URBAN CREEKS MONITORING REPORT

PART C: MONITORING IN SAN MATEO COUNTY FOR POLLUTANTS OF CONCERN

Water Year 2022



Submitted in Compliance with
NPDES Permit No. CAS612008 (Order No. R2-2015-0049)
Provision C.8.h.iv.(1)

SAN MATEO COUNTYWIDE
Water Pollution Prevention Program

A Program of the City/County Association of Governments of San Mateo County

March 31, 2023

CREDITS

This report is submitted by the participating agencies in the

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BAMSC	Bay Area Municipal Stormwater Collaborative
BASMAA	Bay Area Stormwater Management Agency Association
BMP	Best Management Practice
CEC	Contaminants of Emerging Concern
CEDEN	California Environmental Data Exchange Network
CW4CB	Clean Watersheds for Clean Bay
DTSC	California Department of Toxic Substances Control
ECWG	Emerging Contaminants Work Group of the RMP
MRP	Municipal Regional Permit
MS4	Municipal Separate Storm Sewer System
NPDES	National Pollution Discharge Elimination System
PCBs	Polychlorinated Biphenyls
PFAS	Perfluoroalkyl Sulfonates
POC	Pollutant of Concern
RMC	Regional Monitoring Coalition
RMP	San Francisco Bay Regional Monitoring Program
RWSM	Regional Watershed Spreadsheet Model
SMCWPPP	San Mateo Countywide Water Pollution Prevention Program (SMCWPPP)
SFEI	San Francisco Estuary Institute
SPoT	Statewide Stream Pollutant Trend Monitoring
SSC	Suspended Sediment Concentration
SSID	Stressor/Source Identification
STLS	Small Tributary Loading Strategy
TOC	Total Organic Carbon
UCMR	Urban Creeks Monitoring Report
USEPA	US Environmental Protection Agency
WLA	Wasteload Allocation
WQO	Water Quality Objective
WY	Water Year

1.0 INTRODUCTION

This Pollutants of Concern (POC) monitoring report was prepared by the San Mateo Countywide Water Pollution Prevention Program (SMCWPPP), as part of SMCWPPP's March 2023 Urban Creeks Monitoring Report (UCMR). SMCWPPP is a program of the San Mateo County City/County Association of Governments (C/CAG). SMCWPPP prepared this report on behalf of San Mateo County local municipal agencies subject to the regional stormwater National Pollutant Discharge Elimination System (NPDES) permit for San Francisco Bay Area (Bay Area) municipalities issued by the San Francisco Regional Water Quality Control Board (Water Board). The stormwater permit is usually referred to as the Municipal Regional Permit (MRP). The current version became effective July 1, 2022 and is referred to as MRP 3.0 (SFBRWQCB 2022). This report fulfills the requirements of MRP provision C.8.h.iv.(1) for reporting a summary of provision C.8.f. POC Monitoring conducted during Water Year (WY) 2022[1] and the allocation of sampling effort projected for the forthcoming water year (WY 2023).

It is important to note that for polychlorinated biphenyls (PCBs), this report focuses on progress to-date towards identifying source areas and properties in San Mateo County. In this context, it evaluates all of the relevant and readily available sediment and stormwater runoff chemistry data collected in San Mateo County, ranging back to the early 2000s.

This POC monitoring report is an appendix to SMCWPPP's WY 2022 Urban Creeks Monitoring Report (UCMR). In compliance with provision C.8.h.iv.(1), this report includes monitoring locations, number and types of samples collected, purpose of sampling (i.e., Management Questions addressed), and analytes measured.

Any POC monitoring data generated by SMCWPPP's sampling of receiving waters (e.g., creeks) is submitted to the San Francisco Bay Area Regional Data Center for upload to the California Environmental Data Exchange Network (CEDEN).[2] However, SMCWPPP did not monitor receiving waters for POCs during WY 2022.

Section 2.0 of this report describes the specific monitoring and reporting requirements in MRP provision C.8.f. (POC Monitoring) and third-party sources of San Mateo County monitoring data. Section 3.0 summarizes POC monitoring accomplishments relative to the requirements in the MRP. Section 4.0 describes the QA/QC program that was implemented by the SMCWPPP during WY 2022 POC monitoring activities and summarizes the results of a QA/QC evaluation. Section 5.0 focuses on PCBs and mercury monitoring activities and evaluates progress to-date towards identifying PCBs source areas and properties in San Mateo County. Section 6.0 summarizes and discusses all of the POC monitoring data presented in this report. Section 7.0 provides the references cited in Sections 1.0 through 6.0.

[1] The water quality monitoring described in this report was conducted on a Water Year basis. A Water Year begins on October 1 and ends on September 30 of the named year. For example, Water Year 2022 (WY 2022) began on October 1, 2021 and concluded on September 30, 2022.

[2] CEDEN has historically only accepted and shared data collected in streams, lakes, rivers, and the ocean (i.e., receiving waters). In late-2016, SMCWPPP was notified that there were changes to the types of data that CEDEN would accept and share. However, pending further clarification, SMCWPPP will continue to submit only receiving water data to CEDEN.

2.0 POC MONITORING AND REPORTING REQUIREMENTS

Provision C.8.f. of the MRP (POC Monitoring) includes specific monitoring and reporting requirements, as described in the following sections.

2.1. POC Monitoring Requirements

MRP 3.0 provision C.8.f. requires water quality monitoring for POCs, including PCBs, mercury, copper, and emerging contaminants. Permittees may comply with the monitoring requirements of provision C.8 through a regional collaborative effort, their countywide stormwater program, third-party monitoring, or a combination of these mechanisms. POC monitoring must address the six priority management information needs (i.e., Management Questions) identified in provision C.8.f.:

1. **Source Identification** – identifying or confirming which sources or watershed source areas provide the greatest opportunities for reductions of POCs in urban stormwater runoff.
2. **Contributions to Bay Impairment –** identifying which watershed source areas contribute most to the impairment of San Francisco Bay beneficial uses (due to source intensity and sensitivity of discharge location).
3. **Management Action Effectiveness** – evaluating the effectiveness or impacts of existing management actions, including compliance with Total Maximum Daily Loads (TMDLs) and other POC requirements and providing support for planning future management actions.
4. **Loads and Status** – providing information on POC loads, concentrations or presence in local tributaries or urban stormwater discharges.
5. **Trends** – evaluating trends in POC loading to the Bay and POC concentrations in urban stormwater discharges or local tributaries over time.
6. **Compliance with Receiving Water Limitations** - providing information to assess whether receiving water limitations (RWLs) are achieved.

POC monitoring is conducted on a water year basis (i.e., October 1 through September 30). Provision C.8.f. specifies yearly (i.e., WY) and total (i.e., over the permit term) minimum numbers of samples for each POC. For example, in San Mateo County, MRP 3.0 requires that a minimum total of 65 PCBs samples be collected and analyzed during the permit term, and at least eight PCBs samples be collected annually. The MRP also specifies the minimum number of samples for each POC that must address each Management Question. For example, by the end of the permit term, Management Questions 1 through 3 must be addressed with at least eight PCBs samples, and Management Questions 4 and 5 must be addressed with at least 16 PCBs samples. It is possible that a single sample can address more than one Management Question; however, no more than 25 percent of samples for a POC may be used to satisfy requirements for multiple Monitoring Questions. Table 1 summarizes the POC monitoring requirements for San Mateo County Permittees (SFBRWQCB 2022).

Table 2. MRP provision C.8.f. POC monitoring requirements for San Mateo County Permittees.

Pollutant of Concern	Total Samples [b]	Yearly Minimum	Minimum # of Samples that Must be Collected for Each Management Question by the End of the Permit Term [a]					
			1. Source Identification	2. Contributions to Bay Impairment	3. Management Action Effectiveness	4. Loads and Status	5. Trends	6. Receiving Water Limitations
PCBs	65	8	8	8	8	16	16	--
Total Mercury	50	8	8	8	8	8	8	--
Copper	5	--	--	--	--	5	--	— [f]
Emerging Contaminants [c]	25	--	--	--	--	25	--	--
Ancillary Parameters [d]	--	--	--	--	--	--	--	--
RWLs Assessment (Cu, Zn, FIB, others [e])	5 (4 wet season; 1 dry season)	--	--	--	--	--	--	5

Cu = copper, FIB = fecal indicator bacteria, PCBs = polychlorinated biphenyls, RWLs = receiving water limitations, Zn = zinc

[a] Individual samples can address more than one Management Question simultaneously, up to 25% of total number of samples.

[b] The MRP minimum number of samples must be met by the end of the five-year permit term (i.e., 2027).

[c] The emerging contaminants level of effort described in the MRP can be satisfied through augmentation of the San Francisco Bay Regional Monitoring Program Emerging Contaminants Monitoring Strategy in the amount of $100,000 per year for all Permittees combined.

[d] Total Organic Carbon (TOC) should be collected concurrently with PCBs data when normalization to TOC is deemed appropriate. Suspended sediment concentration (SSC) should be collected in water samples used to assess loads, loading trends, or Best Management Practice (BMP) effectiveness. Hardness data are used in conjunction with copper concentrations collected in fresh water.

[e] Additional RWL analytes are determined under provision C.8.h.iv.

[f] Copper is one of the required RWL analytes.

2.1.1. Receiving Water Limitations Monitoring

Management Question 6 (compliance with RWLs) must be addressed with at least four samples collected during the wet season and one sample collected during the dry season. RWL analytes must include copper, zinc, fecal indicator bacteria (FIB), and any additional analytes identified based on assessment of the potential that discharges may result in receiving waters approaching or exceeding water quality objectives (WQOs). The RWLs Assessment Report required by provision C.8.h.iv.(2) was developed as a regional effort through the Bay Area

Municipal Stormwater Collaborative[3] (BAMSC) and is included as Attachment 1. It describes the regional approach to RWLs monitoring, including determination of analytes in addition to those listed in Table 1, regionally representative sampling locations, and monitoring methods.

2.1.2. Emerging Contaminants

Emerging contaminants are a diverse group of chemicals and compounds, broadly defined as synthetic or naturally occurring chemicals that are not regulated or commonly monitored in the environment but have the potential to enter the environment and cause adverse ecological or human health impacts. The MRP allows for Permittees to satisfy the emerging contaminant (EC) monitoring requirements through augmentation of the San Francisco Bay Regional Monitoring Program (RMP) Emerging Contaminants Monitoring Strategy in the amount of $100,000 per year for all MRP Permittees combined. SMCWPPP and its BAMSC partners have elected to exercise this option and are working through the RMP to identify analytes and monitoring strategies. A letter describing this commitment and approach is included in Attachment 2. SMCWPPP also continues to participate in the RMP's Emerging Contaminant Work Group (ECWG).

2.2. Third-Party Data

SMCWPPP and other Bay Area countywide stormwater programs have a long history of working collaboratively with other organizations that monitor water quality to find mutually beneficial approaches. MRP provision C.8.a.iii. allows Permittees to use data collected by third-party organizations to fulfill monitoring requirements, provided the data are demonstrated to meet the specified data quality objectives. PCBs and mercury monitoring data collected in San Mateo County through two ongoing programs help address provision C.8.f. monitoring requirements: (1) the Small Tributary Loading Strategy (STLS) of the RMP, and (2) the statewide Stream Pollution Trends (SPoT) Monitoring Program, which is a core component of the Surface Water Ambient Monitoring Program (SWAMP) administered by the State Water Resources Control Board (SWRCB).

In addition, Clean Watersheds for a Clean Bay (CW4CB), a BASMAA project that was funded by a grant from USEPA and implemented 2010 - 2017, provided data collected in WY 2012, WY 2013, and WY 2016. These third-party data also provide context for evaluation of SMCWPPP monitoring results.

As in previous years, this POC monitoring report evaluates certain PCBs and mercury data collected in San Mateo County by third parties, along with the data collected directly by SMCWPPP. The following sections provide additional details about the RMP STLS and the SPoT Monitoring Program.

2.2.1. RMP STLS

The RMP's Small Tributary Loading Strategy (STLS) team typically conducts annual monitoring for POCs on a region-wide basis. SMCWPPP is an active participant in the STLS and works with other Bay Area municipal stormwater programs to identify opportunities to direct RMP funds and monitoring activities towards monitoring required by the MRP. POC monitoring activities conducted by the STLS in recent years (WY 2015 – present) have focused on wet weather reconnaissance monitoring in catchments of interest, using a similar approach to

[3] The BAMSC was organized by the Bay Area Stormwater Management Agencies Association (BASMAA) Board of Directors to continue the information sharing and permittee advocacy functions of BASMAA in an informal manner after BASMAA's dissolution.

collecting storm composite samples from catchments with old industrial land uses for PCBs and mercury analysis that was implemented by SMCWPPP in WY 2016 – WY 2018. In WY 2022, the STLS Team did not conduct weather reconnaissance sampling for PCBs/mercury in San Mateo County.

2.2.2. SPoT Monitoring Program

The SPoT Monitoring Program conducts annual dry season monitoring (subject to funding constraints) of sediments collected from a statewide network of large rivers. The goal of the SPoT Program is to investigate long-term trends in water quality (Management Question No. 5 – Trends). Sites are targeted in bottom-of-the-watershed locations with slow water flow and appropriate micromorphology to allow deposition and accumulation of sediments, including a station near the mouth of San Mateo Creek in the City of San Mateo. In most years, sediments are analyzed for PCBs, mercury, metals (including copper) toxicity, pesticides, and/or organic pollutants (Phillips et al. 2014). In WY 2022, SPoT monitoring in San Mateo Creek included a sample analyzed for copper in bedded sediment (Figure 1). The most recent technical report prepared by SPoT program staff was published in 2020 and describes ten-year trends from the initiation of the program in 2008 through 2017 (Phillips et al. 2020).

2.3. MRP Reporting Requirements

Per MRP requirements, SMCWPPP submits a comprehensive Urban Creeks Monitoring Report (UCMR) by March 31 of each year, reporting on all data collected during the foregoing October 1 – September 30 period (SMCWPPP 2017a, 2018a, 2019a, 2021a, 2022a). The UCMR includes summaries of Creek Status monitoring, Stressor/Source Identification (SSID) projects, and this report on POC monitoring. In March 2020, per MRP requirements for the fifth year of the permit term, San Mateo County MRP Permittees submitted an Integrated Monitoring Report (IMR) (SMCWPPP 2020a) in lieu of the annual UCMR. The IMR focused on summarizing and evaluating data collected from WYs 2014 – 2019 and was part of the Report of Waste Discharge submitted by SMCWPPP to apply for coverage under the reissued MRP.

In accordance with MRP requirements, this POC monitoring report includes the following standard monitoring report content:

- The purpose of the monitoring and brief descriptions of study design rationale;
- Quality Assurance/Quality Control summaries for sample collection and analytical methods, including a discussion of any limitations of the data;
- Brief descriptions of sampling protocols and analytical methods;
- Sample location description, including water body name and segment and location coordinates;
- Sample ID, collection date (and time if relevant), and media;
- Concentrations detected, measurement units, and detection limits;
- Assessment, analysis, and interpretation of the data for each monitoring program component;
- A listing of non-Permittee entities whose data are included in the report; and
- Assessment of compliance with applicable water quality standards.

3.0 SUMMARY OF POC MONITORING ACCOMPLISHMENTS

In compliance with MRP provision C.8.f. of the MRP, in WY 2022 SMCWPPP conducted POC monitoring for PCBs and mercury. General methods employed for POC monitoring and quality assurance/quality control (QA/QC) procedures were similar to previous years (SMCWPPP 2015, 2017a, 2018a, 2019a, 2020a, 2021a, 2022a). The MRP-required yearly minimum number of eight samples was met for these pollutants. Specific monitoring stations sampled in WY 2021 are listed in Table 2 and mapped in Figure 1.

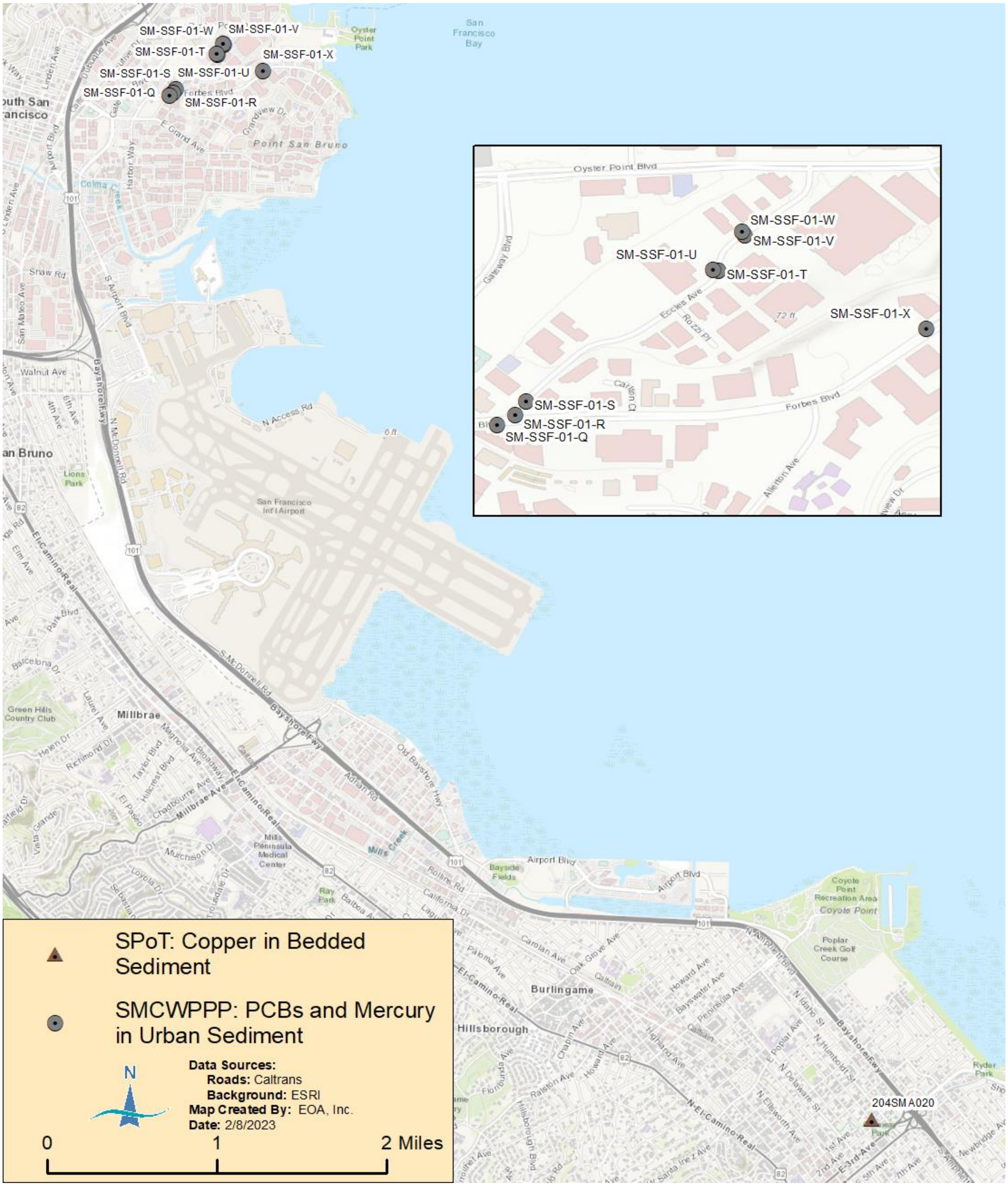

Figure 1. POC Monitoring Stations in San Mateo County, WY 2022.

Table 2. POC Monitoring Stations in San Mateo County, WY 2022.

Organization	Station Code	Sample Date	Latitude	Longitude	Matrix	PCBs	Mercury	Total Copper	WMA[b]	Total PCBs[a] (mg/kg dry weight)	Total Mercury (mg/kg dry weight)	Description
SMCWPPP	SM-SSF-01-R	9/26/2022	37.656717	-122.395713	sediment	X	X		315	0.015	0.018	Sampled between railway and sidewalk on north side of Forbes at Eccles Ave. W
SMCWPPP	SM-SSF-01-Q	9/26/2022	37.656478	-122.396134	sediment	X	X		315	0.047	0.015	Sampled railway at sidewalk on south side of Forbes at Eccles Ave.
SMCWPPP	SM-SSF-01-S	9/26/2022	37.657026	-122.395447	sediment	X	X		315	0.14	0.013	Sampled embankment along railway on Eccles Ave. across from 417 Eccles Ave.
SMCWPPP	SM-SSF-01-T	9/26/2022	37.660064	-122.39097	sediment	X	X		314	0.020	0.021	Sampled from inlet at 528 Eccles Ave.
SMCWPPP	SM-SSF-01-U	9/26/2022	37.660096	-122.3911	sediment	X	X		314	0.019	0.018	Sampled inlet at Avis rent a car on Eccles Ave.
SMCWPPP	SM-SSF-01-V	9/26/2022	37.66089	-122.39036	sediment	X	X		314	0.0024	0.018	Sampled inlet at 550 Eccles Ave.
SMCWPPP	SM-SSF-01-W	9/26/2022	37.66097	-122.390441	sediment	X	X		314	0.0030	0.022	Sampled inlet in driveway at 551 Eccles Ave.
SMCWPPP	SM-SCS-0921-X[a]	9/26/2022	37.65872	-122.386156	sediment	X	X		315	0.027	0.015	Sampled where old railway came out onto Eccles Ave. Sampled exposed sediments at sidewalk.
SPoT	204SMA020				sediment			X	--	--	--	Creek bed sediment sample.

[a] A field duplicate was collected at the same location as sample SM-SCS-0921-X. See the QA/QC report (Attachment 3) for more information.
[b] WMA = Watershed Management Areas (see Section 5.0)

4.0 SUMMARY OF DATA QUALITY FOR WY 2022

In accordance with MRP requirements, a comprehensive QA/QC program was implemented by SMCWPPP covering all aspects of POC monitoring conducted during WY 2022. The QA/QC protocols have been described in previous SMCWPPP UCMRs (SMCWPPP 2017a, 2018a, 2019a, 2021a, 2022a) and IMR (SMCWPPP 2020a) and continued to be based upon the Quality Assurance Project Plan (QAPP) developed for the CW4CB project (AMS 2012), supplemented by the Bay Area Stormwater Management Agencies Association (BASMAA) Regional Monitoring Coalition (RMC) QAPP (BASMAA 2020) and the Quality Assurance Program Plan (QAPrP) for the California Surface Water Ambient Monitoring Program (SWAMP).

Data were assessed for seven data quality attributes: (1) representativeness, (2) comparability, (3) completeness, (4) sensitivity, (5) contamination, (6) accuracy, and (7) precision. These seven attributes were compared to Data Quality Objectives (DQOs), which were established to ensure that data collected are of adequate quality and sufficient for the intended uses. DQOs address both quantitative and qualitative assessment of the acceptability of data. Representativeness and comparability are qualitative while completeness, sensitivity, contamination, accuracy, and precision are quantitative assessments. Specific DQOs are based on Measurement Quality Objectives (MQOs) for each analyte.

Overall, the results of the QA/QC review suggest that the data generated during WY 2022 POC monitoring were of sufficient quality for the purposes of this program. While some data were flagged in the project database based on the MQOs and DQOs identified in the QAPPs, none of the data were rejected. Attachment 3 contains a report summarizing the results of the WY 2022 data validation.

5.0 PROGRESS TO-DATE IDENTIFYING PCBS AND MERCURY SOURCES

The below sections summarize progress to-date using POC monitoring, informed by desktop screening/evaluation methods including site records reviews and aerial photograph analysis, to identify sources of PCBs and mercury in San Mateo County stormwater runoff. SMCWPPP's PCBs and mercury monitoring has been focused on MS4 (Municipal Separate Storm Sewer System) catchments in San Mateo County (referred to as Watershed Management Areas or WMAs) containing high interest parcels with land uses potentially associated with PCBs (e.g., old industrial, electrical, and recycling) and/or other characteristics potentially associated with pollutant discharge (e.g., poor housekeeping, unpaved areas, and storage tanks). The two general POC monitoring categories of samples types are:

1. Composite stormwater runoff samples collected in San Mateo County during storm events for PCBs and mercury analysis. These samples are typically collected from outfalls or manholes at or near the bottom of catchments with old industrial land uses. Management Questions addressed may include No. 1 (Source Identification), No. 2 (Contributions to Bay Impairment), No. 4 (Loads and Status), No. 5 (Trends), and No. 6 (Compliance with Receiving Water Limitations) (see Section 2.1).
2. Sediment samples typically collected during dry weather from manholes, storm drain inlets, shallow soils, roadways, gutters, driveways, and/or sidewalks in MS4 catchments with old industrial land uses. Management Questions addressed may include No. 1 (Source Identification), No. 2 (Contributions to Bay Impairment), No. 4 (Loads and Status), and No. 5 (Trends) (see Section 2.1).

In addition to the efforts described in the below sections, in recent years (WYs 2015 – 2019) the RMP has conducted stormwater runoff monitoring in San Mateo County and other parts of the Bay Area through the STLS, with a focus on PCBs and mercury. As described earlier (Section 2.2.1), the STLS monitoring in San Mateo County was coordinated with SMCWPPP, with SMCWPPP staff assisting with selection of sampling stations and coordination with staff from local agencies. Monitoring objectives have included characterizing PCBs and mercury concentrations in stormwater runoff from the bottom of selected urban catchments with potential pollutant source areas. SMCWPPP (2017a, 2018a, 2019a, 2020a, 2021a, 2022a) include additional information on the STLS efforts in San Mateo County.

5.1. Sampling Summary and Chronology

The following sections summarize the general chronology of PCBs and mercury monitoring conducted in San Mateo County to characterize pollutant concentrations across the urban landscape and to identify source areas and properties. To-date, composite samples of stormwater runoff have been collected from the bottom of 49 San Mateo County WMAs and over 400 individual and composite grab samples of sediment have been collected within priority WMAs to help characterize the catchments and identify source areas and properties. Most samples were collected in the public right-of-way (ROW). The grab sediment samples were collected from a variety of types of locations, including manholes, storm drain inlets, driveways, streets, and sidewalks, often adjacent to or nearby high interest parcels with land uses associated with PCBs and/or other characteristics potentially associated with pollutant discharge. SMCWPPP's PCBs and mercury monitoring program has also included collecting sediment samples in the public ROW by every known PCBs remediation site in San Mateo County, to the extent applicable and feasible.

When a previously unknown potential source property was revealed via the PCBs and mercury monitoring program, SMCWPPP conducted a follow-up review of current and historical records regarding site occupants and uses, hazardous material/waste use, storage, and/or release, violation notices, and any remediation activities. In addition to databases such as EPA's Toxic Release Inventory (TRI) and Envirofacts, and the State of California's Geotracker and Envirostor, some of the most useful records were often found at the San Mateo County Department of Environmental Health.

Four previously unknown potential source properties have been identified in San Mateo County, all in WMA 210 (Pulgas Creek Pump Station South) in the City of San Carlos. SMCWPPP is working with the City of San Carlos to determine next steps for these properties, including additional monitoring and/or potential referral to the Water Board (see Section 5.5.6 for more details). In addition, SMCWPPP's PCBs and mercury monitoring program has led to SMCWPPP referring four other properties (two sets of two adjacent properties, all in San Carlos) to the Water Board for potential further PCBs investigation and abatement (see Section 5.5.6).

5.1.1. WY 2000 through WY 2014

From 2000 to 2015, SMCWPPP and other parties conducted periodic sediment sampling programs in San Mateo County to characterize the distribution of PCBs in various land uses throughout the urban landscape and identify catchments and properties that are potential sources of PCBs to the MS4. During this period, over 270 sediment samples were collected in San Mateo County, mainly from streets and MS4s in the public right-of-way (e.g., storm drain lines accessed via manholes, storm drain inlets, drainage channels, and pump station sumps). The samples were analyzed for PCBs congeners, total mercury, and ancillary analytes (KLI and EOA 2002, SMCSTOPPP 2002, 2003, and 2004, Yee and McKee 2010, SMCWPPP 2015, and CW4CB 2017a).

The initial step in the sediment sampling programs was a 2000 and 2001 collaborative project among SMCWPPP and other Bay Area countywide stormwater programs referred to as the Joint Stormwater Agency Project (JSAP). The JSAP measured concentrations of PCBs, mercury and other pollutants in sediments collected from stormwater conveyance systems in San Mateo County and other parts of the Bay Area (KLI and EOA 2002). The primary goal was to characterize the distribution of pollutants among land uses in watersheds draining to San Francisco Bay.

In follow-up to the JSAP regional survey, SMCWPPP and other Bay Area countywide stormwater programs began performing "case studies" in some areas where relatively elevated PCBs were found during the JSAP. The primary goals were to develop methods to identify PCBs sources and begin to identify measures to address any controllable sources found. The techniques employed included collection and analysis of stormwater conveyance sediment samples and research on historical and current land use. In the early 2000s, SMCWPPP completed PCBs case study work in four San Mateo County areas where elevated levels of PCBs were found during the JSAP survey. The case studies investigated the Bradford and Broadway pump station drainages in Redwood City, the South Maple pump station drainage in South San Francisco, an area in the vicinity of Colma Creek, and the Pulgas Creek pump station drainage in San Carlos (SMCSTOPPP 2002, 2003, and 2004).

In 2007, a State of California Proposition 13 grant-funded study by the San Francisco Estuary Institute (SFEI) collected street dirt and MS4 sediment samples in the City of San Carlos in San

Mateo County and other parts of the Bay Area (Yee and McKee 2010). In addition, beginning in 2010 SMCWPPP partnered with the Bay Area Stormwater Management Agencies Association (BASMAA) to implement the USEPA grant-funded Clean Watersheds for a Clean Bay (CW4CB) project. CW4CB conducted additional investigation of PCBs sources to the MS4 in several old industrial areas in the Bay Area, including the Pulgas Creek pump station drainage in San Carlos (CW4CB 2017a).

In WY 2014, SMCWPPP worked with San Mateo County MRP Permittees to conduct a process to screen for "high interest parcels" for PCBs in the county. The process was generally consistent with a framework developed through a collaboration of SMCWPPP and the other Bay Area countywide stormwater programs in consultation with Water Board staff. The screening covered all land areas in the county that drain to San Francisco Bay, focusing on about 160,000 urban parcels. Parcels were identified that were industrialized in 1980 or earlier (i.e., old industrial parcels) or have other land uses associated with PCBs (i.e., electrical, recycling, and military). SMCWPPP then worked with municipal staff to prioritize these parcels based on the evaluation of existing information on land uses and practices (e.g., redevelopment status, extent and quality of pavement, level of current housekeeping, any history of stormwater violations, and presence of electrical or heavy equipment, storage tanks, or stormwater treatment), local institutional/historical knowledge, and surveys of site conditions (walking/windshield surveys, Google Street View, and/or aerial photography). The prioritization resulted in a list of about 1,600 high interest parcels for PCBs in San Mateo County (SMCWPPP 2015).

5.1.2. WY 2015

In January and February 2015, SMCWPPP designed a monitoring plan based on the results of the 2014 screening for high interest parcels. SMCWPPP then collected 101 sediment samples from the urban storm drainage system (e.g., manholes, storm drain inlets) and public right-of-way surfaces (e.g., street gutters). The general goal was to continue attempting to identify potential PCBs source areas. Samples were distributed among the nine municipalities that collectively encompass 93% of the old industrial land use in San Mateo County that drains to San Francisco Bay (SMCWPPP 2015).

5.1.3. WY 2016

MRP provisions C.11.a.iii. and C.12.a.iii. require that Permittees provide a list of management areas in which new PCBs and mercury control measures will be implemented during the permit term. These management areas were designated Watershed Management Areas (WMAs). In FY 2016, SMCWPPP began implementing a process to identify WMAs and prioritize them based on the potential for identifying PCBs sources and controls (especially source property referrals) to reduce PCBs loads. Progress toward developing the list was initially submitted in a report dated April 1, 2016 (SMCWPPP 2016a) and the initial list was submitted with SMCWPPP's FY 2015/16 Annual Report (SMCWPPP 2016b).

The 1,600 high interest parcels described above are almost entirely located within 105 "catchments of interest" with high interest parcels comprising at least 1% of their area (and usually with existing pollutant controls). WMAs were defined as the sum of the 105 catchments of interest and an additional 25 catchments with existing or planned stormwater pollutant controls (e.g., GI implemented on parcels per provision C.3 requirements, built on public lands such as parks, or retrofitted into the public ROW), for a total of about 130 catchments designated as WMAs (SMCWPPP 2016a and b). It should be noted that WMA catchments are stormwater runoff hydrologic catchments in San Mateo County that drain to 24-inch or larger diameter outfalls. These urban catchments were originally delineated at this geographical scale as part of SMCWPPP's program to help local agencies develop trash controls in San Mateo County (SMCWPPP 2014).[4]

Finally, during the WY 2016 rainy season SMCWPPP collected eight composite samples of stormwater runoff. The samples were collected from outfalls at the bottom of WMAs that contain high interest parcels (i.e., with land uses associated with PCBs such as old industrial, electrical, and recycling, as described above). The RMP STLS collected an additional seven stormwater runoff composite samples in San Mateo County in coordination with SMCWPPP. Composite samples consisting of four to eight aliquots collected during the rising limb and peak of the storm hydrograph (as determined through field observations) were analyzed for PCBs congeners, total mercury, and other analytes (SMCWPPP 2017a).

5.1.4. WY 2017

SMCWPPP's major WY 2017 POC monitoring efforts included the following:

- Collected 17 composite samples of stormwater runoff from outfalls at the bottom of WMAs that contain high interest parcels with land uses associated with PCBs. The RMP STLS collected an additional four stormwater runoff composite samples in San Mateo County in coordination with SMCWPPP. Composite samples consisting of four to eight aliquots collected during the rising limb and peak of the storm hydrograph (as determined through field observations) were analyzed for PCBs congeners, total mercury, and other analytes (SMCWPPP 2018a).
- Collected 61 sediment samples as part of the program to attempt to identify source properties within WMAs. These samples were collected in the public ROW, including locations adjacent to high interest parcels. Individual and composite sediment samples collected from manholes, storm drain inlets, driveways, and sidewalks were analyzed for PCBs congeners, total mercury, and other analytes (SMCWPPP 2018a).
- Continued updating and prioritizing the list of WMAs in San Mateo County (SMCWPPP 2017b).

5.1.5. WY 2018

SMCWPPP's major WY 2018 POC monitoring efforts included the following:

- Collected 13 composite samples of stormwater runoff from outfalls at the bottom of WMAs that contain high interest parcels with land uses associated with PCBs. The RMP STLS collected an additional two stormwater runoff composite samples in San Mateo County in coordination with SMCWPPP. Composite samples consisting of four to eight aliquots collected during the rising limb and peak of the storm hydrograph (as determined through field observations) were analyzed for PCBs congeners, total mercury, and other analytes (SMCWPPP 2019a).
- Collected 50 sediment samples as part of the program to attempt to identify source properties within WMAs. These samples were collected in the public ROW, including

[4] The WMA numbering system starts with the numerical designations (ranging from 0 to 408) used by SMCWPPP (2014). Additional WMAs were delineated for areas that contain parcels of interest but were not delineated in 2014, with numerical designations ranging from 1000 to 1017. These 18 WMAs are not necessarily hydrologic catchments. They combine areas that drain to outfalls ≥ 24-inches, drain directly to natural waterways including the Bay, and/or private drainages. Finally, additional WMAs were delineated that lack parcels of interest but include pollutant controls (mainly GI in old urban parcels that were redeveloped). These WMAs are not hydrologic catchments and were delineated for each Permittee that drains to the Bay. They were designated "Other –" followed by three letters representing the jurisdiction (e.g., Other – SSF for South San Francisco).

locations adjacent to high interest parcels. Individual and composite sediment samples collected from manholes, storm drain inlets, driveways, and sidewalks were analyzed for PCBs congeners, total mercury, and other analytes (SMCWPPP 2019a).
- Continued updating and prioritizing the list of WMAs in San Mateo County (SMCWPPP 2018b).

5.1.6. WY 2019

During WY 2019, SMCWPPP collected 25 sediment samples as part of the program to attempt to identify source properties within WMAs. These samples were collected in the public ROW, including locations adjacent to high interest parcels. Individual and composite sediment samples collected from manholes, storm drain inlets, driveways, and sidewalks were analyzed for PCBs congeners, total mercury, and other analytes. In addition, the RMP STLS collected two stormwater runoff composite samples in San Mateo County in coordination with SMCWPPP. The results of the WY 2019 and prior PCBs and mercury monitoring are summarized in the following sections. SMCWPPP also continued updating and prioritizing the list of WMAs in San Mateo County (SMCWPPP 2019b).

5.1.7. WY 2020

During WY 2020, SMCWPPP collected eight sediment samples and analyzed each for PCBs and mercury. As in previous years, in WY 2020 the primary goal of PCBs and mercury monitoring conducted by SMCWPPP was to attempt to identify PCBs source properties or areas and thus to help address Management Question No. 1 (Source Identification). Sampling stations were located in a City of San Carlos old industrial catchment (WMA 210) where previous samples had some of the most elevated PCBs concentrations observed in the Bay Area. The sampling was designed to provide additional information relative to three suspected source properties in this WMA. See Section 5.5.6 for additional details. SMCWPPP also continued updating and prioritizing the list of WMAs in San Mateo County along with completing a Reasonable Assurance Analysis for San Mateo County that described scenarios to achieve the PCBs and Mercury San Francisco Bay TMDL Wasteload Allocations (SMCWPPP 2020b).

Third-party organizations did not collect samples for PCBs analysis in San Mateo County during WY 2020.[5] In addition, during WY 2020 the RMP STLS did not collect any stormwater runoff samples in San Mateo County.

5.1.8. WY 2021

During WY 2021, SMCWPPP collected an additional eight sediment samples in San Carlos and analyzed each for PCBs and mercury. As in previous years, the primary goal of PCBs and mercury monitoring conducted by SMCWPPP in WY 2021 was to attempt to identify PCBs source properties or areas and thus to help address Management Question No. 1 (Source Identification). Sampling stations were located in a City of San Carlos old industrial catchment (WMA 210) where previous samples had some of the most elevated PCBs concentrations observed in the Bay Area. Similar to WY 2020, the sampling was designed to provide additional information relative to three suspected source properties in this WMA (see Section 5.5.6). Samples were collected from the public right-of-way using methods similar to those implemented previously (SMCWPPP 2015, 2016a, 2016b, 2017a, 2017b, 2018a, 2019a, 2020a, 2021a). Individual and composite sediment samples collected from manholes, storm drain

[5] However, one sediment sample was collected in San Mateo County by the SPoT program and analyzed for mercury to address Management Question No. 5 (Trends) (see Section 2.2.2).

inlets, driveways, and sidewalks were analyzed for the 40 PCBs congeners analyzed by the RMP for Bay samples[6] (EPA method 1668C), total mercury (method EPA 7471A), and moisture/total solids[7] (method ASTM D2216). See Section 5.5.6 for additional details. SMCWPPP also continued updating and prioritizing the list of WMAs in San Mateo County (SMCWPPP 2021b).

5.1.9. WY 2022

During WY 2022, SMCWPPP collected an additional eight sediment samples in City of South San Francisco and analyzed each for PCBs and mercury (Table 2). As in previous years, the primary goal of the PCBs and mercury monitoring was to attempt to identify PCBs source properties or areas and thus to help address Management Question No. 1 (Source Identification). Sampling stations were located in two old industrial land use catchments (WMAs 314 and 315). Some stormwater runoff samples previously collected from the bottom of these catchments showed elevated PCBs concentrations, but specific source properties had not been identified. The sediment sampling was designed to attempt to locate PCBs source areas withing these WMAs, including along railway ROWs (see Section 5.5.2). Samples were collected from the public ROW using methods similar to those implemented previously (SMCWPPP 2015, 2016a, 2016b, 2017a, 2017b, 2018a, 2019a, 2020a, 2021a, 2022a). Individual sediment samples collected from storm drain inlets, sidewalks, and public ROW areas associated with railways (Table 2) were analyzed for the 40 PCBs congeners analyzed by the RMP for Bay samples[8] (EPA method 1668C), total mercury (method EPA 7471A), and moisture/total solids[9] (method ASTM D2216). SMCWPPP also continued updating and prioritizing the list of WMAs in San Mateo County (SMCWPPP 2022b).

Third-party organizations did not collect samples for PCBs source identification in San Mateo County during WY 2022. In addition, during WY 2022 the RMP STLS did not collect any stormwater runoff samples in San Mateo County.

5.2. San Mateo County Stormwater Runoff Monitoring for PCBs and Mercury

To prioritize WMAs for stormwater sampling, SMCWPPP has evaluated several types of data, including land use, PCBs and mercury concentrations from prior sediment and stormwater runoff sampling efforts, municipal storm drain maps showing pipelines and access points (e.g., manholes, outfalls, pump stations), and logistical/safety considerations. Composite samples, consisting of four to eight aliquots collected during the rising limb and peak of the storm hydrograph (as determined through field observations), have been collected and analyzed for the RMP 40 PCBs congeners (EPA method 1668C), total mercury (EPA method 1631E), and suspended sediment concentration (SSC; method ASTM D3977-97).

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[6] The "RMP 40" congeners include: congeners PCB-8, PCB-18, PCB-28, PCB-31, PCB-33, PCB-44, PCB-49, PCB-52, PCB-56, PCB-60, PCB-66, PCB-70, PCB-74, PCB-87, PCB-95, PCB-97, PCB-99, PCB-101, PCB-105, PCB-110, PCB-118, PCB-128, PCB-132, PCB-138, PCB-141, PCB-149, PCB-151, PCB-153, PCB-156, PCB-158, PCB-170, PCB-174, PCB-177, PCB-180, PCB-183, PCB-187, PCB-194, PCB-195, PCB-201, PCB-203.

[7] Samples were analyzed for total solids to allow for calculation of dry weight concentrations.

[8] The "RMP 40" congeners include: congeners PCB-8, PCB-18, PCB-28, PCB-31, PCB-33, PCB-44, PCB-49, PCB-52, PCB-56, PCB-60, PCB-66, PCB-70, PCB-74, PCB-87, PCB-95, PCB-97, PCB-99, PCB-101, PCB-105, PCB-110, PCB-118, PCB-128, PCB-132, PCB-138, PCB-141, PCB-149, PCB-151, PCB-153, PCB-156, PCB-158, PCB-170, PCB-174, PCB-177, PCB-180, PCB-183, PCB-187, PCB-194, PCB-195, PCB-201, PCB-203.

[9] Samples were analyzed for total solids to allow for calculation of dry weight concentrations.

During WYs 2016 – 2018, SMCWPPP collected 38 composite samples of stormwater runoff from outfalls at the bottom of WMAs that contain high interest parcels (SMCWPPP did not collect stormwater runoff samples in WYs 2019 – 2022). From WYs 2016 – 2019, an additional 15 composite stormwater samples were collected through the RMP's STLS, with four of the RMP's STLS samples being at previously sampled sites. Prior to that, from WYs 2011 – 2014, the RMP STLS collected 43 grab samples at four sites, with the majority being at the Pulgas Creek Pump Station south catchment loading station. The total of 96 samples (at 49 stations) primarily helps address Management Questions No. 1 (Source Identification) and No. 4 (Loads and Status). These data have also been used by the RMP STLS to improve calibration of the Regional Watershed Spreadsheet Model (RWSM), which is a land use-based planning tool for estimation of overall POC loads from small tributaries to San Francisco Bay at a regional scale. San Mateo County PCBs and mercury stormwater runoff sampling results are summarized in Attachment 4.

