Attachment 3

CITY OF CHULA VISTA

TRASH AMENDMENTS BASELINE ASSESSMENT

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1. Background

In April 2015, the State Water Resources Control Board (SWRCB) adopted Amendments to the Water Quality Control Plan for Ocean Waters of California (Ocean Plan) as well as the Water Quality Control Plan for Inland Surface Waters, Enclosed Bays, and Estuaries (ISWEBE Plan) – collectively referred to as the "Trash Amendments."

The Trash Amendments provide two "tracks" that the City of Chula Vista (City) may select from to pursue compliance:

- Track 1: The City must install and maintain "full capture devices" in its MS4 to capture trash in runoff from all "priority land uses" in the City's jurisdiction.
- Track 2: The City must use a combination of full capture devices and other structural and non-structural BMPs to achieve an overall trash load reduction equivalent to what would be achieved in the Track 1 approach.

The Trash Amendments are statewide regulations, but the actual mandate to comply with the Trash Amendments was a 13383 Order (No. R9-2017-0077) issued by the San Diego Regional Water Quality Control Board (Regional Board). This order dictates the timeline for the City to make its decision between Track 1 and Track 2 and to submit initial trash program documentation to the Regional Board. The compliance timeline is shown in Table 1.

Table 1. Key Dates for Trash Amendment Adoption and Compliance

Item	Date
Adoption by the SWRCB	April 7, 2015
Approval by OAL	December 2, 2015 ("Effective Date")
Approval by USEPA	January 12, 2016
13383 Order issued by the San Diego Regional Board	June 2, 2017
Permittee Selection of Compliance Track (Track 1 or 2)	September 5, 2017
If the Permittee Selects Track 2……. Submittal of an Implementation Plan	December 3, 2018
Final Compliance with Trash Amendments	Anticipated ~December 2028 *10 years from first implementing permit, but no later than 15 years from Effective Date (December 2, 2030)*

2. Purpose

The purpose of this baseline assessment is to provide the City with information to make an informed decision between a Track 1 and a Track 2 approach. The largest component of this effort involves identifying the BMPs, both structural and non-structural, needed to achieve compliance under each Track and then developing planning-level estimates of the quantities and associated costs. Additionally, this assessment includes information on differences in the anticipated compliance confidence associated with each Track. Furthermore, the City is also obligated to meet trash-related goals set forth in the San Diego Bay Watershed Management Area Water Quality Improvement Plan (WQIP). Since there may be significant programmatic overlap in achieving compliance with both the Trash Amendments and the WQIP, this report also provides an assessment of how each Track option will affect the City's compliance with trash-related WQIP goals.

3. Identification of Priority Land Use Areas and Affected Inlets

3.1 Priority Land Use Identification

The Statewide Trash Amendments require the City to address trash in Priority Land Use (PLU) areas or equivalent alternative land use areas via full capture devices (Track 1) or to implement BMPs throughout the City to address the amount of trash equivalent to the amount generated in PLU areas (Track 2). As such, the first step for assessing compliance options is to determine the extent of the PLUs within the City's jurisdiction. PLU areas include:

- High-density residential (≥10 dwelling units per acre),
- Industrial,
- Commercial,
- Mixed urban (combination of high-density residential, industrial, and commercial), and
- Public transportation stations.

A land use analysis was performed using the most recent land use GIS data provided by the City. The 391 discrete land use categories present within boundaries of the City were compared to the definitions of the five PLUs designated in the Trash Amendments to determine which land uses and parcels fall within the PLU definitions. The analysis resulted in the designation of 261 of the land uses within the dataset as PLUs under the Trash Amendments. The City land use categories do not match up exactly with the definition of high-density residential land use in the Trash Amendments (i.e. ≥10 dwelling units per acre). Therefore, for several of the residential land use categories, a GIS analysis was performed to calculate the number of dwelling units per acre. An updated summary of the PLUs within the City's jurisdiction is provided in Table 2 and the final estimated PLU areas within the City are illustrated in Figure A-1 of Appendix A. Note that while the portion of the City that lies east of I-805 contributes a larger amount of total PLU area, that side of the City is significantly larger overall and the ratio of PLU to non-PLU areas is actually higher on the west side of I-805.

The City conducted a thorough review of the identified PLUs and the assumptions used during the identification process. Detailed information about the PLUs and the assumptions utilized in developing the City's PLUs is provided in Appendix A.

Table 2. Priority Land Use Breakdown for the City of Chula Vista

Priority Land Use	Total Area in City		Area by East/West (acres)		Percent of Total PLUs
	(sq mi)	(acres)	East of I-805	West of I-805	
Commercial	2.18	1,397.69	784.37	613.31	29%
High Density Residential	4.18	2,676.13	1,616.59	1,059.54	56%
Mixed Urban	0.07	45.39	4.79	40.60	1%
Industrial	0.90	575.12	175.55	399.57	12%
Public Transportation Stations	0.16	105.32	19.40	85.92	2%
Total	**7.50**	**4,799.65**	**2,600.71**	**2,198.94**	**100%**

3.1.1 Identification of Affected Inlets

Under a Track 1 compliance approach, full capture trash control devices are required to be installed at storm drain structures that receive runoff from PLUs. GIS analysis was used to identify storm drain structures that receive runoff from PLUs. A total of 2,662 such inlet structures, herein referred to as "PLU inlets," were identified. These locations are mapped in Figure A-1 of Appendix A.

3.2 Pilot Investigation of Alternative Priority Land Use Area

The Trash Amendments also allow a municipality to select alternative land use areas that differ from the specified PLU categories. Exact areas for potential alternative PLUs were not identified during discussions with the City, so no alternative PLU areas were incorporated into this baseline study. However, the City expressed interest in exploring this option further. Therefore, a pilot-level investigation was conducted to visually assess the amounts of trash found in specific PLU and non-PLU areas of the City and assesses the feasibility of utilizing alternative PLU areas in the future. The investigation is discussed in Appendix B.

4. Full Capture System Equivalency Options

In order to develop a compliance approach estimate for the funding needed under a Track 2 approach, an estimate of a full capture system equivalency (FCSE) value is needed. FCSE is a trash load reduction target the City would need to meet through implementation of a combination of programmatic, operational, and structural controls. Achievement of the FCSE target demonstrates compliance with the Trash Amendments.

The Trash Amendments provide two examples of approaches to determine FCSE: (1) a trash capture rate approach and (2) a reference approach. Both methods rely on measuring or otherwise quantifying the amount of trash captured by full capture devices to establish a baseline value.

4.1 General Approach

The method used to quantify trash generation was based on a literature review but it also allows for future refinement based on results from pilot studies, such as the efforts currently underway by the County of San Diego to monitor area-specific trash generation.

A literature review was conducted, which focused on four trash generation studies completed within the United States: two in California[1,2] and two in Maryland[3]. The studies were compared and analyzed for relevance to the City. A comparison of the studies is presented in Table A-4 of Appendix A.

These studies were used to determine the trash generation rates (TGRs) associated with PLU classifications as defined by the Trash Amendments. The literature review was used to determine a series of metrics correlated with TGRs. A geospatial analysis using median household income and population density data from the 2010 Census was conducted to evaluate and characterize these metrics for each of the four study cities. Then, regression was used to determine the best fit model between the derived metrics and the literature TGRs to isolate the best predictor of TGRs for each category of PLU.

The TGRs obtained as described above were based on the best available trash generation data from the literature. However, since none of the available studies characterized trash generation rates within the San Diego region, the County of San Diego's Regional Trash Generation Rate Study will provide valuable region-specific data upon its completion, which is scheduled for fall 2017. If this study finds that trash generation rates in San Diego County are significantly different than in the areas from the literature study, this region-specific trash generation data could be incorporated into the model in the future.

4.2 Full Capture System Equivalency

After the literature review and model development, it was determined that the metric that provided the best fit for the published TGRs for commercial and industrial land uses was the ratio of Median Household Income (MHI) to Population Density. For high density residential PLUs, the best fit model was obtained using the MHI and population density from census blocks with greater than or equal to 10 households, as High Density Residential is defined by the Trash Amendments. TGRs for mixed urban and public transportation station PLUs were not represented in the available literature, and thus, were derived from the average of the Commercial, Industrial, and High Density Residential Trash Generation Rates. In order to calculate the FCSE for the City at this stage, the TGR model was applied to the census metrics associated with each individual PLU parcel, generating a range of TGRs throughout the City, see Figure 1. Following the literature, TGRs are expressed in units of gallons per acre per year. The TGRs were multiplied by the acreage for each parcel and PLU combination. The trash generated per year in gallons was converted into tons per year, and then the weight of trash in tons generated per parcel was summed for each category of PLU (Table 3).

[1] County of Los Angeles Department of Public Works Watershed Management Division. 2004. Trash Baseline Monitoring Results, Los Angeles River and Ballona Creek Watersheds.

[2] Bay Area Stormwater Management Agencies Association (BASMAA). 2014. San Francisco Bay Area Stormwater Trash Generation Rates, Final Technical Report.

[3] Maryland Department of the Environment. 2014. Total Maximum Daily Loads of Trash and Debris for the Middle Branch and Northwest Branch Portions of the Patapsco River Mesohaline Tidal Chesapeake Bay Segment, Baltimore City and County, Maryland.

