City of Phoenix

2019

ANNUAL REPORT

Municipal Separate Storm Sewer System

PHX WATER SMART

September 27, 2019

Prepared by

AECOM

City of Phoenix
WATER SERVICES DEPARTMENT
ENVIRONMENTAL SERVICES DIVISION
Quality Reliability Value

September 27, 2019

Mr. Christopher M. Henninger
Manager
Stormwater and General Permits Unit, Surface Water Section
Arizona Department of Environmental Quality
Mail Code: 5415A-1
1110 West Washington Street
Phoenix, Arizona 85007

Re: ANNUAL REPORT FOR AZPDES PERMIT NO. AZS000003, MUNICIPAL SEPARATE STORM SEWER SYSTEM

Dear Mr. Henninger:

We are pleased to submit the 2018-2019 Annual Report for the City's Municipal Separate Storm Sewer System (MS4) Permit No. AZS000003, issued on February 3, 2009. This report covers the reporting period beginning July 1, 2018 and ending on June 30, 2019. This document includes the information specified in Section 8.1.1 for All Annual Reports.

We appreciate this opportunity to provide you with information about our stormwater management program. Please direct any questions you may have regarding this report to Linda Palumbo at 602-534-2916.

Sincerely,

Kathryn Sorensen

BH Kathryn Sorensen
Water Services Director

Enclosure

cc: Alexis Strauss, Region IX, Environmental Protection Agency (with attachment)
Nancy Allen (Office of Environmental Programs)
Kini Knudsen (Street Transportation Department)
Alan Stephenson (Planning and Development Services Department)
Ray Dovalina (Public Works Department)
Monique Coady (Law Department)

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ANNUAL REPORT FORM

For Phase I MS4s – Due September 30th each year

PART 1: GENERAL INFORMATION

A. Name of Permittee: City of Phoenix, Arizona

B. Permit Number: AZS000003

C. Reporting Period: July 1, 2018 – June 30, 2019

D. Name of Stormwater Mgt. Program Contact: Linda Palumbo

Title: Environmental Programs Coordinator

Mailing Address: 2474 South 22nd Avenue, Building #31

City: Phoenix Zip: 85009 Phone: (602) 534-2916

Fax Number: (602) 534-7151 Email Address: linda.palumbo@phoenix.gov

E. Name of Certifying Official: Kathryn Sorensen, PhD
(Sections 9.2 and 9.12 of the permit)

Title: Water Services Director

Mailing Address: 200 West Washington Street, 9th Floor

City: Phoenix Zip: 85003 Phone: (602) 262-6627

Fax Number: (602) 534-1090 Email Address: kathryn.sorensen@phoenix.gov

PART 2: ANNUAL REPORT CERTIFICATION

The Annual Report Form must be signed and certified by either a principal executive officer or ranking elected official; or by a "duly authorized representative" of that person in accordance with Sections 9.2 and 9.12 of the permit.

I certify under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

BK Kathryn Sorensen 8/12/19

Signature of Certifying Official Date

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PART 3: NARRATIVE SUMMARY OF STORMWATER MANAGEMENT PROGRAM ACTIVITIES

Attach a status summary addressing each of the following in the approximate order referenced below. Briefly describe implementation, progress, and challenges in each area during the reporting year. Also, explain any significant developments or changes to the number or type of activities, frequency or schedule of activities, or the priorities or procedures for specific management practices.

A. Summarize public awareness activities including outreach

- **Report outreach events, topics, number of people reached, number and type of materials distributed and the Target groups.**

Stormwater Outreach
The City of Phoenix conducted a variety of stormwater-related public awareness activities throughout the 2018/19 reporting year, including best management practices to minimize runoff of pollutants in stormwater, and municipal stormwater management practices for construction sites.

Major accomplishments include the following:

- Participated in community education events at the Arizona Outdoor Expo, Chinese Culture and Cuisine Festival, and Tres Rios Nature Festival reached over 3,400 people.
- Developed two videos about stormwater pollution prevention with the Water Services Department Community Education and Outreach (CEO) Division. One is a general stormwater awareness video, and one focuses on monsoon awareness. Both videos are expected to be finalized in early Fiscal Year (FY) 2019/20.
- A monsoon preparation postcard was sent to 70 homeowner associations (HOAs) to encourage cleaning of HOA culverts, drainage grates and catch basins, to clear drainage channels and retention basins and to check drywells for proper functioning.

A summary of the stormwater outreach activities for FY 2018/19 is included in Table 3-1.

Table 3-1 Stormwater Outreach Activities

Date(s)	Event / Activity	Audience	Message	Handouts
7/17/2018	Maricopa County Flood Control District Lunch and Learn (Green Infrastructure)	Targeted Business (Adults 40)	Targeted / Industry Specific	None
7/11, 7/18, 7/25, and 7/27/2018	Family H2O Labs at Phoenix Libraries (Juniper, South Mountain Community, Desert Sage, and Burton Barr)	General Public (64 people)	General Stormwater Awareness	64 Activity Books
10/3/2018	Celgene Event	Targeted Business (Adults 100)	Targeted / Industry Specific	None
11/28/2018	Stormwater Compliance Academy	Targeted Business (36 Adults)	Stormwater Compliance Chapter 32C	Pens 36; Pet Waste Bags 12

Date(s)	Event / Activity	Audience	Message	Handouts
2/8-2/10, 2019	Chinese Cultural & Cuisine Festival	General Public (Adults 600, Children 600)	General Stormwater Awareness / Management	Pet Waste Bags 38; Pollution Solution Brochure (Spanish) 7; Miscellaneous SWAG (e.g., pens, pencils, bookmarks, etc.) 804; Cups, mugs, etc. 116
2/18/2019	Sustainability Solutions Family Day	General Public (300 People)	General Stormwater Awareness	Hopper Stickers Post-It Pads
3/2/2019	Melrose 7th Avenue Street Fair	General Public (200 People)	General Stormwater Awareness	Hopper Stickers Post-It Pads
3/2-3/3, 2019	Tres Rios Nature Festival	General Public (Adults 500, Children 500)	General Stormwater Awareness / Management	Pet Waste Bags 33; Pollution Solution Brochure (Spanish) 9; School Flyers 13; Miscellaneous SWAG (e.g., pens, pencils, bookmarks, etc.) 665; Cups, mugs, etc. 86
3/6/2019	Outreach materials (SWAG) provided to CEO for miscellaneous outreach events.	General Public	General Stormwater Awareness / Management	Pet Waste Bags 100; Frisbees 40; Miscellaneous SWAG (e.g., pens, pencils, bookmarks, etc.); Cups, mugs, etc. 30
3/18/2019	Downtown Dog Park Grand Opening	General Public (50 People)	General Stormwater Awareness	Pet Waste Bags (50)
3/30-3/31, 2019	2019 Outdoor Expo	General Public (Adults 600, Children 600)	General Stormwater Awareness / Management	Pet Waste Bags 11; School Flyers 25; Miscellaneous SWAG (e.g., pens, pencils, bookmarks, etc.) 1102; Cups, mugs, etc. 107
4/13/2019	South Mountain Community Center Spring Fling	General Public (Adults 80, Children 120)	General Stormwater Awareness / Management	Pet Waste Bags 1; Pollution Solution Brochure (Spanish) 2; School Flyers 3; Miscellaneous SWAG (e.g., pens, pencils, bookmarks, etc.) 121; Cups, mugs, etc. 19
5/1 & 5/3, 2019	Filmed drone video	General Public	General Stormwater Awareness / Management	None