Table 3 summarizes PCBs, mercury, and SSC monitoring results for stormwater runoff samples collected in San Mateo County (by SMCWPPP and RMP STLS) through WY 2021.[10] Total PCBs was calculated as the sum of the RMP 40 congeners. Particle ratio is calculated by dividing the total pollutant (PCBs or mercury) concentration by SSC. Assuming a pollutant is entirely bound to suspended sediments in the water sample, particle ratios estimate the average concentration of pollutant on the suspended sediment and are sometimes referred to as particle concentration. Since PCBs and mercury are hypothesized to primarily be bound to sediment in aquatic environments, particle ratios are often used to normalize pollutant concentrations in samples with varying levels of suspended sediment.

Table 3. Descriptive Statistics – PCBs and Mercury Concentrations in San Mateo County Stormwater Runoff and Natural Waterway Water Samples through WY 2022[a]

Statistic	PCBs (ng/L)[b]	Hg (ng/L)	SSC (mg/L)	PCBs Particle Ratio (mg/kg)[c]	Hg Particle Ratio (ng/mg)[c]
Min	0.01	ND[d]	3.0	0.0	ND[d]
10th Percentile	1.10	1.80	10.40	0.03	0.04
25th Percentile	2.92	4.00	21.70	0.08	0.12
50th Percentile	6.47	6.90	42.00	0.17	0.23
75th Percentile	31.43	15.00	74.08	0.70	0.45
90th Percentile	70.86	29.78	108	1.51	0.68
Max	2,988	71.10	719	22.75	2.33
Mean	59	13	68	0.8	0.35

[a] Results were averaged for storm events with more than one sample collected during the storm. SMCWPPP and the RMP did not collect stormwater runoff samples in San Mateo County in WYs 2020, 2021 and 2022.

[b] Total PCBs calculated as sum of RMP 40 congeners.

[c] PCBs and Hg particle ratios calculated by dividing total PCBs and Hg concentrations by SSC, respectively.

[d] Not Detected.

[10] SMCWPPP and the RMP did not collect stormwater runoff samples in San Mateo County in WYs 2020 and 2021.

For storms with more than one sample, total PCBs concentrations were averaged in Table 3. In addition, for sites with multiple samples, particle ratios in Table 3 were calculated by dividing the sum of PCBs concentrations by the sum of suspended sediment concentrations. This averaging is essentially equivalent to “compositing” all the individual samples that have been collected at a site. This is consistent with the RMP STLS approach to data evaluation (Gilbreath et al., 2021).

Low PCBs concentrations in composite stormwater runoff samples from the bottom of WMA catchments have suggested that either PCBs sources are not prevalent in the catchment or the samples are “false negatives.” False negatives could be the result of low rainfall/runoff rates failing to mobilize sediments from source areas and/or other factors. Only a few stormwater runoff sampling stations in San Mateo County have been resampled, but the results from two such stations in South San Francisco, as described by SMCWPPP (2018), suggested small storm sizes may have resulted in false negatives. SMCWPPP, in collaboration with the SCVURPPP, has explored developing methods to normalize results from this type of stormwater runoff monitoring based upon storm intensity. However, the high variability in many of the parameters involved leads to a high degree of uncertainty in the evaluation results. SMCWPPP will continue to evaluate normalization methods and results as more data become available in future years, in coordination with related efforts by the RMP (referred to as the RMP’s “Advanced Data Analysis”).

5.3. Regional Stormwater Runoff Monitoring for PCBs and Mercury

This section evaluates data collected by SMCWPPP to-date on PCBs concentrations in stormwater runoff and natural waterways in the context of similar data collected throughout the Bay Area. The analysis included data from other Bay Area countywide stormwater programs and the RMP STLS (Gilbreath et al., 2021). The dataset includes water samples collected during 433 storm events at 163 MS4 bottom of catchment stations and 31 natural waterways (usually creeks with natural channels) throughout the Bay Area. The MS4 catchment sites included storm drain manholes, outfalls, pump stations, and artificial channels.[11] Many of the sites have been sampled more than once and/or have multiple sample results reported for individual storm events. Twenty-seven of the 163 MS4 sites have multiple sample results (sample counts of 2 to 80) and 18 of the 31 natural waterway sites have multiple sample results (sample counts of 2 to 126). The majority of the regional samples were collected as single storm event composite samples at each site. However, for sites with multiple grab samples collected throughout a storm event, the PCBs concentration for that storm event is reported as the average of all individual grab samples collected during that storm event.

The average or composite storm event PCBs concentrations in Bay Area stormwater runoff and natural waterway samples (n=433) are shown in Figure 2. PCBs particle ratios are shown in Figure 3. Figures 2 and 3 compare PCBs results for samples collected in San Mateo County to samples collected outside of the County. Four of the ten highest storm event PCBs concentrations in the overall stormwater runoff sample dataset are for samples collected in San Mateo County. The highest average PCBs concentration measured during a storm event in the Bay Area was from the Pulgas Creek Pump Station South in San Carlos (2,988 ng/L). Average PCBs concentrations measured during 2 other storm events at the Pulgas Creek Pump Station South were also in the top ten of all Bay Area storm events collected regionally. The 8th highest storm event PCBs concentration in the Bay Area was measured at the Industrial Road Ditch sample site, also in San Carlos (160 ng/L). Of the samples collected regionally, storm event

[11] Stormwater runoff samples have also been collected from inlets and/or treatment systems (e.g., bioretention) during special studies. However, those are not included in this analysis.

samples collected in San Mateo County also included four of the five highest average PCBs particle ratios.

The average or composite storm event mercury concentrations in Bay Area stormwater runoff and natural waterway samples (n=261) are shown in Figure 4. Mercury particle ratios are shown in Figure 5. Similar to Figures 2 and 3 for PCBs, Figures 4 and 5 compare mercury results for samples collected in San Mateo County to samples collected outside of the County.

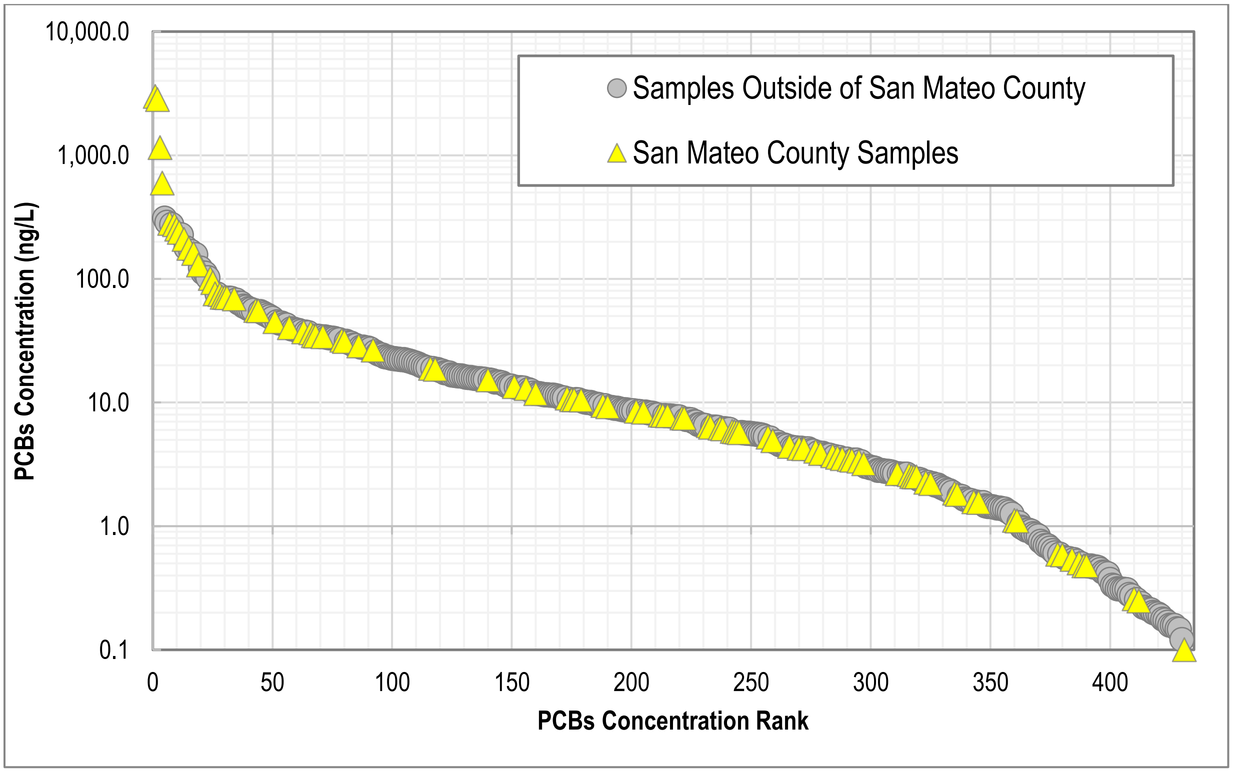

Figure 2. PCBs Concentrations in Storm Event Samples Collected in MS4s and Natural Waterways in the Bay Area.

Table 4 provides descriptive statistics for PCBs (n=433) and mercury (n=261) concentrations in the Bay Area stormwater runoff and natural waterway dataset. The median PCBs concentration is 7.7 ng/L and the mean is 39 ng/L. The median PCBs particle ratio is 0.11 mg/kg and the mean is 0.37 mg/kg. As shown in Figures 2 and 3, which are plotted on a log scale, there are a few catchments with highly elevated PCBs concentrations (such as the Pulgas Creek Pump Station catchments) that greatly influence the mean concentration relative to the median (i.e., 50^{th} percentile).

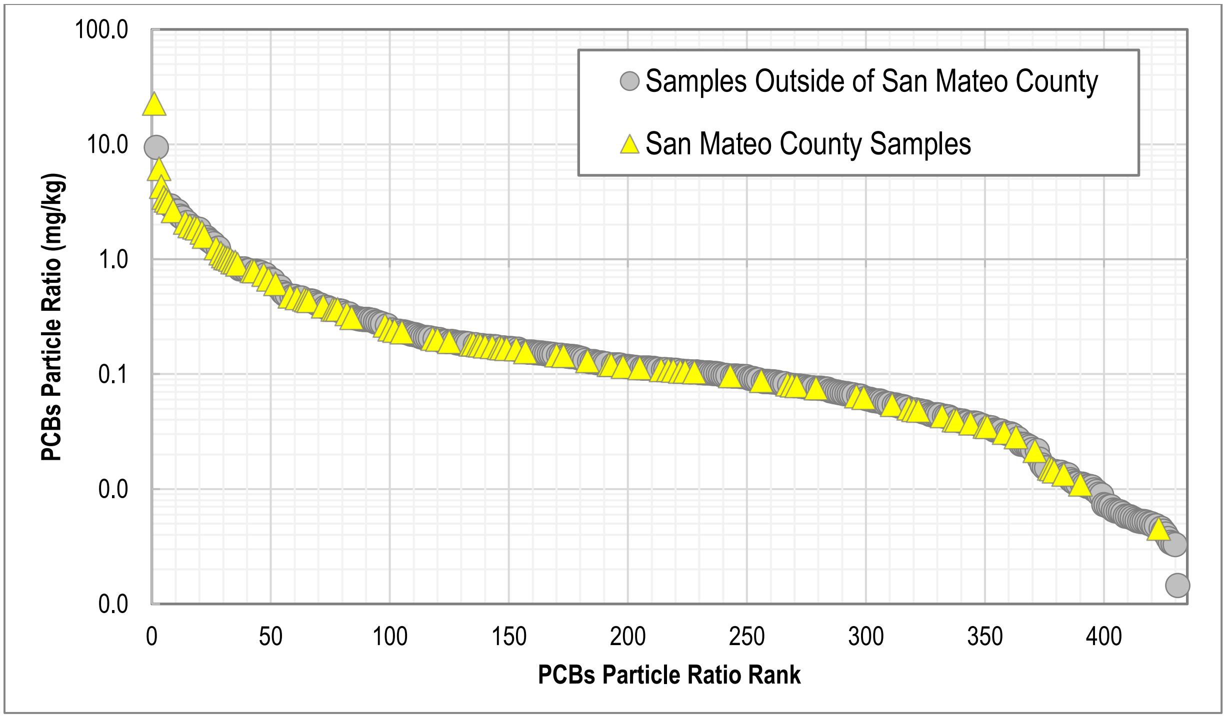

Figure 3. PCBs Particle Ratio in Storm Event Samples Collected in Large MS4s and Natural Waterways in the Bay Area.

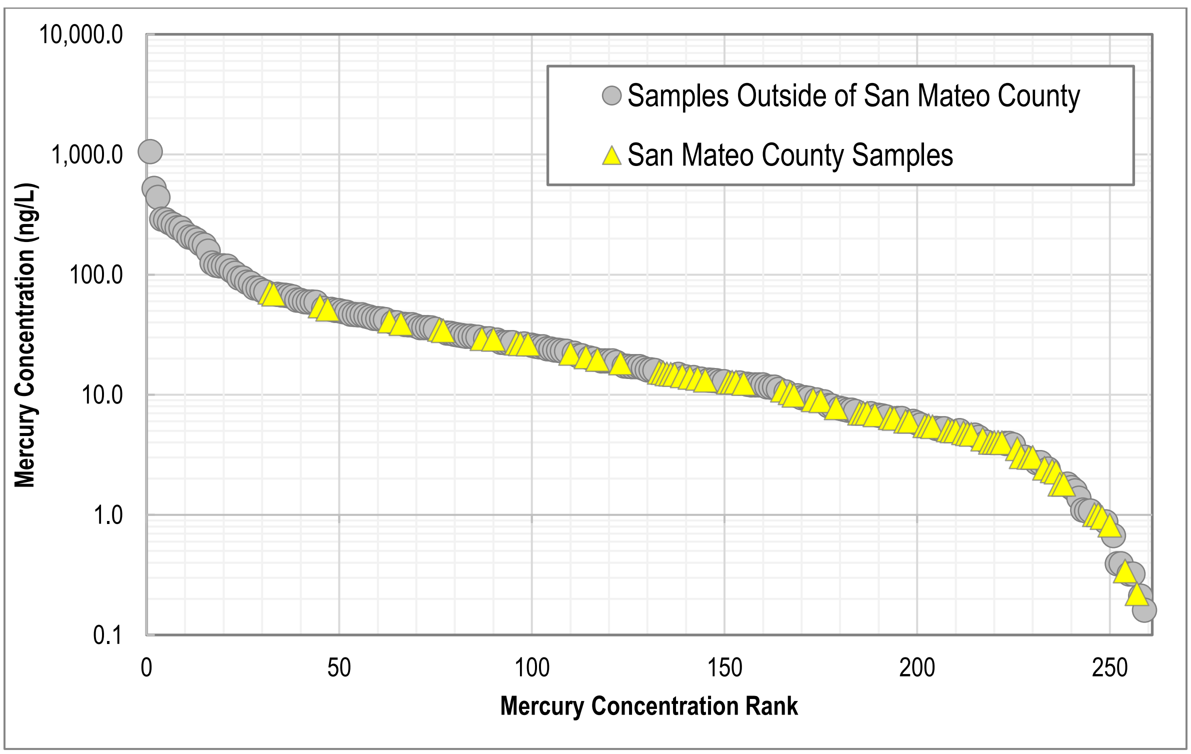

Figure 4. Mercury Concentrations in Storm Event Samples Collected in MS4s and Natural Waterways in the Bay Area.

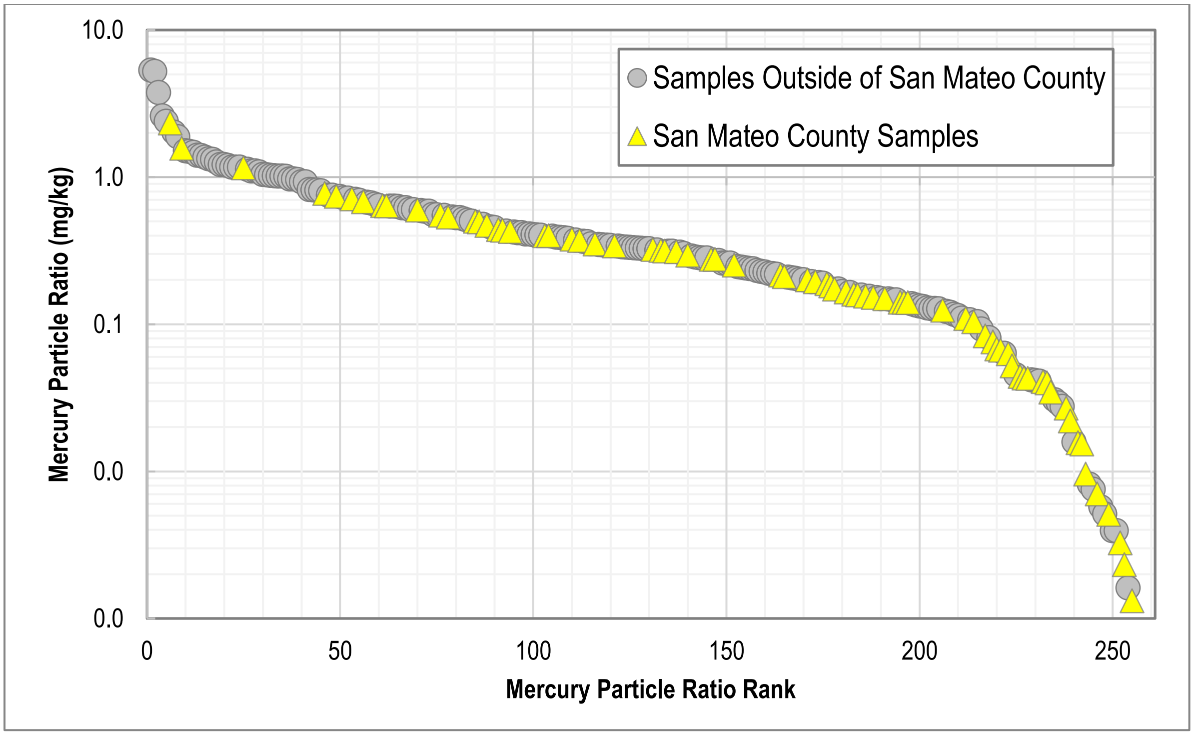

Figure 5. Mercury Particle Ratio in Storm Event Samples Collected in Large MS4s and Natural Waterways in the Bay Area.

Table 4. Descriptive Statistics – Storm Event PCBs and Mercury Concentrations in Bay Area Stormwater Runoff and Natural Waterway Water Samples through WY 2022[a]

Statistic	PCBs (ng/L)[b]	HgT (ng/L)	SSC (mg/L)	PCBs Particle Ratio (mg/kg)[c]	HgT Particle Ratio (mg/kg)[c]
N	433	261	434	434	257
Min	ND[d]	ND[d]	1.0	ND[d]	ND[d]
10th percentile	0.48	2.3	13	0.01	0.04
25th percentile	2.2	6.3	28	0.05	0.15
50th percentile	7.7	16	63	0.11	0.33
75th percentile	21	39	140	0.22	0.63
85th percentile	36	61	231	0.44	0.95
90th percentile	55	85	297	0.78	1.1
Max	2,988	1,053	2630	23	5.3
Mean	39	41	130	0.37	0.50

[a] Based upon storm event data collected at 194 PCBs sampling stations during 433 storm events, and 174 mercury sampling stations during 261 storm events. Results were averaged for storm events with more than one sample collected during the storm.

[b] Total PCBs calculated as sum of RMP 40 congeners.

[c] PCBs and Hg Particle Ratios calculated by dividing Total PCBs and Hg concentrations by SSC, respectively.

[d] Not Detected.

5.4. San Mateo County Sediment Monitoring for PCBs and Mercury

Since WY 2001, over 400 sediment samples have been collected in San Mateo County as part of investigations to characterize urban catchments of interest (i.e., WMAs) and identify source properties within WMAs, potentially for referral to the Water Board for further investigation and potential abatement. These samples were collected in the public right-of-way (ROW), including locations adjacent to high interest parcels. Individual and composite sediment samples were collected from manholes, storm drain inlets, driveways, streets, and sidewalks.

Each sediment sample was analyzed for the RMP 40 PCBs congeners and total mercury. Total PCBs was calculated as the sum of the RMP 40 congeners. The laboratory passed all samples through a 2 mm sieve before analysis to remove gravel and cobbles. Table 5 compares the descriptive statistics for POC sediment samples that have been collected in San Mateo County through WY 2021, WY 2022 samples, and all Bay Area wide samples. All of the WY 2022 PCBs samples were below 0.2 mg/kg. The median was 0.02 mg/kg, and the mean was 0.03 mg/kg. For the WY 2022 mercury samples, all eight samples were below 0.3 mg/kg. The median was 0.13 mg/kg, and the mean was 0.12 mg/kg.

Attachment 5 summarizes San Mateo County PCBs and mercury sediment monitoring locations and analytical results. The results are discussed by selected WMA in the following sections, along with sediment data from previous Water Years and the stormwater runoff data collected to-date.

Table 5. Descriptive Statistics – PCBs and Mercury Concentrations in Sediment Samples

	All Bay Area Samples To-date		San Mateo County Samples WYs 2001-2021		San Mateo County Samples WY 2022	
Number of Sediment Samples	**1,645**	**1,467**	**421**	**376**	**8**	**8**
	PCBs (mg/kg)[a,b]	**Hg (mg/kg)**	**PCBs (mg/kg)[a,b]**	**Hg (mg/kg)**	**PCBs (mg/kg)[a]**	**Hg (mg/kg)**
Min	ND[c]	ND[c]	ND[c]	0.006	0.002	0.06
10th Percentile	0.01	0.05	0.01	0.04	0.003	0.08
25th Percentile	0.02	0.09	0.02	0.06	0.012	0.10
50th Percentile	0.07	0.15	0.05	0.17	0.020	0.13
75th Percentile	0.26	0.30	0.16	0.33	0.032	0.13
90th Percentile	0.97	0.75	0.69	3.93	0.073	0.14
Max	193	21	193	0.20	0.14	0.15
Mean	0.76	0.40	1.01	0.17	0.034	0.12

[a] Total PCBs calculated as sum of RMP 40 congeners.
[b] Includes 26 samples from reports on three PCBs site cleanups in San Carlos and Redwood City.
[C] Not Detected.

5.5. Watershed Management Area Status

SMCWPPP evaluated the monitoring data available to-date to help categorize WMAs by level of PCBs in existing stormwater runoff and sediment samples.[12] Based upon the data collected in San Mateo County to-date by SMCWPPP and other parties (e.g., the RMP's STLS), catchments of interest were categorized into the following five groups:

1. One or more sediment and/or stormwater runoff samples with PCBs concentrations (particle ratios for stormwater runoff) greater than 0.5 mg/kg (500 ng/g) and source properties have been identified within the catchment.
2. One or more sediment and/or stormwater runoff samples with PCBs concentrations (particle ratios for stormwater runoff) greater than 0.5 mg/kg (500 ng/g) and source properties have not been identified within the catchment.
3. One or more sediment and/or stormwater runoff samples with PCBs concentrations (particle ratios for stormwater runoff) between 0.2 – 0.5 mg/kg (200 – 500 ng/g), any other samples not in this range have PCBs concentrations (particle ratios for stormwater runoff) less than 0.2 mg/kg (200 ng/g).
4. All sediment and/or stormwater runoff samples have PCBs concentrations (particle ratios for stormwater runoff) less than 0.2 mg/kg (200 ng/g).
5. No samples collected to-date.

Figure 6 is a map illustrating the current status of WMAs in San Mateo County, based on the sediment and stormwater runoff monitoring results to-date. Only WMAs with high interest parcels were included in Figure 6.

Attachment 6 provides a summary of PCBs and mercury monitoring results for San Mateo County WMAs. For each WMA, Attachment 4 includes:

- The WMA area, the area of high interest parcels in the WMA, and the percent of the total WMA area that is comprised of high interest parcels;
- A summary of the number of stormwater runoff and sediment samples collected to-date in the WMA; and
- The median and range of PCBs concentrations in the samples collected to-date in the WMA (median and range of PCBs particle ratio for stormwater runoff samples).

Attachments 4, 5, and 6 summarize PCBs and mercury monitoring results for stormwater runoff and sediment samples collected in San Mateo County to-date.**[13]** Based on the available data to-date (e.g., sediment and stormwater runoff monitoring and land use research through WY 2022), WMAs with stormwater runoff sample PCBs particle ratios and/or sediment sample PCBs concentrations ≥ 0.2 mg/kg, and/or other features relevant to PCBs investigations, are described in the following sections, with one section for each applicable municipality.

[12] This section focuses on "catchments of interest," which as described earlier (Section 5.1) are a subset of the list of San Mateo County WMAs. The list of 130 WMAs includes 105 "catchments of interest" with high interest parcels for PCBs comprising at least 1% of their area. The remaining 25 WMAs include PCBs and mercury controls such as green infrastructure on parcels but generally lack high interest parcels.

[13] The WMA IDs in San Mateo County are numerical (1 – 1017). Sample names consist of a prefix for the county (SM), followed by a three-letter prefix for the Permittee where the sample was collected (e.g., SSF for South San Francisco, SCS for San Carlos), followed by the WMA ID, and followed by a letter (e.g., A, B, C) to distinguish the sampling site from the WMA in which that sample was collected. Samples collected previously may have a different sample naming convention.

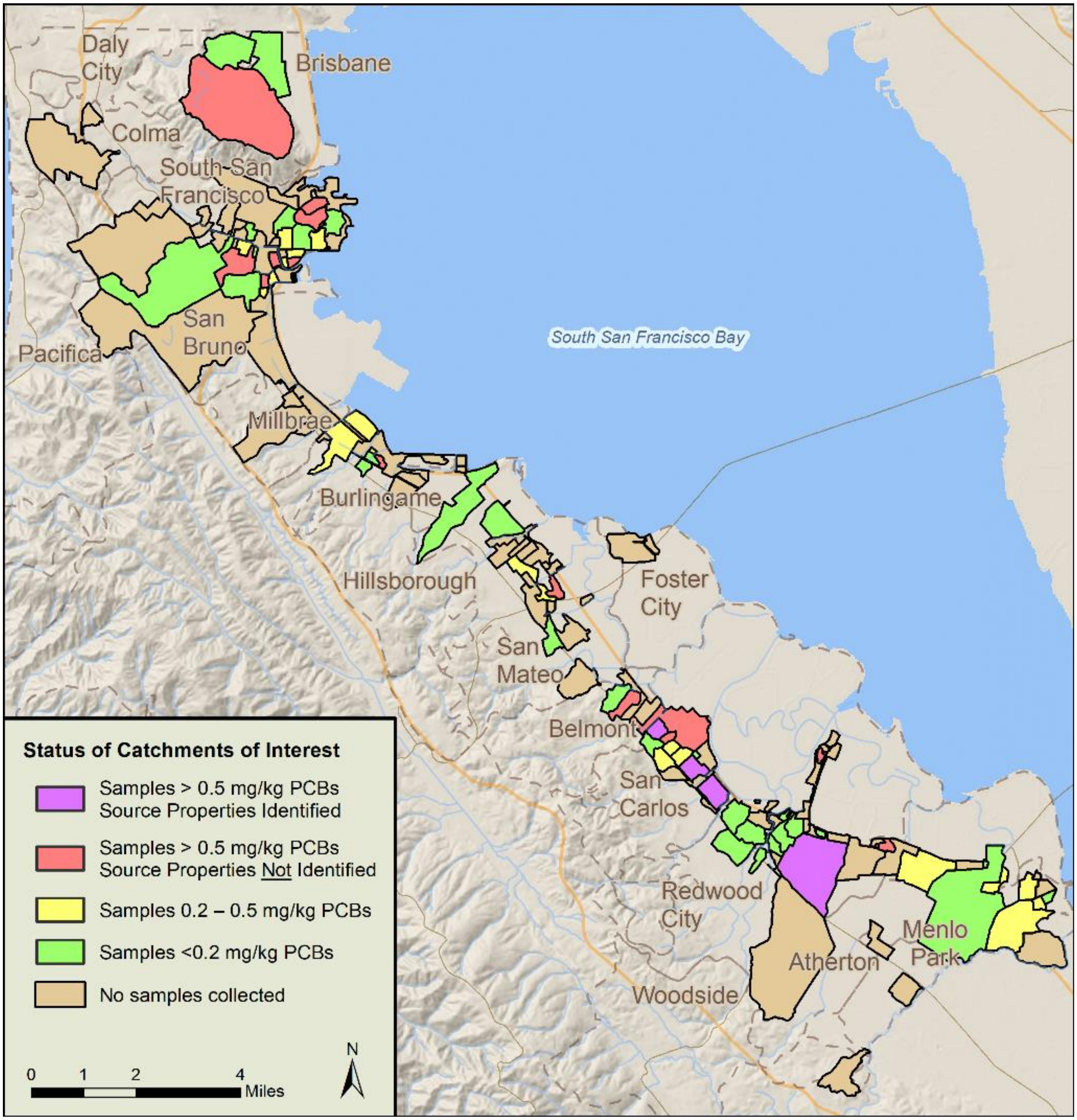

Figure 6. San Mateo County WMA Status Based upon Total PCBs Concentration in Sediment and/or PCBs Particle Ratio in Stormwater Runoff Samples Collected through WY 2022.

5.5.1. City of Brisbane

WMAs in the City of Brisbane with PCBs particle ratios over 0.2 mg/kg in stormwater runoff samples, elevated concentrations of PCBs in sediment samples, and/or other features relevant to investigating sources of PCBs are shown in Figure 7 and briefly described below. It should be noted that the industrial area in the northeast corner of Figure 7 drains to San Francisco's combined sewer and is therefore not included in this evaluation.

WMA 17

WMA 17 is a large catchment that corresponds to the watershed of the now underground Guadalupe Creek. It contains a large industrial area developed mostly in the 1960s and buildings of the type that could potentially have PCBs in building materials. Several old railroad lines used to support the industries. A sediment sample collected during WY 2015 in one of the two main lines under Valley Drive had elevated levels of PCBs (1.22 mg/kg) despite potential dilution due to the large size of the watershed. A stormwater runoff sample collected by the RMP in WY 2016 (SM-BRI-17A or Valley Dr SD) had a relatively low PCBs particle ratio of 0.11 mg/kg. Six additional sediment samples were collected in WY 2018, with one of the samples having elevated PCBs (1.02 mg/kg), and the remaining samples all under 0.2 mg/kg. The elevated sample was collected from an inlet that drains a portion of one of the old railroad lines. Another four sediment samples were collected in WY 2019 along the old railroad line with one of the samples having an elevated PCBs concentration (0.56 mg/kg), and the other three being below 0.2 mg/kg PCBs. Despite the above attempts to iteratively hone in on a source area in this WMA, none of the sediment samples collected to-date with elevated PCBs appears appear to be associated with a specific parcel. However, it is possible that additional sediment sampling could lead to identifying specific source property(ies) (e.g., within the railroad ROW).

WMA 1004

WMA 1004 is located along Tunnel Avenue in the Brisbane Baylands area. Stormwater runoff sample SM-BRI-1004A (Tunnel Avenue Ditch) was collected by the RMP in WY 2016 and had a relatively low PCBs particle ratio of 0.11 mg/kg. The catchment has a high proportion of high interest properties, including containing all of the Brisbane Baylands old railyard and a large PG&E property on Geneva Avenue. The Baylands area is an active cleanup site (although not for PCBs) and will eventually be redeveloped. Several sediment samples collected in past years in the vicinity of the PG&E property and historical railroad lines had relatively low PCBs concentrations (<0.2 mg/kg PCBs).

WMA 350

WMA 350 is upstream of WMA 1004 and is partly located in Daly City. It contains a PCBs cleanup site (Bayshore Elementary in Daly City) that was redeveloped in 2017. The PCBs were associated with the original building materials and it therefore appears unlikely that there is an ongoing source of PCBs to the MS4. One sediment sample collected downstream of the school in WY 2018 had a relatively low concentration of PCBs.

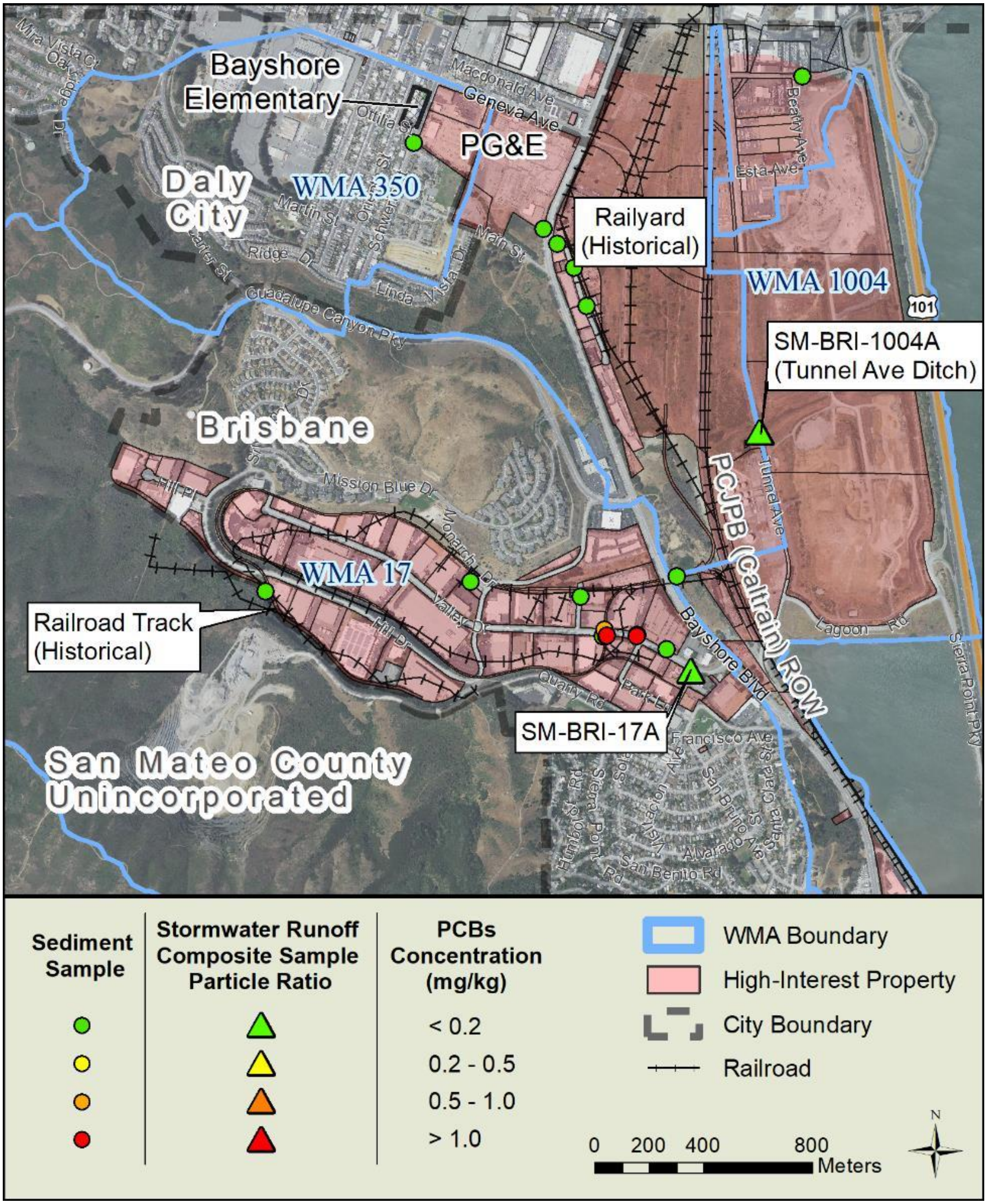

Figure 7. WMAs 17, 350, and 1004.

5.5.2. City of South San Francisco

WMAs in the City of South San Francisco with PCBs particle ratios over 0.2 mg/kg in stormwater runoff samples, elevated concentrations of PCBs in sediment samples, and/or other features relevant to investigating sources of PCBs are shown in Figures 8 through 12 and briefly described below.

WMA 291

WMA 291 is a relatively large catchment that is comprised almost entirely of old industrial land uses. A stormwater runoff sample collected by the RMP in WY 2017 had an elevated PCB particle ratio (0.74 mg/kg). A 2002 sediment sample at 245 S. Spruce Avenue had an elevated PCBs concentration of 2.72 mg/kg and this property was referred to the Water Board in June 2003. However, since that time, investigations have not shown further evidence that this property is a source of PCBs to the MS4. Sediment samples in WY 2015 and WY 2017 on Linden Avenue near Dollar Avenue were also moderately elevated for PCBs (0.48 and 0.44 mg/kg). Two sediment samples were collected near 245 S. Spruce Avenue in WY 2018, one of which was moderately elevated for PCBs (0.21 mg/kg). The moderately elevated sample was collected from the boundary of the property and a historical railroad, which now is part of the current BART right-of-way. Investigations in this WMA have iteratively collected a total of 19 sediment samples, but except for the tentative identification of 245 S. Spruce Avenue, source properties have not been identified.

WMA 294

WMA 294 is a 67-acre catchment that drains into Colma Creek at Mitchell Avenue. Within the WMA is 166 Harbor Way, designated in the Department of Toxic Substances Control (DTSC) Envirostor database as “Caltrans/SSF Maintenance Station.” This property was purchased by Caltrans which tested the soil and found several contaminants including PCBs. The contaminated soil has been capped since at least 2005 and the property is currently mostly vacant with a small portion devoted to k-rail storage. A sediment sample was collected in the driveway of this property in WY 2017 had a moderately elevated PCBs concentration of 0.28 mg/kg. A stormwater runoff sample collected in WY 2017 also had a moderately elevated PCBs particle ratio (0.37 mg/kg).

WMA 314

WMA 314 is a 66-acre catchment located near Oyster Point that is comprised of light industrial land uses along with an old railroad right-of-way. Site SM-SSF-314A (Gull Dr. SD) was sampled by the RMP STLS in WY 2015 and resampled in WY 2018 and had an elevated PCBs particle ratio in both samples (0.95 and 0.86 mg/kg, respectively). The WY 2018 sample had a total PCBs concentration (71 ng/L) that was about an order of magnitude higher than the WY 2015 sample (8.6 ng/L). Two sediment samples collected in WY 2017 both had relatively low (urban background) concentrations of PCBs, with the highest concentration being 0.15 mg/kg. Another sediment sample taken in WY 2019 also had a low PCBs concentration of 0.02 mg/kg. An additional four sediment samples collected in WY 2022 in WMA 314 (Figure 8) all had relatively low PCBs concentrations, with the highest concentration being 0.02 mg/kg. Thus, the efforts to-date have not identified any source area(s) associated with the elevated PCBs particle ratios in the stormwater runoff samples.

WMA 315

WMA 315 is a 108-acre catchment with an outfall very close to the outfall for WMA 314. WMA 315 is comprised almost entirely of light industrial land uses. The RMP STLS collected a stormwater runoff sample at the bottom of this catchment in WY 2016 and then resampled the same station in WY 2018 (Gull Drive station). Total PCBs (5.8 ng/L) and PCBs particle ratio (0.18 mg/kg) were relatively low in the WY 2016 sample, but roughly an order of magnitude higher in the WY 2018 sample (total PCBs = 93.2 ng/L and PCBs particle ratio = 1.02 mg/kg). Five sediment samples were collected in this catchment in WY 2019, with two of the samples having moderately elevated PCBs concentration (0.27 and 0.43 mg/kg). Both samples were along railroads, one active and one historic. An additional four sediment samples collected in WY 2022 in WMA 314 (Figure 8) all had relatively low PCBs concentrations, with the highest concentration being 0.14 mg/kg. Thus, the efforts to-date have not identified any specific source area(s) associated with the elevated PCBs particle ratios in the stormwater runoff samples.

WMA 319

WMA 319 is also located near Oyster Point. Sample SM-SSF-319A (Forbes Blvd Outfall) was collected by the RMP STLS in WY 2016 and had a relatively low PCBs particle ratio of 0.08 mg/kg. Although the catchment was historically industrial, it is now mostly redeveloped and composed of biotechnology corporations. A sediment sample in WY 2017 also had a relatively low (0.06 mg/kg) PCBs concentration.

WMA 358

WMA 358 is a small 32 acre catchment that drains into Colma Creek at Utah Avenue. A sediment sample collected in WY 2015 had an elevated PCBs concentration (1.46 mg/kg). Three follow-up sediment samples collected in WY 2017 all had relatively low (urban background) levels of PCBs, with the highest concentration being 0.09 mg/kg. Another follow-up sediment sample collected in WY 2019 also had a low concentration (0.03 mg/kg). Stormwater runoff samples have not been collected from this catchment and would be challenging to collect because of tidal inundation. The attempts to-date to identify a source area in this WMA have not succeeded. However, it is possible that additional sediment sampling could be more fruitful.

WMA 359

WMA 359 is a small 23 acre catchment that drains into Colma Creek behind 222 Littlefield Avenue. In WY 2017 the RMP STLS collected a stormwater runoff sample with a somewhat elevated PCBs particle ratio of 0.79 mg/kg. The catchment is composed of all old industrial land uses including old railroad tracks. In WY 2018, three follow-up sediment samples collected in the catchment all had relatively low PCBs concentrations (less than 0.2 mg/kg). Another follow-up sediment sample collected in WY 2019 also had a low PCBs concentration (0.13 mg/kg). Based on the work conducted to-date, it appears that identifying any source areas via additional sediment sampling in this WMA's public ROW would be challenging.

WMA 1001

WMA 1001 is a large 345-acre catchment that is composed of all the non-contiguous small catchments along Colma Creek that have outfall diameters of 18-inches and smaller. In WY 2018, a stormwater runoff sample collected from this catchment had a relatively low total PCBs concentration of 1,100 ng/L, but a moderately elevated PCBs particle ratio of 0.35 mg/kg. Six sediment samples collected in 2015 and 2018 had relatively low concentrations (≤ 0.09 mg/kg).

WMA 1001B

In WY 2017, a stormwater runoff sample (SM-SSF-1001B) collected on Shaw Road near this catchment's outall to Colma Creek had an elevated PCBs particle ratio (1.7 mg/kg). This catchment is very small and only drains about five light industrial properties along Shaw Road including historical rail lines. A sediment sample collected in this catchment in WY 2015 had a concentration of 0.46 mg/kg. Five additional sediment samples were collected in this catchment in WY 2018, with one having a moderately elevated PCBs concentration of 0.35 mg/kg, and the other five all having relatively low concentrations (≤ 0.06 mg/kg). During WY 2019, two sediment samples were also collected along Shaw Road in WMA 362 (just south of WMA 1001) to investigate an electrical property and another property that straddles both WMAs. Both had low concentrations of PCBs (≤ 0.07 mg/kg).

WMA 1001D

Between 2000 and 2015, seven samples were collected in this catchment with two of the samples (from 2000 and 2007) having a moderately elevated PCBs concentration (0.23 and 0.43 mg/kg). The remaining five samples all had low concentrations of PCBs (< 0.04 mg/kg). During an attempt in WY 2017 to sample stormwater runoff near the outfall of this catchment, field workers observed that this catchment likey drains to the south to WMA 291.

