Track 2 Implementation Plan: For Compliance with San Diego Region Water Quality Control Board Order No. R9-2017-0077

City of Vista, California

Vista, CA
November 29, 2018

Prepared by:

CITY OF VISTA
CALIFORNIA

STATEMENT OF CERTIFICATION AND LEGAL AUTHORITY ESTABLISHMENT

IMPLEMENTATION PLAN PER CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD SAN DIEGO REGION ORDER NO. R9-2017-0077

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 assure 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 [40 CFR 122.22(d)].

Executed on the 29th day of November, 2018 at the City of Vista.

Greg Mayer
City Engineer

P: **760-639-6111** | **cityofvista.com** | F: **760-639-6112**
200 Civic Center Drive, Vista, California 92084-6275

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1 Introduction and Background

In the San Diego Region, stormwater discharges from municipal separate storm sewer systems (MS4s) are regulated through a regional general permit (Regional MS4 Permit) adopted by the California Regional Water Quality Control Board, San Diego Region (San Diego Water Board) pursuant to Section 402(p) of the Clean Water Act. The term Regional MS4 Permit refers to the San Diego Water Board's Order No. R9-2013-0001, as amended by Order Nos. R9-2015-0001 and R9-2015-0100, NPDES No. CAS0109266, *National Pollutant Discharge Elimination System (NPDES) Permit and Waste Discharge Requirements for Discharges from the MS4s Draining the Watersheds within the San Diego Region*. The City is a permittee of the Regional MS4 Permit.

On April 7, 2015, the State Water Board adopted Resolution No. 2015-0019, amending the Water Quality Control Plan for Ocean Waters of California (Ocean Plan) and the Water Quality Control Plan for Inland Surface Waters, Enclosed Bays, and Estuaries of California (ISWEBE Plan) to address the impacts of trash to the surface waters of California (referred to hereafter as the Trash Amendments). The Trash Amendments became effective December 2, 2015 and establish a statewide narrative water quality objective and implementation requirements to control trash, including a prohibition against the discharge of trash to ocean and surface waters. Trash is typically generated on land and transported to surface water, predominantly through stormwater discharges from MS4s.

The Trash Amendments required the San Diego Water Board to take certain steps towards implementation of the narrative water quality objective and prohibition by June 2, 2017 through requirements incorporated into the Regional MS4 Permit or through a monitoring and reporting order issued pursuant to Water Code section 13267 or 13383. The San Diego Water Board did not amend the Regional MS4 Permit within the time frame specified by the Trash Amendments; therefore, the initial steps in planning for the implementation of the Trash Amendments were through Order R9-2017-0077 (Trash Order) in accordance with Water Code section 13383. The San Diego Water Board intends to incorporate the requirements of the Trash Amendments into the Regional MS4 Permit during its next reissuance, anticipated in 2019.

To comply with the discharge prohibition presented in the Trash Order, MS4 permittees are required to implement either of the following tracks:

> *Track 1*: Install, operate, and maintain full capture systems for all storm drains that capture runoff from the priority land uses (PLUs) in their jurisdictions; or
>
> *Track 2*: Install, operate, and maintain any combination of full capture systems, multi-benefit projects, other treatment controls, and/or institutional controls within either the jurisdiction of the MS4 permittee or within the jurisdiction of the MS4 permittee and contiguous MS4 permittees. The MS4 permittee may determine the locations or land uses within its jurisdiction to implement any combination of controls. The MS4 permittee shall demonstrate that such combination achieves full capture system equivalency. The MS4 permittee may determine which controls to implement to achieve compliance with full capture system equivalency. It is, however, the State

Water Board's expectation that the MS4 permittee will elect to install full capture systems where such installation is not cost-prohibitive.

Each MS4 permittee was required to submit written notification to the San Diego Water Board of its intent to select either Track 1 or Track 2 as its compliance pathway. On August 31, 2017, the City of Vista provided notice that Track 2 was selected as its compliance pathway.

Track 2 allows permittees to install, operate, and maintain any combination of full capture systems, multi-benefit projects, other treatment controls, and/ or institutional controls for PLUs. Track 2 also requires the submission of an Implementation Plan (Plan) to the San Diego Water Board by December 3, 2018.

In accordance with the Trash Order, the Track 2 Implementation Plan must describe the following:

1. The combination of controls selected by the MS4 Permittee for compliance and a rationale for each selection;
2. How the combination of controls is designed to achieve full capture system equivalency;
3. How full capture system equivalency will be demonstrated;
4. How the implemented controls identified in the trash implementation plans will be monitored and assessed in jurisdictional runoff management program or Water Quality Improvement Plan Annual Reports;
5. Proposals by MS4 permittees, if any, to substitute Priority Land Uses described in Finding 9 above with other locations or land uses, provided that the total trash generated in other locations or land uses is equivalent to, or greater than, the total trash generated in the Priority Land Use being substituted; and
6. A time schedule to achieve full compliance with the trash discharge prohibition, including interim milestones (such as average load reductions of ten percent per year or other progress) to full implementation. The proposed final compliance date must not be later than fifteen (15) years from the effective date of the Trash Amendments (i.e. December 2, 2030).

Per the Trash Order, the Track 2 Plan will be deemed accepted by the San Diego Water Board ninety (90) days after submission unless otherwise directed in writing by the San Diego Water Board Executive Officer.

2 Baseline Assessment of Trash Capture and Generation Rates

The Trash Order requires that the discharge of trash must be mitigated in the following PLUs, including: High-Density Residential, Mixed Urban, Commercial, Industrial, and Public Transit Stations. PLUs in the City were identified and mapped using the City's geographic information systems (GIS) data and the General Plan GIS data. See Attachment 1 for a map of the Plan Area.

In May 2018, the final draft of the "Regional Trash Generation Rates for Priority Land Uses in San Diego County" (County Study) was completed, providing trash generation rates for PLUs throughout the county. The City of Vista participated in the County Study and included one sample site for each of the following PLUs: Commercial, Industrial, and High-Density Residential. Table 1 is from the County Study and presents mean trash generation rates for the PLUs. The City's baseline trash generation rates calculated in this Plan used the aforementioned generation rates. No PLU substitutions (Item 5 in previous section) are anticipated at this time by the City.

Table 1. Baseline Trash Generation Rates[1]

PLU	No. Sites in the County	Mean Volume-Based Trash Generation Rates (gallons/acre/year)[1]	Mean Weight-Based Trash Generation Rates (pounds/acre/year)
High-Density Residential	10	2.50	0.48
Industrial	14	2.60	0.66
Commercial	11	6.00	0.95

1. *Rates from the "Regional Trash Generation Rates for Priority Land Uses in San Diego County", and includes a representative site from the City of Vista.*

Trash generation rates were not calculated for Mixed Urban land uses in the County Study; therefore, an average of the other PLU sites (High-Density Residential, Industrial, Commercial) was utilized for the Mixed Urban PLU, resulting in a trash generation rate of 3.70 gallons/acre/year.

Because Public Transportation Stations were also not confirmed in the County Study, Public Transportation Stations were averaged based on High-Density, Industrial, Commercial PLU sites.[1] In "Trash Total Maximum Daily Loads for the Los Angeles River Watershed" staff report on August 9, 2007, Public Transportation Stations were assigned "industrial" land use trash generation rates. If the City were to apply similar methodology, the trash generation rate for Public Transportation Stations would be 2.60 gallons/acre/year, instead of 3.70 gallons/acre/year, as calculated for the Mixed Urban PLU. This higher generation rate is appropriate for areas where people may congregate, as expected at bus stops, and as such, the City opted for the more conservative trash generation rate of 3.70 gallons/acre/year for Public Transportation Stations PLU (calculated by taking the average of the PLU generation rates in Table 1).