Date(s)	Event / Activity	Audience	Message	Handouts
6/10-6/14, 2019	Handed out "how to legally drain your pool" outreach flyers to 20 homes.	Residential/ Home Owners (Adults 20)	General Stormwater Awareness / Management	Pool Flyer / Door Hanger 20
6/25/2019	Filmed Monsoon Madness TV segment with PHX11.	General Public	General Stormwater Awareness / Management	None

Tres Rios Nature Festival

Internet and social media returned:

- 1,642 visits to the stormwater program webpage
- 21 Twitter posts (42,254 impressions with 267 engagements)
- 34 Facebook posts (16,269 impressions with 457 engagements).

Social Media Post Example

The City continues to participate in Stormwater Outreach for Regional Municipalities (STORM), which coordinates stormwater outreach throughout the Phoenix metropolitan area. STORM developed three common videos for home automotive maintenance, mobile carpet cleaners, and home painters, providing each municipality with content for hosting online or at events. STORM managed several public outreach events, and two construction-related seminars. STORM also created educational materials for construction activities. The STORM Annual Report is included as an attachment.

B. Summarize public involvement activities including outreach

- **Identify activities, number of people involved, number and type of materials distributed if applicable.**

<u>Household Hazardous Waste Collection</u>
The Public Works Department (PWD) provided Phoenix residential customers with nine (9) Household Hazardous Waste (HHW) collection events in FY 2018/19. Over 6,476 customers participated in the HHW events.

The following materials were collected, and recycled or reused, where feasible:

- Approximately 45,080 pounds of oil based paint and related materials
- 42,535 pounds of flammable liquids
- Over 3,500 gallons of used oil
- Close to 7.35 tons of lead acid and rechargeable batteries
- Close to 23,556 gallons of latex paint.

Other items collected and properly disposed included: antifreeze, pesticides, herbicides, and other hazardous and toxic materials. Non-hazardous materials brought to HHW events were sorted out and disposed of as Municipal Solid Waste, such as alkaline batteries and containers/bottles.

- **Describe MS4 system for public reporting of spills, dumping, discharges, and related stormwater issues.**

- The City continues to offer a Stormwater Hotline (602-256-3190) in English and Spanish, as well as an email address (ask.water@phoenix.gov) for anyone who wishes to report a complaint concerning illicit discharges or releases to the storm drain system. The contact information is distributed with outreach materials and is available on the stormwater website (www.phoenix.gov/stormwater). The City received 342 complaints and other stormwater related requests during the year.

C. Summarize Illicit Discharge, Detection and Elimination (IDDE) program activities. Include:

- **Illicit discharge prevention activities.**

  The City discourages discharges to the storm drain system through the placement of Pollution Awareness Markers (PAMs) on existing catch basins. This year 993 PAMs were added to existing catch basins and more than 22,000 PAMs have been installed since the program started.

  The City standard for managing hazardous waste and hazardous materials at municipal facilities is the Hazardous Materials Management Program (HMMP) Manual. The manual is available to City employees online through the City's intranet. HMMP procedures apply to all City departments unless stated otherwise and were developed to ensure the City operations are in compliance with federal, state, and local environmental and safety regulations. The HMMP Manual directs personnel to locate storage areas as far away as possible from washes, drains, and drywells and requires that they be protected from weather. Requirements are provided for secondary containment, security, air quality permitting, safety and spill response equipment, proper signs, and labeling. Container storage requirements such as aisle spacing, limitations on drum stacking, segregation of incompatible materials, and types and condition of containers are also provided.

  The HMMP Manual contains a comprehensive stormwater management procedure, which, also serves as the facility stormwater management plan required by Phoenix City Code Chapter 32C. The procedure applies to all city facilities with the potential to impact stormwater and addresses permit applicability including the Multi-Sector General Permit (MSGP) and De Minimis General Permit (DMGP), training and inspection requirements, and BMPs for solid waste/litter control, parking lots and building washing, scrap metal and equipment, bulk material piles, vehicle and equipment washing and fueling, and maintenance of stormwater management devices.

  The HMMP Manual is maintained by the Office of Environmental Programs (OEP). Each HMMP procedure is reviewed at least once every two years and revised as necessary. Revisions may be made more frequently if regulatory requirements change.

  During reporting year 2018/19, five of the ten HMMP procedures were reviewed. One document Disposal and Recycling of Hazardous Waste and Materials was updated based on input from 14 operating departments and staff with stormwater expertise, including Environmental Quality Specialists and Environmental Program Coordinators. Two HMMPs for Used Batteries – Recycling and Disposal, and Storage and Handling of Hazardous Materials had only minor updates. Two additional HMMPs for Used Oil and Petroleum Contaminated Absorbent Material, and Universal Waste Lamps, Mercury Containing Equipment and Lamp Ballasts were reviewed but did not require any updates. The HMMP for Stormwater Management was reviewed, but update of this HMMP was delayed pending issuance of the Arizona Department of

Environmental Quality (ADEQ) new Construction General Permit (CGP) and ADEQ Pesticide General Permit, and also to incorporate changes due to the recent issuance of the MSGP.

- **Training dates and topics:**

Stormwater training covering IDDE is accomplished through training offered by various departments, including Water Services Department (WSD), PWD, Parks and Recreation, and OEP. Municipal employee stormwater training is coordinated by the OEP Pollution Prevention (P2) Program.