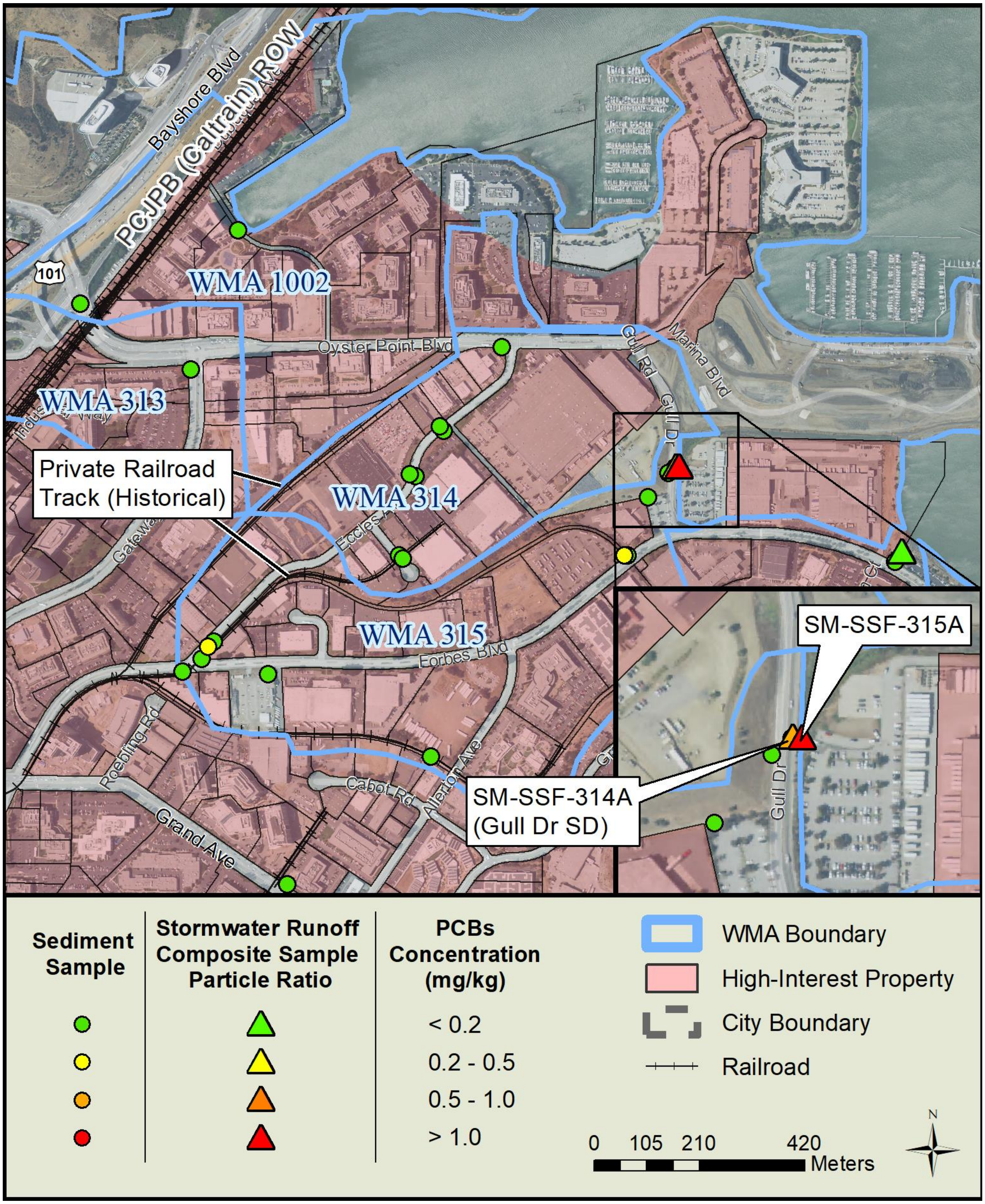

Figure 8. WMAs 313, 314, 315, and 1002

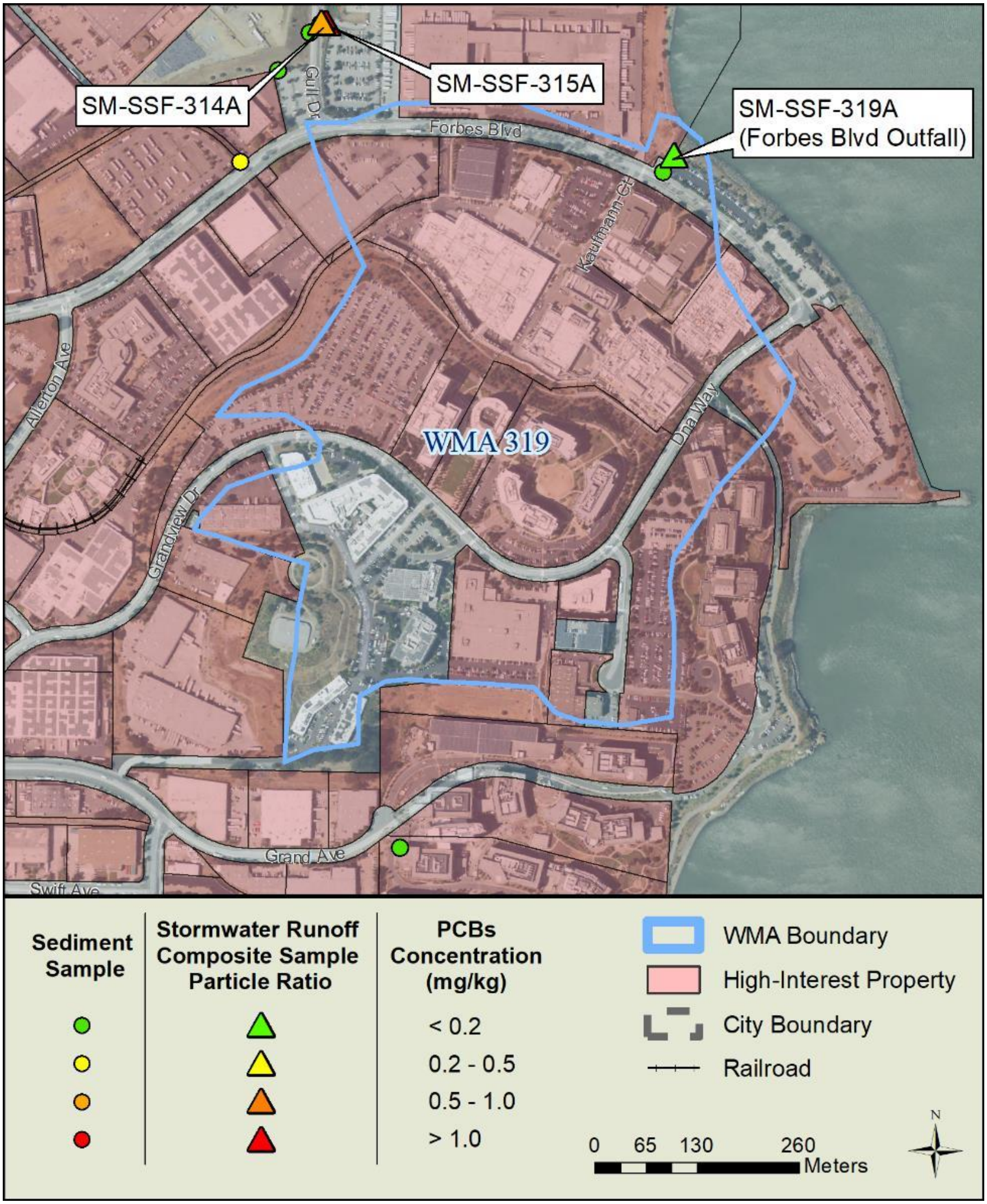

Figure 9. WMA 319

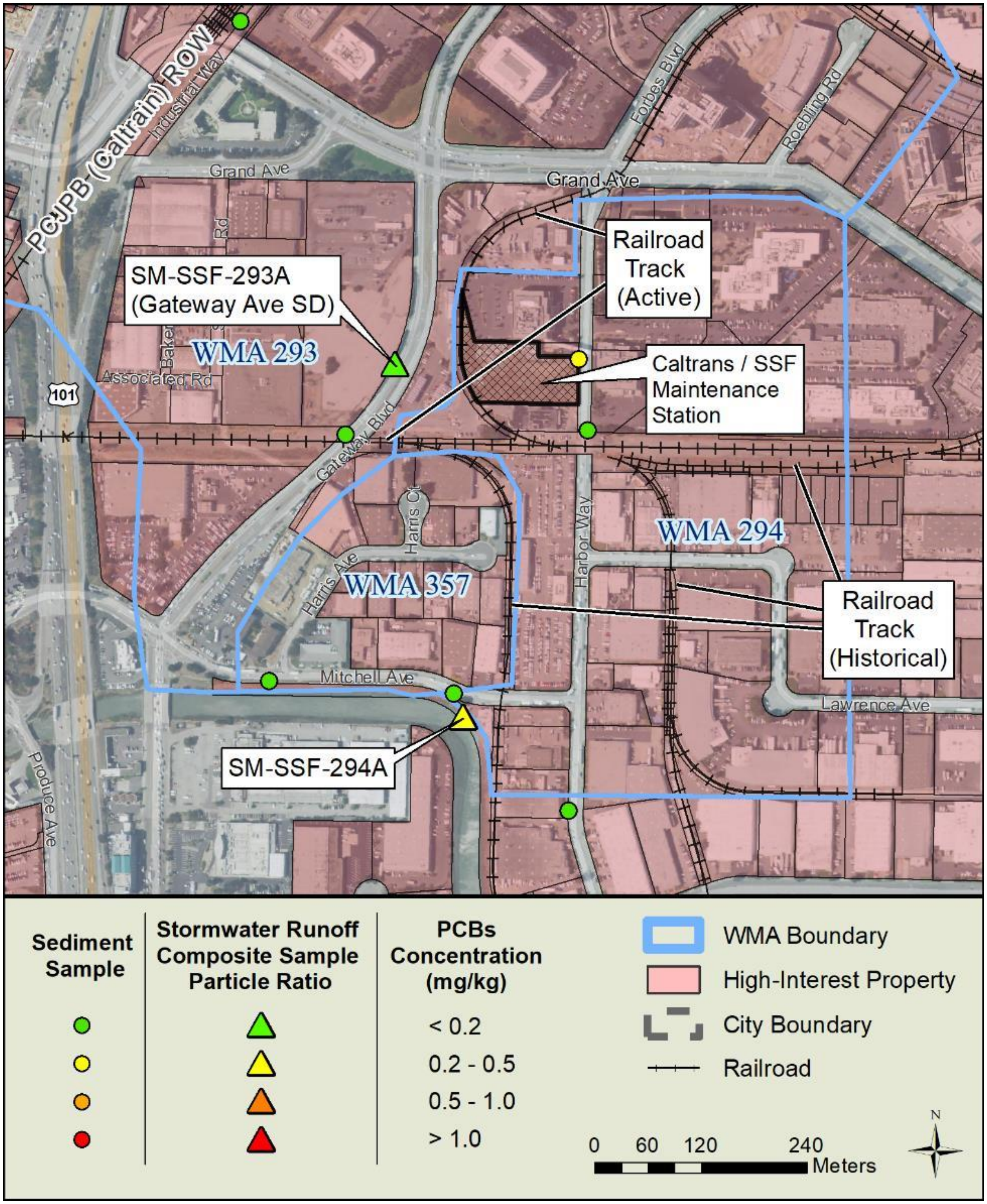

Figure 10. WMAs 293, 294, and 357

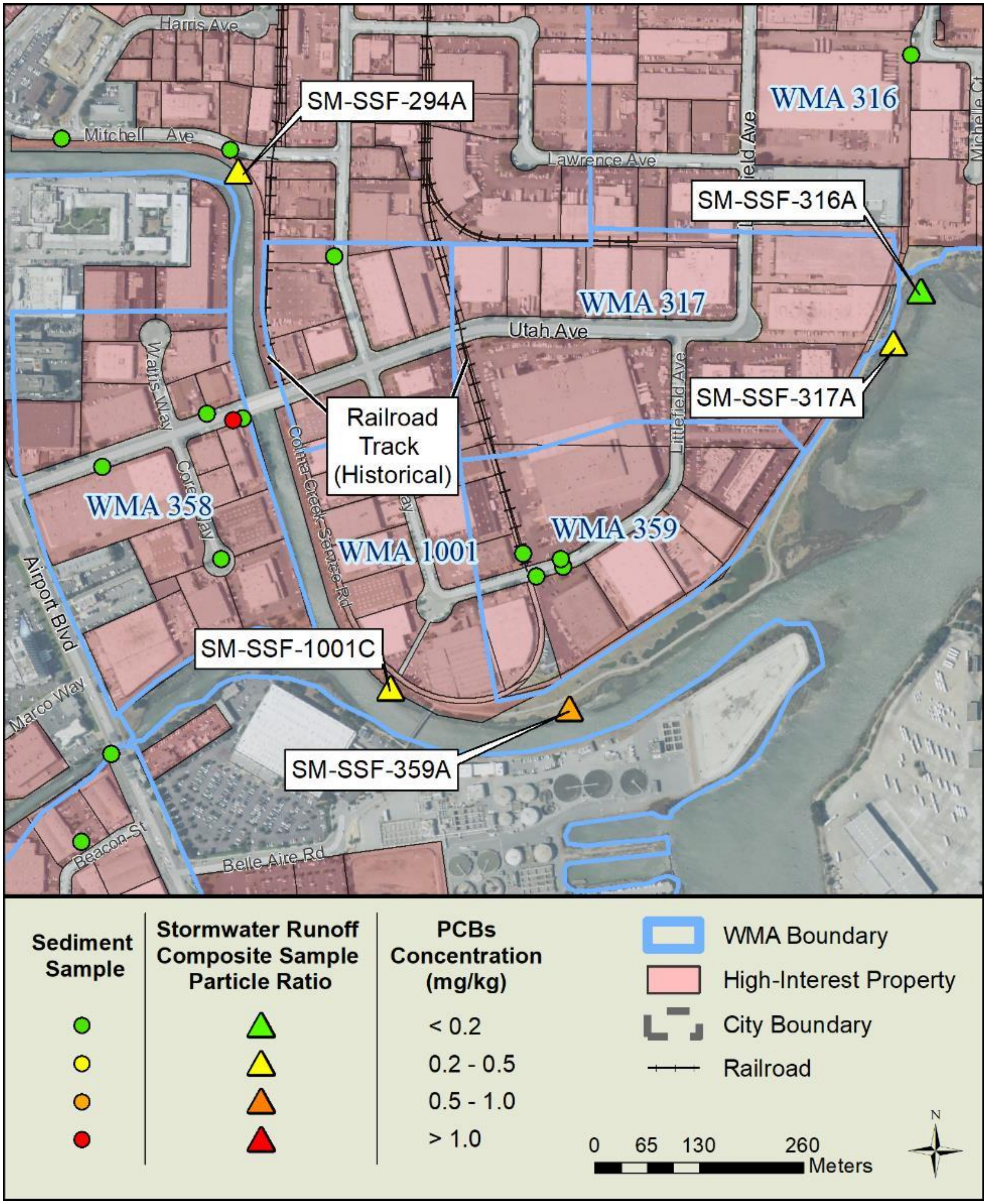

Figure 11. WMAs 316, 317, 358, 359, and 1001

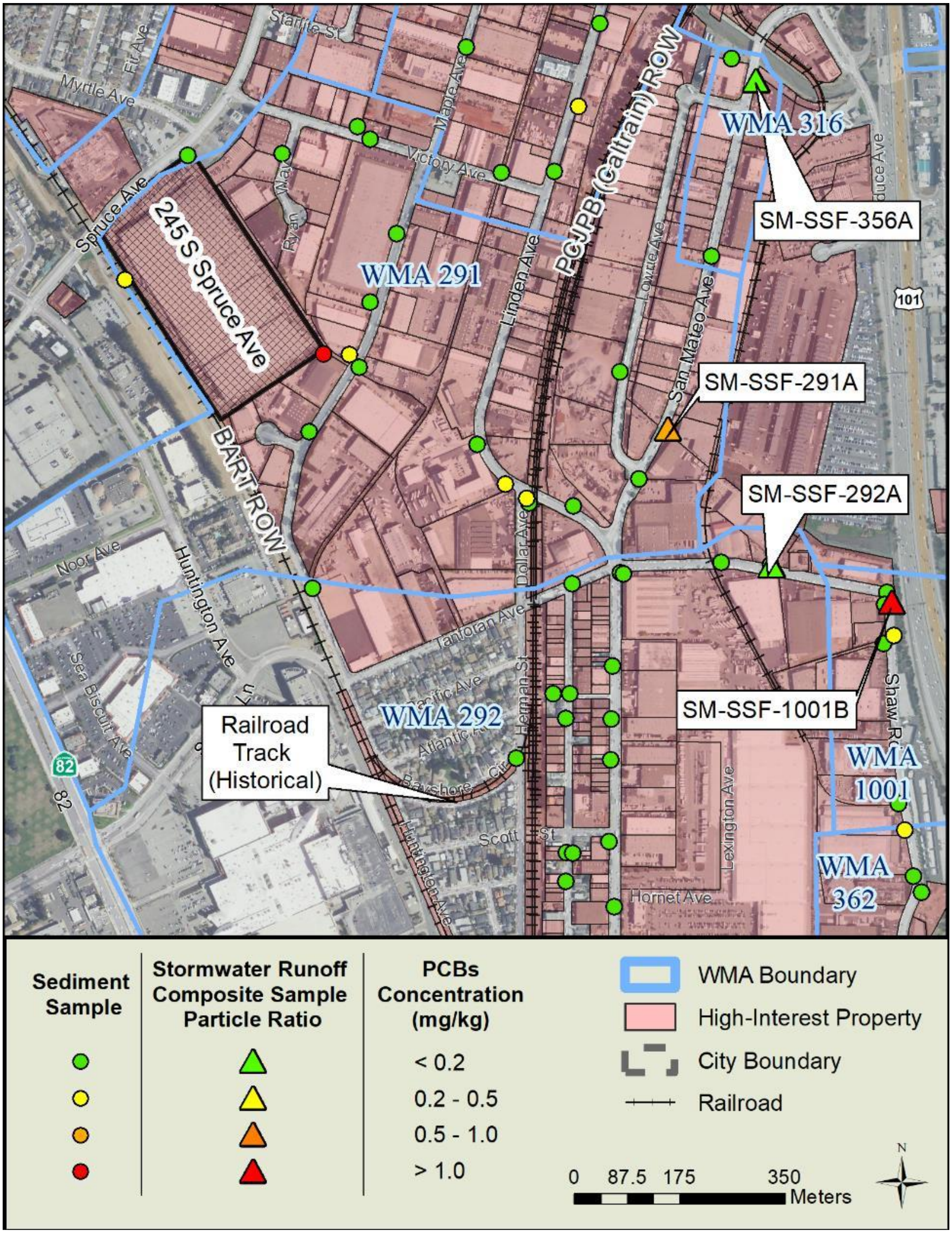

Figure 12. WMAs 291, 292, 316, and 1001

5.5.3. City of Burlingame

WMAs in the City of Burlingame with PCBs particle ratio over 0.2 mg/kg in stormwater runoff samples, elevated concentrations of PCBs in sediment samples, and/or other features relevant to investigating sources of PCBs are shown in Figures 13 and 14 and briefly described below.

WMA 85

WMA 85 is a 121-acre catchment northwest of Highway 101 in Burlingame that is comprised mostly of light industrial land uses. A stormwater sample collected in WY 2018 had a slightly elevated PCBs particle ratio of 0.24 mg/kg, and a repeat sample of the same location by the RMP in WY 2019 had a PCBs particle ratio of 0.33 mg/kg and a relatively high total PCBs concentration of 31.1 ng/l. Two previous sediment samples collected in this WMA had relatively low concentrations (less than 0.2 mg/kg), including one at a pump station.

WMA 142

WMA 142 is a small 20-acre catchment that is comprised mostly of industrial land uses. Sample SM-BUR-142A was part of a trio of stormwater runoff samples collected at the forebay of the Marsten Road pump station. It had an elevated PCBs particle ratio (0.67 mg/kg). SM-BUR-1006A, which was collected at the same location but drains adjacent WMA 1006, had a moderately elevated PCBs particle ratio (0.37 mg/kg). Seven sediment samples collected in or very close to WMA 142 in WY 2018 all had low PCBs concentrations (less than 0.2 mg/kg).

WMA 164

WMA 164 is a 241-acre catchment. The lower half of this catchment has mostly light industrial land uses and the upper half has mostly residential and commercial land uses. A stormwater runoff sample collected in WY 2018 had a moderately elevated PCBs particle ratio of 0.45 mg/kg, although another sample collected by the RMP in WY 2019 had a low PCBs particle ratio of 0.05 mg/kg. This site is downstream of a pump station where sediments may settle out of the stormwater runoff flows. Four sediment samples collected in this catchment in WYs 2002 and 2015 had relatively low PCBs concentrations (less than 0.2 mg/kg).

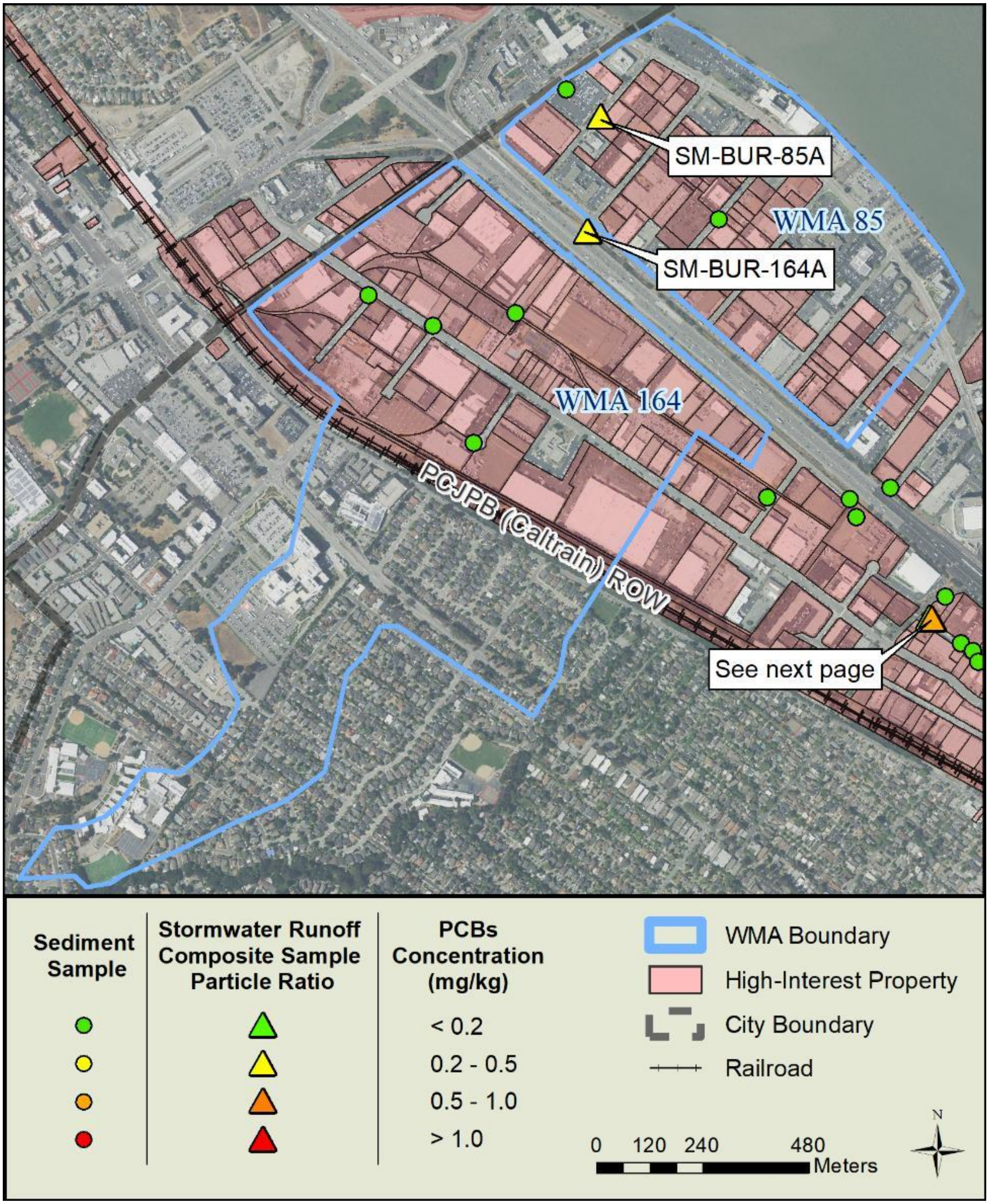

Figure 13. WMAs 85 and 164

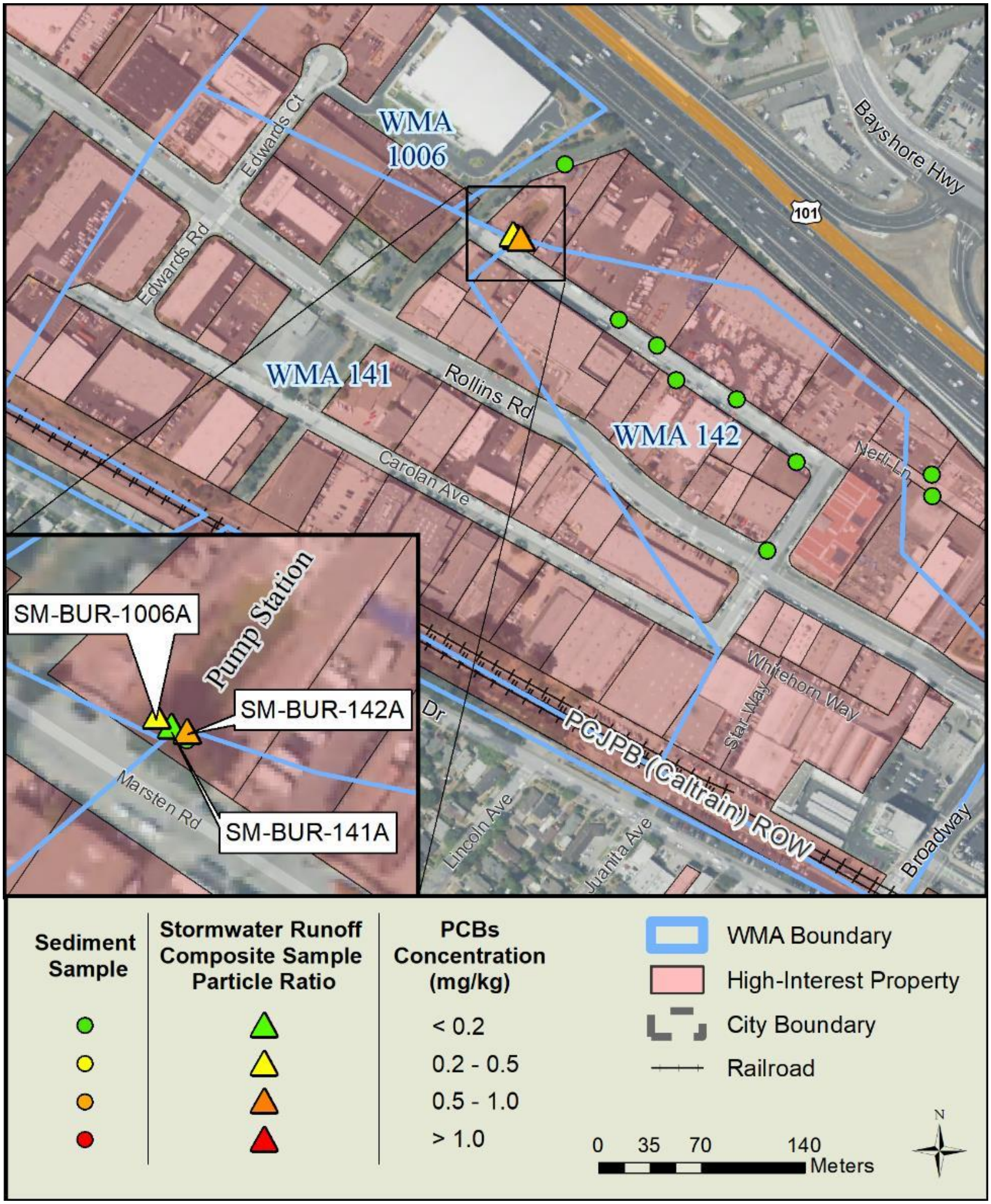

Figure 14. WMAs 141, 142, and 1006

5.5.4. City of San Mateo

WMAs in the City of San Mateo with PCBs particle ratio greater than 0.2 mg/kg in stormwater runoff samples, elevated concentrations of PCBs in sediment samples, and/or other features relevant to investigating sources of PCBs are shown in Figure 15 and briefly described below.

WMA 156

WMA 156 is a 40-acre catchment that flows north into the 16th Street Channel at Delaware Street. Historically it contained old industrial land uses. It drains Caltrain property including the Hayward Park Station. There is a major retail redevelopment project currently underway in this WMA. A stormwater runoff sample collected in WY 2017 near the catchment outfall had a slightly elevated PCB particle ratio (0.2 mg/kg) but a sediment sample collected upstream did not have an elevated PCBs concentration.

WMA 408

WMA 408 is a 43-acre catchment next to WMA 156. It is comprised of a mix of retail, commercial and residential land uses, with a relatively low proportion (16%) of high interest parcels (see Attachment 4). A stormwater runoff sample collected in WY 2017 had a relatively high PCBs particle ratio (1.9 mg/kg). This result was notable given the lack of industrial land uses and low percentage of high interest parcels. Seven follow-up sediment samples collected from this WMA in WY 2018 all had relatively low PCBs concentrations (less than 0.2 mg/kg). Given the high previous result and low concentrations in multiple sediment samples, it may be advisable to resample the stormwater runoff station.

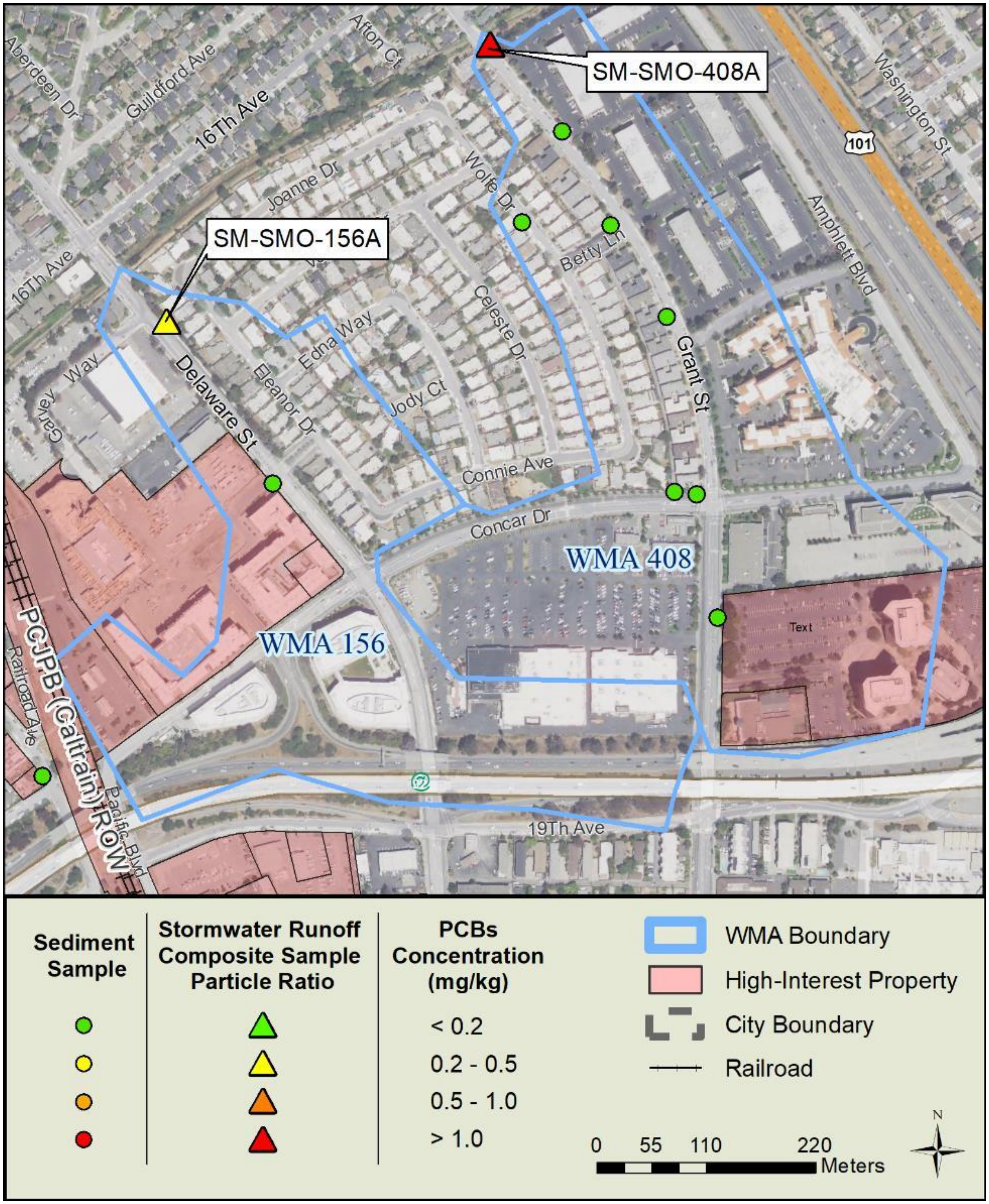

Figure 15. WMAs 156 and 408

5.5.5. City of Belmont

WMAs in the City of Belmont with PCBs particle ratio greater than 0.2 mg/kg in stormwater runoff samples, elevated concentrations of PCBs in sediment samples, and/or other features relevant to investigating sources of PCBs are shown in Figure 16 and briefly described below.

WMA 60

WMA 60 is a 298-acre catchment that drains north into Laurel Creek. Two stormwater runoff samples were collected in the catchment in WY 2017 (SM-BEL-60A and SM-BEL-60B). Sample SM-BEL-60A was not elevated but SM-BEL-60B had a relatively high PCBs particle ratio (1.0 mg/kg). This result was noteworthy since the sample catchment is mostly residential with few high interest parcels. In WY 2018, seven sediment samples were collected in this catchment, all of which had relatively low PCBs concentrations (less than 0.2 mg/kg). In WY 2019 an additional sediment sample was collected that also had a very low PCBs concentration (0.002 mg/kg). Given the previous elevated stormwater runoff sample result and the low concentrations in the sediment samples, it may be advisable to resample the stormwater runoff station.

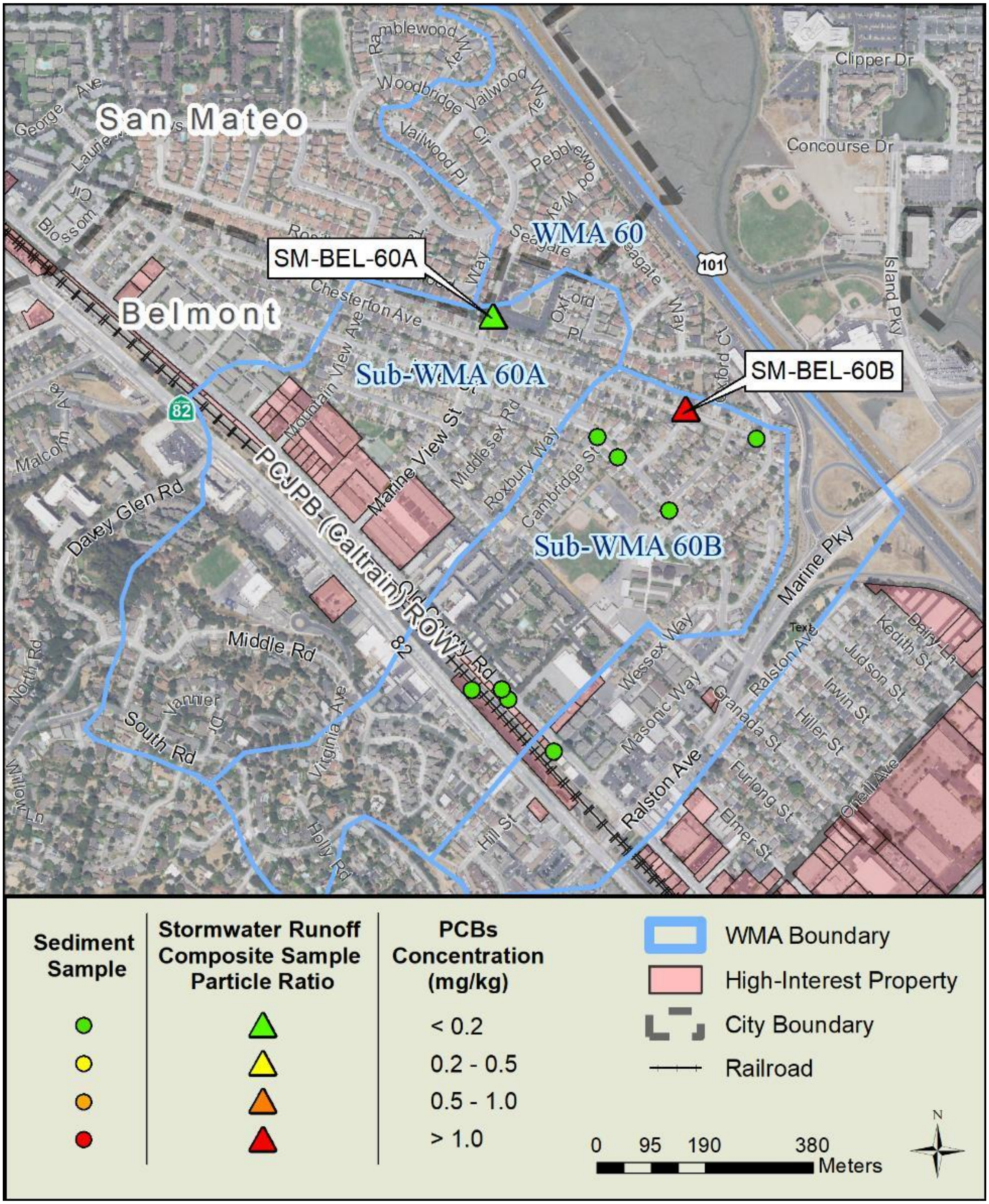

Figure 16. WMA 60

5.5.6. City of San Carlos

WMAs in the City of San Carlos with PCBs particle ratios greater than 0.2 mg/kg in stormwater runoff samples, elevated concentrations of PCBs in sediment samples, and/or other features relevant to investigating sources of PCBs are shown in Figure 17 – 20 and briefly described below.

WMA 75

WMA 75 is a 66-acre catchment comprised entirely of old industrial land uses. Sample SM-SCS-75A (Industrial Road Ditch) was collected by the RMP in WY 2016 and had a PCBs particle ratio of 6,140 ng/g, which is among the highest levels found in Bay Area stormwater samples collected to-date. The sample station is located where the MS4 daylights into a ditch on the east side of Industrial Road downstream of the adjacent Delta Star and Tiegel Manufacturing properties. SMCWPPP collected seven sediment samples in WY 2017 in the area. Two of these samples were collected near the Delta Star and Tiegel properties. One was collected in the storm drain line directly downstream of both properties and had a very elevated PCBs concentration (49.4 mg/kg). The other was also elevated, with a PCBs concentration of 1.20 mg/kg, and was collected from surface sediments at the location where the Tiegel property drains into the public right-of-way. In WY 2018, SMCWPPP collected a sample across the street from Delta Star in front of the PG&E property. The sample had a PCBs concentration of 0.76 mg/kg. It is not believed that the PCBs in this sample originated from the PG&E property given that the sample only drained a portion of the front parking lot. Rather, the PCBs were more likely present at this location due to a halo effect around Delta Star. For example, groundwater has been observed in the MS4 in this area due to a high-water table, tidal effects, and infiltration. PCBs-containing sediments potentially could have been conveyed upstream in the storm drain line by groundwater that infiltrated into the pipe. The remainder of the PG&E property drains toward the east. The remaining samples were not elevated, suggesting that there are no other sources of PCBs in this WMA other than Delta Star and Tiegel properties (Figure 17).

Delta Star manufactures transformers, including transformers with PCBs historically (from 1961 to 1974). This is a cleanup site with elevated PCBs found in on-site soil and groundwater samples. PCBs migrated to the adjacent Tiegel property at 495 Bragato Road, a roughly three-acre site that is largely unpaved. A “Removal Action” under DTSC oversight was implemented between June 1989 and January 1991 to remove soil impacted with PCBs exceeding 25 ppm. The Delta Star and Tiegel properties currently meet public health, safety, and the environmental cleanup goals based on human exposure at the site. However, based on the PCBs concentrations in the sediment and stormwater runoff samples, the site appears to be a source of PCBs to the MS4 and San Francisco Bay at levels that are a concern from the standpoint of San Francisco Bay PCBs TMDL (i.e., contribute to bioaccumulation in Bay fish and other wildlife). SMCWPPP worked with the City of San Carlos to refer these properties to the Water Board for potential additional investigation and abatement.

WMA 31 (Pulgas Creek Pump Station North)

WMA 31 is a 99-acre catchment that drains to the Pulgas Creek pump station from the north. In addition to elevated sediment samples collected by SMCWPPP from the pump station sump, the RMP collected four stormwater runoff samples from the bottom of catchment (i.e., where flows enter the pump station from the north) during two storms in WY 2011. The samples were all elevated, with an average PCBs particle ratio of 893 ng/g. In addition, street dirt and sediment samples with elevated PCBs have been collected in front of and in the vicinity of 977 Bransten Road, a property within WMA 31 (Figure 18). The current occupant of this property is

GC Lubricants. 977 Bransten Road is a DTSC cleanup site due to soil and groundwater contamination with PCBs and other pollutants associated with activities at GC Lubricants and California Oil Recyclers, Inc., a previous tenant at the site. 1007/1011 Bransten Road is the property located adjacent to and immediately north of 977 Bransten Road and designated the "Estate of Robert E. Frank." A DTSC "Site Screening Form" describes PCBs in the subsurface on both sides of border between the two properties and states there may have been a historic source on both sides of the property line. Abatement measures have been implemented to reduce movement of contaminated soils from the properties, including a concrete cap over contaminated areas. However, the available information suggests that soils/sediments with PCBs are migrating from these properties into the public ROW, including the street and the MS4. SMCWPPP worked with the City of San Carlos to refer these properties to the Water Board for potential additional investigation and abatement.

WMA 210 (Pulgas Creek Pump Station South)

WMA 210 is a 141-acre catchment that drains to the Pulgas Creek pump station from the south (Figures 19 and 20). In addition to elevated sediment samples collected by SMCWPPP from the pump station sump, the RMP's STLS has collected 33 storm samples at the bottom of this catchment (i.e., where flows enter the pump station from the south):

- WY 2011 – four samples collected in February and March 2011.
- WY 2013 – four samples collected in March 2013.
- WY 2014 – 25 samples collected from November 2013 through March 2014.

The 33 samples had an average PCBs particle ratio of 8,220 ng/g, the highest of any stormwater runoff sampling location in the Bay Area. There appear to be several sources of PCBs within this WMA.

The best documented of these sites is the property at 1411 Industrial Road. A sediment sample with a very elevated PCBs concentration (193 mg/kg) was previously collected from a storm drain inlet located in the parking lot of this 1.3-acre property. The property drains to the MS4 at a manhole at the sidewalk along the edge of Industrial Road where other elevated sediment samples have been collected. Since 2012 the occupant of this property has been a Habitat for Humanity Re-Store. Based upon records from the San Mateo County Department of Environmental Health, before that the property was occupied by an auto body shop and an automotive paint company. Between 1958 and 1994, Adhesive Engineering / Master Builders, Inc. was the occupant and conducted manufacturing, research and development of construction grade epoxy resin and products. Adhesive Engineering / Master Builders, Inc. had a history of violations for leaky wastewater drums and improper storage of hazardous wastes in the late 1980s and early 1990s, and PCBs were reportedly used on the site in the past. An environmental assessment report conducted as part of a business closure in 1994 revealed that 93 mg/kg PCBs was found in a soil sample collected in 1987. The soil sample was collected beneath an aboveground tank that was heated by oil-containing PCBs circulating in coils around the tank. The report also described the removal in 1987 of 44 cubic yards of contaminated soil from the area where the tank was located. As part of the 1994 environmental assessment, a soil sample was collected from the same area and PCBs were not detected at that time, but soil samples from other areas on the property were not collected and tested for PCBs. The above information suggests that the 1411 Industrial Road property is a source of PCBs to the MS4. Water Board staff is currently working with the property owner to investigate and clean up the site. SMCWPPP is currently working with the City of San Carlos to explore the possibility of referring this property to the Water Board for potential additional investigation and abatement.

