



February 1, 2012

Bruce H. Wolfe, Executive Officer  
California Regional Water Quality Control Board  
San Francisco Bay Region  
1515 Clay Street, Suite 1400  
Oakland, CA 94612

Dear Mr. Wolfe:

Enclosed is the City of San Pablo's Short-Term Trash Reduction Plan submitted in accordance with Provision C.10.a. in NPDES Permit No. CAS612008 issued by the San Francisco Bay Regional Water Quality Control Board, and/or NPDES Permit No. CA0083313 issued by the Central Valley Regional Water Quality Control Board.

I certify under penalty of law that this document and all attachments are prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluated the information submitted. Based on my inquiry of the person or persons who managed 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."

Sincerely,

Matt Rodriguez  
City Manager

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

## Template & Guidance

---

**Submitted by:**  
**City of San Pablo**  
**13831 San Pablo Avenue**  
**San Pablo, CA 94806**



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

**February 1, 2012**

---

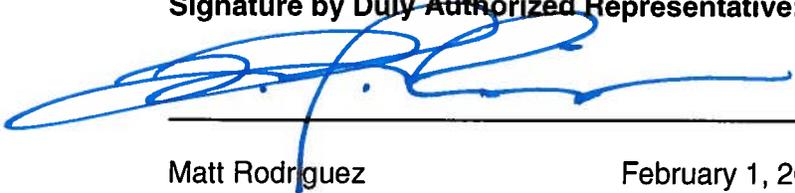
Page Intentionally Left Blank

**City of San Pablo  
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:**



---

Matt Rodriguez  
City Manager

February 1, 2012

# TABLE OF CONTENTS

CERTIFICATION STATEMENT .....	III
TABLE OF CONTENTS.....	IV
LIST OF TABLES.....	V
LIST FIGURES .....	V
2.1 ESTIMATED TRASH BASELINE LOADING RATES FOR GEOGRAPHICAL AREAS IN THE CITY OF SAN PABLO.....	V
ABBREVIATIONS.....	VI
PREFACE.....	VII
1.0 INTRODUCTION .....	1
BASELINE TRASH GENERATION RATES PROJECT .....	1
TRASH LOAD REDUCTION TRACKING METHOD SUMMARY .....	2
SHORT-TERM TRASH LOAD REDUCTION PLAN .....	2
2.0 BASELINE TRASH LOADING ESTIMATE .....	4
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
3.0 LOAD REDUCTION CALCULATION PROCESS .....	9
STEP #1: EXISTING ENHANCED STREET SWEEPING .....	9
STEP #2: TRASH GENERATION REDUCTION CONTROL MEASURES .....	10
STEP #3: ON-LAND INTERCEPTION CONTROL MEASURES .....	10
STEP #4: CONTROL MEASURES THAT INTERCEPT TRASH IN THE MS4 .....	11
STEP #5: CONTROL MEASURES THAT INTERCEPT TRASH IN WATERWAYS.....	11
STEP #6: COMPARISON TO BASELINE TRASH LOAD .....	11
4.0 ENHANCED TRASH CONTROL MEASURES .....	12
CR-1: SINGLE-USE CARRYOUT PLASTIC BAG POLICY .....	13
<i>Baseline Level of Implementation</i> .....	13
<i>Enhanced Level of Implementation</i> .....	13
<i>Reduction from Implementing Control Measure</i> .....	13
CR-3: PUBLIC EDUCATION AND OUTREACH PROGRAMS.....	14
<i>Baseline Level of Implementation</i> .....	14
<i>Enhanced Level of Implementation</i> .....	14
<i>Percent Reduction from Enhancements</i> .....	15
QF-2: ENHANCED STREET SWEEPING.....	16
<i>Baseline Level of Implementation</i> .....	16
<i>Enhanced Level of Implementation</i> .....	16
<i>Percent Reduction from Enhancements</i> .....	16
QF-3: PARTIAL-CAPTURE TREATMENT DEVICES .....	17
<i>Baseline Level of Implementation</i> .....	17
<i>Enhanced Level of Implementation</i> .....	17
<i>Percent Reduction from Enhancements</i> .....	17

