Appendix I

Water Quality

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Table of Contents

List of Tables

List of Figures

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Appendix I
Water Quality

This appendix provides information on the existing water quality at the San Diego International Airport (SAN), based on the following documents:

- The 2015 SAN Storm Water Management Plan (SWMP) as updated and amended;[1]
- The 2016 San Diego Bay Watershed Management Area Water Quality Improvement Plan – Final Deliverable: Water Quality Improvement Plan as updated and amended, including the associated Annual Reports;[2]
- The 2016 SAN Water Stewardship Plan;[3]
- The 2017 SAN Phase II Strategic Stormwater Master Plan;[4] and
- The 2018 Strategic Stormwater Master Plan, Capture and Reuse Project.[5]

Several specific regulatory programs and requirements that inform and are related to the current programs and plans implemented at SAN to address water quality are also discussed.

1.0 Selected Regulatory Programs and Requirements

SAN Storm Water Management Plan (SWMP)

The San Diego County Regional Airport Authority (SDCRAA or "the Authority"), as the owner and operator of SAN, is subject to the requirements of the following two National Pollutant Discharge Elimination System (NPDES) stormwater permits:

- State Water Resources Control Board (SWRCB) Order No. 2014-0057-DWQ, NPDES General Permit No. CAS000001, General Permit for Storm Water Discharges Associated with Industrial Activities (Industrial General Permit).
- San Diego Regional Water Quality Control Board (RWQCB) Order No. R9-2013-0001, as amended by RWQCB Order Nos. R9-2015-0001 and R9-2015-0100, NPDES Permit No.

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[1] San Diego County Regional Airport Authority, *SAN Storm Water Management Plan*, June 2015, Amended January 2019. The SWMP is updated regularly as needed to reflect changing conditions and permit requirements. See https://www.san.org/DesktopModules/Bring2mind/DMX/Download.aspx?EntryId=12857&Command=Core_Download&language=en-US&PortalId=0&TabId=183.

[2] San Diego Bay Responsible Parties, *San Diego Bay Watershed Management Area Water Quality Improvement Plan – Final Deliverable: Water Quality Improvement Plan*, February 2016. The Plan is updated through Annual Reports.

[3] San Diego County Regional Airport Authority, *Water Stewardship Plan-San Diego International Airport-Protecting Our Water Resources*, Prepared by Haley & Aldrich, Inc., May 2016. Available: http://san.org/Portals/0/Documents/Environmental/2016_0509_Water%20Stewardship%20Plan%20Document_F2.pdf.

[4] San Diego County Regional Airport Authority, *Phase II Strategic Stormwater Master Plan-San Diego International Airport,* Prepared by Michael Baker International, July 2017.

[5] San Diego County Regional Airport Authority, *Strategic Stormwater Master Plan, Capture and Reuse Project*, Prepared by AECOM, August 2018.

CAS0109266, NPDES Permit and Waste Discharge Requirements for Discharges from the Municipal Separate Storm Sewer Systems (MS4) Draining the Watersheds Within the San Diego Region (Municipal Permit).

The Authority prepared, and subsequently updated, the SAN SWMP to serve as the Storm Water Pollution Prevention Plan (SWPPP) for meeting the applicable requirements of the Industrial General Permit, as well as the Jurisdictional Runoff Management Program (JRMP) for meeting the applicable requirements of the Municipal Permit. The SAN SWMP complies with the Industrial General Permit requirements of a SWPPP by describing potential pollutant sources, the Best Management Practices (BMPs) implemented to address them, and other Industrial General Permit requirements. It addresses the Municipal Permit requirements of the JRMP document by serving as an informational document that provides a written account of the overall program to be conducted by the Authority to comply with the Municipal Permit.

It has been adapted to reflect reorganization under the 2013 Municipal Permit, and has been updated to incorporate strategies from the Water Quality Improvement Plan (WQIP) for the San Diego Bay Watershed Management Area, developed under Provision B of the MS4 Permit.

BMP Design Manual

The 2013 MS4 Permit updated and expanded stormwater requirements for control of post-construction urban runoff pollution from new developments and redevelopment projects. The Copermittees were required to prepare a Model BMP Design Manual to replace the Countywide Model Standard Urban Stormwater Mitigation Plan (SUSMP), dated March 25, 2011, which was based on the requirements of the 2007 MS4 Permit. Each Copermittee was required to update their own jurisdictional BMP Design Manual with jurisdiction-specific information. The BMP Design Manual guides a project proponent through the selection, design, and incorporation of stormwater BMPs or stormwater treatment control/management facilities that must be implemented to obtain approval of project plans.

The requirements of the MS4 Permit and the Authority's BMP Design Manual require that 100 percent of the pollutants, contained in the volume of stormwater runoff produced from a 24-hour 85^{th} percentile storm event, be retained on-site. It should be noted that the 24-hour 85^{th} percentile storm event design standard is intended to focus on the majority of storm events that occur within an area, with a particular emphasis on initial storms in the rainy season that produce what is known as the "first flush." As indicated in the MS4 Permit for San Diego County, the "first flush" of a rainy season and the first storm events after long dry periods tend to have the highest pollutant loads. Capturing and retaining "first flush" pollutant loads reduces a significant portion of the pollutants in stormwater discharged. Use of the 24-hour 85^{th} percentile rainfall event as a BMP design standard recognizes that smaller storm events are more treatable than large storm events and that large storm events have higher dilution factors. On-site pollutant retention should be accomplished using stormwater capture and reuse or infiltration. These methods must be found technically infeasible before considering biofiltration and other flow-through stormwater treatment controls.

There are several provisions of the Authority's BMP Design Manual that are jurisdiction-specific. The Authority's BMP Design Manual excludes hydromodification requirements, because SAN meets the MS4 Permit exemption for these requirements. The Authority's BMP Design Manual states that groundwater at SAN does not support beneficial uses (as identified in the Water Quality Control Plan for the San Diego Basin, 1994/1995 as amended[6] and described further below) and that, as a result, the Authority may approve infiltration BMPs, where the vertical distance from the base of the infiltration BMP to the seasonal high groundwater mark is less than 10 feet, provided groundwater quality is maintained.

Finally, the Authority's BMP Design Manual provides information on a framework for the alternative compliance program that might be applicable to the post-construction stormwater treatment controls of development and redevelopment projects.

San Diego Bay Watershed Management Area Water Quality Improvement Plan (WQIP)

The Authority has chosen reduction in the concentrations of copper and zinc in wet weather stormwater discharges as its Focused Priority Water Quality Condition, because copper and zinc continue to be the primary pollutants of concern (POCs). The San Diego Bay WQIP lists the goals, schedules, and strategies to be implemented by the Authority throughout SAN to address this condition.

Strategies listed in the WQIP intended to help the Authority meet the water quality goals for copper and zinc in wet weather discharges at SAN, and which are currently being implemented, include the following:

- Increasing areas swept, especially in runway and taxiway areas, and optimizing sweeping locations and frequencies;
- Optimizing catch basin cleaning and inlet protection;
- Identifying and targeting high-priority pollutant-generating areas for enhanced inspections, and BMP implementation and enforcement;
- Continuing to implement green infrastructure and treatment control BMPs, where feasible; and
- Continuing public education and training efforts.

As required by the MS4 Permit, the San Diego Bay WQIP also lists schedules for meeting both interim and final goals for this Focused Priority Condition. The interim goals for the Authority are based on the established thresholds for stormwater parameters referred to as Numeric Action Levels (NAL)[7] in the Industrial General Permit and the final goals are based on the California Toxic Rule criteria for copper and zinc. The interim goals are expressed as the percentage of wet weather discharge samples with concentrations of copper and zinc that exceed the NALs for those contaminants (33.2 micrograms per liter [μg/L] for copper and 260 μg/L for zinc). The final goals are expressed as the percentage of wet weather discharge samples with concentrations of contaminants that exceed the California Toxic Rule values for copper and zinc in saltwater (4.8 μg/L and 90 μg/L, respectively).

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[6] California Regional Water Quality Control Board San Diego Region, *Water Quality Control Plan for the San Diego Basin*, September 8, 1994 as amended. Available: https://www.waterboards.ca.gov/sandiego/water_issues/programs/basin_plan/.

[7] As stated in the Construction General Permit, NALs "are essentially numeric benchmark values for certain parameters that, if exceeded in effluent sampling, trigger the discharger to take actions.

The San Diego Bay WQIP lists three time periods during which progress towards interim goals is to be assessed, namely, the fiscal years 2013-2017 time period, the fiscal years 2016-2020 time period, and the fiscal years 2021-2025 time period. The assessment of progress toward the final goal for the Authority's Focused Priority Condition related to copper and zinc is conducted during the fiscal years 2026-2030 time period. The interim numeric goals for the fiscal years time period of 2016-2020 was targeted for fiscal year 2017-2018, which has already passed. As such, the Authority is now targeting the interim goals for the 2021-2025 which are paraphrased as follows:

- No more than 20 percent of wet weather stormwater samples will contain concentrations of dissolved copper above the NAL of 33.2 µg/l; and
- No more than 25 percent of wet weather stormwater samples will contain concentrations of dissolved zinc above the NAL of 260 µg/l.