In WY 2017, SMCWPPP collected ten sediment samples from the WMA 210 to better delineate the sources of PCBs in this catchment. Three samples were collected in the vicinity of 1411 Industrial Road to help rule out that neighboring properties are PCBs sources. All three of these samples had relatively low PCBs concentrations, with the highest having a PCBs concentration of 0.07 mg/kg, which helps to verify that the properties to the east and south are not also sources. Multiple sediment samples previously collected around the PG&E substation across the street also had relatively low levels of PCBs, suggesting that this property is not a source.

PCBs were previously found in inlets and manholes in the vicinity of Center, Washington and Varian Streets and Bayport Avenue (Figure 20). The PCBs in these samples could have originated from any of about 20 small industries on these streets. During WY 2017, seven additional samples were collected in this area. The results suggest that three properties may be PCBs sources. Two samples collected from the driveways of 1030 Washington Street, a construction business, had elevated PCBs (1.29 and 3.73 mg/kg). A sample from the driveway of 1029 Washington Street was also elevated with a concentration of 5.64 mg/kg. In addition, a sample from the driveway of 1030 Varian Street, an unpaved lot used for storage, had an elevated PCBs concentration of 1.84 mg/kg.

In WY 2018, SMCWPPP collected two sediment samples along Washington Street. The first sample was from the gutter upstream of 1030 Washington Street and had a PCBs concentration of 0.25 mg/kg. The second sample was from the gutter upstream of 1029 Washington Street and had a PCBs concentration of 0.06 mg/kg. These relatively low concentrations suggest that the sources of PCBs are not upstream of the two properties of interest along Washington Street.

When a previously unknown potential source property is revealed via the PCBs and mercury monitoring program, SMCWPPP conducts a follow-up review of current and historical records regarding site occupants and uses, hazardous material/waste use, storage, and/or release, violation notices, and any remediation activities. Apart from databases such as EPA's Toxic Release Inventory (TRI) and Envirofacts, and the State of California's Geotracker and Envirostor, the most useful records were often kept by San Mateo County Department of Environmental Health. In contrast to 1411 Industrial Road (see above), the review of records for 1030 Washington Street, 1029 Washington Street, and 1030 Varian Street did not reveal any obvious use or release of PCBs in the past.

In WY 2020, SMCWPPP collected eight additional sediment samples in the area where the above three properties (1030 Washington Street, 1029 Washington Street, and 1030 Varian Street) are located, including upstream and downstream samples. Accounting for the normal variability in this type of sampling, the results were very consistent with the past results.

In WY 2021, SMCWPPP collected eight additional sediment samples in the area where the above three properties (1030 Washington Street, 1029 Washington Street, and 1030 Varian Street) are located, with additional focus on the 1030 Varian Street property. The three samples collected closest to 1030 Varian Street had relatively low PCBs concentrations (< 0.2 mg/kg), suggesting that this an unpaved lot may not currently be a source of PCBs, despite the elevated sample (1.84 mg/kg) collected from its driveway in 2017. Based upon limited review of aerial photographs and field observations, it appears that equipment and unidentified materials have been intermittently stored at this location, which possibly could have resulted in intermittent release of PCBs. Otherwise, accounting for the normal variability in this type of sampling, WY 2021 results were consistent with past results. SMCWPPP is currently working with the City of San Carlos to determine next steps for these properties.

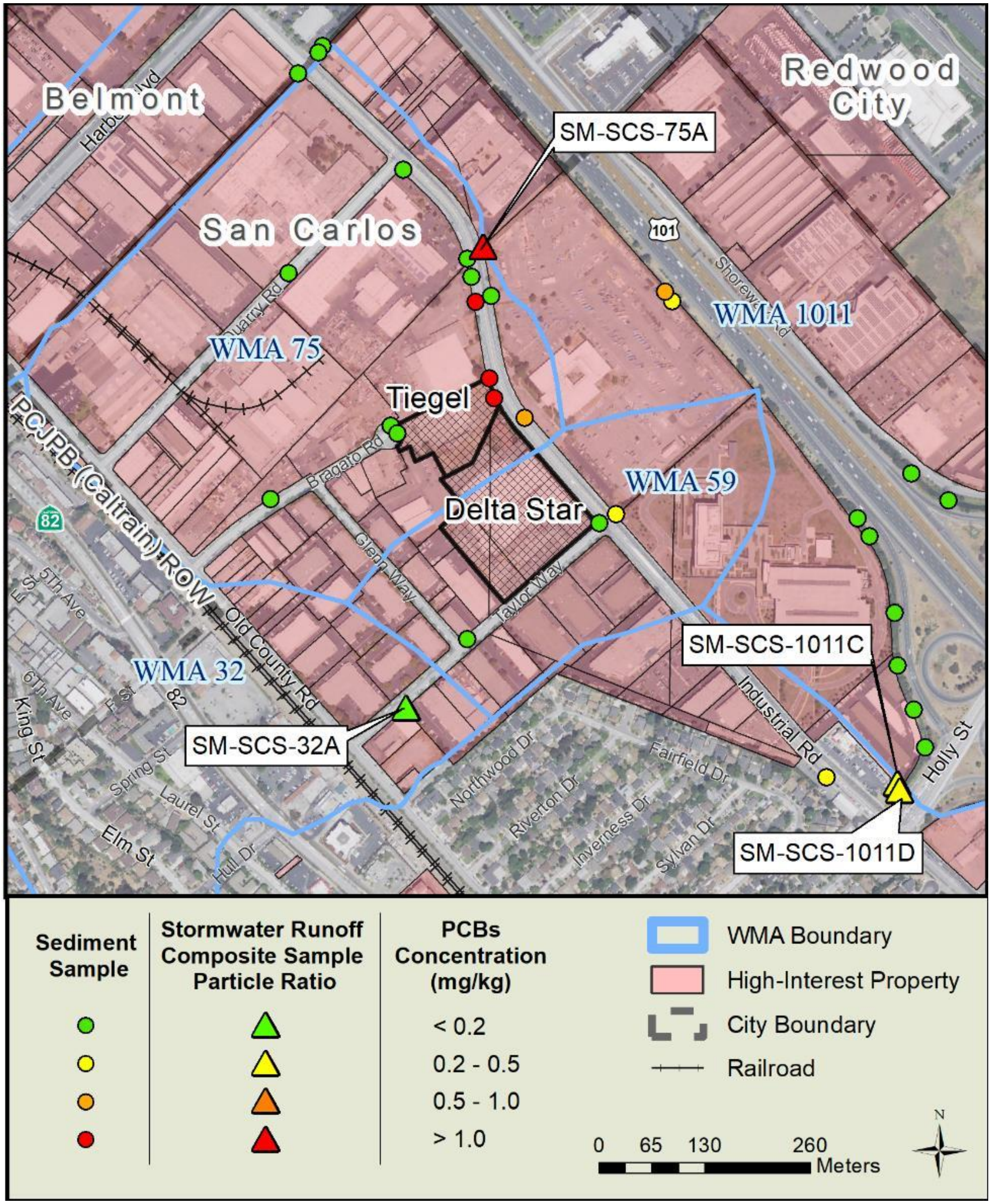

Figure 17. WMAs 59, 75, and 1011

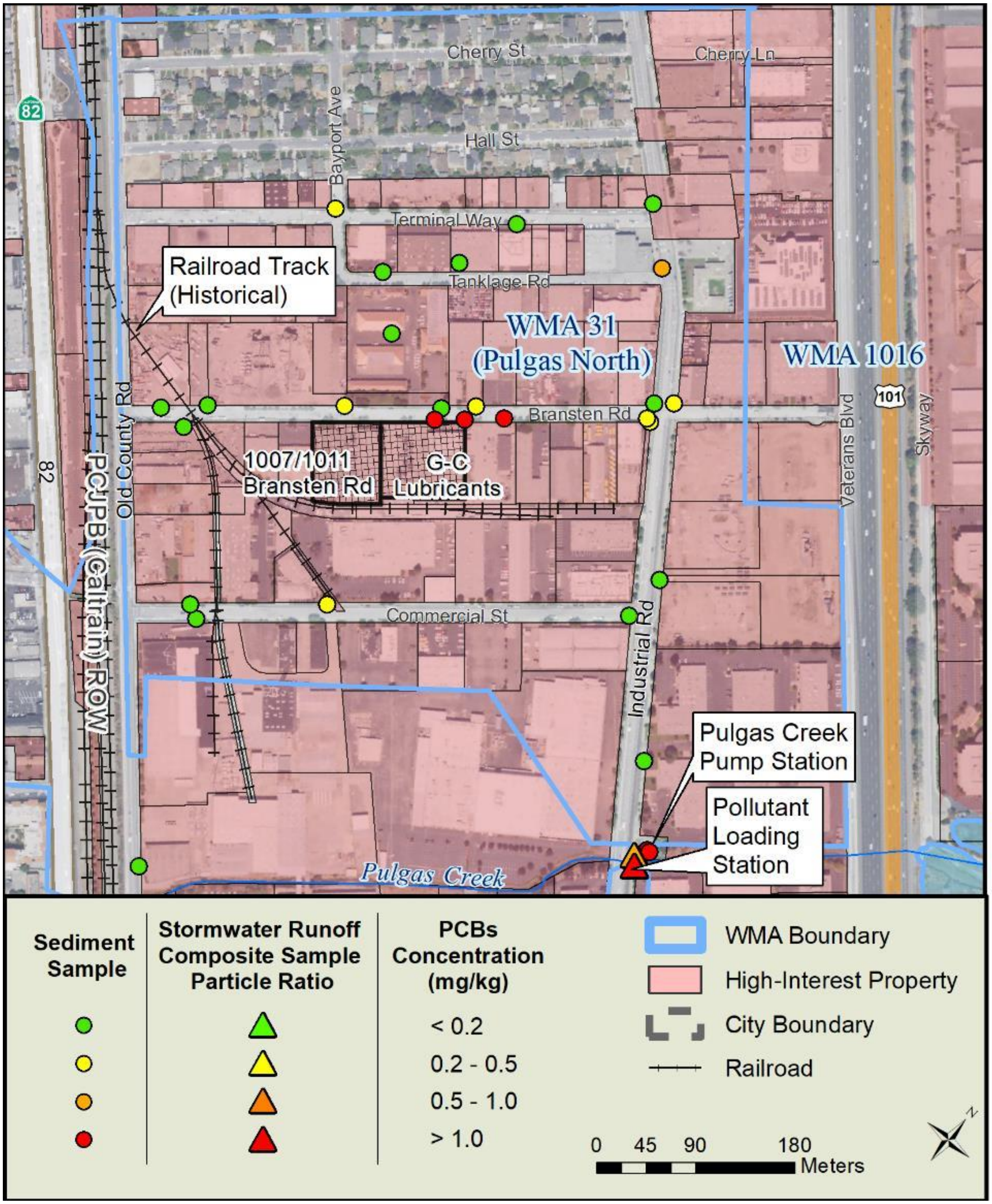

Figure 18. WMA 31

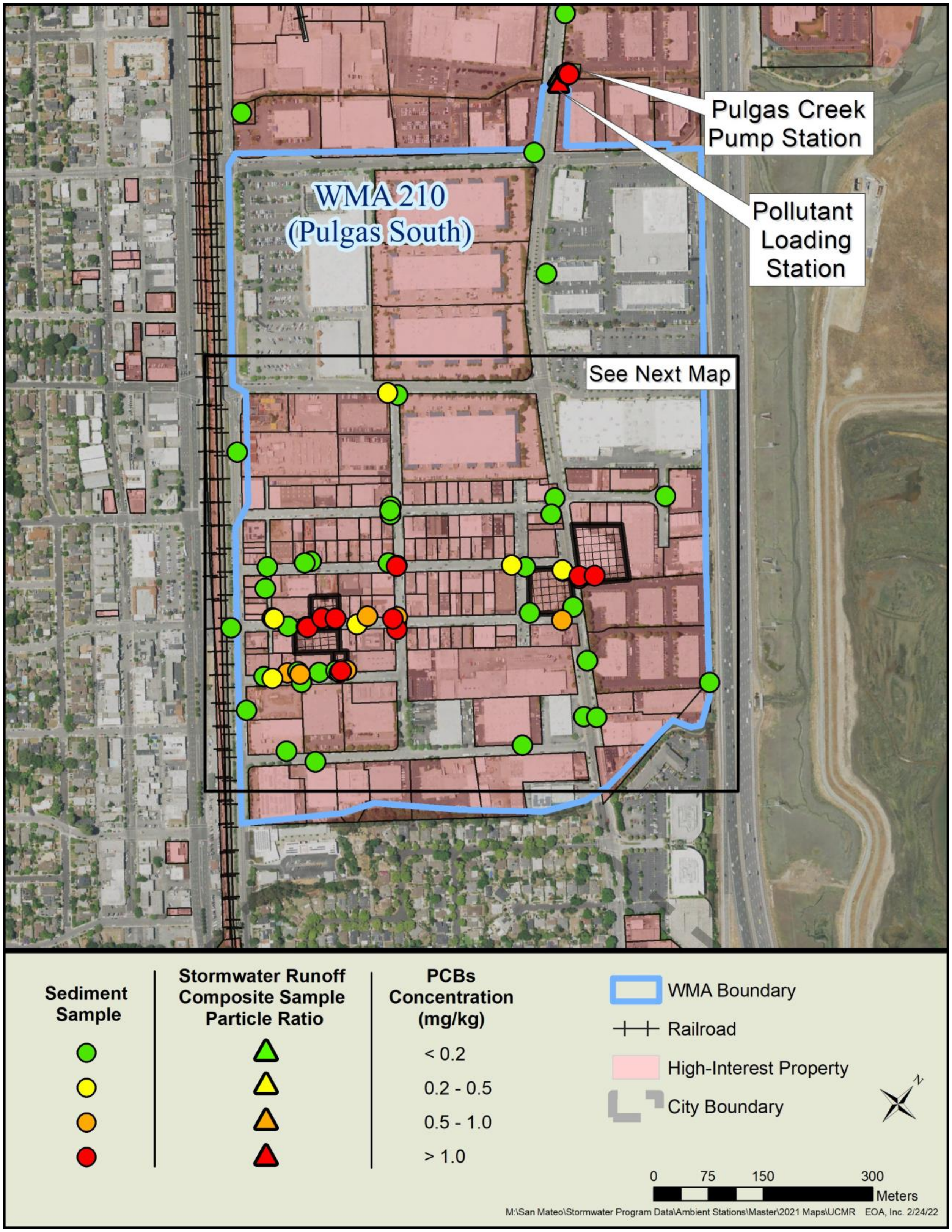

Figure 19. WMA 210

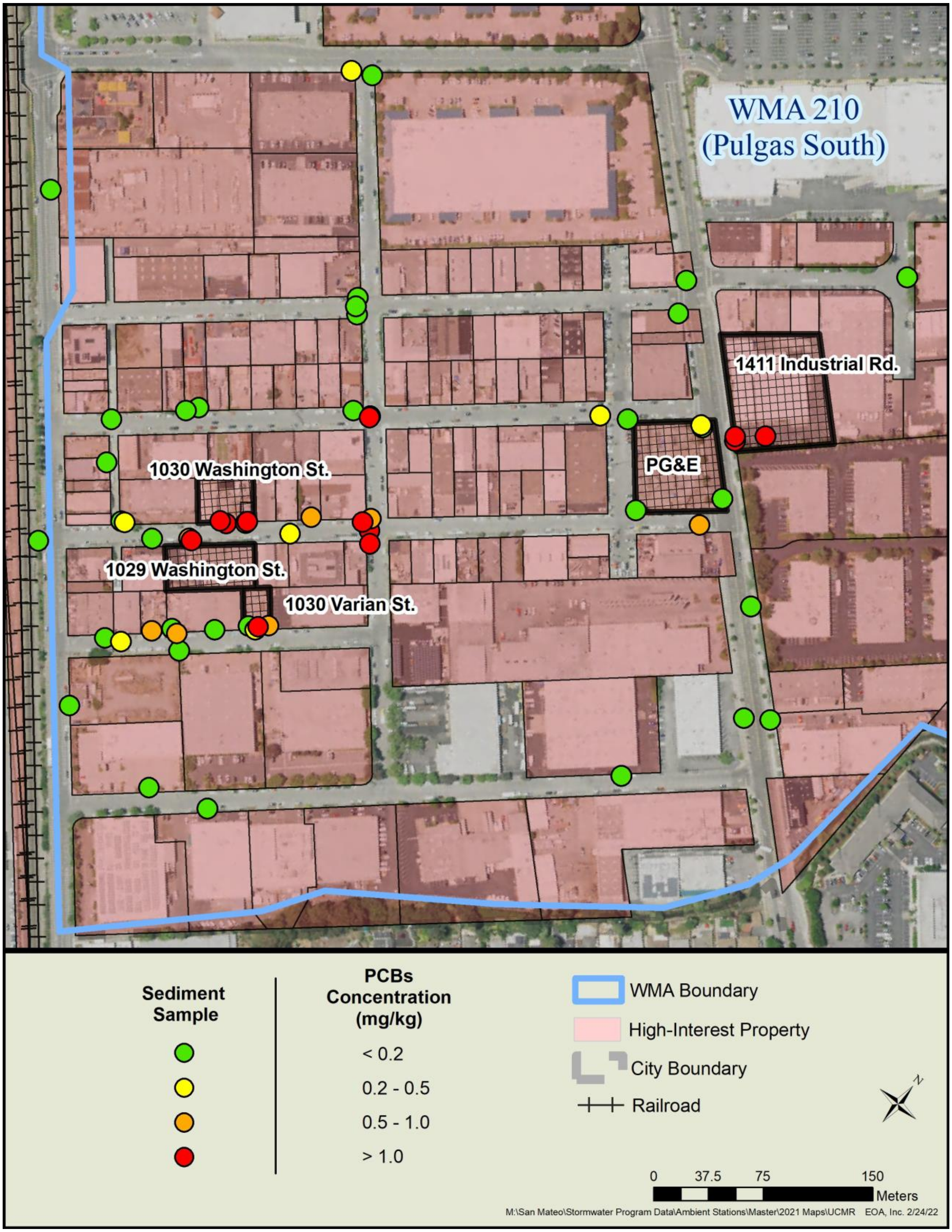

Figure 20. WMA 210 – Enlargement of Sampled Area

5.5.7. City of Redwood City

WMAs in the City of Redwood City with PCBs particle ratio greater than 0.2 mg/kg in stormwater runoff samples, elevated concentrations of PCBs in sediment samples, and/or other features relevant to investigating sources of PCBs are shown in Figure 21 – 24 and briefly described below.

WMA 379

WMA 379 (Figures 21 and 22) is an 802-acre catchment located in Redwood City and the unincorporated North Fair Oaks census-designated place (CDP). The catchment is divided into a northerly half (A) and a southerly half (B), each with a distinct MS4 outfall. Both outfalls were sampled by SMCWPPP in WY 2016. Sample SM-RCY-379A had a relatively low PCBs particle ratio (105 ng/g). Sample SM-RCY-379B also had a relatively low PCBs particle ratio (182 ng/g). In WY 2017, SMCWPPP collected fifteen samples in WMA 379 in an attempt to identify PCBs source along Bay Road and Spring Street, in follow-up to elevated sediment samples collected during previous years, including a sediment sample with an elevated PCBs concentration (6.93 mg/kg) collected in 2014 from a storm drain inlet on Spring Street (Amec 2015). None of nine samples collected in the Bay Road near Hurlingame Avenue area was elevated, with the highest PCBs concentration being 0.14 mg/kg. A single sample collected by SMCWPPP from an inlet at the back of the sidewalk in front of 2201 Bay Road had an elevated PCBs concentration of 1.97 mg/kg. This area includes two properties listed for PCBs on GeoTracker[14]: Tyco Engineering Products and an adjacent railroad spur. The Tyco site was remediated and redeveloped (MRP provision C.3 compliant) and is currently a parking lot for Stanford Hospital. Four sediment samples were collected on Spring Street in WY 2017. None was elevated, with the highest PCBs concentration being 0.08 mg/kg. In WY 2018, two additional samples were collected to further verify the lower results along Spring Street, and to test for the presence of any PCBs sources along Charter Street on the south side of the old Tyco property. Both samples had low concentrations of PCBs (less than 0.2 mg/kg).

A total of 43 sediment samples and 2 composite stormwater runoff samples have been collected to-date in WMA 379 by SMCWPPP and others, but the only potential PCBs source area that has been identified is the former Tyco site and adjacent historical railroad spur. In April 2019, Water Board staff informed SMCWPPP that they plan to include a conditional requirement to clean out the storm drain as part of the proposed cap modification and redevelopment of the property and may have the opportunity to request additional post-cleanout monitoring. SMCWPPP will continue to track these efforts and will request PCBs load reduction credit as appropriate.

WMA 405/1000

WMA 405 (Figure 23) consists almost entirely of SIMS Metal Management at the Port of Redwood City. Samples collected in WYs 2015 and 2017 from the driveway of SIMS and in close proximity to the site but another catchement (WMA 1000) had elevated PCBs concentrations of 0.57 and 0.75 mg/kg, respectively. Sims has implemented practices to prevent metal fluff potentially containing a variety of contaminants (including PCBs) from entering San Francisco Bay.

[14] GeoTracker is the State Water Resources Control Board's Internet-accessible database system used to track and archive compliance data from authorized or unauthorized discharges of waste to land, or unauthorized releases of hazardous substances from underground storage tanks.

WMA 239

WMA 239 (Figure 24) is a 36-acre mostly industrial catchment that is half in Redwood City and half in Menlo Park. In WY 2015, SMCWPPP collected a sediment sample in this catchment that had an elevated PCBs concentration of 0.57 mg/kg. Four additional sediment samples were collected in WY 2017, all of which had relatively low (urban background) PCBs concentrations, with the highest concentration being 0.16 mg/kg. Currently in this WMA there is a large housing redevelopment that is almost complete. One of the areas that was redeveloped (Haven Avenue Industrial Condominiums) at 3633 Haven Avenue was remediated for PCBs contamination in 2006. Stormwater runoff sampling has not been conducted in this catchment due to a lack of public access to the catchment outfall (which discharges to San Francisco Bay).

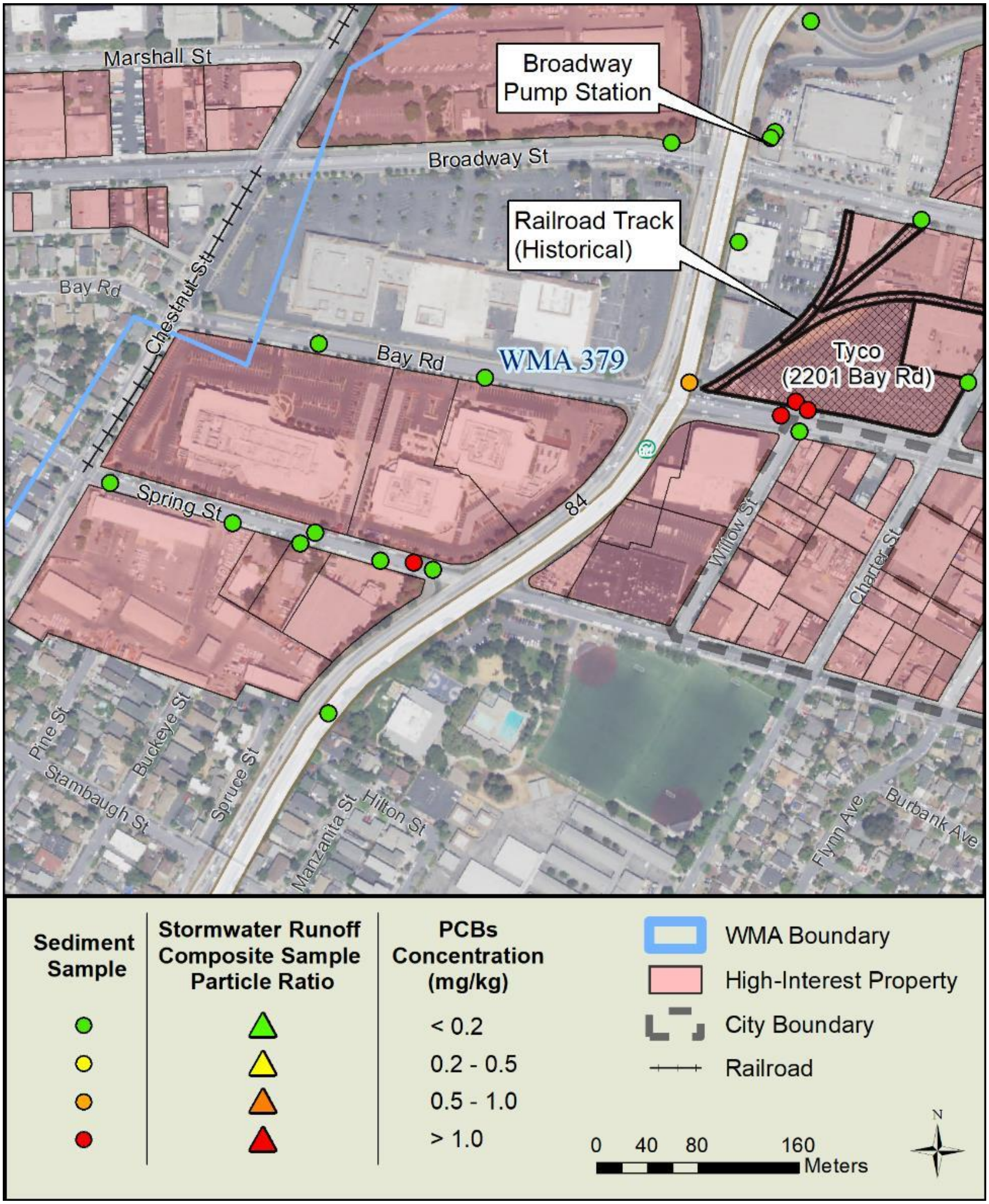

Figure 21. WMA 379 (northwest portion)

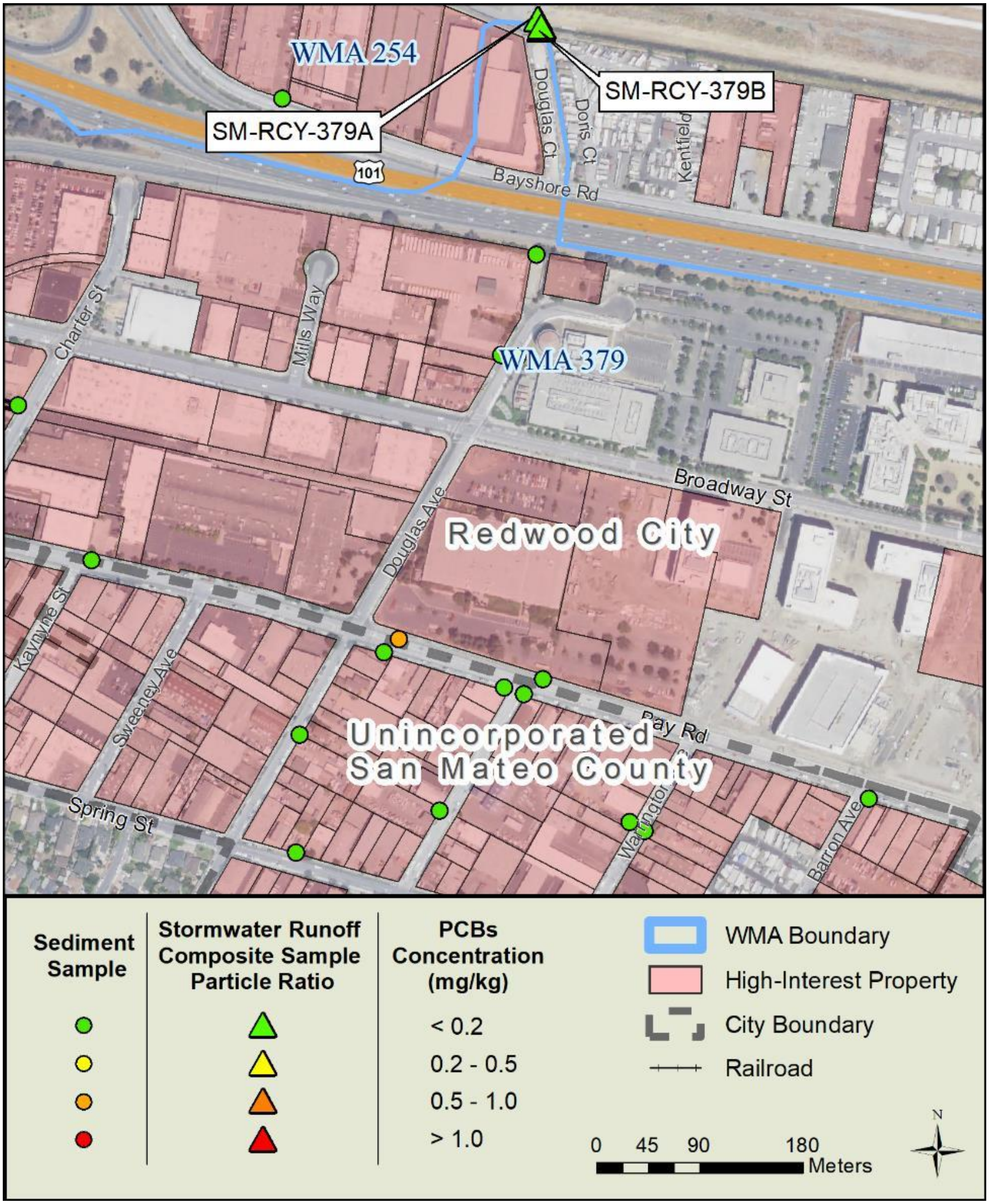

Figure 22. WMAs 254 and 379 (southeast portion)

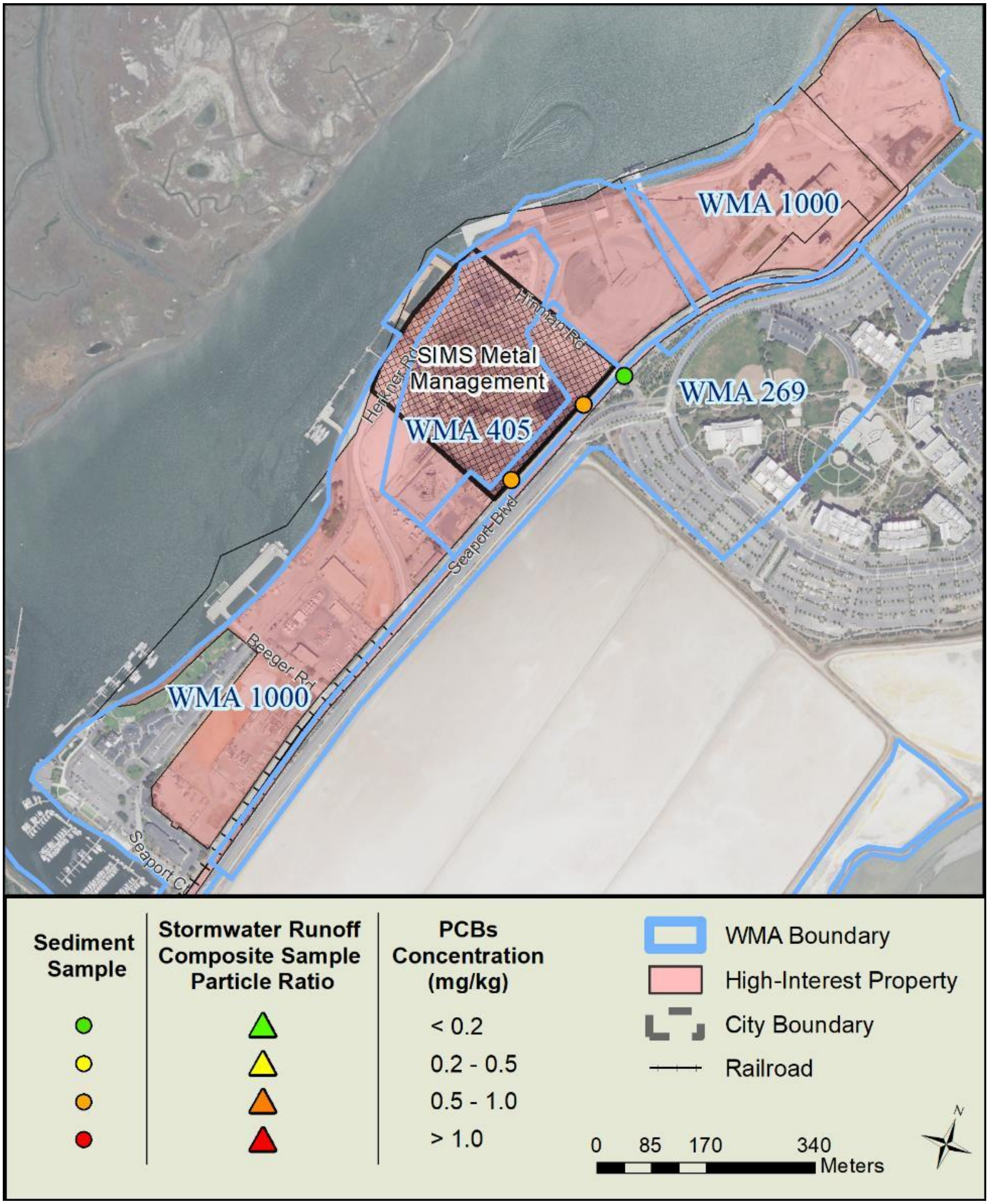

Figure 23. WMAs 269, 405, 1000

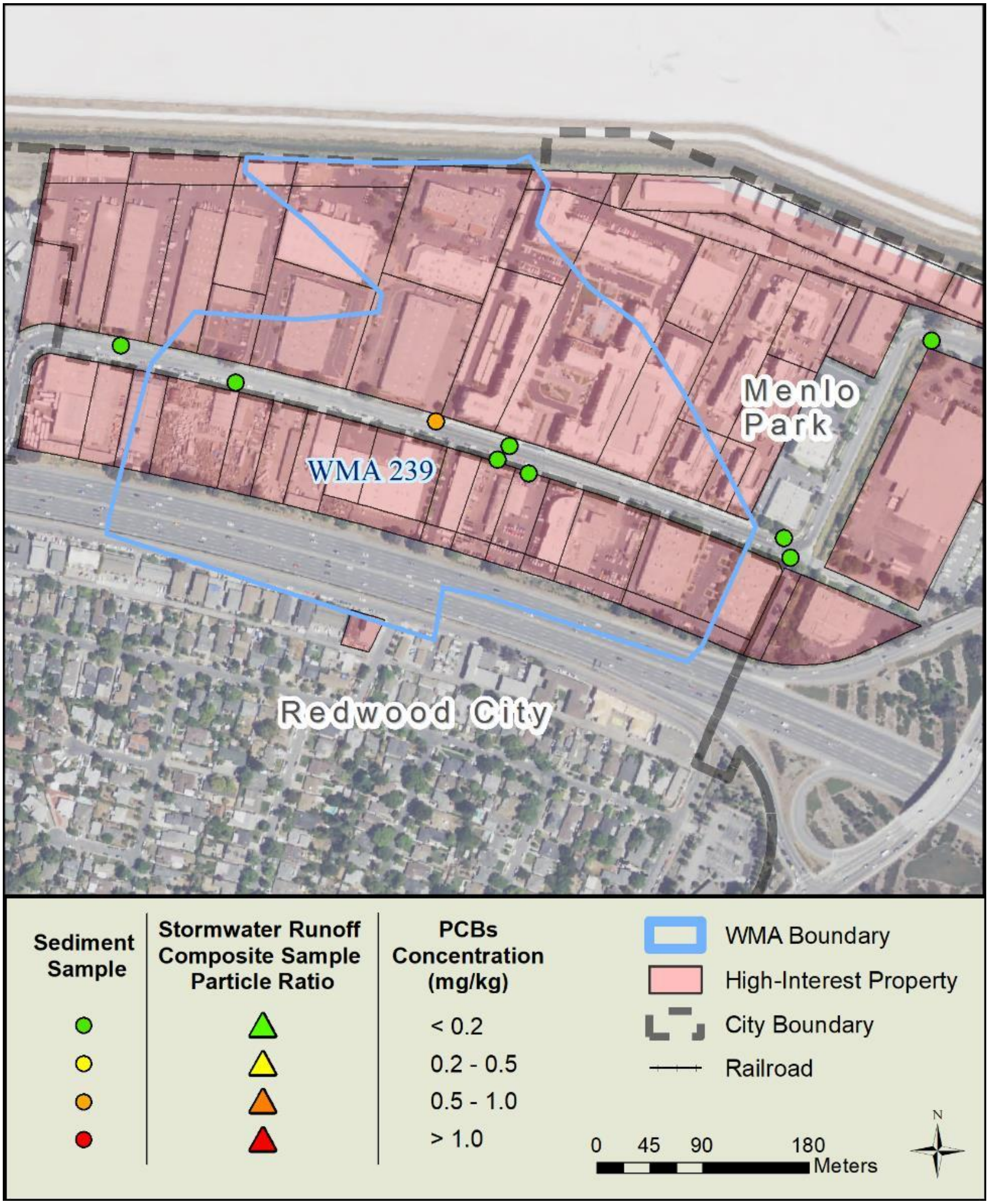

Figure 24. WMA 239

5.5.8. City of East Palo Alto

WMAs in the City of East Palo Alto with PCBs particle ratios greater than 0.2 mg/kg in stormwater runoff samples, elevated concentrations of PCBs in sediment samples, and/or other features relevant to investigating sources of PCBs are shown in Figure 25 and briefly described below.

WMA 70

WMA 70 is a 490-acre catchment. A stormwater runoff sample collected by the RMP in WY 2015 had an elevated total PCBs concentration (28.5 ng/L) but a relatively low PCBs particle ratio (108 ng/g). Three sediment samples collected by SMCWPPP in the area in WY 2017 had relatively low PCBs concentrations, with the highest having a concentration of 0.03 mg/kg.

WMA 1015/72

WMA 1015 consists of multiple catchments in the City of East Palo Alto. This WMA contains Romic Environmental Technologies Corporation, a property that is known to be contaminated with PCBs and has been vacant for many years. A stormwater runoff sample and two sediment samples in close proximity to the Romic driveway but in another catchement (WMA 72) all had relatively low concentrations of PCBs. WMA 1015 also contains 391 Demeter, a property that formerly was used to stockpile soils with PCBs that were removed from a separate remediation site. The site is expected to be redeveloped. This property drains directly to San Francisco Bay, and is all private property and inaccessible. A sediment sample from an inlet at the north end of Demeter Street (WMA 67) was moderately elevated in PCBs with a concentration of 0.21 mg/kg.

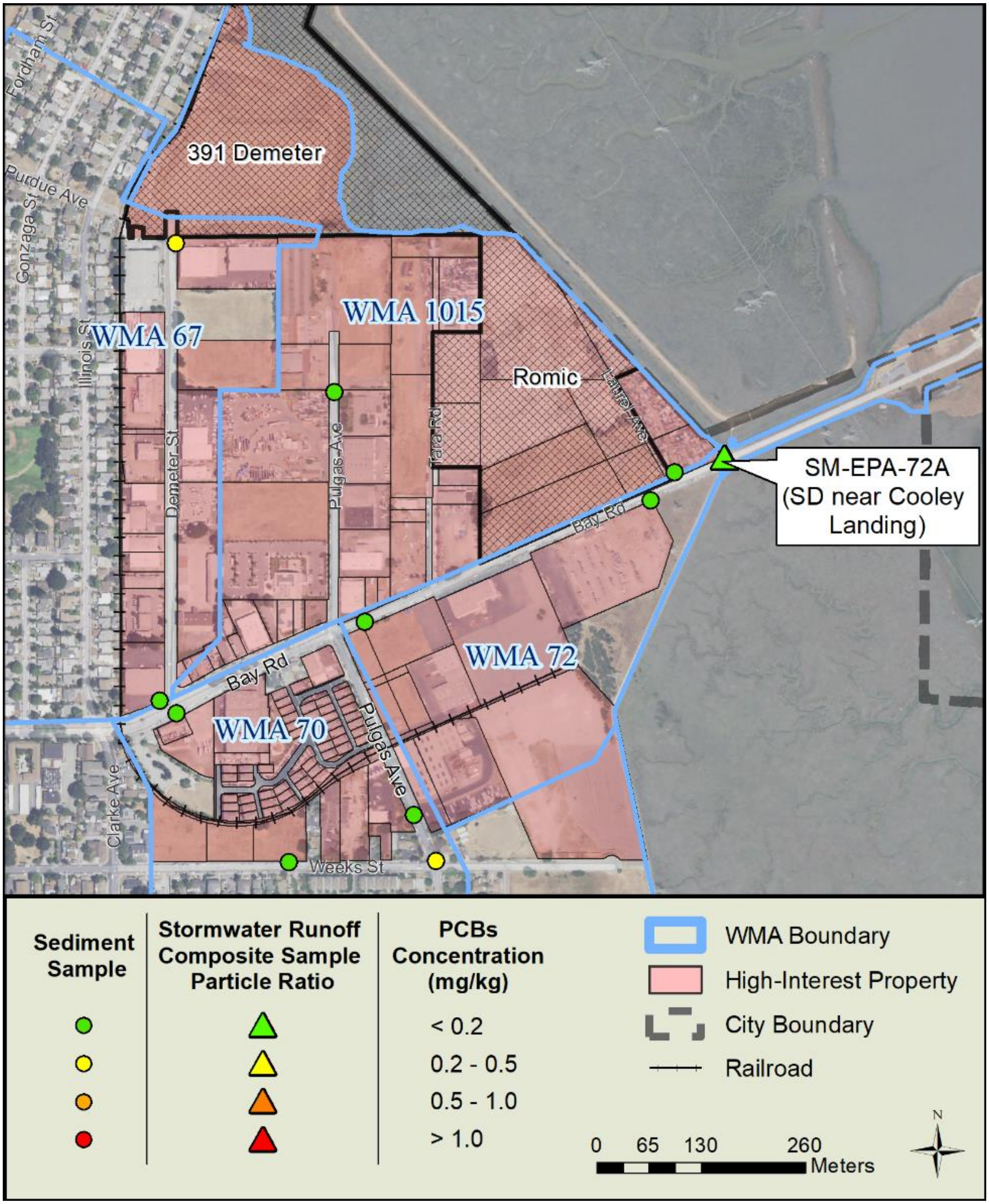

Figure 25. WMAs 70, 72, 1015

6.0 WY 2023 POC MONITORING

SMCWPPP will continue its POC Monitoring program in WY 2023 in compliance with MRP provision C.8.f., using methods similar to those implemented previously (SMCWPPP 2015, 2016a, 2016b, 2017a, 2017b, 2018a, 2019a, 2020a, 2021a, 2022a). During WY 2023, SMCWPPP will:

- Collect composite stormwater runoff samples in San Mateo County during storm events for PCBs and mercury analysis. These samples are typically collected from outfalls or manholes at or near the bottom of MS4 catchments with old industrial land uses. The Management Questions addressed may include No. 1 (Source Area Identification), No. 2 (Contributions to Bay Impairment), and No. 5 (Trends). Management Questions addressed may include No. 1 (Source Identification), No. 2 (Contributions to Bay Impairment), No. 4 (Loads and Status), No. 5 (Trends), and No. 6 (Compliance with Receiving Water Limitations) (see Section 2.1).
- Collect sediment samples in San Mateo County for PCBs and mercury analysis. These samples are typically collected during dry weather from manholes, storm drain inlets, shallow soils, roadways, gutters, driveways, and/or sidewalks in MS4 catchments with old industrial land uses. The Management. Management Questions addressed may include No. 1 (Source Identification), No. 2 (Contributions to Bay Impairment), No. 4 (Loads and Status), and No. 5 (Trends) (see Section 2.1).
- Complete a plan (currently under development) for stormwater runoff and sediment monitoring during WY 2023 that will include more detail on proposed numbers of samples and locations and the associated Management Questions that will be addressed.
- Initiate effectiveness monitoring at Low Impact Development (LID) facilities in WY 2023. Pending guidance from a Technical Advisory Group, flow (or time) weighted composites will be collected at the influent and effluent of the LID facilities during three storm events (if feasible), and samples will be analyzed for POC constituents mercury, PCBs, and copper. Additional analytes will include per- and polyfluoroalkyl substances (PFAS), total suspended solids (TSS), and total petroleum hydrocarbons (TPH). These samples will be used to address Management Questions No. 3 (Management Action Effectiveness) and No. 4 (Loads and Status).
- Work with its BAMSC RMC regional partners to begin implementation of the RWL Assessment Report. Samples collected through this effort will be used to address Management Question No. 6 (Compliance with RWLs).
- Continue to track the SPoT Program to help address Management Question No. 5 (Trends). The SPoT Monitoring Program conducts annual dry season monitoring (subject to funding constraints) of sediments collected from a statewide network of large rivers to investigate long-term trends in water quality, including one station in San Mateo County (Gateway Park near the bottom of San Mateo Creek). Sediments are analyzed for PCBs, mercury, other metals, toxicity, and pesticides, with the exact analytes varying from year to year.
- Continue to participate in the RMP's STLS and ECWG and will continue to provide augmented financial contributions to support the ECWG.

