

# Long-Term Trash Load Reduction Plan and Assessment Strategy

## DRAFT

**Submitted by:**  
**City of Sunnyvale**  
**Environmental Services Department**  
**P.O. Box 3707**  
**Sunnyvale, CA 94088-3707**

*In compliance with Provisions C.10.c of Order R2-2009-0074*



**February 1, 2014**

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**CITY OF SUNNYVALE  
LONG-TERM TRASH LOAD REDUCTION PLAN AND  
ASSESSMENT STRATEGY**

**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:**

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John E. Stufflebean  
Director of Environmental Services

Date

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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
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

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## PREFACE

This Long-Term Trash Load Reduction Plan and Assessment Strategy (Long-Term Plan) is submitted in compliance with provision C.10.c of the Municipal Regional Stormwater NPDES Permit (MRP) for Phase I communities in the San Francisco Bay (Order R2-2009-0074). The Long-Term Plan was developed using a regionally consistent outline and guidance developed by the Bay Area Stormwater Management Agencies Association (BASMAA) and reviewed by San Francisco Bay Regional Water Quality Control Board staff. The Long-Term Plan is consistent with the Long-Term Trash Load Reduction Framework developed in collaboration with Water Board staff. Its content is based on the City of Sunnyvale's current understanding of trash problems within its jurisdiction and the effectiveness of control measures designed to reduce trash impacts associated with Municipal Separate Storm Sewer (MS4) discharges. This Long-Term Plan is intended to be iterative and will be modified in the future based on information gained through the implementation of trash control measures. The City of Sunnyvale therefore reserves the right to revise or amend this Long-Term Plan at its discretion. If significant revisions or amendments are made by the City, the updates and changes will be submitted to the Water Board through the City's annual reporting process.

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## 1.0 INTRODUCTION

### 1.1 Purpose of Long-Term Trash Reduction Plan

The Municipal Regional Stormwater National Pollutant Discharge Elimination System (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.c of the MRP requires Permittees to submit a *Long-Term Trash Load Reduction Plan* (Long-Term Plan) by February 1, 2014. Long-Term Plans must describe control measures that are currently being implemented, including the level of implementation, and additional control measures that will be implemented and/or increased level of implementation designed to attain a 70% trash load reduction by July 1, 2017, and 100% (i.e., “No Visual Impact”) by July 1, 2022.

This Long-Term Plan is submitted by the City of Sunnyvale in compliance with MRP provision C.10.c. Consistent with provision C.10 requirements, the goal of the Long-Term Plan is to solve trash problems in receiving waters by reducing the impacts associated with trash in discharges from the Sunnyvale’s municipal separate storm sewer system (MS4) that are regulated by NPDES Permit requirements. The Long-Term Plan includes:

1. Descriptions of the current level of implementation of trash control measures, and the type and extent to which new or enhanced control measures will be implemented to achieve a target of 100% (i.e. full) trash reduction from MS4s by July 1, 2022, with an interim milestone of 70% reduction by July 1, 2017;
2. A description of the *Trash Assessment Strategy* that will be used to assess progress towards trash reduction targets achieved as a result of control measure implementation; and,
3. Time schedules for implementing control measures and the assessment strategy.

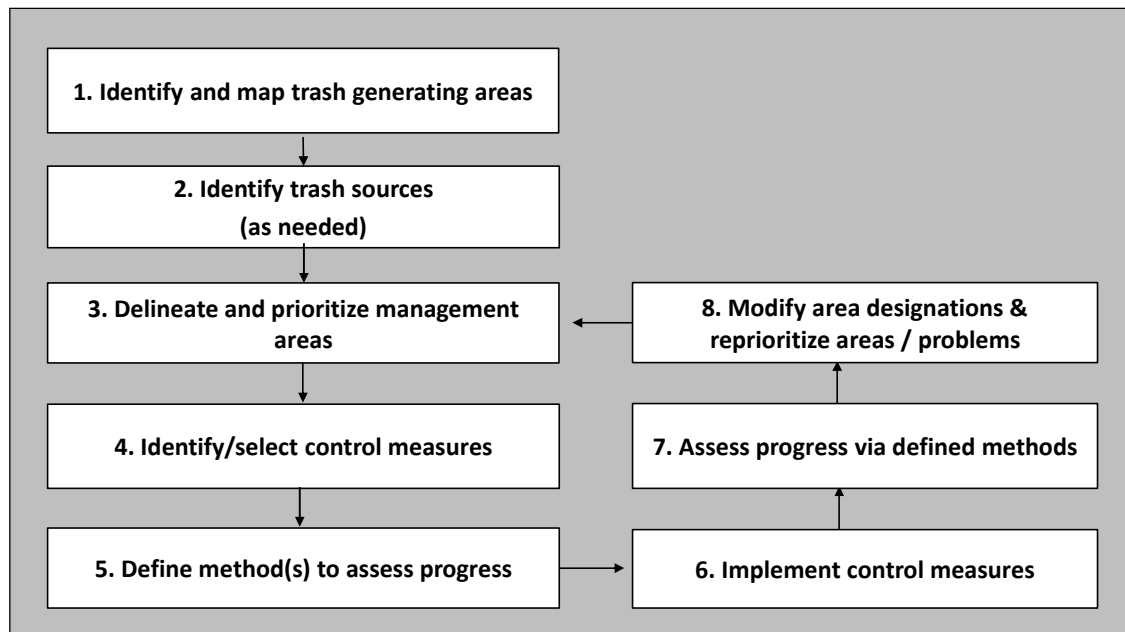
The Long-Term Plan was developed using a regionally consistent outline and guidance developed by the Bay Area Stormwater Management Agencies Association (BASMAA) and reviewed by the San Francisco Bay Regional Water Quality Control Board (Water Board) staff. The Long-Term Plan is consistent with the Long-Term Trash Load Reduction Framework (see section 1.2.1) developed in collaboration with Water Board staff. Its content is based on the Sunnyvale’s current understanding of trash problems within its jurisdiction and the effectiveness of control measures designed to reduce trash impacts associated with Municipal Separate Storm Sewer (MS4) discharges. The Long-Term Plan builds upon trash control measures implemented by the City prior to the adoption of the MRP and during the implementation of the Short-Term Trash Load Reduction Plan submitted to the Water Board on February 1, 2012.

The Long-Term Plan was reviewed and approved for submittal by Sunnyvale’s Sustainability Commission on January 21, 2014 and the City Council on January 28, 2014. Sunnyvale’s Staff Report is attached as Appendix A.

## 1.2 Background

### 1.2.1 Long-Term Trash Load Reduction Plan Framework

A workgroup of MRP Permittees, Bay Area countywide stormwater program staff and Water Board staff met between October 2012 and March 2013 to better define the process for developing and implementing Long-Term Plans, methods for assessing progress toward reduction goals, and tracking and reporting requirements associated with provision C.10. Through these discussions, an eight-step framework for developing and implementing Long-Term Plans was created by the workgroup (Figure 1).



**Figure 1.** Eight-step framework for developing, implementing and refining Long-Term Trash Reduction Plans.

The workgroup agreed that as the first step in the framework, Permittees would identify very high, high, moderate, and low trash generating areas in their jurisdictional areas. Trash generation rates developed through the *BASMAA Baseline Trash Generation Rates Project* (as discussed below) were used as a starting point for differentiating and delineating land areas with varying levels of trash generation. Permittees would then use local knowledge and field and/or desktop assessments to confirm or refine the level of trash generation for specific areas within their jurisdiction. Each Permittee would then develop a map depicting trash generation categories within their jurisdiction.

As a next step, Permittees would then delineate and prioritize Trash Management Areas (TMAs) where specific control measures exist or are planned for implementation. TMAs delineated by Permittees are intended to serve as reporting units in the future. Reporting at the management area level provides the level of detail necessary to demonstrate implementation and progress towards trash reduction targets.

Once control measures are selected and implemented, Permittees will evaluate progress toward trash reduction targets using outcome-based assessment methods. As the results of the progress assessments



are available, Permittees may choose to reprioritize trash management areas and associated control measures designed to improve trash reduction within their jurisdictions.

### 1.2.2 BASMAA Generation Rates Project

Through approval of a BASMAA regional project in 2010, Permittees agreed to work collaboratively to develop a regionally consistent method to establish trash generation rates within their jurisdictions. The project, also known as the *BASMAA Trash Generation Rates Project* (Generation Rates Project) assisted Permittees in establishing the rates of trash generation and identifying very high, high, moderate and low trash generating areas.

The term “trash generation” refers to the rate at which trash is produced or generated onto the surface of the watershed and is potentially available for transport via MS4s to receiving waters. Generation rates do not explicitly take into account existing control measures that intercept trash prior to transport. Generation rates are expressed as trash volume/acre/year and were established via the Generation Rates Project.

In contrast to trash generation, the term “trash loading” refers to the rate at which trash from MS4s enters receiving waters. Trash loading rates are also expressed as trash volume/acre/year and are equal to or less than trash generation rates because they account for the effects of control measures that intercept trash generated in an area before it is discharged to a receiving water. Trash loading rates are specific to particular areas because they are dependent upon the effectiveness of control measures implemented within an area. Figure 2 illustrates the difference between trash generation and loading.



**Figure 2.** Conceptual model of trash generation, interception and load.

Trash generation rates were estimated based on factors that significantly affect trash generation (i.e., land use and income). The method used to establish trash generation rates 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).

Trash generation 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. Trash generation rates estimated from this study are listed for each land use type in Table 1. Methods used to develop trash generation rates are more fully described in BASMAA (2011b, 2011c, and 2012).

**Table 1.** San Francisco Bay Area trash generation rates by land use (gallons/acre/year).

Land Use	Low <sup>b</sup>	Best <sup>b</sup>	High <sup>b</sup>
Commercial & Services	0.7	<b>6.2</b>	17.3
Industrial	2.8	<b>8.4</b>	17.8
Residential <sup>a</sup>	0.3 - 30.2	<b>0.5 - 87.1</b>	1.0 - 257.0
Retail <sup>a</sup>	0.7 - 109.7	<b>1.8 - 150.0</b>	4.6 - 389.1
K-12 Schools	3	<b>6.2</b>	11.5
Urban Parks	0.5	<b>5.0</b>	11.4

a For residential and retail land uses, trash generation rates are provided as a range that takes into account the correlation between rates and household median income.

b For residential and retail land uses: Low = 5% confidence interval; Best = best fit regression line between generation rates and household median income; and, High = 95% confidence interval. For all other land use categories: High = 90<sup>th</sup> percentile; Best = mean generation rate; and, Low = 10<sup>th</sup> percentile.

### 1.2.3 Short-Term Trash Load Reduction Plan

In February 2012, the City of Sunnyvale developed a Short-Term Plan that described the current level of control measures implementation and identified the type and extent to which new or enhanced control measures would be implemented to attain a 40% trash load reduction from its MS4 by July 1, 2014. Since that time, the City of Sunnyvale began to implement its Short-Term Plan. Control measures implemented to date via the Short-Term Plan are briefly described below:

Trash Control Measure	Status
Single Use Carryout Plastic Bag Ordinance	This ordinance (SMC 5.38 – Plastic Carryout Bags) was adopted by the City Council on December 6, 2011 and implemented in two phases. Phase I, which applied to a subset of retailers (based on size, gross annual sales, and type of products sold), became effective on June 20, 2012. Phase II, which expanded the requirements to all retailers became effective on March 20, 2013. The ordinance prohibits retailers from distributing single use plastic bags at point of sale and requires retailers that provide recyclable paper bags at point of purchase for a minimum charge of \$ 0.10 per bag. On August 27, 2013, the City Council approved amendments to the ordinance based on implementation experience to make the ordinance more effective. Two key changes included (1) keeping the paper bag minimum charge at \$0.10 per bag instead of increasing it to \$0.25 per bag as of January 1, 2014; and (2) adding a \$0.10 per bag minimum charge for reusable bags. The City also changed the reporting and record-keeping requirements specified in the ordinance. Compliance with the ordinance has been generally smooth. City staff audited 75 Phase I and Phase II stores for compliance in 2013. Only one letter of non-compliance was issued after verbal warnings and behavior was promptly corrected.

Expanded Polystyrene (EPS) Foam Food Service Ware Ordinance	The ordinance was adopted by the City Council on November 19, 2013 and will be implemented in two phases. Phase I bans the use of EPS foam food containers by retail food establishments will become effective April 22, 2014, coinciding with Earth Day. Phase II, which bans the commercial sale of EPS food containers, will become effective on April 22, 2015.
Public Education, including a focus on school-age children.	The City continues to implement its school education program, which includes a litter prevention element in each of the presentations. Additionally, the City continues to contribute to countywide and regional collaborative education campaigns focused on litter prevention and targeting a youth audience.
Uncovered Load Ordinance	This ordinance (SMC 8.16 – Solid Waste Management and Recycling)], which became effective December 1, 2011, specifies that any operator of an open bed truck hauling waste and recyclables for disposal at the SMaRT Station will be subject to a fee for a tarp to be used for covering debris and solid waste material. The average compliance rate for FY 2012-2013 was 99.4% based on 26,955 transactions at the SMaRT station and for which City sold 165 tarps.
Improved Container Management	City staff continues to enforce the requirements of Sunnyvale Municipal Code 8.15.040 and 8.15.050 to ensure that businesses and households have sufficient trash collection frequencies and that that trash bins/containers are of an adequate size to hold the quantity of trash generated to prevent unintended releases of trash.
On-land Cleanups	The City has and will continue to organize and sponsor land-based trash cleanups such as the Great American Litter Pick Up (started pre-MRP) and “Knock Out Litter” (started in 2011) events. The Great American Litter Pick Up event is conducted every spring and the “Knock Out Litter” event is conducted every fall in collaboration with the Department of Public Safety. Event cleanup locations and quantities of litter collected will be tracked and reported annually.

Full Trash Capture	The City has completed installations to fulfill the Stormwater Permit's minimum full trash capture requirement of 164 acres and has taken significant actions to implement additional full trash capture in the urban service area to contribute to achievement of the 40% reduction target. A total of 174 full trash capture devices, treating an estimated area of 1,368 acres, have been installed or are planned or under construction. These include small devices installed in individual storm drain inlets at the curb and larger devices installed in larger storm drain lines to capture larger areas. These devices have been installed by the City or by private development.
In channel/shoreline Cleanups	The City sponsors two single-day creek/channel or shoreline cleanup events during National River Cleanup Day and Coastal Cleanup Day annually. In addition, City staff will continue to cleanup the five trash Hot Spots annually. The volume of debris collected at these events will continue to be tracked and reported annually.

