the same time that the larger items are removed.

### **Enhanced Level of Implementation**

The City of San Mateo will implement the following new or enhanced on-land trash cleanup activities by July 1, 2014. These on-land cleanups will be conducted or coordinated each year, and the volume of trash removed will be tracked to demonstrate progress toward the 40 percent trash load reduction.

### **Spring Cleanup**

As discussed in control measure CR-3, the City of San Mateo will coordinate and implement a spring cleanup event starting in 2012. The event will be scheduled to coincide with spring cleanups taking place in other jurisdictions within the Countywide Program. These spring cleanups will be promoted under one theme by the Countywide Program PIP. PIP will assist by directing volunteers to cleanup events in their communities. For this event, on-land cleanup opportunities will be promoted in addition to in-creek/channel cleanups. The City will equip volunteers with reusable 5-gallon plastic buckets and gloves and will arrange for the disposal of collected trash.

### **Bayfront Cleanup**

The primary focus of the City's annual Bayfront Cleanup event is on removing trash from along the shoreline near the Bayfront Trail. However, the spring cleanup event may stimulate volunteer interest in doing on-land cleanups during the Bayfront Cleanup event. The City will continue to coordinate and facilitate upstream/inland in-creek/channel and on-land cleanups during this event. As in previous years, the City will advertise the event in conjunction with California Coastal Commission and Countywide Program campaigns. Advertising done by the City at City-owned facilities and on the City's website will include information on cleanup opportunities at on-land sites. The City will provide reusable 5-gallon plastic buckets and gloves and will arrange for the disposal of collected trash.

### **Volunteer-Led On-Land Cleanups**

The City of San Mateo periodically receives inquiries from volunteer groups and businesses interested in organizing and implementing on-land cleanups, including requests for "Adopt-a-spot" arrangements. The City will coordinate volunteer-led on-land cleanups and will conduct outreach targeting various groups (i.e., homeowners associations, service organizations and schools) to determine the level of volunteer interest. As with other cleanup events, the City will provide reusable 5-gallon buckets and gloves and arrange for the disposal of collected trash.

### **Routine Cleanups by Municipal Staff**

City of San Mateo stormwater staff conducts on-land trash cleanups during the course of the work day, including during Stormwater Collection System Screening and other routine activities. City staff will continue cleanups at on-land sites and will document the volume of trash removed for tracking purposes.

### **Percent Reduction from Enhancements**

At this time, the City of San Mateo is electing not to establish a percent reduction in the baseline trash load from on-land cleanups, as it is difficult to estimate the annual volume of on-land trash that will be removed that meets the criteria for this control measure. Rather, data from all volunteer and municipal cleanups will be collected once a trash removal tracking system is developed and implemented (i.e., during the spring cleanup event). The volume of on-land trash removed by municipal staff during routine activities since July 1, 2011 was quantified at 28 gallons (approximately a 0.1 percent reduction). This reduction credit estimate will be applied to the baseline trash load and is included in the Summary Table in Section 5.0. An estimate of the volume of on-land trash removed during the remainder of this compliance year will be included in the Annual Report due in September 2012.

## QF-3: Partial-Capture Treatment Devices

Partial-capture devices are treatment devices that have not been approved as full-capture by the San Francisco Bay Regional Water Quality Control Board, but capture trash at a known effectiveness value. Partial-capture devices may be similar to full-capture devices, but do not meet the full capture definition due to engineering challenges, or they may be completely different types of devices. Partial-capture devices include curb inlet screens (e.g., automated retractable screens), litter booms/curtains and stormwater pump station track racks. Trash loads reduced via partial-capture devices within a Permittee's jurisdictional boundaries may be used to demonstrate attainment of trash load reduction goals.

### Baseline Level of Implementation

#### *Curb Inlet Screens and Litter Booms/Curtains*

Prior to the effective date of the MRP, some Permittees within the Bay area have installed and maintained curb inlet screens and litter booms/curtains. To avoid penalizing these early implementers, the applicable control measures implemented by a Permittee prior to the effective date of the MRP will be credited equally to a control measure implemented after the effective date. Furthermore, the trash load removed via these devices installed prior to the MRP is not accounted for in baseline trash loads. Therefore, the baseline level of implementation is not applicable for this control measure, as devices installed prior to the effective date of the MRP and associated loads reduced will be grandfathered in as enhanced measures.

The City of San Mateo has installed litter booms/curtains at the end of the 16<sup>th</sup> Avenue Channel and on the south end of Marina Lagoon. These partial-capture devices are discussed further in the *Enhanced Level of Implementation* section below.

#### *Stormwater Pump Station Racks*

Similar to the devices described above, some Permittees within the Bay area have installed and maintained trash racks on their stormwater pump stations. Existing pump station trash racks are assumed to remove roughly 25% of the trash that enters the pump station (BASMAA 2012a). The baseline trash load removed via these devices is accounted for in baseline trash loads.

The City of San Mateo operates 9 stormwater pump stations, 8 of which are equipped with trash racks.

### Enhanced Level of Implementation

#### *Litter Booms/Curtains*

A total of 3 additional partial-capture treatment devices have been or will be installed in the City of San Mateo prior to July 1, 2014. These include litter booms installed at the south end of Marina Lagoon, on the 16<sup>th</sup> Avenue Channel just upstream of the 16<sup>th</sup> Avenue Pump Station, and on the 19<sup>th</sup> Avenue Channel. A list of these partial-capture devices is included in Table QF-3-1. All devices listed within the table are enhanced trash control measures. Calculation of loads reduced from partial-capture devices will be consistent with the approach described in the *Trash Load Reduction Tracking Method Report* (BASMAA 2012a).