QF-5: FULL-CAPTURE TREATMENT DEVICES ..... 18  
*Baseline Level of Implementation*..... 18  
*Enhanced Level of Implementation* ..... 18  
*Percent Reduction from Enhancements*..... 18  
QF-6: CREEK/CHANNEL/ShORELINE CLEANUPS ..... 19  
*Baseline Level of Implementation*..... 19  
*Enhanced Level of Implementation* ..... 19  
*Percent Reduction from Enhancements*..... 19  
**5.0 SUMMARY OF TRASH CONTROL MEASURE ENHANCEMENTS.....20**  
5.1 ANNUAL REPORTING AND PROGRESS TOWARDS TRASH LOAD REDUCTION GOAL(S)..... 22  
5.2 CONSIDERATIONS OF UNCERTAINTIES..... 22  
**6.0 IMPLEMENTATION SCHEDULE .....23**  
**7.0 REFERENCES .....25**

## LIST OF TABLES

1.1 TRASH CONTROL MEASURES QUANTIFIED BY BASMAA  
2.1 REGIONAL DEFAULT ANNUAL TRASH GENERATION RATES BY LAND USE CATEGORY  
2.2 JURISDICTIONAL AREAS AND EFFECTIVE LOADING AREAS IN THE CITY OF SAN PABLO BY LAND USE CLASSES IDENTIFIED BY ABAG (2005)  
2.3 PRELIMINARY ANNUAL TRASH BASELINE LOAD FOR THE CITY OF SAN PABLO  
4.1 TRASH CONTROL MEASURES THAT WILL BE IMPLEMENTED BY THE CITY TO REACH THE 40% TRASH LOAD REDUCTION  
5.1. PLANNED ENHANCED TRASH CONTROL MEASURE IMPLEMENTATION WITHIN THE JURISDICTIONAL BOUNDARIES OF THE CITY OF SAN PABLO AND ASSOCIATED TRASH LOADS REDUCED  
6.1. PRELIMINARY IMPLEMENTATION SCHEDULE FOR ENHANCED TRASH CONTROL MEASURES IN THE CITY OF SAN PABLO

## LIST FIGURES

2.1 ESTIMATED TRASH BASELINE LOADING RATES FOR GEOGRAPHICAL AREAS IN THE CITY OF SAN PABLO

## 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
Q	Flow
SFRWQCB	San Francisco Regional Water Quality Control Board
SWRCB	State Water Resource Control Board
TMDL	Total Maximum Daily Load
USEPA	United States Environmental Protection Agency
Water Board	San Francisco 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 of quantification formulas), the City of San Pablo 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 Pablo's annual reporting process.

**Please Note:** This Baseline Trash Load and Short-Term Trash Load Reduction Plan template and guidance was prepared to assist cities and counties (i.e., Permittees) subject to requirements in provision C.10.a.i of the Municipal Regional Stormwater NPDES Permit (MRP) for Phase I communities in the San Francisco Bay (Order R2-2009-0074). The template and guidance are intended to provide Permittee's with a format for developing their Short-Term Plans and submitting to the San Francisco Bay Regional Water Quality Control Board by February 1, 2012 in compliance with MRP provision C.10.a.i. The template provides a mechanism to link the results of the *Trash Baseline Generation Rates Project* and the *Trash Load Reduction Tracking Method*, each coordinated by Bay Area Stormwater Management Agencies Association (BASMAA). The use of this document and associated guidance are done so under the discretion of each Permittee.

## 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 before 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 Loading Reduction Plan) 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 Loading 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 Pablo in compliance with the portions of MRP provision C.10.a.i listed as 1a and 3 above. In compliance with 1b, BASMAA submitted a progress report on behalf of Permittees that briefly describes the methodologies used to develop trash baseline loads (BASMAA 2011a). These methods are more fully described in BASMAA (2011b, 2011c). Lastly, the *Trash Load Reduction Tracking Method Technical Report* (BASMAA 2011d) 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 towards 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 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 off 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 2012).

## **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 towards 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).

Methods attributable to specific trash control measures fall into two categories: 1) trash load reduction quantification formulas; and 2) load reduction credits (BASMAA 2011e). 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 towards load reduction goals will be demonstrated through comparisons to established trash baseline 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 their 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 Permittee, stormwater program, 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 a quantification formula (QF) or credits (CR) described in the *Trash Load Reduction Tracking Method Technical Report* (BASMAA 2011e).