Control measures described in this Long-Term Plan build upon actions taken to-date via Sunnyvale's Short-Term Plan. A full description of control measures implemented via short and long-term plans is included in section 3.2. Outcomes associated with Short-Term Plan implementation will be reported in the City of Sunnyvale's Fiscal Year 2013-14 Annual Report, scheduled for submittal to the Water Board by September 15, 2014.

### 1.3 Organization of Long-Term Plan

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

- 1.0 Introduction;
- 2.0 Scope of the Trash Problem;
- 3.0 Trash Management Areas and Control Measures;
- 4.0 Progress Assessment Strategies; and
- 5.0 References

Section 2.0 is intended to provide a description of the extent and magnitude of the trash problem in the City of Sunnyvale. Control measures that will be implemented by the City of Sunnyvale as a result of this Long-Term Plan are described in section 3.0. Section 4.0 describes the methods that will be used to assess progress toward trash reduction targets.

## 2.0 SCOPE OF THE TRASH PROBLEM

### 2.1 Permittee Characteristics

Sunnyvale's history has always been based on its economy. Initially the area's open spaces and fertile soils were ideal for fruit orchards that supported the first residents. With the arrival of the railroads in 1864, the economic base of the community began to expand as canneries were built near the rail lines to process the fruit from surrounding orchards. In 1906, Hendy Iron Works was relocated from San Francisco to Sunnyvale, continuing the area's industrial development. The City was incorporated in 1912.

By 1940, the City's population had grown to about 4,400 and Hendy Iron Works was taken over by Westinghouse to support the war effort. After World War II, the defense related industries capitalized on the presence of the Moffett Naval Air Station, with Lockheed Missiles and Space Company moving to Sunnyvale in 1956, and soon becoming the City's largest employer. The 1950s and 1960s became the period of largest growth for the community, resulting in a population of 96,000 by 1970.

Today, Sunnyvale is the second largest city in Santa Clara County and the fifth largest in the San Francisco Bay area with a current residential population of 145,973. The City encompasses approximately 24 square miles and is almost entirely surrounded by the cities of Santa Clara, Cupertino, Los Altos and Mountain View, generally between Calabazas Creek on the east and Steven's Creek on the west. Sunnyvale is at the crossroads of four of the South Bay's major freeways and expressways, US Highways 237 and 101 and Lawrence and Central Expressways.

The City has a workforce of approximately 118,500 and a daytime population of 230,000. According to the 2010 Census, the City has a population density of 6,173.9 people per square mile, and average household size of 2.68. Of the residents who call the City of Sunnyvale home, 22.4% are under the age of 18, 6.7% are between 18 and 24, 36.3% are between 25 and 44, 23.4% are between 45 and 64, and 11.2% are 65 and older. The median household income was \$95,582 in 2011.

Approximately 56.1% of residents have a Bachelor Degree or higher. The largest employers in Sunnyvale are Lockheed Martin Space Systems; Northrup Grumman Marine; Yahoo, Inc. (Headquarters); Network Appliance, Inc (Headquarters); and Juniper Networks (Headquarters); Apple, HP, Synopsys, Inc.; Broadcom; and Advanced Mirco Devices.

There are 52 shopping centers/complexes and about 315 restaurants in Sunnyvale. The City maintains 20 public parks, two golf courses, and 51 tennis courts. There are 26 public and private schools (elementary, middle, and high schools) and approximately 132 multi-purpose sports fields.

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<sup>1</sup> Business and Economic Fact Sheet for Sunnyvale CA, April 2013. Available at <http://sunnyvale.ca.gov/Portals/0/Sunnyvale/OCM/ED-GeneralFiles/Business%20Economic%20Fact%20Sheet%206-12-13%20update.pdf>.

Land uses within Sunnyvale depicted in ABAG (2005) are provided in

Table 2. Sunnyvale is primarily comprised of seven land uses. These include commercial and services, industrial, residential, retail, K-12 schools, urban parks, and other.

**Table 2.** Percentages of the Sunnyvale's jurisdictional area<sup>2</sup> within land use classes identified by ABAG (2005)

Land Use Category	Jurisdictional Area (Acres)	% of Jurisdictional Area
Commercial and Services	1133	9
Industrial	2117	18
Residential	6700	56
Retail	541	4
K-12 Schools	433	4
Urban Parks	366	3
Other	782	6

## 2.2 Trash Sources and Pathways

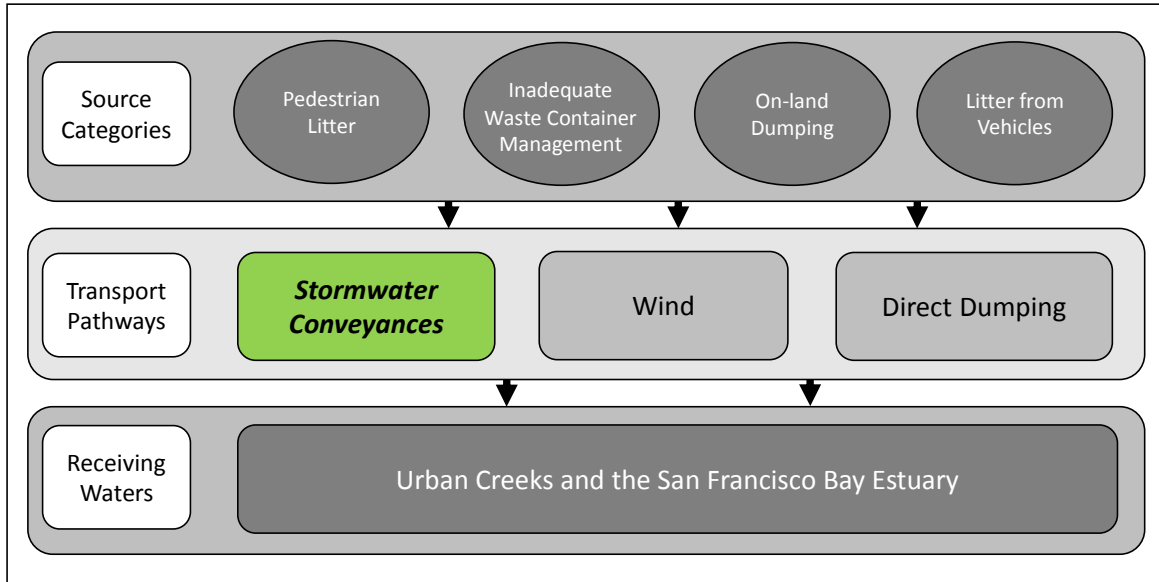
Trash in San Francisco Bay Area creeks and shorelines originates from a variety of sources and is transported to receiving waters by a number of pathways (Figure 3). Of the four source categories, pedestrian litter includes trash sources from high traffic areas near businesses and schools, transitional areas where food/drinks are not permitted (e.g. bus stops), and from public or private special events with high volumes of people. Trash from vehicles occurs due to littering from automobiles and uncovered loads. Inadequate waste container management includes sources such as overflowing or uncovered containers and dumpsters as well as the dispersion of household and business-related trash and recycling materials before, during, and after collection. On-land illegal dumping of trash is the final source category.

Trash is transported to receiving waters through three main pathways: 1) Stormwater Conveyances; 2) Wind; and, 3) Direct Dumping. Stormwater or urban runoff conveyance systems (e.g., MS4s) consist of curbs/gutters, and pipes and channels that discharge to urban creeks and the San Francisco Bay shorelines. Wind can also blow trash directly into creeks or the Bay. Lastly, trash in receiving waters can also originate from direct dumping into urban creeks and shorelines.

This Long-term Plan and associated trash control measures described in Section 3.0 are focused on reducing trash from one of the transport pathways illustrated in Figure 3— **stormwater conveyances**. Specifically, the Long-term Plan is focused on reducing the impacts of discharges from MS4s to San Francisco Bay Area receiving waters and the protection of associated beneficial uses.

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<sup>2</sup> A Permittee's jurisdictional area is defined as the urban land area within a Permittee's boundary that is not subject to stormwater NPDES Permit requirements for traditional and non-traditional small MS4s (i.e. Phase II MS4s) or the California Department of Transportation, or owned and maintained by the State of California, the U.S. federal government or other municipal agency or special district (e.g., flood control district).

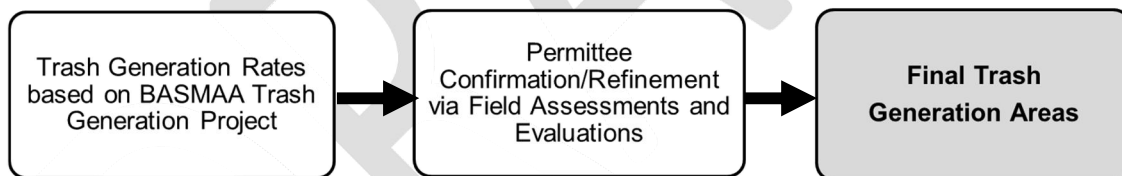


**Figure 3.** Trash sources categories and transport pathways to urban creeks.

## 2.3 Trash Generating Areas

### 2.3.1 Generation Categories and Designation of Areas

The process and methods used to identify the level of trash generation within the City of Sunnyvale are described in this section and illustrated in Figure 4.



**Figure 4.** Trash sources categories and transport pathways to urban creeks.

As a first step, trash generation rates developed through the *BASMAA Trash Generation Rates Project* were applied to parcels within the City of Sunnyvale based on current land uses and 2010 household median incomes. A Draft Trash Generation Map was created as a result of this application. The draft map served as a starting point for the City of Sunnyvale to identify trash generating levels. Levels of trash generation are depicted on the map using four trash generation rate (gallons/acre/year) categories that are symbolized by four different colors illustrated in Table 3.

**Table 3.** Trash generation categories and associated generation rates (gallons/acre/year).

Category	Very High	High	Moderate	Low
Generation Rate (gallons/acre/year)	> 50	10-50	5-10	< 5

The City of Sunnyvale then reviewed and refined the Draft Trash Generation Map to ensure that trash generation categories were correctly assigned to parcels or groups of parcels. City staff refined maps using the following process:

1. Based upon knowledge of trash generation patterns and problem areas within the City, staff identified areas on the Draft Trash Generation Map that potentially had incorrect trash generation category designations.
2. Trash generation category designations initially assigned to areas identified in step #1 were then assessed and confirmed or refined by the City using the methods listed below.

**a. On-Land Visual Assessments**

To assist Permittees with developing their trash generation maps, BASMAA developed a *Draft On-land Visual Trash Assessment Protocol (Draft Protocol)*. The Draft Protocol entails walking a street segment and visually observing the level of trash present on the roadway, curb and gutter, sidewalk, and other areas adjacent to the street that could potentially contribute trash to the MS4. Based on the level of trash observed, each segment (i.e., assessment area) was placed into one of four on-land assessment condition categories that are summarized in Table 4.

City staff reviewed the preliminary Trash Generation Map provided by the Program and divided the map into manageable sections for field verification and ground-truthing activities. Environmental Compliance Inspection staff was deployed to these areas in June and July 2013 to conduct these field reviews, and additional field reviews were conducted in October 2013. The field reviews focused mainly on areas of the map indicating high (red) and medium (yellow) trash generation rates and areas designated as low (green) that were suspected to have more trash, based on individual knowledge and field experience. Staff developed and utilized a checklist, based on the Draft Protocol described above, to evaluate designated areas. Staff walked the areas in teams of two to verify the visible trash impact in the area and, after independently documenting findings, field teams analyzed the findings and either confirmed that areas are properly designated or reclassified areas on the map accordingly. This was conducted in 69 designated areas with 115 separate evaluations.

**Table 4.** Definitions of on-land trash assessment condition categories.

On-land Assessment Condition Category	Summary Definition
A (Low)	Effectively no trash is observed in the assessment area.
B (Moderate)	Predominantly free of trash except for a few pieces that are easily observed.
C (High)	Trash is widely/evenly distributed and/or small accumulations are visible on the street, sidewalks, or inlets.



D (Very High)	Trash is continuously seen throughout the assessment area, with large piles and a strong impression of lack of concern for litter in the area.
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**b. Querying Municipal Staff**

Input and working field knowledge was gathered from the City's wastewater collection system staff and citywide enforcement staff. Additionally, the Draft Trash Generation Map and on-land visual assessment findings were reviewed and validated with the City's solid waste program staff and the City's parks and boulevards maintenance program managers and team leads. These input sessions provided additional insight into the littering patterns and potential sources around the City.

**c. Viewing Areas via Goggle Maps – Street View**

City staff utilized both Google Maps and Google Earth Street View to view specific areas for a better understanding of the actual land uses, area demographics, and to make observations and document community conditions. This information was considered during the delineation of the trash management areas and in determining the trash control measure approach.

- Based on assessments conducted to confirm/refine trash generation category designations, the City created a Final Trash Generation Map which depicts the most current understanding of trash generation within the City of Sunnyvale. The City documented this process by tracking the information collected through the assessments and subsequent refinements to the Draft Trash Generation Map. The City of Sunnyvale's Final Trash Generation Map is included as Figure 5. As the City moves forward with implementation of the Long-Term Trash Plan and conducts field assessments and monitoring, the City may update the Trash Generation Map to reflect any new findings.

### 2.3.2 Summary of Trash Generating Areas and Sources

Summary statistics for land use and trash generation categories generated through the mapping and assessment process are presented in Table 5.

**Table 5.** Percentage of jurisdictional area within the City of Sunnyvale assigned to each trash generation category.

Trash Generation Category	Commercial and Services	Industrial	Residential	Retail	K-12 Schools	Urban Parks	Other	Total
Very High	0.01 %	0.01 %	-	0.07 %	-	-	-	0.09%
High	0.83 %	0.36 %	2.06 %	4.21 %	-	0.04 %	-	7.50%
Medium	8.43 %	16.83 %	1.78 %	0.19 %	3.27 %	3.00 %	-	33.50%
Low	0.11 %	0.34 %	51.66 %	0.01 %	0.31 %	-	6.48 %*	58.91%

\*There are 782 acres within the City of Sunnyvale jurisdictional area that is classified as "Other" which includes Agricultural, Urban Open, Wastewater Facilities, Water, Water Supply Facilities and Wetland.