The Phoenix Municipal Separate Storm Sewer System (MS4) permit requires IDDE training for two major groups of employees: (1) field staff without direct stormwater program responsibilities; and (2) employees with direct stormwater program responsibilities (Stormwater Field Staff). In addition, the training is divided into three (3) frequencies:

- Annual (for select field staff with “no direct stormwater responsibility” only)
- New Employee Training (for Stormwater Field Staff – offered twice a year)
- Refresher Training (for Stormwater Field Staff – offered every two years).

Other specific training requirements include municipal, industrial, and construction site inspections, hazardous materials handling, spill management, street maintenance and repair and water/sewer maintenance and is limited to employees working in functions with the potential to impact stormwater. Affected employees are identified in the stormwater training plan in the City’s Stormwater Management Plan (SWMP). The training is offered by various departments and is divided into two frequencies:

- New Employee Training (conducted twice per year)
- Refresher Training (conducted once every two years).

- **Annual Training**

Stormwater Awareness Training. Awareness training covering IDDE is provided to select field staff with no direct stormwater responsibilities. Topics taken from the City MS4 stormwater permit requirements include identification of harmful/prohibited practices (illegal dumping or spills) into the City’s stormwater system and proper management procedures (reporting to the Stormwater Management Section). Forty-six sessions were held and 971 people were trained, including 27 new City employees in PWD and eight new City employees in WSD. *Note that some WSD employees that received the Basic Awareness training also received the Spill Prevention and Management Practices training, and Hazardous Materials Handling training due to their job classification and duties.

Date	Number Attended
August 28, 2018	18
August 30, 2018	10
August 31, 2018	18
September 4, 2018	3
September 10, 2018	12
September 12, 2018	18

Date	Number Attended
September 20, 2018 (two WSD sessions)	31
September 21, 2018	16
September 24, 2018	26
September 25, 2018	14
October 2, 2018	13
October 5, 2018	15
October 17, 2018	44
October 22, 2018	19
November 15, 2018	10
November 28, 2018	2
January 9, 2019	185
January 24, 2019	44
January 30, 2019	40
January 31, 2019	66
February 21, 2019	1
February 28, 2019	23
March 18, 2019	2
April 3, 2019	16
April 9, 2019	27
April 15, 2019	21
April 18, 2019	1
May 8, 2019	17
May 13, 2019 (two WSD sessions)	18
May 15, 2019 (two WSD sessions)	21
June 5, 2019	4
June 13, 2019	41
June 14, 2019	4
June 15, 2019 (two WSD sessions)	17
June 18, 2019 (two WSD sessions)	63
June 20, 2019	26
June 21, 2019	2

Date	Number Attended
June 24, 2019	6
June 25, 2019	27
June 26, 2019	5
June 27, 2019	25

- **New Employee Training and Biennial Refreshers**

IDDE for Stormwater Inspection Staff. Topics covered include MS4 permit requirements, Phoenix City Code, detecting and identifying illicit discharges, De Minimis and other sources of non-stormwater discharges, outfall inspections, sampling, and field screening. Two sessions were held and five new WSD employees attended. Biennial refresher training was not required this reporting year.

Date	Number Attended
March 21, 2019	3
June 5, 2019	2

Street Repair and Road Improvement for Street Maintenance Staff. Training is provided to all field staff in the Street Maintenance Division of the Street Transportation Department (STR). Training covers IDDE awareness, pollution prevention, and BMPs to minimize discharges to storm drains. Specific topics include BMPs for hazardous material use and storage, street sweeping, painting and striping, sediment pile management, paving, vehicle maintenance and washing, handling spills, solid waste, and concrete washout areas. Biennial refresher training was completed this reporting year. Eleven sessions were held and 371 people were trained, including 31 new STR employees.

Date	Number Attended
February 5, 2019	33
February 6, 2019 (two sessions)	70
February 7, 2019	37
February 12, 2019	36
February 13, 2019	38
February 14, 2019	30
February 21, 2019	26
February 26, 2019	54
February 27, 2019 (two sessions)	47

Spill Prevention and Management Practices – non-Fire Department. Training covers site-specific spill prevention and response procedures/responsibilities and spill management practices to prevent or minimize discharges to the storm sewer system and drywells. Fourteen sessions were held and 592 people were trained. This included five new City employees in WSD, and 14 new employees in PRD.

Date	Number Attended
October 30, 2018	15
November 13, 2018	14
January 11, 2019	117
January 16, 2019	13
February 12, 2019	17
February 26, 2019	14
March 12, 2019	12
May 7, 2019	13
May 8, 2019	79
May 15, 2019	61
May 16, 2019	58
May 21, 2019	68
May 22, 2019	75
May 23, 2019	36

Spill Prevention and Management Practices – Fire Department. Training is delivered through an online video and training module, which was created specifically for the Phoenix Fire Department. The training covers stormwater awareness, specific spill prevention and response procedures/responsibilities for use during emergency responses, including protection of storm drains and drywells, and BMPs for Fire Department facilities. Biennial refresher training was completed this reporting year for Company Officers (Fire Captains) and Command Officers. There were 409 individual computer sessions for 409 employees completed between April 17, 2019 and June 20, 2019. The rosters showing the actual Fire Department training are available upon request.

Hazardous Material Handling. Training covers responsibilities for spill prevention and reporting, compliance with regulatory and City hazardous materials management procedures (proper handling, storage, transportation, and disposal) to prevent contamination of stormwater runoff. Refresher training was provided and sessions for new employees are included in these totals. Sixteen sessions were held and 608 people were trained. This included five new City employees in WSD and 14 new City employees in PRD. One new employee with PDD also attended this training.

Date	Number Attended
September 20, 2018	6
October 30, 2018	15
November 13, 2018	14
January 11, 2019	117

Date	Number Attended
January 16, 2019	13
February 12, 2019	17
February 26, 2019	14
March 6, 2019	10
March 12, 2019	12
May 7, 2019	13
May 8, 2019	79
May 15, 2019	61
May 16, 2019	58
May 21, 2019	68
May 22, 2019	75
May 23, 2019	36

Water/Sewer Maintenance. Training is provided to field staff in Water Distribution and Wastewater Collection and includes protocols to minimize discharges including those found in the WSD Stormwater Pollution Prevention Plan, Emergency Response Plan and Field Incident Response Plan. Ten sessions were held and 176 people were trained, including four new City WSD employees.

Date	Number Attended
October 30, 2018	14
November 13, 2018	16
December 18, 2018	26
January 16, 2019	12
February 12, 2019	13
February 26, 2019	14
March 12, 2019	18
April 23, 2019	15
April 30, 2019	18
May 10, 2019	30

Municipal Stormwater Inspections. Training topics include federal and local regulatory requirements, applicable permits and codes, stormwater BMPs, municipal facility inspection procedures, illicit discharges and De Minimis discharges. Biennial inspector refresher training was completed this reporting period on May 28, 2019 for four OEP employees; there were no new OEP employees.