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 (2011e). 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 of quantification formulas), the City of San Pablo 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 Pablo’s annual reporting process.

**Table 1.1.** Trash control measures for which load reduction quantification credits or formulas were developed to track progress towards trash load reduction goals.

<b>Load Reduction Credits</b>
Single-use Carryout Plastic Bag Ordinances
Polystyrene Foam Food Service Ware Ordinances
Public Education and Outreach Programs
Activities to Reduce Trash from Uncovered Loads
Anti-Littering and Illegal Dumping Enforcement Activities
Improved Trash Bin/Container Management Activities
Single-Use Food and Beverage Ware Ordinances
<b>Quantification Formulas</b>
On-land Trash Pickup (Volunteer and/or Municipal)
Enhanced Street Sweeping
Partial-Capture Treatment Devices
Enhanced Storm Drain Inlet Maintenance
Full-Capture Treatment Devices
Creek/Channel/Shoreline Cleanups (Volunteer and/or Municipal)

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

- Introduction;
- Trash Baseline Load Estimate;
- Load Reduction Calculation Process
- Planned Implementation of New or Enhanced Control Measures;
- Implementation Schedule; and
- 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 Loading 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 trash baseline load from the City of San Pablo's Municipal Separate Storm Sewer System (MS4). In compliance with Provision C.10.a.ii of the MRP, the City of San Pablo worked collaboratively with other MRP Permittees through BASMAA to develop data and the process necessary to establish 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 (2012) 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 literature review;
2. Develop conceptual model;
3. Develop and implement sampling and analysis plan;
4. Test 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 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 Pablo. 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 Pablo's baseline trash load from its MS4. A full description of the methods by which trash baseline loads were developed is included in BASMAA (2012a) and is summarized below.

### Permittee Characteristics

Incorporated in 1948, the City of San Pablo covers 1,667 acres in Contra Costa County, and has a jurisdictional area of 1,366 acres. According to the 2010 Census, it has a population of 29,139, with a population density of 1,1062.6 people per square mile, and average household size of 3.28. Of the 29,139 who call the City of San Pablo home, 28.3% are under the age of 18, 11.1% are between 18 and 24, 30.0% are between 25 and 44, 21.8% are between 45 and 65, and 8.8% are 65 or older.

Top employers in the City of San Pablo include Doctors Medical Center, Contra Costa College, Casino San Pablo, Vale Healthcare Center and San Pablo Healthcare and Wellness Center. The median household income was \$37,184 in 2000<sup>1</sup>.

---

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

## 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 Loading 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 Pablo. The City of San Pablo's jurisdictional areas includes all urban land areas within the City of San Pablo 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 Contra Costa County;
- Colleges and Universities (Private or Public);
- Non-urban Land Uses (e.g., agriculture, forest, rangeland, open space, wetlands, water);
- 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 Pablo’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 Pablo are presented in Table 2.2.

**Table 2.2.** Jurisdictional areas and effective loading areas in the City of San Pablo by land use classes identified by ABAG (2005).

Land Use Category	Jurisdictional Area (Acres)	Effective Loading Area (Acres)	% of Effective Loading Area
High Density Residential	616	587	48
Low Density Residential	305	292	24
Rural Residential	6	4	0
Commercial and Services/ Heavy, Light and Other Industrial	180	140	12
Retail and Wholesale	173	139	11
K-12 Schools	65	38	3
Urban Parks	20	18	2
<b>TOTAL</b>	<b>1,366</b>	<b>1,218</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 Pablo 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 Pablo are provided in Table 2-3 and areas associated with these rates 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 Pablo prior to 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 to not penalize implementers of enhanced street sweeping programs prior to the effective date of the MRP. For those Permittees that sweep less frequent than the baseline ceiling, their current sweeping frequency serves as their baseline.

The City of San Pablo's baseline street sweeping program includes sweeping all streets in residential areas twice per month, most streets in the downtown area four times per month, and sweeping most arterial roads twice per month. The City's current street sweeping program is the same except that arterial roads are swept four times per month.

Parking enforcement signs for street sweeping are posted in most residential areas, on some arterial roads and in the downtown area in the City. Parking enforcement equivalent occurs on arterial roads. 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 Pablo 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 Pablo does not own stormwater pump stations with trash racks.