During the field verification process, staff identified and documented common trash types and potential sources in the survey areas. Common trash types observed included beverage containers, grocery bags, polystyrene foam, paper, metal, other miscellaneous trash, food wrappers, food waste, and construction debris. Observed trash sources included moving vehicles; parked cars; uncovered loads; restaurants; convenience stores; liquor stores; bus stops; overflowing or uncovered receptacles or dumpsters; dispersal of household trash and recyclables before, during and after collection; illegal dumping on land; homeless encampments; lodging establishments; construction sites; commercial businesses; and gas stations. These findings allow the City to strategically target actions to specific sources such as restaurants, bus stops, retail areas, or office parks. A summary of this information including distinguishing characteristics and potential sources of trash for each of the preliminary trash management areas is included in Section 3.0 Trash Management Area and Control Measures section of this Plan.



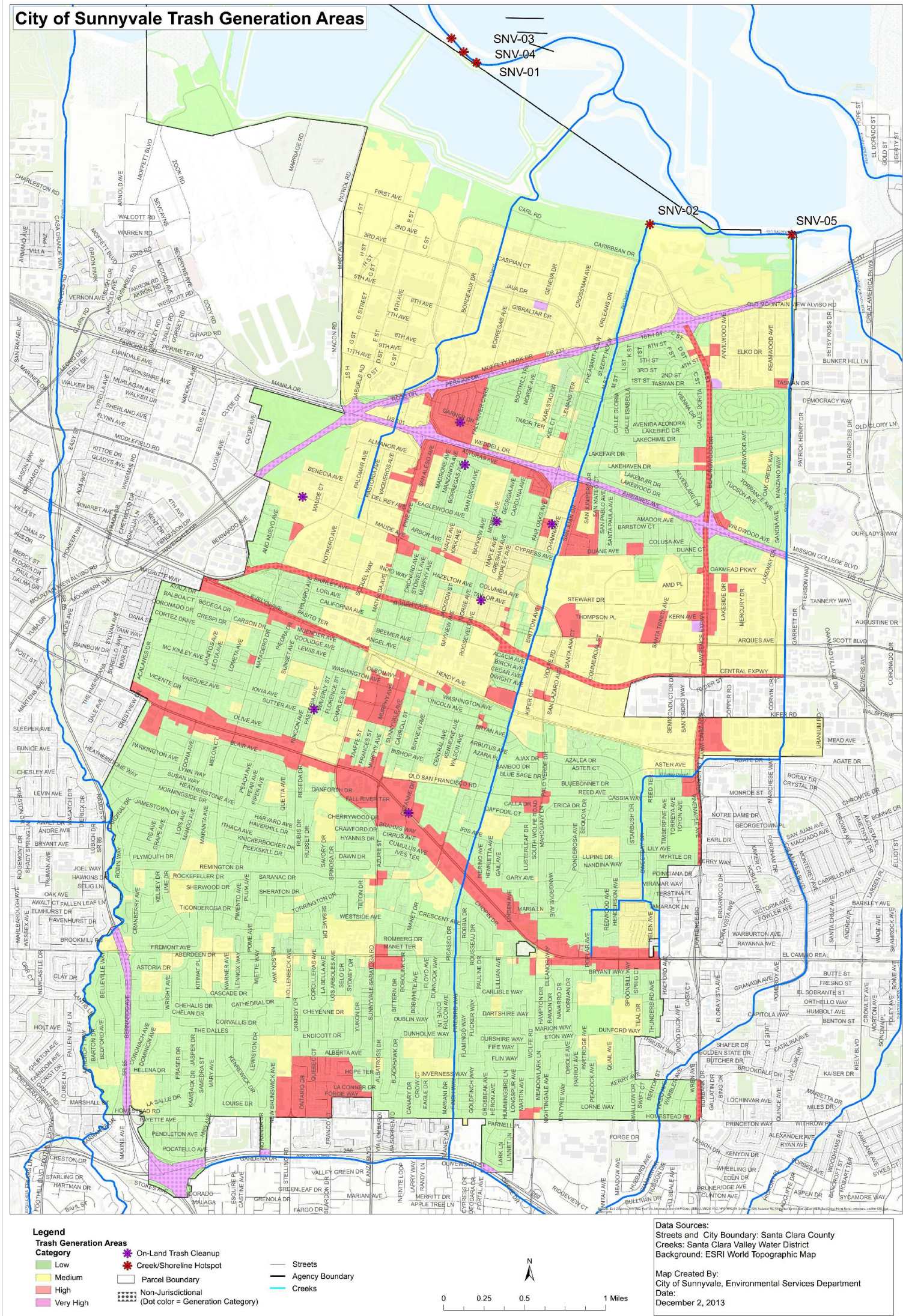


Figure 5. Final Trash Generation Map for the City of Sunnyvale



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### 3.0 TRASH MANAGEMENT AREAS AND CONTROL MEASURES

This section describes the control measures that the City of Sunnyvale has implemented or plans to implement to significantly reduce trash problems and achieve a target of 100% (i.e. full) trash reduction from the MS4 by July 1, 2022. The selection of control measures described in this section is based on the City of Sunnyvale's current understanding of the trash problems within our jurisdiction and the effectiveness of control measures designed to reduce trash impacts associated with MS4 discharges. Information on the effectiveness of some trash control measures is currently lacking and therefore in the absence of this information, the City based the selection of control measures on existing effectiveness information, experience in implementing trash controls and knowledge of trash problems, planned pilots to gather additional information, and estimated costs and resources needed for implementation. As knowledge is gained through the implementation of these control measures via planned pilot programs, the City may choose to refine the trash control strategy described in this section. If significant revisions or amendments are made, information on the revisions or amendments will be submitted to the Water Board through Sunnyvale's annual reporting process.

#### 3.1 Management Area Delineation and Prioritization

Consistent with the Long-Term Plan framework, the City of Sunnyvale delineated and prioritized trash management areas (TMAs) based on the geographical distribution of trash generating areas, types of trash sources, and current or planned control measure locations. TMAs are intended to form the management units by which trash control measure implementation can be tracked and assessed for progress towards trash reduction targets. Once delineated, TMAs were also prioritized for control measure implementation. City staff analyzed and considered the following factors when designating TMAs:

- geographic boundaries;
- storm sewer system infrastructure layout;
- existing drainage catchments;
- actions already taken; and
- grouping of similar land use categories to allow for common tactics to be applied over a broad area.

Initially, TMA delineation was focused on isolating relatively large red and yellow pockets. As this effort progressed, smaller TMAs and groupings of common, distributed land uses were clustered together into several TMAs (island retail, island industrial/commercial, schools and churches, etc). Subareas were created if roadway or neighborhood boundaries bisected a TMA or if there were multiple similar land use clusters that were not geographically contiguous. Finally, all green areas throughout the City were grouped together to form TMA 14. Staff then reviewed each TMA individually to identify and document distinguishing characteristics, actual land uses, known sources of trash in the area, and any other relevant information that was readily known or would be needed to determine appropriate trash control measure implementation. This information was reviewed and validated with multiple City work groups with field experience and working knowledge of these areas.

A map depicting the City's TMAs is included as Figure 6. All jurisdictional areas within the City are included within a TMA. The amount of jurisdictional land area and associated trash condition categories for each TMA are included in Table 6.

Sunnyvale has prioritized initial trash control measure implementation based on the following considerations:

- Measures that are cost effective over the long term
- Measures that result in multiple benefits and support broader community goal and objectives
- Measures that contribute to the City's vision and values

#### Pilot Actions and Effectiveness Assessments

The City's Long-Term Plan specifies an approach that is intended to meet the Permit's 2017 and 2022 trash load reduction goals. The City plans to proceed with a strategic application of full trash capture installations and other trash control measures in appropriate TMAs. It is generally recognized that installation and proper ongoing maintenance of full trash capture is sufficient treatment of an area for trash. Full trash capture control measures are costly, both in initial capital costs and long-term operations and maintenance, and do not contribute to improved community aesthetics. The City will be implementing pilot actions that will be monitored and assessed in order to validate what level of implementation would result in effectiveness that is comparable to full trash capture.

The pilots and associated monitoring will be conducted in coordination and as a part of the SCVURPPP's Pilot Assessment Strategy and BASMAA's Tracking California's Trash Grant Project which are discussed in Section 4 of this Plan. The pilot actions will include control measures such as enhanced education and business inspections, enhanced street sweeping with parking prohibitions or increased frequency, and installation of partial trash capture devices. These actions will be conducted as pilots alone or in combination, and implemented in a portion of TMA 1A (middle stretch of El Camino Real) where a large full trash capture device will be constructed in summer of 2014. Once constructed, the trash captured in the device will be monitored and the amount of trash captured will be quantified over time. Following the initial year of monitoring, the City will implement the pilot actions and continue to monitor and quantify the trash captured. This will give staff the opportunity to evaluate the effectiveness of the pilot actions implemented upstream of the device in 2014-2015 and 2015-2016. Based on the findings of these pilots, full implementation of an appropriate suite of effective actions will be applied to other TMAs, as appropriate, starting in 2016.

**Table 6.** Jurisdictional area and percentage of each Trash Management Area (TMA) comprised of trash generation categories

TMA	Jurisdictional Area (Acres)	Trash Generation Category			
		Very High	High	Moderate	Low
1A	999.89	0.30%	15.61%	56.09%	28.00%
1B	55.04	-	100%	-	-
2A	135.58	-	99.85%	0.15%	-
2B	117.25	-	99.17%	0.02%	0.81%
3A	1,338.16	-	-	98.04%	1.96%
3B	12.16	-	100%	-	-
3C	2.76	100%	-	-	-
4A	63.01	-	99.46%	0.54%	-
4B	99.88	-	99.30%	0.33%	0.36%
4C	37.61	-	100%	-	-
5	141.50	-	86.72%	13.28%	-
6	73.02	-	97.11%	1.77%	1.12%
7A	154.13	1.50%	-	98.50%	-
7B	45.28	-	2.24%	95.60%	2.16%
7C	309.56	-	0.55%	98.77%	0.67%
7D	72.26	-	-	100%	-
7E	14.61	-	-	100%	-
8	406.21	0.67%	0.77%	97.42%	1.15%
9A	194.91	-	0.017%	90.56%	9.42%
9B	98.69	-	-	-	100%
9C	30.03	-	-	-	100%
9D	49.62	-	-	0.04%	99.96%
9E	53.04	-	-	98.94%	1.06%
10	27.47	-	100%	-	-
11	479.52	-	0.05%	93.37%	6.58%
12	200.69	-	-	100%	-
13	294.22	-	1.22%	98.61%	0.17%
14	6,566.83				100%

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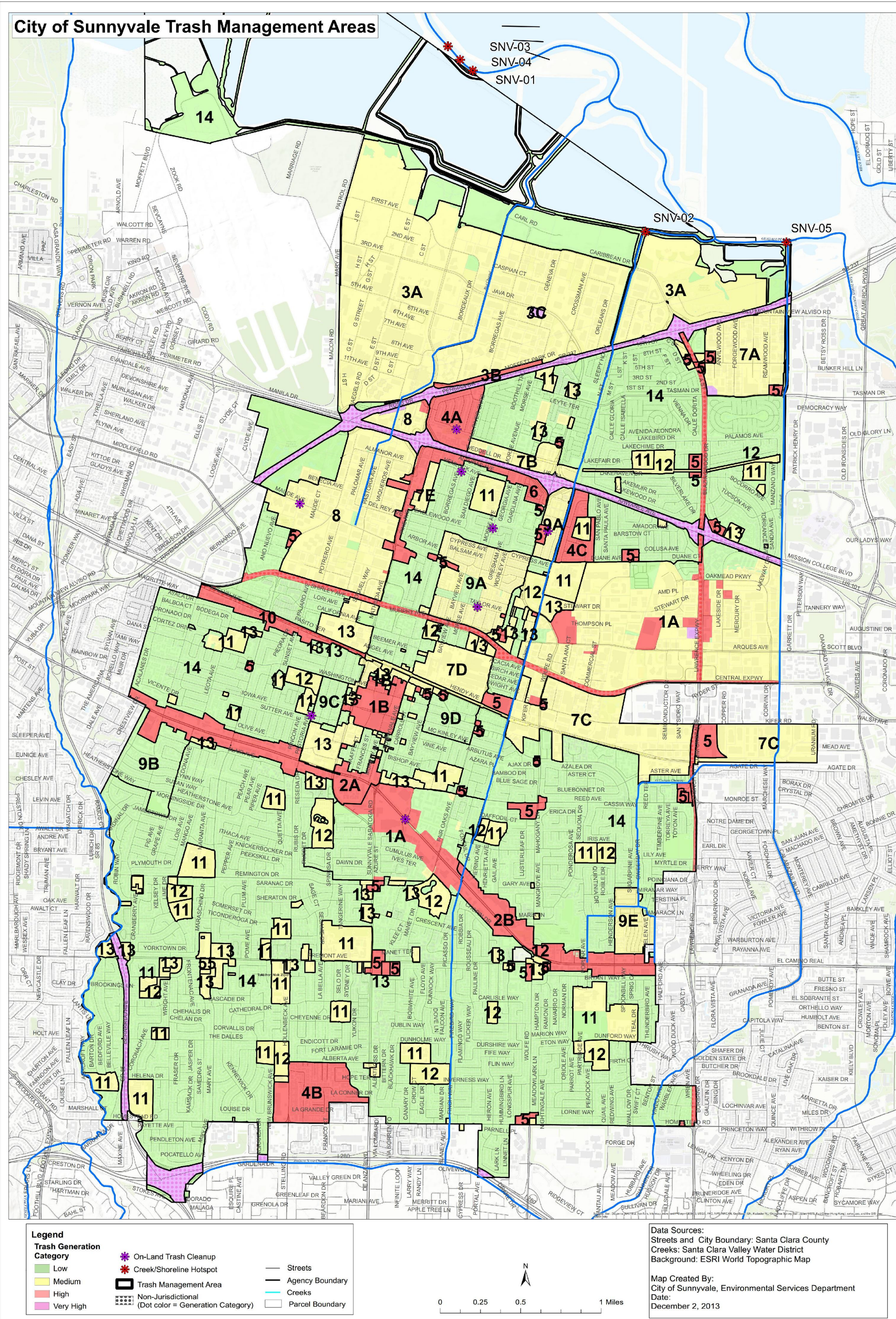


Figure 6. Trash Management Area Map for the City of Sunnyvale



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## 3.2 Current and Planned Trash Control Measures

The City's General Plan describes a vision and values for the community which strive to make Sunnyvale:

- A regional leader in environmental sustainability. The City takes environmental preservation and protection seriously and considers how each action will affect Sunnyvale for future generations.
- A safe, secure and healthy place for all people. The health and safety of residents is a primary concern. Sunnyvale is a clean and attractive city with many opportunities for physical activity in a natural environment.
- A city managed by a responsible and responsive government. The City delivers quality services in a comprehensive, cost-effective manner.