Table 3. FCSE Calculation from PLU areas in tons per year

Priority Land Use Type	City Total (tons/year)	East of I-805 (tons/year)	West of I-805 (tons/year)
High Density Residential	60.30	42.86	17.45
Industrial	26.34	7.17	19.17
Commercial	59.45	29.66	29.80
Mixed Use	1.72	0.17	1.55
Public Transportation Stations	3.71	0.68	3.02
Total	**151.53**	**80.53**	**70.99**

The total literature-based FCSE value for the City of Chula Vista is **151.53 tons**, or 36,294 gallons per year of trash, based on a wet weight conversion.

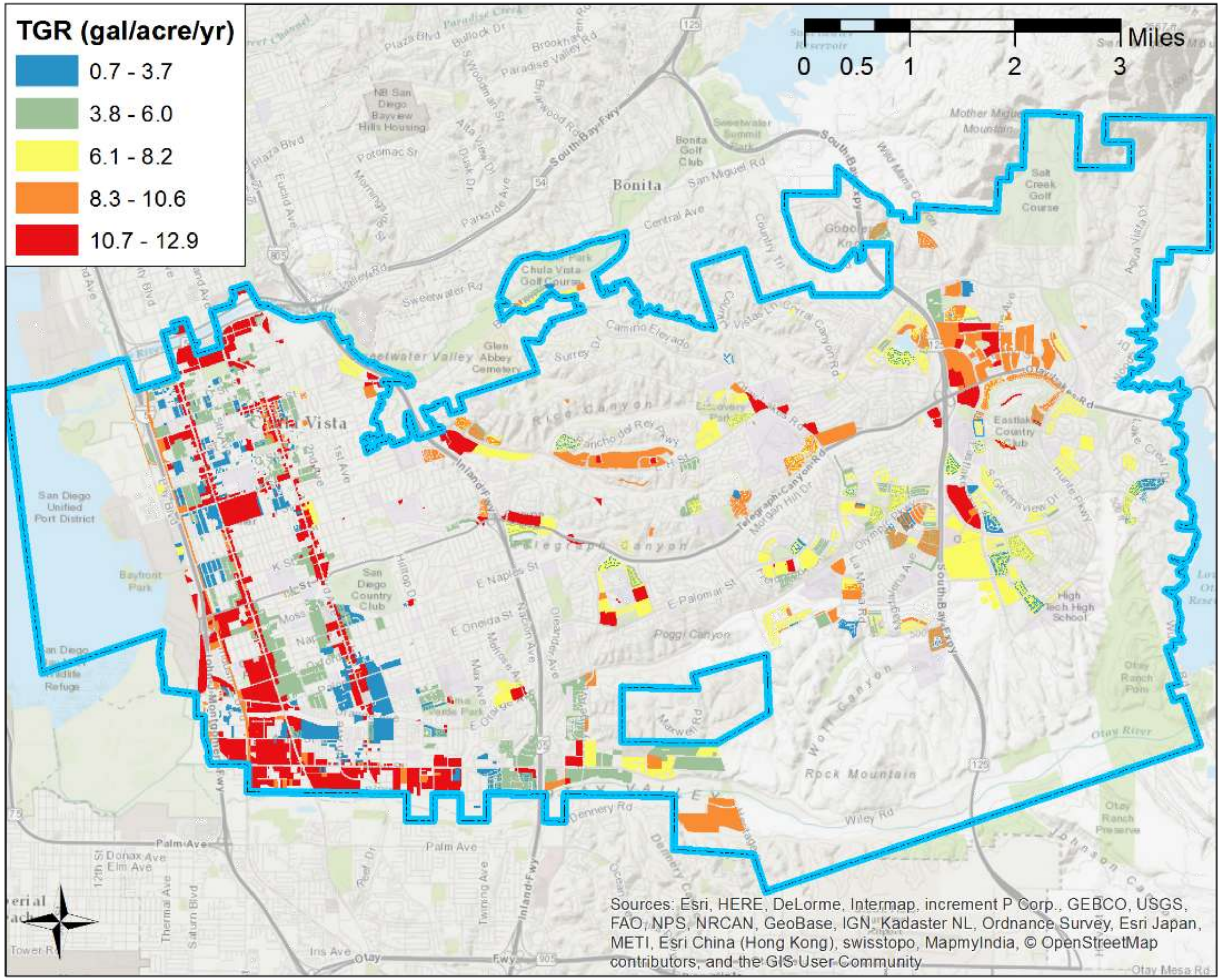

Figure 1. Modeled Trash Generation Rates for Priority Land Use parcels in the City of Chula Vista

5. Track 1 Assessment

5.1 Structural BMP Types

Under a Track 1 approach, the City would be required to install full capture devices in storm drain structures conveying runoff from all the PLU areas in its jurisdiction. Based on full capture devices commonly implemented in other regions of the state, the BMPs in the table below were selected:

Table 4. BMP types used in primary Track 1 assessment

BMP Type	Description	Example Photo
Connector Pipe Screen (CPS) **CPS manufactured by StormTek was used in cost calculations**	Can be installed in catch basins and clean outs. Bolted in front of the outlet pipe.	
Curb inlet style drainage insert **The Round Curb Inlet Basket (R-GISB) manufactured by Bio Clean was used in cost calculations.**	Can capture trash entering through a curb inlet. Basket can be positioned below manhole opening for ease of maintenance.	
Drainage Insert (grate inlet style) **The Grate Inlet Skimmer Box (GISB) manufactured by Bio Clean was used in cost calculations**	Typically installed in smaller catch basins with grated inlets. Usually more frequent maintenance than CPS.	
Automatic Retractable Screen (ARS) **ARS manufactured by United Stormwater was used in cost calculations**	Installed at curb inlets. ARS is <u>not</u> a full capture device. However, when used in conjunction with a CPS, the ARS keeps debris out of the drain and allows it to be picked up by street sweeping, thus reducing the required maintenance frequency for CPS.	

Other larger BMPs such as Bio Clean Nutrient Separating Baffle Boxes and Contech CDS units, are also considered full capture devices when sized properly. While having higher capital costs than the smaller BMPs in the table above, they can have lower long term maintenance costs since a single large unit can be installed in place of several smaller individual-drain BMPs, thus reducing the number of BMPs requiring maintenance. It is often assumed that the savings in annual maintenance costs will result in these larger BMPs being more cost effective in the long term. However, in site-specific analyses performed by the consultant team in other municipalities, this assumption was not supported. Site specific investigations demonstrated that 1) the high installation costs of the large BMPs combined with 2) limitations on the number of smaller upstream BMPs that could be replaced by each large unit, resulted in higher total 20-year costs for the large BMPs. Additional detail on these findings is provided in Appendix C.

Based on the findings regarding large BMP costs, this baseline assessment did not include a city-wide assessment of a Track 1 scenario using these large BMPs. However, full assessments of four different Track 1 scenarios using smaller individual-drain BMPs were performed:

- **Scenario 1A: CPS with ARS**. In this scenario, full capture devices will be installed at all public PLU inlets and at locations in public storm drains downstream of all private PLU inlets. These inlets will be equipped with CPS in most instances and with grate inlet style drainage inserts (GISB) in the small number of inlets where CPS cannot be used. ARS will also be installed at all public curb inlets with a CPS.
- **Scenario 1B: CPS without ARS**. This scenario is identical to the CPS with ARS Scenario except that no ARS units will be used.
- **Scenario 1C: Curb Inlet Baskets.** In this scenario, curb inlet baskets (R-GISB) rather than CPS will be installed at public PLU curb inlets. No ARS will be used. Cost calculations were based on the assumption that all inlets projected as having a CPS with ARS in Scenario 1A would instead have a curb inlet basket with no ARS in Scenario 1C. CPS will still be used for locations downstream of private PLU inlets, and CPS or GISB will still be used for a small number of public inlets where curb inlet baskets cannot be used.
- **Scenario 1D: Downstream Locations.** This scenario is based on the assumption that the City would be able to identify key storm drain junction locations where a single CPS could be used to collect trash from multiple upstream public PLU inlets. This scenario requires fewer total BMPs, but it is assumed more frequent maintenance will be required due to the increased average drainage area of each BMP. ARS will be installed at all public PLU curb inlets in this scenario.

5.2 Scenarios 1A through 1C

In Scenarios 1A, 1B, and 1C, one full capture device is installed in each public PLU inlet. The type of device depends on the scenario and on the type of inlet structure, as indicated in the attributes of the SW_Junction GIS layer provided by the City. For example, some drainage structures can accommodate either a CPS or curb inlet basket, so they would have a CPS installed in Scenarios 1A and 1B and a curb inlet basket in Scenario 1C. Conversely, a small, square grated inlet can only accommodate a GISB, so it would have that BMP in all three scenarios.

Approximately half of the identified PLU inlets are privately owned, but the City does not have legal authority to require private property owners to install BMPs in these drains. Therefore, full capture devices would be installed in public storm drain structures downstream of these private

PLU inlets. Since site specific feasibility analyses would be required to determine the exact locations where these devices could be installed, for the purposes of this baseline study, a GIS analysis was performed to determine an estimate of the number of full capture devices that would be needed to intercept flows from all private PLU inlets. This was done by identifying all the locations where a privately owned storm drain pipe within a PLU connected directly to a downstream publicly owned junction, plus all locations where a private PLU inlet connected directly to a downstream publicly owned pipe. This resulted in an estimate of 365 full capture devices that would be needed to intercept flows from 1195 private PLU inlets. It was also assumed that these 365 full capture devices would all be CPS since runoff would likely be conveyed to the public structure via a pipe, making it infeasible to use GISB and curb inlet baskets to capture trash. Since these CPS would tend to receive flows from multiple upstream inlets, a higher required maintenance frequency was assumed for these CPS compared to CPS receiving runoff from a single public inlet.