**Baseline Trash Loading Estimate**

The estimated baseline trash load from the City of San Pablo 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 Pablo 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, high and very high trash loading rates.

**Table 2.3.** Preliminary annual trash baseline load for the City of San Pablo.

Category	Annual Load (gallons)
Preliminary Generation Trash Load	16,052
Load Removed via Baseline Street Sweeping	9,724
Load Removed via Baseline Storm Drain Inlet Maintenance	316
Load Removed via Baseline Stormwater Pump Station Maintenance	0
<b>Preliminary Trash Baseline Load</b>	<b>6,012</b>

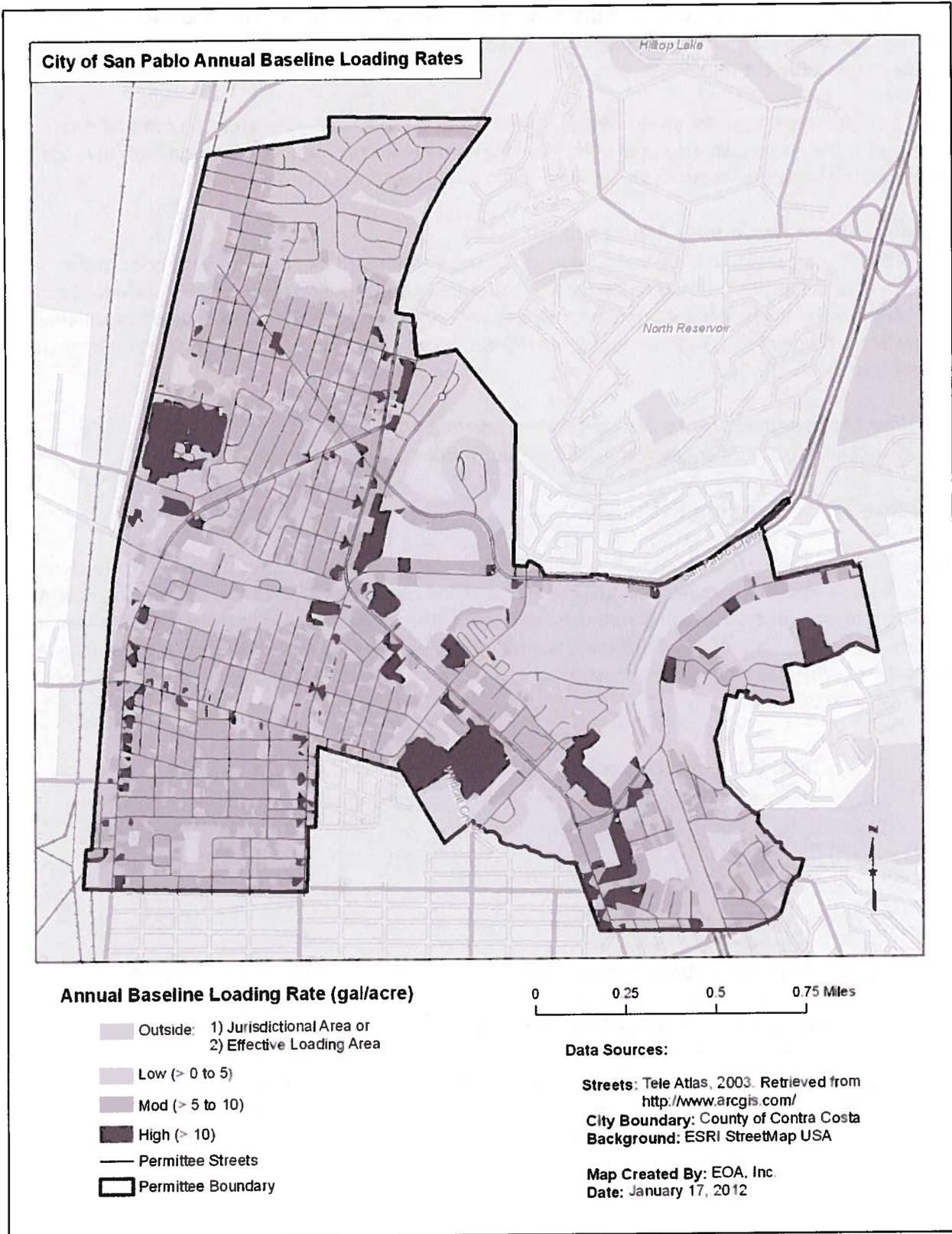


Figure 2.1. Estimated trash baseline loading rates for geographical areas in the City of San Pablo.