Total Maximum Daily Load Designation

The Total Maximum Daily Load (TMDL) program, established under Section 303(d) of the 1972 Federal Water Pollution Control Act (also known as the Clean Water Act [CWA]), identifies and attempts to restore waters that do not meet water quality standards, even though the discharges received may be in compliance with existing pollution controls. The TMDL is the maximum amount of pollutants that a waterbody can accept and still meet water quality standards. Federal regulations require that development of the TMDL consider contributions from point sources (federally permitted discharges) and nonpoint sources. TMDLs are established at the level necessary to implement the applicable water quality standards. Point sources are defined in the CWA, Section 502. Nonpoint sources are not defined in the statute but are considered to be any source that is not covered under the point source definition. A typical example of a nonpoint source is stormwater. The U.S. Environmental Protection Agency (USEPA) has established regulations requiring that NPDES permits be revised to be consistent with any approved TMDL. Under CWA Section 303(d), states are required to submit to USEPA a list identifying waters within its boundaries not meeting water quality standards (impaired waters) and the water quality parameter (i.e., pollutant) not being met (referred to as the 303(d) List[8]). States are also required to include a priority ranking of such waters, taking into account the severity of the pollution and the impacted beneficial uses, for the development of TMDLs. San Diego Bay is currently listed under Section 303(d) as "impaired" for impacts due to mercury, polycyclic aromatic hydrocarbons (PAHs), and polychlorinated biphenyls (PCBs). In addition, portions of San Diego Bay into which stormwater from SAN discharges are listed under CWA Section 303(d) as "impaired" for impacts due to copper, sediment toxicity, and benthic community effects.

Water Quality Control Plan (Basin Plan)

The RWQCB is required to prepare and periodically update a Water Quality Control Plan (Basin Plan)[9] that establishes existing and potential beneficial uses of surface water and groundwater for each body of water within the San Diego County region. According to the Basin Plan for San Diego,

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[8] California State Water Resources Control Board, *2014 and 2016 California Integrated Report (Clean Water Act Section 303(d) List and 305(b) Report)*, 2018. Available: https://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2014_2016.shtml.

[9] California Regional Water Quality Control Board San Diego Region, *Water Quality Control Plan for the San Diego Basin*, September 8, 1994 as amended. Available: https://www.waterboards.ca.gov/sandiego/water_issues/programs/basin_plan/.

beneficial uses are defined as the uses of water necessary for the survival or well-being of man, plants, and wildlife. These uses of water serve to promote the tangible and intangible economic, social, and environmental goals of mankind and include drinking, swimming, industrial, and agricultural water supply, as well as the support of fresh and saline aquatic habitats.

Beneficial uses have been designated for specific coastal bodies of water, inland surface waters, and groundwaters. There are no inland surface bodies of water located on SAN property; therefore, contaminated discharges or runoff would not directly degrade or adversely affect beneficial uses of an on-site receiving water. The closest identified inland surface water is the stream referred to as Powerhouse Canyon (also known locally as "Florida Canyon") located in Balboa Park, more than one mile northeast of SAN. Powerhouse Canyon does not drain onto SAN, nor does SAN drain into Powerhouse Canyon.

The waters, to which stormwater from SAN discharges, are the coastal waters of the San Diego Bay and groundwater of the San Diego Mesa Hydrologic Area. Groundwater underlying SAN and the Liberty Station mixed-use development (the former Naval Training Center) to the west is not used for drinking, irrigation, or industrial supply purposes. This is largely because the groundwater is of poor quality due to its high salinity, a condition resulting from the site's close proximity to San Diego Bay. No existing or potential beneficial uses for groundwater are designated for the San Diego Mesa Hydrologic Area. According to the Basin Plan, groundwater within this hydrologic area has been exempted by the San Diego RWQCB from the municipal use designation under the terms and conditions of State Board Resolution No. 88-63, "Sources of Drinking Water Policy."

2.0 Environmental Setting

This section describes the existing hydrology and water quality conditions at SAN and the vicinity. These conditions include a description of the local topography, regional hydrologic units, groundwater, surface water conditions, and water quality characteristics.

2.1 Topography

SAN is generally flat, with local minor elevation variations due to landscaping. Ground surface elevations across the area range from approximately 10 to 20 feet above mean sea level (msl).

2.2 Hydrologic Units

The Proposed Project area is situated within the Pueblo San Diego Hydrologic Unit listed in the San Diego Basin Plan. Data from Lindbergh Field, the San Diego Airport (WSO COOP ID #047740) for the period between 1914 to 2012 shows the mean annual rainfall was 10.13 inches, the maximum annual rainfall was 24.93 inches in 1941, and the minimum annual rainfall was 3.41 inches in 1953.

2.3 Groundwater

Depths to groundwater range from approximately 7 to 12 feet below ground surface. Flow rate is low due to flat topography and low permeability. Recharge of the groundwater is limited, since most of the land surface at SAN is paved or semi-paved and, therefore, impervious. Groundwater flow is southward toward San Diego Bay.

The general hydrologic regime includes: freshwater underflow from the regional groundwater system toward San Diego Bay; freshwater recharge from water and wastewater distribution, collection, and transmission lines; saline water encroachment from the ocean, and potentially from the larger, deeper storm drains; and brackish to saline native groundwater beneath the artificial fill. The San Diego Formation in the area south of SAN is the principal aquifer that provides groundwater recharge. Because of SAN's proximity to San Diego Bay, diurnal changes in sea level caused by lunar tides cause concurrent changes in the level of groundwater elevations in the near-shore groundwater.

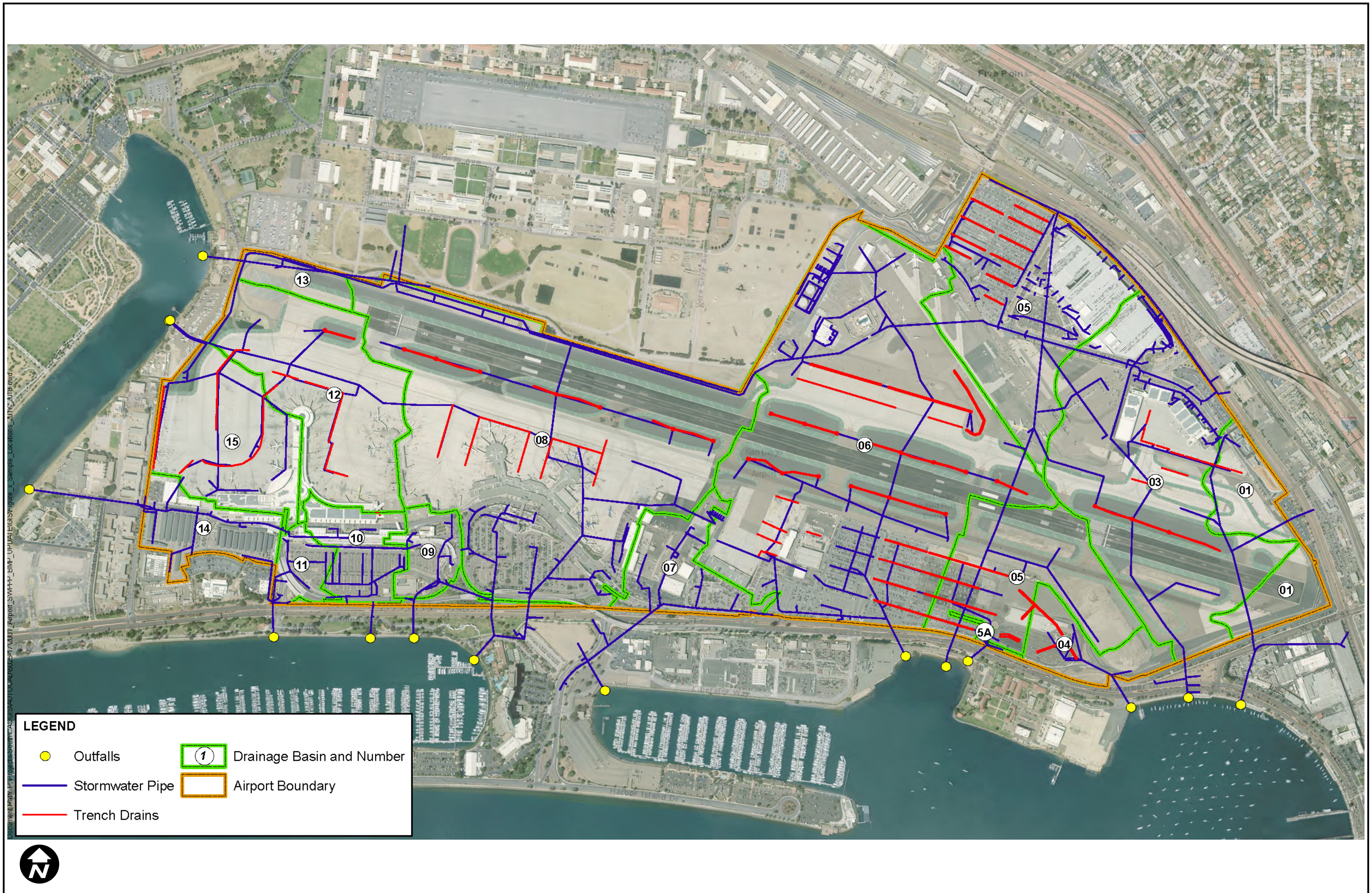
2.4 Surface Water

Surface water in the vicinity of SAN is dominated by San Diego Bay to the south and a leg of the Bay, called the Navy Boat Channel or former Naval Training Center Boat Channel or "the boat channel," which runs north-south along the western boundary of SAN. Drainage typically flows in a southerly direction toward San Diego Bay and a southwesterly direction toward the boat channel. The largest body of fresh water in proximity to SAN is the San Diego River approximately one mile to the north, which flows in an east-west direction and drains into the Pacific Ocean.