Table 2 presents trash generation rates of each PLU, the total acres of each PLU within the City, and the gallons per year that need to be reduced at the 10-year compliance point of the Trash Order. Because most full-capture devices, such as connector pipe screens or hydrodynamic separators, offer the ability to consider storage volumes, only volume of trash will be discussed in the Plan. Weight will not be discussed in the Plan.

Per the Trash Order, "full-capture system equivalency is the trash load that would be reduced if full-capture systems were installed, operated, and maintained for all storm drains that capture runoff from the relevant areas of land".

[1]The County Study did not include a Public Transportation Station PLU site in the trash generation rate analysis because it typically includes other PLU types in its drainage area that were already being assessed. Instead, literature reference values were recommended to be used.

For the City, the total volume of trash required to be reduced to demonstrate full-capture equivalency is 11,130gallons per year, as shown calculated below.

Table 2. PLU Generation Rates

PLU	Mean Volume-Based Trash Generation Rates (gallons/acre/year)[1]	Total Acres[2,3]	Total to be Reduced (gallons/year)[3]
Commercial	6.00	720	4,320
Industrial	2.60	1,060	2,760
Mixed Urban	3.70	410	1,520
High-Density Residential	2.50	940	2,350
Public Transportation Stations	3.70	50	180
Total	**-**	**3,180**	**11,130**

1. Rates for Commercial, Industrial, and High-Density Residential PLUs provided by *"Regional Trash Generation Rates for Priority Land Uses in San Diego County."* Mixed Urban and Public Transportation Stations PLU rates calculated using an average of Commercial, Industrial, and High-Density Residential.
2. Acres calculated using City GIS data for PLU acreage.
3. Values rounded to the nearest ten.

3 Trash Management Implementation and Control Measures

Following implementation of Track 2, the combination of structural and non-structural controls must be designed to demonstrate full-capture system equivalency, i.e, reduce the baseline trash load by 11,130gallons/year to zero within 10 years. Structural best management practices (BMPs) exist throughout the city, and the City maintains a GIS-based inventory of them. Non-structural BMPs are presented in the Jurisdictional Runoff Management Program (JRMP) document and Water Quality Improvement Plans (WQIPs) for the San Luis Rey and Carlsbad watersheds. Both structural and non-structural BMPs were reviewed and evaluated to determine all of the trash-related controls currently in place and how much trash is already being removed beyond the baseline.

Moving forward, additional structural BMPs will be required because not all trash will be removed with the existing structural and non-structural BMPs. Using non-structural controls as well as structural BMPs also allows for consideration of partial capture BMPs where full-capture may not be feasible. The proposed combination of controls provide the basis of this Plan. The Plan is intended to be adaptive and may be modified in the future based on information gained through the implementation of trash control measures.

3.1 Existing Structural Controls

The City's GIS files were used to determine the number and types of existing structural BMPs that provide for trash removal. See Attachment 1 for map of the BMP sites and drainage areas. BMPs outside of the PLUs were not considered.

To consider what trash is already being removed from the storm drain system, the following equation was used based on the Los Angeles precedent, as stated in the "City of Los Angeles Institutional Measures Quantification Study for Trash TMDL Compliance":

Land Use Trash Generation Rate x Drainage Area of BMP x Percent Effectiveness of BMP

= Trash Kept Out of Storm Drain System

The following subsections summarize the City's efforts to implement full-capture and partial-capture systems.

3.1.1 Full-Capture System

Three connector pipe screens (CPS) were installed in the City as part of the County Study. These are the only known full-capture devices per the State Water Resources Control Board's current "Certified Full Capture System List of Trash Treatment Control Devices", and the City's GIS data. Devices on the state-certified full capture list are considered 100% effective in this Plan. One CPS is in each of the following areas: Commercial, Industrial, and High-Density Residential.

Based on the drainage area to the catch basin, PLU trash generation rate, and trash capture effectiveness associated with each full-capture device, the total trash reduction for the three existing CPS units is approximately 280 gallons per year. See Attachment 2 for details on trash reduction for full capture BMPs.

3.1.2 Partial-Capture System

The overall trash reduction achieved by partial capture BMPs was calculated based on the drainage areas associated with each of those BMPs. The generation rates of each PLU category (Table 2) were multiplied with drainage areas to produce a value for the volume of trash that can be captured by each BMP per year. The total volume of trash captured was then multiplied by the effectiveness of each BMP to provide a more accurate value for the volume of trash prevented from entering the storm drain system. The effectiveness of all applicable partial-capture BMPs is shown below in Table 3.

The effectiveness values were generated from the BMP ratings for trash in the California Stormwater Quality Association's "Stormwater Best Management Practice Handbook" (Handbook). The Handbook provided descriptions and removal effectiveness ratings of "low," "medium," and "high" for various BMPs, which were then translated into the range of values shown below. Systems or devices that may be full-capture were shown with ranges up to 100% with lower ranges for systems with more design ambiguity. Systems of ranking "low" are not considered to be very effective and were only given ranges of up to 15% effectiveness. Systems or devices of "medium" ranking were assigned a value between "low" and "high" based on best professional engineering judgment and potential of specific device.

Table 3. BMP Effectiveness

BMP Type	Range of Effectiveness (%)
Continuous Deflective Separation (CDS)	90 – 100
Catch Basin	0 –10
Catch Basin with Grating	80 –90
Drain Insert	75 – 100
Media Filter	80 – 100
Bioretention Area	80 – 100
Downstream Defender	90 – 100
Trench Drain	70 – 100
Water Quality Inlet	40 – 050
Wet Vault, Oil/Grit/Water Separator	50 – 100
FloGard Plus	90 – 100
Modular Wetland System	60 – 100
Detention Basin	80 – 100
Nutrient Separating Baffle Box	90 – 100
Pervious Pavement	0 – 10
Grate Inlet Skimmer Box	90 – 100
Infiltration Basin	90 – 100
Detention Underground Pipe	5 – 15
Stormceptor	90 – 100
SilvaCell	90 – 100
Unspecified Trash Capture Device	70 – 80
CPS (MS4 Trash Collector)	100

The drainage areas were calculated using the City's GIS polygons, which are based on BMP sites. When multiple BMPs were found in a single drainage area, the most conservative effectiveness value was used for the calculation. Based on the drainage area, PLU trash generation rate, and assumed trash capture effectiveness associated with each partial capture device, the total trash reduction for the existing partial capture BMPs is approximately 1,180 gallons per year.

Although some of the City's partial capture devices may currently be providing full-capture, that determination is planned to be evaluated as a strategy in the plan at a later date.

3.2 Existing Non-Structural Controls

This section summarizes the City's existing non-structural controls that have been and will continue to be implemented throughout the compliance period.

3.2.1 Street Sweeping

The City uses vacuum-street sweepers in their street sweeping. Most routes are swept twice per month. Some downtown areas are swept weekly. See Attachment 3 for a map of street sweeping. To determine the percent trash reduction from street sweeping,

considerations were made for the efficiencies of the sweepers and the effectiveness of removing trash from along the curb and gutter.