5.3 Scenario 1D

This scenario assumes that key locations can be identified such that a single CPS can be installed in a structure that receives runoff from multiple public PLU inlets. The total number of full capture devices used to treat public inlets was thus reduced to 60% of the number in the Scenarios 1A through 1C. An example of a strategic location is provided in Figure 2 below. However, it should be noted that all of the public inlets that would have an ARS installed in Scenario 1A will still have an ARS installed in the this scenario, even if that drain will no longer have a CPS installed. The assumption is that having ARS installed upstream of the structures with CPS will still be beneficial for minimizing the required maintenance frequency. Despite retaining the same number of ARS as Scenario 1A, this scenario still results in an increased average drainage area per BMP, so CPS in public inlets are assumed to have a higher required maintenance frequency.

Note that the reduction in number of CPS installed in this scenario applies to locations treating flows entering *public* PLU inlets. For private PLU inlets, the BMP implementation would be identical to the Scenarios 1A through 1C (i.e. an estimated 365 CPS installed to handle 1,195 private inlets).

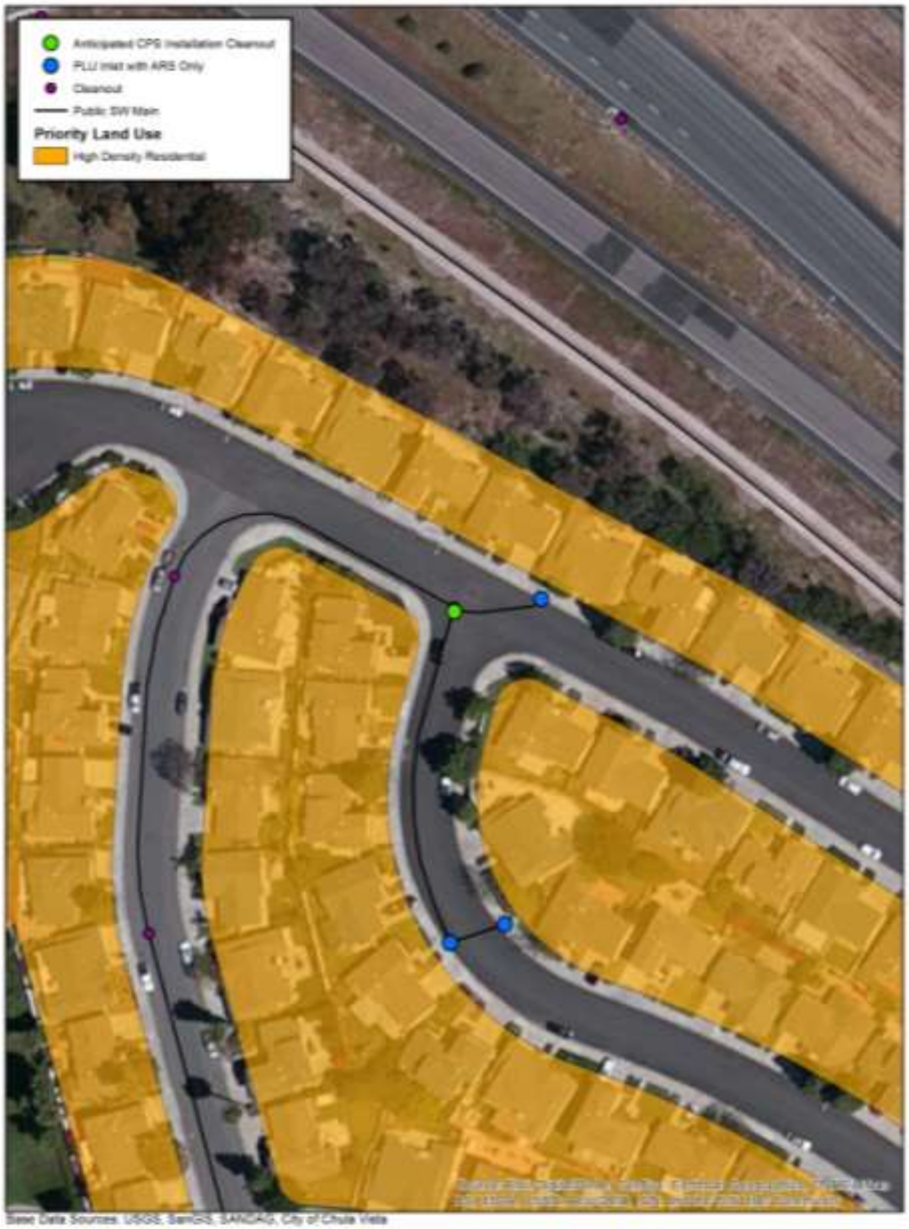

Figure 2. Example Strategic Location for CPS Installation.
In this example, one CPS would be installed at the downstream junction (green) rather than installing three CPS in the upstream drains (blue).

5.4 Track 1 Implementation Schedule

The Trash Amendments require full compliance within ten years, with permittees required to demonstrate achievement of interim milestones. For Track 1 the anticipated requirement is installation of approximately 10 percent of the total full capture devices each year. Therefore, in the Track 1 scenarios the installation schedule of all BMPs has been distributed evenly over the first 10 years of the program.

5.5 Track 1 Implementation, Monitoring, and Reporting

Unlike a Track 2 approach, a Track 1 approach does not require the City to prepare an "Implementation Plan" in which it outlines its entire trash control program and submits it to the Regional Board for approval. However, significant staff time will still be needed to plan the program prior to actual implementation. Cost estimates for Track 1 scenarios include a one-time cost for program planning plus additional annual costs to cover program management.

According to the Trash Amendments, a Track 1 approach requires annual reporting but does not require a monitoring program. Annual reporting will primarily entail reporting on progress toward installation of all full capture devices and on annual maintenance activities. Therefore, a significant proportion of the reporting program will be the ongoing collection and management of this BMP data. Additionally, collecting data on BMP installation will be completed in year 10, so reporting costs are reduced in years 11 through 20.

It should be noted that the 13383 Order issued by the Regional Board indicates that there will be "monitoring and reporting" requirements for both Track 1 and Track 2. However, Regional Board staff added a footnote to the Order indicating that these monitoring and reporting requirements will be based on the corresponding section of the Trash Amendments that indicates monitoring is only required for Track 2. While the 13383 Order still leaves the door open for the Regional Board to issue stricter monitoring requirements, based on previous feedback from the Regional Board staff and on the addition of the previously mentioned footnote to the 13383 Order, it is understood that the intention is to require a true monitoring program (e.g. performing field assessments at outfalls and water bodies) only for Track 2. Therefore, no separate costs were included for a monitoring program in the Track 1 scenarios.

5.6 Track 1 Costs

Although full compliance is to be achieved over a ten year period, annual costs were calculated for a twenty year period. This was done to better reflect the impact of the long term program costs that the City will continue to incur even after all of the full capture devices have been purchased. Table 5 and Figure 3 below summarize both the total number of full capture devices installed and the twenty-year total costs for all four Track 1 Scenarios. To reflect the relative impact of different program components, costs have been broken down into the following categories:

- **Structural BMP Capital Costs:** This covers the purchase and installation of all structural trash control BMPs. It also includes an estimated cost to cover the staff time needed to coordinate with vendors to acquire the BMPs.
- **BMP Maintenance**: This covers regular inspection and maintenance of structural trash control BMPs by City staff. Maintenance rates were based on data provided by City staff. Based on conversations with Los Angeles County, the maintenance frequency used for an inlet with a CPS and ARS was three cleanings plus one additional inspection per year. For situations where a CPS will be used downstream of multiple PLU inlets, the number of cleanings per year was increased to seven to cover monthly cleanings during the rainy season.
- **Repair and Replacement**: This includes costs to cover repairs when installed BMPs become damaged as well as costs to cover full replacement when BMPs are damaged beyond repair.
- **Data Collection, Reporting, and Management**: This covers the annual data collection and reporting activities discussed in the previous section, as well as initial program planning costs and an annual cost to cover ongoing management of the program.

- **Contingency**: A 15% contingency was included to account for unforeseen increases in BMP capital costs or in City labor costs.