To that end, the City of Sunnyvale is committed to implementing programs and providing services that advance community cleanliness and environmental stewardship. The City's current and planned trash control measures are described in more detail in this section.

### 3.2.1 Jurisdictional-wide Control Measures and TMA #14

More than 58 percent of Sunnyvale's jurisdictional area is considered Low Trash Generating (Green). The City has a good balance of residential to non-residential land uses with residential accounting for more than 51 percent of all land uses. There are more than 56,400 total housing units in the City, of which almost 38 percent are single-family detached homes and slightly more than 11 percent are single-family attached housing units. In 2011, the home ownership rate in Sunnyvale was 47 percent.

Homeownership can represent an investment in, and commitment to, a community. It tends to result in a somewhat greater and sustained level of property maintenance and higher participation in community affairs.

The City is committed to providing high quality services to Sunnyvale residents. The City has implemented and will continue to implement citywide beautification efforts that include litter cleanup and removal and has instituted broad policy actions to address litter in the community. These policy actions, such as prohibitions of single use plastic bags or prohibitions of expanded polystyrene food containers, are effective source control actions that eliminate commonly littered items. As a true source control action, these products are no longer available for transport through the MS4. These actions also address the other transport pathways of litter and products are not available to be directly deposited or windblown into local waterways. Additionally, these types of sources control actions also reduce long-term city related cleanup and maintenance costs.

The actions that have been and will be implemented jurisdiction-wide are described below.

#### Implemented Prior to and Continued after MRP:

**Street Sweeping** -- The City provides street sweeping every other week for most of the City's streets and medians. Residential areas are swept during the day. Major arterials and commercial/industrial areas of the City are swept at night with minimal interference from parked cars or traffic. Downtown Sunnyvale is swept three times a week.

***Boulevard Landscape Maintenance and Litter Removal*** -- The City provides regular landscape maintenance, including litter cleanup, on major streets, medians, and boulevards throughout the City.

***Storm Inlet Cleaning Program*** -- The City annually cleans its storm sewer inlets and catch basins to remove debris and trash. This cleaning is conducted before the on-set of the rainy season in an effort to clean out the trash in the storm system prior to first flush.

***Improved Trash Bins/Container Management*** -- Solid Waste Division staff continues to enforce the requirements of SMC 8.16.040 and 8.16.050 to ensure that businesses and households have sufficient trash collection frequencies and that the trash bins/containers are of an adequate size to hold the quantity of trash generated to prevent unintended releases of trash. The City will continue to include language in the contract with its franchised waste hauler to allow City staff to go out with drivers on their routes and identify problematic properties. The contract also includes requirements for ensuring container lids are properly closed after emptying and for cleaning up litter in the vicinity of any solid waste storage bins. Solid Waste Program staff will continue with follow up and enforcement with property owners where bin sizing, placement, collection frequency, and failures to comply with municipal code are noted.

***Public Education*** -- The City has implemented and continues to implement an extensive and comprehensive public education and outreach program with an emphasis on anti-litter messages. This includes staffing multiple community events, articles and advertising placement in local newspapers and newsletters, and social media messaging. Additionally, the City actively participates in the following countywide and regional public education initiatives.

***Watershed Watch Campaign (Countywide)***

The City will continue to implement the countywide Watershed Watch Campaign through active participation and funding of the Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP). This Campaign conducts media advertising that includes anti-litter messages. Anti-litter advertisements for television, print, transit and radio have been developed and are used each year and will continue in the future. A telephone survey is conducted every five years to measure the effectiveness of outreach and increase in awareness about litter and stormwater related messaging. The FY 12-13 Watershed Watch media advertising included 312 anti-littering advertisements on TV, radio and online media. The Campaign also conducted outreach at a community event to promote the BASMAA "Be the Street" anti-littering campaign.

***Outreach to School-age Children or Youth through ZunZun (Countywide)***

Through participation and funding of the SCVURPPP countywide ZunZun Program, the City is continuing to implement litter reduction outreach to elementary school-age children. Up to 50 ZunZun assemblies at elementary schools are conducted in the Santa Clara Valley each year. These bilingual musical assemblies educate elementary school students and their teachers on watersheds and urban runoff pollution prevention, including litter. ZunZun performances use physical comedy, audience participation and musical instruments to educate teachers and children. Handouts, including teacher and student activity sheets, are distributed following the assembly. The SCVURPPP Schools and Youth Education and Outreach Work Group provides a list of schools for ZunZun to contact. In addition to schools with high Hispanic populations, the list includes schools with high Asian/Pacific Islander populations. ZunZun assemblies are evaluated using postage-paid evaluation cards that are distributed to all teachers present at the performances. Teachers mail the completed evaluation cards to SCVURPPP, and results are

compiled by SCVURPPP staff. Based on the teacher feedback, changes are made to future assemblies and/or handouts.

*BASMAA Regional Media Relations Project*

Through participation and funding of the BASMAA Regional Media Relations Project, the City is continuing 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 PSAs focus on litter issues each year (e.g., creek clean-up activities, preventing litter by using reusable containers, etc.).

Implemented Post-MRP and prior to July 1, 2014:

**Single-Use Carryout Bag Policies** – The City adopted an ordinance prohibiting the distribution of single-use plastic carryout bags on December 13, 2011 (SMC 5.38 - Plastic Carryout Bags). Phase 1 of SMC 5.38 applied the prohibition to all grocery, convenience, liquor and drug store and also included are other large stores sized 10,000 square feet and over and/or stores that generate \$2 million or more that sell perishable goods beginning June 20, 2012. Phase II, which expanded the requirements to all retailers became effective on March 20, 2013.

**Polystyrene Foam Food Service Ware Policies** – On November 19, 2013, the Sunnyvale City Council adopted an ordinance prohibiting the distribution of expanded polystyrene foam food or beverage containers by food service vendors in the City. The effective date for the ordinance will be April 22, 2014 (Earth Day). The ordinance includes three components:

- 1) Implementation of a ban on the use of expanded polystyrene food containers by retail food establishments after due diligence;
- 2) Codifying the city's existing practice of no EPS food container use as part of city business; and
- 3) Establishing a ban on all commercial sales of EPS food containers beginning April 22, 2015.

**Uncovered Load Ordinance** — The City has prescriptive language in municipal contracts for debris and garbage haulers. Per requirements of the contract, haulers are required to have collection vehicles that have water-tight bodies and are required to place tarps over all open debris boxes during transport to the disposal site.

The City revised SMC 8.16 (Solid Waste Management and Recycling) of the City's Municipal Code to implement the following enhanced control measures, effective December 1, 2011.

SMC 8.16.190 specifies that:

- (a) All vehicles, conveyances, or containers used for hauling solid waste within the City shall be of such construction as to comply with all laws, rules, and regulations of the state of California pertaining thereto, and shall be of a type and construction to prevent leakage, spillage, or overflow. This ordinance is intended to implement the requirements of Vehicle Code section 23114 or its successor statute; and
- (b) Any operator of an open bed truck hauling waste and recyclables for disposal at the SMaRT Station will be subject to a fee for which the operator will receive a tarp to be used for covering debris and solid waste.

The ordinance revisions reinforce State of California requirements for municipal trash haulers to cover loads and establish a fee for uncovered loads delivering materials to the SMaRT station. A required payment of a fee for a tarp, if a load is uncovered, is enforced at the SMaRT station. The fee as established by resolution of the City Council for the truck tarp is currently set at \$15.00.

***Improved Trash Bins/Container Management*** – The City has been an active participant in the Santa Clara County Zero Litter Initiative (ZLI) and on the ZLI Steering Committee. In October 2012 and January 2013, the ZLI convened two roundtable sessions that brought together local water quality program administrators, solid waste program administrators, and solid waste collection and facility operators. Through these roundtable sessions, the participants identified a collection of focus areas where tools can be developed and implemented in order to reduce trash/litter that results from the collection and disposal/recycling of municipal solid waste. Tools will be developed in FY 13-14 for the following:

- Improved training for solid waste drivers and facility staff;
- Identified improvements to solid waste service parameters and operations that result in “right sizing” of solid waste containers to minimize over-flowing trash;
- Development of a set of contract language best practices that enforce cleanup of trash that escapes during collection or processing of solid waste;
- Targeted public education for commercial and multi-family properties where shared trash enclosures are often littered and dirty.

Once these tools are developed, the City will implement as appropriate as part of long term trash management efforts with an initial pilot effort to be initiated in TMA #9.

***Public Education and Outreach Programs*** – Through participation and funding of the regional BASMAA Youth Outreach Campaign, the City is implementing an outreach campaign designed to reduce littering from the target audience in the Bay Area. The Youth Outreach Campaign was launched in September 2011 and aims to increase the awareness of Bay Area Youth (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 youth to enable the peer-to-peer distribution of Campaign messages. The Campaign will at least run through FY 13-14. A brief description of the Campaign activities is provided below:

- Raising Awareness: The Campaign is raising awareness of the target audience on litter and stormwater pollution issues. Partnerships with youth commissions, high schools, and other youth focused organizations have been developed to reach the target audience. Messages targeted to youth have been created and distributed via paid advertising, email marketing, Campaign website and social networking sites (e.g., Facebook and Twitter).
- Engage the Youth - The advertisements 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 was launched to get Bay Area youth further involved in the Campaign. An online voting system was used to select the winning entry. Media advertising was conducted to promote the winning entry.
- Change Behaviors: To move the audience along the behavior change continuum, the Campaign is using 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 continues to interact with the target audience through email marketing and social media websites.

The Youth Campaign includes a pre and post campaign survey to evaluate the effectiveness of outreach. The pre-campaign survey was conducted in FY 11-12 and the post campaign survey will begin in FY 13-

14. Other evaluation mechanisms, such as website hits, number of youth engaged in the Campaign's social networking website, etc. are also being used to evaluate its effectiveness in increasing awareness and changing behavior.

The City continues to implement its school and general public education program which includes a litter prevention element. The City's Environment Outreach staff also attends multiple community events and meetings and provides anti-litter education to event attendees and participants. The City's Annual Reports will continue to include a full description of the multiple public education and outreach efforts and associated results.

***Distributed Full Trash Capture*** – Through the redevelopment that occurred around the City, the City required private development projects to install full trash capture devices. Additionally, the City has installed two small trash capture devices (connector pipe screens) in targeted areas around the City as a part of pilot trash capture and through the SFEP Bay Area Trash Capture Demonstration Project. In total, 35 large full trash capture devices (hydrodynamic separators), 7 media filters, and 16 connector pipe screens have been installed or are under construction in TMA 14 areas. The private devices are maintained by the property owner and inspected as part of the City's Stormwater Treatment System Operations and Maintenance Inspection Program. The public devices are maintained and inspected by the City's wastewater collections crews.

### **3.2.2 Trash Management Area #1A – Catchment 47 and Catchment 27**

This TMA is comprised of two of storm sewer system catchments that will be treated by large full trash capture devices. Catchment 47 is a mix of red and green trash generating areas and includes a busy stretch of El Camino Real. This area has a high concentration of retail and commercial establishments and experiences high pedestrian and vehicle traffic. The likely sources of trash in the area come from the retail and commercial customers, the storage and collection of trash from these retail and commercial establishments, and vehicles traveling through the area. The Catchment 27 area of this TMA is comprised predominantly of yellow trash generating areas with several red pockets. Here the yellow areas are mainly large high-tech office campuses, R&D facilities, and light industrial facilities. The red pockets are large retail stores such as Lowes, Fry's Electronics, and Sports Basement.

Implemented Prior to and Continued after MRP:

***See Jurisdictional-wide Implementation***

Implemented Post-MRP and prior to July 1, 2014:

***See Jurisdictional-wide Implementation***

***Full Trash Capture*** – Through the redevelopment in this area, the City required several private development projects to install full trash capture devices. The private devices are maintained by the property owner and inspected as part of the City's Stormwater Treatment System Operations and Maintenance Inspection Program. Additionally, the City has installed three small trash capture devices in this area. The public devices are maintained and inspected by the City's wastewater collections crews. In total, there are 6 hydrodynamic separators, 3 filters, 3 screens, and 3 connector pipe screens installed in this TMA.

The City is currently completing engineering and design for the construction of two new large full-trash capture devices (HDS units). The estimated total area treated in Catchment 47 and Catchment 27 will be 1,040 acres. These catchments do include some inlet and private property devices already installed. This overlap will be accounted for in future tracking and reporting. Construction of the devices is anticipated to be completed by September 30, 2014.

***Trash Control Measure Pilot Implementation*** – The City will be implementing pilot actions that will be implemented and assessed in order to validate what level of implementation would result in effectiveness that is comparable to full trash capture in Catchment 47. The pilot actions will include control measures such as enhanced education and business inspection, enhanced street sweeping, and partial trash capture. These actions will be conducted as pilots alone or in combination, and implemented in a portion of Trash Management Area 1A (middle stretch of El Camino) where a large full trash capture device will be constructed in 2014. Once constructed, the trash captured in the device will be monitored and the amount of trash captured will be quantified over time. Then, the City will implement the pilot actions and continue to monitor and quantify the trash captured. This will give staff the opportunity to evaluate the effectiveness of the pilot actions implemented upstream of the device in 2014-2015 and 2015-2016. Based on the findings of these pilots, full implementation of an appropriate suite of effective actions will be applied to other TMAs, as appropriate, starting in 2016.