The annual volume of debris removed from the litter boom/sea curtain at the south end of Marina Lagoon was determined to be approximately 500 gallons. However, this volume included larger (i.e. metal) items that would have been illegally dumped into the lagoon. Accordingly, the trash volume used to determine the percent reduction off the City's baseline trash load was established at 50% of the volume actually removed, or 250 gallons. Accurate records of the volume of trash removed from the 16<sup>th</sup> Avenue litter boom have not been maintained. The volume of trash removed from this device that was used to determine the percent reduction off the City's baseline trash load was 64 gallons (two 32-gallon trash bags), which was the volume of trash most recently removed. A third litter boom will be installed on the 19<sup>th</sup> Avenue Channel, possibly at the Bermuda Drive crossing. Accurate records of trash removed from litter booms/sea curtains will be maintained moving forward.

### **Percent Reduction from Enhancements**

The total estimated annual volume of trash that will be reduced by July 1, 2014 as a result of implementing partial-capture treatment devices listed in Table QF-3-1 is 314 gallons. This volume is equal to approximately a 2 percent reduction in the baseline trash load to urban creeks from the MS4 owned and operated by the City of San Mateo. Both values provided within this section are included in Trash Load Reduction Summary Table included in Section 5.0.

**Table QF-3-1. Partial capture treatment devices installed or planned to be installed within the City of San Mateo prior to July 1, 2014.**

Device ID	Public or Private	Device Name	Location (Cross Streets)	Installation Date/ Anticipated Installation Date	Total Area Treated (approx. acres)	Estimated Trash Load Reduced
LB-16	Public	Litter Boom/Curtain	16 <sup>th</sup> Avenue. Channel: 2055 Detroit Drive	Unknown	1,393	64 gallons
LB-19	Public	Litter Boom/Curtain	19 <sup>th</sup> Avenue Channel: Possibly at Bermuda Drive	Prior to July 1, 2014	34,081	Unknown
LB-ML	Public	Litter Boom/Curtain	South End of Marina Lagoon: Port Royal & Rock Harbor (Foster City)	Unknown	1,949	250 gallons (conservative estimate)

## QF-5: Full-Capture Treatment Devices

As defined by the Municipal Regional Stormwater Permit (MRP), a full-capture system or device is any single device or series of devices that traps all particles retained by a 5 mm mesh screen and has a design treatment capacity of not less than the peak flow rate (Q) resulting from a one-year, one-hour storm in the sub-drainage area. A list of the full-capture systems and devices recognized by the San Francisco Bay Regional Water Quality Control Board (Water Board) is included in *Trash Load Reduction Tracking Method Report* (BASMAA 2012a). Trash loads reduced via publicly- or privately-owned and operated devices within a Permittee's jurisdictional area that are recognized by the Water Board as full-capture may be used to demonstrate attainment of trash load reduction goals.

### Baseline Level of Implementation

Prior to adoption of the MRP, some Permittees installed and maintained full capture devices. To avoid penalizing these early implementers, an applicable control measure implemented within a Permittee's jurisdictional area prior to the effective date of the MRP will be credited equally to a control measure implemented after the effective date. Therefore, the baseline level of implementation is established as no full-capture treatment devices installed.

### Enhanced Level of Implementation

The City of San Mateo's participation in the BASMAA Baseline Loading Study included the installation of 12 full-capture treatment devices (connector pipe screens) in early spring, 2010. Sites were selected to collect trash loading data representative of the following land use categories: Retail – Moderate Income (5 sites); High-Density Residential (5 sites); K-12 Schools (1 site); and Parks (1 site).

The installation of approximately 133 additional connector pipe screens is in progress. The installation of these and any additional devices is anticipated to be complete by early spring, 2012. These additional devices are being installed to fulfill the MRP's Minimum Full Trash Capture requirement to treat runoff from an area equivalent to 30% (82 acres) of Retail/Wholesale land that drains into the City's MS4. A list of these full-capture devices is included in Table QF-5-1. All devices listed within this table are enhanced trash control measures. Table QF-5-1 also includes estimates of the area treated and the calculated trash load reduced from each full-capture treatment device. These values are planning-level estimates based on the total area treated and gallons of trash reduced for all devices divided by the total number of devices. Once all devices are installed, more accurate estimates for area treated and trash load reduced for each device will be calculated using GIS. These calculations are consistent with the approach described in the *Trash Load Reduction Tracking Method Report* (BASMAA 2012a).

### Percent Reduction from Enhancements

The total estimated annual volume of trash that will be reduced by July 1, 2014 as a result of implementing full capture devices is 1,133 gallons. This volume is equal to approximately a 7.5 percent reduction in the baseline trash load to urban creeks from the municipal separate storm sewer system (MS4) owned and operated by the City of San Mateo. Both values provided within this section are included in Trash Load Reduction Summary Table included in Section 5.0.

**Table QF-5-1. Trash full-capture treatment devices within the jurisdictional boundaries of the City of San Mateo that are planned for installation by July 1, 2014.**