Street sweeping efficiency for trash reduction is reported in the literature based on two methods: 1) direct measurement of what is picked up by the sweeper divided by the total trash load; and 2) indirect measurement by assessing the trash load in a watershed at a control point with and without sweeping during the study period. The following methodology is based on the findings in the Bay Area which focuses on indirect measurement of the trash.

Methodology for Reduction Approach

There has recently been and will likely continue to be more studies relating street sweeping to trash reduction. Regarding trash reduction from sweeping, the "Literature Review for Trash Amendment Compliance Strategy" prepared for the County of San Diego in 2015 reported trash reduction from street sweeping ranging from 20% to 87%. "Tracking California's Trash Project" from the Bay Area Stormwater Management Agencies Association (BASMAA) describes a study in which bi-weekly street sweeping had an average trash removal efficiency of 67.2% in San Jose and monthly sweeping in Freemont had an average removal of 99%. This demonstrates that street sweepers can be very effective in picking up trash from streets.

However, the study "The Measurement and Reduction of Urban Litter Entering Stormwater Drainage Systems" by Neil Armitage and Mark Marais notes that the effectiveness of street sweeping will vary depending on the time between storms. See Figure 3-1 for a graph of the maximum expected efficiency of street sweeping. Per Figure 3-1, a bimonthly street sweeping program in the dry season with an average significant storm every 100 days would have a street-sweeping efficiency of approximately 95%. Even in the wet season when significant storms could result in the same average frequency of bi-monthly street sweeping (14 days between sweeps and 14 days between storms), the efficiency is still as high as 50%. This assumes that a parking enforcement program is in place and sweepers are able to reach the trash. The same BASMAA study also concluded that for streets swept once or twice per month the pre-sweeping trash levels returned within one to two weeks. The study indicated that because of this, trash can be found on the streets about half of the time in areas that are swept monthly or bi-monthly in very high or high trash generating areas.

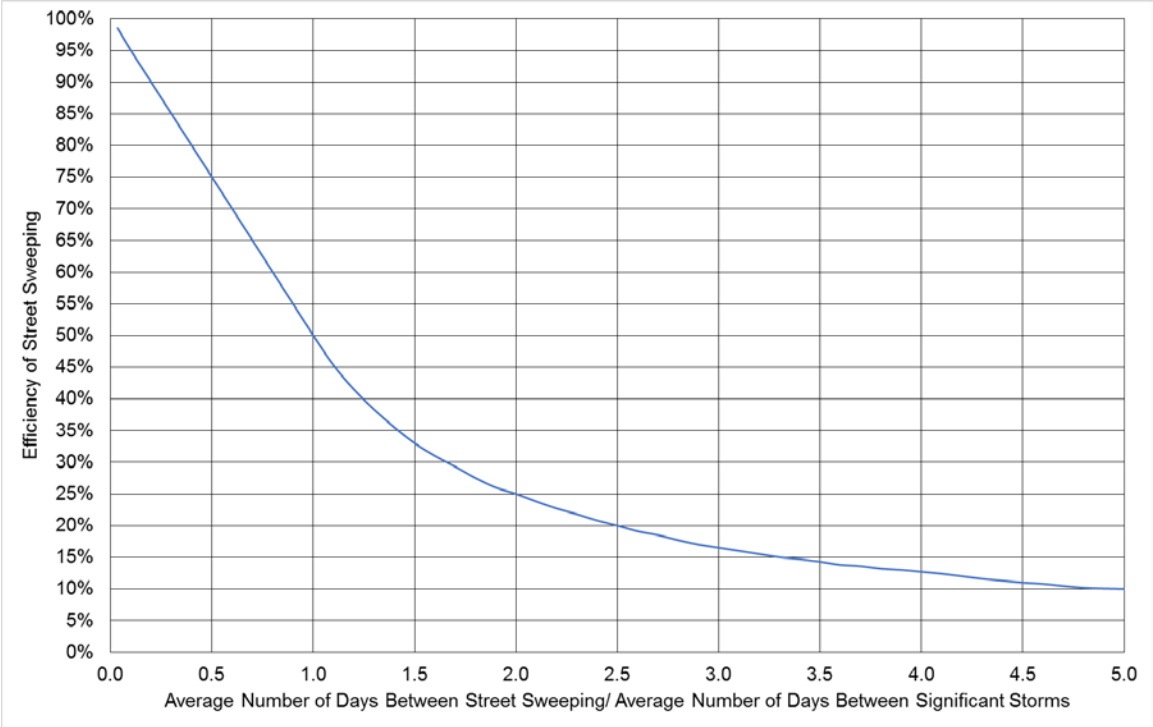

Figure 3-1. Maximum Expected Efficiency of Street Sweeping

City Street Sweeping Trash Reduction

To use this approach to determine the percent reduction from street sweeping, recent weather data for the City was reviewed. Using data from three weather stations[2] in the City, the average days between significant rain events (above 0.1 inch) was determined for the 2018 dry-seasons from May through October. This indicated an average of approximately 60 days between storm events. In the wet season of November 1, 2017 to April 31, 2018, the City had an average of approximately 11 days between rain events. Considering the City's parking-enforced, bimonthly sweeping program and the graphic below, the dry season would have a sweeping effectiveness of approximately 89% and a wet season approximate effectiveness of 39%. Overall effectiveness is 64%. See Figure 3-2. These values are within the studied range of effectiveness of the BASMAA study.

[2]The three weather stations analyzed were KCAVISTA11, KCAVISTA13, and KCAVISTA22 from Weather Underground.