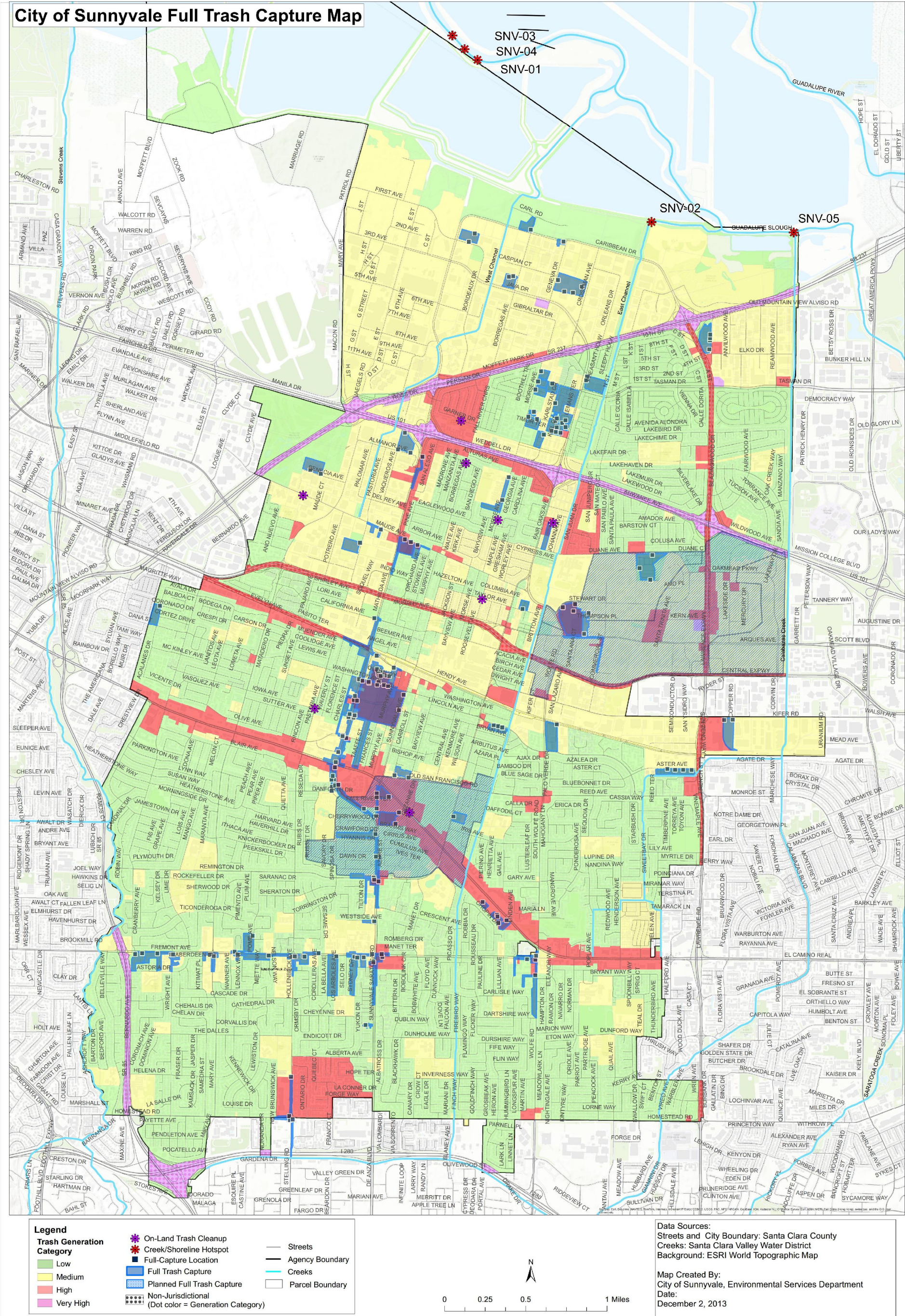


Figure 7. Trash Full Capture Device Map for the City of Sunnyvale



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### 3.2.3 Trash Management Area #1B – Downtown Town Center

TMA #1B represents the downtown town center of the City. This area consists of vibrant Murphy Avenue, which is a mix of restaurants, bars, and small retail. The Town Center also includes department stores and small independent businesses. There is also a variety of nearby residential, office and civic uses. The CalTrain station and a variety of available bus routes are also located within or in close proximity to the area. This area experiences high pedestrian and vehicle traffic. The likely sources of trash in the area come from the retail and restaurant customers, the storage and collection of trash from these retail and food service establishments, and vehicle traffic. This area is subject to the City's Downtown Specific Plan, which was updated in March 2013, and continues to undergo significant redevelopment.

Implemented Prior to and Continued after MRP:

*See Jurisdictional-wide Implementation.*

**Business Improvement District** – The City has one Business Improvement District which represents the downtown area. The downtown Murphy Avenue historical area is located within TMA #14. The City provides street sweeping in the Murphy Avenue core area bounded by Frances Street, Evelyn Avenue, Sunnyvale Avenue, and Washington Avenue three times per week and sidewalks are cleaned with the special street cleaning unit weekly. Adjacent city-owned parking lots in this area are part of a special parking district and are swept three times a week as well.

Implemented Post-MRP and prior to July 1, 2014:

*See Jurisdictional-wide Implementation.*

**Full Trash Capture** – Through the redevelopment in this area, the City required several private development projects to install full trash capture devices. The private devices are maintained by the property owner and inspected as part of the City's Stormwater Treatment System Operations and Maintenance Inspection Program. Additionally, the City has installed three small trash capture devices (connector pipe screens) in this area. The public devices are maintained and inspected by the City's wastewater collections crews. In total, there are 4 hydrodynamic separators, 10 filters, and 3 connector pipe screens installed or currently under construction in this TMA. These trash capture devices provide treatment for almost all of TMA #1B. A small section of this TMA that is not treated by the full trash capture is a section of the downtown Murphy Avenue historic district and adjacent parking lot. This area is within the Business Improvement District and received street sweeping three times a week and weekly sidewalk cleaning.

Planned for future implementation (between July 2014 and July 2022)

There are no additional actions planned for this TMA at this time.

### 3.2.4 Trash Management Area #2A and 2B – El Camino

TMA #2A and 2B are high trash generating areas (Red) composed of the entire length of El Camino excluding the area that will be treated by the full trash capture device being constructed to treat

Catchment 47 (TMA 1A). El Camino bisects the City of Sunnyvale and runs the width of Sunnyvale from the Santa Clara city border to the Mountain View city border. This area is a retail and commercial thoroughfare bisecting the City with high pedestrian and vehicle traffic. Main sources of trash in the area are the trash enclosure areas serving the businesses and litter from pedestrian and vehicle traffic. There are an estimated 415 businesses in this area of which 196 businesses are in the City's existing commercial inspection system.

El Camino Real is under the jurisdiction of CalTrans. The City and CalTrans have an existing maintenance agreement that delegates certain maintenance functions to the City, including street sweeping, landscape maintenance and litter removal. Additionally, the City provides storm sewer maintenance and inlet and catch basin cleaning along El Camino. The City will be engaging with CalTrans to coordinate and collaborate on the additional trash control measures to be implemented along El Camino Real.

Implemented Prior to and Continued after MRP:

***See Jurisdictional-wide Implementation.***

Implemented Post-MRP and prior to July 1, 2014:

***See Jurisdictional-wide Implementation.***

**Full Trash Capture** – Through the redevelopment in this area, the City required several private development projects to treat this area with full trash capture devices. The private devices are maintained by the property owner and inspected as part of the City's Stormwater Treatment System Operations and Maintenance Inspection Program. Additionally, the City has installed two small trash capture devices (connector pipe screens) in this area. The public devices are maintained and inspected by the City's wastewater collections crews. In total, five large full trash capture devices and two connector pipe screens have been installed in TMA 2.

Planned for future implementation (between July 2014 and July 2022)

**Enhanced Business Inspection, Enhanced Street Sweeping, and/or Partial Trash Capture** – Based on the results of the pilot trash control measures and assessments conducted in Catchment 47 as described earlier, the City will plan for implementation of an appropriate suite of trash control measures to effectively address the sources of trash in this TMA. The planning effort will begin in fiscal year 2016-2017 with implementation to begin in 2018. Based on current knowledge of the TMA, the suite of trash control measure would likely include:

- **Enhanced Business Inspection** – As a retail and commercial thoroughfare in Sunnyvale, the City is considering instituting an enhanced business engagement and inspection program targeting trash and litter from businesses in the area. The City will take an education first approach and reach out to all business found to have trash/litter issues and will follow-up with inspection and enforcement if the business does not take actions to eliminate trash caused by their operation.
- **Increased Street Sweeping Frequency** – The City currently sweeps along El Camino and its medians every other week through a maintenance agreement with CalTrans. This area is part of the City's night sweeping program, and therefore, interference from parked vehicles or moving traffic is minimal. The City may, in coordination with CalTrans (who has jurisdiction for all of El Camino) increase the street sweeping frequency to weekly.

- **Partial Trash Capture** – The City may, in coordination with CalTrans, install partial trash capture devices throughout this TMA. These devices would keep litter and debris on the street surface, making it more available to be caught by the City’s street sweeper. The partial trash capture devices would be inspected and maintained by City staff.

### **3.2.5 Trash Management Area #3A, 3B, 3C – High Tech Area North of 237**

TMA 3A is a medium trash generating area (Yellow) composed of large high tech industrial office and research parks such as Yahoo, Lockheed Martin, and NetApp. Main sources of trash in the TMA are the trash enclosure areas serving the office buildings. Most company campuses have on-site cafeterias and there is light pedestrian traffic in the area. There are an estimated 250 businesses in this area of which 191 businesses are in the City’s existing commercial inspection system. This TMA consists of approximately 1222 acres.

TMA 3B is a high trash generating area (Red) that consists of Moffett Park Road from Mathilda Avenue to Innsbruck Drive. Moffett Park Drive runs parallel to Highway 237. This area has been a main route for garbage and recycling collection vehicles as they exit Highway 101 or 237 on route to the Sunnyvale Material and Recovery Transfer (SMaRT) Station. Additionally, this area experiences high traffic during commute hours as many area workers travel on Highway 101 or 237 and exit here as part of daily commutes. Parcels adjacent to this TMA are high tech industrial campuses. Main sources of trash and litter in this area flies out of moving vehicles and litter from solid waste collection vehicles and individual trucks travelling to the SMaRT Station. This area will undergo significant redevelopment in the next 1-2 years. Due to anticipated construction, collection vehicles will likely be rerouted and will no longer travel along Moffett Drive Road. Additional on-land assessments of this area may be conducted during and post redevelopment.

TMA 3C is a very high trash generating area (Purple) composed of a single multi-use retail complex that has primary food service establishments and a convenience food store surrounded by medium trash generation areas. This complex is a food destination for some of the nearby high tech workers. There are an estimated 5 businesses in the complex, all of which are in the City’s existing commercial inspection system.

Implemented Prior to and Continued after MRP:

***See Jurisdictional-wide Implementation.***

Implemented Post-MRP and prior to July 1, 2014:

***See Jurisdictional-wide Implementation.***

**Full Trash Capture** – Through the redevelopment in this area, the City required several private development projects to treat this area with full trash capture devices. The private devices are maintained by the property owner and inspected as part of the City’s Stormwater Treatment System Operations and Maintenance Inspection Program. Additionally, the City has installed two small trash capture devices (connector pipe screens) in this area. The public devices are maintained and inspected by the City’s wastewater collections crews. In total, nine large full trash capture devices and one connector pipe screen has been installed in TMA 3.

Planned for future implementation (between July 2014 and July 2022)

**Enhanced Business Inspection** – As described, this TMA is predominantly comprised of high-tech office parks and campuses that are generally well maintained and clean. With initial planning anticipated to begin in FY 2014-2015, the City will implement an enhanced trash targeted business education and inspection program. City Environmental Compliance Inspectors will engage the property owners and companies in this area through an enhanced business engagement and inspection program targeting trash and litter from the businesses in the area. The small purple area (TMA 3C) will be prioritized, as it is a very high trash generating area. The City will take an education first approach and reach out to all businesses found to have trash/litter issues and will follow-up with inspection and enforcement if the business does not take actions to eliminate trash caused by their operation.

### **3.2.6 Trash Management Area # 4A, 4B, and 4C**

TMA 4A is a high trash generating area (Red) composed of large higher density residential homes. This area is an older, higher density residential neighborhood with a large mobile home community to the east. There are many small multi-family properties along the perimeter of this area with single family homes in the center. There is also a large, well maintained mobile home community on the east side of this TMA. Traffic calming improvements (speed bumps and other augmentations) have been installed throughout the area. Some streets are impacted by parked cars. This TMA consists of approximately 63 acres.

Similarly, TMA 4B is a high trash generating area (Red) composed of large higher density residential homes. This area is an older, higher density residential neighborhood with a large mobile home community to the east. There are many smaller multi-family properties along the perimeter with single family homes in the center. Streets are very impacted by parked cars. This TMA consists of approximately 100 acres.

Implemented Prior to and Continued after MRP:

***See Jurisdictional-wide Implementation.***

Implemented Post-MRP and prior to July 1, 2014:

***See Jurisdictional-wide Implementation.***

**Full Trash Capture** –The City has installed two small trash capture devices (connector pipe screens) in this area. These devices are maintained and inspected by the City's wastewater collections crews.

Planned for future implementation (between July 2014 and July 2022)

**Full Trash Capture** –The City will conduct a feasibility review for constructing larger full trash capture devices to treat both TMA 4A and 4B. TMA 4C will be evaluated for the installation of small full trash capture devices (a combination of connector pipe screens and auto-retractable screens) in each of the

storm sewer catch basins draining this area. Preliminary engineering and design for these devices would begin in FY 2015-2016, with construction planned for completion by 2017.

### 3.2.7 Trash Management Area #5 – Island Retail

TMA 5 represents retail land uses dispersed throughout the City. It consists of an estimated 386 businesses, 145 of which are already inspected by City staff. These can be stand-alone restaurants, fast food establishments, or convenience stores. These can also be commercial strip malls with a mix of retail, food, and service establishments or large supermarkets, drugstores, and department stores. Many of these red pockets are completely surrounded by low trash generating (green) areas. Trash generation from these specific land uses have not yet been field verified.

Implemented Prior to and Continued after MRP:

***See Jurisdictional-wide Implementation.***

Implemented Post-MRP and prior to July 1, 2014:

***See Jurisdictional-wide Implementation.***

***Full Trash Capture*** –The City has installed 16 small trash capture devices (connector pipe screens) in areas that drain stormwater from some of these establishments included in the TMA. These devices are maintained and inspected by the City’s wastewater collections crews.