Table 5. 20-Year Costs for Track 1 Scenarios

	Scenario 1A: *CPS with ARS*	**Scenario 1B:** *CPS without ARS*	**Scenario 1C:** *Curb Inlet Baskets*	**Scenario 1D:** *Downstream Locations*
# Full Capture Devices Installed	1,796	1,796	1,796	1,223
# of ARS Installed	1,226	0	0	1,226
Costs				
Structural BMP Capital Costs	$5,009,904	$3,144,790	$3,684,230	$4,007,914
BMP Maintenance	$9,018,273	$10,292,218	$12,829,069	$9,694,174
Repair & Replacement	$1,361,644	$892,439	$2,135,237	$1,068,871
Data Collection, Reporting, & Management	$1,110,000	$1,110,000	$1,110,000	$1,110,000
Contingency (15%)	$2,474,973	$2,315,917	$2,963,780	$2,382,144
Total Cost	**$18,974,794**	**$17,755,364**	**$22,722,317**	**$18,263,103**

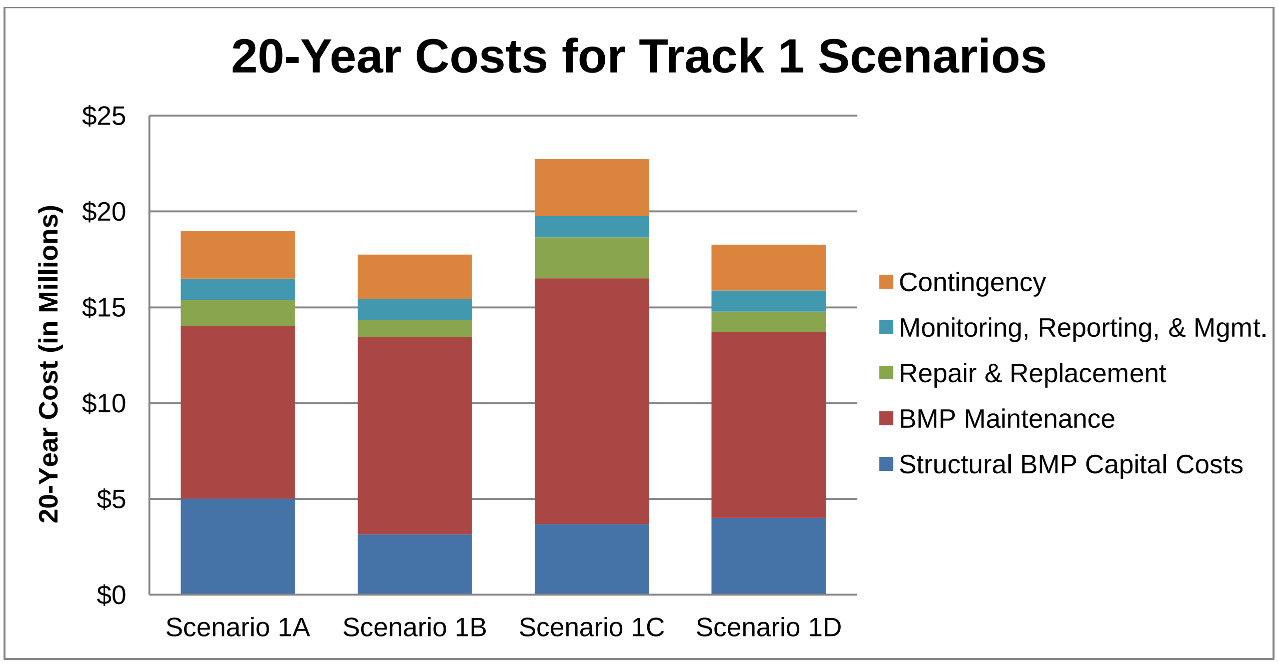

Figure 3. Cost Comparison for Track 1 Scenarios

A more detailed breakdown of the calculations used to estimate costs for both Track 1 and Track 2 is provided in Appendix D. Information in this appendix includes:

- BMP capital costs
- Maintenance rates
- BMP repair and replacement estimates
- Crosswalk between storm drain junction type and BMP type
- Year-by-year cost breakdowns

6. Track 2 Assessment

6.1 Track 2 Approach

As described in Section 3, development of a Track 2 approach is centered on the FCSE value, which is the estimated amount of trash per year generated from all the City's PLUs. Under Track 2, the City must achieve an annual trash load reduction equal to the FCSE. This trash load reduction can be achieved through a combination of the following:

- Installation of full capture devices
- Existing trash removal activities
- New or enhanced trash removal programs

First, data was collected on the City's existing programs that provide trash removal. For each existing activity, a trash load reduction value (in gallons of trash removed per year) was then calculated. Next, a suite of potential enhanced trash removal activities were identified. Based on a combination of data provided by the City and from the literature, calculations were performed to determine an estimated cost and trash load reduction for each enhanced activity.[4]

The combined trash load reduction from existing activities and enhanced efforts was then subtracted from the FCSE to determine the quantity of trash that would need to be removed by full capture devices. A calculation was then performed to convert this trash load reduction value into an estimate of the total number of structural BMPs that would need to be installed. Additional information on these calculations is provided in Appendix D.

6.2 Track 2 Scenarios

Based on discussions with City staff, Track 2 costs were estimated for scenarios using the same BMP types as Track 1 Scenarios 1B (CPS without ARS) and 1C (curb inlet baskets). To show the similarity to Track 1 Scenarios that use the same full capture devices, for Track 2, these have been labeled Scenarios 2B and 2C, respectively. Since the calculation used to estimate the number of full capture devices required was based on a per-inlet trash removal rate, a Track 2 equivalent of the 1D "downstream locations" scenario was not included. Both Track 2 scenarios use the same existing and enhanced trash removal efforts and the same *number* of full capture devices, but *types* of full capture devices used will be different, as described below:

- **Scenario 2B:** Drains will be equipped with CPS in most instances and with grate inlet style drainage inserts (GISB) in the small number of inlets where CPS cannot be used. ARS will not be used.
- **Scenario 2C:** Curb inlet baskets (R-GISB) will be installed instead of CPS wherever possible, although CPS and GISB will still be needed for some drainage structures. ARS will not be used.

A single cost value is reported for each of these two scenarios in Section 6.6. However, technically, two cost calculations were performed for each scenario, and Section 6.6 reports average values. A "conservative" and an "optimistic" version of each Track 2 scenario were calculated. Both versions use all of the same existing trash removal activities and enhanced efforts. The difference is in the estimated trash load reduction value assigned to each activity. For each activity, two load reduction values were calculated: a low end value based on more

[4] EOA, Inc. 2012. Trash Load Reduction Tracking Method: Assessing the Progress of the San Francisco Bay Area MS4s Towards Stormwater Trash Load Reduction Goals. Technical Report (Version 1.0).

conservative assumptions about the effectiveness of the strategy and a high end value based on more optimistic assumptions. The conservative versions use all of the low end load reduction values, and the optimistic versions use the high end values. Since the number of full capture devices needed in a Track 2 approach goes down when other activities provide more trash removal, the optimistic versions require significantly fewer full capture devices. For simplicity, the body of this report focuses on the average of the conservative and optimistic versions of each scenario, but full breakdowns of the optimistic and conservative version costs are provided in Appendix D.

6.3 Existing Activities and Enhanced Efforts

Table 6 and Table 7 provide descriptions of all the existing activities and enhanced efforts, respectively, that were incorporated into the Track 2 scenarios. A few additional enhanced efforts were also quantified, but were not incorporated into the Track 2 scenarios. Additional information on these can be found in Appendix D.

Table 6. Existing Trash Removal Efforts

	Average of Optimistic and Conservative Estimates	
Control Measure Description	**Trash Reduced (Gallons)**	**Existing Load Reduction (%)**
Street Sweeping		
Total annual debris removal was provided by the City. The conservative scenario is based on a Bay Area study (EOA, Inc. 2007) which indicates that only 1% of street sweeping debris is trash. However, since these types of studies are limited, the optimistic scenario assumes that 3% of street sweeping debris is trash.	4,070	11.2%
Storm Drain Cleaning Data		
Quantity based on annual average of trash removed during MS4 cleaning 2008-2015. (same for both scenarios since the average amount of trash removed annually was directly measured and reported by the City)	2,045	5.6%
Trash Bin Addition Program (Industrial and Commercial Areas)		
Per the franchise agreement/contract between the City of Chula Vista and Republic Services, 25 additional trash bins used in bus stops within commercial and industrial areas are provided by Republic Services each year. Trash reduction was estimated based on the assumption that each bin has a 60 gallon capacity and that, on average, a bin becomes 40% full over the span of a week. The quantity used for trash reduction credit should only include trash that would otherwise litter City streets. The conservative scenario assumes that 5% of the trash would have been littered in the absence of the bin. The optimistic scenario assumes that 10% of the trash would have been littered in the absence of the bin.	2,340	6.4%
Treatment Control BMP Cleaning		
There are 249 projects on the City's Treatment Control BMP inventory. The conservative scenario assumes each project removes trash at a level of 3 gallons/year. The optimistic scenario assumes 5 gallons/year.	996	2.7%
Trash Clean-Up Events		
This includes trash removal data provided by ILACSD and the City for three annual events (Creek to Bay, Coastal Cleanup Day, and Beautify CV Day). ILACSD and City staff reported different trash removal quantities for the Beautify CV event, so the conservative value uses the smaller reported value for that event, and the optimistic scenario uses the larger reported value.	1,631	4.5%
Unauthorized Encampment Clean-Ups		
Annual trash removal quantity provided by City for encampment at 3rd and Orange. Conservative estimate reduces trash removal rate by 50% because counting encampment trash removal has been contested in other areas. One of the main arguments is that this trash would be going to a water body rather than the MS4, so a City shouldn't take credit for removing trash that's in or along the water body. Optimistic scenario counts the full quantity.	1,317	3.6%
Homeless Outreach Team Program		
Total annual trash removal for 2016 was provided by the City. This program targets parks, facilities and problem areas of the City. Some of the material removed is unattended belongings that would be unlikely to end up in the MS4. The conservative scenario assumes that only 40% of the material removed is trash that would have made it to the MS4. The optimistic scenario assumes 75% of the material removed is trash that would have made it to the MS4.	3,594	9.9%
Total	**15,993**	**44.1%**