San Diego Bay is the largest marine and bay estuary in Southern California. Depths range from 20 feet at narrow areas to 40 feet in the northern portion, with an average depth of 15 feet. As a working harbor, San Diego Bay includes recreational boating areas and commercial docks. The boat channel formerly was a portion of the San Diego River Channel, which was diverted to its present location in the 1800s. The boat channel measures approximately 4,922 feet long by 558 feet wide with an average depth of 15 feet. As a result of shoaling (i.e., sediment accumulation/ deposition), the boat channel entrance to San Diego Bay may be shallow.

Approximately 90 percent of SAN property is considered impervious area as the surface is covered by buildings and paved surfaces. As noted above, surface runoff at SAN flows primarily towards the south to San Diego Bay, and the west-southwest to the boat channel. **Figure 1** delineates the overall existing stormwater management system at SAN, including the general locations of existing storm drain lines, flow directions, and outfalls, as well as existing structural BMPs. The numbering of the drainage basins as shown on the figures in this appendix is no longer continuous due to changes in the airport drainage system over time.

Currently, SAN discharges its stormwater runoff into the San Diego Bay via sheet flow into gutters and drainage outfalls located around the perimeter of SAN property. Flow in the majority of the storm drain system is intermittent and dependent on the amount of rainfall and subsequent runoff. SAN currently has 15 outfalls, only two of which discharge stormwater exclusively from SAN and are owned by the Authority; the remaining 13 outfalls discharge runoff that commingles with runoff from other jurisdictions, who also own those outfalls.



Source: Wood PLC Environment and Infrastructure Solutions, August 2019.

Figure 1

EXISTING STORMWATER MANAGEMENT SYSTEM AT SAN

2.5 Water Quality

Pollutants typically found in SAN runoff include sediment, nutrients (e.g., fertilizers), oxygen-demanding substances (e.g., decaying vegetation), bacteria (including coliform bacteria), heavy metals (aluminum, cadmium, chromium, copper, iron, lead, nickel, silver, and zinc), synthetic organics (e.g., fuels, oils, solvents, lubricants), pesticides, and other toxic substances.

Rainfall on the runways and taxiways, as well as industrial and commercial sites, picks up a multitude of pollutants. These pollutants dissolve in the runoff or adsorb onto soil particles and are transported by gravity flow through the network of concrete channels and underground pipes that comprise the SAN storm drain conveyance systems. Areas at SAN that store materials pose pollutant release potential to enter the stormwater system; however, operations at SAN are subject to the requirements of the SAN SWMP. The SWMP includes current inventories and characterizations of materials and activities that could adversely impact stormwater quality and delineates BMPs and management practices to avoid such impacts, and also sets forth a program for inspection and enforcement of such BMPs and practices.

Although implemented as a unified program, the components of the SAN SWMP are discussed below in regard to construction-related discharges, industrial-related discharges, and municipal (MS4)-related discharges to coincide with the description of the NPDES permits for those three types of stormwater discharges. Stormwater discharge sample collection and laboratory analysis are the principle means of evaluating the impact on the condition of receiving waters (such as San Diego Bay) caused by discharges from these 3 sources/activities. Each of the three NPDES permits applicable to SAN include requirements for stormwater discharge monitoring.

Construction-related Discharges

The Construction General Permit, NPDES Permit No. CAS000002, requires stormwater discharge monitoring for construction sites based on the risk of impacts to receiving waters. Only Risk Levels 2 and 3 are required to collect stormwater discharges, although Risk Level 1 sites with a potential to discharge non-visible pollutants must also collect stormwater discharge samples. The relatively flat topographic relief of the SAN site and the absence of "sediment-sensitive waterbody" designation for San Diego Bay results in most construction projects as SAN being considered Risk Level 1. Those project sites were also managed during development in a manner that precluded the need for any stormwater discharge sampling.

Industrial- and Municipal-related Discharge Monitoring

In 2005, after the Authority began operation of SAN, the Authority reviewed the previous 10 years of stormwater runoff quality sampling data collected at SAN to identify the primary POCs. The results of the review were detailed in the 2005 Site Audit Report[10] and identified 13 POCs that exceeded certain benchmark values that were derived from the California Toxic Rule,[11] the USEPA

[10] MACTEC, *Site Audit Report for Storm Drainage System BMP Program at San Diego International Airport*, June 2005.

[11] Numeric Criteria for Priority Toxic Pollutants for the State of California; California Toxic Rule (40 CFR 131.38), USEPA, 65 Federal Register (FR) 31682-31719, May 18, 2000. Available: https://archive.epa.gov/region9/water/archive/web/html/index-20.html.

Multi-Sector Permit,[12] and USEPA Recommended Ambient Water Quality Criteria,[13] as applicable. Total and dissolved copper and total and dissolved zinc were identified as the priority/primary POCs, because they exceeded the benchmark values more than 50 percent of the time. Annual stormwater runoff sampling conducted since 2005 continues to show that total and dissolved copper and zinc remain the primary POCs. Thus, the Authority has chosen the reduction of concentrations of copper and zinc in wet weather stormwater discharges as its Focused Priority Water Quality Condition in the San Diego Bay Watershed WQIP.

In 2008, a subsequent study evaluated and identified the largest sources of copper and zinc and the BMPs that might best be able to prevent or reduce their impacts to receiving waters. As noted in the 2007-2008 Storm Water Sampling Summary Report,[14] the sources for copper on a scale of highest to lowest were runway/airfield ramps, roofs, parking lots, and SAN operation areas. As for zinc, the highest to lowest sources were roofs, runway/airfield ramps, parking lots, and SAN operations areas. As such, the source identification sampling found that the runway/airfield ramp areas and roofs should be considered as the priority areas for treatment control BMPs to be implemented to reduce copper and zinc loads in stormwater discharges.

Since the 2006-2007 wet-season (or wet-weather or rainy season), the NPDES Permits-required stormwater sampling/monitoring program at SAN has been conducted annually in accordance with the Stormwater Monitoring Programs outlined in Appendix D of the SWMP. Sample locations have been modified over time in response to various operational changes and construction projects. With the latest MS4 Permit having taken effect on June 27, 2013, and the latest Industrial General Permit having taken effect on July 1, 2015, the sampling plans in Appendix D of the SWMP were updated to guide future monitoring and sampling activities. Additions to the program included analyses to address changes in the Permits, the 303(d) listings, investigative orders issued by the San Diego Water Board pertinent to the Authority, the incorporation of the BMP Design Manual into the SWMP, and various changes in the nature and location of SAN activities. There are two main stormwater sampling programs in Appendix D that monitor wet-season stormwater discharges from SAN, namely: (1) the Industrial Monitoring Implementation Plan; and the (2) the Municipal Wet Weather Monitoring Program. The Stormwater Monitoring Programs are updated frequently in response to changing site conditions, changing permit requirements, and other relevant factors. The Stormwater Monitoring Programs, as updated in January 2019, have the following objectives:

- Identify and characterize sources of POCs.
- Measure BMP implementation and pollutant removal effectiveness to assess compliance with best available technology economically achievable (BAT), best conventional pollutant control technology (BCT), and maximum extent practicable (MEP) standards, as applicable,

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[12] National Pollutant Discharge Elimination System (NPDES) Storm Water Multi-Sector General Permit for Industrial Activities, USEPA, 65 Federal Register (FR) 64746, Final Reissuance, October 30, 2000.

[13] U.S. Environmental Protection Agency, *National Recommended Ambient Water Quality Criteria – Saltwater or Freshwater Aquatic Life Protection*, various dates prior to 2005. Available: https://www.epa.gov/wqc/national-recommended-water-quality-criteria-aquatic-life-criteria-table.

[14] MACTEC, *2007-2008 Storm Water Sampling Summary Report*, September 2008.

and track water quality over time as current BMPs are implemented and as new BMPs (or modifications to existing BMPs) are introduced.

- Compare POCs levels in stormwater runoff (stormwater quality) with the NAL requirements set by the Industrial General Permit, or other relevant benchmarks.
- Track and review progress toward meeting the goals in the WQIP and assess the effectiveness of pollutant control strategies being implemented. The first three interim goals of the WQIP are to ensure that the majority of stormwater runoff quality meets the NALs for copper and zinc.
- Gather information for investigative orders, CWA Section 303(d) list of water quality impaired segments (303(d) list), and pending TMDLs that may impact areas under SDCRAA jurisdiction.