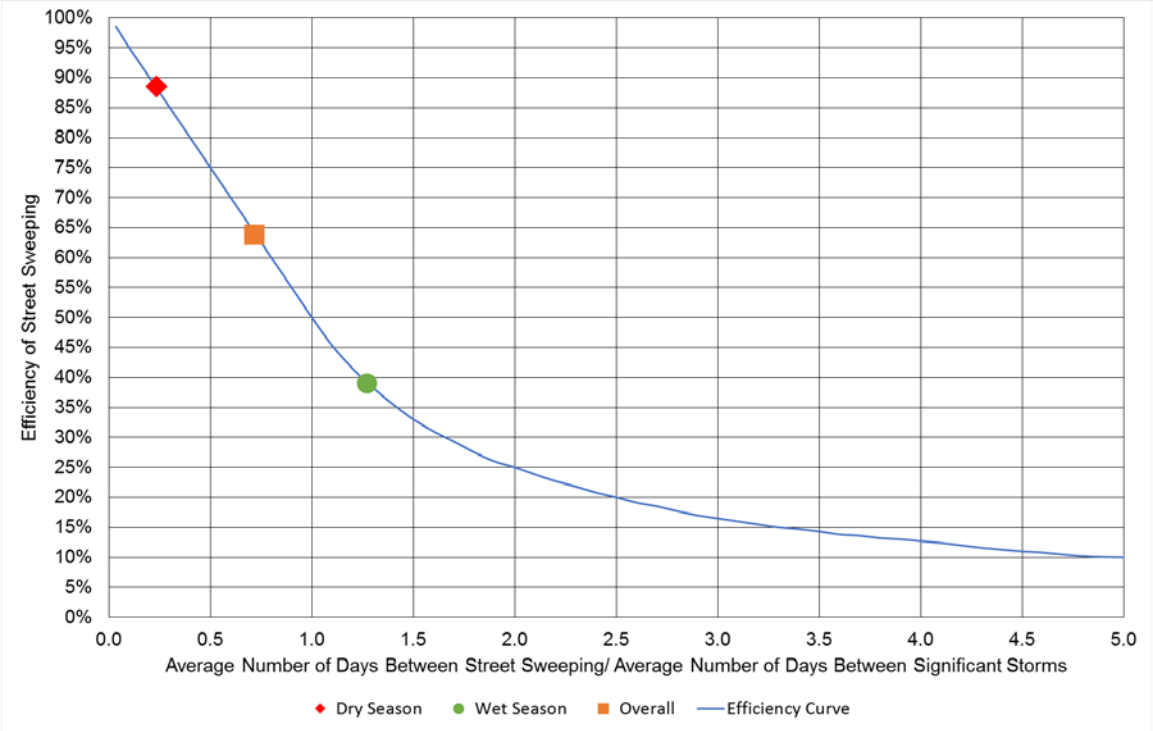

Figure 3-2. Expected Efficiency of Street Sweeping during Dry and Wet Season

If we use the overall value (64%) and consider that only half of the trash is picked up based on the BASMAA findings, we could assume that the trash reduction from street sweeping in the City would be 32%. A similar method is being used in the Bay Area with the primary difference being that the method is normalized for multiple agencies in the area based on typical times between storm events and various street sweeping frequencies. A review of Bay Area compliance documents finds that other agencies are reporting approximately 40% trash reduction from street sweeping. Reported reductions varied from city to city, with approximately 43% reported in the City of East Palo Alto and the City of San Bruno. In lieu of a study for the San Diego region that is similar in nature, the City will conservatively assume a trash reduction of 32% from street sweeping. This reduction may increase in the future if local street sweeping studies are conducted.

Therefore, a trash reduction of approximately 32% of the total baseline generation (or 3,565 gallons per year) will be conservatively assumed from street sweeping.

3.2.2 Other Non-structural BMPs

Studies and reports support that non-structural BMPs have proven to be effective for trash reduction. One reviewed study, by Gershman in 2005 reported that education and outreach can result in a 75% reduction in trash. Comprehensive programs such as public clean up days, litter hotlines, enforcement of litter laws, and beautification projects generally yield higher results. A provision in the Municipal Regional Permit for the Bay Area required permittees, such as City of East Palo Alto and City of San Bruno, to reduce trash from their MS4s by 40% before July 1, 2014, with 100% compliance by 2022. Using BASMAA's "Trash Load Reduction Tracking Method," load reduction credits

to track progress towards this goal were given with the implementation of certain trash control measures. These trash control measures included public education and outreach and improved trash bin/container management activities, which align with the efforts currently conducted by the City of Vista. Both the City of East Palo Alto and City of San Bruno received 8% load reduction credit for their public education and outreach program control measures (3% advertising campaigns, 2% outreach to school-age children or youth, 1% media relations such as using free media, 2% community outreach events). The City of East Palo Alto also received 1% reduction credit for implementing specific enhanced control measures, such as litter receptacles, while City of San Bruno received 3% reduction credit. City of Los Angeles Bureau of Sanitation & Environment in 2014 reported a slightly higher estimated percentage for those trash control measures; catch basin maintenance, public outreach, enforcement, and trash receptacles collectively had 13.5% program effectiveness for the City of Los Angeles. While specifics may vary based on area, the concept of the percent removal for non-structural BMPs can be applied to the City.

As described in the JRMP and WQIP documents, the City currently implements a wide range of non-structural activities and institutional controls to eliminate the discharge of trash from the storm drain system into the receiving waters. These activities include the following:

- Public education and outreach (similar the potential 8% granted through BASMAA)
    - Implementation of education and outreach activities, targeting key pollutants and audiences.
    - Implementation of community trash cleanup events.
    - Publish local and regional messaging, including opportunities for public engagement in pollution prevention and reporting of incidents.
- Use of trash container management (similar the potential 4% granted through BASMAA)
    - Trash enclosure design requirements to prevent run-on and contact of trash with stormwater.
    - Maintaining trash receptacles at high use areas throughout the City, including parks, bus stops, and pedestrian ways.
- Other additional non-structural BMPs are as follows:
    - Existing development inspections to confirm implementation of minimum BMPs, including good housekeeping and appropriate trash management.
    - Regular inspection of construction sites to ensure proper waste management.
    - Inspection and maintenance certification of existing structural BMPs installed throughout the City.
    - Authority to prevent the discharge of pollutants in stormwater, including ability to enforce corrective actions and additional BMPs.
    - Implementation of pet waste collection stations throughout the City.

- Public storm drain system maintenance such as catch basin cleaning and illegal dumping/spill response.

- (Upcoming/Anticipated) Amend municipal code and development standards, as necessary, to address Trash Order requirements.

These existing non-structural BMPs and activities are similar in scope to those described in aforementioned studies, as well as Regional Board acceptance of percent pollutant removal. Based on the review of various agencies' activities and supporting studies, pollutant reduction from other non-structural BMPs is conservatively assumed to be 12 percent. This yields a reduction of 1,335 gallons of trash.

4 Implementation Plan

Currently implemented activities discussed in the previous sections allow the City the opportunity to consider an existing reduction in the amount of trash that needs to be reduced each year. Implementation of the trash reduction strategy described in this plan will begin in fiscal year 2019-2020. This existing reduction can be applied in the initial years of the program while the City conducts internal studies and identifies funding for the installation of additional full-capture devices. See Table 4 for a summary of the existing trash reduction from the baseline considering current City efforts.

Table 4. Trash Capture Existing Reduction

Description	Gallons/Year
Reduction for Full-Capture BMPs	280
Reduction for Partial Capture BMPs	1,180
Reduction for Street Sweeping	3,565
Reduction for Other Non-Structural BMPs	1,335
Total Reduction Already Achieved	**6,360**

The Trash Order requires that full compliance with the trash discharge prohibition occurs within 10 years of the effective date of the first implementing permit, no later than December 2, 2030, and demonstration of achievements of interim milestones such as average load reductions of 10 percent per year or other progress to full implementation. The 10 percent yearly progress is for the total of all the PLUs.

To effectively implement, evaluate, monitor, and course correct (if necessary), the City intends to begin detailed planning efforts in Years 1 and 2, and initiating structural BMP construction activities in Year 3.

Table 5. Trash Reduction

Description	Gallons
Baseline Trash Generated	11,130
Total Reduction Already Achieved	6,360
Percent Reduction at Year 1	**57%**
Remaining Trash to be Reduced by Year 10	4,770
Additional Percent Reduction Needed by Year 10	**43%**
Trash Removed Annually in Year 10	**11,130**

To achieve full capture compliance by Year 10, the City's primary strategy will be to augment non-structural BMPs and existing structural BMPs with the installation of full-capture devices (e.g., connector pipe screens, hydrodynamic separator devices, or similar) within PLUs. Early stages of implementation will include the design and execution of several studies and analyses to assist with confirming device installation feasibility and prioritization. These studies will ensure that devices are installed strategically and effectively. Knowledge and data gained from the studies will also guide future decisions so that trash reduction activities can be adaptively managed in a responsible manner over time. An overview of implementation activities and strategies are as follows:

- Years 1 through 5:
    - Identify, prioritize, and install full-capture structural devices in public storm drain system within PLUs. This phase of implementation will function similarly to Track 1 implementation activities.
        - The City plans to conduct studies to strategize device installation, considering device type, design, location, and identification of construction constraints.
        - The City plans to consider both previously prepared studies and future studies for compliance. Previously prepared studies provide preliminary options for BMP types, prioritization, and locations. The preparation of new studies may focus on drainage, further prioritization, and optimizing efficiencies and locations of BMPs,
    - Maintain current street sweeping program and existing non-structural BMPs, as described in Section 3.2.
    - Evaluate opportunities to retrofit existing structural BMPs within the City to achieve trash full capture compliance.
        - The City will inventory the BMPs identified in Attachment 2 and determine opportunities to retrofit existing BMPs for full-capture equivalency as well as determine if BMPs herein identified as partial-capture may be currently designed as full-capture. Updates to load removal from these findings will be documented in the annual reports, as appropriate.
    - Explore opportunities for partnerships with Caltrans (see Section 5.3).
    - Evaluate existing municipal code and development standards, and identify revisions that may be necessary to implement Trash Order requirements.
        - The City anticipates an Ordinance will be adopted requiring all new development to comply with trash order requirements.
    - Explore funding mechanisms to finance trash order compliance needs.
    - Year 5 milestone assessment to evaluate progress toward trash reduction requirement (see Section 5.4). Evaluate, monitor, and course correct areas of implementation as needed, considering both structural and non-structural BMPs.