Table 7. Enhanced Trash Removal Efforts

Control Measure Description	Average of Optimistic and Conservative Estimates: Trash Reduced Annually (Gallons)	Average of Optimistic and Conservative Estimates: Load Reduction Credit (%)	Average of Optimistic and Conservative Estimates: $/Gallon Trash Removed (20 Year)	Is Load Reduction Directly Measure-able?	Initial Planning /Start Up Cost	Annual Cost
Additional Trash Clean-up Event organized by I Love a Clean San Diego (ILACSD)						
One additional clean-up event per year. This event would be on the same scale as Creek to Bay and Coastal Cleanup Day and organized by ILACSD. Optimistic scenario uses the average trash removal value reported from current ILACSD events. Conservative estimate uses 75% of the current average trash removal value to simulate diminishing returns from adding more events. <u>Start-up Cost</u>: $1,000 to cover staff time necessary to coordinate with ILACSD to initiate an additional event. <u>Annual Cost</u>: Per questionnaire, City pays ~$2,000 for sponsorship of each event.	547	1.5%	$3.75	Yes	$1,000	$2,000
Additional Trash Clean-up Event organized by City						
One additional clean-up event, similar to Beautify Chula Vista Day, per year. Since trash removal reports from ILACSD and the City differed for the Beautify Chula Vista Day, the lower value was used in the conservative scenario, and the higher value was used in the optimistic scenario. <u>Start-up Cost</u>: $2,500 to cover staff time necessary to plan a new annual event. <u>Annual Cost</u>: Per questionnaire, the Beautify CV Day costs $15,000 a year to run.	381	1.1%	$39.65	Yes	$2,500	$15,000
Additional Public Area Trash Bins						
Adding 20 new trash bins to public areas, such as in parks or around schools. Trash reduction quantities are based on the same assumptions as the Trash Bin Addition Program in Table 6. <u>Start-up Cost:</u> Capital cost to purchase and install new trash bins based on a cost of $500 per bin. (City questionnaire indicated that the per bin cost varies between $85 and $1,500 depending on type). Also includes staff time to determine locations for new trash bin placement and to coordinate acquisition of new bins. Trash bin spacing has been shown to impact effectiveness, so planning bin placement strategically can help maximize load reduction. <u>Annual Cost:</u> Hauling/maintenance cost information was not provided by City. Annual cost estimate based on each new bin requiring 5 additional minutes per week of staff time at $75/hr.	3,276	9.0%	$2.17	No	$12,500	$6,497
Public Education and Outreach Programs						
Includes advertising campaign to reduce litter, eight community outreach events/presentations completed annually for school-age children (K-12), and use of free media (PSAs, etc) to reduce litter issues. Outreach must include an evaluation component (e.g. pre-post campaign surveys and student/teacher feedback). Assumed duties would be performed by Storm Water Education & Outreach staff. Fact sheet CR-3 indicates the above activities would equate to a 6% trash load reduction, so that value was used in the optimistic scenario. However, the San Francisco Regional Board called the fact sheet CR-3 reduction credits "grossly inflated," so the value was reduced by 50% in the conservative scenario. <u>Start Up Cost</u>: Assumes 120 hours to develop program. (City-estimated hourly rate for outreach staff is $70/hr) <u>Year 1-10 Cost:</u> Assumes 120 hours for one advertising campaign, four hours per community outreach event, and ten hours for media relations. Includes $1,500 for miscellaneous costs associated with printing and mailings. Evaluation component for advertising and community outreach events assumed to take 80 hours.	1,633	6.0%	$11.55	No	$8,400	$18,440

Control Measure Description	Average of Optimistic and Conservative Estimates: Trash Reduced Annually (Gallons)	Average of Optimistic and Conservative Estimates: Load Reduction Credit (%)	Average of Optimistic and Conservative Estimates: $/Gallon Trash Removed (20 Year)	Is Load Reduction Directly Measure-able?	Initial Planning /Start Up Cost	Annual Cost
Enhanced Unauthorized Encampment Cleanups						
Increased efforts to clean up encampments. Could include increasing frequency of cleaning at 3rd and Orange or cleaning other encampment areas (permanent or temporary) identified in the city. Could also include expansion of Homeless Outreach Team activities. Trash removal quantities are estimates based on data provided by City on removal quantities and costs for clean-ups at 3rd and Orange. Optimistic: 50% increase in annual budget will result in 50% increase in trash removal. Conservative: 50% increase in annual budget will result in 30% increase in trash removal. <u>Start-up Cost:</u> Assumes $2,500 to cover staff time to plan modifications to existing efforts <u>Annual Cost:</u> Assumes a 50% increase to what City reported as current amount spent annually on encampment cleanups	703	1.9%	$8.12	Yes	$2,500	$5,579
Single-Use Carryout Plastic Bag Policies						
Trash removal percentage is based on literature values, which assume that the City implements outreach programs and performs enforcement to ensure compliance with the plastic bag ban. Fact sheet CR-1 allows 6% reduction credit. Bay Area Permit states that all "source control" trash reduction activities combined can account for a maximum of 10% trash load reduction. Our interpretation of the Bay Area Permit language is that it should probably require multiple product bans to achieve a full 10% reduction, so a 6% reduction might be considered too high for a single product ban. Therefore, for product ban activities we reduced the fact sheet value by 50% to get the conservative load reduction credit. <u>Start Up Cost</u>: Covers staff time to develop outreach and enforcement programs. <u>Annual Cost:</u> Assumes 4 hours per week spent on enforcement annually plus $1,000 for data collection and annual reporting.	1,633	6.0%	$10.47	No	$10,000	$16,600
Enhanced Street Sweeping						
Per City data, residential streets are swept every other month. This would be increased to once a month for residential streets west of the 805. GIS analysis using sweeping data from the City was used to estimate mileage of residential area sweeping routes west of the 805. City data was used to calculate the average amount of debris removed per mile swept. The optimistic scenario assumes 3% of all debris collected is trash. Conservative scenario assumes 1% of sweeping debris is trash and also reduces overall total by 15% to account for diminishing returns. <u>Start-up Cost:</u> $8,000 to plan/modify sweeping schedules <u>Annual Cost:</u> City sweeping data was used to calculate the cost per mile of sweeping and then multiplied by the total number additional miles to be swept annually.	414	1.1%	$39.26	Yes	$8,000	$15,863
Totals	**8,587**	**26.7%**	NA	NA	**$44,900**	**$79,980**

<u>Notes</u>:

- As a point of reference, the cost per gallon trash removal rate from the Track 1 scenarios was approximately $20-25/gallon of trash removed.
- All references in the above table to “Fact Sheets” are based on the 2012 publication “Trash Load Reduction Tracking Method: Assessing the Progress of the San Francisco Bay Area MS4s Towards Stormwater Trash Load Reduction Goals. Technical Report (Version 1.0).” by EOA, Inc.

6.4 Track 2 Implementation Schedule

Like Track 1, Track 2 also requires permittees to demonstrate achievement of interim milestones on their way to full compliance within ten years. According to the Trash Amendments, this entails demonstration of ten percent average trash load reductions each year. In other words, the Track 2 program must provide trash load reductions of ten percent of the FCSE in year one, twenty percent in year two, thirty percent in year three, etc. Since the City's existing activities may provide over forty percent of the FCSE, implementation of new structural and non-structural BMPs can be relatively limited in the early years of the program, resulting in cost savings. However, completely deferring full capture device installation until later years would potentially lead to scrutiny by the Regional Board or non-governmental organizations (NGOs). Therefore, in the Track 2 scenarios, full capture devices are still installed during the initial years of the program, but in slightly reduced numbers. This allows the City to monitor installed BMPs on a small scale and apply lessons learned when ramping up installation over the remaining years. Rollout of the new non-structural "enhanced activities" (Table 7) would be spaced out across the first ten years, with more cost effective activities tending to be implemented earlier.

6.5 Track 2 Implementation, Monitoring, and Reporting

Unlike Track 1, Track 2 requires the City to develop an implementation plan and submit it to the Regional Board. In this implementation plan the City must define their FCSE, describe how their program will achieve FCSE, and describe the monitoring program they will implement to demonstrate attainment. It is expected that development of an implementation plan will be a very involved process that will require meetings with the Regional Board staff to discuss compliance metrics. In addition to a large upfront cost to cover the implementation plan, Track 2 is also anticipated to have higher annual program management costs since it has more components to manage.

The other major programmatic requirement specific to Track 2 is the monitoring program. This program will require the City to gather data annually from all of the program components and quantify the data to demonstrate achievement of progress milestones. It is anticipated that the monitoring program will also require field investigations, such as monitoring at MS4 outfalls or performing visual trash assessments in PLU areas. Receiving water monitoring for trash may also need to be added to the program in future years. Details of the monitoring program will need to be worked out with Regional Board staff as part of the process of developing the implementation plan.

6.6 Track 2 Costs

Annual costs were calculated for a twenty-year period. Table 8 and Figure 4 below summarize both the total number of full capture devices installed and the twenty-year total costs for the two Track 2 scenarios. Costs were broken down into the same categories as those reported for Track 1, with one additional category, "Non-Structural BMP Efforts." Non-structural BMP efforts refers to both the existing trash removal activities and the enhanced efforts. However, it is assumed that the existing activities will not account for any additional costs, so only the enhanced efforts contribute to the costs in this category. Note that a 20 percent contingency was used for the Track 2 scenarios, as opposed to the 15 percent contingency used for Track 1. This was to account for the higher degree of uncertainty associated with the non-structural BMP efforts included in Track 2.