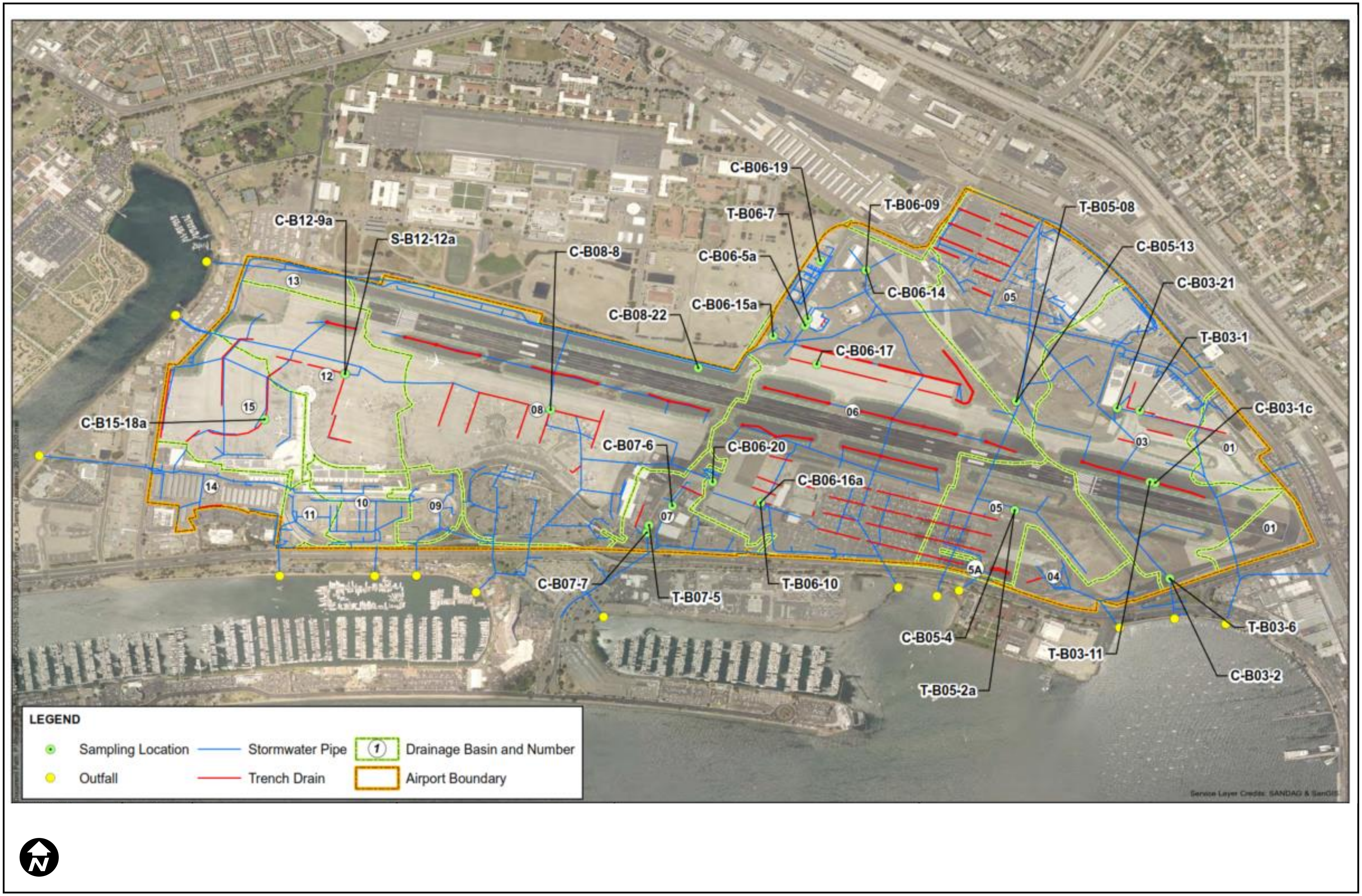
The implementation of the 2019-2020 monitoring program is summarized below, along with results and findings, as detailed in the Stormwater Sampling Report 2019-2020.[15]

The wet-weather sampling locations outlined in the monitoring programs have been selected to monitor compliance with the Industrial General Permit, with the data collected from those sites used to monitor the compliance with the Municipal Permit/Water Quality Improvement Plan goals. As such, there are 17 sample locations and one alternate location throughout the 7 of 15 drainage basins at SAN, in which industrial activities occur. The sampling locations were selected on the basis of continuing review of the potential pollutants and pollutant sources, the scope of industrial operations within those particular drainage basins, the requirements of the Industrial General Permit, and recently installed treatment control BMPs (sampling locations were moved to be downstream from those treatment control BMPs, where feasible). **Figure 2** shows the 15 drainage basins, those seven in which industrial activities occur, and the sampling locations at SAN. Sampling locations were selected as far downstream as feasible to capture as many areas as possible with industrial activities within a given drainage basin. Where sampling locations were tidally influenced or access was restricted (e.g., when aircraft were present in the aircraft movement area), samples of sheet flow runoff were collected.

The Industrial General Permit requires that four samples be collected annually from each sample site within four hours after the start of discharge. At SAN, given the generally erratic rain patterns, sampling teams are on call 24 hours a day/seven days a week at the request of the Authority to maximize the potential for capturing runoff samples from a storm event.

The Industrial General Permit requires that oil and grease (O&G), total suspended solids (TSS), and pH (measure of how acidic/basic water is) must be analyzed at all compliance sampling locations. Three analytes, namely, biochemical oxygen demand (BOD), chemical oxygen demand (COD), and ammonia are specifically listed in the Industrial General Permit as required analytes for air transportation facilities. In addition, samples must be analyzed for analytes that are likely to be found in stormwater runoff, including any related to receiving water 303(d) list impairments or any approved TMDLs. Thus, samples collected at SAN are analyzed for PCBs, PAHs, indicator

[15] Wood PLC Environment and Infrastructure Solutions, *Stormwater Sampling Report 2019-2020 (Draft)*, November 2020.



Source: Wood PLC Environment and Infrastructure Solutions, November 2020.

Figure 2

SAN DRAINAGE BASINS AND STORMWATER SAMPLING LOCATIONS (2019-2020)

bacteria (total coliform, fecal coliform, and Enterococcus), total and dissolved metals (arsenic, cadmium, chromium, trivalent chromium, hexavalent chromium, and nickel), plus dissolved lead, total hardness, and organochlorine pesticides. The remaining analytes, including total metals (aluminum, copper, iron, lead, and zinc), dissolved metals (copper and zinc), methylene blue active substances (MBAS), ethylene glycol, total petroleum hydrocarbons (TPH), and specific conductance (SC) were selected on the basis of an evaluation of activities conducted within the drainage basins at SAN and review of the dataset that included historical water quality results from on-site sampling and relevant publicly available data sources for other comparable offsite locations, as noted above in the 2005 Sampling Plan. As such, samples from the compliance sampling locations were analyzed for these POCs, with variations occurring at different sites according to the industrial pollutant source assessments for each area and site conditions at the time of sampling.

Prior to the 2013-2014 monitoring season, mercury was added as a potential source of pollutants from industrial activities as a result of investigative orders issued by the RWQCB for areas in the northern portion of San Diego Bay and a subsequent re-evaluation of potential industrial pollutant sources. During the 2013-2014 and the 2014-2015 monitoring seasons, sampling results showed mercury was not detected at any of the compliance sites; therefore, mercury was removed from all compliance sampling locations' analyte lists during the 2015 SWMP update. Common industrial sources of mercury include establishments primarily engaged in manufacturing metal products and motor vehicle dismantlers, which are not activities that are performed at SAN.

For the 2019-2020 monitoring season, eight rounds of compliance sampling were completed for eight monitored storm events. The total rainfall for the eight storm events was 6.28 inches and the monitoring season's total rainfall for SAN was 13.57 inches, which is approximately 30 percent above the annual total average rainfall of approximately 10 inches. As many as 56 total compliance samples were collected during the eight storm events at 15 sampling locations. **Table 1** summarizes the mean, maximum, and minimum for the analytical results, and identifies the benchmarks for each POC.