Industrial Stormwater Inspections. Training is provided to all inspectors in the WSD Environmental Services Division. Topics include applicable permits and codes, stormwater pollution prevention policies, structural and non-structural BMPs, and inspection and enforcement procedures. Two sessions were held and five new WSD water quality inspectors attended. Biennial refresher training was not required this reporting year.

Date	Number Attended
March 21, 2019	3
June 5, 2019	2

Construction Sites Plan Review and Inspection Training. The Planning and Development Department (PDD) provided on-the-job training (OJT) for stormwater plan review and inspections. Seven new inspectors were hired this reporting period and received the OJT. Biennial training was not required this reporting period. PDD plan reviewers received training twice; on December 11, 2018 (15 attendees) and June 13, 2019 (17 attendees). Three new PDD plan reviewers were hired and trained this reporting year. OEP provides biennial training for OEP inspectors that conduct inspections of municipal stormwater projects. Training includes municipal ordinances related to stormwater and construction, erosion and sediment controls, and structural and non-structural BMPs. OEP biennial inspector training was completed this reporting period on May 28, 2019 for four OEP employees; there were no new OEP employees.

Other training not included or counted in Part 4 of this Annual Report includes:

- Three WSD Stormwater Inspectors attended the Arizona Water Association Surface Water/Ground Water Sampling Workshop on Feburary 5 – 7, 2019.

- Seven WSD Stormwater Inspectors, the WSD Chief Water Quality Inspector, one WSD Environmental Quality Specialist, and one OEP Environmental Quality Specialist attended the Arizona Water Association 92nd Annual Conference and Exhibition from April 16 – April 18, 2019. In addition to topics including wastewater, drinking water, water reuse, water resources, regulatory topics, and groundwater, the conference included two afternoon sessions covering stormwater (Multi-Sector General Permit, Stormwater Pollution Prevention Plans (SWPPPs), and general requirements).

- Four WSD Stormwater Inspectors attended the Cues Inc. Training (video equipment manufacturer for video truck) on May 14 – 16, 2019.

- Three WSD Stormwater Inspectors attended the American Stormwater Institute LLC, Qualified MS4 Stormwater Inspector Training on June 4 – 5, 2019.

➢ **IDDE screening program and investigations – including an overview of industrial facility inspections, identified sources, and any significant corrective or enforcement actions.**

The IDDE program continues to track illicit flows discovered in the storm drain system to identify their sources. Dry-weather flows are investigated by opening manholes and following the flow upstream. Flow changes (typically volume) are observed by the IDDE crew when the manholes are opened. Once the suspected illicit tap is determined to be nearby, the video system is then inserted in the storm drain pipe to track the flow directly to its source. By using the video system the City can then determine where the illicit connection or tap is located and then conduct the appropriate inspection. Occasionally, dye testing or a similar procedure is used to verify the source of the connection.

IDDE investigations are also initiated as a result of complaints, reported spills, or emergency response activities. During the report period, the following non-stormwater discharges were investigated:

- 08/01/2018 – An APS pole-mounted transformer was knocked down near 16th Street and McDowell. There was a spill of 20 to 30 gallons of mineral oil into the east-side of 16th Street. The spill flowed into a catch basin. A private contractor cleaned up the catch basin and the roadway gutter, and removed contaminated soil.

- 08/22/2018 – A forklift transporting waste oil spilled oil at SunTree, 4502 W. Monterosa Street. Drywells in the retention areas were flooded and contaminated with oil. A Notice of Violation (NOV) and cleanup order was issued.

- 08/28/2018 - An accident occurred on 35th Avenue and Buckeye Road involving a fuel tanker and a smaller vehicle, resulting in a spill of around 80-100 gallons of diesel fuel. Approximately 20-30 gallons of diesel fuel entered the storm catch basin located on the northwest corner of 35th Avenue and Buckeye Road. After conducting an inspection of the affected area, it was determined that further cleanup of the area was needed to include a catch basin, manhole and landscape area to remove dirt that was saturated with diesel fuel. The additional cleanup was conducted and verified. Outfall SR003 showed no signs of being affected by the spill.

- 09/05/2018 – A sanitary sewer manhole lost containment on private property at 4747 E. Southern Avenue. The sanitary sewer overflow (SSO) spill was vactored up at the spill way leading to a catch basin and the standing water in the manhole was also vactored. The storm main was flushed with 10,000 gallon of water from the nearby fire hydrant.

- 09/18/2018 –. Inspectors noticed a hose coming from an industrial building into a catch basin at Colmenero’s Pallets, located at 2947 E. Illini Street. During an investigation, inspectors found the company pumping their septic tank into the catch basin. Inspectors issue a field NOV and directed the Manager to cease and desist from further discharge immediately and to clean the storm drain. Escalated enforcement was pursued (see Section E for more information).

- 09/20/2018 – An APS transformer caught on fire and spilled mineral oil near S. Central Avenue and Lincoln Street. APS cleaned up the oil and took measures to reduce stormwater contamination such as placing a boom around the catch basin and putting absorbent in the storm drain. However, there was still oil in the catch basin and an inspection of the outfall revealed a thin oil sheen. APS was required to conduct additional cleanup activities.

- 10/10/2018 – Sewage was leaking from a disabled motor home parked at 9022 N 8th Street and staining the street. A field NOV was issued and the site was reinspected to verify the leaking had stopped and the vehicle was removed.

- 10/15/2018 – A large SSO, estimated at 800,000 gallons, was reported at 4415 W Lower Buckeye Road. It is believed that the SSO was caused by infiltration of stormwater into the sanitary sewer collection system during tropical storm Sergio. Three sanitary sewer manholes lost containment and comingled with stormwater, which likely reached the Salt River at outfall SR001, located on the north bank of the Salt River, west of 51st Avenue.

Stormwater crews dispatched on Monday morning following the storm inspected the MS4 and did not identify visual evidence of sanitary waste in the manholes or at the outfall.

- 11/01/2018 - Intermittent pumping of water to the curb at 48th Street south of Madison Street was reported. It was determined to be caused by a high water table which is causing a pump to activate. Groundwater is an allowable non-stormwater discharge.