Device ID <sup>[1]</sup>	Public or Private	Device Name	Location (Cross Streets)	Installation Date/Anticipated Installation Date	Estimated Total Area Treated (acres) <sup>[2]</sup>	Estimated Trash Load Reduced (gallons) <sup>[2]</sup>
SMB-01	Public	Connector Pipe Screen	Alameda de las Pulgas & Parkside W	Spring 2010	1.6	9
SMB-02	Public	Connector Pipe Screen	Barneson Ave & Ashwood Ct	Spring 2010	1.6	9
SMB-03	Public	Connector Pipe Screen	Alameda de las Pulgas & 30 <sup>th</sup> Ave	Spring 2010	1.6	9
SMB-04	Public	Connector Pipe Screen	Isabelle Ave & 30 <sup>th</sup> Ave	Spring 2010	1.6	9
SMB-05	Public	Connector Pipe Screen	Harvard Rd & Georgetown Ave	Spring 2010	1.6	9
SMB-06	Public	Connector Pipe Screen	244 Harvard Rd	Spring 2010	1.6	9
SMB-07	Public	Connector Pipe Screen	E 3 <sup>rd</sup> Ave & S B St	Spring 2010	1.6	9
SMB-08	Public	Connector Pipe Screen	E 3 <sup>rd</sup> Ave & S Delaware St	Spring 2010	1.6	9
SMB-09	Public	Connector Pipe Screen	S Delaware St @ Kmart Entrance	Spring 2010	1.6	9
SMB-10	Public	Connector Pipe Screen	S Delaware St 150 ft S of Concar Dr	Spring 2010	1.6	9
SMB-11	Public	Connector Pipe Screen	42 <sup>nd</sup> Ave & Dumont St	Spring 2010	1.6	9
SMB-12	Public	Connector Pipe Screen	31 <sup>st</sup> Ave between Beverly & Lansdale	Spring 2010	1.6	9
SM-1	Public	Connector Pipe Screen	2 <sup>nd</sup> Ave & San Mateo Drive	12/12/11	1.6	9
SM-2	Public	Connector Pipe Screen	2 <sup>nd</sup> Ave & San Mateo Drive	12/12/11	1.6	9
SM-3	Public	Connector Pipe Screen	24 2 <sup>nd</sup> Ave	12/12/11	1.6	9
SM-4	Public	Connector Pipe Screen	San Mateo Dr & 2 <sup>nd</sup> Ave	12/12/11	1.6	9
SM-6	Public	Connector Pipe Screen	101 S. San Mateo Dr	12/12/11	1.6	9
SM-7	Public	Connector Pipe Screen	Santa Inez Ave & Amphlett Blvd	12/12/11	1.6	9
SM-8	Public	Connector Pipe Screen	Santa Inez Ave & Amphlett Blvd	12/12/11	1.6	9
SM-9	Public	Connector Pipe Screen	Amphlett Blvd & Monte Diablo Ave	12/13/11	1.6	9
SM-10	Public	Connector Pipe Screen	Amphlett Blvd & Monte Diablo Ave	12/13/11	1.6	9
SM-11	Public	Connector Pipe Screen	Ellsworth Ave & 2 <sup>nd</sup> Ave	12/13/11	1.6	9
SM-12	Public	Connector Pipe Screen	Ellsworth Ave & 2 <sup>nd</sup> Ave	12/13/11	1.6	9
SM-13	Public	Connector Pipe Screen	3 <sup>rd</sup> Ave & Claremont St	12/13/11	1.6	9

Table QF-5-1 (continued).

Device ID <sup>[1]</sup>	Public or Private	Device Name	Location (Cross Streets)	Installation Date/Anticipated Installation Date	Estimated Total Area Treated (acres) <sup>[2]</sup>	Estimated Trash Load Reduced (gallons) <sup>[2]</sup>
SM-14	Public	Connector Pipe Screen	3 <sup>rd</sup> Ave & Claremont St	12/13/11	1.6	9
SM-16	Public	Connector Pipe Screen	2 <sup>nd</sup> Ave & Railroad Ave	12/13/11	1.6	9
SM-17	Public	Connector Pipe Screen	Railroad Ave & 2 <sup>nd</sup> Ave	12/14/11	1.6	9
SM-18	Public	Connector Pipe Screen	Railroad Ave & 2 <sup>nd</sup> Ave	12/14/11	1.6	9
SM-19	Public	Connector Pipe Screen	Railroad Ave & 3 <sup>rd</sup> Ave	12/14/11	1.6	9
SM-20	Public	Connector Pipe Screen	7 Railroad Ave	12/14/11	1.6	9
SM-21	Public	Connector Pipe Screen	Cypress Ave & Amphlett Blvd	12/14/11	1.6	9
SM-22	Public	Connector Pipe Screen	Amphlett Blvd & 2 <sup>nd</sup> Ave	12/14/11	1.6	9
SM-23	Public	Connector Pipe Screen	2 <sup>nd</sup> Ave & Amphlett Blvd	12/14/11	1.6	9
SM-24	Public	Connector Pipe Screen	3 <sup>rd</sup> Ave & Norfolk St	12/15/11	1.6	9
SM-25	Public	Connector Pipe Screen	3 <sup>rd</sup> Ave & Norfolk St	12/15/11	1.6	9
SM-26	Public	Connector Pipe Screen	3 <sup>rd</sup> Ave & Norfolk St	12/15/11	1.6	9
SM-27	Public	Connector Pipe Screen	Palm Ave & 21 <sup>st</sup> Ave	12/15/11	1.6	9
SM-28	Public	Connector Pipe Screen	Palm Ave & 21 <sup>st</sup> Ave	12/15/11	1.6	9
SM-29	Public	Connector Pipe Screen	Gum St & Leslie St	12/15/11	1.6	9
SM-30	Public	Connector Pipe Screen	Leslie St & Gum St	12/15/11	1.6	9
SM-31	Public	Connector Pipe Screen	1806 Leslie St	12/16/11	1.6	9
SM-33	Public	Connector Pipe Screen	9 <sup>th</sup> Ave & Railroad Ave	12/16/11	1.6	9
SM-34	Public	Connector Pipe Screen	9 <sup>th</sup> Ave & Railroad Ave	12/16/11	1.6	9
SM-35	Public	Connector Pipe Screen	Railroad Ave & 9 <sup>th</sup> Ave	12/16/11	1.6	9
SM-36	Public	Connector Pipe Screen	Claremont St & 9 <sup>th</sup> Ave	12/16/11	1.6	9
SM-37	Public	Connector Pipe Screen	Amphlett Blvd & 5 <sup>th</sup> Ave	12/16/11	1.6	9
SM-38	Public	Connector Pipe Screen	7 <sup>th</sup> Ave & Amphlett Blvd	12/16/11	1.6	9
SM-39	Public	Connector Pipe Screen	9 <sup>th</sup> Ave & Amphlett Blvd	12/19/11	1.6	9

Table QF-5-1 (continued).