### 3.0 LOAD REDUCTION CALCULATION PROCESS

Using the guiding principles and assumptions described BASMAA (2011e), a stepwise process for calculating trash load reductions was developed collaboratively through BASMAA. This process is fully described in Trash Load Reduction Tracking Method Technical Report (BASMAA 2011e) and is briefly summarized in this section. The process takes into 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, it 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 as presented in Figure 2.1 and 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 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 controls 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 #2.

## 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).

---

<sup>2</sup> The only exception to this statement are load reductions 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 Device: Curb Inlet Screens (Area-specific)
- QF-3b: Partial-capture Treatment Device: Stormwater Pump Station Trash Racks 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 Device: 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 four 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 towards MRP trash load reduction goals.

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

## 4.0 ENHANCED TRASH CONTROL MEASURES

This section describes the new or enhanced trash control measures planned for implementation by the City of San Pablo. The enhanced control measures described are designed to reach a 40% reduction by July 1, 2014. New and enhanced control measures that will be implemented by the City of San Pablo include those listed in Table 4.1.

**Table 4.1.** Trash control measures that will be implemented by the City to reach the 40% trash load reduction.

Control Measure
Single-use Carryout Plastic Bag Ordinances
Public Education and Outreach Programs
Enhanced Street Sweeping
Partial-Capture Treatment Devices
Full-Capture Treatment Devices
Creek/Channel/Shoreline Cleanups (Volunteer and/or Municipal)

## **CR-1: Single-use Carryout Plastic Bag Policy**

Single-use plastic carryout bags have been found to contribute substantially to the litter stream and to have adverse effects on marine wildlife (United Nations 2009, CIWMB 2007, County of Los Angeles 2007). The prevalence of litter from plastic bags in the urban environment also compromises the efficiency of systems designed to channel storm water runoff. Furthermore, plastic bag litter leads to increased clean-up costs for the Permittees and other public agencies.

Based on recent experiences of municipalities throughout the State, the process Permittees must go through to enact a single-use carryout plastic bag policy/ordinance is difficult due to intense scrutiny and opposition from not only public interest groups and lobbyists, but also merchants and community members. In most cases, most opposition groups are pressing for the development of Environmental Impact Reports (EIRs) in accordance with the California Environmental Quality Act (CEQA).

### **Baseline Level of Implementation**

Prior to adoption of the MRP, Permittees within the Bay area have enacted policies or ordinances on Single-use Carryout Plastic Bags. 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 Pablo plans to adopt an ordinance prohibiting the distribution of single-use carryout plastic bags. The ordinance will ban the use of single-use carryout plastic bags from all retail establishments except non-profit reuse organization such as the Salvation Army and restaurants. The ordinance will impose a five cent charge on paper bags. The West Contra Costa Integrated Waste Management Authority (Authority) has hired a consultant to prepare the CEQA documents on behalf of all West County jurisdictions. The City of San Pablo Council approved the joint collaboration. The City of San Pablo will work with the Authority and the member agencies to educate the public prior to the ordinance adoption. The ordinance is scheduled to be implemented on July 1, 2013. The total percent trash reduced from MS4s as a result of implementing a single-use carryout plastic bag ordinance will be reported in the Annual Report submitted each September to the Water Board.

### **Reduction from Implementing Control Measure**

The City of San Pablo will receive a 12 percent reduction credit for implementing specific enhanced control measures described in Enhanced Level of Implementation section above. The 12 percent reduction credit will be applied to the City of San Pablo's baseline trash load. This percent reduction credit is consistent with methods presented in the BASMAA (2011e). A summary of all load reductions anticipated through the implementation of this plan are included in Section 4.0.