7.0 SUMMARY

This POC monitoring report was prepared as part of SMCWPPP's March 2022 UCMR. SMCWPPP prepared this report on behalf of San Mateo County local municipal agencies subject to the MRP. This report fulfills the requirements of MRP provision C.8.h.iv.(1) for reporting a summary of POC Monitoring per provision C.8.f. conducted during WY 2022. Highlights from the WY 2022 POC monitoring program include the following:

- In WY 2022, SMCWPPP continued to collect and analyze POC samples in compliance with MRP provision C.8.f. Yearly minimum sampling requirements specified in provision C.8.f. were met for all POC monitoring parameters.
- SMCWPPP's PCBs and mercury monitoring has generally focused on San Mateo County WMAs containing high interest parcels with land uses potentially associated with PCBs. Consistent with MRP requirements, the focus has been on PCBs, with ancillary and secondary benefits assumed to be realized for mercury. This report summarized progress to-date towards identifying PCBs source areas and properties (see Section 5.0). In this context, it evaluated all the relevant and readily available sediment and stormwater runoff PCBs chemistry data collected in San Mateo County through WY 2022, ranging back to the early 2000s. This included POC monitoring data collected directly by SMCWPPP and appropriate data collected by third parties such as the RMP's STLS.
- To-date, composite samples of stormwater runoff have been collected from the bottom of 49 San Mateo County urban catchments of interest (Watershed Management Areas or WMAs) and over 400 individual and composite grab samples of sediment have been collected within priority WMAs. All of these samples were analyzed for PCBs and mercury to help characterize the catchments and identify source areas and properties. Most samples were collected in the public ROW. The grab sediment samples were collected from a variety of types of locations, including manholes, storm drain inlets, driveways, streets, and sidewalks, often adjacent to or nearby high interest parcels with land uses associated with PCBs and/or other characteristics potentially associated with pollutant discharge (e.g., poor housekeeping, unpaved areas). SMCWPPP's PCBs and mercury monitoring program has also included collecting sediment samples in the public ROW (e.g., from streets and the MS4) by every known PCBs remediation site in San Mateo County, to the extent applicable and feasible.
- During WY 2022, SMCWPPP collected an additional eight sediment samples in City of South San Francisco and analyzed each for PCBs and mercury. Sampling stations were located in two catchments with old industrial land uses (WMAs 314 and 315). Some stormwater runoff samples previously collected from the bottom of these catchments had showed elevated PCBs concentrations, but specific source properties had not been identified. As in previous years, the primary goal of the WY 2022 PCBs and mercury monitoring was to attempt to identify PCBs source properties or areas, including along the public ROWs of railways within the catchments, but all the samples had relatively low PCBs concentrations. Efforts to-date have not identified any specific source area(s) within WMAs 314 and 315.
- In accordance with MRP requirements, a comprehensive QA/QC program was implemented by SMCWPPP covering all aspects of POC monitoring that was conducted during WY 2022. Overall, the results of the QA/QC review suggest that the data generated during WY 2022 POC monitoring were of sufficient quality for the purposes of this program. While some data were flagged in the project database based on the MQOs and DQOs identified in the QAPPs, none of the data was rejected.

- Figure 6 is a map illustrating the current status of WMAs in San Mateo County, based upon the monitoring data collected through WY 2022. Based upon total PCBs concentration in sediment and/or PCBs particle ratio in stormwater runoff samples, each WMA is placed in one of the following categories, to help prioritize future efforts to conduct additional monitoring and implement PCBs controls:
    1. Samples > 0.5 mg/kg PCBs, source properties identified.
    2. Samples > 0.5 mg/kg PCBs, source properties not identified.
    3. Samples 0.2 – 0.5 mg/kg PCBs.
    4. Samples <0.2 mg/kg PCBs.
    5. No samples collected.
- During WY 2022, SMCWPPP continued working with other Bay Area stormwater programs to help oversee RMP efforts that satisfy the POC monitoring requirement for CECs within provision C.8.f.
- In WY 2023, SMCWPPP will continue to participate in the RMP's STLS and ECWG and will continue to provide augmented financial contributions to support the ECWG.
- In WY 2023, SMCWPPP will collect composite stormwater runoff samples in San Mateo County during storm events and sediment samples for PCBs and mercury analysis. SMCWPPP will complete a plan (currently under development) for stormwater runoff and sediment monitoring during WY 2023 that will include more detail on proposed numbers of samples and locations and the associated Management Questions that will be addressed.
- In WY 2023, SMCWPPP will initiate effectiveness monitoring at Low Impact Development (LID) facilities in WY 2023. Pending guidance from a Technical Advisory Group, flow (or time) weighted composites will be collected at the influent and effluent of the LID facilities during three storm events (if feasible), and samples will be analyzed for POC constituents mercury, PCBs, and copper.
- In WY 2023, SMCWPPP will work with its BAMSC RMC regional partners to begin implementation of the RWL Assessment Report.

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Attachment 1

Regional Receiving Water Limitations Assessment Report

Receiving Water Limitations Assessment Report

Receiving Water Limitations Monitoring Plan

Submitted in compliance with Provision C.8.h.iv of National Pollutant Discharge Elimination System (NPDES) Permit No. CAS612008, Order No. R2-2022-0018

Submitted by

Alameda Countywide Clean Water Program (ACCWP)
Contra Costa Clean Water Program (CCCWP)
Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP)
San Mateo Countywide Water Pollution Prevention Program (SMCWPPP)

March 14, 2023

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ACRONYMS AND ABBREVIATIONS

ACCWP	Alameda Countywide Clean Water Program
BAMSC	Bay Area Municipal Stormwater Collaboration
BASMAA	Bay Area Stormwater Management Agencies Association
Basin Plan	Water Quality Control Plan for the San Francisco Basin
CCCWP	Contra Costa Clean Water Program
CEDEN	California Environmental Data Exchange Network
CTR	California Toxics Rule
DPR	California Department of Pesticide Regulation
EB	Equipment blank
FIB	Fecal indicator bacteria
FD	Field duplicate
FB	Field blank
MP	Monitoring plan
MQO	Measurement quality objectives
MRP	Municipal Regional Stormwater Permit
NPDES	National Pollutant Discharge Elimination System
NTR	National Toxics Rule
PAH	Polycyclic aromatic hydrocarbon
PBDE	Polybrominated diphenyl ether
PCBs	Polychlorinated biphenyls
P&T	Pesticides and toxicity
QA/QC	Quality assurance and quality control
QAPP	Quality Assurance Project Plan
RMP	Regional Monitoring Program for Water Quality in San Francisco Bay
RWL	Receiving water limitations
RWL MP	Receiving Water Limitations Monitoring Plan
SFBRWQCB	San Francisco Bay Regional Water Quality Control Board
SCVURPPP	Santa Clara Valley Urban Runoff Pollution Prevention Program
SMCWPPP	San Mateo Countywide Water Pollution Prevention Program

SPoT	Stream Pollution Trends
STLS	Small Tributaries Loading Strategy
SWAMP	California Surface Water Ambient Monitoring Program
TMDL	Total Maximum Daily Load
USEPA	United States Environmental Protection Agency
Water Board	San Francisco Bay Regional Water Quality Control Board
WQAS	Water Quality Attainment Strategy
WQO	Water quality objective

1. INTRODUCTION

This Receiving Water Limitations Assessment Report was prepared collaboratively by the Alameda Countywide Clean Water Program (ACCWP), the Contra Costa Clean Water Program (CCCWP), the Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP), and the San Mateo Countywide Water Pollution Prevention Program (SMCWPPP) per the Municipal Regional Permit (MRP) for urban stormwater issued by the San Francisco Bay Regional Water Quality Control Board (SFBRWQCB; Order No. R2-2022-0018). This report fulfills the requirements of MRP Provision C.8.h.iv.(2)(a) for providing a Receiving Water Limitations Assessment Report.

MRP Permittees are required to develop and implement a plan for monitoring receiving waters (creeks and rivers that flow to San Francisco Bay) to provide information to assess whether receiving water limitations (RWLs) are achieved. Per MRP 3.0 Provisions C.8.f and C.8.h.iv, the monitoring program should assess "the potential that discharges of these analytes may result in levels in receiving waters approaching or exceeding water quality objectives and the basis of the determination." The RWL monitoring methods must include the following attributes (SFBRWQCB 2022):

- Collection and analysis of analytes during the wet season in receiving waters (i.e., creeks and rivers that flow to San Francisco Bay) influenced by urban stormwater runoff.
- Collection and analysis of analytes during the dry season in receiving waters (i.e., creeks and rivers that flow to San Francisco Bay) influenced by dry season urban runoff.
- Sampling locations for RWLs assessment monitoring shall be spatially and temporally representative of the sampled waterbody. Sampled waterbodies shall be representative of the range of receiving waterbody types.

Permittees are to develop a Receiving Water Limitations Assessment Report, herein referred to as the RWL Monitoring Plan (MP or RWL MP), no later than March 31, 2023. The MP must provide the following information:

- Relevant water quality objectives against which to compare monitoring data;
- Analytes in addition to those listed in MRP Table 8.2 to monitor based on assessment of the potential that discharges of these analytes may result in levels in receiving waters approaching or exceeding water quality objectives and the basis of the determination; and
- Identification of waterbodies to be sampled, sampling locations within those waterbodies, and sampling schedule consistent with the requirements in MRP Tables 8.1 and 8.2.

The RWL MP is subject to approval by the SFBRWQCB Executive Officer for compliance and technical adequacy. Upon approval by the Executive Officer, Permittees will augment the RWLs assessment monitoring required in Tables 8.1 with the analytes identified in the report. By no later than March 31, 2026, or as part of the Integrated Monitoring Report, Permittees will submit an updated Receiving Water Limitations Assessment Report with proposed monitoring to be conducted during the next permit term.

This MP addresses sampling and analysis activities related to the implementation of the RWL monitoring that will be conducted by the ACCWP, CCCWP, SMCWPPP and SCVURPPP (i.e., the collaborating Programs).

The sampling and analytical methods described in this MP will be implemented by the collaborating Programs. The Programs will employ common laboratories using the same methods for all analyses and will incorporate protocols to ensure consistency in quality assurance and data management efforts.

2. BACKGROUND

MRP Provision C.8.f.ii specifies the analytes to be included in the MP as copper, zinc and fecal indicator bacteria (MRP Table 8.2). The MRP also states that additional analytes should be monitored "based on assessment of the potential that discharges of these analytes may result in levels in receiving waters approaching or exceeding water quality objectives." The following subsections describe the analyte selection process and provide the water quality objectives by which exceedances will be assessed.

2.1 Evaluation of Analytes

A summary of the process used to evaluate potential analytes is provided below. A more detailed description of the process is provided in Appendix A. The analyte evaluation was conducted in two steps: 1) compilation of water quality data collected in non-tidal receiving water locations within the four counties; and 2) an assessment of analyte concentrations which included comparison of concentrations with existing and draft proposed water quality objectives (WQOs) and criteria.

2.1.1 Data Compilation

The collaborating Programs accessed and compiled relevant water quality data from the California Environmental Data Exchange Network (CEDEN) from the last decade (2010-2021). The Programs then reviewed the compiled data on a county-by-county basis to eliminate non-relevant data points (e.g., monitoring at treatment facilities, collected in subtidal areas, associated with "field measurements", and uncertain data quality). The resulting dataset comprised approximately 26,000 data points. These data points represented many analyte types, including fecal indicator bacteria (FIB) and organic, inorganic, and conventional water quality parameters. Four primary monitoring efforts generated approximately 93% of these data points:

1. Regional Monitoring Program for Water Quality in San Francisco Bay (RMP) Small Tributaries Loading Strategy (STLS, 55%),
2. Bay Area Stormwater Management Agencies Association Regional Monitoring Coalition (RMC, 23%),
3. California Surface Water Ambient Monitoring Program (SWAMP, 13%), and
4. Department of Pesticide Regulation Surface Water Monitoring Project (DPR, 2%).

2.1.2 Analyte Selection

To evaluate which analytes to include in the monitoring program, the maximum concentration of each of the analyte was compared to the most stringent of existing water quality thresholds developed and used by federal and state regulatory agencies. This data review process was modeled after the Reasonable Potential Analysis method used by NPDES permit writers to determine if pollutants require effluent limits in NPDES wastewater permits. The water quality thresholds used in the analysis include:

- California Toxics Rule (CTR) and National Toxics Rule (NTR) Water Quality Criteria/Criterion, which were developed based on USEPA protocols and are protective of aquatic life exposed to those concentrations in the receiving water, or where applicable, protection of human health for consumption of organisms.
- Numeric WQOs listed in the Water Quality Control Plan for the San Francisco Basin (Basin Plan; RWQCB 2019) for the protection of aquatic life beneficial uses in freshwater surface waters.
- WQOs in Basin Plan Amendment R2-2021-0002, which amends the 2019 Basin Plan WQOs for bacteria.
- EPA National Recommended Water Quality Criteria, Aquatic Life and Human Health Criteria.
- Other water quality thresholds provided by SFBRWQCB staff.

The regional dataset was organized into several analyte groups for evaluation. The analyte groups include FIB, trace metals (including mercury), polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbon (PAHs), polybrominated diphenyl ethers (PBDEs), pesticides, and nutrients. No individual constituent was eliminated from consideration due to lack of a numeric WQO or criterion. Rather, individual constituents were evaluated as part of their larger group. A detailed description of the evaluation for each data group is provided in Appendix A.

Based on the analysis of readily available data collected over the last decade in Bay Area creeks and channels (i.e., receiving waters), the following analytes will be included in the RWL monitoring program:

- *E. coli* – applicable FIB, required by MRP Provision C.8.f.

- Dissolved copper – required by MRP Provision C.8.f.
- Dissolved zinc - required by MRP Provision C.8.f.
- Dissolved lead – based on the comparison of data to Basin Plan WQOs.
- Hardness – ancillary parameter to calculate site-specific metals WQOs.
- Total Mercury – based on the comparison of data to Basin Plan WQOs.
- PCBs (RMP 40)[1] – based on the comparison of data to CTR criteria.
- Total Phosphorus – based on anticipation of new statewide criteria.
- Total Nitrogen – based on anticipation of new statewide criteria.
- Unionized Ammonia – based on Regional Water Board staff recommendation.
- Ammonia, pH, specific conductance, temperature – ancillary parameters to calculate unionized ammonia.

Additionally, pesticides and toxicity (P&T) are also included in the RWL monitoring program, consistent with the monitoring being conducted in compliance with MRP Provision C.8.g – Pesticides and Toxicity Monitoring. Descriptions of the analytes, methods, timing, and sampling locations for pesticides and toxicity monitoring are included in Section 4. These descriptions explain the rationale for the monitoring conducted under provision C.8.g achieving the objectives of C.8.f RWL monitoring requirements.

2.2 Water Quality Objectives and Thresholds

The Water Quality Objectives that will be used to evaluate observed chemical concentrations are listed in Table 2-1. Pesticide and toxicity monitoring data will be evaluated consistent with MRP3 C.8.g permit requirements.

Table 2-1. Water Quality Objectives/Criteria for the Analytes Measured for the RWL MP

Analytes	Units	Applicable Objective/Criteria (Freshwater)	
		1-hr	4-day
Copper, Dissolved	ug/L	13	9.0
Lead, Dissolved		65	2.5
Zinc, Dissolved		117	118
E. coli	MPN/100mL	STV = 320	GM = 100
Total Mercury	ug/L	2.4	NA
PCBs (RMP 40)	ug/L	NA	NA
Total Nitrogen	mg/L	TBD	TBD

[1] The RMP 40 congener list was developed by the San Francisco Estuary Institute during the early years of RMP implementation and has been used by a variety of monitoring projects in the Bay Area over the last several decades, including stormwater programs subject to MRP for a variety of efforts. A list of these 40 congeners is available at https://www.sfei.org/sites/default/files/project/Updated_DMMO_PCB_Congener_and_PAH_Analyte_Lists.pdf

Analytes	Units	Applicable Objective/Criteria (Freshwater)	
		1-hr	4-day
Total Phosphorus	mg/L	TBD	TBD
Unionized Ammonia (as N)	mg/L	Annual Median = 0.025	

Notes: STV – statistical threshold value. GM – geometric mean.

For pesticides, applicable water quality thresholds provided by SFBRWQCB staff will be compared to the monitoring results.

3. PROJECT AND DATA QUALITY OBJECTIVES

The monitoring program will implement a comprehensive data quality assurance and quality control (QA/QC) program, covering all aspects of RWL monitoring. QA/QC for data the collected will be performed according to procedures detailed in both the BASMAA RMC Quality Assurance Project Plan (QAPP) (BASMAA 2020)[2] and the Clean Watersheds for a Clean Bay (CW4CB) QAPP (BASMAA 2013)[3], which between them address all proposed Project monitoring and analytical aspects. Data quality protocols incorporated into both QAPPs reference SWAMP measurement quality objectives (MQOs), so there is no expected conflict between the two. These combined QAPPs are herein referred to as the RWL MP QAPPs.

4. SAMPLING DESIGN

This section describes the sampling locations and sample frequencies for those parameters not subject to MRP Provision C.8.g permit requirements. Sampling locations, frequency, and timing for pesticides and toxicity are addressed in Section 4.3 below.

4.1 Sampling Locations

Each of the four Countywide Stormwater Programs selected a single sampling location for RWL monitoring within their respective county, for a total of four sites. Sampling stations are listed in Table 4-1 and mapped in Figure 1. Sampling stations were selected to represent a range of receiving waterbody types present in the San Francisco Bay Area. Criteria used to select waterbody types include:

- Watershed size
- Percent impervious watershed area
- Existing upstream impoundment (or not)
- Channel type

[2] https://basmaa.org/wp-content/uploads/2023/03/BASMAA_RMC_QAPP_v4_Final_2020_signed.pdf

[3] https://basmaa.org/wp-content/uploads/2021/01/final_cw4cb-qapp_r1_081513.pdf.

- Availability of previous water quality monitoring data

All sampling locations are above tidally influenced areas near the bottom of their respective watershed and are influenced by urban runoff. Selected watersheds range from 6 to 117 square miles in size and 6 to 46 percent impervious area. San Mateo Creek and Walnut Creek both have impoundments; approximately 85% of the watershed area is upstream of Crystal Springs Reservoir at San Mateo Creek, compared to one percent of the watershed area upstream of Lafayette Reservoir at Walnut Creek. All four sampling locations have been part of previous monitoring data collection efforts. There is a stream gage at the sampling station in Castro Valley Creek; the remaining stations have stream gages further upstream.

Table 4-1. Sampling Locations and Associated Watershed Characteristics for RWL Monitoring

County	Location	Latitude	Longitude	Watershed Size (sq miles)	% Impervious Area	Upstream Impoundments (Area upstream dam)	Existing Monitoring Data Collection
Alameda	Castro Valley Creek at N 3rd St (Japanese Gardens)	37.68016	-122.08059	6	46	None	Previous monitoring for ACCWP and USGS. USGS gaging station
Santa Clara	Saratoga Creek at Cabrillo Av (Bowers Park)	37.35973	-121.97336	17	21	None	Previous monitoring for SCVURPPP; stream gage further upstream
San Mateo	San Mateo Creek at 3rd Ave (Gateway Park)	37.56981	-122.31780	33	6	Crystal Springs Reservoir (28 sq mi)	Long term P&T monitoring site (SPoT); stream gage further upstream
Contra Costa	Walnut Creek at Concord Ave	37.97990	-122.05176	117	16	Lafayette Reservoir (1.2 sq mi)	FCD property; previous monitoring for CCCWP; stream gage further upstream

A summary of watershed characteristics for each of the RWL sampling watersheds is provided below.

4.1.1 Castro Valley Creek

Castro Valley Creek drains a 6-square mile watershed that encompasses portions of unincorporated Alameda County. Castro Valley Creek is a major tributary to one of the larger watersheds within Alameda County, the 48-square mile San Lorenzo Creek watershed. The proposed monitoring location is located near a long-term USGS gauging station just below the confluence of Castro Valley Creek with Chabot Creek. Land use is largely suburban throughout these two catchments. Together these two catchments are nearly full developed with mostly high density residential land uses, with approximately 10% open space in the area of upper Castro Valley Creek. The drainage of the two creek systems is approximately 60% underground segments, with a near even split between engineered channel and more natural channel segments, which are largely represented within the upper sections of the Castro Valley Creek catchment.

4.1.2 Saratoga Creek

Saratoga Creek drains a 17-square mile watershed including parts of unincorporated Santa Clara County, the Town of Saratoga, and the Cities of Santa Clara and San Jose. Saratoga Creek is a major tributary to San Tomas Aquino Creek that originates on the northeastern slopes of the Santa Cruz Mountains along Castle Rock Ridge at 3,100 feet in elevation. Saratoga creek flows for approximately 4.5 miles in an eastern direction through forested terrain, largely contained within Sanborn County Park. It continues for about 1.5 miles through the low-density residential foothill region of the Town of Saratoga and then for another eight miles along the alluvial plain of the Santa Clara Valley, through the cities of San Jose and Santa Clara characterized by high-density residential neighborhoods.

4.1.3 San Mateo Creek

San Mateo Creek drains a 33-square mile watershed including parts of unincorporated San Mateo County, the City of San Mateo, and the Town of Hillsborough. The upper 88 percent of the watershed is characterized by the northwest/southeast trending ridges and valleys of the San Andreas Rift Zone and the Santa Cruz Mountains. Runoff from this undeveloped 28-square mile area drains to a system of reservoirs which were constructed in the late 1800s and are now owned and operated by the San Francisco Public Utilities Commission (SFPUC). These include the San Andreas Reservoir, Upper Crystal Springs Reservoir, and Lower Crystal Springs Reservoir, all of which are oriented along the northwest trending San Andreas Rift Zone.

Below the Lower Crystal Springs reservoir dam, the watershed encompasses approximately five square miles and is mostly urbanized with an overall imperviousness of approximately 38 percent (STOPPP 2002). Low and medium density residential land uses characterize the area upstream of El Camino Real, and high density residential and commercial land uses characterize the watershed downstream of El Camino Real. San Mateo Creek below the Lower Crystal Spring reservoir dam is approximately 5.5 miles in length and is nearly 50 percent modified (STOPPP 2002). There are several engineered reaches, including a 2,000-foot culvert that begins downstream of El Camino Real. There is one main tributary in this reach, Polhemus Creek which enters San Mateo Creek approximately 0.75 mile downstream of the dam. San Mateo Creek flows to San Francisco Bay at Ryder Park, just south of Coyote Point and is tidally influenced downstream of Highway 101.

4.1.4 Walnut Creek

The Walnut Creek watershed is the largest watershed in Contra Costa County totaling 146 square miles, or 96,000 acres, in size. The Walnut Creek watershed has 309 miles of creek channels accounting for almost a quarter of all mapped creek channels in Contra Costa County. The watershed extends from San Ramon to the south, Martinez to the north, Moraga and Orinda to the west, and Concord to the east.

The Walnut Creek watershed encompasses the Grayson-Murderers, Concord, Pine-Galindo, San Ramon, and Las Trampas sub-watersheds. Draining the west side of Mount Diablo and the east side of the East Bay hills, Walnut Creek's major tributaries include San Ramon Creek, Bollinger Creek, Las Trampas Creek, Lafayette Creek, Grayson Creek, Murderer's Creek, Pine Creek, Tice Creek, and Galindo Creek. The Cities of Walnut Creek, Lafayette, Pleasant Hill and Danville lie completely within the boundaries of the Walnut Creek watershed, while the Cities of Concord, Martinez, and small areas of Moraga and San Ramon are partly within the watershed.

Agriculture and livestock were previously important industries in the valleys of the Walnut Creek watershed. An increase in housing and commercial development along the creek created the need for improved flood control measures. Today, a stormwater drainage system reroutes surface waters from their original path through the valley. Land use and other physical factors have also affected the way surface and groundwater reach the creek channel. Land uses in the Walnut Creek watershed consist of 13% agricultural lands; 58% urban lands; and 29% open space, parks and recreation areas, and water.

4.2 Sampling Frequency and Timing

The Project will include a total of four wet season sample events and one dry season sample event at each of the four sampling locations over the permit term. SFBRWQCB staff indicated that wet season sample events do not need to occur during storm events (Richard Looker, SFBRWQCB, personal communication). However, Programs will target wet season sampling events within one to two days following a storm event to better assess water quality in receiving water that is influenced by urban stormwater runoff. Provision C.8.h.iv requires that an updated RWL "Assessment Report with proposed monitoring to be conducted during the next permit term" is submitted by March 31, 2026. Therefore, the collaborating Programs will attempt to complete all required RWL monitoring by the end of Water Year 2025 (i.e., September 30, 2025) so that all RWL monitoring data is available for review and interpretation in the March 31, 2026 report.

Figure 1. RWL Monitoring Sites and Watershed Areas

4.3 Pesticide and Toxicity Monitoring

MRP Provision C.9 implements the Total Maximum Daily Load (TMDL) and Water Quality Attainment Strategy (WQAS) for diazinon and pesticide-related toxicity for all Bay Area urban creeks. The TMDL/WQAS amendments to the Basin Plan were adopted by the Water Board in 2005. MRP Provision C.9 requires Permittees to implement comprehensive control programs to eliminate pesticide-related toxicity associated with stormwater discharges. The TMDL/WQAS was designed to address all current and future toxicity associated with current and future use pesticides.

The TMDL/WQAS also requires that the MRP include pesticides and toxicity monitoring; this monitoring is described in MRP Provision C.8.g. The MRP factsheet provides perspective on the intent of the monitoring required in Provision C.8.g:

> *Toxicity testing provides a tool for assessing toxic effects (acute and chronic) of all the chemicals in samples of stormwater, receiving waters or sediments and allows the cumulative effect of the pollutants present in the sample to be evaluated, rather than the toxic responses to individual chemicals. Toxicity in water and on sediment also are monitored in order to determine whether the numeric targets in the TMDL/WQAS are being achieved, and to help provide evidence on whether pesticide-related toxicity is decreasing in urban creek waters.*
>
> *This subprovision [C.8.g] combines all the pesticide and toxicity monitoring into one place. This format is intended to provide for more thoughtful dry weather and wet weather sampling designs that may provide more meaningful data for the region and potentially for statewide studies.*

In collaboration with Water Board staff, Permittees designed and, in 2009, began implementing a comprehensive pesticide and toxicity monitoring program, which is contained in MRP Provision C.8.g. This monitoring program has evolved over time based on new information about the types of pesticides that may be a risk to urban creek water quality. As such, the Provision C.8.g pesticides and toxicity monitoring program satisfies both the TMDL/WQAS and RWL monitoring needs.

4.3.1 Sampling Locations

Pesticide and toxicity sampling locations are selected to represent mixed land use in urban watersheds that are not already being monitored for toxicity or pesticides by other programs, such as the SWAMP Stream Pollution Trends (SPoT) Program. Specific monitoring locations within the identified creeks are based on the likelihood that they will contain fine depositional sediments during the dry season and are safe to access during wet weather sampling, if relevant.

Consistent with the needs of the TMDL/WQAS, Programs may elect to revisit the same site over time to better understand temporal variation, select new sites annually to better understand spatial variation, or choose some combination of the two. Lists of potential sampling locations for pesticide and toxicity sampling are provided by countywide Program in the Tables 4-2 through 4-5. Watershed size and percent impervious statistics were calculated from USGS StreamStats[4].

4.3.2 Sampling Frequency and Timing

MRP Provision C.8.g requires Permittees to conduct pesticide and toxicity monitoring in receiving waters annually at the numbers of sampling sites listed in Table 4-2. Monitoring is conducted in both wet and dry seasons to best evaluate receiving water conditions. Dry season water column monitoring includes water column toxicity monitoring of test species described in Section 5. Wet season monitoring consists of monitoring both pesticides and toxicity in the water column. Pesticides monitored as part of Provision C.8.g monitoring are described Section 5 as well.

Table 4-2. Numbers of Sites Where Water Toxicity and Pesticides Monitoring are Required by MRP Provision C.8.g.

<table>
<tr><th rowspan="2">Permittees[1]</th><th colspan="2">Minimum Number of Sample Sites</th></tr>
<tr><th>Dry Weather</th><th>Wet Weather</th></tr>
<tr><td>Alameda County Permittees</td><td>2 per year</td><td rowspan="4">10 collective samples over the Permit term, with at least 6 samples by the end of the third water year of the Permit</td></tr>
<tr><td>Contra Costa County Permittees</td><td>1 per year</td></tr>
<tr><td>Santa Clara County Permittees</td><td>2 per year</td></tr>
<tr><td>San Mateo County Permittees</td><td>1 per year</td></tr>
</table>

[1] Solano County permittees are required to collect one dry weather Pesticides & Toxicity sample over the permit term, but they are not required to conduct RWL assessment monitoring.

[4] https://streamstats.usgs.gov/ss/.

Table 4-3. Existing and Potential Sampling Locations and Associated Watershed Characteristics for Pesticides and Toxicity Monitoring, ACCWP.

Site ID	Site Name	Latitude	Longitude	Watershed Size (sq miles)	% Impervious Area	Upstream Impoundments (Area upstream dam)	Existing Monitoring Data Collection
204CVY010	Castro Valley Cr above USGS gauging station	37.68016	-122.08059	6	46	None	Previous monitoring for ACCWP and USGS.
Z4LA	Zone 4, Line A--Hayward Industrial Storm Drain-Z4LA	37.64536	-122.13630	1.6	67	None	P&T WY2023
SANLORCRKUP	San Lorenzo Creek Upper-SANLORCRKUP	37.68197	-122.14305	46.2	12.4	20.7	P&T WY2023
204ACA200	South San Ramon Creek at Johnson Drive	37.70103	-121.91983	39	23	None	P&T WY2023
204SAU030	Sausal at E.22nd	37.78566	-122.22424	3.9	22	None	P&T WY2016
205R01198	Zone 6 Line G west of Grimmer-205R01198	37.50872	-121.96650	13.2	25	None	P&T WY2016
204WRD002	Ward Creek upstream of Ameron Pump Station	37.61729	-122.07366	8.4	38	None	P&T WY2017
204AVJ020	Arroyo Viejo Rec. Center	37.76253	-122.17539	0.2	51	None	P&T WY2018
204LME100	Glen Echo at 29th Street	37.81726	-122.26107	1.1	38	None	P&T WY2019
204ALP147	Arroyo Las Positas just upstream of 1st St	37.69985	-121.74141	16.3	15	None	P&T WY2020
204ALP180	channelized tributary to Arroyo Seco at Patterson directly d/s from Patterson Pass Rd.	37.696086	-121.71471	7.3	6	None	P&T WY2020
204SLE030	San Leandro Creek at Empire Road	37.72556	-122.18361	45.8	8	42.0	P&T WY2021
204SLO010	San Lorenzo Creek downstream of confluence with Castro Valley Creek	37.67757	-122.08204	45.5	29	19.8	P&T WY2021
204R01380	Arroyo de la Laguna 750m north of Bernal Ave	37.66228	-121.90612	222	13	None	P&T WY2022
204ADV010	Arroyo del Valle 130m upstream of the Arroyo de la Laguna confluence	37.66244	-121.90466	172	2.3	146	P&T WY2022

Table 4-4. Existing and Potential Sampling Locations and Associated Watershed Characteristics for Pesticides and Toxicity Monitoring, CCCWP

Site ID	Site Name	Latitude	Longitude	Watershed Size (sq miles)	% Impervious Area	Upstream Impoundments (Area upstream dam)	Existing Monitoring Data Collection
207R02615	Walnut Creek at Concord Ave	37.97990	-122.05176	146	30	Lafayette Reservoir (1.2 sq mi)	FCD property; previous monitoring for CCCWP and DPR; stream gage further upstream
207R04819	Las Trampas Creek near Gazebo Park	37.89270	-122.11037	146	30	Lafayette Reservoir (1.2 sq mi)	Previous monitoring for CCCWP
207ALH010	Alhambra Creek at Main Street	38.01691	-122.13619	16.75	15	None	Previous monitoring for CCCWP; stream gage further upstream
206R01319	San Pablo Creek at Fred Jackson Way	37.96744	-122.36554	43	20	Briones Reservoir (TBD) and San Pablo Reservoir (TBD)	Previous monitoring for CCCWP
543EAN015	East Antioch Creek	38.01042	-121.79691	11.35	60	Lake Alhambra (TBD)	Previous monitoring for CCCWP

Table 4-5. Existing and Potential Sampling Locations and Associated Watershed Characteristics for Pesticides and Toxicity Monitoring, SCVURPPP

Site ID	Site Name	Latitude	Longitude	Watershed Size (sq miles)	% Impervious Area	Upstream Impoundments (Area upstream dam)	Existing Monitoring Data Collection
205STQ010	San Tomas Aquino at Mission College Blvd	37.38888	-121.96872	26	34	None	Long term P&T monitoring site (SCVURPPP);
205STE021	Stevens Creek at Hwy 101	37.40895	-122.06904	24	9	Stevens Creek Reservoir (17 sq mi)	Long term P&T monitoring site (SCVURPPP);
205GUATRM	Guadalupe River at Trimble	37.38888	-121.96872	172	23	Lexington, Guadalupe Creek, Almaden, Calero (78 sq mi)	DPR P&T monitoring site

Table 4-6. Existing and Potential Sampling Locations and Associated Watershed Characteristics for Pesticides and Toxicity Monitoring, SMCWPPP

Site ID	Site Name	Latitude	Longitude	Watershed Size (sq miles)	% Impervious Area	Upstream Impoundments (Area upstream dam)	Existing Monitoring Data Collection
204SMA020	San Mateo Creek at 3rd Ave (Gateway Park)	37.56981	-122.31780	33	6	Crystal Springs Reservoir (28 sq mi)	Long term P&T monitoring site (SPoT); stream gage further upstream
204COL040	Colma Creek at Orange Ave	37.65333	-122.42582	11	39	None	Downstream of Orange Memorial Regional Treatment Facility
204COR005	Cordilleras Creek at Lenolt St	37.49677	-122.24313	3	16	None	New site
204RED010	Redwood Creek at Maple St	37.48196	-122.22640	6	30	None	Previous POC monitoring site (SMCWPPP)
202R01308	Pilarcitos Creek at Oak Ave	37.46833	-122.43647	27	1.7	Pilarcitos Lake (4 sq mi)	Previous bioassessment and P&T monitoring site (SMCWPPP)
202SPE005	San Pedro Creek at Hwy 1	37.59454	-122.50517	7.2	8	None	Previous POC monitoring site (SMCWPPP)

5. ANALYTICAL METHODS

Water samples will be analyzed for the parameters listed in Table 5-1 (RWL aquatic chemistry), Table 5-2 (P&T aquatic chemistry), and Table 5-3 (aquatic toxicity). Analytical methods and reporting units are also provided. The collaborating Programs have agreed to use common laboratories. Each Program may elect to use a different (and geographically closer) analytical laboratory for *E. coli* analysis in order to achieve the 8-hour hold time for these samples.

MQOs for laboratory analyses for metals, organics, nutrients, and *E. coli* were selected to match SWAMP (2022) requirements and are described in the Project QAPPs.

Table 5-1. RWL Monitoring Laboratory Analytical Methods

Analyte	Sampling Method	Recommended Analytical Method	Reporting Units
Pb, dissolved	Grab	EPA 200.8	ug/L
Cu, dissolved	Grab	EPA 200.8	ug/L
Zn, dissolved	Grab	EPA 200.8	ug/L
Hardness	Grab	EPA 1638M / SM 2340	mg/L
E. coli	Grab	SM 9223B (Quantitray)	MPN
Total Mercury	Grab	EPA 1631	ug/L
PCBs (RMP 40)	Grab	EPA 1668	ng/L
Nitrate as N	Grab	EPA 300.0	mg/L
Nitrite as N	Grab	SM 4500	mg/L
TKN	Grab	SM 4500	mg/L
Total Phosphorus	Grab	SM 4500-P B/F-11 (LL)	mg/L
Ammonia	Grab	SM 4500-NH3 B,C-11	mg/L

Table 5-2. Pesticides and Toxicity Monitoring Aquatic Chemistry Analytical Methods

Analyte	Sampling Method	Recommended Analytical Method	Reporting Units
Pyrethroids	Grab	EPA 625.1	ng/L
Imidacloprid	Grab	EPA 632	ug/L
Fipronil and degradates	Grab	EPA 625.1	ng/L

Table 5-3. Pesticides and Toxicity Monitoring Aquatic Toxicity Analytical Methods

Test Species	Test Endpoint	Recommended Analytical Method	Evaluation
Pimephales promelas	Larval survival and growth	EPA 821/R-02-013	Pass or Fail using TST, % effect
Ceriodaphnia dubia	Survival	EPA 821/R-02-013	Pass or Fail, % effect < 25% passes, % effect > 25% fails
Ceriodaphnia dubia	Reproduction	EPA 821/R-02-013	Pass or Fail using TST, % effect
Selenastrum capricornutum	Growth	EPA 821/R-02-013	Pass or Fail using TST, % effect
Hyalella azteca	Survival	EPA 821/R-02-012	Pass or Fail using TST, % effect

Test Species	Test Endpoint	Recommended Analytical Method	Evaluation
Chironomus dilutus	Survival	EPA 821/R-02-012	Pass or Fail using TST, % effect

6. FIELD METHODS AND PROCEDURES

Field crews will collect grab samples of water using protocols comparable to those specified by SWAMP. Sampling techniques will include direct filling of sterile sample containers for *E. coli* samples, collection of mercury samples using clean hands/dirty hands protocols, and direct immersion or use of pre-cleaned peristaltic pump and tubing assemblies for all other samples. Samples must be collected in a consistent manner that neither contaminates, loses, or changes the form of the analytes of interest. In addition, QA/QC measures should be performed according to the RWL MP QAPPs.

Sample collection methods were developed for the RWL MP based upon standard sampling protocols associated with the most restrictive analytes, FIB and trace metals. In order to achieve short hold time requirements associated with analysis of FIB samples, Programs will identify storms capable of being sampled and samples delivered to selected analytical laboratory within six hours of collection and with sufficient time remaining in standard laboratory work hours to receive and initiate testing (i.e., two hours). To address potential contamination issues associated with sampling and field filtration of dissolved trace metal samples (copper, lead, and zinc), clean-hands, dirty-hands protocols will be employed using appropriate sampling equipment, including use of inline filters for collection of dissolved fraction samples or capsule filters for manual filtering of bulk sample material within 15 minutes of sample collection.

Field personnel will also collect water quality measurements at time of sampling in order to calculate unionized ammonia from results for Ammonia as N analyses. These measurements will include, at a minimum, temperature, pH, and electrical conductivity. Other sampling details are summarized below.

6.1 Pre-Sampling Procedures

At least 72 hours prior to the sampling window, the analytical laboratories should be contacted to notify them of the sampling schedule and the number of samples to be delivered. Required sample containers will be ordered from the labs.

One or two days prior to collection of field data, the sample team should complete/assemble the following:

- Paperwork (Monitoring Plan, chain-of-custody forms, datasheets, maps, permits, gate keys).
- Sample containers and sterile sample collection containers.
- Labels and marker to write on labels.
- Cooler(s) with cube ice and zip-top bags for double-bagging the ice.
- Sampling and filtration devices:

    - Sampling extension pole with device to hold sample bottles, and screwdriver to loosen the band that holds the sample bottle to the pole.
    - Peristaltic pump with laboratory-clean tubing train and 0.45 µm trace-metal precleaned inline filter, or precleaned syringe connected directly to a precleaned capsule filter
- Water quality meter (calibrated within 24 hours of use).
- Ethanol solution 70 percent for field sterilization of sampling extension pole.
- Samples gloves (powder-free polyethylene, nitrile, or non-talc latex).
- Paper towels.
- Rubber boots or chest/hip waders for each person.
- Cell phone.
- Camera.
- Personal protective equipment (personal flotation device, reflective vest, eye protection, chemical resistant gloves)
- First aid kit.

6.2 Sample Collection

FIB and aquatic toxicity samples will be collected by direct immersion of the lab-provided sample container. All samples should be collected in the centroid of the stream if feasible. Except for sample containers that contain a chemical preservative or a dechlorinating compound, the sample containers should be opened, filled, and recapped below the water surface. Sample containers should be filled to the shoulder of the bottle. Samples should always be collected upstream of sampling personnel and equipment, and with the sample container pointed upstream when the container is opened for sample collection. Care must be taken not to sample water downstream of areas where sediments have been disturbed in any manner by field personnel.

- If the centroid of the stream cannot be sampled by wading, a sampling devices (e.g., a pole sampler) can be used to reach the sampling location. Such devices typically involve a means to extend the reach of the sampler, with the sample collection bottle attached to the end of the device for filling at the desired location. These methods do not allow opening of the sample container under water, so there is some potential for contamination when the container is opened prior to lowering the sample container into the stream. When sampling from a stream bank, the sample container or intermediate collection container is attached to a device which is attached in turn to the end of an extendable sampling pole. When no other option is available, sites may be accessed by bridge or through a field inlet and sampled with a sample container-suspending device, lowered into the stream at the end of a pole. Extreme care must be taken to avoid contaminating the sample with debris from the pole and bridge. For *E. coli* samples, care must also be taken to sterilize all sampling devices with a 70 percent ethanol solution between stations. Allow the pole to air-dry before the sample is taken.

- All remaining samples will be collected via direct immersion or use of a peristaltic pump with Teflon and Masterflex tubing chains. Filtering of dissolved fraction samples will either be performed using an inline filter during sample collection or with a capsule filter within fifteen minutes of collection of grab samples. In either case, blanking will be completed per QAPP requirements to assess any contamination caused by collection technique.

Proper gloves must be worn to both prevent contamination of the sample and to protect sampling personnel from environmental hazards. The user should wear at least one layer of gloves, but two layers help protect against leaks. All gloves must be powder-free. Disposable polyethylene, nitrile, or non-talc latex gloves are acceptable, with polyethylene the preferred outer layer for trace metals sampling.