Device ID <sup>[1]</sup>	Public or Private	Device Name	Location (Cross Streets)	Installation Date/Anticipated Installation Date	Estimated Total Area Treated (acres) <sup>[2]</sup>	Estimated Trash Load Reduced (gallons) <sup>[2]</sup>
SM-40	Public	Connector Pipe Screen	9 <sup>th</sup> Ave & Amphlett Blvd	12/19/11	1.6	9
SM-41	Public	Connector Pipe Screen	10 <sup>th</sup> Ave & Amphlett Blvd	12/19/11	1.6	9
SM-42	Public	Connector Pipe Screen	10 <sup>th</sup> Ave & Amphlett Blvd	12/19/11	1.6	9
SM-43	Public	Connector Pipe Screen	Amphlett Blvd & Sunnybrae Blvd	12/19/11	1.6	9
SM-44	Public	Connector Pipe Screen	Folkstone Ave & Amphlett Blvd	12/19/11	1.6	9
SM-45	Public	Connector Pipe Screen	Folkstone Ave & Amphlett Blvd	12/19/11	1.6	9
SM-46	Public	Connector Pipe Screen	1206 Amphlett Blvd	12/20/11	1.6	9
SM-47	Public	Connector Pipe Screen	Humboldt St & Amphlett Blvd	12/20/11	1.6	9
SM-48	Public	Connector Pipe Screen	Amphlett Blvd & Howard Ave	12/20/11	1.6	9
SM-49	Public	Connector Pipe Screen	Howard Ave & Amphlett Blvd	12/20/11	1.6	9
SM-50	Public	Connector Pipe Screen	Amphlett Blvd & Howard Ave	12/20/11	1.6	9
SM-52	Public	Connector Pipe Screen	Bayswater Ave & Amphlett Blvd	12/20/11	1.6	9
SM-54	Public	Connector Pipe Screen	Delaware St & 2 <sup>nd</sup> Ave	12/20/11	1.6	9
SM-55	Public	Connector Pipe Screen	Delaware St & 2 <sup>nd</sup> Ave	12/21/11	1.6	9
SM-56	Public	Connector Pipe Screen	Delaware St & 2 <sup>nd</sup> Ave	12/21/11	1.6	9
SM-60	Public	Connector Pipe Screen	1 <sup>st</sup> Ave & Railroad Ave	12/21/11	1.6	9
SM-61	Public	Connector Pipe Screen	1st Ave & Railroad Ave	12/21/11	1.6	9
SM-62	Public	Connector Pipe Screen	Railroad Ave & 1st Ave	12/21/11	1.6	9
SM-63	Public	Connector Pipe Screen	Railroad Ave & 1st Ave	12/21/11	1.6	9
SM-65	Public	Connector Pipe Screen	Ellsworth Ave & Baldwin Ave	12/21/11	1.6	9
SM-66	Public	Connector Pipe Screen	Ellsworth Ave & Baldwin Ave	12/22/11	1.6	9
SM-67	Public	Connector Pipe Screen	2nd Ave & B St	12/22/11	1.6	9
SM-68	Public	Connector Pipe Screen	B St & 1st Ave	12/22/11	1.6	9
SM-69	Public	Connector Pipe Screen	2nd Ave & Main St	12/22/11	1.6	9

Table QF-5-1 (continued).

Device ID <sup>[1]</sup>	Public or Private	Device Name	Location (Cross Streets)	Installation Date/Anticipated Installation Date	Estimated Total Area Treated (acres) <sup>[2]</sup>	Estimated Trash Load Reduced (gallons) <sup>[2]</sup>
SM-70	Public	Connector Pipe Screen	2 <sup>nd</sup> Ave & Main St	12/22/11	1.6	9
SM-71	Public	Connector Pipe Screen	2 <sup>nd</sup> Ave & Railroad Ave	12/22/11	1.6	9
SM-72	Public	Connector Pipe Screen	Claremont St & 2 <sup>nd</sup> Ave	12/22/11	1.6	9
SM-73	Public	Connector Pipe Screen	2 <sup>nd</sup> Ave & Claremont St	12/23/11	1.6	9
SM-74	Public	Connector Pipe Screen	2 <sup>nd</sup> Ave & Claremont St	12/23/11	1.6	9
SM-75	Public	Connector Pipe Screen	2 <sup>nd</sup> Ave & Claremont St	12/23/11	1.6	9
SM-76	Public	Connector Pipe Screen	3 <sup>rd</sup> Ave & El Dorado St	12/23/11	1.6	9
SM-77	Public	Connector Pipe Screen	3 <sup>rd</sup> Ave & El Dorado St	12/23/11	1.6	9
SM-78	Public	Connector Pipe Screen	3 <sup>rd</sup> Ave & Delaware St	12/23/11	1.6	9
SM-79	Public	Connector Pipe Screen	Delaware St & 3 <sup>rd</sup> Ave	12/23/11	1.6	9
SM-80	Public	Connector Pipe Screen	3 <sup>rd</sup> Ave & Delaware St	1/9/12	1.6	9
SM-81	Public	Connector Pipe Screen	Delaware St & 4 <sup>th</sup> Ave	1/9/12	1.6	9
SM-82	Public	Connector Pipe Screen	Delaware St & 4 <sup>th</sup> Ave	1/9/12	1.6	9
SM-83	Public	Connector Pipe Screen	4 <sup>th</sup> Ave & Delaware St	1/9/12	1.6	9
SM-84	Public	Connector Pipe Screen	4 <sup>th</sup> Ave & Delaware St	1/9/12	1.6	9
SM-85	Public	Connector Pipe Screen	Delaware St & 4th Ave	1/9/12	1.6	9
SM-86	Public	Connector Pipe Screen	4th Ave & El Dorado St	1/9/12	1.6	9
SM-87	Public	Connector Pipe Screen	4th Ave & El Dorado St	1/9/12	1.6	9
SM-88	Public	Connector Pipe Screen	4th Ave & El Dorado St	1/10/12	1.6	9
SM-89	Public	Connector Pipe Screen	5th Ave & Delaware St	1/10/12	1.6	9
SM-90	Public	Connector Pipe Screen	5th Ave & Delaware St	1/10/12	1.6	9
SM-91	Public	Connector Pipe Screen	5th Ave & Delaware St	1/10/12	1.6	9
SM-92	Public	Connector Pipe Screen	5th Ave & Claremont St	1/10/12	1.6	9
SM-93	Public	Connector Pipe Screen	Claremont St & 5th Ave	1/10/12	1.6	9