Table 1: Compliance Sampling Analytical Results Summary, 2019-2020 Monitoring Season

Pollutant of Concern	Units	Minimum Value	Maximum Value	Mean[1]	Benchmarks	Number of Samples
General Chemistry						
Ammonia	mg/L	0.32	7.25	1.67	2.14	56
BOD	mg/L	1	105	20.48	30	56
COD	mg/L	1	453	81.64	120	56
Hardness	mg/L	8.7	205	37.42	-	56
MBAS	mg/L	0.025	0.26	0.1	0.5	56
O&G	mg/L	1	4.4	1.46	15	55
pH (field)	pH units	6.2	9.18	7.97	6.0–9.0	56
SC	µmhos/cm	26.3	529	133.89	900	56
Temperature	degrees Celsius (Fahrenheit)	12.1 (53.78)	23.16 (73.69)	15.89 (60.60)	-	56
TSS	mg/L	1	160	24.65	100	56
Metals						
Al	µg/L	12.6	3780	273	750	56

Table 1: Compliance Sampling Analytical Results Summary, 2019-2020 Monitoring Season

Pollutant of Concern	Units	Minimum Value	Maximum Value	Mean[1]	Benchmarks	Number of Samples
As, dissolved	µg/L	0.48	2.46	0.81	150	23
As, total	µg/L	0.61	3.32	1.13	150	23
Cd, dissolved	µg/L	0.17	2.21	0.59	5.3	56
Cd, total	µg/L	0.17	4.76	0.75	5.3	56
Cr III, dissolved	mg/L	ND	7	0.645	1700	56
Cr III, total	mg/L	ND	9.2	1.278	550	56
Cr VI, dissolved	mg/L	ND	2.1	0.398	16	56
Cr VI, total	mg/L	ND	3.1	0.563	16.3	56
Cr, dissolved	µg/L	ND	7.18	1.067	50	56
Cr, total	µg/L	ND	9.54	1.878	50	56
Cu, dissolved	µg/L	2.08	182	34.353	33.2	56
Cu, total	µg/L	3.75	283	57.14	33.2	56
Fe	µg/L	0.0065	16	0.881	1	56
Ni, dissolved	µg/L	0.33	12.1	2.144	1020	56
Ni, total	µg/L	0.346	14	2.936	1020	56
Pb, dissolved	µg/L	ND	9.27	0.708	262	56
Pb, total	µg/L	0.122	33.1	2.707	262	56
Zn, dissolved	µg/L	4.9	812	133.122	260	56
Zn, total	µg/L	8.7	983	220.29	260	56
PAHs						
Acenaphthene	µg/L	ND	ND	ND	970	55
Acenaphthylene	µg/L	ND	ND	ND	300	55
Anthracene	µg/L	ND	ND	ND	300	55
Benzo (a) anthracene	µg/L	ND	ND	ND	300	55
Benzo (a) pyrene	µg/L	ND	ND	ND	300	55
Benzo (b) fluoranthene	µg/L	ND	ND	ND	300	55
Benzo (g,h,i) perylene	µg/L	ND	ND	ND	300	55
Benzo (k) fluoranthene	µg/L	ND	ND	ND	300	55
Chrysene	µg/L	ND	ND	ND	300	55
Dibenzo (a,h) anthracene	µg/L	ND	ND	ND	300	55
Fluoranthene	µg/L	ND	ND	ND	42	55
Fluorene	µg/L	ND	ND	ND	300	55
Indeno (1,2,3-cd) pyrene	µg/L	ND	ND	ND	300	55
Naphthalene	µg/L	ND	ND	ND	2350	55
Phenanthrene	µg/L	ND	ND	ND	300	55
Pyrene	µg/L	ND	ND	ND	300	55
Organochlorine Pesticides and PCBs						
Chlordane	µg/L	ND	ND	ND	0.09	43
PCB-1016	µg/L	ND	ND	ND	0.4	55
PCB-1221	µg/L	ND	ND	ND	0.4	55
PCB-1232	µg/L	ND	ND	ND	0.4	55
PCB-1242	µg/L	ND	ND	ND	0.4	55

Table 1: Compliance Sampling Analytical Results Summary, 2019-2020 Monitoring Season

Pollutant of Concern	Units	Minimum Value	Maximum Value	Mean[1]	Benchmarks	Number of Samples
PCB-1248	µg/L	ND	ND	ND	0.4	55
PCB-1254	µg/L	ND	ND	ND	0.4	55
PCB-1260	µg/L	ND	ND	ND	0.4	55
TPH						
Diesel Range Organics (C10-C24)	mg/L	ND	0.25	ND	0.056-0.14	55
Jet-A	mg/L	ND	2.9	0.425	0.5	55
Oil Range Organics (C22-C36)	mg/L	ND	0.55	0.153	0.5	55
Glycols						
Ethylene glycol	mg/L	ND	ND	ND	140	4
Microbiology						
Total Coliforms	MPN/100 mL	110	50000	7652.5	1000	20
Fecal Coliforms	MPN/100 mL	1	1900	403.35	200	20
Enterococcus	CFU/100 mL	110	11000	2735.5	276	20

Source: Wood PLC Environment and Infrastructure Solutions, *Stormwater Sampling Report 2019-2020 (Draft)*, November 2020.

Note:

1. Half of the detection limit was used as the value for statistical analysis of results that were not detected.

Abbreviations: µg/L – micrograms per liter; µmhos/cm – micromhos per centimeter; BOD – biochemical oxygen demand; CFU/100 mL – colony forming units per 100 milliliters; COD – chemical oxygen demand; MBAS – methylene blue active substances; mg/L – milligrams per liter; MPN/100 mL – most probable number per 100 milliliters; ND – not detected; O&G – oil and grease; PAH – polycyclic aromatic hydrocarbon; PCB – polychlorinated biphenyl; SC – specific conductance; TPH – total petroleum hydrocarbons; TSS – total suspended solids.

Industrial-related Discharges

The analytical results of the compliance samples are compared with the NALs listed in the Industrial General Permit. These benchmarks are not receiving water limits. As stated in the Industrial General Permit, these benchmark concentrations are not effluent limitations and should not be interpreted or adopted as such. These values are levels that the SWRCB uses to determine whether stormwater discharges from any given facility merit further monitoring to ensure that the facility has been successful in implementing a SWPPP, or whether NAL exceedances have occurred and exceedance response actions (ERAs) are required, as described in the Industrial General Permit. As such, these levels represent a target concentration for a facility to achieve through implementation of pollution prevention measures at the facility.

For the 2019-2020 monitoring season, the sampling averages for each analyte and their corresponding annual and/or instantaneous NAL limit(s) listed in the Industrial General Permit are summarized in **Table 2**. Only total copper was detected at a concentration that exceeded the NAL, when comparing the overall mean concentration for all sites for all storms for the 2019-2020 wet-weather monitoring season.

Table 2: Analyte NAL Values and Sampling Averages

Analyte	Units	Annual NAL[1]	Instantaneous Maximum NAL[2]	Analyte Average[3] (2019 2020)
Aluminum (Total)	mg/L	0.75		0.273
Ammonia (as N)	mg/L	2.14		1.67
Arsenic (Total)	mg/L	0.15		0.001
Biochemical Oxygen Demand (BOD)	mg/L	30		20.48
Cadmium (Total)	mg/L	0.0053		0.001
Chemical Oxygen Demand (COD)	mg/L	120		81.64
Copper (Total)	mg/L	0.0332		**0.057**
Iron (Total)	mg/L	1		0.881
Lead (Total)	mg/L	0.262		0.003
Nickel (Total)	mg/L	1.02		0.003
Oil and Grease (O&G)	mg/L	15	25	1.46
pH (field)	pH units	N/A	6.0<>9.0	7.97
Total Suspended Solids (TSS)	mg/L	100	400	24.65
Zinc (Total)	mg/L	0.26		0.220

Source: Wood PLC Environment and Infrastructure Solutions, *Stormwater Sampling Report 2019-2020 (Draft)*, November 2020.

Notes:

Bold/shaded = exceedance

1. Annual NAL Exceedances – The comparison of the average concentration for each parameter using the results of all the sampling and analytical results for the entire reporting year and comparing this value to the corresponding Annual NAL values in Industrial General Permit Table 2.
2. Instantaneous NAL Exceedance – The comparison of all sampling and analytical results from each distinct sample with the corresponding instantaneous maximum NAL values in Industrial General Permit Table 2. An instantaneous maximum NAL exceedance occurs when two or more analytical results from samples taken for any parameter within a reporting year exceed the instantaneous maximum for TSS, O&G, and range for pH.
3. No instantaneous maximum NAL exceedances were observed in the 2018 – 2019 monitoring season. The parameters TSS and pH had single sampling events with detected concentrations that exceeded the instantaneous maximum NAL values, but did not have two sampling events within the monitoring season; thus, they do not qualify as instantaneous maximum NAL exceedances.

Abbreviations: mg/L – milligrams per liter; N/A – not applicable; NAL – numeric action level.

Concentrations of total copper first exceeded the NAL during the 2015-2016 monitoring season. As such, in compliance with the Industrial General Permit, the Authority performed a Level 1 ERA (exceedance response action) evaluation and developed a Level 1 ERA Report. Results of the evaluation included identifying locations with high copper concentrations, researching potential copper sources not identified in the SWPPP, ensuring that BMPs were adequate for controlling copper pollutant sources, adding and modifying existing BMPs with corresponding SWPPP revisions, and providing focused training for tenants and Authority personnel.