Table 8. 20-Year Costs for Track 2 Scenarios

	Scenario 2B*, (CPS)	Scenario 2C*, (Curb Inlet Baskets)
# Full Capture Devices Installed	*580*	*580*
# of ARS Installed	*0*	*0*
Costs		
Structural BMP Capital Costs	$1,014,905	$1,189,980
BMP Maintenance	$3,239,088	$4,044,226
Repair & Replacement	$282,001	$646,967
Non-Structural BMP Efforts	$1,118,921	$1,118,921
Monitoring, Reporting, & Management	$3,550,000	$3,550,000
Contingency (20%)	$1,840,983	$2,110,019
Total	**$11,045,898**	**$12,660,113**

* Values reported are an average of the “conservative” and “optimistic” versions of each scenario. “Conservative” and “optimistic” assume relatively low and relatively high, respectively, levels of trash reduction from the same non-structural BMP efforts.

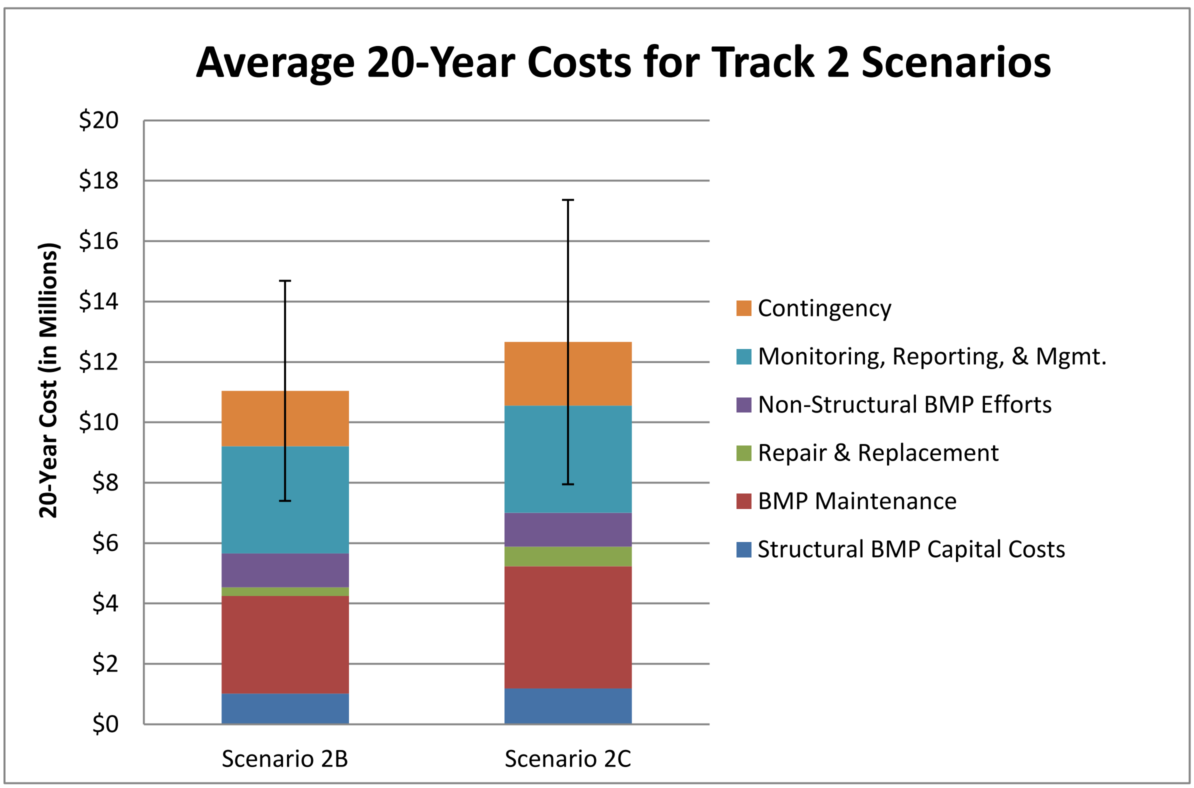

Figure 4. Cost Comparison for Track 2 Scenarios
Error bars show the calculated total costs of the conservative and optimistic versions of each scenario. Main columns depict the average between conservative and optimistic versions.

7. Track-Switching Assessment

The Regional Board has indicated that it will be acceptable for a city to initially select a Track 2 approach and then later switch to a Track 1 approach. This strategy might be desirable if, for example, after implementing the first few years of a Track 2 program, the City finds that its non-structural BMP efforts turn out to be less effective or more costly than anticipated. One example of a track-switching was included to provide a picture of how the total and annual costs would compare to the other scenarios.

7.1 Scenario Assessed

The situation assessed assumes that the City initially selects Track 2, Scenario 2B (CPS without ARS) and then switches to the corresponding Track 1 Scenario, 1B, after five years. The first five years of program implementation and costs match the Track 2B Scenarios. The City would install a relatively low number of structural BMPs in these years but would still need to develop an implementation plan, perform Track 2 monitoring and reporting, and implement new non-structural BMP efforts. Then in year six, the City would discontinue Track 2 monitoring and any non-structural BMP efforts that it had started in years one through five and start installing a much higher number of structural BMPs annually. For year six, it was also assumed that there would be a relatively high amount of staff labor for program management and reporting in order to handle the transition between tracks.

7.2 Costs for Track-Switching Approach

Annual costs were once again calculated for a twenty year period. A 20 percent contingency was used for the entire 20-year period. Table 9 and Figure 5 below summarize both the total number of full capture devices installed and the twenty-year total costs for switching from Scenario 2B to 1B after five years.

Table 9. 20-Year Costs If Switching From Track 2 to Track 1 after 5 Years

	Switch From Scenario 2B* to 1B
# Full Capture Devices Installed	*1796*
# of ARS Installed	*0*
Costs	
Structural BMP Capital Costs	$3,144,790
BMP Maintenance	$9,074,524
Repair & Replacement	$767,975
Non-Structural BMP Efforts	$30,168
Monitoring, Reporting, & Management	$1,815,000
Contingency (20%)	$2,357,358
Total	**$17,189,815**

* Values reported are based on an average of the “conservative” and “optimistic” versions of scenario 2B. “Conservative” and “optimistic” assume relatively low and relatively high, respectively, levels of trash reduction from the same non-structural BMP efforts.

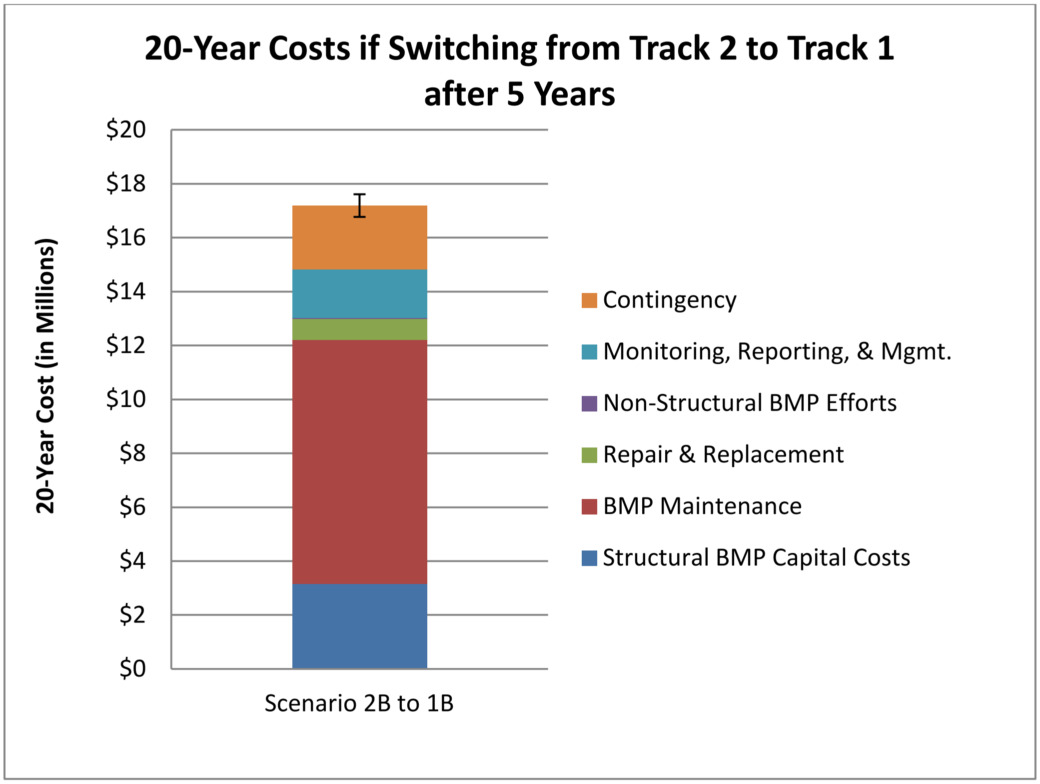

Figure 5. Costs Breakdown if Switching from Track 2 to Track 1
Error bars show the calculated total costs based on the conservative and optimistic versions of Scenario 2B. The main column depicts the average between calculations based on conservative and optimistic versions of Scenario 2B.

8. Discussion

8.1 Track Cost Comparison

A breakdown of 20-year program costs for all scenarios presented in Sections 5 through 7 is shown in Table 10 and Figure 6. Overall, Track 1 scenarios had higher total costs than Track 2 scenarios. The distribution of costs also differs between tracks, with a much larger proportion of costs required to cover monitoring, reporting, and program management under Track 2.