7. SAMPLE CONTAINERS AND HANDLING

Standard sample container types and handling techniques for Project analytes are summarized in Table 7-1. These protocols will be adjusted consistent with project needs.

Table 7-1. SWAMP Sample Handling Protocols for Project Analytes in Surface Water

Analyte	Analyte Group	Sample Container Material & Property	Preservative	Holding Time (at 4 ± 2º C)
Dissolved Copper, Zinc, Lead	Inorganics	Polyethylene	Following field filtration, HNO3 to pH<2 within 48 of collection	Field filtered within 15 minutes of collection. 6 months at room temperature following acidification
Hardness (as $CaCO_3$)	Conventional	Polyethylene	Cool to ≤6 ºC; HNO3 or H2SO4 to pH<2	6 months
PCBs (RMP 40)	Synthetic Organics	1000-mL I-Chem 200- Series amber glass bottle, with Teflon lid-liner	Cool to ≤6º C in the dark.	1 year until extraction, 1 year after extraction
Total Mercury	Inorganics	250-mL glass or acid cleaned Teflon bottle	Cool to 6º C in the dark and acidify to 0.5% with pre-tested HCl within 48 hours	6 months at room temperature following acidification
Nitrate as N	Nutrients	Polyethylene	Cool to ≤6 ºC	48 hours
Nitrite as N	Nutrients	Polyethylene	Cool to ≤6 ºC	48 hours
TKN	Nutrients	Polyethylene	Cool to ≤6 ◦C; H2SO4 to pH<2	28 days
Total Phosphorus	Nutrients	Polyethylene	Cool to ≤6 ◦C; H2SO4 to pH<2	28 days

Analyte	Analyte Group	Sample Container Material & Property	Preservative	Holding Time (at 4 ± 2º C)
Ammonia as N	Nutrients	Polyethylene	Cool to ≤6 ◦C; H_2SO_4 to pH<2	28 days
E. coli	Bacteria	Sterile Polyethylene	Sodium Thiosulfate	8 hours (6 hours for transport to lab plus 2 hours for lab to initiate test)
Aquatic Toxicity	Toxicity	8 @ 4-L Amber glass	Cool to ≤6 ºC	36 hours
Pyrethroid pesticides, fipronil, and imidacloprid	Pesticides	Amber glass	Cool to ≤6 ºC and store in the dark	Samples must be extracted within 7 days of collection (3 days for cyfluthrin and permethrin)

Field crews should properly store and preserve samples as soon as possible after collection. Sample containers should be placed on crushed or cube ice in an insulated ice chest; ice should be placed into sealed, double-bagged zip-top bags prior to sampling to prevent any contamination of samples by melt water. Sufficient ice will be needed to lower the sample temperature to 4 ± 2 °C within 45 minutes after time of collection. Sample temperature should be maintained at 4 ± 2 °C until delivered to the laboratory.

Sample transport should be arranged so that samples arrive at the laboratory well within hold time requirements. The analytical laboratories should be informed in advance and reminded at time of sample delivery of the holding time requirements, so that required processing or analyses are initiated as soon as possible.

Each receiving laboratory has a sample custodian who examines the samples for correct documentation, proper preservation and holding times. The laboratory will follow sample custody procedures outlined in their QA plan.

8. SAMPLE DOCUMENTATION

Individual field crews are responsible for generating sample documentation in the field. Various methods of field documentation are described below.

8.1 Field Datasheets

All field data gathered by this project will be recorded on standardized field data entry forms. Given that sampling may be conducted during storm events, these forms should be printed on waterproof paper and all information should be recorded in pencil or waterproof pen. These forms are shown in Appendix B. Information will be photocopied/scanned and delivered to the Monitoring Coordinator for each Program. All entries should be legible and initialed / signed by the individual making the entries. Field data sheets shall include at a minimum:

- Date and time of sample collection, including arrival on site and time of departure
- Names of crew members
- Narrative description of the sampling site (general location)
- Summary of any meetings or discussions with property owner or agency personnel
- Other relevant information such as current and antecedent weather conditions
- Sample IDs
- Collection of QA/QC samples, if relevant (e.g., field duplicates, field blanks)
- Deviations from sampling plans, site safety plans, and QAPP procedures

8.2 Photographs

Photographic documentation is an important part of sampling procedures. An associated photo log will be maintained documenting sites and subjects associated with photographs. A copy of all photographs should be provided to the Monitoring Coordinator at the conclusion of sampling efforts.

8.3 Sample Labeling

All samples collected will be labeled in a clear and precise way for proper identification in the field and for tracking in the laboratory. At a minimum, the sample labels will contain the following information: station ID and date/time of collection. Site IDs are listed in Table 8-1.

Each sample collected for the Project will be labeled according to the following naming convention:

SITE-YYYYMMDD-HHMM

where:

SITE - Site ID (e.g., ACCV)

YYYYMMDD – Date

HHMM – hour and minute in 24-hour time (for example, if a sample was collected at 3:25 p.m. the HHMM would be "1525")

Table 8-1. Site IDs for RWL Monitoring Stations

Site ID	County	Location	Latitude	Longitude
204CVY010	Alameda	Castro Valley Creek above USGS gauging station	37.68016	-122.08059
SCSC	Santa Clara	Saratoga Creek at Cabrillo Av (Bowers Park)	37.35973	-121.97336

Site ID	County	Location	Latitude	Longitude
SMSM	San Mateo	San Mateo Creek at 3rd Ave (Gateway Park)	37.56981	-122.31780
207R02615	Contra Costa	Walnut Creek at Concord Ave	37.97990	-122.05176

For pesticides and toxicity monitoring, the site IDs will be assigned based on the site included in Table 4-2.

8.4 Sample Chain of Custody Forms and Custody Seals

All sample shipments for analyses will be accompanied by a chain of custody record (COC). COCs will be completed and sent with the samples for each laboratory and each shipment (e.g., each event). If multiple coolers are sent to a single laboratory on a single day, COC forms will cover only samples within a given cooler.

The COC will identify the contents of each shipment and maintain the custodial integrity of the samples. Generally, a sample is considered to be in someone's custody if it is either in someone's physical possession, in someone's view, locked up, or kept in a secured area that is restricted to authorized personnel. Until the samples are shipped, the custody of the samples will be the responsibility of the field contractor. The sampling team leader or designee will sign the COC in the "relinquished by" box and note date and time.

A self-adhesive custody seal will be placed across the lid of each sample at a point of closure. The shipping / storage containers in which samples are stored (usually an ice chest) will be sealed with self-adhesive custody seals any time they are not in someone's possession or view before shipping. All custody seals will be signed and dated.

9. QUALITY CONTROL

Field personnel will strictly adhere to Project QAPPs to ensure the collection of representative, uncontaminated samples. To the extent possible, sampling methods are designed to be consistent with those employed for previous investigations while maintaining compliance with the MRP. The most important aspects of quality control associated with sample collection are as follows:

- Field personnel will be thoroughly trained in the proper use of sample collection equipment and will be able to distinguish acceptable versus unacceptable samples in accordance with pre-established criteria presented in this MP.
- Field personnel will be thoroughly trained to recognize and avoid potential sources of sample contamination (e.g., dirty hands, ice used for cooling, potentially contaminating materials).

- To the extent possible, sampling equipment that comes in direct contact with the sample will be made of non-contaminating materials and will be thoroughly cleaned between sampling events.
- Sample containers will be pre-cleaned and of the recommended type.

Aspects of particular relevance to the sampling program are described below.

9.1 Field Blanks

Field blank (FB) samples will be collected at a rate as described in the Project QAPPs.

FB samples are collected in the field by passing analyte-free deionized water supplied by the laboratory through the sampling equipment (tubing, bottles). They are identified as “blanks” and submitted to the contracted analytical laboratory for analysis. If target analytes are not found, or found in very low concentrations, then there can be some degree of confidence that sampling equipment, containers and techniques are not causing contamination. These samples are collected in addition to any bottle or tubing blank analyses that the laboratory may perform after cleaning and prior to transfer to the field.

After collection, field blanks are treated identically to samples. The label should be identical to the field sample collected associated with the blank, with “FB” inserted at the end of the standard sample ID. The time recorded for the blank should be the actual time of the blank sample collection.

9.2 Equipment Blanks

Equipment blank (EB) samples will be collected at a rate as described in the Project QAPPs.

Equipment blanks are generated by the personnel responsible for cleaning sampling equipment. Equipment blanks must be analyzed before the equipment is brought to the sampling site. To ensure that sampling equipment is contaminant-free, water known to be low in the target analyte(s) must be processed though the equipment as during sample collection. The water is collected, processed, and analyzed in the same way as a field sample. An equipment blank must be prepared for dissolved metals in water samples whenever a new lot of filters is used.

9.3 Field Duplicate Samples

Field duplicates (FDs) will be collected by each Program a minimum of once over the course of Project implementation. FD samples should be collected immediately following the collection of its associated field sample (i.e., the FD for mercury should be collected immediately following the field sample for mercury, then the field duplicate for PCBs should be collected immediately following the field sample for PCBs, and so on). FD samples should be submitted to the laboratory as blind samples, using the correct sample date and entering a sample time fifteen minutes before that reported for the field sample.

10. FIELD HEALTH AND SAFETY PROCEDURES

All field staff will be expected to abide by their employer's (i.e., the field contractor's) health and safety programs.

11. DATA EVALUATION

The data evaluation methods will employ a combination of graphical and descriptive statistics to evaluate if the monitoring data may be exceeding water quality objectives/criteria and thresholds.

12. REFERENCES

BASMAA (Bay Area Stormwater Management Agency Association) Regional Monitoring Coalition (RMC). 2020. Creek Status and Pesticides & Toxicity Monitoring Quality Assurance Project Plan, Final Version 4. Prepared for BASMAA by EOA, Inc. on behalf of the Santa Clara Urban Runoff Pollution Prevention Program and the San Mateo Countywide Water Pollution Prevention Program, Applied Marine Sciences on behalf of the Alameda Countywide Clean Water Program, and Armand Ruby Consulting on behalf of the Contra Costa Clean Water Program. 79 pp plus appendices.

BASMAA (Bay Area Stormwater Management Agency Association). 2013. Quality Assurance Project Plan. Clean Watersheds for a Clean Bay – Implementing the San Francisco Bays PCBs and Mercury TMDLs with a Focus on Urban Runoff. EPA San Francisco Bay Water Quality Improvement Fund Grant # CFDA 66.202. Prepared by Applied Marine Sciences (AMS).

SFBRWQCB (San Francisco Bay Regional Water Quality Control Board). 2009. San Francisco Regional Water Quality Control Board Municipal Regional Stormwater NPDES Permit. Order R2-2009-0074, NPDES Permit No. CAS612008. 125 pp plus appendices.

SFBRWQCB (San Francisco Bay Regional Water Quality Control Board). 2015. San Francisco Region Water Quality Municipal Regional Stormwater NPDES Permit. Order R2-2015-0049, NPDES Permit No. CAS612008. 152 pp plus appendices.

SFBRWQCB. 2019. San Francisco Bay Basin (Region 2) Water Quality Control Plan (Basin Plan). Website accessed November 21, 2022.

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STOPPP (San Mateo Countywide Stormwater Pollution Prevention Program). 2002. Characterization of Imperviousness and Creek Channel Modifications for Seventeen Watersheds in San Mateo County. January 2002.

SWAMP (Surface Water Ambient Monitoring Program). 2022. SWAMP Quality Assurance Program Plan, Version 2.0. Prepared for the California State Water Resources Control Board. January 2022.

APPENDIX A

Process for Evaluation and Selection of Analytes

INTRODUCTION

MRP Provision C.8.f requires that the receiving water limitations (RWLs) monitoring program should assess "the potential that discharges of these analytes may result in levels in receiving waters approaching or exceeding water quality objectives and the basis of the determination."

Through the Bay Area Municipal Stormwater Collaboration (BAMSC), the countywide stormwater Programs in Alameda, Contra Costa, San Mateo, and Santa Clara counties collaboratively developed, on behalf of all applicable Permittees, a RWLs Monitoring Plan (MP). The RWL MP includes a uniform list of target analytes to be monitored regionally. This appendix describes the process used by the stormwater Programs to evaluate and select analytes for inclusion in the RWL MP.

ANALYTE LIST

To assist in determining the regional analyte list, stormwater Programs accessed and compiled relevant water quality data from the California Environmental Data Exchange Network (CEDEN) from the last decade (2010-2021). The regional data center at Moss Landing Marine Laboratories (MLML) assisted with this compilation. The initial data query provided analytical data in CEDEN identified as "samplewater" and collected at locations identified as either "bank," "midchannel," "reach," or "X." These data are assumed to have been collected in receiving waters (i.e., local creeks/channels). The Programs then reviewed the compiled data on a county-by-county basis to eliminate non-relevant data points (e.g., LID monitoring data and data collected in subtidal areas). The resulting dataset comprises over 47,000 data points. The compiled dataset was then reviewed to exclude non-relevant data and those of uncertain data quality. This review process resulted in the exclusion of some data points for one or more of the following reasons:

- Analytes classified as "field measurements," which removed approximately 20,000 data points.
- Additional non-relevant analytes (e.g., velocity, silt, sand), which removed approximately 700 data points.
- Data points with compliance codes indicating that the data were estimated, rejected, or of screening level quality only, which removed approximately 600 data points.
- Data points with one of the following CEDEN Quality Assurance (QA) codes, which removed approximately 50 data points.

QACode	Definition
BRK	Broken container
BT	Insufficient sample to perform the analysis
FIF	Probe / Instrument failure
LRGN	Data rejected - Surrogate recovery not within control limits, flagged by laboratory
LRIL	Data rejected - RPD exceeds laboratory control limit, flagged by laboratory

QACode	Definition
LRIP	Data rejected - Analyte detected in field or lab generated blank, flagged by laboratory
LRIU	Data rejected - Percent Recovery exceeds laboratory control limit, flagged by laboratory
LRJ	Data rejected - Estimated value - EPA Flag, flagged by laboratory
LRJA	Data rejected - Analyte positively identified, but quantitation is an estimate, flagged by laboratory
LRM	Data rejected - A matrix effect is present, flagged by laboratory
LRQ	Data rejected - Based on professional judgment, QA/QC protocols were not met, flagged by lab
LST	Sample was lost or destroyed
R	Rejected

Over 26,000 data points remained following the exclusions described above. These data points represent many analyte types, including fecal indicator bacteria (FIB) and organic, inorganic, and conventional water quality parameters. Four primary monitoring efforts generated approximately 93% of these data points:

1. Regional Monitoring Program for Water Quality in San Francisco Bay (RMP) Small Tributaries Loading Strategy (STLS, 55%),
2. Bay Area Stormwater Management Agencies Association Regional Monitoring Coalition (RMC, 23%),
3. California Surface Water Ambient Monitoring Program (SWAMP, 13%), and
4. Department of Pesticide Regulation Surface Water Monitoring Project (DPR, 2%).

Two pollutant categories falling into the synthetic organics category, PCBs and PBDEs, were reported on a congener basis, which required calculating a sum of individual congeners to use for comparison to Water Quality Objectives (WQOs). Given that a relatively large proportion of PCBs and PBDEs congeners were reported at non-detectable concentrations (NDs), it was necessary to quantify the NDs to generate summary statistics and box and whisker plots for these two analyte categories. The Programs' analyses incorporated a substitution of NDs with a value of 0, consistent with RMP data analyses and reporting for the Regional Monitoring Program (personal communication with Don Yee, SFEI, October 26, 2022).

A relatively small number of data points were reported with a Results Qualifier code of less than (<), greater than (>), less than or equal to (≤), or greater than or equal to (≥). This affected 102 data points (0.4%), primarily associated with FIB, and a few instances of nutrients were also affected. For generating summary statistics and box and whisker plots, these values were quantified as the reported concentration with the number of instances of using one of these Results Qualifier codes were also reported.

In conducting the data analysis, it was also necessary to pool data for some data points. In particular, those reported on the same fraction and using the same or similar methods but using slightly different analyte names were pooled. For example, in the case of hardness, data are reported using one of three names in the compiled database: (1) Hardness as CaCO3, (2) Hardness as CaCO3, total, and (3) Hardness as CaCO3, dissolved. As hardness is always analyzed as the dissolved fraction, these three analytes were pooled in the statistical analyses. Similar manipulations were conducted on other analytes where the reported information allowed this determination. Data for applicable analytes that did not have sufficient detail to support this type of pooling were excluded from the analysis.

Data were processed in MS Excel and R Studio. To replace non-detects with zero and calculate the replacement percentage, all non-detects (whether 0, NA, or a negative value) were replaced with NA for each analyte or analyte grouping and substituted with a value of "0". The proportion of replaced values (i.e., results with ResQualCode = "ND" and reported alternatively as NA, 0, or the negative value of the method detection limit) was calculated as the percentage of the total number of NDs relative to the total number of analyses for a particular sampling event. The chosen congeners of PAHs, PCBs, and PBDEs were summed by event and collated into their own summed files to generate a sum of the individual compounds/congeners within that analyte group. These concentrations summed by the event were then used to create boxplot figures.

PAHs, fipronil, pesticides, and pyrethroids were converted from their reported units to µg/L in Excel to generate consistent units for displaying in the boxplots. Boxplot figures for all analytes or analyte groups (e.g., PAHs, PCBs, PBDEs) show the minimum and maximum values (whiskers) as well as the 25th percentile (1st quartile, bottom of box), the median, and the 75th percentile (3rd quartile, top of box) and outliers. Select boxplots that supported decision-making are presented below in relation to specific analytes.

ANALYTE SELECTION

To evaluate which analytes to include in the monitoring program, the maximum value for each of the analytes described above were compared to the most stringent of the existing water quality thresholds developed by federal and state regulatory agencies This data review process was modeled after the Reasonable Potential Analysis (RPA) method used by National Pollutant Discharge Elimination System (NPDES) permit writers to determine if pollutants require effluent limits. The water quality thresholds used in the analysis include:

- California Toxics Rule (CTR) and National Toxics Rule (NTR) Water Quality Criteria/Criterion, which were developed based on USEPA protocols and are protective of aquatic life exposed to those concentrations in the receiving water, or where applicable, protection of human health for consumption of organisms.
- Numeric WQOs listed in the Water Quality Control Plan for the San Francisco Basin (Basin Plan; RWQCB 2019) for the protection of aquatic life beneficial uses in freshwater surface waters.
- WQOs in Basin Plan Amendment R2-2021-0002, which amends the 2019 Basin Plan WQOs for bacteria.
- EPA recommended Water Quality Criteria for Aquatic Life and Human Health

The regional dataset is organized into several analyte groups for evaluation. No individual constituent was eliminated from consideration due to lack of a numeric WQO or criterion. Rather, individual constituents were evaluated as part of their larger group. The sections below describe data screening and review for each analyte group. The recommended list of RWL analytes is included at the end of this section.

FIB. Bacteria data were available for *E. coli* (n=405) and enterococcus (n=157). In freshwater, *E. coli* is the sole indicator, with two WQOs, a six-week rolling geometric mean (GM), and a statistical threshold value (STV), which approximates a single sample maximum. Per MRP Provision C.8.f Table 8.2, *E. coli* will be included in the RWL monitoring program. Because all RWL monitoring will be conducted in freshwater, samples will not be analyzed for enterococci, which is the indicator for marine or brackish/saline waters.

Metals. Metals data were available for total fraction arsenic (n=18), cadmium (n=18), chromium (n=30), copper (n=101), lead (n=13), nickel (n=30), and zinc (n=18). CTR WQOs for several metals included in the Basin Plan are hardness-dependent and are given for the dissolved fraction of the metal in water. The WQOs for metals are given for both 1-hour (acute) and 4-day (chronic) averages. For all metals, except zinc, the 4-day WQO was the lower concentration (most stringent) and thus, used for the analyses. Metals data were first screened using WQOs based on a conservative hardness of 100 mg/L as $CaCO_3$. A review of all hardness data in the censored dataset shows that actual hardness in the region is generally higher; the median and mean hardness are 255 and 290 mg/L as $CaCO_3$, respectively. The 5^{th}, 25^{th} and 75^{th} percentiles are 103, 170, and 496 mg/L as $CaCO_3$, respectively. Maximum metals concentrations in the dataset exceeded the lead, copper, and zinc WQOs based on a hardness of 100 mg/L as $CaCO_3$; boxplots for the four remaining analytes are shown in Figure A-1. No additional analysis of the copper and zinc data was conducted because these analytes must be included in the RWL monitoring program per MRP Provision C.8.f Table 8.2.

Of the 13 samples in the dataset with lead results, five had total lead concentrations that exceeded the chronic WQO (4-day). These samples were all collected during rain events in December 2014 as part of RMP STLS monitoring. One station was in Contra Costa, three in Alameda, and one in Santa Clara County. No results exceeded the acute WQO (1-hour) for lead, which is the more applicable criteria for storm event samples given the shorter duration of most storm events. Because the lead data were only available as the total recoverable metal in water, the WQO was calculated as a total recoverable criterion, by eliminating the conversion factor in the equation, instead of a dissolved criterion as the other metals were calculated. No hardness data were available for these samples; therefore, the criterion was not adjusted for hardness. However, if the median of all of the regional hardness data (i.e., 255 mg/L as $CaCO_3$) is used to calculate the criterion, three samples would exceed the WQO. Based on these findings, lead should be added to the list of analytes in the RWL monitoring program. It should be measured as the dissolved fraction to simplify comparison with the criterion.

Hardness should be included with the metals analysis so that the WQOs can be adjusted to site-specific conditions. In addition to RWL monitoring for copper, zinc, and lead, five additional copper samples will be collected by each Program per MRP Provision C.8.f to provide information on pollutants of concern (POC) loads, concentrations, and /or presence/absence. Furthermore, one or two annual sediment samples (depending on the Program population) will be analyzed for a suite of metals (arsenic, cadmium, chromium, copper, lead, nickel, zinc) per MRP 3.0 Provision C.8.g (Pesticides and Toxicity Monitoring).

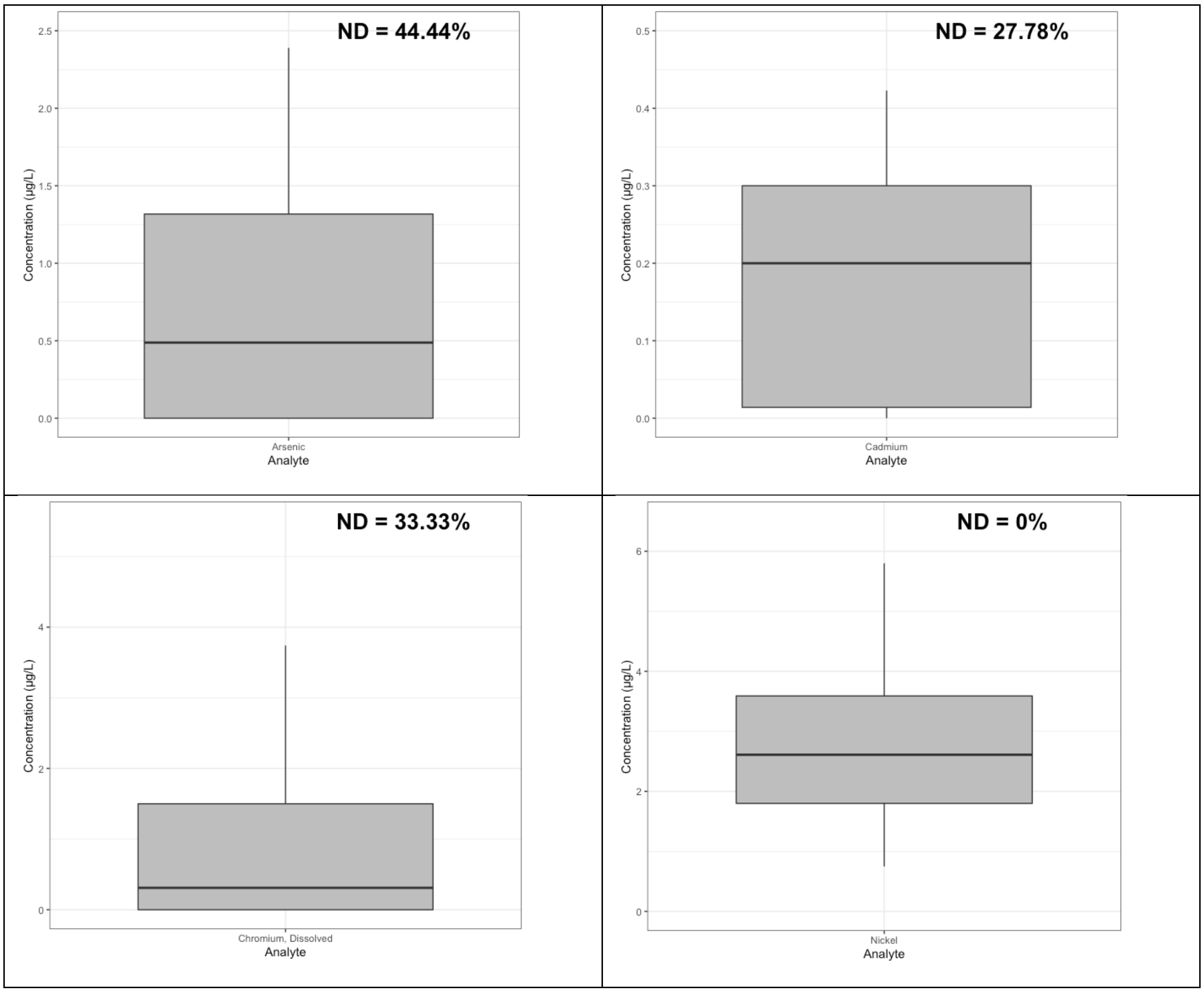

Figure A-1. Box plots generated from 4-county CEDEN data (2010-2021) for total fraction inorganic parameters not to be measured through RWL monitoring.

Mercury. Data were available for mercury (n=315) and were compared to WQOs from the Basin Plan (Figure A-2). Many of the data exceeded the acute and chronic WQOs. Mercury is already identified as a POC in the Bay Area, and there is a mercury Total Maximum Daily Load (TMDL) for San Francisco Bay with load reduction requirements for urban runoff sources. Although mercury is already being sampled by the stormwater Programs per MRP 3.0 Provision C.8.f (50 to 60 samples, depending on population, over the five-year permit term) to address several other information needs (i.e., identification of source areas, effectiveness of management actions, status of POC loads, and trends), it will be included in the RWL monitoring program.

PCBs. Data were available for PCBs (n=103 sum of RMP 40 PCB congeners) and were compared to the CTR criterion for Total PCBs (sum of 209 PCB congeners) (Figure A-2). Many of the data exceeded the CTR criterion. There is a PCBs TMDL for San Francisco Bay with load reduction requirements for urban runoff sources. Similar to mercury, PCBs will be included in the RWL monitoring program even though it is already being sampled by the stormwater Programs (65 to 75 samples, depending on population, over the five-year permit term) per MRP Provision C.8.f to address other information needs (i.e., identification of source areas, effectiveness of management actions, status of POC loads, and trends) that may overlap with RWLs assessment.

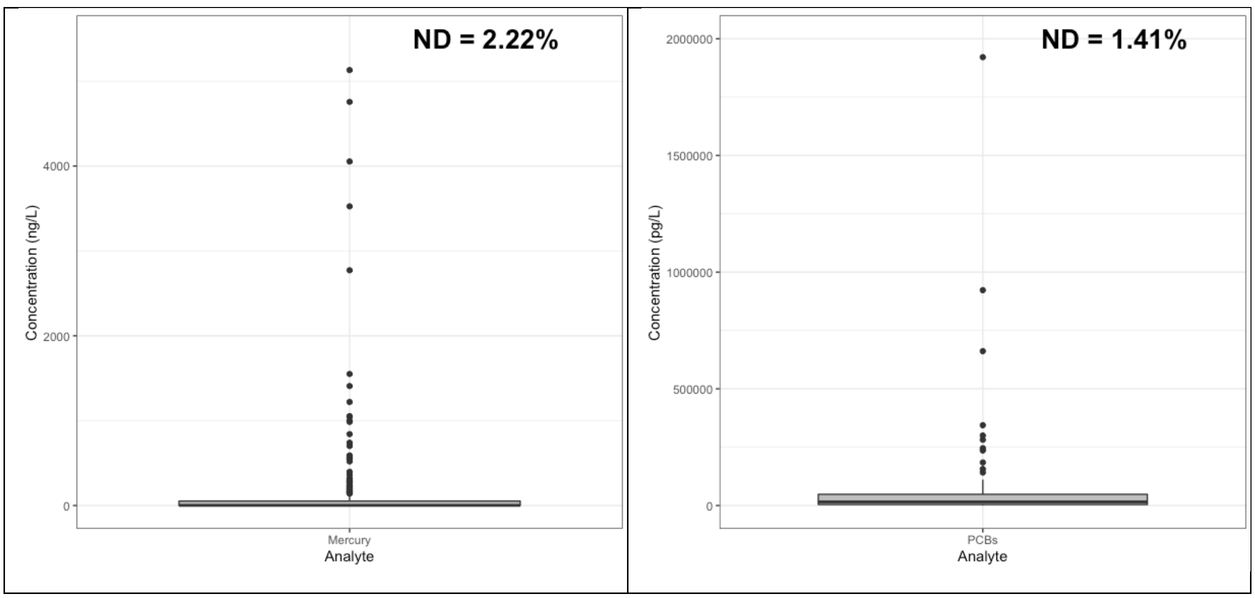

Figure A-2. Box plots generated from 4-county CEDEN data (2010-2021) for total fraction mercury (left) and sum of RMP 40 PCBs (right). The Basin Plan WQO for mercury is 0.025 ug/L (25 ng/L) and the CTR water quality criteria for PCBs for human health is 0.00017 ug/L (170 pg/L).

Selenium. Data were available for total selenium (n=63) and dissolved selenium (n=66). These data were collected from creeks throughout the Bay Area as part of RMP STLS monitoring (n=36 total, n=36 dissolved), SWAMP studies (n=7 total, n=28 dissolved), and Lehigh Permanente special studies (n=20 total, n=2 dissolved). Selenium data were compared to criteria from the National Toxics Rule (NTR) which are listed in the CTR (Figure A-3). While no samples had selenium concentrations exceeding the acute criterion, 11 of 63 total selenium results and two of 66 dissolved selenium results exceeded the chronic criterion, which is for the total recoverable fraction. All of the samples with exceedances were collected from Permanente Creek which has been identified as impaired for selenium and is being investigated by the

Lehigh Permanente Quarry through its NPDES permit. Because selenium does not exceed criteria elsewhere in the regional dataset, it will not be included in the RWL monitoring program.

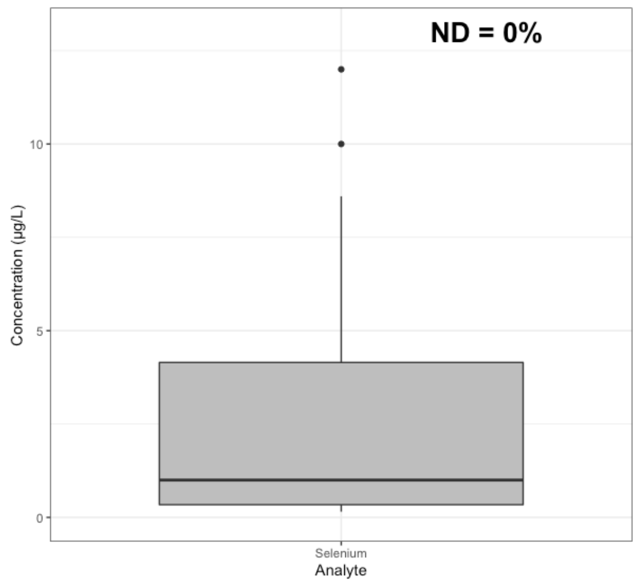

Figure A-3. Box plots generated from 4-county CEDEN data (2010-2021) for total fraction selenium. The Basin Plan WQO for selenium is 5 ug/L; all datapoints above the WQO are associated with Permanente Creek monitoring.

Pesticides. Pesticide data were available for fipronil and its degradates (n=13), pyrethroids (n=12 to 68 depending on constituent), carbaryl (n=33), chlorpyrifos (n=11), dicamba (n=18), imidacloprid (n=30), indoxacarb (n=10), malathion (n=10), and oxadiazon (n=10). There are no promulgated numeric criteria for pesticides in the CTR or WQOs in the Basin Plan except for chlorpyrifos and malathion. For the two pesticides with relevant criteria, malathion and chlorpyrifos, analytical results for Bay Area sampling efforts largely generated non-detects. For malathion, eight of ten samples collected by DPR over the study period were reported as NDs, with consistent MDLs of 0.001 and RLs of 0.02 ug/L associated with each analysis. For chlorpyrifos, each of the eleven samples collected by DPR and STLS resulted in NDs, with ten of the eleven samples exhibiting reporting limits below the 0.041 ug/L CCC.

However, pesticide-related toxicity is a known concern in Bay Area urban creeks. As such, a Water Quality Attainment Strategy and TMDL for Diazinon and Pesticide-related Toxicity in Urban Creeks was established by the SFBRWQCB. This comprehensive program is enforced through MRP Provision C.9 (Pesticides and Toxicity Control) and covers all existing and future issues related to pesticides in creeks. Furthermore, many pesticides (e.g., pyrethroids, imidacloprid, fipronil) are being monitored in receiving water (along with toxicity endpoints for several organisms) in dry and wet weather by the stormwater Programs as required by MRP Provision C.8.g (Pesticides and Toxicity) monitoring. Therefore, pesticides will not be included in the RWL monitoring program.

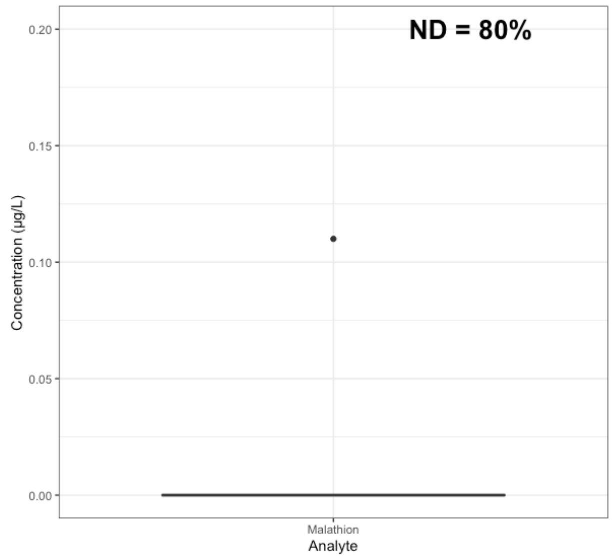

Figure A-4. Box plot generated from 4-county CEDEN data (2010-2021) for total fraction malathion. EPA Aquatic Life Criteria CCC for malathion is 0.1 ug/L.

PAHs. The regional dataset contains 846 data points in the PAH group. Data were available for 28 individual PAHs (n=16 to 34 depending on PAH), 16 of which have CTR objectives for human consumption of organisms. Maximum concentrations for these 16 PAHs were compared to the CTR objectives. Seven individual PAHs exceeded the CTR criteria: benzo(a)anthracene (9 of 34), benzo(a)pyrene (14 of 34), benzo(b)fluoranthene (17 of 34), benzo(k)fluoranthene (9 of 17), chrysene (18 of 34), dibenzo(a,h)anthracene (1 of 34), indeno(1,2,3-cd)pyrene) (13 of 34). These samples were collected at five stations throughout the counties of Alameda, Contra Costa, San Mateo, and Santa Clara as part of RMP STLS monitoring in Water Years 2011 through 2014. All samples with PAH concentrations that exceeded the CTR criteria were QA flagged as having some blank contamination with no blank correction (QA Code: NBC). Furthermore, all of the sample batches associated with these samples were flagged by the QA officer as having cursory verification/validation and minor deviations (VLC, VMD), some were also flagged as having incomplete QA (VQI), and some had "accuracy issues" noted in the Batch Comments. Finally, all results were reported without associated reporting limits (QA Code: NRL). Although the data were not rejected by the laboratory or QA officer, these issues suggest that there is uncertainty associated with these data. Therefore, inclusion of PAHs in the RWL monitoring program is not supported by these data. However, one or two annual sediment samples (depending on the Program population) will be analyzed for total PAHs per MRP Provision C.8.g (Pesticides and Toxicity Monitoring).

Nutrients. The regional dataset contains nutrient data for ammonia as N (n=778), nitrate as N (n=503), nitrite as N (n=494), total Kjeldahl nitrogen (n=689), orthophosphate as P (n=228) and phosphorus as P (n=860). There are currently no promulgated freshwater aquatic life WQOs against which to compare these data. Most of the nutrient data were collected synoptically with bioassessment monitoring conducted by the stormwater Programs and SWAMP, typically in the months of April, May and June. In addition, some of the nutrient data (over 250 records) were collected as part of MRP Provision C.8.f (POC) monitoring during the previous MRP permit term (i.e., MRP 2.0). Nutrients were included with MRP 2.0 POC monitoring to support SFBRWQCB efforts to develop nutrient numeric endpoints (NNE) for the San Francisco Bay Estuary, and prior data collected in freshwater tributaries to San Francisco Bay were used by the Nutrient Strategy Technical Team to develop and calibrate nutrient loading models. The "San Francisco Bay Nutrient Management Strategy" (NMS) is part of a statewide initiative to address nutrient over-enrichment in State waters (RWQCB 2022 and Senn et al. 2014). The NMS focuses on nutrient impacts to the estuarine San Francisco Bay and is a separate program from the State Biostimulatory Substances Objective and Program to Implement Biological Integrity. This latter program is contemplating the development of statewide nutrient-related WQOs for the protection of aquatic life in freshwater receiving waters. Although the State Biostimulatory Substances Objective and Program to Implement Biological Integrity has not yet published draft WQOs for public review, the supporting science products are evaluating relationships between measures of biological integrity (e.g., California Stream Condition Index) and biostimulatory variables such as total nitrogen (TN) and total phosphorus (TP). Therefore, TN and TP should be included in RWL monitoring with results compared to WQOs developed through the State Biostimulatory Substances Objective program.

Unionized ammonia data were not available on CEDEN and therefore not evaluated as part of the data review. However, the constituents necessary to calculate unionized ammonia should be included in RWL monitoring (i.e., ammonia and field measurements of temperature, pH, specific conductance) per Regional Water Board staff recommendations (Richard Looker, RWQCB, personal communication).

PBDEs. The regional dataset includes result for 42 individual PBDEs from 24 samples which were collected as part of RMP STLS monitoring in Water Years 2011 through 2014. There are no freshwater aquatic life WQOs against which to compare these data. PBDEs are a group of flame retardant additives used in thermoplastics, polyurethane foam, and textiles. They have been studied extensively as part of the RMP Emerging Contaminants Workgroup (ECWG), which lists them as "low concern" due to decreasing concentrations in Bay wildlife and sediment over time, and declining sources due to their phase out (Miller et al. 2020). Because PBDEs are already included in the RMP ECWG and Status and Trends monitoring programs they will not be included in the RWL monitoring program.

ANALYTES FOR RWL MONITORING

Based on the analysis of readily available data collected over the last decade in Bay Area creeks and channels (i.e., receiving waters), the following analytes will be included in the RWL monitoring program:

- *E. coli* – applicable FIB, as required by MRP Provision C.8.f.
- Dissolved copper – required by MRP Provision C.8.f.
- Dissolved zinc - required by MRP Provision C.8.f.

- Dissolved lead – based on the comparison of data to SF Bay Basin Plan WQOs.
- Hardness – ancillary parameter to calculate site-specific metals WQOs.
- Total Mercury – based on the comparison of data to SF Bay Basin Plan WQOs.
- PCBs (RMP 40) – based on the comparison of data to CTR criteria
- Total Phosphorus – based on anticipation of new statewide criteria.
- Total Nitrogen – based on anticipation of new statewide criteria.
- Unionized Ammonia – based on Regional Water Board staff recommendations.
- Ammonia, pH, specific conductance, temperature – ancillary parameters to calculate Unionized ammonia.
- Pesticides as required by provision C.8.g:
    - Pyrethroids: bifenthrin, cyfluthrin, cypermethrin, deltamethrin, esfenvalerate, lambda-cyhalothrin, permethrin;
    - Imidacloprid; and
    - Fipronil and its degradates fipronil-sulfone, fipronil-desulfinyl, fipronil sulfide and fipronil amide (amide is optional – do it if lab offers the suite).
- Toxicity as required by provision C.8.g.

REFERENCES

Miller, E., Mendez, M., Shimabuku, Il, Buzby, N. and Sutton, R. (2020). Contaminants of Emerging Concern in San Francisco Bay: A Strategy for Future Investigations. 2020 Update. Contribution No. 1007.

RWQCB. (2022). San Francisco Bay Nutrient Management Strategy. Website accessed November 17, 2022.

RWQCB. (2019). San Francisco Bay Basin (Region 2) Water Quality Control Plan (Basin Plan). Website accessed November 21, 2022.

Senn, D.B. and Novick, E., (2014). Scientific Foundation for the San Francisco Bay Nutrient Management Strategy. Draft FINAL. October 2014.