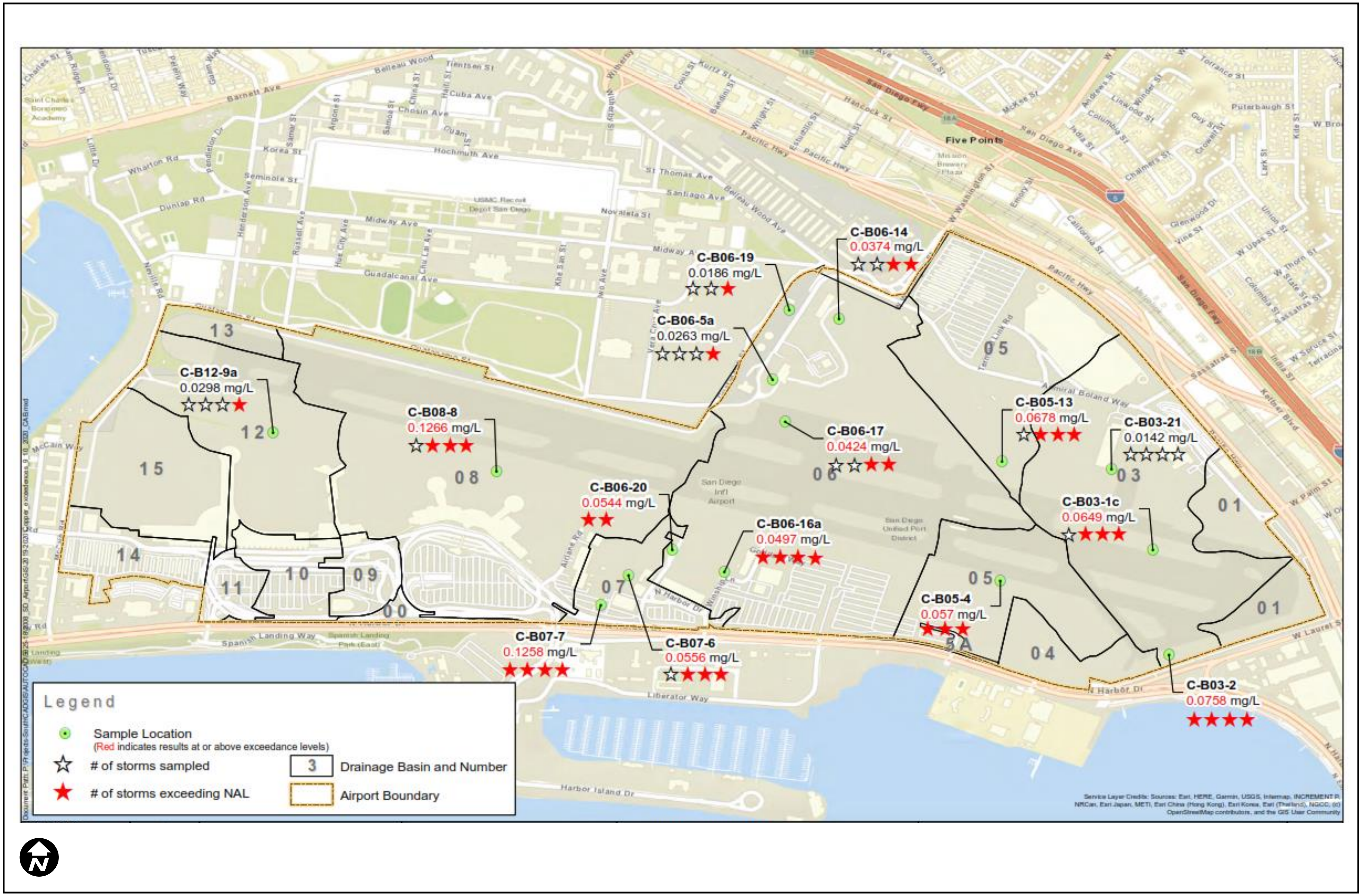
Given that the Authority was already in Level 1 status for copper at the start of the 2016-2017 monitoring season, and given that NAL for copper was again exceeded during the 2016–2017 monitoring season, the Authority was elevated to Level 2 status for copper beginning July 1, 2017. In response, the Authority developed a Level 2 ERA Action Plan detailing the Industrial Activity

BMPs Demonstration that would be conducted to evaluate all pollutant sources associated with industrial activities that are related to the NAL exceedance and to present how implemented BMPs were expected to lower copper concentrations in stormwater and, thus, prevent any future copper NAL exceedances. A Level 2 ERA Technical Report would be developed once the Level 2 ERA Action Plan has been implemented. Implementation of the Level 2 ERA Action Plan began during the 2017-2018 season. The SAN Stormwater Capture and Reuse System, the expansion of which is a component of the SDCRAA's Proposed Project, comprises one element of the Level 2 ERA Action Plan. Given that it will take several years to construct the SAN Stormwater Capture and Reuse System in its entirety, the Authority requested a multi-year extension of the time allowed to complete the Level 2 ERA Action Plan and submit the subsequent Level 2 ERA Technical Report. The San Diego RWQCB approved the request on February 19, 2019.

The 2016–2017 monitoring season recorded the first NAL exceedance for zinc. In response to this exceedance, a Level 1 ERA evaluation was conducted for zinc, whereby potential pollutant sources contributing to the exceedance were identified and BMPs were added or modified in an attempt to lower zinc concentrations in stormwater runoff. At the end of the 2016-2017 monitoring season, the Authority prepared a Level 1 ERA Report summarizing the evaluation's findings and the steps that will be taken to decrease zinc levels. In response to the 2017-2018 copper and zinc NAL exceedances and the extension granted by the San Diego RWQCB for complete implementation of the Level 2 ERA Action Plan and subsequent submittal of the Level 2 ERA Technical Report for copper, SAN revised the Level 2 ERA Action Plan to incorporate zinc, adjust the schedule and list remaining tasks to be performed. The revised action plan also identified temporary BMPs to be installed pending the stormwater capture and reuse development and other BMP installations. The Level 2 ERA Technical Report has been postponed, following San Diego RWQCB approval of the Authority's request for a multi-year extension of the time allowed for completing the Level 2 ERA Action Plan for copper (as noted above). The Revised Level 2 ERA Action Plan outlines the Industrial Activity BMPs Demonstration being conducted to evaluate all pollutant sources associated with industrial activity that are related to the NAL exceedances. Additionally, the Revised Level 2 ERA Action Plan presents how implemented BMPs are expected to lower copper and zinc concentrations in stormwater and, thus, prevent any future copper and zinc NAL exceedances. As such, implementation of the Level 2 ERA Action Plan for both copper and zinc continues at this time. However, as noted above, only total copper exceeded the NAL during the 2019-2020 wet-weather monitoring season, which indicates that the actions being implemented in the Level 2 ERA Action Plan for zinc appear to be effective.

Although all seven drainage areas with industrial activities, which are subject to the Industrial General Permit, continue to be evaluated, based on the sample locations from which sample results exceeded the NAL for copper, the focus of the ERA actions for copper is on the sampling locations and drainage areas that most frequently exceeded the NAL, namely, basins 3, 5, 6, 7, and 8, as shown in **Figure 3**.

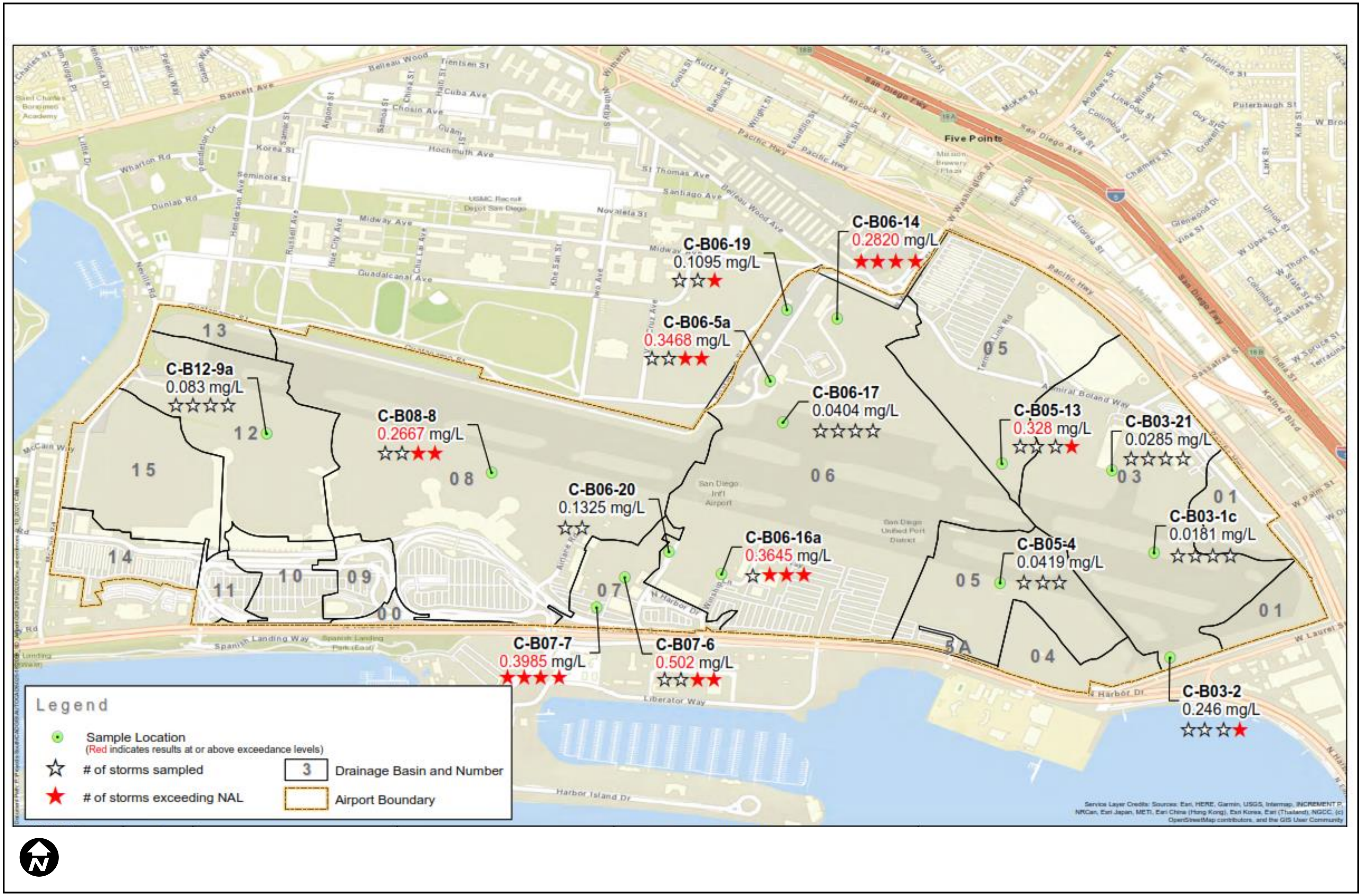
Similarly, although all seven drainage areas with industrial activities continue to be evaluated, based on the sample locations from which sample results exceeded the NAL for zinc, the focus of the ERA actions for zinc will be on the sampling locations and drainage areas that most frequently exceeded the NAL, namely, basins 6 and 7, as shown in **Figure 4**.