- 11/05/2018 – A complaint was received of a discharge of wash water from Sunstate Equipment Corp located at 5425 E. Washington. Research revealed that the storm drain connection was originally authorized by the City in the 80’s. The business receives runoff/drainage from a privately owned storm drain system to the north. In addition, the facility is in an area where the water table is high, and it appears that the storm drain system also collects groundwater. The water going to 54th street comes from a pipe connected to a pump by the retention basin, which pumps when the basin reaches a certain level. The facility was required to implement best management practices (BMPs) to minimize the potential for pollutants to enter the storm drain. The non-stormwater flow was sampled, and did not exceed any IDDE triggers used for outfall monitoring.

- 12/06/2018 – A large discharge of a white colored fluid with black flakes coming from the roof drains was observed at Window World, 2530 W. Holly Street. The fluid/debris was coming from a roof-stripping operation. A Field NOV was issued to clean all spilled debris and materials and keep materials from ongoing operation from getting into the street.

- 12/07/2018 – While replacing wet weather sampling bottles at outfall SR003, Inspectors noticed a fuel odor. The area north and upstream of the outfall was surveyed but no obvious signs of dumping were observed. On December 10, manholes upstream were investigated as well as a catch basin where a spill involving diesel fuel happened on August 28 at the northwest corner of 35th Avenue and Buckeye Road. Though no visible evidence of the spill remained, the source of the fuel odor may have been from the August 28 incident.

- 12/13/2018 – A complaint was received that employees at Maestro Muffler, located at 902 W. Hatcher, were pouring antifreeze in a catch basin. The source of the antifreeze like substance was determined to be detergent used by the shop. Outreach and educational materials were given to the employee as well as a review of Phoenix City Code Chapter 32C in regards to dumping into the storm drain system. A visual inspection of the premises indicated that the automotive shop was in good clean condition, with no open containers of fluids, soaps or oil. They were issued a field NOV and order to cease and desist pouring mop water with detergents into the catch basin.

- 01/12/2019 –. A complaint was received that someone was washing out their equipment in a vacant lot, resulting in black colored water running into the street near 6808 S. Central Avenue. The inspector observed a small puddle filled with dark colored water on a vacant lot located at 6808 S. Central. It appeared as if someone had been washing out equipment and the runoff was getting close to entering the city’s storm system. A representative from Torrez Construction indicated they will properly dispose of their wash water and not let any of it enter the city street.

- 01/15/2019 – A rainbow sheen was noticed coming from Best Price Auto Repair located at 9214 N. 9th Street. A storm drain was discharging water with a rainbow sheen to the street. The property was in poor repair with numerous oil spills and poor housekeeping. A field NOV was issued with a requirement to clean the street and clean their contaminated gravel. They satisfied these requirements by the next day.

- 01/17/2019 – A homeowner was sand blasting cars in his driveway and the residue was going down the street at 13424 N. 19th Avenue. The Inspector spoke with the homeowner and explained they are not allowed to have sand flowing from the yard into the street. They were required to clean up the area.

- 01/30/2019 – A resident complained that their neighbor drained and flushed their vehicle radiator into the street near 4328 W. Garden Drive. A resident at 4328 W. Garden confirmed that they were responsible for the spill, but claimed that the liquid was "rusty water" and not transmission fluid. A Field NOV was issued and the resident was required to clean the spill before the next rain event.

- 02/14/2019 – A resident at 4641 N. 14th Avenue is constantly moving inoperable vehicles from his property and leaving trails of oil, transmission and brake fluids across the asphalt surface. The spills all appeared set-in and dried, it did not appear that any fresh oil had been spilled recently. At the time of inspection nobody came to the door. Information on required practices was left along with a written warning that further spills, if left unaddressed, could result in enforcement action.

- 02/14/2019 – A jet fuel spill at the airport north of terminal 2 discharged into a storm drain. This was reported to ADEQ, though the spill did not reach the MS4. It discharged to an airport storm drain, and was addressed under the MSGP.

- 02/15/2019 – Grease was being dumped into storm drain at 2755 S. 99th Avenue. There was evidence of grease in the storm drain right outside of the facility. A field NOV was issued and the owner was required to clean the spill.

- 02/22/2019 – Water was discharging from United Right of Way Inc., located at 1502 W. Broadway Road. A hose was placed over the fence discharging water into the sidewalk and street. Inspectors contacted the main office and asked them to stop the discharge due to oil sheen present in the water. A facility inspection was conducted.

- 02/22/2019 – A business owner called to state that the business next to him was discharging stormwater which contained pollutants such as oil, antifreeze, and other chemicals into the storm drain near 2328 W. Broadway Road. United Auto Parts LLC had a sheen on stormwater that was pooled up in the parking lot. There was an area where damaged vehicles were kept. This area did not contain a berm and was probably the cause of the sheen. The business was informed that they had to stop pumping the stormwater into the storm drain due to the sheen. A facility inspection was conducted.

- 02/28/2019 – A U.S. Diversified industrial sweeper was being drained into a grate on a property near 21001 N. Tatum Boulevard. Standing water was found in the catch basin where suspected dumping occurred. An employee of U.S. Diversified indicated that they had recently dumped in this catch basin. They were informed that this was not an allowable discharge and that they must stop immediately.

- 03/20/2019 – A truck fuel tank was punctured spilling 100 gallons of fuel from 16th Street to Old Southern Avenue. A private contractor performed the clean-up. A follow-up visit confirmed the spill was remediated.

- 03/27/2019 – A complaint was received that a business at 1818 E. University Drive was discharging process water into the street. The property representative indicated they had left a water line on throughout the night and caused an overflow. A Field NOV was issued for the discharge and they were required to clean up sediment in the street.

- 03/28/2019 – Desert Mountain Countertops, located at 3207 E. Washington Street, was discharging water into the street from their granite manufacturing activities. The water was grey colored and had sediments. A field NOV was issued requiring that they dismantle the hard pipe and to clean up the street.

- 05/08/2019 – Three sources were found to be contributing to a dry weather flow near outfall SR010 at 7th Avenue and the Salt River. The sources were a SRP Junction Box at 7th Avenue, an unidentified flow from a Maricopa County building located at 2nd Avenue and Jackson Street, and from Phoenix City Hall. A vent pipe at City Hall was investigated and determined to be a cross connection. The issue at City Hall has been discussed with management and the Public Works Department and a remedy is being planned.

- 05/20/2019 – A SSO occurred at 5601 E Calle Del Paisano. Approximately 5,200 gallons of sewage flowed into a storm drain that discharged into the Arizona Canal, upstream from a drinking water source. The Water Treatment facility was notified, and took mitigating measures.

- 06/21/2019 – A facility was discharging cloudy water into the street and had a lot of white residue tracking-out leaving the property at Ortiz Stone LLC at 59 S. 40th Place. A field NOV was issued to cease and desist immediately and to clean the area.