Table QF-5-1 (continued).

Device ID <sup>[1]</sup>	Public or Private	Device Name	Location (Cross Streets)	Installation Date/Anticipated Installation Date	Estimated Total Area Treated (acres) <sup>[2]</sup>	Estimated Trash Load Reduced (gallons) <sup>[2]</sup>
SM-94	Public	Connector Pipe Screen	Claremont St & 5 <sup>th</sup> Ave	1/10/12	1.6	9
SM-95	Public	Connector Pipe Screen	Claremont St & 5 <sup>th</sup> Ave	1/11/12	1.6	9
SM-96	Public	Connector Pipe Screen	5 <sup>th</sup> Ave & Claremont St	1/11/12	1.6	9
SM-97	Public	Connector Pipe Screen	5 <sup>th</sup> Ave & Claremont St	1/11/12	1.6	9
SM-98	Public	Connector Pipe Screen	5 <sup>th</sup> Ave & Railroad Ave	1/11/12	1.6	9
SM-99	Public	Connector Pipe Screen	5 <sup>th</sup> Ave & Railroad Ave	1/11/12	1.6	9
SM-100	Public	Connector Pipe Screen	5 <sup>th</sup> Ave & Railroad Ave	1/11/12	1.6	9
SM-101	Public	Connector Pipe Screen	Railroad Ave & 5 <sup>th</sup> Ave	1/11/12	1.6	9
SM-102	Public	Connector Pipe Screen	5 <sup>th</sup> Ave & S B St	1/12/12	1.6	9
SM-104	Public	Connector Pipe Screen	5 <sup>th</sup> Ave & Laurel Ave	1/12/12	1.6	9
SM-105	Public	Connector Pipe Screen	S B St & 5 <sup>th</sup> Ave	1/12/12	1.6	9
SM-106	Public	Connector Pipe Screen	S B St & 5 <sup>th</sup> Ave	1/12/12	1.6	9
SM-107	Public	Connector Pipe Screen	4 <sup>th</sup> Ave & Claremont St	1/12/12	1.6	9
SM-108	Public	Connector Pipe Screen	4 <sup>th</sup> Ave & Claremont St	1/12/12	1.6	9
SM-109	Public	Connector Pipe Screen	4th Ave & Claremont St	1/12/12	1.6	9
SM-110	Public	Connector Pipe Screen	Claremont St & 4th Ave	1/13/12	1.6	9
SM-111	Public	Connector Pipe Screen	Claremont St & 4th Ave	1/13/12	1.6	9
SM-112	Public	Connector Pipe Screen	5th Ave & Claremont St	1/13/12	1.6	9
SM-113	Public	Connector Pipe Screen	5th Ave & El Camino Real	1/13/12	1.6	9
SM-114	Public	Connector Pipe Screen	4th Ave & San Mateo Dr	1/13/12	1.6	9
SM-115	Public	Connector Pipe Screen	San Mateo Dr & 4th Ave	1/13/12	1.6	9
SM-116	Public	Connector Pipe Screen	San Mateo Dr & 3rd Ave	1/13/12	1.6	9
SM-117	Public	Connector Pipe Screen	3rd Ave & San Mateo Dr	1/16/12	1.6	9
SM-118	Public	Connector Pipe Screen	3rd Ave & San Mateo Dr	1/16/12	1.6	9
SM-119	Public	Connector Pipe Screen	50 E 3 <sup>rd</sup> Ave	1/16/12	1.6	9
SM-120	Public	Connector Pipe Screen	Ellsworth Ave & 3 <sup>rd</sup> Ave	1/16/12	1.6	9

Table QF-5-1 (continued).