- Years 6 through10:
  - Continue to install full-capture structural devices in the public storm drain system to attain interim and final trash reduction milestones.
    - The City intends to continue to monitor the latest information and studies regarding the effectiveness of trash removal devices. As more information becomes available, the City will consider a variety of structural solutions to meet milestones and trash order compliance.
  - Maintain current street sweeping program and existing non-structural BMPs, as described in Section 3.2.
    - The City intends to continue to monitor the latest information and studies on street sweeping and other non-structural BMPs. As more information becomes available, the City will consider revisions and enhancement of their programs, as appropriate.
  - Year 8 milestone assessment to evaluate progress toward trash reduction requirement (see Section 5.4). Evaluate, monitor, and course correct areas of implementation as needed, considering both structural and non-structural BMPs.
  - Conduct final assessment of compliance in Year 10 (see Section 5.4).

5 Progress Monitoring and Assessment Strategy

The City is required to provide annual reports to the San Diego Water Board to describe progress made toward achieving full compliance with the trash discharge prohibition. Per the Trash Order, the monitoring and reporting requirements are dependent on the measures elected to be implemented.

Appendix E of the Water Quality Control Plan for Inland Surface Waters, Enclosed Bays, and Estuaries (ISWEBE Plan) , “Final Part 1 Trash Provisions of the Water Quality Control Plan for Inland Surface Water, Enclosed Bays, and Estuaries of California,” states the following questions should be considered when preparing monitoring reports:

What type of and how many treatment controls, institutional controls, and/or multi benefit projects have been used and in what locations?

1. How many full capture systems have been installed (if any), in what locations have they been installed, and what is the individual and cumulative area served by them?
2. What is the effectiveness of the total combination of treatment controls, institutional controls, and multi-benefit projects employed by the MS4 permittee?
3. Has the amount of Trash discharged from the MS4 decreased from the previous year? If so, by how much? If not, explain why.
4. Has the amount of Trash in the MS4’s receiving water(s) decreased from the previous year? If so, by how much? If not, explain why.

For all of the questions above, the Trash Order states that the City should consider the questions but that they are not required. The intent is to keep trash out of the storm drain

system where compliance will be measured, and annual reports will discuss achievements for the activites implemented during the 10-year duration of the Plan.

5.1 Monitoring Approach

In accordance with the Trash Order, two approaches are acceptable and defensible assumptions for quantifying trash reduction: the Trash Capture Rate Approach and the Reference Approach.

5.1.1 Quantification Approach: Trash Capture Rate

The Trash Capture Rate Approach is described as follows:

"Directly measure or otherwise determine the amount of trash captured by full capture systems for representative samples of all similar types of land uses, facilities, or areas within the relevant areas of land over time to identify specific trash capture rates. Apply each specific trash capture rate across all similar types of land uses, facilities, or areas to determine full capture system equivalency. Trash capture rates may be determined either through a pilot study or literature review. Full capture systems selected to evaluate trash capture rates may cover entire types of land uses, facilities, or areas, or a representative subset of types of land uses, facilities, or areas. With this approach, full capture system equivalency is the sum of the products of each type of land use, facility, or area multiplied by trash capture rates for that type of land use, facility, or area."

5.1.2 Quantification Approach: The Reference Approach

The Reference Approach is described as follows:

"Determine the amount of trash in a reference receiving water in a reference watershed where full capture systems have been installed for all storm drains that capture runoff from all relevant areas of land. The reference watershed must be comprised of similar types and extent of sources of trash and land uses including PLUs and all other land uses, facilities, or areas as the permittee's watershed. With this approach, full capture system equivalency would be demonstrated when the amount of trash in the receiving water is equivalent to the amount of trash in the reference receiving water."

5.2 Selection of Approach

The City has selected the Trash Capture Rate Approach to determine full capture system equivalency. This option allows the City to determine generation rates based on data from its own trash capture devices. In addition, the reported volume of trash reduction is objectively derived from the amount collected and removed from the system. The contrasting option, the Reference Approach, allows for excessive variability regarding the origination of the referenced trash, which limits the ability to adequately determine the effectiveness of the system.

5.3 Caltrans Coordination

Section 1.9.c. of the Trash Order requires MS4 permittees to coordinate trash capture efforts with Caltrans where applicable. Recognizing that California State Route 78

bisects its jurisdictional area, the City will explore opportunities to partner with Caltrans on the installation and maintenance of trash capture facilities during the early years of Plan implementation.

5.4 Monitoring and Reporting Plan

A monitoring report will be submitted annually. In the first few years of the new program, a desktop review may work well for drainage areas served by certified and properly designed full-capture systems. After identifying and confirming the PLU areas with full-capture systems, the City may quantify the performance of partial capture devices and institutional controls in the remaining PLU drainage areas for full capture equivalency. Some field work may be done to collect and validate data and assumptions for partial capture devices, and follow with desktop evaluation to determine full capture equivalency, as needed. The monitoring report will note progress towards compliance, such as stating the additional average load reduction based on new controls. An average reduction of 10% per year over ten years is the target milestone. The anticipated milestone reduction is as follows:

- Year 5 – 50% trash reduction: Assessment would be performed in Year 5 annual report.
- Year 8 – 80% trash reduction: Assessment would be performed in Year 8 annual report. Course correct before Year 10
- Year 10 –100% compliance: Revise and update Year 8 report to demonstrate compliance.

The monitoring report will include GIS-mapped locations and drainage areas served for each of the full-capture systems, multi-benefit projects, other treatment controls, and/or institutional controls installed or used by the City.

To note the amount of trash reduced, the annual Monitoring Reports can reference the individual questions in the Trash Amendments:

1. What type of and how many treatment controls, institutional controls, and/or multi benefit projects have been used and in what locations?
    i. Listed in annual reports beginning in Year 1.
2. How many full capture systems have been installed (if any), in what locations have they been installed, and what is the individual and cumulative area served by them?
    i. Listed in annual reports beginning in Year 1.
    ii. Updated in annual reports beginning in Year 3.
3. What is the effectiveness of the total combination of treatment controls, institutional controls, and multi-benefit projects employed by the MS4 permittee?
    i. Listed in annual reports beginning in Year 1.
    ii. Updated in annual reports beginning in Year 4.
4. Has the amount of Trash discharged from the MS4 decreased from the previous year? If so, by how much? If not, explain why.
    i. Updated in each report beginning in Year 4.
5. Has the amount of Trash in the MS4's receiving water(s) decreased from the previous year? If so, by how much? If not, explain why.

i. Using trash capture approach to assess trash in the MS4, as discussed previously. However, the existing program for dry weather MS4 major outfall monitoring may be utilized, if needed and appropriate, to assess trash in the receiving water discharged by the MS4.