As shown by the error bars in Figure 6, optimistic and conservative versions of the Track 2 scenarios differ by several million dollars, with the Conservative versions approaching, but not quite matching some of the Track 1 scenario total costs. However, it is important to remember that the conservative and optimistic versions of a scenario are not two distinct approaches that the City can choose between, but rather two projections of the same Track 2 approach. A municipality choosing Track 2 would clearly aim to achieve the higher trash load reduction values of the optimistic scenario, but achievement of those higher reduction credits is not a certainty. Therefore, it may be helpful to think of the conservative and optimistic costs as representing the range of costs for a Track 2 scenario.

Table 10. 20-Year Costs for All Scenarios

	Track 1				Track 2		Track-Switching
	Scenario 1A *CPS with ARS*	Scenario 1B *CPS without ARS*	Scenario 1C *Curb Inlet Baskets*	Scenario 1D *Downstream Locations CPS with ARS*	Scenario 2B* *CPS without ARS*	Scenario 2C* *Curb Inlet Baskets*	Scenario 2B* to 1B
Structural BMP Capital Costs	$5,009,904	$3,144,790	$3,684,230	$4,007,914	$1,014,905	$1,189,980	$3,144,790
BMP Maintenance	$9,018,273	$10,292,218	$12,829,069	$9,694,174	$3,239,088	$4,044,226	$9,074,524
Repair & Replacement	$1,361,644	$892,439	$2,135,237	$1,068,871	$282,001	$646,967	$767,975
Non-Structural BMP Efforts	-	-	-	-	$1,118,921	$1,118,921	$30,168
Monitoring, Reporting, & Mgmt.	$1,110,000	$1,110,000	$1,110,000	$1,110,000	$3,550,000	$3,550,000	$1,815,000
Contingency	$2,474,973	$2,315,917	$2,963,780	$2,382,144	$1,840,983	$2,110,019	$2,357,358
Total	**$18,974,794**	**$17,755,364**	**$22,722,317**	**$18,263,103**	**$11,045,898**	**$12,660,113**	**$17,189,815**

* Track 2 values reported are based on an average of the “conservative” and “optimistic” versions of each scenario. “Conservative” and “optimistic” assume relatively low and relatively high, respectively, levels of trash reduction from the same non-structural BMP efforts.

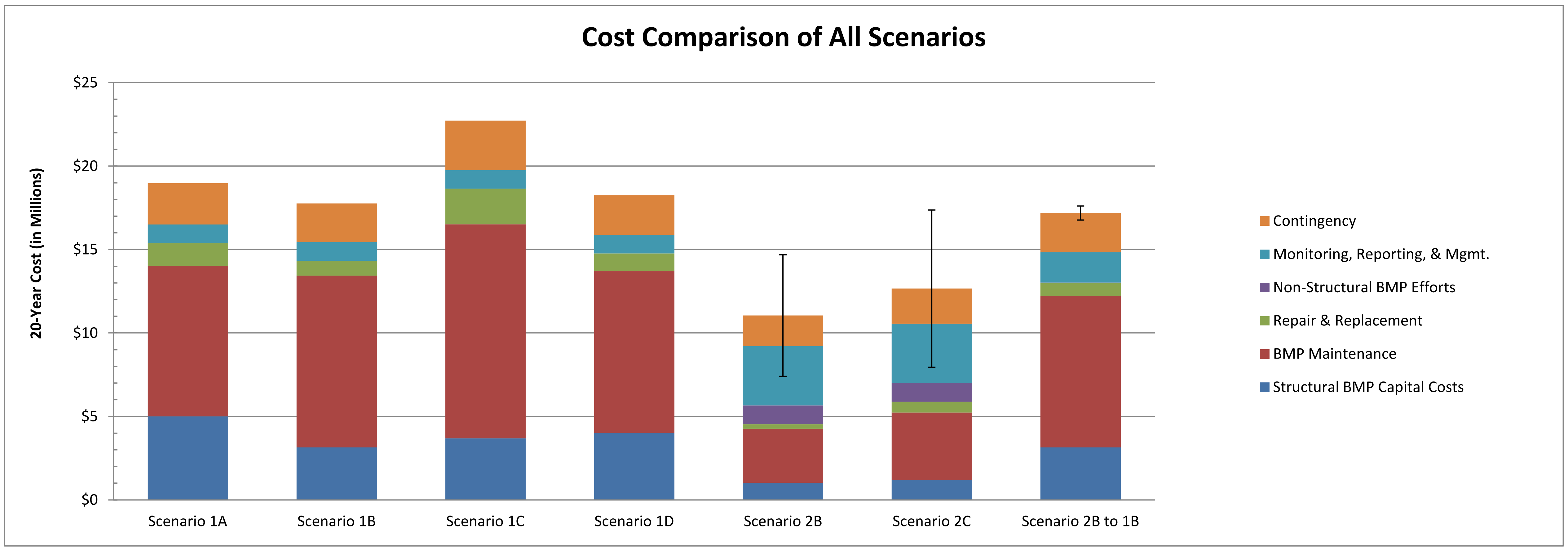

Figure 6. 20-year Costs for All Scenarios
Error bars for the final three scenarios show the calculated total costs based on the conservative and optimistic versions of Track 2 scenarios. The main column depicts the average between calculations based on conservative and optimistic versions.

8.2 Track-Switching Costs

The scenario that switches from Track 2 to Track 1 after five years results in a total cost that is similar to following a Track 1 approach, 1B in this case, the whole time. One common concern with switching tracks is that a City may end up wasting money since it would end up purchasing the same number of full capture devices as it would have if it started off in Track 1, but it would also have to spend money on an implementation plan and non-structural BMP efforts that it would end up discontinuing. However, the cost calculations for the track-switching scenario suggest that the savings in BMP repair and maintenance during the first five years of the program can help offset the costs of these Track 2 components that are discontinued in year 6. Although the 20-year cost of the track-switching scenarios is similar to the 20-year cost of Scenario 1B, there are important differences in the *annual* costs. As shown in Figure 7 below, at the time of the switch from Track 2 to Track 1 in year six, there is a very large increase in annual cost, because the City needs to install large numbers of structural BMPs in years six through ten.

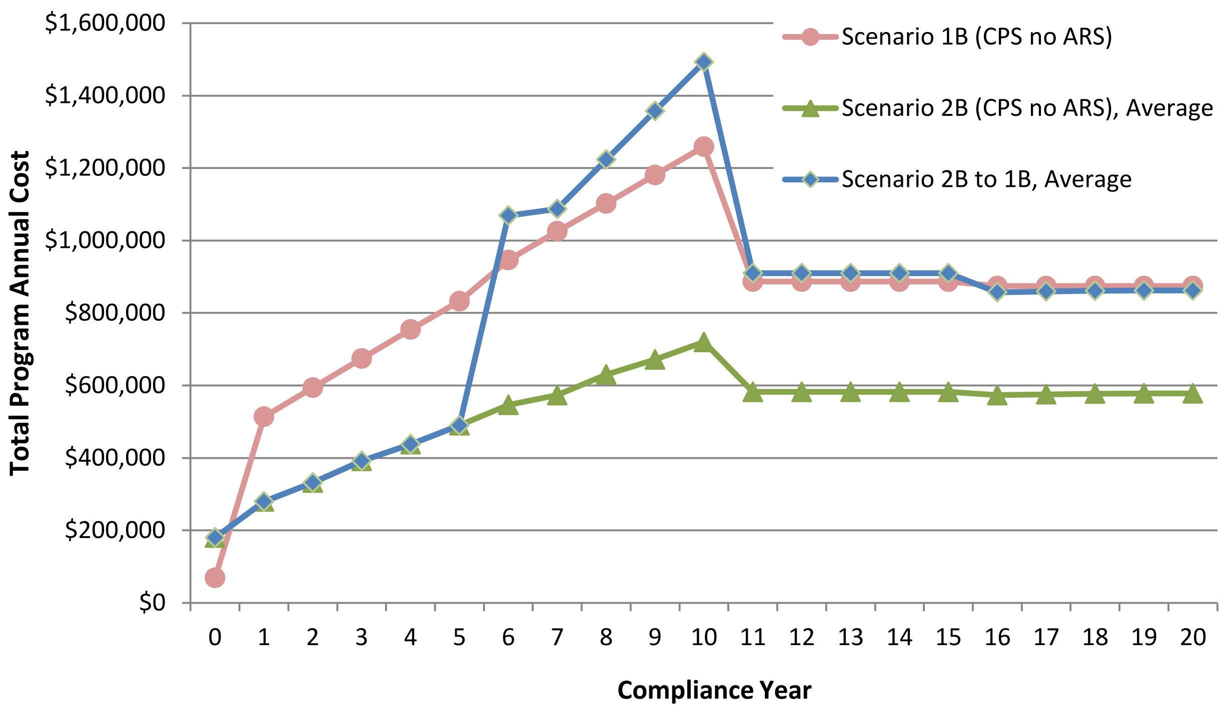

Figure 7. Comparison of Annual Costs for Track-Switching vs. Standard Scenarios
Values reported are based on an average of the "conservative" and "optimistic" versions of Scenario 2B.