Planned for future implementation (between July 2014 and July 2022)

***Enhanced Business Inspection*** – With initial planning anticipated to begin in 2020, the City will implement an enhanced trash targeted business education and inspection program to reach these dispersed retail establishments. City Environmental Compliance Inspectors will engage the property owners and companies through an enhanced business engagement and inspection program targeting trash and litter from these businesses. Through this effort, City inspectors will also verify the level of trash generated from these facilities. The City will take an education first approach and reach out to all businesses found to have trash/litter issues and will follow-up with inspection and enforcement if the business does not take actions to eliminate trash caused by their operation.

### 3.2.8 Trash Management Area #6 – Ahwanne Loop

This area consists of a stretch of Ahwanne Avenue as it runs parallel to US Highway 101 to North Fair Oaks Ave. On the west side, it continues south along Mathilda Avenue to just past Maude Avenue. It includes a higher density, lower income area that includes a larger mobile home park, several larger multi-family complexes (some of which are converted hotels), and Sunnyvale Square Shopping Center. Along Ahwanne Avenue is a sound wall for US 101 that often collects and traps windblown litter. There are also issues with illegal dumping and homelessness in this area. There is an active neighborhood group in this area that has worked with the City to conduct on-land trash cleanups. Portions of these areas are slated for redevelopment and the area is included in the City’s development of the Perry Park Specific Plan. There are an estimated 75 businesses in this area, of which 37 are already inspected by City staff.

Implemented Prior to and Continued after MRP:

***See Jurisdictional-wide Implementation.***

Implemented Post-MRP and prior to July 1, 2014:

***See Jurisdictional-wide Implementation.***

***Full Trash Capture*** –The City has installed 4 small trash capture devices (connector pipe screens) in this area. These devices are maintained and inspected by the City’s wastewater collections crews.

***On-land Trash Cleanups*** – As part of the annual Great American Littler Pick-up and Knock-out Litter events, the City has hosted trash cleanups in this area. The neighborhood group is interested in continuing to conduct trash cleanups on a regular basis. City staff will continue to host additional cleanup events and work to support the neighborhood’s interest to conduct additional cleanups. Staff will track when the cleanup events are conducted and will report on the amount of trash collected in the City’s Stormwater Annual Reports.

Planned for future implementation (between July 2014 and July 2022)

***Enhanced Business Inspection, Enhanced Street Sweeping, and/or Partial Trash Capture*** – Based on the results of the pilot trash control measures and assessments conducted in Catchment 47 as described earlier, the City will plan for implementation of an appropriate suite of trash control measures to effectively address the sources of trash in this TMA. The planning effort will begin in fiscal year 2016-2017 with implementation to begin in 2018. Based on current knowledge of the TMA, the suite of trash control measure would likely include:

- ***Enhanced Business Inspection*** – As a retail and commercial thoroughfare in Sunnyvale, the City is considering instituting an enhanced business engagement and inspection program targeting trash and litter from the businesses in the area. The City will take an education first approach and reach out to all business found to have trash/litter issues and will follow-up with inspection and enforcement if the business does not take actions to eliminate trash caused by their business.
- ***Enhanced Street Sweeping*** – Based on further assessment of this area, the City will consider implementing an enhanced street sweeping program including increasing the frequency of street sweeping or instituting enforced parking prohibitions on street sweeping day. These enhancements will increase the street sweeper’s access to the curb and improve its ability to capture trash on the street as it sweeps.
- ***Partial Trash Capture*** – The City may install partial trash capture devices throughout this TMA. These devices would keep litter and debris on the street surface, making it more available to be caught by the City’s street sweeper. The partial trash capture devices would be inspected and maintained by City staff.

***On-Land Trash Cleanup*** –The City will continue to explore opportunities to collaborate with community and neighborhood groups to conduct additional on-land cleanups in this area. One possibility includes working with Sunnyvale Community Services who has been working with a local, non-profit organization called the Downtown Streets Team (DST) to provide assistance and support to homeless individuals with the goal of transitioning the homeless into permanent housing and employment. The clients serve on a team of volunteers led by DST that provides community services



throughout the year, such as performing litter removal and/or weed abatement at the Sunnyvale Armory, along Fair Oaks Avenue, and in and around Fair Oaks Park. Due to the observations for homeless related issues in the TMA, the City will consider working with the DST to potentially expand their clean up area to impacted portions of this TMA.

### **3.2.9 Trash Management Area #7A, 7B, 7C, 7D, and 7E – Industrial Areas**

This TMA consists of five subareas of varying sizes that are predominantly light industrial land uses interspersed with office parks. These areas contain a mixture of auto body and repair shops, machine shops alongside medical device offices, research and development facilities, and offices. Portions of these areas are slated for, and in some cases undergoing, redevelopment and are undergoing specific plan or area planning including the Lawrence Station Area Plan and Perry Park Specific Plan. These plans will guide the transformation of these areas over the long term. There are an estimated 346 businesses in the area, of which 141 are already inspected by City staff.

Implemented Prior to and Continued after MRP:

***See Jurisdictional-wide Implementation.***

Implemented Post-MRP and prior to July 1, 2014:

***See Jurisdictional-wide Implementation.***

***Full Trash Capture*** – Through the redevelopment in this area, the City required some private development projects to treat this area with full trash capture devices. In total, two large full trash capture devices have been installed in TMA 7. These private devices are maintained by the property owner and inspected as part of the City's Stormwater Treatment System Operations and Maintenance Inspection Program.

Planned for future implementation (between July 2014 and July 2022)

***Enhanced Business Inspection*** – With initial planning anticipated to begin in 2017-2018, the City will implement an enhanced trash targeted business education and inspection program to reach these dispersed retail establishments starting in 2018. City Environmental Compliance inspectors will engage the property owners and companies through an enhanced business engagement and inspection program targeting trash and litter from these businesses. Through this effort, City inspectors will also verify the level of trash generated from these facilities. The City will take an education first approach and reach out to all businesses found to have trash/litter issues and will follow-up with inspection and enforcement if the business does not take actions to eliminate trash produced by their operation.

***Partial Trash Capture*** – Monitoring in the area is scheduled to occur within two areas of implementation of the Enhanced Business Inspection Program and, if additional programming is needed, the City will consider installing additional partial trash capture devices in this area. These devices would keep litter and debris on the street surface, making it more available to be caught by the City's street sweeper. The partial trash capture devices would be inspected and maintained by City staff.

### **3.2.10 Trash Management Area #8 – Mary Avenue**

This is a moderate trash generating area (yellow) that consists mostly of office parks including medical device and high tech office parks. Recent development in the area includes new corporate headquarters for Linked In. Large portions of this area is slated for, and in some cases already undergoing, redevelopment. This area is part of the study area for the City's Perry Park Specific Plan. This plan will guide the transformation of this area over the long term. There are an estimated 192 businesses in this area, of which 152 are already inspected by City staff.

Implemented Prior to and Continued after MRP:

***See Jurisdictional-wide Implementation.***

Implemented Post-MRP and prior to July 1, 2014:

***See Jurisdictional-wide Implementation.***

***Full Trash Capture*** – Through the redevelopment in this area, the City required some private development projects to treat this area with full trash capture devices. In total, four large full trash capture devices have been installed or are planning for installation in TMA 8. The private devices are maintained by the property owner and inspected as part of the City's Stormwater Treatment System Operations and Maintenance Inspection Program. Additionally, the City has installed one small trash capture device (connector pipe screen) in this area. This device is maintained and inspected by the City's wastewater collections crews.

Planned for future implementation (between July 2014 and July 2022)

***Enhanced Business Inspection*** – With initial planning anticipated to begin in 2017-2018, the City will implement an enhanced trash targeted business education and inspection program to reach these dispersed retail establishments starting in 2018. City Environmental Compliance inspectors will engage the property owners and companies through an enhanced business engagement and inspection program targeting trash and litter from these businesses. Through this effort, City inspectors will also verify the level of trash generated from these facilities. The City will take an education first approach and reach out to all businesses found to have trash/litter issues and will follow-up with inspection and enforcement if the business does not take actions to eliminate trash produced by their operation.

***Partial Trash Capture or Enhanced Street Sweeping*** – Monitoring in the area is scheduled to occur within two areas of implementation of the Enhanced Business Inspection Program and, if additional programming is needed, the City will consider installing additional partial trash capture devices or enhancing the street sweeping program in this area. Partial trash capture devices would keep litter and debris on the street surface, making it more available to be caught by the City's street sweeper.

### **3.2.11 Trash Management Area # 9A and 9E – Higher Density Residential**

TMA 9A, 9D, and 9E are moderate trash generating areas (Yellow) composed of large higher density residential homes. These areas represent older development with smaller single family homes on smaller lots. There are many small multi-family properties along the perimeter that have shared trash

enclosure areas that are maintained to varying degrees. Some of the streets are impacted by parked cars.

On-land visual assessments of TMAs 9B, 9C, and 9D were conducted in October 2013 by City staff and little to no visible trash was observed in the field. Observations also noted a slight difference in the housing stock in these TMAs as the properties appeared to be newer and better maintained. There were also very few multi-family properties in these subareas. As a result the trash generation designation for these subareas was changed from moderate trash generating (Yellow) to low trash generating (Green).

Implemented Prior to and Continued after MRP:

***See Jurisdictional-wide Implementation.***

Implemented Post-MRP and prior to July 1, 2014:

***See Jurisdictional-wide Implementation.***

***On-land Trash Cleanups*** – As part of the annual Great American Littler Pick-up and Knock-out Litter events, the City has hosted trash cleanups in this area. City staff will continue to host additional cleanup events. Staff will track when the cleanup events are conducted and will report on the amount of trash collected in the City's Stormwater Annual Reports. Additionally, Sunnyvale Community Services has been working with a local, non-profit organization called the Downtown Streets Team (DST) to provide assistance and support to homeless individuals with the goal of transitioning the homeless into permanent housing and employment. The clients serve on a team of volunteers led by DST that provides community services throughout the year, such as performing litter removal and/or weed abatement at the Sunnyvale Armory (located in this TMA) which serves as a winter homeless shelter. The DST's work area also includes weekly litter cleanup in an area partially covered by this TMA bordered by Fair Oaks Avenue and Wolf Road from Duane Avenue to Evelyn Avenue, including Fair Oaks Park.

Planned for future implementation (between July 2014 and July 2022)

***Improved Container Management Pilot*** – The City has been an active participant in the Santa Clara County Zero Litter Initiative (ZLI) and on the ZLI Steering Committee. In October 2012 and January 2013, the ZLI convened two roundtable sessions that brought together local water quality program administrators, solid waste program administrators, and solid waste collection and facility operators. Through these roundtable sessions, the participants identified a collection of focus areas where tools can be developed and implemented in order to reduce trash/litter that results from the collection and disposal/recycling of municipal solid waste. Tools will be developed in 2014 for a "Right Size, Right Service" campaign to be implemented by participating cities in coordination with the solid waste service providers in 2014-2015. Sunnyvale plans to implement this as a pilot project to improve solid waste container management and reduce litter some these containers in this TMA. Follow-up monitoring and assessment will be conducted in 2015-2016 to measure the effectiveness of the pilot effort. Additional implementation will be initiated post 2016 based on the results of the pilot.

***Enhanced Street Sweeping, and/or Partial Trash Capture*** – Based on the results of the pilot trash control measures and assessments conducted in Catchment 47 as described earlier, the City will plan for implementation of an appropriate suite of trash control measures to effectively address the sources of

trash in this TMA. The planning effort will begin in fiscal year 2020-2021 with implementation to begin in 2021. Based on current knowledge of the TMA, the suite of trash control measure would likely include:

- Enhanced Street Sweeping – Based on further assessment of this area, the City will consider implementing enhanced street sweeping including increasing the frequency of street sweeping or instituting enforced parking prohibitions on street sweeping day. These will increase the street sweeper's access to the curb and improve its ability to capture trash on the street as it sweeps.
- Partial Trash Capture – The City may install partial trash capture devices throughout this TMA. These devices would keep litter and debris on the street surface, making it more available to be caught by the City's street sweeper. The partial trash capture devices would be inspected and maintained by City staff.

### **3.2.12 Trash Management Area # 10 – West Evelyn Avenue**

TMA 10 is a high trash generating (Red) area that consists of a two-mile stretch of West Evelyn Avenue from Highway 85 to Mathilda Avenue. This stretch experiences high vehicle traffic and runs parallel to CalTrain's tracks. To the north side is a sound wall separating the train tracks from the adjacent neighborhood. The sound wall and fence line often captures trash and litter from passing vehicles or from neighboring businesses. Main uses of the south side of this segment of West Evelyn include automotive services facilities, a storage facility, and commercial businesses.

Implemented Prior to and Continued after MRP:

*See Jurisdictional-wide Implementation.*

Implemented Post-MRP and prior to July 1, 2014:

*See Jurisdictional-wide Implementation.*

Planned for future implementation (between July 2014 and July 2022)

**Full Trash Capture** –The City will evaluate this area for the installation of small full trash capture devices (a combination of connector pipe screens and auto-retractable screens) in each of the storm sewer catch basins draining this area. Preliminary engineering and design for these devices would begin in 2016, with installation planned for completion by 2017.

### **3.2.13 Trash Management Area # 11 – Schools and Churches**

This TMA is a cluster of schools and faith based institutions located throughout of the City. These areas are considered moderate trash generating areas (Yellow). There are 26 elementary, middle, and high schools located in Sunnyvale. As shown on the Figure 6 Trash Management Area Map for City of Sunnyvale, many of Sunnyvale's schools are located next to City parks (City parks are included in TMA #12). The City has joint use agreements with many of the school districts under which the City provides for routine maintenance of school play fields. There are many faith based facilities of varying denominations in Sunnyvale and some of the larger, stand-alone parcels are included in this TMA.

Implemented Prior to and Continued after MRP:***See Jurisdictional-wide Implementation.***

**Field Maintenance and Litter Pick-up** – The City has joint use agreements with many of the school districts with school facilities in Sunnyvale. In general, through these agreements the City of Sunnyvale assumes maintenance responsibilities in exchange for exclusive use of open space during non-school hours. The City’s staff conducts field inspections twice daily including removal of visible litter. The play fields, along with all City parks, are maintained per the Sunnyvale Parks Quality Standards Manual to the Quality Standard Level: “areas are free of litter and debris.”