Source: Wood PLC Environment and Infrastructure Solutions, November 2020.

Figure 3

NUMBER OF STORMS WITH NAL EXCEEDANCES FOR COPPER (2019-2020)



Source: Wood PLC Environment and Infrastructure Solutions, November 2020.

Figure 4

NUMBER OF STORMS WITH NAL EXCEEDANCES FOR ZINC (2019-2020)

The Authority's Industrial SWPPP, is again being revised, as necessary, to incorporate appropriate aspects of the Level 2 ERA Action Plan prepared to reduce copper and zinc concentrations. Again, dischargers are in compliance with the Industrial General Permit provided they are developing and implementing Level 1 and Level 2 ERAs as necessary and appropriate for parameter(s) at the site, which exceed the NALs.

Municipal-related Discharges

The wet-weather stormwater compliance samples results are also compared with other analyte benchmarks to further evaluate the effectiveness of the SAN SWMP in addressing industrial activities, commercial activities, and municipal activities. **Table 3** compares the mean concentrations calculated for POCs with the benchmarks, and counts the number of times exceedances occurred for individual samples throughout the 2019-2020 wet season. Those analytes that exceeded their respective benchmarks on at least one occasion at a minimum of at least one sample site included ammonia, BOD, COD, pH, TSS, aluminum, copper (total and dissolved), iron, zinc (total and dissolved), Jet-A, oil range organics, total coliforms, fecal coliforms, and Enterococcus. Most of these analytes exceeded their respective benchmarks at a frequency of less than 25 percent. Determining the frequency of exceedance for each analyte provides for an evaluation of SAN's Storm Water Management Program against the MEP standard required under the Municipal Permit, and it allows the SDCRAA to identify POCs to be addressed in the WQIP. Only total copper, total coliform, fecal coliform, and Enterococcus had an exceedance frequency above 40 percent, with total coliform and Enterococcus both having the highest frequency at 80 percent. The remaining analytes in Table 3 did not exceed the benchmarks at any time.

Table 3: Comparison with Analyte Benchmarks, 2019-2020 Monitoring Season

Pollutant of Concern	Units	Mean Concentration[1]	Benchmarks	Number of Analyses	Number of Exceedances	Exceedance Frequency (%)
General Chemistry						
Ammonia	mg/L	1.67	2.14	56	17	30.3
BOD	mg/L	20.48	30	56	9	16.1
COD	mg/L	81.64	120	56	11	19.6
MBAS	mg/L	0.1	0.5	56	0	0
O&G	mg/L	1.46	15	56	0	0
pH	pH units	7.97	6.0–9.0	56	1	1.8
SC	µmhos/cm	133.89	900	56	0	0
TSS	mg/L	24.65	100	56	3	5.3
Metals						
Al	µg/L	273	750	56	4	7.1
As, dissolved	µg/L	0.81	150	23	0	0
As, total	µg/L	1.13	150	23	0	0
Cd, dissolved	µg/L	0.59	5.3	56	0	0
Cd, total	µg/L	0.75	5.3	56	0	0
Cr III, dissolved	µg/L	0.645	1700	56	0	0
Cr III, total	µg/L	1.278	550	56	0	0
Cr VI, dissolved	µg/L	0.398	16	56	0	0
Cr VI, total	µg/L	0.563	16.3	56	0	0

Table 3: Comparison with Analyte Benchmarks, 2019-2020 Monitoring Season

Pollutant of Concern	Units	Mean Concentration[1]	Benchmarks	Number of Analyses	Number of Exceedances	Exceedance Frequency (%)
Cr, dissolved	µg/L	1.0673	50	56	0	0
Cr, total	µg/L	1.878	50	56	0	0
Cu, dissolved	µg/L	34.353	33.2	56	20	35.7
Cu, total	µg/L	57.14	33.2	56	36	64.3
Fe	µg/L	0.881	1	56	7	12.5
Ni, dissolved	µg/L	2.144	1020	56	0	0
Ni, total	µg/L	2.936	1020	56	0	0
Pb, dissolved	µg/L	0.708	262	56	0	0
Pb, total	µg/L	2.707	262	56	0	0
Zn, dissolved	µg/L	133.12	260	56	9	16.1
Zn, total	µg/L	220.29	260	56	20	35.7
PAHs						
Acenaphthene	µg/L	ND	970	55	0	0
Acenaphthylene	µg/L	ND	300	55	0	0
Anthracene	µg/L	ND	300	55	0	0
Benzo (a) anthracene	µg/L	ND	300	55	0	0
Benzo (a) pyrene	µg/L	ND	300	55	0	0
Benzo (b) fluoranthene	µg/L	ND	300	55	0	0
Benzo (g,h,i) perylene	µg/L	ND	30	55	0	0
Benzo (k) fluoranthene	µg/L	ND	300	55	0	0
Chrysene	µg/L	ND	300	55	0	0
Dibenzo (a,h) anthracene	µg/L	ND	300	55	0	0
Fluoranthene	µg/L	ND	42	55	0	0
Fluorene	µg/L	ND	300	55	0	0
Indeno (1,2,3-cd) pyrene	µg/L	ND	300	55	0	0
Naphthalene	µg/L	ND	2350	55	0	0
Phenanthrene	µg/L	ND	300	55	0	0
Pyrene	µg/L	ND	300	55	0	0
PCBs and Organochlorine Pesticides						
Chlordane	µg/L	ND	0.09	43	0	0
PCB-1016	µg/L	ND	0.4	55	0	0
PCB-1221	µg/L	ND	0.4	55	0	0
PCB-1232	µg/L	ND	0.4	55	0	0
PCB-1242	µg/L	ND	0.4	55	0	0
PCB-1248	µg/L	ND	0.4	55	0	0
PCB-1254	µg/L	ND	0.4	55	0	0
PCB-1260	µg/L	ND	0.4	55	0	0
TPH						
Diesel Range Organics (C10-C24)	mg/L	ND	0.056-0.14	55	0	0
Jet-A	mg/L	0.425	0.5	55	16	29.1
Oil Range Organics (C22-C36)	mg/L	0.153	0.5	55	3	5.4

Table 3: Comparison with Analyte Benchmarks, 2019-2020 Monitoring Season

Pollutant of Concern	Units	Mean Concentration[1]	Benchmarks	Number of Analyses	Number of Exceedances	Exceedance Frequency (%)
Glycols						
Ethylene glycol	mg/L	ND	140	4	0	0
Microbiology						
Total Coliforms	CFU/100 mL	7652.5	1000	20	17	80
Fecal Coliforms	CFU/100 mL	403.35	200	20	9	45
Enterococcus	CFU/100 mL	2735.5	276	20	16	80

Source: Wood PLC Environment and Infrastructure Solutions, *Stormwater Sampling Report 2019-2020 (Draft)*, November 2020.

Note:

1. Half of the detection limit was used as the value for statistical analysis of results that were not detected.

Abbreviations: µg/L – micrograms per liter; µmhos/cm – micromhos per centimeter; BOD – biochemical oxygen demand; CFU/100 mL – colony forming units per 100 milliliters; COD – chemical oxygen demand; MBAS – methylene blue active substances; mg/L – milligrams per liter; ND – not detected; O&G – oil and grease; PAH – polycyclic aromatic hydrocarbon; PCB – polychlorinated biphenyl; SC – specific conductance; TPH – total petroleum hydrocarbons; TSS – total suspended solids.

Table 4 presents the mean concentrations and number of samples collected at compliance sampling locations from the previous 14 monitoring seasons (2005-2006 through 2019-2020). Several analytes have been sampled more than 400 times over 14 years. A comparison of the means between the 2006–2020 14-year wet-weather sampling program dataset and the 2019-2020 dataset indicates improvements in water quality for all analytes except ammonia, iron, Jet-A, total coliform, and Enterococcus.