Device ID <sup>[1]</sup>	Public or Private	Device Name	Location (Cross Streets)	Installation Date/Anticipated Installation Date	Estimated Total Area Treated (acres) <sup>[2]</sup>	Estimated Trash Load Reduced (gallons) <sup>[2]</sup>
SM-121	Public	Connector Pipe Screen	3 <sup>rd</sup> Ave & Ellsworth Ave	1/16/12	1.6	9
SM-122	Public	Connector Pipe Screen	Ellsworth Ave & 4 <sup>th</sup> Ave	1/16/12	1.6	9
SM-123	Public	Connector Pipe Screen	B St & 4 <sup>th</sup> Ave	1/16/12	1.6	9
SM-124	Public	Connector Pipe Screen	B St & 4 <sup>th</sup> Ave	1/17/12	1.6	9
SM-125	Public	Connector Pipe Screen	B St & 4 <sup>th</sup> Ave	1/17/12	1.6	9
SM-126	Public	Connector Pipe Screen	4 <sup>th</sup> Ave & B St	1/17/12	1.6	9
SM-127	Public	Connector Pipe Screen	B St & 4 <sup>th</sup> Ave	1/17/12	1.6	9
SM-128	Public	Connector Pipe Screen	B St & 4 <sup>th</sup> Ave	1/17/12	1.6	9
SM-129	Public	Connector Pipe Screen	B St & 3 <sup>rd</sup> Ave	1/17/12	1.6	9
SM-130	Public	Connector Pipe Screen	B St & 3 <sup>rd</sup> Ave	1/17/12	1.6	9
SM-131	Public	Connector Pipe Screen	B St & 3 <sup>rd</sup> Ave	1/18/12	1.6	9
SM-132	Public	Connector Pipe Screen	3 <sup>rd</sup> Ave & B St	1/18/12	1.6	9
SM-133	Public	Connector Pipe Screen	3rd Ave & Railroad Ave	1/18/12	1.6	9
SM-134	Public	Connector Pipe Screen	3rd Ave & Railroad Ave	1/18/12	1.6	9
SM-135	Public	Connector Pipe Screen	3rd Ave & B St	1/18/12	1.6	9
SM-136	Public	Connector Pipe Screen	B St & 2nd Ave	1/18/12	1.6	9
SM-137	Public	Connector Pipe Screen	B St & 2nd Ave	1/18/12	1.6	9
SM-138	Public	Connector Pipe Screen	2nd Ave & B St	1/19/12	1.6	9
SM-139	Public	Connector Pipe Screen	2nd Ave & B St	1/19/12	1.6	9
SM-140	Public	Connector Pipe Screen	5th Ave & B St	1/19/12	1.6	9
SM-141	Public	Connector Pipe Screen	San Mateo Dr & 5th Ave	1/19/12	1.6	9
SM-142	Public	Connector Pipe Screen	San Mateo Dr & 5th Ave	1/19/12	1.6	9
SM-143	Public	Connector Pipe Screen	5th Ave & San Mateo Dr	1/19/12	1.6	9

[1] Gaps in Device ID numbering were created when several proposed device locations were deemed infeasible.

[2] Estimated Total Area Treated and Estimated Trash Load Reduced are planning-level estimates calculated as follows: Total Area Treated: the estimated treatment/drainage area (acres) for all devices divided by the number of devices. Trash Load Reduced: total load reduced (gallons) for all devices divided by the number of devices.

## **QF-6: Creek/Channel/Shoreline Cleanups**

Creek/channel/shoreline cleanups have been successful in removing large amounts of trash from San Francisco Bay area creeks and waterways and increasing citizens' awareness of trash issues within their communities. Creek/channel/shoreline cleanups are conducted as single-day events or throughout the year by volunteers and municipal agencies. Since volunteers and municipal agencies have the common goal of clean creeks and waterways, their efforts sometimes overlap. This is apparent with some municipal agencies using volunteers to help assess and clean designated trash hot spots during single-day volunteer events.

### **Baseline Level of Implementation**

Trash reduced via creek/channel/shoreline cleanups was not accounted for in the City of San Mateo's baseline trash load described in Section 2.0. Therefore, implementation of any of the control measures described in this section is considered to be an enhancement and can be used to demonstrate progress towards load reduction goals.

### **Enhanced Level of Implementation**

Prior to July 1, 2014, the City of San Mateo will conduct MRP-required cleanups<sup>4</sup> and conduct or coordinate the following non MRP-required creek/channel/shoreline cleanups<sup>5</sup> listed below. Both types of cleanups will be conducted each year and the volume of trash removed will be tracked to demonstrate trash loads reduced. For events that involve volunteer participation, the City will provide reusable 5-gallon plastic buckets and gloves and will arrange for the disposal of collected trash.

### **Bayfront Cleanup**

The City of San Mateo will evaluate historical Bayfront Cleanup data to determine the feasibility of establishing a baseline level of volunteer participation and volume of trash removed. If it is feasible to establish a baseline level, annual participation and trash statistics from October 2009 forward will be evaluated to determine whether an enhanced level of effort has been occurring and whether it warrants trash reduction credits. Volunteer cleanup efforts occurring upstream of the Bayfront on San Mateo Creek and Marina Lagoon will be considered enhanced activities.

### **Spring Cleanup**

As discussed previously, the City of San Mateo will coordinate and implement a spring cleanup event starting in 2012. The event will be scheduled to coincide with spring cleanups taking place in other jurisdictions within the Countywide Program. These spring cleanups will be promoted under one theme by the Countywide Program PIP. PIP will assist by directing volunteers to cleanup events in their communities.

### **Volunteer-led Cleanups**

The City of San Mateo periodically receives inquiries from volunteer groups and businesses interested in organizing and implementing cleanups, including requests for "Adopt-a-spot" arrangements. The City will facilitate such volunteer-led cleanups and ensure that volunteer

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<sup>4</sup> Creek/channel/shoreline "Hot Spot" cleanups conducted in accordance with Permit Provision C.10.b.

<sup>5</sup> All "other" creek/channel/shoreline cleanups conducted by a municipality that are not required by Provision C.10.b.

groups document the location, volume and dominant trash types removed. The City will conduct outreach to community groups and service organizations to assess the level of volunteer interest and promote volunteer-led cleanups.

### **Routine Cleanups by Municipal Staff**

City of San Mateo stormwater staff performs in-creek/channel cleanups during the course of the work day, including during Stormwater Collection System Screening and other routine activities. City staff also performs regular cleanups at locations along the San Mateo Creek frequented by the homeless and other residents of the community. The City is currently evaluating the feasibility of restricting public access to the San Mateo Creek to reduce the amount of trash that accumulates in these locations. In the meantime, cleanups will continue at these locations and will be documented for tracking purposes.