**Volunteer On-land Trash Cleanups** – City staff has worked with and supported local schools interested in conducting volunteer based on-land trash cleanups on and around their school campuses. The City will continue encouraging and supporting additional cleanup events. Staff will track when the cleanup events are conducted and will report on the amount of trash collected in the City’s Stormwater Annual Reports.

Implemented Post-MRP and prior to July 1, 2014:

**Full Trash Capture** – The City has installed five small trash capture devices (connector pipe screen) around schools. These devices are maintained and inspected by the City’s wastewater collections crews.

**Classroom Education** – The City plans to continue to implement its school and outreach program where Sunnyvale staff schedule and provide stormwater pollution prevention presentations in kindergarten and 5<sup>th</sup> grade classrooms. Post-MRP, the presentations were augmented to include litter pollution prevention as an important element of the lessons. Details and additional information on the City’s school outreach program are reported in the annual report, including number of classrooms and number of students reached.

**Youth Outreach** – Through participation and funding of the SCVURPPP countywide ZunZun Program, the City is continuing to implement litter reduction outreach to elementary school-age children. Up to 50 ZunZun assemblies at elementary schools are conducted in the Santa Clara Valley each year. These bilingual musical assemblies educate elementary school students and their teachers on watersheds and urban runoff pollution prevention, including litter. ZunZun performances use physical comedy, audience participation and musical instruments to educate teachers and children. Handouts, including teacher and student activity sheets, are distributed following the assembly. Additionally, the City is an active participant and contributor to BASMAA’s Be the Street Campaign. Be the Street was launched in September 2011 and aims to increase the awareness of Bay Area youth (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 youth to enable the peer-to-peer distribution of Campaign messages. Section 3.2.1 of this Plan includes additional information about the City’s Public Education programs. Details and additional information on these campaign activities are included in the annual report.

Planned for future implementation (between July 2014 and July 2022)

**Enhanced Partnerships** – Sunnyvale is served by four public school districts and multiple private schools. The City will reach out to the schools to improve collaboration and build partnerships to address litter from schools and students. Planning for this effort was initiated in 2013-2014 as the City developed the concept and applied for Clean, Safe Water Grant funding from the Santa Clara Valley Water District. If funded, City staff would work with two high schools and two middle schools to engage their service or environmental clubs to establish school wide “GreenTeams” that would conduct regular litter cleanups on and around their campus, characterize the types and sources of litter collected, and develop and implement an anti-littering campaign on campus including a video documentary about their efforts. The grant funds would be used to provide supplies and materials for the schools, support an incentive program to maintain student participation, and staffing to support the schools throughout the project term. Early feedback from Homestead High School, Fremont High School, and Sunnyvale Middle School has been very supportive and these schools are very interested in participating in the project. If funded, implementation of the proposed two-year project would begin with the 2014-2015 school year.

**Partial or Full Trash Capture** – Monitoring and assessments will be conducted in these areas in 2020 and the City will consider additional actions based on the results. Additional actions may include installation of partial or full trash capture devices around school or faith based properties as needed.

### **3.2.14 Trash Management Area # 12 – Parks**

According to the City’s General Plan, about 745 acres, more than 7 percent of the City’s land, is devoted to open space facilities owned or maintained by the City for public use, including 20 neighborhood parks, athletic fields and golf courses. TMA 12 is a moderate trash generating area (Yellow) that consists of all twenty public parks located in the City limits. These parks are maintained by City staff and are valued community assets.

Implemented Prior to and Continued after MRP:

***See Jurisdictional-wide Implementation.***

**Parks Maintenance and Litter Pick-up** – Sunnyvale is proud of its beautiful parks and the City prioritizes park maintenance as residents expect their parks to be clean and safe. As a part of the routine maintenance activities at all 20 Sunnyvale parks, City staff conducts field inspections twice daily including pick up and removal of visible litter. All City parks are maintained per the Sunnyvale Parks Quality Standards Manual to the Quality Standard Level that “areas are free of litter and debris.”

Implemented Post-MRP and prior to July 1, 2014:

***See Jurisdictional-wide Implementation.***

**Smoking Prohibition in Parks and in Outdoor Dining Areas** – On April 3, 2012, the Sunnyvale City Council approved an ordinance amending Sunnyvale Municipal Code Section 9.28 to prohibit smoking at public parks, outdoor dining areas, or within 20 feet of outdoor dining areas.

Planned for future implementation (between July 2014 and July 2022)

***Partial or Full Trash Capture*** – Monitoring and assessments will be conducted in at City parks in 2016-2017 and the City will consider additional actions based on the results. Additional actions may include installation of partial or full trash capture devices around City parks as needed.

### **3.2.15 Trash Management Area # 13 – Island Office and Commercial**

TMA 13 represents office and commercial land uses dispersed throughout the City. These are moderate trash generating (Yellow) land uses. In total, TMA 13 consists of an estimated 263 businesses, 179 of which are already inspected by City staff. These parcels include single professional or medical services complexes surrounded by residential areas, the City's Civic Center area, or smaller multi-tenant office complexes. Many of these yellow pockets are completely surrounded by low trash generating (green) areas. Trash generation from these specific land uses has not yet been field verified.

Implemented Prior to and Continued after MRP:

***See Jurisdictional-wide Implementation.***

Implemented Post-MRP and prior to July 1, 2014:

***See Jurisdictional-wide Implementation.***

Planned for future implementation (between July 2014 and July 2022)

***Enhanced Business Inspection*** – With initial planning anticipated to begin in 2020, the City will implement an enhanced trash targeted business education and inspection program to reach these dispersed office and commercial establishments starting in 2021. City Environmental Compliance inspectors will work with the property owners and companies through an enhanced business engagement and inspection program targeting trash and litter from these businesses. Through this effort, City inspectors will also verify the level of trash generated from these facilities. The City will take an education first approach and reach out to all businesses found to have trash/litter issues and will follow-up with inspection and enforcement if the business does not take actions to eliminate trash caused by their operation.

***Partial or Full Trash Capture*** – Monitoring and assessments will be conducted in at City parks in 2021 and the City will consider additional actions based on the results. Additional actions may include installation of partial or full trash capture devices around island office or commercial parcels as needed.

### **3.2.16 Creek and Shoreline Hot Spot Cleanups**

Implemented Prior to and Continued after MRP:

**Single Day Cleanup Events** – The City coordinates and sponsors cleanup sites for two volunteer cleanups events each year, National River Cleanup Day in the spring and Coastal Cleanup Day in the fall. These are popular volunteer events with some volunteers returning each year to clean the same area. The City

tracks the amount of trash and litter collected during these events and will continue to report the results in the annual report.

Implemented Post-MRP and continuing:

City staff coordinate and conduct cleanups of five trash hot spots as required in accordance with provision C.10.b (see section C.10.b) of the Municipal Regional Report annually. Sunnyvale's five hot spots are shown on Figure 6 Trash Management Area Map for the City of Sunnyvale. Three of the hot spots are located in Guadalupe Slough, one is located in Sunnyvale East Channel, and one is located in San Tomas Aquino Creek where it intersects with Calabazas Creek. These locations are at the terminus of most of the City's storm sewer system. Cleanups of these hot spots began in 2010. Cleanup data since 2010 shows no discernable trends in the quantities of trash found at the hot spots. Common sources of the trash cleaned-up include pedestrian litter, vehicles, and illegal dumping. Most common types of trash found at cleanups include expanded polystyrene, cigarette butts, plastic bags and bottles.

### **3.3 Control Measure Implementation Schedule**

Based on current knowledge of trash control measure effectiveness and what is known about the characteristics of the Sunnyvale's Trash Management Areas, the following schedule for control measure implementation has been prepared. This schedule is based on the implementation of several pilot projects that will provide additional information on trash control measure effectiveness and will inform control measure deployment in subsequent years and TMAs. This City considers this Plan and the schedule below as a working guide and will modify trash control measure and timing based on field implementation and monitoring and assessment results. This City may, at its discretion, modify or reprioritize trash control measure implementation during the term of this Plan. Any changes to the trash control measures proposed or to the implementation timeframe will be reported through the annual report process.



**Table 7. Sunnyvale Long Term Trash Reduction Plan Schedule.**

1/14/2014

**DRAFT**

Planning/Design	
Implementation	
Monitoring and Assessment	
Pilot Implementation	P

[illegible]

Trash Management Area and Control Measures	Pre-MRP	Short-Term					Long-Term							
		FY 2009-2010	FY 2010-2011	FY 2011-2012	FY 2012-2013	FY 2013-2014 <sup>a</sup>	FY 2014-2015	FY 2015-2016	FY 2016-2017 <sup>b</sup>	FY 2017-2018	FY 2018-2019	FY 2019-2020	FY 2020-2021	FY 2021-2022 <sup>c</sup>
TMA 7A, 7B, 7C,7D,7E -- Industrial areas														
Dispersed Full Trash Capture -- private HDS (2)														
Enhanced Business Inspection														
Partial Trash Capture and/or Enhanced Street Sweeping														
TMA 8 -- Mary Ave														
Dispersed Full Trash Capture -- private HDS (4) and public CPS (1)														
Enhanced Business Inspection														
Partial Trash Capture and/or Enhanced Street Sweeping														
TMA 9A, 9D, 9E -- Higher Density Residential areas														
On-land Trash Cleanups														
Improved Container Management							P	P	P	P	P	P		
Full Trash Capture or Partial Trash Capture or Enhanced Street Sweeping														
TMA 10 -- West Evelyn														
Full Trash Capture (Connector Screens and ARS)														
TMA 11 Schools and Churches														
Field Maintenance and Litter Cleanup														
Dispersed Small Full Trash Capture -- public CPS (5)														
Public Education														
School/Classroom Presentations														
Partnership with Schools and Churches							P	P	P	P	P	P		
Partial Trash Capture and/or Enhanced Street Sweeping Frequency														
TMA 12 Parks														
On-land Cleanups , twice daily														
Ban on Smoking in Public Parks														
Partial Trash Capture and/or Enhanced Street Sweeping														
TMA 13 Island Industrial/Commerical														
Dispersed Full Trash Capture -- private HDS (2), private filters (2), and public CPS (20)														
Enhanced Inspection														
Partial Trash Capture and/or Enhanced Street Sweeping														
TMA 14 Green Areas														
Dispersed Full Trash Capture -- private HDS (35), private filters (7), and public CPS (16)														
Creek and Shoreline Hot Spot Cleanups														
Annual Volunteer Cleanups (National River Cleanup Day and Coastal Cleanup Day)														
Annual Cleanup of 5 Trash Hot Spots														

<sup>a</sup>July 1, 2014 40% trash reduction target<sup>b</sup>July 1, 2014 70% trash reduction target<sup>c</sup>July 1, 2022 100% trash reduction target

## 4.0 PROGRESS ASSESSMENT STRATEGY [AN UPDATE OF THIS SECTION TO BE PROVIDED BY SCVURPPP]

Provision C.10.a.ii of the MRP requires Permittees to develop and implement a 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 targets. Early into the MRP, Permittees decided to work collaboratively to develop a trash load reduction tracking method through the Bay Area Stormwater Management Agencies Association (BASMAA). Permittees, Water Board staff and other stakeholders assisted in developing Version 1.0 of the tracking method. On behalf of all MRP Permittees, the Bay Area Stormwater Management Agencies Association (BASMAA) submitted Version 1.0 to the Water Board on February 1, 2012.

The Trash Assessment Strategy (Strategy) described in this section is intended to serve as Version 2.0 of the trash tracking method and replace version 1.0 previously submitted to the Water Board. The Strategy is specific to Permittees participating in the Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP), including the City of Sunnyvale. The City intends to implement the Strategy in phases and at multiple geographical scales (i.e., jurisdiction-wide and trash management area) in collaboration with SCVURPPP. Pilot implementation is scheduled for the near-term and as assessment methods are tested and refined, the Strategy will be adapted into a longer-term approach. The Strategy selected by the City is described in the following sections.

### 4.1 SCVURPPP Pilot Assessment Strategy

The following SCVURPPP Pilot Trash Assessment Strategy (SCVURPPP Pilot Strategy) was developed by SCVURPPP on behalf of the City and other Santa Clara Valley Permittees. The SCVURPPP Pilot Strategy will be implemented at a pilot scale on a countywide basis and includes measurements and observations in the City of Sunnyvale.

#### 4.1.1 Management Questions

The SCVURPPP Pilot Strategy is intended to answer the following core management questions over time as trash control measures outlined in section 3.0 are implemented and refined:

- Are the MS4 trash load reduction targets (i.e., 40%, 70%, and No Adverse Impacts) being achieved?
- Are there trash problems in receiving waters (e.g., creeks and rivers)?
- If trash problems in receiving waters exist, what are the important sources and transport pathways?

The SCVURPPP Pilot Strategy, including indicators and methods, is summarized in this section and fully described in the SCVURPPP Pilot Trash Assessment Strategy, a compendium document submitted to the Water Board on February 1, 2014 on behalf of all SCVURPPP Permittees (SCVURPPP 2014).



#### **4.1.2 Indicators of Progress and Success**

The management questions listed in the previous section will be addressed by tracking information and collecting data needed to report on a set of key environmental indicators. Environmental indicators are simple measures that communicate what is happening in the environment. Since trash in the environment is very complex, indicators provide a more practical and economical way to track the state of the environment than if we attempted to record every possible variable.

With regard to municipal stormwater trash management, indicators are intended to detect progress towards trash load reduction targets and solving trash problems. Ideally, indicators should be robust and able to detect progress that is attributable to multiple types of trash control measure implementation scenarios. Assessment results should also provide Permittees with an adequate level of confidence that trash load reductions from MS4s have occurred, while also assessing whether trash problems in receiving waters have been resolved. Indicators must also be cost effective, relatively easy to generate, and understandable to stakeholders.

Primary and secondary indicators that SCVURPPP Permittees will use to answer core management questions include:

##### **Primary Indicators:**

- 1-A Reduction in the level of trash present on-land and available to MS4s
- 1-B Effective full capture device operation and maintenance

##### **Secondary Indicators:**

- 2-A Successful levels of trash control measures implementation
- 2-B Reductions in the amount of trash in receiving waters

In selecting the indicators above, the City of Sunnyvale in collaboration with SCVURPPP and other SCVURPPP Permittees recognize that no one environmental indicator will provide the information necessary to effectively determine progress made in reducing trash discharged from MS4s and improvements in the level of trash in receiving waters. Multiple indicators were therefore selected.