In addition to the above referenced investigations, inspectors responded to numerous other complaints. Residential examples include residue leftover from home owner activities, water leaks, swimming pool discharges, and excessive irrigation. Commercial/Industrial examples include washing of paint in the street at commercial properties, washing of mats at restaurants or dirty tallow bin areas, carpet cleaners dumping in street/drains, and general lack of BMP's at commercial/industrial facilities.

D. Municipal Facilities

- **Status of identification and inventory of these facilities.**

The Municipal Facility Inventory (MFI) is maintained in a facility assessment database that tracks inspection activities, compliance findings and pollution prevention recommendations. The inventory includes facilities owned and operated by City staff that store or use hazardous chemicals in containers greater than five (5) gallons, or which otherwise have the potential to pollute stormwater. Chemicals stored onsite at each facility are tracked through an online citywide Safety Data Sheet Management System. There were 287 municipal facilities on the inventory as of June 30, 2019. OEP's inspection facility assessment schedule targets 96 facilities each year. Several facilities were removed from the inventory because they are not operated by City staff, no longer have chemical storage, or were closed/consolidated with other facilities by City departments.

Information maintained in the inventory includes: address, latitude and longitude, chemicals stored or used and their safety data sheets, operational status (operational or closed), Standard Industrial Classification (SIC) codes, date of last assessment, brief description of operations, facility contact, as well as other compliance-related information. The number of facilities may change based on new facilities becoming operational or existing facilities undergoing a change/cessation of operations. Such changes to the MFI are tracked through the facility assessment database.

High-Risk Facilities Identification and Prioritization:

The high-risk facility identification and prioritization was completed on June 30, 2011. The high risk identification process considered each of the following: (1) quantity of chemicals stored onsite (based on Tier II Reports), (2) potential for exposure of such chemicals to stormwater based on storage location, (3) likelihood of a spill or release to occur and discharge offsite based on structural BMPs and site drainage characteristics, (4) potential severity of impact on surface waters for a worst-case scenario release, and (5) MSGP coverage. Storage of and potential for release of other pollutants at the site were also considered as an additional risk factor.

Numeric ranking criteria are used to evaluate all city facilities that had submitted Tier II Reports. The criteria indicate which facilities are “higher risk” and also the overall risk of facilities relative to one another. Whenever these sites are physically assessed, the risk factors are reviewed and adjusted, if necessary. As of June 30, 2019 there were 45 facilities on the high-risk municipal facility inventory.

Of the 45 facilities categorized as high-risk, five facilities (service centers) were determined to be highest risk and were required to develop and implement facility-specific stormwater pollution prevention plans (SWPPP) and to conduct routine quarterly inspections by site staff and annual comprehensive stormwater inspections by OEP. For the 40 others currently classified as high-risk facilities—mainly unstaffed, remote locations associated with sanitary sewer system lift stations and odor control stations, or fire stations with double-walled (aboveground storage tank) ASTs containing diesel fuel—an increase in inspection frequency was not deemed necessary, but a comprehensive stormwater facility assessment is targeted at least once every three years.

- **Overview of inspection findings (i.e., number inspected, number with follow-up actions needed, significant findings).**

The OEP conducts Environmental Facility Assessments (EFAs) of City owned and operated facilities to acquire baseline information, ensure compliance with select environmental compliance requirements, including spill preparedness and response procedures, hazardous materials storage, and identification of opportunities to reduce hazardous material use and hazardous waste generation. The EFA inspection checklist includes a section on stormwater BMPs, the facility’s SWMP, and a targeted review of high-risk facilities; this checklist is used to meet the Facility Assessment Measurable Goal at Appendix A Section III.B.(1) and the Municipal Facility Inspection Measurable Goal at Appendix A Section IV.C.(2).

OEP’s target schedule is to conduct EFA’s at 96 (of 287) facilities each year. The highest-risk facility service centers (5), which have facility specific SWPPPs, are inspected by site staff quarterly and receive a comprehensive stormwater inspection by OEP at least annually. Forty other high risk facilities are targeted to receive a comprehensive facility stormwater inspection once every two to three years.

In 2018/19, EFAs were completed at 95 of the facilities on the MFI. There were 54 facilities with zero corrective action findings as a result of the assessment. Forty-one facilities had a total of 137 findings; recommended corrective action items are summarized in the next section. The annual service center SWPPP inspections are included in this finding count for this reporting year. Beginning in reporting year 2016/17, "Safety Data Sheet (SDS)" database update findings are referred to Department and Human Resources Safety Division and are no longer specified as EFA findings.

In 2018/19, 18 of the 45 high-risk facilities were assessed, including annual SWPPP inspections at all five of the highest-risk service centers with SWPPPs. The five high risk service centers are also assessed quarterly by site staff. Twelve facilities, including the five service centers, had findings, nine of which had some corrective actions related to stormwater which required improved stormwater BMPs. These are summarized in the following section.

➢ **Activities needed and performed in response to inspections (EFAs)**

The OEP records and tracks all activities needed as a result of an EFA until resolution. As applicable, facility status updates identifying any uncorrected findings are regularly provided to Department Directors. The text below summarizes the primary stormwater-related corrective action activities performed during 2018/19.

<u>2018/19 Corrective Actions Implemented (EFAs)</u>

- Spill response BMPs
  - Ensured spill response kits are adequately stocked and accessible
  - Installed or updated emergency contact poster in areas where hazardous materials are used or stored, including pesticide storage sign requirements
  - Ensured departments have updated and distributed Facility Spill Response Plans.