6 Implementation Schedule

See Table 6 for a summary of the anticipated schedule for compliance. The schedule shows both anticipated implementation and reporting/monitoring activities.

The Plan is intended to be adaptive and allow for the ability to course correct implementation strategies based on early studies and reports. The Plan may be modified in the future based on information gained through the implementation of trash control measures and milestone achievement. If any new information becomes available regarding baseline generation rates or the load reduction in the process of implementation and reporting, the City may amend or revise this Plan and the associated implementation schedule. The City will resubmit any required amendments or revisions to the document and/or schedule to the San Diego Water Board as part of the annual reporting process.

Table 6. Trash Control Measure Implementation and Monitoring/Reporting Schedule

Trash Management Control Measures	**Year 1 (FY 19-20)**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	**Year 7**	**Year 8**	**Year 9**	**Year 10 (FY 28-29)**
Implementation: Maintain bi-weekly street sweeping, BMP O&M, and existing non-structural controls	X	X	X	X	X	X	X	X	X	X
Monitoring: *Annual Monitoring Report to Board*	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*
Implementation: Adopt and implement funding plan and any required ordinances	X	X								
Implementation: Prepare/Perform BMP Location and Drainage Studies, as needed.	X	X								
Monitoring: *Desktop Analysis of Anticipated Reduction for Annual Monitoring Report*	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*
Implementation: Install structural devices on public property			X	X	X	X	X			
Implementation: Retrofit previously installed devices to full-capture equivalency, if applicable			X	X	X					
Implementation: Determine effectiveness of devices and programs and course correct, as needed				X	X	X	X	X	X	X
Monitoring: *Perform field studies to determine compliance, if needed and applicable*								*X*		*X*
Implementation: Implement additional controls following field studies if determined necessary									X	X
Implementation: Meet compliance										X

7 References

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6. EOA, Inc. *Tracking California's Trash Project: Evaluation of Street Sweeping and Curb Inlet Screens as Measures to Control Trash in Stormwater for BASMAA*. Oakland, 2016.

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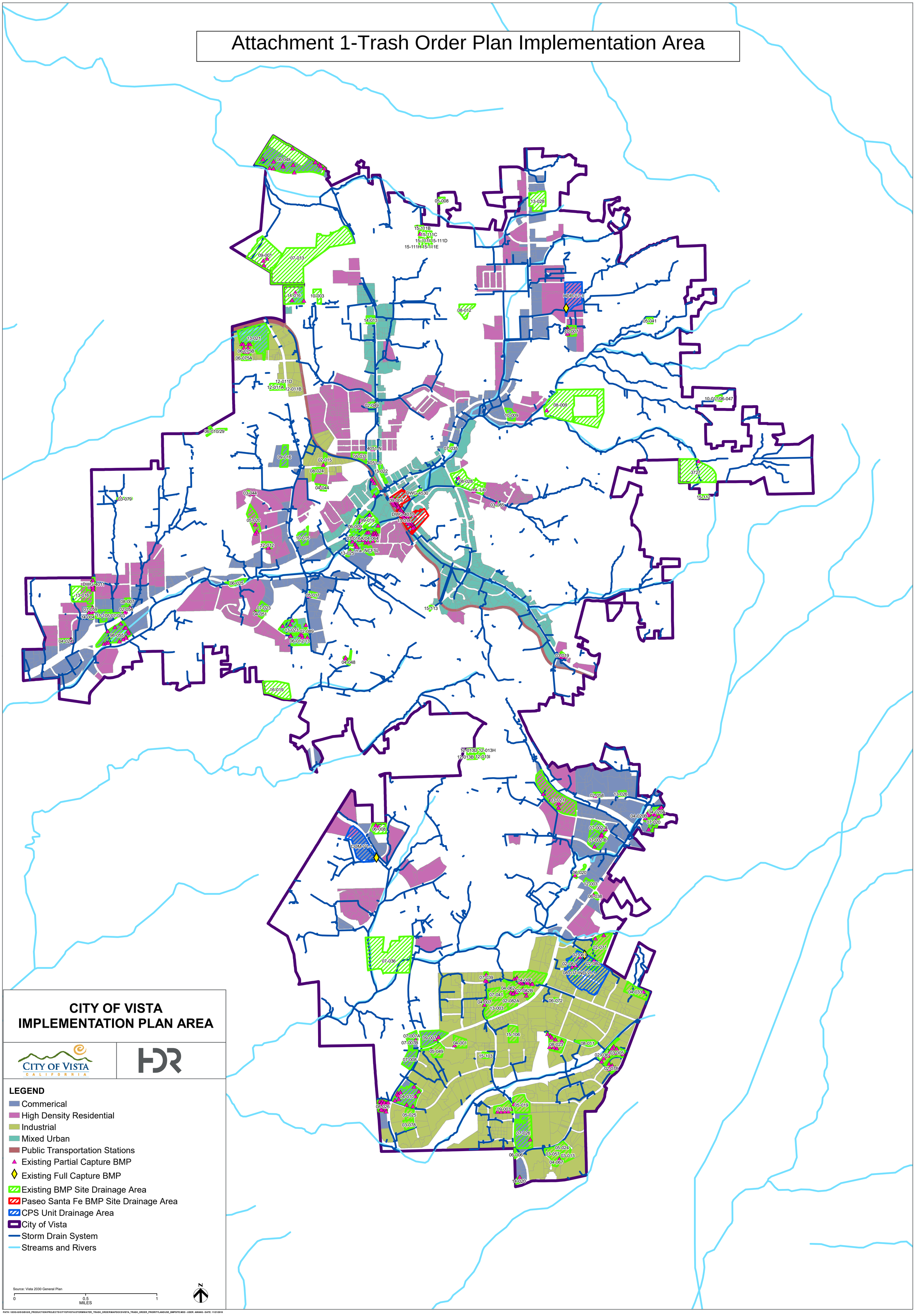
Attachment 1. Trash Order Implementation Plan Area

Attachment 1-Trash Order Plan Implementation Area



CITY OF VISTA IMPLEMENTATION PLAN AREA

CITY OF VISTA
CALIFORNIA

HDR

LEGEND

- Commerical
- High Density Residential
- Industrial
- Mixed Urban
- Public Transportation Stations
- Existing Partial Capture BMP
- Existing Full Capture BMP
- Existing BMP Site Drainage Area
- Paseo Santa Fe BMP Site Drainage Area
- CPS Unit Drainage Area
- City of Vista
- Storm Drain System
- Streams and Rivers

Source: Vista 2030 General Plan

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Attachment 2. Trash Reduction for Existing Partial and Full Capture BMPs Table