APPENDIX B
Field Datasheets

Receiving Water Limitations Monitoring
Field Data Log Sheet

GENERAL INFORMATION:

Site ID: | Site Name:

Field Personnel: | Stormwater Consultant:

Arrival Date: | Arrival Time: | Departure Time:

Purpose of visit: ☐ Site Inspection ☐ Wet Season Sampling ☐ Dry Season Sampling

Antecedent Dry Period: ☐ 0-12 hrs ☐ 12-24 hrs ☐ 24-36 hrs ☐ 36-48 hrs ☐ 48-72 hrs ☐ >72 hrs

SAMPLE LOCATION & TYPE DETAILS:

Position Coordinates: | Latitude: | Longitude:

Collection Location: ☐ Right Bank ☐ Left Bank ☐ Center of Flow ☐ Other____________________

Collection Depth: ☐ Near Surface ☐ Mid Water ☐ Near Bottom ☐ Depth Integrated ☐ Other__________

Collection Method: ☐ Manual Grab by Hand ☐ Manual with Grab Pole ☐ Isokinetic Sampler

SAMPLES COLLECTED (check all that apply and record time of collection):

☐ Copper, Lead, Zinc (Dissolved) Time: __________ ☐ Hardness Time: __________

☐ Mercury (Total) Time: __________ ☐ PCB Congeners Time: __________

☐ *E. coli* Time: __________ ☐ TKN Time: __________

☐ Nitrate Time: __________ ☐ Nitrite Time: __________

☐ Ammonia Time: __________ ☐ Total Phosphorus Time: __________

FIELD QA/QC SAMPLES COLLECTED (check all that apply):

☐ Field duplicate (analytes and time of collection) ____________________

☐ MS/MSD (analytes and time of collection) ____________________

☐ Field blank (analytes and time of collection) ____________________

FIELD MEASUREMENTS:

Staff Plate Reading (if present): __________ ft Time of reading: __________

If staff plate not present, provide estimate of flow rate or qualitative description:____________________

____

pH ________ Temperature ________ Specific Conductance: ________ Time of measurements ________

Duplicate pH ______ Duplicate Temp. ______ Duplicate Specific Cond.______ Time of duplicates________

STANDARD OBSERVATIONS:

Rainfall: ☐ None ☐ Intermittent ☐ Light ☐ Moderate ☐ Heavy

Oil: ☐No ☐Yes (extent)____________ Floating material ☐No ☐Yes (type) ____________

Odor: ☐No ☐Yes __________ Turbidity ☐No ☐Yes __________ Color ☐No ☐Yes __________

Other observations (wildlife, construction, recreational activity)

____

Photos taken: ☐ Sampling Point ☐ Upstream ☐ Downstream ☐ Other ____________________

COMMENTS / SAMPLING NOTES:

SWAMP Field Data Sheet (Water Chemistry & Discrete Probe) - EventType=WQ			Entered in d-base (initial/date)	Pg of Pgs
*StationID: __ __ __ __ __ __ __ __ __ __	*Date (mm/dd/yyyy):	/ /	*Group:	*Agency:
Funding: __ __ __ __ __ __ __ __	ArrivalTime:	DepartureTime:	*SampleTime (1st sample):	*Protocol:
*ProjectCode:	*Personnel:		*Purpose (circle applicable): WaterChem WaterTox Habitat FieldMeas	*PurposeFailure:

*Location: Bank Thalweg Midchannel OpenWater		*GPS/DGPS	Lat (dd.ddddd)	Long (ddd.ddddd)	OCCUPATION METHOD: Walk-in Bridge R/V __________ Other
GPS Device:		Target:		-	STARTING BANK (facing downstream): LB / RB / NA
Datum: NAD83	Accuracy (ft / m):	*Actual:		-	Point of Sample (if Integrated, then -88 in dbase)

Habitat Observations (CollectionMethod = Habitat_generic)

SITE ODOR:	None,Sulfides,Sewage,Petroleum,Smoke,Other_______	WADEABILITY: Y / N / Unk	BEAUFORT SCALE (see attachment):	DISTANCE FROM BANK (m):	STREAM WIDTH (m): / WATER DEPTH (m):
SKY CODE:	Clear, Partly Cloudy, Overcast, Fog, Smoky, Hazy	WIND DIRECTION (from):		HYDROMODIFICATION: None, Bridge, Pipes, ConcreteChannel, GradeControl, Culvert, AerialZipline, Other LOCATION (to sample): US / DS / WI / NA	
OTHER PRESENCE:	Vascular,Nonvascular,OilySheen,Foam,Trash,Other______			PHOTOS (RB & LB assigned when facing downstream; RENAME to StationCode_yyyy_mm_dd_uniquecode):	1: (RB / LB / BB / US / DS / ##)
DOMINANT SUBSTRATE:	Bedrock, Concrete, Cobble, Boulder, Gravel, Sand, Mud, Unk, Other_________				
WATERCLARITY:	Clear (see bottom), Cloudy (>4" vis), Murky (<4" vis)	PRECIPITATION:	None, Fog, Drizzle, Rain, Snow		2: (RB / LB / BB / US / DS / ##)
WATERODOR:	None, Sulfides, Sewage, Petroleum, Mixed, Other____	PRECIPITATION (last 24 hrs):	Unknown, <1", >1", None		
WATERCOLOR:	Colorless, Green, Yellow, Brown	EVIDENCE OF FIRES:	No, <1 year, <5 years		3: (RB / LB / BB / US / DS / ##)
OVERLAND RUNOFF (Last 24 hrs):	none, light, moderate / heavy, unknown				
OBSERVED FLOW:	NA, Dry Waterbody Bed, No Obs Flow, Isolated Pool, Trickle (<0.1cfs), 0.1-1cfs, 1-5cfs, 5-20cfs, 20-50cfs, 50-200cfs, >200cfs				

Field Measurements (SampleType = FieldMeasure; Method = Field)

	DepthCollec (m)	Velocity (fps)	Air Temp (°C)	Water Temp (°C)	pH	O2 (mg/L)	O2 (%)	Specific Conductivity (uS/cm)	Salinity (ppt)	Turbidity (ntu)			
SUBSURF/MID/ BOTTOM/REP													
SUBSURF/MID/ BOTTOM/REP													
SUBSURF/MID/ BOTTOM/REP													
Instrument:													
Calib. Date:													

Samples Taken (# of containers filled) - Method=Water_Grab

Field Dup YES / NO: (SampleType = Grab / Integrated; LABEL_ID = FieldQA; create collection record upon data entry

SAMPLE TYPE: Grab / Integrated | COLLECTION DEVICE: | Indiv bottle (by hand, by pole, by bucket); Teflon tubing; Kemmer; Pole & Beaker; Other ___________________

	DepthCollec (m)	Inorganics	Bacteria	Chl a	TSS / SSC	TOC / DOC	Total Hg	Dissolved Mercury	Total Metals	Dissolved Metals	Organics	Toxicity	VOAs
Sub/Surface													
Sub/Surface													

COMMENTS:

Attachment 2

Letter Describing Approach to Monitoring of Emerging Contaminants

C/CAG

CITY/COUNTY ASSOCIATION OF GOVERNMENTS
OF SAN MATEO COUNTY

Atherton • Belmont • Brisbane • Burlingame • Colma • Daly City • East Palo Alto • Foster City • Half Moon Bay • Hillsborough • Menlo Park • Millbrae • Pacifica • Portola Valley • Redwood City • San Bruno • San Carlos • San Mateo • San Mateo County •South San Francisco • Woodside

March 31, 2023

Ms. Eileen White
Executive Officer
San Francisco Bay Region
Regional Water Quality Control Board
1515 Clay Street, Suite 1400
Oakland, CA 94612

Subject: Regional Stormwater Monitoring Strategy for Emerging Contaminants

Dear Ms. White:

This letter transmits the regional stormwater monitoring strategy for emerging contaminants in compliance with provision C.8.f.ii of the Municipal Regional Permit for Stormwater (MRP 3.0), NPDES Permit No. CAS612008 (Order No. R2-2022-0018), on behalf of Permittees that participate in the San Mateo Countywide Stormwater Pollution Prevention Program (SMCWPPP), a program of the San Mateo County City/County Association of Governments (C/CAG). Provision C.8.f.ii. (Table 8.2, footnote c) of the MRP states that:

> *Permittees, collectively, shall produce or cause to be produced a stormwater monitoring strategy for emerging contaminants (ECs) by April 1, 2023 that prioritizes ECs for stormwater monitoring listed in this table and possibly others and establishes an approach for sampling stormwater ECs based on specific or likely physico-chemical properties, sources, transport pathways, and fate of prioritized ECs. Permittees must conduct or cause to be conducted ECs stormwater monitoring to execute the ECs stormwater monitoring strategy at a level of effort indicated in the table. This level of effort can be satisfied either through sampling and analysis of the number of samples indicated in this table or through augmentation of the San Francisco Bay Regional Monitoring Program Emerging Contaminants Monitoring Strategy in the amount of $100,000 per year for all Permittees combined.*

The stormwater portion of the RMP's EC Monitoring Strategy is currently under development and builds upon a stormwater EC screening study conducted from 2018 through 2023 and ongoing watershed hydrology, sediment, and pollutant loads modeling. The stormwater portion of the RMP's EC Monitoring Strategy is scheduled for completion in late 2023 and will be implemented during the term of MRP 3.0 through the RMP. This portion of the RMP's EC Monitoring Strategy includes both watershed/stormwater modeling and monitoring tasks to address high priority management questions established collaboratively through the RMP and consistent with those included in MRP 3.0.

As discussed at C/CAG's Stormwater Committee, San Mateo County Permittees have agreed to satisfy this MRP 3.0 requirement by annually contributing their equitable share of $100,000 to augment the San Francisco Bay Regional Monitoring Program (RMP) EC Monitoring Strategy[1] (see Table 1). San Mateo County Permittees annual contributions will be made through SMCWPPP.

Table 1. Contributions that MRP Permittees have agreed to make annually to augment the RMP's Emerging Contaminant Monitoring Strategy during the term of the permit.

Permittee Group	Annual Contribution	Relative Percentage[2]
Alameda County Permittees	$30,923	30.92%
Contra Costa County Permittees	$21,649	21.65%
Santa Clara County Permittees	$33,489	33.49%
San Mateo County Permittees	*$13,939*	*13.94%*
Total	**$100,000**	**100%**

San Mateo County Permittees look forward to continuing to participate in the RMP and the development and implementation of the stormwater portion of the EC Monitoring Strategy. Please contact me if you have any comments or questions.

Very truly yours,

Reid Bogert
Senior Stormwater Program Specialist

cc: C/CAG Stormwater Committee Members
Dr. Thomas Mumley, Assistant Executive Officer, SF Bay Regional Water Board
Dr. Jay Davis, SF Bay RMP Lead Scientist, San Francisco Estuary Institute

[1] https://www.sfei.org/sites/default/files/biblio_files/CEC%20Strategy%20-%202020%20Update%20-%20Final_92320.pdf
[2] Relative percentages are based on the populations within the MRP-associated portions of each county at the start of MRP 3.0 (Department of Finance, January 2022).

Attachment 3

WY 2022 Quality Assurance / Quality Control Report

Pollutants of Concern Monitoring Quality Assurance/Quality Control Report, WY 2022

1.0 INTRODUCTION

The San Mateo Countywide Pollution Prevention Program (SMCWPPP) conducted Pollutants of Concern (POC) Monitoring in Water Year (WY) 2022 to comply with provision C.8.f. (Pollutants of Concern Monitoring) of the National Pollutant Discharge Elimination System Program (NPDES) Municipal Regional Permit for the San Francisco Bay Area (i.e., MRP; Order No. R2-2022-0018). In WY 2022, POC monitoring included sampling and analysis for polychlorinated biphenyls (PCBs) and total mercury. This report summarizes the Quality Assurance/Quality Control (QA/QC) procedures and results for this monitoring effort.

The SMCWPPP POC monitoring program utilizes the Clean Watersheds for Clean Bay Project (CW4CB) Quality Assurance Project Plan (QAPP; BASMAA 2013) as a basis for PCBs and mercury QA/QC procedures. Data are assessed for seven data quality attributes: (1) Representativeness, (2) Comparability, (3) Completeness, (4) Sensitivity, (5) Contamination, (6) Accuracy, and (7) Precision. These seven attributes are compared to Data Quality Objectives (DQOs), which were established to ensure that data collected are of adequate quality and sufficient for the intended uses. DQOs address both quantitative and qualitative assessment of the acceptability of data – representativeness and comparability are qualitative while completeness, sensitivity, precision, accuracy, and contamination are quantitative assessments. Specific DQOs are based on Measurement Quality Objectives (MQOs) for each analyte. The MQOs for PCBs and mercury are summarized in Table 1.

Table 1. Measurement quality objectives for analytes in sediment from CW4CB QAPP (BASMAA 2013).

Sample	Mercury	PCBs
Laboratory Blank	< Reporting Limit	< Reporting Limit
Reference Material Recovery (Laboratory Control Sample)	75-125%	50-150%
Matrix Spike Recovery	75-125%	50-150%
Duplicates [1] (Matrix Spike, Field, and Laboratory)	RPD < 25%	RPD < 25%[2]
Reporting Limit	30 µg/kg 0.03 mg/kg 30,000 ng/kg	0.2 µg/kg 0.0002 mg/kg 200 ng/kg

RPD = Relative Percent Difference

[1] N/A if native concentration for either sample is less than the reporting limit

[2] Only applicable for matrix spike duplicates. Method specific for field and laboratory duplicates

Overall, the results of the QA/QC review suggest that the data generated during WY 2022 POC monitoring were of sufficient quality for this program. While some data were flagged in the project database based on the MQOs and DQOs identified in the QAPPs, none of the data were rejected. Further details regarding the QA/QC review are provided in the sections below.

2.0 REPRESENTATIVENESS

Data representativeness assesses whether the data were collected in a manner that represents actual conditions at each monitoring location. For this project, all samples were assumed to be representative if they were collected and analyzed according to protocols specified in the CW4CB QAPP. Field and laboratory personnel received and reviewed the QAPPs and followed prescribed protocols including laboratory methods.

3.0 COMPARABILITY

The QA/QC officer ensures that the data may be reasonably compared to data from other programs producing similar types of data. For POC monitoring, individual stormwater programs strive to maintain comparability within the RMC. The key measure of comparability for all RMC data is the California Surface Water Ambient Monitoring Program.

Electronic data deliverables (EDDs) were submitted to the San Francisco Bay Regional Water Quality Control Board (SFRWQCB) in Microsoft Excel templates developed by their Surface Water Ambient Monitoring Program (SWAMP), to ensure data comparability with SWAMP. In addition, data entry followed SWAMP documentation specific to each data type, including the exclusion of qualitative values that do not appear on SWAMP's lookup lists.[15] Completed templates were reviewed using SWAMP's online data checker[16], further ensuring SWAMP-comparability.

All WY 2022 data were considered comparable to SWAMP data and other RMC data.

4.0 COMPLETENESS

Completeness is the degree to which all data were produced as planned; this covers both sample collection and analysis. An overall completeness of greater than 90% is considered acceptable for RMC chemical data and field measurements.

During WY 2022, SMCWPPP collected 100% of planned samples; eight sediment samples and one field duplicate were collected and analyzed for PCBs and mercury.

5.0 SENSITIVITY

Sensitivity analysis determines whether the methods can identify and/or quantify results at low enough levels. This data quality attribute is evaluated via the assessment of reporting limits (RLs). The majority of RLs for sediment samples analyzed for PCB congeners exceeded the CW4CB RL target of 200 ng/kg (0.2 ug/kg), while 61 samples met the target RL. Most of the samples that exceeded the target RL were due to dilutions that were necessary for high concentrations of certain PCB congeners.

[15] Look up lists available online at https://swamp.waterboards.ca.gov/swamp_checker/LookUpLists.aspx
[16] Checker available online at https://swamp.waterboards.ca.gov/swamp_checker/SWAMPUpload.aspx

The target RL for mercury (0.03 mg/kg) was exceeded for all eight samples. Since the MDL was less than the target RL, and none of the samples have detected concentrations between the MDL and RL (i.e., detected but not quantified; EPA "J" flag), the mercury samples were not affected by the lack of sensitivity in the analytical method.

6.0 CONTAMINATION

For chemical data, contamination is assessed as the presence of analytical constituents in blank samples. Several laboratory blanks were analyzed during sediment analysis for mercury and PCBs, and all were non-detect, indicating that there was no contamination present.

7.0 ACCURACY

Accuracy is assessed as the percent recovery of samples spiked with a known amount of a specific chemical constituent. The analytical laboratory evaluated and reported the Percent Recovery (PR) of Laboratory Control Samples (LCS; in lieu of reference materials)/Laboratory Control Sample Duplicates (LCSD) and Matrix Spikes (MS)/Matrix Spike Duplicates (MSD), which were recalculated and compared to the target ranges in the CW4CB QAPP. If a QA sample did not meet MQOs, all samples in that batch for that analyte were flagged.

The analytical laboratory ran several LCS/LCSD and MS/MSD pairs for the mercury and individual PCB congeners. Most LCS/LCSD and MS/MSD samples met their corresponding MQOs except for two MS samples – PCB 180 and PCB 201. The samples associated with these exceedances were flagged accordingly.

8.0 PRECISION

Precision is the repeatability of a measurement and is quantified by the Relative Percent Difference (RPD) of two duplicate samples. Three measures of precision were used for this project – matrix spike duplicates, laboratory duplicates, and field duplicates. The MQO for RPD specified by the CW4CB QAPP is <25%.

As previously noted, the laboratory analyzed several LCS/LCSD and MS/MSD for mercury and PCBs. All sample pairs were below the MQO.

One field duplicate was collected in WY 2022 for PCBs and mercury. The RPD for the mercury sample was 31% and exceeded the MOQ. Several PCB congeners were not detected or detected at concentrations below the reporting limit and the RPD could not be calculated. For the detected PCB congeners, the field duplicate exceeded the RPD MQO for 13 of 14 detected congeners. The RPDs for the detected congeners is shown in Table 2. Given the inherent variability associated with sediment sample field duplicates, the number of analytes with RPDs outside of the MQO limits is expected to be high. The method used to collect sediment field duplicates provides more insight to laboratory precision than precision of field methods.

Table 2. Relative percent differences for detected[a] PCB congeners in field duplicates collected at site SM-SSF-01-X during WY 2022 sediment sampling.

Congener	Sample (ug/kg)	Duplicate (ug/kg)	Relative Percent Difference[b]
PCB 087	1.1	1.6	37%
PCB 095	1.4	1.5	7%
PCB 099	0.62	1.1	56%
PCB 101	2.4	3.1	25%
PCB 110	2.4	4.2	54%
PCB 118	2.5	4.2	51%
PCB 132/153	2.5	3.7	39%
PCB 138/158	4.3	6.5	41%
PCB 149	2.1	3.1	38%
PCB 170	0.79	1.5	62%
PCB 174	0.68	0.87	24%
PCB 177	0.66	<0.10	NA
PCB 180	1.8	2.9	47%
PCB 183	0.46	0.74	47%
PCB 187	0.7	1.7	83%

[a]Congeners are not shown if both the sample and field duplicate are non-detect.

[b]Relative percent difference cannot be calculated if either the sample or the field duplicate are non-detect.

9.0 REFERENCES

Bay Area Stormwater Management Agency Association (BASMAA). 2013. Quality Assurance Project Plan. Clean Watersheds for a Clean Bay – Implementing the San Francisco Bay's PCB and Mercury TMDL with a Focus on Urban Runoff. Revision Number 1. EPA San Francisco Bay Water Quality Improvement Fund Grant # CFDA 66.202. Prepared for Bay Area Stormwater Management Agencies Association (BASMAA) by Applied Marine Sciences (AMS). August 2013.

SFBRWQCB (San Francisco Bay Regional Water Quality Control Board). 2022. Municipal Regional Stormwater NPDES Permit. Order R2-2022-0018, NPDES Permit No. CAS612008. May. 724 pp.

Surface Water Ambient Monitoring Program (SWAMP). 2022. Surface Water Ambient Monitoring Program Quality Assurance Program Plan. Version 2.0. January. 152 pp.

Attachment 4

Results of Monitoring San Mateo County Stormwater Runoff for PCBs and Mercury

Site Name (RMP Site Name in Parentheses)	Permittee	Sample Type	Latitude	Longitude	Water Year	Sample Date	SSC (mg/L)	Total PCBs (ng/L)	Total PCBs (ng/g)	Total Hg (ng/L)	Total Hg (ng/g)
RMP STLS Stormwater Runoff Samples											
Borel Creek		Receiving Water			WY 2011	2/16/2011	239	3.41	14.3	--	--
SM-SCS-210A (Pulgas Creek PS S)	San Carlos	MS4	37.50456	-122.24898	WY 2011	2/17/2011	49.7	19.1	384	--	--
SM-SCS-210A (Pulgas Creek PS S)	San Carlos	MS4	37.50456	-122.24898	WY 2011	2/17/2011	42.3	53.9	1,273	--	--
SM-SCS-31A (Pulgas Creek PS N)	San Carlos	MS4	37.50462	-122.24905	WY 2011	2/17/2011	105	43.3	411	--	--
SM-SCS-31A (Pulgas Creek PS N)	San Carlos	MS4	37.50462	-122.24905	WY 2011	2/17/2011	83.6	46.9	561	--	--
SM-SCS-210A (Pulgas Creek PS S)	San Carlos	MS4	37.50456	-122.24898	WY 2011	3/18/2011	24.7	21.9	884	--	--
SM-SCS-210A (Pulgas Creek PS S)	San Carlos	MS4	37.50456	-122.24898	WY 2011	3/18/2011	17.4	31.0	1,782	--	--
SM-SCS-31A (Pulgas Creek PS N)	San Carlos	MS4	37.50462	-122.24905	WY 2011	3/18/2011	31.0	66.6	2,148	--	--
SM-SCS-31A (Pulgas Creek PS N)	San Carlos	MS4	37.50462	-122.24905	WY 2011	3/18/2011	50.3	84.5	1,681	--	--
Belmont Creek		Receiving Water			WY 2011	3/18/2011	148	2.83	19.1	--	--
Belmont Creek		Receiving Water			WY 2011	3/18/2011	209	3.06	14.6	--	--
Belmont Creek		Receiving Water			WY 2011	3/18/2011	448	4.91	10.9	--	--
Borel Creek		Receiving Water			WY 2011	3/18/2011	372	6.30	16.9	--	--
Borel Creek		Receiving Water			WY 2011	3/18/2011	628	8.67	13.8	--	--
SM-SCS-210A (Pulgas Creek PS S)	San Carlos	MS4	37.50456	-122.24898	WY 2013	3/6/2013	7.09	15.1	2,125	--	--
SM-SCS-210A (Pulgas Creek PS S)	San Carlos	MS4	37.50456	-122.24898	WY 2013	3/6/2013	30.8	28.5	925	--	--
SM-SCS-210A (Pulgas Creek PS S)	San Carlos	MS4	37.50456	-122.24898	WY 2013	3/6/2013	40.1	32.5	809	--	--
SM-SCS-210A (Pulgas Creek PS S)	San Carlos	MS4	37.50456	-122.24898	WY 2013	3/6/2013	61.2	62.7	1,025	--	--
SM-SCS-210A (Pulgas Creek PS S)	San Carlos	MS4	37.50456	-122.24898	WY 2014	11/19/2013	22.5	467	20,733	--	--
SM-SCS-210A (Pulgas Creek PS S)	San Carlos	MS4	37.50456	-122.24898	WY 2014	11/19/2013	47.3	731	15,447	--	--
SM-SCS-210A (Pulgas Creek PS S)	San Carlos	MS4	37.50456	-122.24898	WY 2014	11/19/2013	277	4,084	14,744	--	--
SM-SCS-210A (Pulgas Creek PS S)	San Carlos	MS4	37.50456	-122.24898	WY 2014	11/19/2013	179	6,669	37,363	--	--
SM-SCS-210A (Pulgas Creek PS S)	San Carlos	MS4	37.50456	-122.24898	WY 2014	2/6/2014	10.1	35.3	3,493	--	--
SM-SCS-210A (Pulgas Creek PS S)	San Carlos	MS4	37.50456	-122.24898	WY 2014	2/6/2014	33.0	50.1	1,519	--	--
SM-SCS-210A (Pulgas Creek PS S)	San Carlos	MS4	37.50456	-122.24898	WY 2014	2/6/2014	65.0	64.1	987	--	--
SM-SCS-210A (Pulgas Creek PS S)	San Carlos	MS4	37.50456	-122.24898	WY 2014	2/6/2014	32.0	143	4,481	--	--
SM-SCS-210A (Pulgas Creek PS S)	San Carlos	MS4	37.50456	-122.24898	WY 2014	2/6/2014	50.9	211	4,153	--	--
SM-SCS-210A (Pulgas Creek PS S)	San Carlos	MS4	37.50456	-122.24898	WY 2014	2/8/2014	27.0	25.1	931	--	--
SM-SCS-210A (Pulgas Creek PS S)	San Carlos	MS4	37.50456	-122.24898	WY 2014	2/8/2014	42.0	29.1	692	--	--
SM-SCS-210A (Pulgas Creek PS S)	San Carlos	MS4	37.50456	-122.24898	WY 2014	2/8/2014	29.0	35.4	1,221	--	--
SM-SCS-210A (Pulgas Creek PS S)	San Carlos	MS4	37.50456	-122.24898	WY 2014	2/8/2014	14.0	37.4	2,672	--	--
SM-SCS-210A (Pulgas Creek PS S)	San Carlos	MS4	37.50456	-122.24898	WY 2014	2/26/2014	43.6	48.3	1,108	--	--
SM-SCS-210A (Pulgas Creek PS S)	San Carlos	MS4	37.50456	-122.24898	WY 2014	2/26/2014	27.0	69.5	2,574	--	--
SM-SCS-210A (Pulgas Creek PS S)	San Carlos	MS4	37.50456	-122.24898	WY 2014	2/26/2014	91.4	172	1,886	--	--

Site Name (RMP Site Name in Parentheses)	Permittee	Sample Type	Latitude	Longitude	Water Year	Sample Date	SSC (mg/L)	Total PCBs (ng/L)	Total PCBs (ng/g)	Total Hg (ng/L)	Total Hg (ng/g)
SM-SCS-210A (Pulgas Creek PS S)	San Carlos	MS4	37.50456	-122.24898	WY 2014	2/26/2014	131	660	5,057	--	--
SM-SCS-210A (Pulgas Creek PS S)	San Carlos	MS4	37.50456	-122.24898	WY 2014	3/26/2014	42.0	61.6	1,467	--	--
SM-SCS-210A (Pulgas Creek PS S)	San Carlos	MS4	37.50456	-122.24898	WY 2014	3/26/2014	38.2	63.0	1,648	--	--
SM-SCS-210A (Pulgas Creek PS S)	San Carlos	MS4	37.50456	-122.24898	WY 2014	3/26/2014	23.7	74.2	3,125	--	--
SM-SCS-210A (Pulgas Creek PS S)	San Carlos	MS4	37.50456	-122.24898	WY 2014	3/26/2014	120	505	4,196	--	--
SM-SCS-210A (Pulgas Creek PS S)	San Carlos	MS4	37.50456	-122.24898	WY 2014	3/31/2014	84.8	16.9	200	--	--
SM-SCS-210A (Pulgas Creek PS S)	San Carlos	MS4	37.50456	-122.24898	WY 2014	3/31/2014	21.6	28.5	1,318	--	--
SM-SCS-210A (Pulgas Creek PS S)	San Carlos	MS4	37.50456	-122.24898	WY 2014	3/31/2014	31.2	85.5	2,741	--	--
SM-SCS-210A (Pulgas Creek PS S)	San Carlos	MS4	37.50456	-122.24898	WY 2014	3/31/2014	41.8	151	3,616	--	--
SM-RCY-267A (Oddstad PS)	Redwood City	MS4	37.49172	-122.21886	WY 2015	12/2/2014	148	9.20	62.4	54.8	372
SM-RCY-337A (Veterans PS)	Redwood City	MS4	37.49723	-122.23693	WY 2015	12/15/2014	29.2	3.52	121	13.7	469
SM-EPA-70A (Runnymede Ditch)	East Palo Alto	MS4	37.46883	-122.12701	WY 2015	2/6/2015	265	28.55	108	51.5	194
SM-EPA-72A (SD near Cooley Landing)	East Palo Alto	MS4	37.47492	-122.12640	WY 2015	2/6/2015	82.0	6.47	78.9	35.0	427
SM-SSF-306A (South Linden PS)	South San Francisco	MS4	37.65017	-122.41127	WY 2015	2/6/2015	43.0	7.81	182	29.2	679
SM-SSF-293A (Gateway Blvd SD)	South San Francisco	MS4	37.65244	-122.40257	WY 2015	2/6/2015	45.0	5.24	117	19.6	436
SM-SSF-319A (Forbes Blvd Outfall)	South San Francisco	MS4	37.65889	-122.37996	WY 2016	3/5/2016	23.0	1.84	80.0	14.7	639
SM-SSF-315A (Gull Dr Outfall)	South San Francisco	MS4	37.66033	-122.38502	WY 2016	3/5/2016	33.0	5.77	175	10.4	315
SM-SSF-314A (Gull Dr SD)	South San Francisco	MS4	37.66033	-122.38510	WY 2016	3/5/2016	10.0	8.59	859	5.62	562
SM-BRI-17A (Valley Dr SD)	Brisbane	MS4	37.68694	-122.40215	WY 2016	3/5/2016	96.0	10.4	109	26.5	276
SM-BRI-1004A (Tunnel Ave Ditch)	Brisbane	MS4	37.69490	-122.39946	WY 2016	3/5/2016	96.0	10.5	109	71.1	741
SM-SCS-32A (Taylor Way SD)	San Carlos	MS4	37.51320	-122.26466	WY 2016	3/11/2016	25.0	4.23	169	28.9	1156
SM-SCS-75A (Industrial Rd Ditch)	San Carlos	MS4	37.51831	-122.26371	WY 2016	3/11/2016	26.0	160	6,139	13.9	535
SM-SSF-291A (S Linden Ave SD (291))	South San Francisco	MS4	37.64327	-122.41066	WY 2017	1/8/2017	16.0	11.8	736	12.4	775
SM-SSF-296A (S Spruce Ave SD at Mayfair Ave (296))	South San Francisco	MS4	37.65084	-122.41811	WY 2017	1/8/2017	111	3.36	30.3	38.9	350
SM-SSF-359A (Outfall to Colma Ck on service road near Littlefield Ave. (359))	South San Francisco	MS4	37.64290	-122.39677	WY 2017	2/7/2017	43.0	33.9	788	9.05	210
Colma Ck at S. Linden Blvd (Colma Ck at S. Linden Blvd)	South San Francisco	Receiving Water	37.65017	-122.41189	WY 2017	2/7/2017	71.0	2.65	37.3	15.3	215
SM-SSF-315A (Gull Dr Outfall)	South San Francisco	MS4	37.66033	-122.38502	WY 2018	1/8/18	91.0	93	1,024	4.74	52.1
SM-SSF-314A (Gull Dr SD)	South San Francisco	MS4	37.66033	-122.38510	WY 2018	1/9/18	75.0	71.0	946	5.10	68.0
SM-BUR-164A	Burlingame	MS4	37.59960	-122.37526	WY 2019	11/28/2018	80.0	3.87	48.4	22.1	276
SM-BUR-85A	Burlingame	MS4	37.60194	-122.37499	WY 2019	11/28/2019	93.0	31.1	334	40.9	440
SMCWPPP Stormwater Runoff Samples											
SM-MPK-71A	Menlo Park	MS4	37.48361	-122.14507	WY 2016	2/17/2016	13.7	0.59	43.2	6.80	496

Site Name (RMP Site Name in Parentheses)	Permittee	Sample Type	Latitude	Longitude	Water Year	Sample Date	SSC (mg/L)	Total PCBs (ng/L)	Total PCBs (ng/g)	Total Hg (ng/L)	Total Hg (ng/g)
SM-RCY-327A	Redwood City	MS4	37.48868	-122.22823	WY 2016	2/17/2016	43.7	5.70	130	14.9	341
SM-RCY-388A	Redwood City	MS4	37.48877	-122.22665	WY 2016	2/17/2016	49.5	2.49	50.3	15.4	311
SM-MPK-238A	Menlo Park	MS4	37.48480	-122.17445	WY 2016	3/5/2016	80.1	3.19	39.8	12.7	159
SM-MPK-238B	Menlo Park	MS4	37.48489	-122.17380	WY 2016	3/5/2016	51.3	6.20	121	8.90	173
SM-RCY-379A	Redwood City	MS4	37.48908	-122.20648	WY 2016	3/5/2016	123	13.0	106	18.3	149
SM-RCY-379B	Redwood City	MS4	37.48910	-122.20647	WY 2016	3/5/2016	43.3	7.87	182	10.9	252
SM-RCY-254A	Redwood City	MS4	37.48916	-122.20651	WY 2016	3/5/2016	13.9	1.57	113	9.90	712
SM-SSF-317A	South San Francisco	MS4	37.64707	-122.39230	WY 2017	12/10/2016	5.80	2.61	450	0.82	141
SM-SSF-316A	South San Francisco	MS4	37.64767	-122.39192	WY 2017	12/10/2016	44.1	4.25	96.4	1.80	40.8
SM-SSF-318A	South San Francisco	MS4	37.64787	-122.38723	WY 2017	12/10/2016	8.50	2.26	266	5.42	638
SM-BUR-142A	Burlingame	MS4	37.59183	-122.36623	WY 2017	12/15/2016	51.5	34.5	670	2.27	44.1
SM-BUR-141A	Burlingame	MS4	37.59184	-122.36626	WY 2017	12/15/2016	51.3	8.48	165	7.79	152
SM-BUR-1006A	Burlingame	MS4	37.59185	-122.36629	WY 2017	12/15/2016	51.8	18.9	365	6.44	124
SM-SSF-1001B	South San Francisco	MS4	37.64076	-122.40637	WY 2017	12/15/2016	32.2	55.2	1,714	2.44	75.8
SM-SSF-292A	South San Francisco	MS4	37.64126	-122.40866	WY 2017	12/15/2016	719	7.89	11.0	0.95	1.32
SM-SSF-294A	South San Francisco	MS4	37.64886	-122.40160	WY 2017	12/15/2016	28.6	10.5	367	1.80	62.9
SM-RCY-324A	Redwood City	MS4	37.48358	-122.22763	WY 2017	1/8/2017	44.0	7.43	169	26.3	598
SM-RCY-323A	Redwood City	MS4	37.48500	-122.23281	WY 2017	1/8/2017	8.10	1.55	191	12.7	1568
SM-SMO-89A	San Mateo	MS4	37.54877	-122.30450	WY 2017	1/10/2017	27.8	4.03	145	2.32	83.5
SM-BEL-60B	Belmont	MS4	37.52746	-122.27434	WY 2017	2/9/2017	36.4	37.2	1,022	3.98	109
SM-BEL-60A	Belmont	MS4	37.52887	-122.27821	WY 2017	2/9/2017	34.3	6.11	178	4.83	141
SM-SMO-156A	San Mateo	MS4	37.55661	-122.30842	WY 2017	2/20/2017	90.6	19	204	12.7	140
SM-SMO-408A	San Mateo	MS4	37.55918	-122.30479	WY 2017	2/20/2017	29.1	55.3	1,900	5.5	189
SM-MPK-66A	Menlo Park	MS4	37.48079	-122.14498	WY 2017	3/24/2017	21.4	8.35	390	3.55	166
SM-SCS-1011B	San Carlos	MS4	37.51692	-122.25373	WY 2018	1/8/2018	15.0	2.50	167	6.12	408
SM-SCS-1011A	San Carlos	MS4	37.51701	-122.25379	WY 2018	1/8/2018	59.7	10.8	181	3.94	66.0
SM-SMO-25A	San Mateo	MS4	37.57970	-122.31911	WY 2018	1/8/2018	14.8	2.22	150	3.10	209
SM-SMO-149A	San Mateo	MS4	37.58710	-122.33222	WY 2018	1/8/2018	17.0	1.79	105	5.24	308
SM-BUR-164A	Burlingame	MS4	37.59960	-122.37526	WY 2018	1/8/2018	9.9	4.43	447	5.27	532
SM-BUR-85A	Burlingame	MS4	37.60194	-122.37499	WY 2018	1/8/2018	15.2	3.67	241	5.55	365
SM-SSF-356A	South San Francisco	MS4	37.64851	-122.40913	WY 2018	1/24/2018	55.8	4.89	88	0.44	7.89
SM-RCY-266A	Redwood City	MS4	37.49483	-122.21869	WY 2018	3/1/2018	21.6	0.11	4.91	4.06	188
SM-RCY-333A	Redwood City	MS4	37.49549	-122.21984	WY 2018	3/1/2018	417	6.30	15.1	4.43	10.6
SM-SCS-1011D	San Carlos	MS4	37.51238	-122.25777	WY 2018	3/1/2018	25.3	5.82	230	0.66	26.1
SM-SCS-1011C	San Carlos	MS4	37.51246	-122.25781	WY 2018	3/1/2018	28.5	5.80	204	0.72	25.3

Site Name (RMP Site Name in Parentheses)	Permittee	Sample Type	Latitude	Longitude	Water Year	Sample Date	SSC (mg/L)	Total PCBs (ng/L)	Total PCBs (ng/g)	Total Hg (ng/L)	Total Hg (ng/g)
SM-SSF-1001C	South San Francisco	MS4	37.64309	-122.39930	WY 2018	3/1/2018	3.20	1.13	353	7.31	2284
SM-SSF-306B (South Linden PS)	South San Francisco	MS4	37.65025	-122.41170	WY 2018	4/6/2018	14.5	2.51	173	4.68	323

Notes:

SSC – Suspended Sediment Concentration.

Total PCBs = sum of the 40 PCBs congeners analyzed by the RMP for Bay samples.

PCBs and mercury results with units of ng/g are particle ratios.

Attachment 5

Results of Monitoring San Mateo County Sediments for PCBs and Mercury

Permittee	WMA	Sample ID	Sample Date	Latitude	Longitude	Total PCBs (mg/kg)	Mercury (mg/kg)
Belmont	60	SM-BEL-60-A	5/22/2018	37.52699	-122.27609	0.00	0.21
		SM-BEL-60-B	5/22/2018	37.52667	-122.27568	0.00	0.02
		SM-BEL-60-C	5/22/2018	37.52297	-122.27790	0.01	0.17
		SM-BEL-60-D	5/22/2018	37.52281	-122.27776	0.02	0.23
		SM-BEL-60-E	5/22/2018	37.52200	-122.27684	0.02	0.09
		SM-BEL-60-F	5/22/2018	37.52295	-122.27849	0.02	0.12
		SM-BEL-60-G	5/22/2018	37.52701	-122.27293	0.01	0.08
		SM-BEL-60-J	5/13/2019	37.52585	-122.27464	0.00	0.01
	77	SM-BEL-01-A	5/13/2019	37.52513	-122.26635	0.01	0.24
Brisbane	1004	SMC025	9/20/2001	37.70673	-122.39801	0.14	1.73
		SM-BRI-01-A	2/18/2015	37.70150	-122.40867	0.04	0.17
		SM-BRI-01-B	2/18/2015	37.70102	-122.40810	0.01	0.04
		SM-BRI-01-C	2/18/2015	37.69897	-122.40682	0.04	0.06
		SM-BRI-01-D	2/18/2015	37.70024	-122.40736	0.01	0.04
	17	SM-BRI-02-A	2/18/2015	37.68805	-122.40444	1.22	0.07
		SM-BRI-02-B	5/29/2018	37.68805	-122.40570	1.02	0.12
		SM-BRI-02-C	5/29/2018	37.68809	-122.40442	0.04	0.07
		SM-BRI-02-D	5/29/2018	37.68975	-122.41143	0.01	0.04
		SM-BRI-02-G	5/29/2018	37.68803	-122.40585	0.01	0.06
		SM-BRI-02-H	5/29/2018	37.68933	-122.40681	0.01	0.05
		SM-BRI-02-I	5/29/2018	37.68765	-122.40319	0.04	0.23
		SM-BRI-02-J	5/14/2019	37.68805	-122.40571	0.03	0.06
		SM-BRI-02-L	5/14/2019	37.68826	-122.40579	0.56	0.14
		SM-BRI-02-M	5/14/2019	37.68930	-122.41998	0.01	0.09
		SM-BRI-02-N	5/14/2019	37.69007	-122.40282	0.15	0.05
Burlingame	1006	SMC015	9/6/2001	37.59387	-122.36823	0.06	0.12
		SMC017	9/6/2001	37.59229	-122.36591	0.14	0.35
		SM-BUR-02-A	2/11/2015	37.59448	-122.36737	0.10	0.30
		SM-BUR-04-A	2/11/2015	37.59425	-122.37052	0.10	0.39
		SM-BUR-04-B	2/12/2015	37.59425	-122.36840	0.01	0.06
		SM-BUR-03-D	5/23/2018	37.59043	-122.36304	0.03	0.12
		SM-BUR-03-E	5/23/2018	37.59030	-122.36303	0.03	0.15
	138	SM-BUR-06-B	5/13/2019	37.58840	-122.33720	0.18	0.16
	142	SM-BUR-03-A	2/11/2015	37.58994	-122.36429	0.15	0.33
		SM-BUR-03-B	2/12/2015	37.59181	-122.36623	0.06	0.09
		SM-BUR-03-C	5/23/2018	37.59087	-122.36455	0.01	0.07
		SM-BUR-03-F	5/23/2018	37.59119	-122.36517	0.02	0.05
		SM-BUR-03-G	5/23/2018	37.59098	-122.36502	0.03	0.06
		SM-BUR-03-H	5/23/2018	37.59134	-122.36547	0.01	0.06
		SM-BUR-03-I	5/23/2018	37.59049	-122.36408	0.03	0.08
	16	SM-BUR-06-A	2/11/2015	37.59107	-122.33662	0.05	0.14

Permittee	WMA	Sample ID	Sample Date	Latitude	Longitude	Total PCBs (mg/kg)	Mercury (mg/kg)
	164	SMC016	9/6/2001	37.59790	-122.37708	0.08	0.10
		SM-BUR-05-A	2/11/2015	37.59820	-122.38085	0.05	0.31
		SM-BUR-05-B	2/11/2015	37.59761	-122.37918	0.09	0.83
		SM-BUR-05-C	2/11/2015	37.59523	-122.37808	0.04	0.10
	85	SM-BUR-01-A	2/12/2015	37.60248	-122.37588	0.03	0.16
		SM-BUR-01-B	2/11/2015	37.59990	-122.37191	0.03	0.17
Colma	Other - COL	SMC024	9/6/2001	37.67407	-122.45691	16.81	1.31
		SMC024	10/16/2003	37.67407	-122.45691	0.00	0.02
		SMC048	10/16/2003	37.67407	-122.45728	0.00	0.02
		SMC049	10/16/2003	37.67352	-122.45770	0.05	0.24
Daly City	1004	SM-DCY-01-A	5/29/2018	37.70427	-122.41417	0.01	0.06
East Palo Alto	1015	SM-EPA-01-C	1/19/2015	37.47474	-122.12710	0.02	0.08
		SM-EPA-01-D	1/19/2015	37.47558	-122.13191	0.06	0.10
	67	SM-EPA-01-A	1/19/2015	37.47722	-122.13418	0.21	0.22
		SM-EPA-01-B	1/19/2015	37.47208	-122.13429	0.02	0.12
	70	SM-EPA-02-A	1/19/2015	37.47084	-122.13069	0.05	0.26
		SM-EPA-02-D	1/19/2015	37.47033	-122.13036	0.34	0.45
		SM-EPA-02-G	3/27/2017	37.47029	-122.13244	0.03	0.05
		SM-EPA-02-H	3/27/2017	37.47194	-122.13406	0.01	0.05
	72	SM-EPA-02-C	1/19/2015	37.47443	-122.12743	0.02	0.33
		SM-EPA-02-F	3/27/2017	37.47300	-122.13143	0.02	0.08
	Other - EPA	SMC019	9/20/2001	37.46112	-122.12421	0.07	0.13
Foster City	1010	SM-FCY-01-A	5/13/2019	37.56762	-122.27260	0.00	0.09
Menlo Park	1012	SM-MPK-05-A	3/27/2017	37.48209	-122.16096	0.06	0.10
	1014	SM-MPK-03-A	1/22/2015	37.48678	-122.18090	0.02	0.04
		SM-MPK-02-E	3/27/2017	37.48525	-122.18228	0.03	0.04
	238A	SM-MPK-04-A	1/20/2015	37.48307	-122.17529	0.03	0.21
		SM-MPK-04-C	1/20/2015	37.48270	-122.17420	0.01	0.12
		SM-MPK-04-D	1/19/2015	37.48342	-122.17178	0.25	0.03
	238B	SM-MPK-04-E	1/19/2015	37.48281	-122.16719	0.29	0.10
	239	SM-MPK-02-B	1/20/2015	37.48610	-122.18564	0.57	0.13
		SM-MPK-02-D	3/27/2017	37.48592	-122.18493	0.01	0.06
	332	SM-MPK-02-A	1/20/2015	37.48664	-122.18868	0.03	0.04
	66	SM-MPK-06-A	1/19/2015	37.47566	-122.14726	0.06	0.12
	71	SM-MPK-05-B	3/27/2017	37.47939	-122.15569	0.01	0.13
	Other - MPK	SM-MPK-01-A	1/20/2015	37.45565	-122.18395	0.02	0.07
Millbrae	401	SM-MIL-01-A	5/13/2019	37.60764	-122.39189	0.00	0.03
Redwood City	1000	SM-RCY-04-D	1/22/2015	37.49742	-122.21299	0.02	0.07
		SM-RCY-05-A	1/22/2015	37.50961	-122.20813	0.57	0.96
		SM-RCY-05-C	4/5/2017	37.51096	-122.20742	0.75	0.35
	1014	SM-RCY-10-E	3/27/2017	37.48510	-122.18221	0.01	0.05