## 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 Pablo implemented the following public education and outreach control measures prior to the effective date of the MRP:

- Participated in the West County Earth Day Festival,
- Hosted creek restoration work days,
- Started the Tile Art Project -community groups would decorate tiles that were installed on trash cans and placed throughout the City and parks,
- Started the Riparian Lab After School Program – series of presentations about litter, creeks, and pollution prevention to youth from 4<sup>th</sup> grade to high school.

These control measures are considered baseline because they were either not related to trash reduction specifically, or they are not planned to be continued during the term of the MRP. New actions or actions started prior to the effective date of the MRP and continued into the future are described under the next section.

### Enhanced Level of Implementation

The City of San Pablo has implemented the following public education and outreach control measures prior to July 1, 2011].

- Annual Wildcat Creek Cleanup – in class presentations about the watershed and how litter travels followed by a creek cleanup event. **(Outreach to School-age Youth/Community Outreach Event)**
- Community Cleanup Program – in class presentations about litter and a school cleanup. **(Outreach to School-age Youth/Community Outreach Event)**
- Articles in the cities newsletter on litter and litter reduction as well as publicity for events. **(Media Relations)**

In addition, the Contra Costa Clean Water Program on behalf of the permittees launched the “Litter Travels but it Can Stop with You” advertising campaign with print materials, paid and non-paid social media, outreach to schools and youth sports leagues, a Program website with anti-littering messages, local radio and TV channels, a Facebook page to promote the anti-littering campaign, and a Pre and Post-Campaign Public Opinion Survey. The Litter campaign begun in 2009 and will continue to promote anti-littering in communities through a concentrated advertising schedule. The campaign has advertised on transportation, mailers, schools, children’s sporting events, and public outreach events including concerts and retail establishments to encourage the public not to litter. Pre and post-campaign survey are

conducted by the Program to assess its effectiveness (please see the Program's annual report for more information).

### **Percent Reduction from Enhancements**

The City of San Pablo will receive an 8 percent reduction credit for implementing specific enhanced control measures described in *Enhanced Level of Implementation* section above. The 8 percent reduction credit will be applied to the City of San Pablo's baseline trash load. This percent reduction credit is consistent with methods presented in the BASMAA (2011e). A summary of all load reductions anticipated through the implementation of this plan are included in Section 5.

## **QF-2: Enhanced Street Sweeping**

Street sweeping is conducted by most, if not all, Bay Area municipalities to remove trash and debris that collect in the gutters at the edge of streets. Parked cars and large storms that produce significant runoff can impact the effectiveness of street sweepers. However, increasing parking enforcement or more frequent street sweeping (as compared to the frequency of storm events) may increase the trash load reduced to MS4s. Permittees who choose to enhance street sweeping may do so to demonstrate trash load reductions to their MS4s and progress towards trash load reduction goals required by the MRP.

### **Baseline Level of Implementation**

The baseline trash load described in Section 2.0 incorporates the trash load reductions due to baseline street sweeping. The City of San Pablo's baseline street sweeping program includes sweeping at a frequency of 4 times per month on average in retail areas and 2 times per month on average in all other areas.

Parking enforcement signs for street sweeping are posted in most residential areas, on some arterial roads and in the downtown area in the City. Parking enforcement equivalent occurs on arterial roads.

### **Enhanced Level of Implementation**

Enhancements to street sweeping frequencies and parking enforcement (or equivalent measures) control measures will be used to calculate loads reduced from enhanced street sweeping, consistent with the trash load reduction tracking method (BASMAA 2011e). Existing enhanced street sweeping includes street sweeping conducted at a frequency greater than two times per month for streets not within retail land use areas. These include arterial roads and some residential areas that are swept on the same route as the retail land use. Approximately 25 percent of the retail route includes non-retail land use areas.

### **Percent Reduction from Enhancements**

The total estimated annual volume of trash that will be reduced by July 1, 2014 as a result of enhanced street sweeping is 303 gallons. As described in Trash Load Reduction Summary Table included in Section 5, this volume is equal to approximately a 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 Pablo.

## 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 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 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. 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.

#### *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 2011e). The baseline trash load removed via these devices is accounted for in baseline trash loads.

### Enhanced Level of Implementation

A total of 20 partial-capture treatment devices will be installed in the City of San Pablo prior to July 1, 2014. The partial-capture devices are curb inlet screens and 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 2011e).