Attachment 2
Trash Reduction for Existing Partial Capture BMPs Table

SiteNumber	BMP Detail	Site Area (acres)	Land Use Category	Trash Generation Rate (gallons/acre/year)	Total (gallons/year)	Effectiveness	Total Effectiveness (gallons/year)
06-048	Box Inlet Filter x4, Curb Inlet Filter x10	43.11	Commercial	6	258.66	0.90	232.79
03-021	CDS x4	21.29	High Density Residential	2.5	53.22	0.90	47.90
13-021	Bioretention area with underdrain x49	19.86	Mixed Urban	3.7	73.49	0.90	66.15
07-026	Downstream Defender x1	15.84	Commerical	6	95.07	0.90	85.56
04-006	Fossil Filter Insert x6, Triton (24" x 36") x6	14.02	Industrial	2.6	36.46	0.30	10.94
98-055	Box Inlet x4, Curb Inlet x8, Trench Drain x1, Wet Vault (oil/water separator) x1	13.28	Commerical	6	79.69	0.50	39.85
04-010	FloGard Plus x8, Contech/Vortechs Model 9000 x1	12.65	Commerical	6	75.90	0.95	72.10
02-071	Fossil Filter Insert x2	11.75	Industrial	2.6	30.54	0.30	9.16
14-016	Modular Wetland System x3	11.26	Mixed Urban	3.7	41.66	0.90	37.50
03-016A/04-064	Catch Basin x5, FloGard Plus x7, Curb Inlet x3, Trench Drain x3	10.04	Mixed Urban	3.7	37.14	0.50	18.57
13-016	Bioretention area x1	9.81	High Density Residential	2.5	24.53	0.90	22.08
13-003	Bioretention area x11	9.74	Industrial	2.6	25.34	0.90	22.80
09-007	Catch Basin Insert x2	9.29	Commerical	6	55.73	0.30	16.72
07-002-B	Catch Basin x1, Curb Inlet x2	7.87	Commerical	6	47.20	0.50	23.60
05-019	CDS x1	7.84	Industrial	2.6	20.39	0.90	18.35
13-023	Contech Stormfilter Vault x4	7.16	Mixed Urban	3.7	26.51	0.50	13.26
08-023	Fossil Filter Insert x8	7.09	Industrial	2.6	18.43	0.30	5.53
04-033	Filter with hydrocarbon boom	6.57	Industrial	2.6	17.09	0.90	15.38
05-020	Curb Inlet Filter x3	6.31	High Density Residential	2.5	15.79	0.90	14.21
07-041	Detention basin x1, Grassy swale x1	6.25	Industrial	2.6	16.24	0.40	6.50
07-008	Grassy swale with underdrain x9, Detention basin with underdrain x5	5.36	Commerical	6	32.16	0.40	12.86
06-012/13	Fossil Filter Insert x5, Suntree NSBB x1, Curb Inlet x1	5.33	Mixed Urban	3.7	19.71	0.30	5.91
09-003	REM Filter Insert x5	4.76	Industrial	2.6	12.38	0.30	3.71
05-049	CDS x1	4.68	Industrial	2.6	12.18	0.90	10.96
15-106	Basin with underdrain x2, Trench drain x4, Pervious concrete x3	4.67	Industrial	2.6	12.14	0.25	3.03
03-057	Detention basin x2, Swale x3	4.61	Industrial	2.6	11.99	0.40	4.80
03-005	Imbrium/Stormceptor 2400 x1, Wet Vault (sand/oil separator) x1, Fossil Filter Insert x5	4.38	Industrial	2.6	11.40	0.30	3.42
02-082A	Fossil Filter Insert x3	4.36	Industrial	2.6	11.35	0.30	3.40
09-016	Detention underground pipe x3, Pervious pavement x1, Bioretention basin x7	4.34	Commerical	6	26.03	0.25	6.51

Attachment 2
Trash Reduction for Existing Partial Capture BMPs Table

SiteNumber	BMP Detail	Site Area (acres)	Land Use Category	Trash Generation Rate (gallons/acre/year)	Total (gallons/year)	Effectiveness	Total Effectiveness (gallons/year)
07-020	Catch Basin x1, Curb Inlet x2	4.32	Commerical	6	25.91	0.50	12.96
02-082B	FloGard Plus x4, Fossil Filter Insert x1	4.25	Industrial	2.6	11.06	0.30	3.32
07-002-A	Curb Inlet x1, Curb Outlet x1	4.25	Commerical	6	25.52	0.50	12.76
04-001	Fossil Filter Insert x1	4.06	Industrial	2.6	10.56	0.30	3.17
02-036	Fossil Filter insert x3	3.94	Industrial	2.6	10.23	0.30	3.07
06-075B	Fossil Filter Insert x8	3.89	Industrial	2.6	10.11	0.30	3.03
10-015	Detention Basin/Infiltration Pond x1	3.65	Commerical	6	21.91	0.80	17.53
08-026	BioClean Grate Inlet Skimmer Box x12, Curb Inlet x3	3.38	Commerical	6	20.30	0.95	19.28
15-105	Bioretention area with underdrain x2	3.32	Commerical	6	19.92	0.90	17.93
05-031	Bioretention area x1	3.20	High Density Residential	2.5	8.00	0.90	7.20
10-007	Curb Inlet x4, BioClean Storm Treatment Tank x4	2.85	High Density Residential	2.5	7.12	0.50	3.56
10-009	Infiltration Basin with Underground Detention x2	2.68	Commerical	6	16.08	0.95	15.27
05-024	Grassy Swale x4, Detention Basin x1	2.62	Industrial	2.6	6.82	0.40	2.73
06-009	Suntree NSBB x2	2.60	Mixed Urban	3.7	9.62	0.95	9.14
04-020A	Fossil Filter Insert x5, CDS x1	2.30	Commerical	6	13.81	0.90	12.43
08-024	Swale x2, Decomposed Granite Pervious Surface x1	2.24	Industrial	2.6	5.83	0.13	0.73
13-018	Bioretention area x3, Porous Concrete x1	2.22	Mixed Urban	3.7	8.22	0.90	7.40
07-023	Swale x2, Detention underground pipe x1	2.17	Commerical	6	13.01	0.05	0.65
02-080	Fossil Filter Insert x2	2.09	Industrial	2.6	5.44	0.30	1.63
06-025	Detention Basin x1, Grassy Swale x1	2.07	Commerical	6	12.40	0.40	4.96
04-051	Fossil Filter Insert x2	2.01	Commerical	6	12.06	0.30	3.62
12-003	Bioretention area x1, Stormchamber system under porous concrete x2, Porous Concrete x3	2.00	Commerical	6	12.01	0.90	10.81
07-007B	CDS x1	1.99	Commerical	6	11.95	0.90	10.75
02-078	Fossil Filter Insert x5	1.93	Industrial	2.6	5.01	0.30	1.50
14-013	Bioretention area with underdrain x2	1.87	Mixed Urban	3.7	6.93	0.90	6.24
04-067	Fossil Filter Insert x1	1.85	Industrial	2.6	4.81	0.30	1.44
07-007A	Porous Concrete x1	1.77	Commerical	6	10.61	0.25	2.65
12-012	REM Drop Inlet Filter x3	1.75	High Density Residential	2.5	4.39	0.90	3.95
02-061	Fossil Filter Insert x2	1.69	Industrial	2.6	4.39	0.30	1.32
08-017	Pervious pavement x1, Detention underground pipe x1	1.61	Industrial	2.6	4.19	0.25	1.05