8.3 Other Risk Factors

8.3.1 Compliance Confidence

In planning any program to comply with regulations, the components of the program are generally built around a set compliance target or standard defined in the regulation. However, it is important to note that the compliance standard for Track 2 is not clearly defined in the Trash Amendments. Therefore, municipalities that select Track 2 will need to engage with the Regional Board to negotiate proposed compliance metrics and monitoring approaches prior to implementation plan submittal in 2018, and until those compliance standards are agreed upon the City cannot have complete confidence that their planned program will result in compliance. Based on previous interactions with the Regional Board on WQIP development, it is possible that the Regional Board's interpretation of Track 2 compliance metrics may be stricter than what was generally expected by the municipalities. It is possible that a City could plan its Track 2 program and then upon submittal of the implementation plan in 2018, the Regional Board could decide that it will not allow a City to count certain activities toward its overall trash load reduction value or that it will require more conservative methods for calculating trash load reduction values associated with certain activities. Conversely, the compliance standard for Track 1 is more clearly defined as the installation of full capture devices in storm drains receiving runoff from all PLUs in a City's jurisdiction. Therefore, there is much more certainty that a Track 1 approach planned at this time will ultimately achieve compliance compared to a Track 2 approach planned at this time.

The lack of a clear definition of Track 2 compliance standards in the Trash Amendments could also result in the compliance targets *changing* over the course of the 10-year compliance window. For example, even if a City is meeting its compliance milestones agreed upon with the Regional Board, a NGO could observe trash in a water body and then challenge the validity of the agreed upon Track 2 approach and compliance standards. This could put pressure on the Regional Board to change the compliance standard, or it could result in the City having to conduct costly additional studies (e.g. to demonstrate that the trash was not coming from the City's MS4) to maintain the agreed upon compliance standard. Track 1 compliance, on the other hand, would be much harder to challenge since it is based strictly on installing and maintaining BMPs rather than more subjective metrics such as visual trash observations at outfalls or in water bodies.

8.3.2 Flooding and Infrastructure Damage

While all of the structural BMPs considered in this report are designed with mechanisms to allow water to safely bypass the BMP if it reaches capacity or clogs, there is always some risk of BMP failure leading to flooding or infrastructure damage. If flooding occurs and leads to property damage, there is the potential for lawsuits or other claims against the City. The risk of such a situation is likely higher in Track 1 scenarios simply due to the larger number of structural BMPs. However, in Track 2, especially in conservative scenarios, the City will still need to install a large number of structural BMPs, so the difference in flood risk between Track 1 and Track 2 may not be dramatic.

8.4 Impact on WQIP Goals

In addition to the requirements of the Trash Amendments, the City is also impacted by the trash-related goals from the San Diego Bay WQIP. These goals only apply to the portion of the City west of the 805 where "physical aesthetics" (i.e. trash) are identified as a "Focused Priority Condition." To achieve compliance, by fiscal year 2028, <u>one</u> of the following goals must be achieved for the Focused Priority Condition:

1. 95% of the MS4 outfalls visually assessed for trash must have an "optimal" rating.

-- OR --

2. 100% of the high volume trash drainage area for which BMP retrofit is feasible must have structural trash control BMPs installed.

Implementing either a Track 1 or Track 2 approach will contribute to the achievement of either one of these WQIP goals, but the degree to which the City's Trash Amendments compliance program overlaps with the WQIP goals may vary based on the details of the program.

One issue is that the land use-based PLU definitions do not explicitly match up with the term "high volume trash drainage area" used in the WQIP goals. Therefore, the degree to which a Track 1 approach contributes to meeting the BMP retrofit WQIP goal (goal #2) mainly depends on how close the correspondence is between PLUs and high volume trash generation areas. A Track 1 approach should also indirectly help achieve the MS4 outfall trash assesment goal (goal #1), since installing full capture devices should reduce the trash levels observed at outfalls. A Track 2 approach would provide the City with more flexibility on the locations of both structural and non-structural BMPs. For example, non-structural BMPs such as clean-up events and increased street sweeping can target the west side of the City, which would contribute to achieving goal #1. Additionally, Track 2 allows a City to take credit for structural BMPs installed in non-PLU areas. If high volume trash drainage areas were defined significantly differently than PLUs and the number of BMPs required to treat those areas was significantly less than the number of BMPs required to treat all PLU inlets, it is possible that implementing a Track 2 approach could still meet goal #2. However, if PLUs and high volume trash drainage areas are defined as being equivalent or approximately equivalent, which is likely, then implementing a Track 2 approach would not result in enough BMP retrofits to meet goal #2. Additional comparison of WQIP goals and Trash Amendment requirements is provided below:

- The high volume trash drainage area BMP retrofit goal was developed to correspond with the State Trash Amendments, as noted in footnote 5 to Table 4-23 in the accepted 2016 WQIP. In this context, "high volume trash drainage area" as used in the WQIP would generally correspond to PLUs as defined in the Trash Amendments.
    - However, the WQIP indicates that high volume trash drainage areas are portions of the City that data indicates do in fact generate high levels of trash. On the other hand, because the default PLUs in the Trash Amendments are based strictly on land use, it is possible that some areas defined as PLUs do not generate high volumes of trash, and vice versa. There are two main approaches to this issue:
        - Define high volume trash drainage areas as equivalent to PLUs. This is straightforward but could result in the City being required to install structural BMPs to treat PLUs that do not actually generate high levels of trash to comply with the BMP retrofit goal.
        - Collect and present data to the Regional Board to argue for adjustment to PLUs such that areas shown by data or institutional knowledge to generate high trash volumes are the only areas considered PLUs for purposes of Trash Amendments compliance. This approach would be contingent on Regional Board approval. If approved, it would likely be a more effective use of City resources since BMP installation would be targeted only at areas known to generate high volumes of trash.
- The high volume trash drainage area BMP retrofit goal only applies to areas that are feasible for retrofit. Track 1, as described in the Trash Amendments, requires installation of full capture devices in all PLU inlets and does not mention an exemption for infeasibility. In the Los Angeles region though, that Regional Board has developed a framework through which jursidictions can document that BMP installation is infeasible in certain locations and still comply via only structural BMP installation. It is anticipated that a similar pathway will be able to be worked out with the San Diego Regional Board, although this will remain an uncertainty until the details of Trash Amendments application to the Permit and the WQIP are worked out.

- The optimal outfall rating goal is similar to a Track 2 type of approach in that it is based on performance measured by monitoring rather than BMP implementation. The underlying assumption is that 95% optimal scores at outfalls demonstrates full capture equivalency. The WQIP goals were developed with Regional Board staff in view of Trash Amendments requirements, so this view of full capture equivalency may continue to hold in the future. On the other hand, it is also possible that once the Trash Amendments are incorporated into the Permit, the Regional Board revises this opinion and applies a more onerous definition of full capture equivalency. In that case, meeting the WQIP goal for MS4 outfall trash scores may not be sufficient to demonstrate compliance with the Trash Amendments.
- Also note that standard and enhanced non-structural BMPs directly contribute to achieving the MS4 outfall trash assessment goal but not the BMP retrofit goal.

It is also important to remember that the WQIP is a “living” document, and the Regional Board expects municipalities to make regular updates to the document. Therefore, it is probable that there may be an opportunity to revise or clarify the WQIP physical aesthetics goals to more closely coincide with the City’s chosen Trash Amendments compliance approach.

9. Conclusions

The following is a list of general conclusions about Track 1 and Track 2 approaches drawn from the materials presented in this report:

1. Track 2 may be less expensive than Track 1, but that is based on the assumptions that the City’s trash removal efforts yield trash load reduction values consistent with initial estimates and that the final compliance metrics determined by the Regional Board are consistent with what is currently anticipated. If these assumptions are not met, the City may need to switch to a Track 1 approach. This would result in the City accruing all the capital costs of a Track 1 approach *plus* the costs of preparing an implementation plan and doing additional monitoring during the period in which it is following a Track 2 approach.
2. Structural full capture devices would be required in both tracks. Connector pipe screens are expected to be more cost effective than other full capture devices.
3. Because Track 2 allows the City to take credit for existing non-structural BMPs that remove trash, such as street sweeping and cleanups, installation of full capture devices can be ramped up more slowly over the first few years of program implementation. Track 1 would require installing fairly large numbers of full capture devices even in the first years of program implementation.
4. Track 2 has a higher risk of Regional Board enforcement actions or third party lawsuits (see Section 8.1.1).
5. Track 1 has a higher risk of flooding damage and associated costs, although since a relatively large number of structural BMPs are also anticipated under Track 2, this difference may not be large (see Section 8.1.2).
6. Track 1 would be expected to result in achieving at least one (% of area retrofitted with BMPs), and possibly both (full capture BMPs may also result in meeting the MS4 outfall trash level goal), of the City's two WQIP goals.

7. Track 2 may result in achieving one of the City's WQIP goals (MS4 outfall trash levels) but most likely is not capable of achieving the other WQIP goal (% of area retrofitted with BMPs).

Feasibility of a Track 2 approach is largely dependent on how the Regional Board will define full capture equivalency. If a relatively reasonable and achievable definition, like the MS4 outfall trash level goal the City has in the WQIP, is used, then Track 2 is more attractive. Under that type of approach, Track 2 would allow for the City to focus program expenditures on controlling trash where data shows it is a significant problem. However, if Track 2 is interpreted as requiring the City to demonstrate that receiving waters have essentially no trash, or other standards that effectively make the City's compliance depend on controlling sources beyond MS4 discharges (e.g., direct illegal dumping into creeks and rivers or transient encampments), then Track 2 becomes virtually unachievable and cost prohibitive.

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