Table 4: T-test Results – All Compliance Sampling Locations Combined (2005–2020)

Analyte	Units	Mean Concentration[1]	Benchmarks	Number of Samples
General Chemistry				
Ammonia	mg/L	1.579	2.14	476
BOD	mg/L	**34.308**	30	478
COD	mg/L	**127**	120	478
O&G	mg/L	1.542	15	477
MBAS	mg/L	0.152	0.5	476
pH	pH units	7.506	6.0 – 9.0	478
SC	µmhos/cm	282.83	900	478
TSS	mg/L	35.326	100	478
Metals				
Al	µg/L	600.119	750	478
Cu, dissolved	µg/L	**115.593**	33.2	480
Cu, total	µg/L	**162.825**	33.2	481
Fe	µg/L	0.798	1	478
Pb, dissolved	µg/L	1.474	262	319
Pb, total	µg/L	6.138	262	478
Zn, dissolved	µg/L	**270.179**	260	480

Table 4: T-test Results – All Compliance Sampling Locations Combined (2005–2020)

Analyte	Units	Mean Concentration[1]	Benchmarks	Number of Samples
Zn, total	µg/L	**368.168**	260	481
TPH				
Jet-A	mg/L	0.335	0.5	475
Oil Range Organics (C22-C36)	mg/L	0.428	0.5	475
Microbiology				
Total Coliforms	CFU/100 mL	**3846.1**	1000	127
Fecal Coliforms	CFU/100 mL	**457.65**	200	127
Enterococcus	CFU/100 mL	**1292.57**	276	127

Source: Wood PLC Environment and Infrastructure Solutions, *Stormwater Sampling Report 2019-2020 (Draft)*, November 2020.

Analyte concentrations in bold/shaded are above the benchmark.

Abbreviations: µg/L = micrograms per liter; µmhos/cm = micromhos per centimeter; BOD = biochemical oxygen demand; CFU/100 mL = colony forming units per 100 milliliters; COD = chemical oxygen demand; MBAS = methylene blue active; substances; mg/L = milligrams per liter; MPN/100 mL = most probable number per 100 milliliters; O&G = oil and grease; SC – specific conductance; TPH – total petroleum hydrocarbons; TSS – total suspended solids.

The San Diego Bay Watershed WQIP is another aspect of the Municipal Permit, which required the development of stormwater quality goals for the Authority. The discussion above noted that the Authority has chosen reduction in the concentrations of copper and zinc in wet weather stormwater discharges as its Focused Priority Water Quality Condition, because copper and zinc have been shown to be the primary POCs. The Fiscal Year 2019-2020 San Diego Bay WQIP Annual Report (2019-2020 WQIP Annual Report)[16] released in January of 2021 provides the most recent publicly-available details on the Authority's performance in meeting the WQIP interim goals. Using the data and information from the 2019-2020 wet-weather sampling program,[17] the 2019-2020 WQIP Annual Report found that the number of samples with dissolved copper concentrations exceeding the benchmark in 2019-2020 was 36 percent. As such, the 2017-2018 fiscal year WQIP interim goal for copper was being met. However, this percentage shows that the Authority is currently not meeting the interim goal of less than 20 percent for the fiscal years 2021-2025 time period.

The 2019-2020 WQIP Annual Report also found that that the number of samples with dissolved zinc concentrations that exceeded the dissolved zinc benchmark in 2019-2020 was 16 percent. As such, the 2017-2018 fiscal year WQIP interim goal for zinc was being met. This percentage also shows that the Authority is currently meeting the interim goal of less than 25 percent for the fiscal years 2021-2025 time period.

As noted in the Fiscal Year 2019-2020 San Diego Bay WQIP Annual Report, interim goals are intended as milestones that help assess progress toward the longer-term goals. The Authority has used the adaptive management process outlined in the WQIP to evaluate the progress toward

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[16] San Diego Bay Responsible Parties, *San Diego Bay Watershed Management Area Water Quality Improvement Plan – FY 2019-2020 Annual Report,* January 2020. Available: http://www.projectcleanwater.org/download/san-diego-bay-wqip-2019-2020-annual-report/.

[17] Wood PLC Environment and Infrastructure Solutions, *Stormwater Sampling Report 2019-2020 (Draft)*, November 2020.

meeting the goals and modify the strategies being implemented. As such, several of those strategies initially identified as optional have since been implemented. One strategy now being implemented is stormwater capture and reuse. First implemented as part of the Terminal 2 Parking Plaza, the Authority continues to develop stormwater capture and reuse infrastructure, as discussed further below.

In addition to the pollutants contributed by stormwater or wet weather flows, dry weather runoff can also seriously degrade the quality of the receiving water. Dry weather flows conveyed by the stormwater conveyance system, which can be substantial, consist of flows from groundwater infiltration and accidental, improper, or illegal discharges to the stormwater conveyance system. Typical examples of the latter are over-irrigation runoff and illegally disposed used motor oil, antifreeze, and other such chemicals, and spilled jet fuel; however, the potential for such occurrences is also minimized through implementation of the SAN SWMP, as noted above.

SAN Stormwater Capture and Reuse System

The 2018 Strategic Stormwater Master Plan, Capture and Reuse Project [18] describes the scope and benefits of stormwater capture and reuse at SAN. As noted above, stormwater capture and reuse is one strategy for meeting the final WQIP goals for the Authority (and thereby reducing pollution impacts to and improving the water quality of San Diego Bay). Stormwater capture and reuse is also one element of the Industrial Stormwater Permit-required Level 2 ERA Action Plan noted above, which is intended to improve the water quality in San Diego Bay.

The 2018 Strategic Stormwater Master Plan, Capture and Reuse Project includes hydrology and hydraulic modeling of existing conditions at SAN. The 2018 Strategic Stormwater Master Plan, Capture and Reuse Project identifies necessary modifications to existing storm drains owned by the Authority or the City of San Diego. The Authority would coordinate with the City of San Diego on final design and construction details. The SAN Stormwater Capture and Reuse System is a large-scale multi-phase project intended to capture a portion of the stormwater that currently enters the stormwater system and eventually flows into San Diego Bay. As part of the Proposed Project, the system would be expanded to capture runoff from at least 170 additional acres of SAN's 661-acre site. Stormwater runoff from these areas is currently being treated using more traditional BMPs, such as catch basin inlet filters. The portions of SAN property not tied into the SAN Stormwater Capture and Reuse System are managed under other elements of SAN's Storm Water Management Program.

The SAN Stormwater Capture and Reuse System's initial phase was related to the Terminal 2 Parking Plaza, which was completed in 2018, and diverts runoff from approximately eight acres in this area, which is then treated by a series of high-rate media filters and ultraviolet light before being pumped to the airport's Central Utility Plant (CUP), where it is used as make-up water. Construction of the most recent phase of the SAN Stormwater Capture and Reuse System began in late 2018 and was completed in December of 2020. It is intended to capture stormwater on the north side of SAN and either reuse the water for car washing at the Rental Car Center and irrigation

[18] San Diego County Regional Airport Authority, *Strategic Stormwater Master Plan, Capture and Reuse Project,* Prepared by AECOM, August 2018.

on the north side of SAN or discharge the water to the existing bioswales around the Rental Car Center or a combination of both. The water is minimally treated for car washing or irrigation, primarily by removing fine particulates via filtration. If the stormwater is discharged to the bioswales, it will infiltrate the bioswale soils and reach the underdrain system, from which it will be discharged into the storm drain system. Both treatment processes create a water quality benefit. Reused stormwater, such as that reallocated for car washing, will not be discharged into the storm drain system, but instead will be conveyed to the sanitary sewer system. As a result, none of the pollutants in the reused stormwater will be discharged into San Diego Bay. Infiltration into soils, through use as irrigation water or drainage into bioswales before discharging into the storm drain system, retains a majority of the pollutants.

As noted above, the Proposed Project is subject to the new development/redevelopment requirements of the MS4 Permit and the SDCRAA BMP Design Manual. These requirements dictate a hierarchical approach to designing and implementing post-construction stormwater treatment controls for the project that can retain on-site 100 percent of the pollutants contained in the volume of stormwater runoff produced from a 24-hour 85th percentile storm event. To comply with the post-construction stormwater treatment control requirements, the Proposed Project would expand the capture area of the first phase of the SAN Stormwater Capture and Reuse System by at least 170 acres and include construction of an underground cistern tank with up to 3.4 million gallons of storage. The SAN Stormwater Capture and Reuse System will allow for the creation of a bank of post-construction treatment control credits that can be applied to the footprint of the project. The Proposed Project would also construct several infiltration areas within the infield islands between the runway and taxiways (excluding, specifically, the airfield islands that are California least tern nesting habitat).

Opportunities for stormwater reuse would include: (1) CUP cooling towers; (2) onsite irrigation; (3) Rental Car Center car wash; and/or (4) possible reuse for toilet flushing by dual plumbing at Terminal 1. At final build-out, the total combined storage capacity of the existing and proposed elements of the SAN Stormwater Capture and Reuse System would be approximately 12 to 21 million gallons and allow for the capture and reuse or infiltration of approximately 39 to more than 50 million gallons of stormwater per year.

The overall purpose, intent, and design of the SAN Stormwater Capture and Reuse System is three-fold: (1) to develop a bank of credits needed to accommodate the post-construction stormwater treatment control requirements of the Municipal Permit for new developments/redevelopments applicable to the Proposed Project; (2) to provide a stormwater treatment control process to address copper and zinc and meet the NALs in the Industrial General Permit and the Authority's goals listed in the San Diego Bay WQIP; and (3) to help offset the amount of potable water being used for non-potable purposes at SAN.