### **Percent Reduction from Enhancements**

The total estimated annual volume of trash that will be reduced by July 1, 2014 as a result of implementing creek/channel/shoreline cleanups is 2,000 gallons. This volume is equal to approximately a 12.5 percent reduction in the baseline trash load to urban creeks from the MS4 owned and operated by the City of San Mateo. Both values provided within this section are included in Trash Load Reduction Summary Table included in Section 5.0. The actual volume of trash removed from in creek/channel cleanups since July 1, 2011 was estimated to be over 4,000 gallons. However, a large percentage of debris removed from in-channel cleanups consisted of large items (furniture, tires) placed in the channel by the homeless and other residents in the community. The 2,000-gallon volume was established as a conservative estimate based on the volume of trash that would have reached the channel through the storm drain system.

## **5.0 SUMMARY OF TRASH CONTROL MEASURE ENHANCEMENTS**

The City of San Mateo is committed to reducing the potential for trash impacts in local water bodies in the San Francisco Bay Area. The planned enhanced trash control measures described in Section 4.0 are also summarized in Table 5-1. The enhancements are intended to comply with the 40 percent trash load reduction goal in MRP provision C.10.

New and enhanced control measures and best management practices that the City plans to implement by July 1, 2014 include activities for which credit will be given toward the 40 percent reduction requirement (e.g., public education and outreach, anti-littering and illegal dumping enforcement), and activities for which quantification methods currently exist (e.g., on-land and in-creek/channel cleanups, full-capture treatment devices). Specific control measures are listed in Table 5-1.

**Table 5-1. Planned enhanced trash control measure implementation within the jurisdictional boundaries of the City of San Mateo and associated trash load reduction.**

Trash Control Measure	Summary Description of Control Measure	% Reduction (Credits)	Trash Load Reduced (gal)	Cumulative % Reduction (Compared to Baseline)
Existing Enhanced Street Sweeping	Existing enhanced street sweeping above established baseline level.	2.0	325	2.0
CR-2: Polystyrene Foam Food Service Ware Policy	Policy banning the distribution of polystyrene foam food and beverage ware at City-sponsored events or on City-owned property.	2.0	311	4.0
CR-3: Public Education and Outreach Programs	Outreach efforts beyond those required in the MRP	8.0	1,244	12.0
CR-4: Activities to Reduce Trash from Uncovered Loads	Language in City’s hauling service contracts that requiring covered loads, a City ordinance prohibiting uncovered loads, and City PD enforcement of the CA Vehicle Code prohibiting uncovered loads.	5.0	777	17.0
CR-5: Anti-Littering and Illegal Dumping Enforcement Activities	Thorough investigation of reports of illegal dumping, including collection of evidence to help identify offenders, and enforcement procedures including citations.	2.0	311	19.0
CR-6: Improved Trash Bin/Container Management (Municipally or Privately-Controlled)	Ordinance for appropriate trash service for private and public property; enforcement for inadequate trash service for private containers; Strategic Plan for public area trash containers.	6.0	933	25.0
QF-1: Enhanced On-land Trash Cleanups (Volunteer and/or Municipal)	Efforts to facilitate & coordinate on-land cleanups at Spring and Bayfront Cleanup events; efforts to identify interested volunteer groups & facilitate / coordinate volunteer-led cleanups.	0.1	28	25.1
QF-3c: Litter Booms (Partial-capture Treatment Device)	Existing litter booms at the south end of Marina Lagoon and on the 16 <sup>th</sup> Avenue Channel. Additional litter boom to be located on the 19 <sup>th</sup> Avenue Channel.	2.0	314	27.1
QF-5: Full-capture Treatment Devices	Approximately 145 full-capture treatment devices installed throughout the City.	7.5	1,133	34.6
QF-6: Creek/Channel/Shoreline Cleanups (Volunteer and/or Municipal)	Enhanced (upstream) efforts during the Bayfront Cleanup; Spring Cleanup; efforts to identify interested volunteer groups & facilitate / coordinate volunteer-led cleanups; documentation of routine cleanups performed by City staff.	12.5	2,000	47.1

## 5.1 Annual Reporting and Progress Towards Trash Load Reduction Goal(s)

Consistent with MRP Provision C.10.d(i), the City of San Mateo intends to report on progress towards MRP trash load reduction goals on an annual basis beginning with the 2011-2012 Annual Report. Annual reports will include:

1. A brief summary of all enhanced trash load reduction control measures implemented to-date;
2. The dominant types of trash likely removed via these control measures;
3. Total trash loads removed (credits and quantifications) via each control measure implementation; and
4. A summary and quantification of progress towards trash load reduction goals.

Similar to other MRP provisions, annual reporting formats will be consistent region-wide. Annual reports are intended to provide a summary of control measure implementation and demonstrate progress toward MRP trash reduction goals. For more detailed information on specific control measures, the City of San Mateo will retain supporting documentation on trash load reduction control measure implementation. These records should have a level of specificity consistent with the trash load reduction tracking methods described in the *BASMAA Trash Load Reduction Tracking Method Technical Report* (BASMAA 2012a).

## 5.2 Considerations of Uncertainties

Baseline trash loading and load reduction estimates are based on the best available information at the time this Short-Term Plan was developed. As with any stormwater loading and reduction estimate, a number of assumptions were used during calculations and therefore uncertainty is inherent in the baseline trash load estimate presented in Section 2.0 and the load reduction estimate presented in this section. For these reasons, the baseline loading estimates presented in this plan should be considered first-order estimates. During the implementation of this Short-Term Plan and subsequent plans, additional information may become available to allow the calculation of a more robust baseline load.