The ultimate goal of municipal stormwater trash reduction strategies is to reduce the impacts of trash associated with MS4s on receiving waters. Indicators selected to assess progress towards this goal should ideally measure outcomes (e.g., reductions in trash discharged). The primary indicators selected by SCVURPPP are outcome-based and include those that are directly related to MS4 discharges. Secondary indicators are outcome or output-based and are intended to provide additional perspective on and evidence of, successful trash control measure implementation and improvements in receiving water condition with regard to trash.

As described in Section 2.2, trash is transported to receiving waters from pathways other than MS4s, which may confound our ability to observe MS4-associated reductions in creeks and shorelines. Due to this challenge of linking MS4 control measure implementation to receiving water conditions, the receiving water based indicator is currently considered a secondary indicator. Evaluations of data on the amount of trash in receiving waters that are conducted over time through the Pilot Assessment Strategy will assist the City in further determinations of the important sources and pathways causing problems in local creeks, rivers and shorelines.

### 4.1.3 Pilot Assessment Methods

This section briefly summarizes the preliminary assessment methods that the City of Sunnyvale will implement through the SCVURPPP Pilot Strategy to generate indicator information described in the previous section. Additional information on each method can be found in the SCVURPPP Pilot Trash Assessment Strategy submitted to the Water Board by SCVURPPP on behalf of the City.

#### 1-A. On-land Visual Assessments

As part of the Trash Generation Map assessment and refinement process (see Section 2.3.1), a draft on-land visual assessment method was developed to assist Permittees in confirming and refining trash generating area designations (i.e., very high, high, moderate and low trash generating categories). The draft on-land visual assessment method is intended to be a cost-effective tool and provide Permittees with a viable alternative to quantifying the level of trash discharged from MS4s. As part of BASMAA's *Tracking California's Trash* grant received from the State Water Resources Control Board (see Section 4.2), quantitative relationships between trash loading from MS4s and on-land visual assessment condition categories will be established. Condition categories defined in the draft on-land assessment protocol are listed in Table 7

**Table 7.** Trash condition categories used in the draft on-land visual assessment protocol.

Trash Condition Category	Summary Definition
<b>A (Low)</b>	Effectively no trash is observed in the assessment area.
<b>B (Moderate)</b>	Predominantly free of trash except for a few pieces that are easily observed.
<b>C (High)</b>	Trash is widely/evenly distributed and/or small accumulations are visible on the street, sidewalks, or inlets.
<b>D (Very High)</b>	Trash is continuously seen throughout the assessment area, with large piles and a strong impression of lack of concern for litter in the area.

On-land visual assessments will be conducted in trash management areas within the City of Sunnyvale as part of the SCVURPPP Pilot Trash Assessment Strategy. On-land assessments are intended to establish initial conditions and detect improvements in the level of trash available to MS4s over time. More specifically, on-land visual assessment methods will be conducted in areas not treated by trash full capture devices in an attempt to evaluate reductions associated with other types of control measures. Assessment methods for areas treated by full capture devices are described in this next section.

Given that the on-land assessment method and associated protocol have not been fully tested and refined, initial assessments will occur at a pilot scale in the City and in parallel to the Tracking California's Trash project. The frequency of assessments and number of sites where assessments will

occur during the pilot stage are more fully described in the SCVURPPP Pilot Trash Assessment Strategy (SCVURPPP 2014).

### **1-B. Full Capture Operation and Maintenance Verification**

Consistent with the MRP, adequate inspection and maintenance of trash full capture devices is required to maintain full capture designation by the Water Board. The City of Sunnyvale is currently developing an operation and maintenance verification program (Trash O&M Verification Program), via SCVURPPP, to ensure that devices are inspected and maintained at a level that maintains this designation.

The SCVURPPP Trash O&M Verification Program will be modeled on the current O&M verification program for stormwater treatment controls implemented consistent with the Permit new and redevelopment requirements. Additional details regarding the Trash O&M Verification Program can be found in the SCVURPPP Pilot Trash Assessment Strategy (SCVURPPP 2014).

### **2-A. Control Measure Effectiveness Evaluations**

In addition to on-land trash assessments and full capture operation and maintenance verification, the City will also conduct assessments of trash control measures implemented within their jurisdictional area. Assessment methods will be selected based on trash sources and the type of control measure being implemented. Control measure effectiveness evaluations are more fully described in the SCVURPPP Pilot Trash Assessment Strategy. The following are example assessment methods that may be used to demonstrate successful control measure implementation and progress towards trash reduction targets:

- Product-related Ordinances – Descriptions of outreach efforts, tracking and reporting business compliance rates, or other metrics of control measure performance.
- Street Sweeping – Identification sweeping frequency and the ability to sweep to the curb by primary TMA, including any enhancements that have been implemented; and any other metrics demonstrating the enhanced performance of street sweeping.
- Public/Private Trash Container Management – Descriptions of control measures implemented to prevent overflowing trash containers or promoting the more effective use of public/private bins, including any new or enhancements to existing actions; and any other metrics demonstrating the performance of the control measure.
- Public Outreach and Education – Descriptions of outreach and education actions specific to trash deduction, including the number of events conducted within the municipality; descriptions of effectiveness measurements, including the results of pre- and post-implementation surveys or other metrics.
- On-land Cleanups and Enforcement – Descriptions of on-land cleanup actions, including any enhancements that have been implemented; identification of whether on-land cleanup are Permittee or volunteer-led; or other metrics of control measure performance.
- Storm Drain Inlet Maintenance – Descriptions of the level of maintenance, including any enhancement to maintenance frequency; the numbers of inlets where enhanced maintenance is being implemented; and any other metrics demonstrating the performance of inlet maintenance.

- Anti-littering and Illegal Dumping Prevention/Enforcement – Descriptions of control measures implemented to prevent littering and illegal dumping, including any new or enhancements to existing actions; descriptions and results of enhanced enforcement actions; and any other metrics demonstrating the performance of the control measure.
- Prevention of Uncovered Loads – Descriptions of control measures implemented to prevent trash dispersion from uncovered loads, including any new or enhancements to existing actions; descriptions and results of enhanced enforcement actions; and any other metrics demonstrating the performance of the control measure.
- Partial Capture Devices – Descriptions, numbers and types of devices implemented; maintenance frequencies by device or groups of devices; and any other metrics demonstrating the partial capture device performance.
- Other Control Measures – Descriptions of control measures implemented to prevent or intercept trash before discharge to receiving waters, and any other metrics demonstrating the performance of the control measure.

## **2-C. Receiving Water Condition Assessments**

The ultimate goal of stormwater trash management in the Bay Area is to significantly reduce the amount of trash found in receiving waters. In the last decade, Santa Clara Valley Permittees and volunteers have collected data on the amounts of trash removed during cleanup events. More recently, Permittees have conducted trash assessments in creek and shoreline hotspots using standardized assessment methods. In an effort to answer the core management question *Have trash problems in receiving waters been resolved?*, the City of Sunnyvale plans to continue conducting receiving water condition assessments at trash hot spots a minimum of one time per year. Assessment will be conducted consistent with Permit hot spot cleanup and assessment requirements. Additional information on receiving water assessment methods can be found in the SCVURPPP Pilot Trash Assessment Strategy (SCVURPPP 2014).

## **4.2 BASMAA “Tracking California’s Trash” Project**

The SCVURPPP Pilot Assessment Strategy described in the previous section recognizes that outcome-based trash assessment methods needed to assess progress toward trash reduction targets are not well established by the scientific community. In an effort to address these information gaps associated with trash assessment methods, the Bay Area Stormwater Management Agencies Association (BASMAA), in collaboration with SCVURPPP, the 5 Gyres Institute, San Francisco Estuary Partnership, the City of Los Angeles, and other stormwater programs in the Bay Area, developed the *Tracking California’s Trash* Project. The Project is funded through a Proposition 84 grant awarded to BASMAA by the State Water Resources Control Board (SWRCB) who recognized the need for standardized trash assessment methods that are robust and cost-effective.

The Project is intended to assist BASMAA member agencies in testing trash assessment and monitoring methods needed to evaluate trash levels in receiving waters, establish control measures that have an equivalent performance to trash full capture devices, and assess progress in trash reduction over time. The following sections provide brief descriptions of tasks that BASMAA will conduct via the three-year Project. Full descriptions of project scopes, deliverables, and outcomes will be developed as part of the task-specific Sampling and Analysis Plans required by the SWRCB during the beginning of the Project. The Project is currently underway and will continue through 2016.

#### 4.2.1 Testing of Trash Monitoring Methods

BASMAA and the 5 Gyres Institute will evaluate the following two types of assessment methods as part of the Project:

- **Trash Flux Monitoring** – Trash flux monitoring is intended quantify the amount of trash flowing in receiving waters under varying hydrological conditions. Flux monitoring will be tested in up to four receiving water bodies in San Francisco Bay and/or the Los Angeles areas. Methods selected for evaluation and monitoring will be based on a literature review conducted during this task and through input from technical advisors and stakeholders. Monitoring is scheduled to begin in 2014 and will be completed in 2016.
- **On-land Visual Assessments** – As part of the Project, BASMAA will also conduct an evaluation of on-land visual assessment methods that are included in the SCVURPPP Pilot Assessment Strategy. The methods are designed to determine the level of trash on streets and public right-of-ways that may be transported to receiving waters via MS4s. BASMAA plans to conduct field work associated with the evaluation of on-land visual assessment at a number of sites throughout the region. To the extent practical, sites where the on-land methods evaluations take place will be coordinated with trash flux monitoring in receiving waters. On-land assessments will occur in areas that drain to trash full capture devices, and all sites will be assessed during wet and dry weather seasons in order to evaluate on-land methods during varying hydrologic conditions. Monitoring is scheduled to begin in 2014 and will be completed in 2016.

#### 4.2.2 Full Capture Equivalent Studies

Through the implementation of BASMAA's *Tracking California's Trash* grant-funded project, a small set of "Full Capture Equivalent" projects will also be conducted in an attempt to demonstrate that specific combinations of control measures will reduce trash to a level equivalent to full capture devices. Initial BMP combinations include high-frequency street sweeping, and enhanced street sweeping with auto-retractable curb inlet screens. Other combinations will also be considered. Studies are scheduled to begin in 2014 and will be completed in 2016.

### 4.3 Additional Progress Assessments

As discussed in Section 3.1, the City will be implementing pilot actions that will be monitored and assessed in order to validate what level of implementation would result in effectiveness that is comparable to full trash capture. The pilots and associated monitoring will be conducted in coordination and as a part of the SCVURPPP's Pilot Assessment Strategy and BASMAA's *Tracking California's Trash* Grant Project which are discussed above. The pilot actions will include control measures such as enhanced education and business inspections, enhanced street sweeping with parking prohibitions or increased frequency, and installation of partial trash capture devices. These actions will be conducted as pilots alone or in combination, and implemented in a portion of TMA 1A (middle stretch of El Camino Real) where a large full trash capture device will be constructed in summer of 2014. Once constructed, the trash captured in the device will be monitored and the amount of trash captured will be quantified over time. Following the initial year of monitoring, the City will implement the pilot actions and continue to monitor and quantify the trash captured. This will give staff the opportunity to evaluate the effectiveness of the pilot actions implemented upstream of the device in 2014-2015 and 2015-2016.



Based on the findings of these pilots, full implementation of an appropriate suite of effective actions will be applied to other TMAs, as appropriate, starting in 2016.

## 4.4 Long-Term Assessment Strategy

The City of Sunnyvale is committed to implementing standardized assessment methods post-2016 based on the lessons learned from pilot assessments and studies that will occur between 2014 and 2016. Assessment activities described in the previous sections will evaluate the utility of different assessment methods to demonstrate progress towards trash reduction targets and provide recommended approaches for long-term implementation. Lessons learned will be submitted to the Water Board with the FY 2015-2016 Annual Report and a revised Strategy will be developed and submitted, if necessary. The revised Strategy will include agreed upon assessment methods that will be used to demonstrate progress during the remaining term of trash reduction requirements. Reporting using the new/revised methods will begin with the FY 2016-17 Annual Report.

## 4.5 Implementation Schedule

The implementation schedule for the SCVURPPP Pilot Implementation Strategy, BASMAA's Tracking California's Trash project, and the Long-Term Assessment Strategy are included in Table 8. Load reduction reporting milestones are also denoted in the table. The schedule is consistent with the need for near-term pilot assessment results to demonstrate progress toward short-term targets, while acknowledging the need for testing and evaluation of assessment methods and protocols prior to long-term implementation. For more detailed information on implementation timelines, refer to the SCVURPPP Pilot Trash Assessment Strategy (SCVURPPP 2014) and monitoring plans developed as part of BASMAA's Tracking California's Trash project.

**Table 8.** City of Sunnyvale trash progress assessment implementation schedule.

Trash Assessment Programs and Methods	Prior to FY 2013-14	Fiscal Year								
		2013-14 <sup>a</sup>	2014-15	2015-16	2016-17 <sup>b</sup>	2017-18	2018-19	2019-20	2020-21	2021-22 <sup>c</sup>
Pilot Trash Assessment Strategy (SCVURPPP)										
On-land Visual Assessments										
Initial (Baseline) Assessments	X									
Pilot Progress Assessments		X	X	X	X					
Full Capture Operation and Maintenance Verification			X	X	X					
Control Measure Effectiveness Evaluations	X	X	X	X	X					
Receiving Water Condition Assessments	X	X	X	X	X					
Tracking California’s Trash Project (BASMAA)										
Testing of Trash Monitoring Methods										
Trash Flux Monitoring Protocol Testing			X	X	X					

On-land Visual Assessment Evaluations			X	X	X					
Full Capture Equivalent Studies			X	X	X					
<b>Sunnyvale Pilot Actions and Effectiveness Assessments</b>										
Monitoring of Catchment 47 Full Trash Capture Device			X	X	X					
Pilot Action Implementation and Assessment				X	X					
<b>Long-Term Trash Assessment Strategy (SCVURPPP)</b>						X	X	X	X	X

<sup>a</sup>July 1, 2014 40% trash reduction target

<sup>b</sup>July 1, 2014 70% trash reduction target

<sup>c</sup>July 1, 2022 100% trash reduction target

## 5.0 REFERENCES <UPDATE AS NEEDED>

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