- Structural BMPs (to minimize exposure to stormwater and prevent spills)
  - Ensured facilities only store containers of hazardous materials under weather-protective cover or inside; this includes review of storage of fuel containers used for small equipment fuel-oil mixtures at PRD facilities.
  - Ensured secondary containment for hazardous material containers, pesticides, lead acid batteries, used oil, etc., are adequate and in good repair with minimal standing free liquids
  - Ensured oil and other fluid drained into large oil pans is transferred into closed and labeled containers at one PWD facility
  - Ensured repair/cleaning of existing secondary containment structures, including repair of pool chemical secondary containment structures at three PRD pool facilities
  - Ensured facilities provide sediment control (e.g., straw wattles, fiber rolls, containment walls) for material or soil stockpiles
  - Ensured facilities do not store scrap metals, oily leaking equipment and waste materials that may migrate into the MS4 or block stormwater drainage directly on the ground

  - Ensured clean-up of outside storage area at one PRD facility, and implemented proper outside storage of scrap metal at one Police Department facility
  - Ensured original chemical storage containers are in good repair and kept closed with proper lids, and any spilled materials are cleaned and disposed of properly.
  - Ensured proper chemical storage of pails of chlorine tablets and portable sodium hydroxide storage tanks at one WSD facility

- Non-structural BMPs (practices and procedures)
  - Ensured container closure and labeling standards are followed for chemical containers, pesticides and universal wastes.
  - Ensure logging and signage requirements are followed for universal wastes
  - Improved housekeeping and general site, parking lot, and outdoor equipment and material storage practices, including review of parking lot sweeping frequency
  - Ensured secondary containment structures are maintained clean and dry with minimal standing free liquids
  - Ensured storage amounts are kept to a minimum
  - Ensured all outdated materials were removed from one WSD site
  - Ensured all hazardous materials and hazardous building materials are handled properly, and waste determinations/profiles have been completed for materials
  - Ensured hazardous waste satellite area accumulation logs were completed
  - Ensured Spill Prevention Control and Countermeasure Plan in place at WSD facilities.

2018/19 High-Risk Facilities – Improved Stormwater Controls and Practices Implemented

- Verified facility spill plans and/or posted spill contact info and spill response procedures, including pesticide storage sign requirements
- Inspected spill kits and verified spill kits are available in needed areas
- Verified there are no illicit discharges to the MS4 from routine facility practices
- Ensured all containers are labeled and with proper secondary containment
- Ensured compliance with HMMP storage practices for hazardous materials—store indoors, or under other weather protections, in properly closed containers in good repair, with appropriate secondary containment; ensured prompt clean-up of small spills
- Ensured proper storage requirements (container closure, labeling, logging and signage requirements) for pesticides and universal wastes as required by HMMP
- Ensured secondary containment structures are maintained clean and dry with minimal standing free liquids
- Ensured proper storage practices for scrap metal as required by HMMP. Implemented clean-up of outside storage of scrap metal and rusted materials at one PWD facility and two Police Department facilities
- Ensured vehicle repair parts with greasy/oily fluid residue (e.g., engines, cylinders) are stored under tarps or other overhead protection with secondary containment if applicable
- Ensured all Used Oil hoses and tanks are properly labelled as “Used Oil” at one service center and at one WSD facility

- Monitored maintenance of retention basins to ensure they are maintained free of trash and debris
- Ensured proper housekeeping/litter collection and general site, parking lot, and outdoor equipment and material storage practices, including refuse storage, solid waste bin collection areas, and monitoring parking lot sweeping frequency
- Facilitated parking lot sweeping for sediments/debris at two service centers, and clean-up of surplus office items being stored outside at one service center
- Facilitated clean-up of water line repair spoils from one WSD service center bulk bin storage area; monitored use of bulk bin storage areas at other service centers to ensure that materials remain within bins and areas outside bins are swept regularly
- Implemented cleanup of small fluid releases from equipment and vehicle drips, and ensured that drip pans or other methods are used to control small fluid releases; such as, oil-absorbent mats or absorbent. Ensured that absorbent used for spills is cleaned-up and disposed of properly to prevent material from migrating in parking lot
- Ensured vehicle washing areas are well maintained, including clean-up of sediments and maintenance of sewer interceptors
- Ensured all hazardous materials are handled properly, hazardous waste determinations have been completed, and all required hazardous waste logging and records are completed
- Ensured all hazardous materials and hazardous building materials are handled properly, and waste determinations/profiles have been completed for materials
- Ensured SPCC monthly inspections are completed as required, and SPCC is available on site
- Facilitated coordination between departments at one service center to implement improved practices on litter clean-up and control including coordination to provide additional storage space for PWD residential refuse containers in 3-sided concrete bins.

<u>2018/19 Other Stormwater-Related Municipal Facility Activities</u>

- Okemah Service Center – In May of 2019, City staff observed a dumpster containing leaking vehicle repair parts. The vehicle repair parts in the dumpster were observed to be leaking fluids, staining the surrounding asphalt and leaking into a small area of a nearby detention basin. In addition, City staff observed oil and fluid stains from vehicles in the parking lot and at other on-site basins. In June and July of 2019, a consultant was hired to surface clean affected asphalt areas. In addition, soil samples were collected for analysis from the stained soil in the detention basins. No Soil Remediation Level regulatory clean-up levels were exceeded. Site staff has moved the dumpster to a concrete pad and will provide secondary containment. In addition, BMP requirements were reviewed with site staff, such as using absorbent on vehicle leaks and drips and ensuring all liquids are drained from vehicle parts under repair.

<u>2018/19 Other Stormwater-Related Improvement Projects</u>

The following projects were identified in response to OEP inspection findings in reporting year 2017/2018, and completed early in reporting year 2018/2019.

- 22nd Avenue and Union Hills Service Centers, Parts Canopies – During the fourth quarter of 2017 OEP SWPPP inspection, it was noted that the parts pick-up storage areas at these locations were lacking covered storage for lead-acid batteries and hydraulic cylinders waiting for repair. Funding was approved to construct 10 foot x 20 foot x 14 foot canopies at the request of the PWD Fleet Services Division. The canopies are used for storage of lead-acid batteries to be recycled and hydraulic cylinders waiting repair.

The following project was identified in response to WSD outfall inspection findings in 2017/18. OEP also noted minor erosion during a fourth quarter 2016 inspection near two outfalls, and erosion near all three outfalls during a fourth quarter 2017 inspection:

- Okemah Service Center Erosion/Drainage Study – The Okemah service center is a 13.5-acre City service center property managed by the PWD Facilities Management Division, and includes operations by PWD Solid Waste Division, PWD Fleet Services Division, and STR Maintenance. Erosion has been noted on the east, west, and north fencelines, including the three north outfalls. Funding was encumbered in reporting year 2017/2018 to conduct a drainage and grading study/hydraulic analysis report of the property including retention basins, drywells and outfalls. The study was completed in January 2019, and addressed the erosion and drainage issues, and provided suggested resolution. The PWD received approval to use stormwater funds to obtain final design plans to address the erosion, improve drainage around the bulk storage area, and regrade basins to retain first flush stormwater treatment as outlined in the study. Design is ongoing in reporting year 2019/20. The PWD also received approval to move forward with construction using stormwater funds once design is completed. However, the site construction improvements will be prioritized based on construction costs.