## 6.0 IMPLEMENTATION SCHEDULE

Implementation of enhanced trash control measures by the City of San Mateo is currently planned to occur in a timeframe consistent with MRP requirements. A preliminary implementation schedule for all planned enhancements is described in Table 6-1. This schedule provides a timeframe for reducing trash discharged from the City of San Mateo's MS4 by 40 percent by July 1, 2014.

Based on new information that becomes available during the implementation of this Short-Term Plan (e.g., revisions to baseline loading estimates or load reduction credits or quantification formulas), the City of San Mateo may choose to amend or revise this Plan and/or the associated implementation schedule. If revisions or amendments occur, a revised Short-Term Plan and implementation schedule will be submitted to the Water Board via the City of San Mateo's annual reporting process.

**Table 6-1. Preliminary implementation schedule for enhanced trash control measures in the City of San Mateo.**

Trash Control Measure	Beginning Date of Implementation
CR-2: Polystyrene Foam Food Service Ware Ban	Summer 2012
CR-3: Public Education and Outreach Programs	Spring 2012
CR-4: Activities to Reduce Trash from Uncovered Loads	January 2013
CR-5: Anti-Littering and Illegal Dumping Enforcement Activities	July 1, 2014
CR-6: Improved Trash Bin/Container Management (Municipally or Privately-Controlled)	Fall 2012
QF-1: On-land Trash Cleanups (Volunteer and/or Municipal)	Spring 2012
QF-3c: Litter Booms (Partial-capture Treatment Devices)	Spring 2012
QF-5: Full-capture Treatment Devices	Fall 2011
QF-6: Creek/Channel/Shoreline Cleanups (Volunteer and/or Municipal)	Spring 2012

## 7.0 REFERENCES

- Allison R.A. and F.H.S. Chiew 1995. Monitoring stormwater pollution from various land uses in an urban catchment. Proceedings from the 2<sup>nd</sup> International Symposium on Urban Stormwater Management, Melbourne, 551-516.
- Allison, R.A., T.A. Walker, F.H.S. Chiew, I.C. O'Neill and T.A. McMahon 1998. From Roads to rivers: Gross pollutant removal from urban waterways. Report 98/6. Cooperative Research Centre for Catchment Hydrology. Victoria, Australia. May 1998.
- Armitage, N. 2001. The removal of Urban Litter from Stormwater Drainage Systems. Ch. 19 in Stormwater Collection Systems Design Handbook. L. W. Mays, Ed., McGraw-Hill Companies, Inc. ISBN 0-07-135471-9, New York, USA, 2001, 35 pp.
- Armitage, N. 2003. The removal of urban solid waste from stormwater drains. Prepared for the International Workshop on Global Developments in Urban Drainage Management, Indian Institute of Technology, Bombay, Mumbai India. 5-7 February 2003.
- Armitage, N. 2007. The reduction of urban litter in the stormwater drains of South Africa. Urban Water Journal Vol. 4, No. 3: 151-172. September 2007.
- Armitage N., A. Rooseboom, C. Nel, and P. Townshend 1998. "The removal of Urban Litter from Stormwater Conduits and Streams. *Water Research Commission (South Africa) Report No. TT 95/98*, Pretoria.
- Armitage, N. and A. Rooseboom 2000. The removal of urban litter from stormwater conduits and streams: Paper 1 – The quantities involved and catchment litter management options. *Water S.A.* Vol. 26. No. 2: 181-187.
- BASMAA (Bay Area Stormwater Management Agencies Association). 2011a. Progress Report on Methods to Estimate Baseline Trash Loads from Bay Area Municipal Stormwater Systems and Track Loads Reduced. February 2011.
- BASMAA (Bay Area Stormwater Management Agencies Association). 2011b. Method to Estimate Baseline Trash Loads from Bay Area Municipal Stormwater Systems: Technical Memorandum #1. Prepared by EOA, Inc. April 2011.
- BASMAA (Bay Area Stormwater Management Agencies Association). 2011c. Sampling and Analysis Plan. Prepared by EOA, Inc. April 2011.
- BASMAA (Bay Area Stormwater Management Agencies Association). 2011d. Trash Load Reduction Tracking Method: Technical Memorandum #1 – Literature Review. Prepared by EOA, Inc. May 2011.
- BASMAA (Bay Area Stormwater Management Agencies Association). 2012a. Trash Load Reduction Tracking Method: Technical Report. Prepared by EOA, Inc. February 2012
- BASMAA (Bay Area Stormwater Management Agencies Association). 2012b. Trash Baseline Generation Rates: Technical Report. Prepared by EOA, Inc. February 2012.
- County of Los Angeles. 2002. Los Angeles County Litter Monitoring Plan for the Los Angeles River and Ballona Creek Trash Total Maximum Daily Load. May 30, 2002.
- County of Los Angeles. 2004a. Trash Baseline Monitoring Results Los Angeles River and Ballona Creek Watershed. Los Angeles County Department of Public Works. February 17, 2004.

County of Los Angeles 2004b. Trash Baseline Monitoring for Los Angeles River and Ballona Creek Watersheds. Los Angeles County Department of Public Works. May 6, 2004.

County of Los Angeles, Department of Public Works, Environmental Programs Division. 2007. *An Overview of Carryout Bags in Los Angeles County: A Staff Report to the Los Angeles County Board of Supervisors*. Alhambra, CA. [http://dpw.lacounty.gov/epd/PlasticBags/PDF/PlasticBagReport\\_08-2007.pdf](http://dpw.lacounty.gov/epd/PlasticBags/PDF/PlasticBagReport_08-2007.pdf). August 2007.

Kim, L.H, M. Kayhanian, M.K. Stenstrom 2004. Event mean concentration and loading of litter from highways during storms. *Science of the Total Environment* Vol 330: 101-113.