Attachment 2
Trash Reduction for Existing Partial Capture BMPs Table

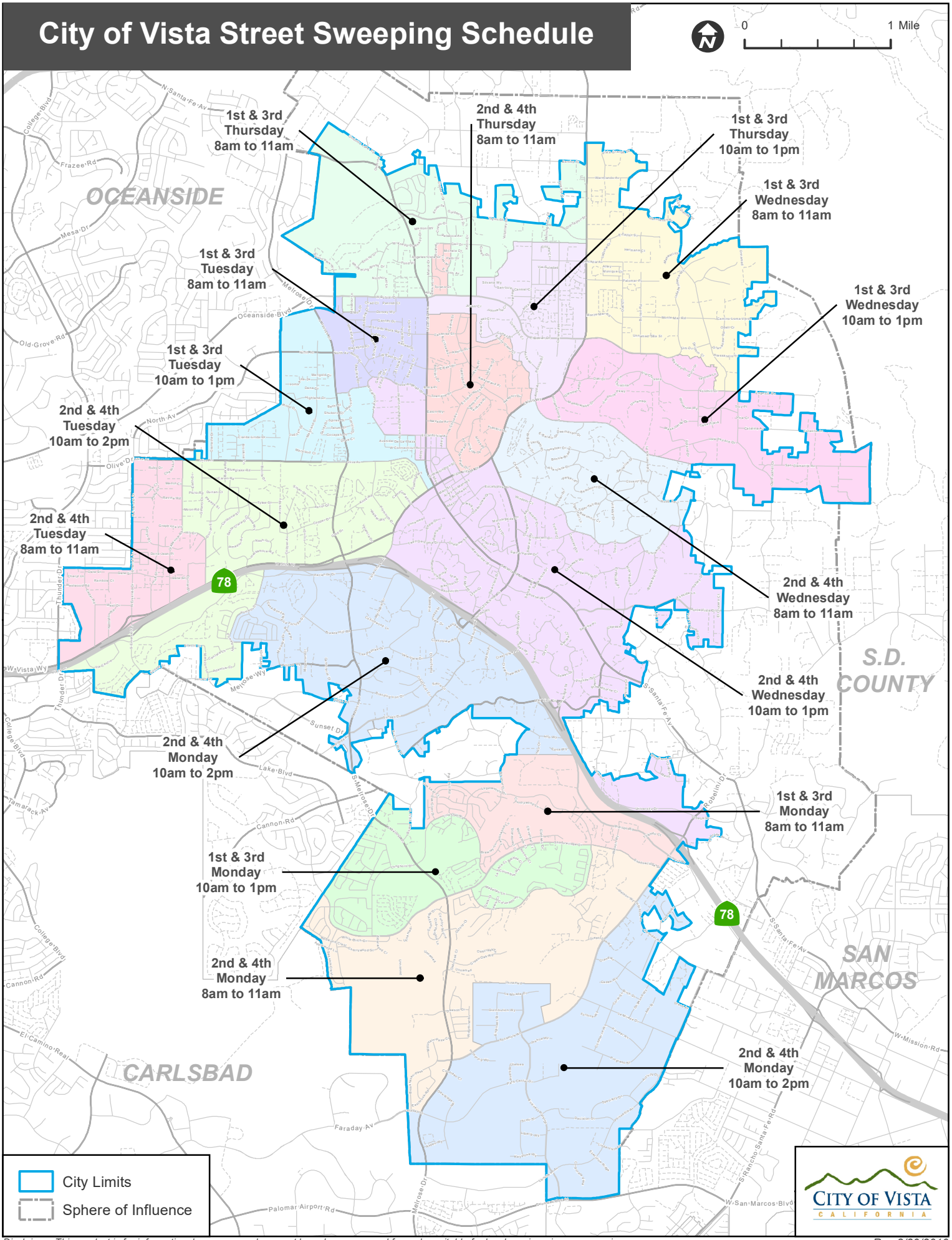
SiteNumber	BMP Detail	Site Area (acres)	Land Use Category	Trash Generation Rate (gallons/acre/year)	Total (gallons/year)	Effectiveness	Total Effectiveness (gallons/year)
02-054	Curb Inlet x3	1.40	Commerical	6	8.41	0.50	4.21
13-022	Pervious Pavement x4, Bioretention area with underdrain x10	1.36	Mixed Urban	3.7	5.03	0.25	1.26
04-024	Fossil Filter Insert x5	1.29	Commerical	6	7.74	0.30	2.32
02-081	Fossil Filter Insert x2	1.23	Industrial	2.6	3.20	0.30	0.96
05-017	Fossil Filter Insert x1	1.18	Commerical	6	7.07	0.30	2.12
04-020B	Fossil Filter Insert x4, CDS x1	1.16	Commerical	6	6.97	0.90	6.28
15-103	Bioretention area with underdrain x1	1.13	Industrial	2.6	2.94	0.90	2.65
01-059	Catch Basin x3, Trench Drain x1	1.05	Commerical	6	6.33	0.50	3.16
07-039	Grate Inlet x3	1.04	Industrial	2.6	2.72	0.50	1.36
02-049	Fossil Filter Insert x2	1.03	Mixed Urban	3.7	3.79	0.30	1.14
02-015	BioClean Grate Inlet Skimmer Box x1	1.01	Industrial	2.6	2.62	0.95	2.49
02-058	Fossil Filter Insert x1	0.97	Commerical	6	5.81	0.30	1.74
14-020	[Drain Insert] x1	0.93	Commerical	6	5.60	0.30	1.68
02-089	Fossil Filter Insert x1	0.85	Mixed Urban	3.7	3.15	0.30	0.95
06-038	Fossil Filter Insert x1	0.85	Commerical	6	5.09	0.30	1.53
06-075A	Detention underground pipe x2, Pervious Pavement x7	0.80	Industrial	2.6	2.07	0.25	0.52
13-025	CDS x1	0.79	Commerical	6	4.76	0.90	4.28
09-004	Catch Basin Insert x3	0.74	Mixed Urban	3.7	2.74	0.30	0.82
06-006	Detention Basin x1	0.68	Commerical	6	4.07	0.80	3.25
03-019	Fossil Filter Insert x4	0.64	Commerical	6	3.83	0.30	1.15
04-007	Fossil Filter Insert x2	0.61	Industrial	2.6	1.57	0.30	0.47
09-010	Curb Inlet x2	0.59	Mixed Urban	3.7	2.17	0.50	1.09
DWG-4530	Detention underground pipe x1, Bioretention area with underdrain x11	0.56	Mixed Urban	3.7	2.06	0.90	1.85
14-004	Swale x2, Pervious concrete x4	0.53	Commerical	6	3.15	0.13	0.39
15-113	Bioretention with underdrain x1, Pervious pavers x1	0.48	Commerical	6	2.85	0.25	0.71
4051-N	[Proprietary Device] x1	0.34	Mixed Urban	3.7	1.27	0.80	1.01
4051-S	[Proprietary Device] x1	0.34	Mixed Urban	3.7	1.24	0.80	0.99
03-085	FloGard Plus x1	0.26	High Density Residential	2.5	0.65	0.95	0.62
	SilvaCell, Clearwater Media Filter	15.78	Commercial	6	94.70	0.95	89.97
				Total (Partial Capture)	**1740.26**	-	**1176.61**

Attachment 2
Trash Reduction for Existing Full Capture BMPs

SiteNumber	BMP Detail	Site Area (acres)	Land Use Category	Trash Generation Rate (gallons/acre/year)	Total (gallons/year)	Effectiveness	Total Effectiveness (gallons/year)
1	MS4 Trash Collector	24.79	Industrial	2.6	64.45	1.00	64.45
1	MS4 Trash Collector	16.87	High Density Residential	2.5	42.18	1.00	42.18
1	MS4 Trash Collector	28.24	Commerical	6	169.44	1.00	169.44
				Total (Full-Capture)	**276.07**	-	**276.07**

Attachment 3. Street Sweeping Map

Attachment 3 - Street Sweeping Map



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Rev 8/30/2016