### 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 is 236 gallons. This volume is equal to approximately a 4 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 Pablo. Both values provided within this section are included in Trash Load Reduction Summary Table included in Section 5.

## 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 2011e). Trash loads reduced via publically or privately owned and operated devices within a Permittee's jurisdictional area that have been 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 no trash full-capture devices have been installed.

### Enhanced Level of Implementation

A total of 50 trash full-capture treatment devices will be installed in the City of San Pablo prior to July 1, 2014. The full-capture devices are connector pipe screens and are enhanced trash control measures. The City is unsure where it will install these devices but the estimated treatment/drainage area is 209.5 acres with 10% retail, 5% schools, 10% commercial, 50% high density residential, and 25% in low density residential land use areas. These calculations are consistent with the approach described in the *Trash Load Reduction Tracking Method Report* (BASMAA 2011e).

### 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 701 gallons. This volume is equal to approximately a 11.6 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 Pablo. Both values provided within this section are included in Trash Load Reduction Summary Table included in Section 5.

## **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 citizen's 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 Pablo's baseline trash load described in Section 2.0. However, the City's maintenance crews have been cleaning the creeks annually before the rainy season and removing trash, homeless camps, and any obstructions in the watercourse. 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 Pablo will conduct MRP-required<sup>3</sup> hot spot cleanups. The cleanups will be conducted each year and the volume of trash removed will be tracked to demonstrate trash loads reduced.

### **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 347 gallons. This volume is equal to approximately a 5.8 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 Pablo. Both values provided within this section are included in Trash Load Reduction Summary Table included in Section 5.

---

<sup>3</sup> Creek/channel/shoreline cleanups conducted in accordance with Permit Provision C.10.b.

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

The City of San Pablo 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 3.0 are also listed in Table 5.1. The enhancements are intended to comply with the 40% trash load reduction goal in MRP provision C.10.

**Table 5.1.** Planned enhanced trash control measure implementation within the jurisdictional boundaries of the City of San Pablo and associated trash loads reduced.

Trash Control Measure	Summary Description of Control Measure	% Reduction (Credits)	Trash Load Reduced	Cumulative % Reduction (Compared to Baseline)
Single-use Carryout Plastic Bag Ordinance (CR-1)	Ban plastic and charge for paper bags	12	685	11.4
Public Education and Outreach Programs (CR-3)	Countywide Litter Campaign and City outreach, events, and publicity	8	457	7.6
Enhanced Street Sweeping (QF-2) – (Existing and Future Enhanced)	Sweeping some non-retail land uses more frequently	NA	303	5
Curb Inlet Screens (Partial-capture Treatment Device) (QF-3a)	Install 20 curb inlet screens	NA	236	4
Full-capture Treatment Devices (QF-5)	Install 50 connector pipe screens	NA	701	11.6
Creek/Channel/Shoreline Cleanups (Volunteer and/or Municipal) (QF-6)	Conduct annual hot spot cleanups	NA	347	5.8

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

Consistent with MRP Provision C.10.d (i), the City of San Pablo intends to report on progress towards MRP trash load reduction goals on an annual basis beginning with the Fiscal Year 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 provision, 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 Pablo 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 2011e).

## 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 Pablo 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 Pablo's MS4 by 40%.

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 of quantification formulas), the City of San Pablo 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 Pablo's annual reporting process.

Table 6.1. Preliminary implementation schedule for enhanced trash control measures in the City of San Pablo.

Trash Control Measure	Beginning Date of Implementation
Single-use Carryout Plastic Bag Ordinance (CR-1)	July 1, 2013
Public Education and Outreach Programs (CR-3)	Ongoing
Enhanced Street Sweeping (QF-2)	Ongoing
Curb Inlet Screens (Partial-capture Treatment Device) (QF-3a)	October 1, 2012
Full-capture Treatment Devices (QF-5)	October 1, 2012
Creek/Channel/Shoreline Cleanups (Volunteer and/or Municipal) (QF-6)	June 9, 2010

## 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). 2011e. Trash Load Reduction Tracking Method: Technical Report. Prepared by EOA, Inc. XXXX 2011
- BASMAA (Bay Area Stormwater Management Agencies Association). 2012. Trash Baseline Generation Rates: Technical Report. Prepared by EOA, Inc. XXXX 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.