Permittee	WMA	Sample ID	Sample Date	Latitude	Longitude	Total PCBs (mg/kg)	Mercury (mg/kg)
	239	SM-RCY-10-A	1/20/2015	37.48636	-122.18757	0.04	0.06
		SM-RCY-10-C	3/27/2017	37.48581	-122.18504	0.16	0.05
		SM-RCY-10-D	3/27/2017	37.48571	-122.18474	0.02	0.04
	253	SM-RCY-09-A	1/22/2015	37.48606	-122.19643	0.05	0.06
	254	SM-RCY-06-A	1/22/2015	37.48850	-122.20902	0.09	0.07
	267	SM-RCY-04-B	1/22/2015	37.49303	-122.21726	0.01	0.10
	269	SM-RCY-05-D	5/13/2019	37.51154	-122.20694	0.02	0.01
	327	SMC-033	10/4/2001	37.48907	-122.23151	0.00	--
		SMC-034	10/4/2001	37.48889	-122.22821	0.08	--
		SM-RCY-15-A	2/10/2015	37.48952	-122.23632	0.05	0.08
	333	SM-RCY-04-A	1/22/2015	37.49547	-122.21968	0.02	0.07
	336	SM-RCY-03-B	5/13/2019	37.49198	-122.22804	0.01	0.03
	337	SMC004	10/24/2000	37.49731	-122.23700	0.08	0.11
		SM-RCY-01-A	2/10/2015	37.49504	-122.23654	0.03	0.33
		SM-RCY-01-B	2/10/2015	37.49607	-122.23841	0.05	0.09
		SM-RCY-03-A	2/10/2015	37.49366	-122.23425	0.02	0.13
	379	SMC002	10/24/2000	37.48730	-122.21368	0.12	--
		SMC-035	10/4/2001	37.48651	-122.21399	0.08	--
		SMC-036	10/4/2001	37.48810	-122.21338	0.07	--
		SMC-037	10/4/2001	37.48309	-122.21759	0.01	--
		SMC-038	10/4/2001	37.48413	-122.21667	0.09	--
		SMC001	10/24/2000	37.48730	-122.20648	0.07	0.17
		SM-RCY-07-A	1/21/2015	37.48669	-122.21235	0.10	0.08
		SM-RCY-07-B	1/21/2015	37.48650	-122.20665	0.35	0.21
		SM-RCY-07-C	1/21/2015	37.48650	-122.20681	0.13	0.08
		SM-RCY-11-A	1/22/2015	37.48006	-122.22206	0.03	0.16
		SM-RCY-07-D	3/28/2017	37.48532	-122.21334	1.97	0.14
		SM-RCY-12-A	3/28/2017	37.48444	-122.21848	0.02	0.07
		SM-RCY-12-B	3/28/2017	37.48430	-122.21787	0.08	0.09
		SM-RCY-12-C	3/30/2017	37.48438	-122.21774	0.00	0.01
		SM-RCY-12-E	3/28/2017	37.48471	-122.21958	0.01	0.05
		SM-RCY-12-F	3/28/2017	37.48551	-122.21624	0.01	0.08
		SM-RCY-07-E	5/29/2018	37.48604	-122.21158	0.04	0.07
		SM-RCY-07-F	5/29/2018	37.48554	-122.21191	0.04	0.06
		SM-RCY-12-G	5/22/2018	37.48419	-122.21715	0.01	0.10
		RCA-201409241050	9/24/2014	37.48538	-122.21345	2.37	--
		RCB-201409241015	9/24/2014	37.48528	-122.21358	1.25	--
		RCC-201409291115	9/29/2014	37.48550	-122.21441	0.57	--
		RCD-201409241200	9/24/2014	37.48418	-122.21685	6.93	--
		RCE-201409291030	9/29/2014	37.48573	-122.21774	0.04	--
		RCF-201409291230	9/29/2014	37.48721	-122.21461	0.02	--

Permittee	WMA	Sample ID	Sample Date	Latitude	Longitude	Total PCBs (mg/kg)	Mercury (mg/kg)
		RCG-201409240945	9/24/2014	37.48726	-122.21372	0.07	--
	407	SM-RCY-04-C	1/22/2015	37.49129	-122.21345	0.01	0.23
		SM-RCY-04-E	5/13/2019	37.49309	-122.21312	0.00	0.12
	Other - RCY	SMC011	10/24/2000	37.48889	-122.22699	0.34	--
		SMC-032	10/4/2001	37.48828	-122.22699	0.02	--
		SMC030	10/4/2001	37.48090	-122.23450	0.01	0.66
		SMC031	10/4/2001	37.48053	-122.22693	0.14	0.18
		SM-RCY-13-A	1/22/2015	37.48136	-122.22602	0.01	0.10
San Bruno	292	SBO01	7/12/2007	37.63690	-122.41241	0.03	0.36
		SBO02	7/12/2007	37.63708	-122.41162	0.18	0.27
		SSO05	7/12/2007	37.63690	-122.41229	0.00	0.47
		SBO03	7/12/2007	37.63489	-122.41150	0.01	0.15
		SBO04	7/12/2007	37.63647	-122.41241	0.00	0.07
		SBO05	7/12/2007	37.63611	-122.41150	0.16	0.11
		SBO06	7/12/2007	37.63892	-122.41248	0.00	0.23
		SBO07	7/12/2007	37.63928	-122.41241	0.11	0.30
		SBO08	7/12/2007	37.63928	-122.41272	0.00	0.20
		SBO09	7/12/2007	37.63892	-122.41162	0.15	0.21
		SBO10	7/12/2007	37.63831	-122.41162	0.00	0.06
		SBO11	7/12/2007	37.63971	-122.41162	0.12	0.22
		SBO13	7/12/2007	37.63831	-122.41339	0.00	0.13
	362	SM-SBO-05-D	5/14/2019	37.63538	-122.40616	0.07	0.06
San Carlos	1011	S-1	7/10/2015	37.51538	-122.25843	0.02	--
		S-10	7/10/2015	37.51589	-122.25769	0.03	--
		S-11	7/10/2015	37.51560	-122.25717	0.05	--
		S-12	7/10/2015	37.51551	-122.25644	0.08	--
		S-13	7/10/2015	37.51549	-122.25581	0.10	--
		S-14	7/10/2015	37.51579	-122.25521	0.02	--
		S-15	7/10/2015	37.51632	-122.25485	0.01	--
		S-16	7/10/2015	37.51681	-122.25468	0.01	--
		S-17	7/10/2015	37.51711	-122.25429	0.01	--
		S-2	7/10/2015	37.51519	-122.25826	0.01	--
		S-3	7/10/2015	37.51435	-122.25789	0.02	--
		S-4	7/10/2015	37.51377	-122.25783	0.05	--
		S-5	7/10/2015	37.51328	-122.25760	0.04	--
		S-6	7/10/2015	37.51286	-122.25743	0.07	--
		S-7	7/10/2015	37.51232	-122.25783	0.01	--
		S-8	7/10/2015	37.52043	-122.26604	0.02	--
		S-9	7/10/2015	37.52019	-122.26633	0.01	--
		SMC028	9/20/2001	37.52051	-122.26599	0.00	0.05
		SMC029	9/20/2001	37.51251	-122.25879	0.42	0.63

Permittee	WMA	Sample ID	Sample Date	Latitude	Longitude	Total PCBs (mg/kg)	Mercury (mg/kg)
		BG-1	10/17/2014	37.51785	-122.26117	0.72	0.09
		S-1	10/17/2014	37.51775	-122.26106	0.37	0.09
		SCA37	8/24/2007	37.50909	-122.25781	0.00	0.06
		SCA38	8/24/2007	37.50970	-122.25708	0.00	0.07
		SCA39	9/21/2007	37.51050	-122.25598	0.00	0.13
	1016	PUL27	5/14/2013	37.50470	-122.24899	0.96	0.15
		SMC023	9/25/2001	37.50472	-122.24899	2.26	0.32
		SCA11	8/23/2007	37.50189	-122.25281	0.00	0.28
		SMC-023	9/25/2001	37.50472	-122.24895	6.19	--
		SMC-045	10/3/2002	37.50171	-122.25238	0.00	--
	210	PUL12	9/25/2012	37.49697	-122.24599	0.84	0.07
		PUL13	9/25/2012	37.49748	-122.24727	0.02	0.36
		PUL14	9/25/2012	37.49804	-122.24707	0.11	0.18
		PUL18	5/14/2013	37.50006	-122.24399	0.22	0.10
		PUL19	5/14/2013	37.49980	-122.24349	0.09	0.21
		PUL20	5/14/2013	37.49959	-122.24349	0.55	0.10
		PUL21	5/14/2013	37.49897	-122.24209	0.02	0.05
		PUL22	5/14/2013	37.50027	-122.24356	192.91	0.07
		PUL23	5/14/2013	37.49852	-122.24898	0.11	0.06
		PUL24	5/14/2013	37.49770	-122.24746	0.07	0.12
		PUL25	5/14/2013	37.49620	-122.24625	0.02	0.07
		PUL28	5/14/2013	37.49824	-122.24547	1.19	0.14
		PUL4	9/25/2012	37.50014	-122.24373	2.45	0.13
		PUL7	9/24/2012	37.50029	-122.24783	0.40	0.13
		PUL8	9/25/2012	37.49979	-122.24445	0.05	0.22
		PUL9	9/25/2012	37.49940	-122.24394	0.05	1.10
		SMC021	9/20/2001	37.49876	-122.24596	1.22	0.92
		SCA01	8/23/2007	37.49811	-122.24268	0.13	0.17
		SCA02	8/23/2007	37.49609	-122.24530	0.00	0.13
		SCA03	8/23/2007	37.49670	-122.24628	0.41	0.30
		SCA04	8/23/2007	37.49817	-122.24532	2.22	0.24
		SCA05	8/23/2007	37.49872	-122.24609	0.07	0.27
		SCA06	8/23/2007	37.49829	-122.24658	0.00	0.13
		SCA07	8/23/2007	37.49811	-122.24701	0.10	0.19
		SCA08	8/23/2007	37.49768	-122.24750	0.00	0.09
		SCA09	8/23/2007	37.49824	-122.24880	0.00	0.11
		SCA10	8/23/2007	37.50067	-122.25153	0.00	0.12
		SCA16	8/23/2007	37.50371	-122.24857	0.04	0.10
		SCA17	8/23/2007	37.50067	-122.24481	0.10	0.18
		SCA18	8/23/2007	37.50049	-122.24469	0.06	0.29
		SCA19	8/23/2007	37.49918	-122.24656	0.13	0.24

Permittee	WMA	Sample ID	Sample Date	Latitude	Longitude	Total PCBs (mg/kg)	Mercury (mg/kg)
		SCA20	8/23/2007	37.49926	-122.24664	0.17	0.15
		SCA21	8/23/2007	37.50035	-122.24769	0.10	0.16
		SCA22	8/23/2007	37.50005	-122.24397	0.12	0.11
		SCA25	8/23/2007	37.49887	-122.24225	0.01	0.07
		SCA36	8/24/2007	37.49969	-122.24463	0.30	0.77
		SMC-021	9/20/2001	37.49875	-122.24597	1.82	--
		SMC-046	10/3/2002	37.50269	-122.24719	0.18	--
		SMC-047	10/3/2002	37.50012	-122.24371	11.52	--
		SM-SCS-06-A	3/30/2017	37.49628	-122.24492	0.01	0.17
		SM-SCS-06-B	3/30/2017	37.49690	-122.24589	0.03	0.08
		SM-SCS-06-C	3/30/2017	37.49746	-122.24638	5.64	0.04
		SM-SCS-06-D	3/30/2017	37.49733	-122.24555	1.84	3.93
		SM-SCS-06-E	3/30/2017	37.49614	-122.24537	0.00	0.02
		SM-SCS-06-F	3/30/2017	37.49768	-122.24626	3.73	0.12
		SM-SCS-06-G	3/30/2017	37.49776	-122.24615	1.29	0.07
		SM-SCS-06-H	3/30/2017	37.49942	-122.24278	0.07	0.06
		SM-SCS-06-I	3/30/2017	37.50158	-122.24354	0.03	0.27
		SM-SCS-06-L	4/5/2017	37.50021	-122.24113	0.06	0.13
		SM-SCS-06-M	5/22/2018	37.49727	-122.24686	0.25	0.10
		SM-SCS-06-N	5/22/2018	37.49731	-122.24662	0.06	0.05
		SM-SCS-20-A	9/17/2020	37.496656	-122.246386	0.07	0.19
		SM-SCS-20-B	9/17/2020	37.497265	-122.246886	0.09	0.10
		SM-SCS-20-C	9/17/2020	37.499214	-122.246607	0.04	0.13
		SM-SCS-20-D	9/17/2020	37.497302	-122.245552	0.37	0.34
		SM-SCS-20-E	9/17/2020	37.49746	-122.2464	0.58	0.07
		SM-SCS-20-F	9/17/2020	37.497668	-122.246307	3.51	0.12
		SM-SCS-20-G	9/17/2020	37.497775	-122.246147	1.11	0.06
		SM-SCS-20-H	9/17/2020	37.498288	-122.24544	0.77	0.08
		SM-SCS-0921-A	9/13/2021	37.496878	-122.24615	0.67	0.01
		SM-SCS-0921-B	9/13/2021	37.496971	-122.246043	0.10	0.01
		SM-SCS-0921-C	9/13/2021	37.49714	-122.245788	0.03	0.01
		SM-SCS-0921-D	9/13/2021	37.497294	-122.245609	0.11	0.01
		SM-SCS-0921-F	9/13/2021	37.498227	-122.245389	2.09	0.02
		SM-SCS-0921-G	9/13/2021	37.497891	-122.245837	0.45	0.02
		SM-SCS-0921-H	9/13/2021	37.498052	-122.245797	0.56	0.01
		SM-SCS-0921-I	9/13/2021	37.497377	-122.245496	0.52	0.01
	31	PUL1	9/24/2012	37.50623	-122.25353	1.61	--
		PUL10	9/24/2012	37.50583	-122.25432	0.34	--
		PUL15	9/25/2012	37.50661	-122.25300	1.44	0.23
		PUL2	9/24/2012	37.50510	-122.25538	0.05	--
		PUL26	5/14/2013	37.50653	-122.25444	0.14	0.07

Permittee	WMA	Sample ID	Sample Date	Latitude	Longitude	Total PCBs (mg/kg)	Mercury (mg/kg)
		PUL5	9/24/2012	37.50484	-122.25542	0.02	--
		SMC022	9/20/2001	37.50653	-122.25330	0.29	0.07
		SCA12	8/23/2007	37.50372	-122.25403	0.00	0.13
		SCA13	8/23/2007	37.50378	-122.25417	0.01	0.21
		SCA14	8/23/2007	37.50452	-122.25311	0.30	0.35
		SCA15	8/23/2007	37.50606	-122.25071	0.00	0.05
		SCA26	8/23/2007	37.50484	-122.25572	0.00	0.09
		SCA27	8/23/2007	37.50639	-122.25329	1.09	0.06
		SCA28	8/24/2007	37.50633	-122.25355	0.19	0.04
		SCA29	8/24/2007	37.50751	-122.25194	0.09	0.08
		SCA30	8/24/2007	37.50737	-122.25185	0.21	0.15
		SCA31	8/24/2007	37.50838	-122.25279	0.87	0.12
		SCA32	8/24/2007	37.50732	-122.25439	0.00	0.08
		SCA33	8/24/2007	37.50700	-122.25572	0.27	0.29
		SCA34	8/24/2007	37.50787	-122.25421	0.01	0.13
		SCA35	8/24/2007	37.50873	-122.25330	0.05	0.27
		SMC-042	10/3/2002	37.50738	-122.25189	0.31	--
		SMC-043	10/3/2002	37.50761	-122.25178	0.32	--
		SMC-044	10/3/2002	37.50525	-122.24961	0.03	--
		SM-SCS-05-A	4/3/2017	37.50645	-122.25071	0.12	0.06
		SM-SCS-05-B	4/3/2017	37.50686	-122.25492	0.14	0.07
	59	SM-SCS-01-L	3/30/2017	37.51528	-122.26202	0.18	0.17
		SM-SCS-01-M	3/30/2017	37.51397	-122.26382	0.04	2.36
		SM-SCS-01-O	5/22/2018	37.51538	-122.26179	0.31	0.16
	75	SMC020	9/20/2001	37.51770	-122.26379	20.29	1.84
		SM-SCS-01-A	2/10/2015	37.51798	-122.26640	0.10	0.05
		SM-SCS-01-B	2/10/2015	37.51915	-122.26483	0.09	0.05
		SM-SCS-01-C	2/10/2015	37.51631	-122.26494	0.04	0.17
		SM-SCS-01-D	2/10/2015	37.51778	-122.26358	0.02	0.08
		SM-SCS-01-E	2/10/2015	37.51548	-122.26660	0.03	0.09
		SM-SCS-01-G	3/30/2017	37.51664	-122.26351	1.20	0.11
		SM-SCS-01-H	4/3/2017	37.51623	-122.26485	0.06	0.14
		SM-SCS-01-I	4/3/2017	37.51798	-122.26386	0.02	0.05
		SM-SCS-01-J	4/3/2017	37.51818	-122.26392	0.09	0.09
		SM-SCS-01-N	3/30/2017	37.51686	-122.26358	49.40	0.80
		SM-SCS-01-P	5/22/2018	37.51643	-122.26308	0.76	0.06
	80	SM-SCS-07-A	5/13/2019	37.49684	-122.24727	0.14	0.17
San Mateo	1007	SMC012	10/25/2000	37.57013	-122.31860	0.01	0.05
	1009	SM-SMO-07-B	2/12/2015	37.55247	-122.30973	0.04	0.04
		SM-SMO-08-A	2/12/2015	37.54986	-122.30739	0.03	0.04
	101	SM-SMO-11-A	2/18/2015	37.53200	-122.28861	0.08	0.13

Permittee	WMA	Sample ID	Sample Date	Latitude	Longitude	Total PCBs (mg/kg)	Mercury (mg/kg)
	111	SM-SMO-04-A	2/18/2015	37.56774	-122.32320	0.06	0.11
		SM-SMO-05-A	2/12/2015	37.56514	-122.31933	0.05	0.07
	114	SM-SMO-06-A	2/18/2015	37.56134	-122.31515	0.23	0.25
	149	SMC005	10/25/2000	37.58691	-122.33191	0.19	0.20
		SM-SMO-14-A	2/12/2015	37.58631	-122.33303	0.07	0.63
	156	SM-SMO-07-C	4/5/2017	37.55516	-122.30717	0.01	0.05
	25	SM-SMO-02-A	2/11/2015	37.57746	-122.32173	0.03	0.13
	403	SM-SMO-15-A	2/12/2015	37.56700	-122.31035	0.02	0.08
	408	SM-SMO-07-D	5/23/2018	37.55756	-122.30338	0.01	0.11
		SM-SMO-07-E	5/23/2018	37.55402	-122.30207	0.00	0.04
		SM-SMO-07-F	5/23/2018	37.55515	-122.30259	0.00	0.06
		SM-SMO-07-G	5/23/2018	37.55513	-122.30234	0.00	0.04
		SM-SMO-07-H	5/23/2018	37.55674	-122.30272	0.02	0.10
		SM-SMO-07-I	5/23/2018	37.55757	-122.30439	0.01	0.13
		SM-SMO-07-J	5/23/2018	37.55840	-122.30395	0.01	0.13
	89	SM-SMO-08-B	2/12/2015	37.54552	-122.30445	0.01	0.07
	92	SM-SMO-08-C	5/13/2019	37.54847	-122.29967	0.00	0.02
	Other - SMO	SMC013	10/25/2000	37.58087	-122.32343	0.09	0.11
		SM-SMO-09-A	5/23/2018	37.54157	-122.30636	0.04	0.07
South San Francisco	1001	SM-SSF-09-D	2/13/2015	37.65025	-122.41140	0.04	0.07
		SM-SSF-09-A	2/17/2015	37.65047	-122.41284	0.02	0.18
		SM-SSF-09-C	2/17/2015	37.65147	-122.41703	0.02	0.16
		SM-SSF-10-A	2/17/2015	37.65328	-122.42609	0.01	0.05
		SM-SSF-03-E	5/24/2018	37.64792	-122.40022	0.09	0.07
		SM-SSF-04-G	5/29/2018	37.64229	-122.40323	0.01	0.11
	1001B	SM-SSF-05-A	2/17/2015	37.63734	-122.40605	0.46	0.05
		SM-SSF-05-C	5/24/2018	37.64013	-122.40653	0.06	0.06
		SM-SSF-05-D	5/24/2018	37.63774	-122.40618	0.01	0.07
		SM-SSF-05-E	5/24/2018	37.64090	-122.40648	0.02	0.10
		SM-SSF-05-F	5/24/2018	37.64025	-122.40633	0.35	0.06
		SM-SSF-05-G	5/24/2018	37.64072	-122.40652	0.01	0.18
	1001D	SMC003	10/25/2000	37.65033	-122.41388	0.23	0.17
		SSO10	7/12/2007	37.64807	-122.41248	0.43	0.34
		SSO19	7/12/2007	37.64709	-122.41290	0.04	0.12
		SSO24	7/12/2007	37.64893	-122.41461	0.02	0.10
		SM-SSF-08-B	2/13/2015	37.65035	-122.41412	0.04	0.06
		SM-SSF-08-C	2/13/2015	37.64932	-122.41211	0.01	0.04
		SM-SSF-08-D	2/13/2015	37.64706	-122.41390	0.04	0.17
	1002	SMC026	9/6/2001	37.65088	-122.38373	0.12	0.35
		SM-SSF-02-C	4/5/2017	37.66440	-122.39508	0.02	0.05
		SM-SSF-02-D	4/5/2017	37.66303	-122.39861	0.08	0.15

Permittee	WMA	Sample ID	Sample Date	Latitude	Longitude	Total PCBs (mg/kg)	Mercury (mg/kg)
	291	SMC009	10/25/2000	37.64429	-122.41669	0.48	--
		SMC-039	10/2/2001	37.64508	-122.41632	0.07	--
		SMC-040	10/2/2001	37.64429	-122.41718	2.72	--
		SMC-041	10/2/2001	37.64410	-122.41650	0.04	--
		SSO16	7/12/2007	37.64252	-122.41119	0.00	0.03
		SSO18	7/12/2007	37.64209	-122.41241	0.00	0.01
		SSO20	7/12/2007	37.64752	-122.41638	0.00	0.05
		SSO21	7/12/2007	37.64771	-122.41663	0.00	0.08
		SSO22	7/12/2007	37.64728	-122.41803	0.13	0.09
		SSO25	7/5/2007	37.64313	-122.41742	0.03	0.12
		SM-SSF-06-A	2/16/2015	37.64411	-122.41159	0.02	0.06
		SM-SSF-06-B	2/17/2015	37.64219	-122.41329	0.48	0.07
		SM-SSF-06-C	2/13/2015	37.64612	-122.41585	0.05	0.05
		SM-SSF-06-F	4/5/2017	37.64299	-122.41425	0.04	0.08
		SM-SSF-06-H	4/5/2017	37.64240	-122.41370	0.44	0.08
		SM-SSF-06-I	4/5/2017	37.64212	-122.41325	0.04	0.24
		SM-SSF-07-C	5/24/2018	37.64534	-122.42094	0.21	0.06
	292	SBO12	7/12/2007	37.64111	-122.41150	0.00	0.10
		SSO15	7/12/2007	37.64093	-122.41241	0.00	0.17
		SMC027	9/6/2001	37.64130	-122.40961	0.03	0.04
		SM-SSF-05-B	2/17/2015	37.64109	-122.41145	0.02	0.09
		SM-SSF-06-D	2/17/2015	37.64128	-122.40868	0.14	3.40
		SM-SSF-06-G	4/5/2017	37.64079	-122.41729	0.15	0.06
	293	SM-SSF-02-A	2/16/2015	37.65172	-122.40318	0.07	0.37
		SM-SSF-02-B	2/16/2015	37.65591	-122.40464	0.01	0.07
	294	SM-SSF-03-A	2/16/2015	37.64910	-122.40172	0.07	0.28
		SM-SSF-03-C	2/16/2015	37.65181	-122.40008	0.19	0.18
		SM-SSF-03-D	4/5/2017	37.65253	-122.40021	0.28	0.47
	295	SSO01	7/5/2007	37.63971	-122.40381	0.33	0.18
		SSO02	7/5/2007	37.64130	-122.40363	0.00	0.06
		SM-SSF-04-B	2/16/2015	37.63974	-122.40212	0.30	0.09
	296	SM-SSF-07-B	5/24/2018	37.64722	-122.41981	0.02	0.83
	313	SM-SSF-02-F	4/5/2017	37.66189	-122.39608	0.01	0.05
	314	SM-SSF-01-B	2/16/2015	37.66032	-122.38511	0.12	0.07
		SM-SSF-01-E	4/3/2017	37.65864	-122.39130	0.15	0.19
		SM-SSF-01-G	4/3/2017	37.66241	-122.38908	0.05	0.03
		SM-SSF-01-R	5/14/2019	37.65858	-122.39122	0.02	0.16
		SM-SSF-01-T	9/26/2022	37.660064	-122.39097	0.02	0.021
		SM-SSF-01-U	9/26/2022	37.660096	-122.3911	0.019	0.018
		SM-SSF-01-V	9/26/2022	37.66089	-122.39036	0.002	0.018
		SM-SSF-01-W	9/26/2022	37.66097	-122.390441	0.003	0.022

Permittee	WMA	Sample ID	Sample Date	Latitude	Longitude	Total PCBs (mg/kg)	Mercury (mg/kg)
	315	SM-SSF-01-L	5/14/2019	37.65693	-122.39556	0.27	0.27
		SM-SSF-01-M	5/14/2019	37.66021	-122.38526	0.02	0.26
		SM-SSF-01-N	5/14/2019	37.65977	-122.38571	0.03	0.50
		SM-SSF-01-O	5/14/2019	37.65871	-122.38623	0.43	0.14
		SM-SSF-01-P	5/14/2019	37.65504	-122.39049	0.01	0.06
		SM-SSF-01-Q	5/14/2019	37.65647	-122.39420	0.07	0.56
		SM-SSF-01-R	9/26/2022	37.656717	-122.395713	0.015	0.018
		SM-SSF-01-Q	9/26/2022	37.656478	-122.396134	0.047	0.015
		SM-SSF-01-S	9/26/2022	37.657026	-122.395447	0.14	0.013
		SM-SCS-0921-X	9/26/2022	37.65872	-122.386156	0.027	0.015
	316	SSO03	7/12/2007	37.65192	-122.39429	0.00	1.24
		SM-SSF-01-D	2/16/2015	37.65031	-122.39213	0.02	0.14
		SM-SSF-01-J	5/24/2018	37.65270	-122.39367	0.03	0.05
	318	SM-SSF-01-C	2/16/2015	37.64896	-122.38728	0.01	0.24
	319	SM-SSF-01-I	4/3/2017	37.65870	-122.38012	0.06	0.22
	354	SM-SSF-08-A	2/13/2015	37.65088	-122.41622	0.02	0.23
	356	SSO17	7/12/2007	37.64587	-122.40991	0.00	0.08
		SM-SSF-06-E	2/13/2015	37.64883	-122.40961	0.03	3.59
	357	SM-SSF-03-B	2/16/2015	37.64918	-122.40410	0.09	0.15
	358	SM-SSF-04-A	2/16/2015	37.64606	-122.40160	1.46	0.15
		SM-SSF-04-C	4/3/2017	37.64613	-122.40198	0.01	0.08
		SM-SSF-04-D	4/3/2017	37.64450	-122.40173	0.09	0.11
		SM-SSF-04-E	4/3/2017	37.64608	-122.40147	0.05	0.07
		SM-SSF-04-H	5/14/2019	37.64551	-122.40344	0.03	0.09
	359	SM-SSF-03-F	5/24/2018	37.64449	-122.39690	0.05	0.07
		SM-SSF-03-G	5/24/2018	37.64458	-122.39694	0.01	0.08
		SM-SSF-03-H	5/24/2018	37.64463	-122.39747	0.02	0.09
		SM-SSF-03-J	5/14/2019	37.64438	-122.39728	0.13	0.44
	362	SM-SSF-05-H	5/24/2018	37.63642	-122.40572	0.01	0.08
		SM-SSF-05-J	5/14/2019	37.63666	-122.40587	0.00	0.12
	Other - SSF	SMC010	10/25/2000	37.65332	-122.42548	0.19	0.06
Unincorporated	1005	SM-SMC-09-A	2/17/2015	37.63283	-122.40533	0.01	0.05
	1011	SM-SMC-08-A	2/10/2015	37.51758	-122.27088	0.02	0.10
	247	SM-SMC-01-A	3/27/2017	37.41451	-122.19379	0.00	0.04
	379	SM-SMC-04-A	1/21/2015	37.47622	-122.20808	0.09	0.11
		SM-SMC-04-C	1/21/2015	37.47851	-122.21224	0.06	0.13
		SM-SMC-05-A	1/21/2015	37.47476	-122.21126	0.03	0.10
		SM-SMC-06-A	1/21/2015	37.48194	-122.20616	0.02	0.05
		SM-SMC-06-B	1/21/2015	37.48307	-122.20310	0.02	0.06
		SM-SMC-06-C	1/21/2015	37.48426	-122.20777	0.93	0.39
		SM-SMC-07-A	1/21/2015	37.48484	-122.21082	0.06	0.20

Permittee	WMA	Sample ID	Sample Date	Latitude	Longitude	Total PCBs (mg/kg)	Mercury (mg/kg)
		SM-SMC-07-B	1/21/2015	37.48516	-122.21341	0.07	0.14
		SM-SMC-06-D	3/28/2017	37.48389	-122.20673	0.05	0.06
		SM-SMC-06-E	3/28/2017	37.48384	-122.20653	0.01	0.07
		SM-SMC-06-F	3/28/2017	37.48291	-122.20734	0.02	0.07
		SM-SMC-06-G	3/28/2017	37.48285	-122.20546	0.05	0.30
		SM-SMC-06-H	3/28/2017	37.48278	-122.20531	0.03	0.07
		SM-SMC-06-I	3/28/2017	37.48415	-122.20792	0.14	3.15
		SM-SMC-06-J	3/28/2017	37.48349	-122.20874	0.08	0.09
		SM-SMC-06-K	3/28/2017	37.48396	-122.20634	0.02	0.04
		SM-SMC-06-L	3/28/2017	37.48256	-122.20875	0.03	0.10
	Other - RCY	SMC006	10/24/2000	37.47528	-122.28278	0.01	0.04
	Other - SMC	SM-SMC-03-A	1/21/2015	37.47682	-122.19520	0.00	0.03
	Other - SMC	SM-SMC-10-A	1/20/2015	37.43302	-122.20285	0.04	0.06
	Other - WDE	SMC007	10/25/2000	37.44452	-122.29108	0.00	0.03
Woodside	Other - WDE	SMC008	10/24/2000	37.41632	-122.26910	0.00	0.04

Note: Total PCBs = sum of the 40 PCBs congeners analyzed by the RMP for Bay samples.

Attachment 6

Summary of PCBs and Mercury Monitoring Results in San Mateo County WMAs

WMA ID	Permittee	Area (acres)	Area High Interest Parcels (acres)	Percent High Interest Parcels	Sediment Samples			Stormwater Runoff Samples		
					n	PCBs Median (mg/kg)	PCBs Range (mg/kg)	n	PCBs Particle Ratio Median (mg/kg)	PCBs Particle Ratio Range (mg/kg)
210	San Carlos	141	33	23.2%	51	0.13	0 - 192.91	33	1.78	0.20 - 37
17	Brisbane	1,639	55	3.4%	7	0.04	0.01 - 1.22	1	--	0.11
142	Burlingame	20	9	44.3%	9	0.03	0.01 - 0.15	1	--	0.67
359	South San Francisco	23	12	51.2%	3	0.02	0.01 - 0.06	1	--	0.79
408	San Mateo	43	7	16.3%	7	0.01	0 - 0.02	1	--	1.90
60	Belmont	298	6	1.9%	7	0.01	0 - 0.02	2	0.60	0.18 - 1.02
379	Redwood City	802	110	13.7%	44	0.06	0 - 6.93	2	0.14	0.11 - 0.18
291	South San Francisco	194	64	33.1%	19	0.05	0 - 2.72	1	--	0.74
1000	Redwood City	148	108	73.0%	3	0.57	0.02 - 0.75	0	--	--
75	San Carlos	66	38	58.3%	12	0.09	0.02 - 49.4	1	--	6.14
31	San Carlos	99	27	27.2%	26	0.19	0 - 1.61	4	1.12	0.41 - 2.15
1016	San Carlos	142	27	19.0%	8	0.54	0 - 6.19	0	--	--
239	Menlo Park / EPA	36	11	29.1%	5	0.04	0.01 - 0.57	0	--	--
358	South San Francisco	32	7	21.8%	4	0.07	0.01 - 1.46	0	--	--
70	East Palo Alto	490	16	3.3%	4	0.04	0.01 - 0.34	1	--	0.11
314	South San Francisco	66	4	5.4%	8	0.02	0.002 - 0.15	2	0.91	0.86 - 0.95
294	South San Francisco	67	21	31.2%	3	0.19	0.07 - 0.28	1	--	0.37
1001	South San Francisco	413	107	26.0%	17	0.04	0.01 - 0.43	2	1.03	0.35 - 1.71
407	Redwood City	18	10	52.9%	1	0.01	0.01 - 0.01	0	--	--
85	Burlingame	121	13	10.4%	2	0.03	0.03 - 0.03	1	--	0.24
164	Burlingame	241	79	32.6%	4	0.07	0.04 - 0.09	1	--	0.45
336	Redwood City	66	4	6.6%	0	--	--	0	--	--
1011	Redwood City	507	63	12.3%	25	0.03	0 - 0.72	4	0.19	0.17 - 0.23
25	San Mateo	219	6	2.9%	1	--	0.03	1	--	0.15
149	Burlingame	480	5	1.1%	2	0.13	0.07 - 0.19	1	--	0.11
266	Redwood City	91	4	4.1%	0	--	--	1	--	0.00
77	Belmont	86	4	4.7%	0	--	--	0	--	--

WMA ID	Permittee	Area (acres)	Area High Interest Parcels (acres)	Percent High Interest Parcels	Sediment Samples			Stormwater Runoff Samples		
					n	PCBs Median (mg/kg)	PCBs Range (mg/kg)	n	PCBs Particle Ratio Median (mg/kg)	PCBs Particle Ratio Range (mg/kg)
59	San Carlos	28	9	32.1%	3	0.18	0.04 - 0.31	0	--	--
356	South San Francisco	10	2	18.0%	2	0.02	0 - 0.03	1	--	0.09
333	Redwood City	15	4	29.4%	1	--	0.02	1	--	0.02
111	San Mateo	95	5	4.8%	2	0.06	0.05 - 0.06	0	--	--
1008	San Mateo	111	1	0.5%	0	--	--	0	--	--
139	Burlingame	63	2	3.0%	0	--	--	0	--	--
181	Daly City	75	12	15.6%	0	--	--	0	--	--
298	South San Francisco	122	3	2.7%	0	--	--	0	--	--
307	Daly City	1,277	5	0.4%	0	--	--	0	--	--
401	Millbrae	52	7	12.6%	0	--	--	0	--	--
238	Menlo Park	345	84	24.2%	4	0.14	0.01 - 0.29	2	0.08	0.04 - 0.12
67	East Palo Alto	95	11	12.0%	2	0.12	0.02 - 0.21	0	--	--
114	San Mateo	85	8	9.3%	1	--	0.23	0	--	--
295	South San Francisco	25	3	11.7%	4	0.155	0 - 0.33	0	--	--
362	South San Francisco	18	9	51.6%	2	0.234	0.01 - 0.46	0	--	--
350	Daly City	317	15	4.8%	1	0.009	0.01	0	--	--
32	Belmont	67	2	3.3%	0	--	--	1	--	0.17
317	South San Francisco	32	9	27.1%	0	--	--	1	--	0.45
66	Menlo Park	64	19	29.8%	1	0.06	0.06	1	--	0.39
1006	Burlingame	306	49	15.9%	5	0.10	0.01 - 0.14	1	--	0.36
319	South San Francisco	99	31	31.2%	1	--	0.06	1	--	0.08
318	South San Francisco	70	32	45.4%	1	--	0.01	1	--	0.27
1004	Brisbane	804	507	63.0%	4	0.02	0.01 - 0.04	1	--	0.11
156	San Mateo	40	7	17.0%	1	--	0.01	1	--	0.20
323	Redwood City	185	2	0.9%	0	--	--	1	--	0.19
306	South San Francisco	37	7	18.4%	0	--	--	2	0.18	0.17 - 0.18
315	South San Francisco	108	34	31.8%	10	0.04	0.02 - 0.43	2	0.60	0.17 - 1.02

WMA ID	Permittee	Area (acres)	Area High Interest Parcels (acres)	Percent High Interest Parcels	Sediment Samples			Stormwater Runoff Samples		
					n	PCBs Median (mg/kg)	PCBs Range (mg/kg)	n	PCBs Particle Ratio Median (mg/kg)	PCBs Particle Ratio Range (mg/kg)
324	Redwood City	44	1	2.0%	0	--	--	1	--	0.17
141	Burlingame	62	4	6.9%	0	--	--	1	--	0.17
89	San Mateo	98	10	10.3%	2	0.02	0.01 - 0.04	1	--	0.14
327	Redwood City	126	7	5.1%	3	0.05	0 - 0.08	1	--	0.13
337	Redwood City	138	16	11.5%	4	0.04	0.02 - 0.08	1	--	0.12
293	South San Francisco	654	58	8.9%	2	0.04	0.01 - 0.07	1	--	0.12
254	Redwood City	39	4	9.9%	1	--	0.09	1	--	0.11
316	South San Francisco	117	26	21.9%	3	0.02	0 - 0.03	1	--	0.10
72	East Palo Alto	26	12	44.4%	2	0.02	0.02 - 0.02	1	--	0.08
267	Redwood City	75	16	20.9%	1	--	0.01	1	--	0.06
388	Redwood City	42	1	1.4%	0	--	--	1	--	0.05
71	Menlo Park	1,394	22	1.6%	1	--	0.01	1	--	0.04
296	South San Francisco	1,272	7	0.6%	0	--	--	1	--	0.03
292	San Bruno	220	37	16.9%	19	0.12	0 - 0.18	1	--	0.01
313	South San Francisco	77	11	14.3%	1	--	0.01	0	--	--
1005	Millbrae	791	59	7.4%	1	--	0.01	0	--	--
1007	San Mateo	87	7	8.4%	1	--	0.01	0	--	--
1014	Menlo Park	176	18	10.3%	3	0.02	0.01 - 0.03	0	--	--
354	South San Francisco	10	4	44.7%	1	--	0.02	0	--	--
403	San Mateo	48	1	1.4%	1	--	0.02	0	--	--
332	Menlo Park	17	1	5.1%	1	--	0.03	0	--	--
1009	San Mateo	175	43	24.3%	2	0.03	0.03 - 0.04	0	--	--
1015	East Palo Alto	52	48	92.7%	2	0.04	0.02 - 0.06	0	--	--
253	Redwood City	280	16	5.8%	1	--	0.05	0	--	--
16	Burlingame	24	8	31.4%	1	--	0.05	0	--	--
1012	Menlo Park	54	42	79.4%	1	--	0.06	0	--	--
101	San Mateo	221	10	4.3%	1	--	0.08	0	--	--

WMA ID	Permittee	Area (acres)	Area High Interest Parcels (acres)	Percent High Interest Parcels	Sediment Samples			Stormwater Runoff Samples		
					n	PCBs Median (mg/kg)	PCBs Range (mg/kg)	n	PCBs Particle Ratio Median (mg/kg)	PCBs Particle Ratio Range (mg/kg)
1002	South San Francisco	316	66	20.9%	3	0.08	0.02 - 0.12	0	--	--
357	South San Francisco	17	3	18.5%	1	--	0.09	0	--	--
1010	Foster City	273	8	3.1%	0	--	--	0	--	--
1013	Redwood City	40	4	8.9%	0	--	--	0	--	--
1017	San Mateo	19	4	21.1%	0	--	--	0	--	--
120	San Mateo	10	1	4.9%	0	--	--	0	--	--
138	Burlingame	15	5	29.9%	0	--	--	0	--	--
207	San Carlos	82	7	8.2%	0	--	--	0	--	--
247	Menlo Park	239	20	8.5%	0	--	--	0	--	--
252	Menlo Park	108	5	4.9%	0	--	--	0	--	--
261	Atherton	1,679	3	0.2%	0	--	--	0	--	--
269	Redwood City	45	4	9.2%	0	--	--	0	--	--
290	San Bruno	2,017	9	0.4%	0	--	--	0	--	--
297	South San Francisco	30	2	6.7%	0	--	--	0	--	--
311	South San Francisco	111	3	2.8%	0	--	--	0	--	--
325	Redwood City	21	1	4.8%	0	--	--	0	--	--
329	Colma	806	4	0.5%	0	--	--	0	--	--
334	Redwood City	19	4	18.3%	0	--	--	0	--	--
335	Redwood City	24	0	0.0%	0	--	--	0	--	--
352	South San Francisco	40	7	16.7%	0	--	--	0	--	--
378	Menlo Park	138	4	2.9%	0	--	--	0	--	--
395	Millbrae	480	8	1.6%	0	--	--	0	--	--
399	San Mateo	32	1	4.6%	0	--	--	0	--	--
405	Redwood City	22	22	100.0%	0	--	--	0	--	--
57	San Carlos	63	4	5.6%	0	--	--	0	--	--
68	East Palo Alto	317	0.5	0.2%	0	--	--	0	--	--
80	San Carlos	21	1	4.7%	0	--	--	0	--	--

WMA ID	Permittee	Area (acres)	Area High Interest Parcels (acres)	Percent High Interest Parcels	Sediment Samples			Stormwater Runoff Samples		
					n	PCBs Median (mg/kg)	PCBs Range (mg/kg)	n	PCBs Particle Ratio Median (mg/kg)	PCBs Particle Ratio Range (mg/kg)
90	San Mateo	21	0.3	1.4%	0	--	--	0	--	--
92	San Mateo	136	4	2.7%	0	--	--	0	--	--
Other -	Unincorporated	10,917	343	3.1%	3	0.00	0 - 0.04	0	--	--
Other -	Woodside	7,286	5	0.1%	1	--	0	0	--	--
Other -	Menlo Park	2,487	25	1.0%	1	--	0.02	0	--	--
Other -	Colma	1,139	5	0.4%	4	0.03	0 - 16.81	0	--	--
Other -	San Carlos	2,517	2	0.1%	1	--	0.06	0	--	--
Other -	East Palo Alto	274	4	1.4%	1	--	0.07	0	--	--
Other -	Redwood City	6,030	6	0.1%	6	0.07	0.01 - 0.34	0	--	--
Other -	San Mateo	5,800	55	0.9%	1	--	0.09	0	--	--
Other -	South San Francisco	1,554	3	0.2%	1	--	0.19	0	--	--
Other -	Atherton	2,315	1	0.0%	0	--	--	0	--	--
Other -	Belmont	2,511	5	0.2%	0	--	--	0	--	--
Other -	Brisbane	245	0.4	0.2%	0	--	--	0	--	--
Other -	Burlingame	1,827	9	0.5%	0	--	--	0	--	--
Other -	Daly City	1,131	11	1.0%	0	--	--	0	--	--
Other -	Foster City	2,065	0	0.0%	0	--	--	0	--	--
Other -	Hillsborough	3,974	3	0.1%	0	--	--	0	--	--
Other -	Millbrae	1,309	3	0.2%	0	--	--	0	--	--
Other -	Portola Valley	5,790	0	0.0%	0	--	--	0	--	--
Other -	San Bruno	542	0	0.0%	0	--	--	0	--	--

Notes:

Total PCBs = sum of the 40 PCBs congeners analyzed by the RMP for Bay samples.