The following capital improvement project was identified in response to a public complaint in 2018/19:

- PRD Encanto Golf Course Erosion – In November 2018 a citizen complaint was received concerning erosion from the Encanto Golf Course located between 16th and 17th Avenue at Virginia Avenue. The existing dirt flood irrigation berm on the south side of Virginia Avenue was causing sediment erosion onto the street and at one catch basin. The PRD received approval to use stormwater funds to install a sidewalk, pony wall, fence and two gates to address the erosion issue. The project is scheduled to be funded in reporting year 2019/20.

In addition to improvements made in response to inspection findings and complaints, the following capital improvement projects which included stormwater improvements also had activity in 2018/19:

Aviation Department:

- The Sky Harbor Airport reconstruction of the T3 North Apron (ongoing project) is installing new trench drains and new storm drain piping for site improved drainage.
- The Sky Harbor Airport Terminal 4 North Apron Reconstruction project includes a complete redesign. Trench drains are being installed in place of the current manholes, which are limited in number. This project will take place over several fiscal years, and was also noted in last year's annual report.
- Sky Harbor Airport Turf Improvement Project north of Terminal 2 and near 24th Street/Sky Harbor Circle replaced turf landscaping with rock and decomposed granite at several locations. The project is to assist with reducing dust/dust control and water conservation, but also includes stormwater features such as curb cuts, gabion walls, French drains, and detention basins.
- The Sky Harbor Airport Sky Train Stage 2 (west of 24th Street) will include a large on-site retention basin with catch basins to drain on-site flows to the retention basin. This is an ongoing project.

Street Transportation Department:

- 107th Avenue Project (between Camelback Road and Indian School Road). This project consists of street, bicycle and pedestrian improvements including the installation of curb and gutters, sidewalk, bicycle lane and landscaping. The project includes a mainline storm drain within 107th Avenue that is comprised of 30 inch and 36-inch storm drain pipe. In addition, sixteen catch basins and associated storm drain laterals have been installed.
- Riverview Drive. This project consists of constructing a roadway to connect Riverview Drive over an existing drainage channel between 16th Street and 24th Street. The project includes construction of a box culvert, retaining walls, water main, roadway, curb and gutters, sidewalk, landscaping, and stormdrain facilities.
- Avenida Rio Salado Phase II (between 51st Avenue to 35th Avenue). This project included construction of new roadway to include three lanes in each direction with a center median/turn lane, bicycle lane, curb and gutters, sidewalks, landscaping, and improved storm drain facilities.

- **Identification and tracking of municipal owned and operated facilities subject to permitting under the MSGP.**
  - Table 3-2 contains a listing of the eleven (11) City-owned and operated facilities subject to permitting under the MSGP, based on their industry sector and/or SIC code.

Table 3-2 City Owned/Operated Facilities Subject to MSGP

Department	Facility	Address	POC	Authorization #	Comments
Public Works	Skunk Creek Landfill	3165 W Happy Valley Road Phoenix, AZ 85027	Engineering Supervisor Doug Sawyer 602-534-1157	AZMSG-61708	
	27th Avenue Solid Waste Management Facility	3060 S 27th Avenue Phoenix, AZ 85009		AZMSG-62581	
	SR 85	28361 W Patterson Road Buckeye, AZ 85326		AZMSG-14391	
	North Gateway Transfer Station	30205 N Black Canyon Hwy, Phoenix, AZ 85085		AZMSG-61710	
Aviation	Sky Harbor International Airport	3400 E Sky Harbor Blvd, Ste 3300 Phoenix, AZ 85034	Project Manager Lisa Farinas 602-273-2787	AZMSG-66063	
	Deer Valley Airport	702 W Deer Valley Road Phoenix, AZ 85027		AZMSG-66017	
	Phoenix/Goodyear Airport	1658 S Litchfield Road Goodyear, AZ 85338		AZMSG-61934	
Water Services	91st Avenue Wastewater Treatment Plant	5616 S 91st Avenue Tolleson, AZ 85353	Environmental Quality Specialist Doug Taylor 602-534-5081	AZMSG-61871	
	23rd Avenue Wastewater Treatment Plant	2470 S 22nd Avenue Phoenix, AZ 85009		AZMSG-61896	
	Cave Creek Water Reclamation Plant	22841 N Cave Creek Road Phoenix, AZ 85024		AZMSG-61713	
City Clerk	Customer Service Center (Print Shop)	2640 S 22nd Avenue Phoenix, AZ	Environmental Quality Specialist Hilary Hartline 602-534-1778	AZRNED-670	No Exposure Certification September 2015

Note: The City previously submitted Sector L Closure Certifications for 15 city properties located on closed landfill sites (three of which were previously owned/operated by the City), which are not covered under the MSGP.

- **Status of all inventories, maps, and map studies required by the permit to be developed including completion dates.**

  The stormwater GIS database conversion project has been completed. The Stormwater GIS team is reviewing the data in each quarter section and adding new infrastructure. The data is being shared as a web service that is hosted on the Enterprise ArcGIS Server and shared for all city staff to access.

The City considers the storm drains to be protected critical infrastructure. As such, the City has not provided a copy of the GIS maps as an attachment. However, the maps are available for review by ADEQ upon request.

- **For the Outfall inspection program, describe the status of:**
  - Staff training
    Outfall inspection training is described in Section H.
  - Outfall inventory
    The outfall inventory is described in Section H.
  - Inspection tracking system
    The outfall inspection tracking system is described in Section H.
  - Overview of Inspection and screening procedures, and any significant findings
    Inspection and screening procedures and findings are discussed in Section H.

E. Industrial Facilities

- **Status of identification and inventory of these facilities.**

In April 2017, WSD migrated to a new database application for tracking facilities and inspections. As part of the data migration, WSD has been reviewing and updating the facility inventory.

The City currently manages an inventory of over 4,100 active stormwater facilities, which includes over 1,600 industrial (potential MSGP) facilities as well as commercial businesses, such as restaurants and auto service stations. Inspectors also focus on facilities that submit federal Toxic Release Inventory reports, facilities that generate Resource Conservation and Recovery Act (RCRA) hazardous waste, treatment storage and disposal facilities (TSDFs), and non-municipal solid waste facilities throughout the City.

Because lead and copper have been identified in wet-weather samples in quantities exceeding surface surface water quality standards (SWQS), facilities that use or store lead or copper had been identified for priority inspections. However, no significant findings were identified at these facilities, and this practice has been discontinued. WSD is attempting to put all active stormwater facilities on a five to six year inspection cycle, as staffing allows.

In addition to the industrial inspections, the City has incorporated a stormwater assessment into many of the inspections conducted by the Commercial Section. Stormwater assessments are conducted at commercial businesses including restaurants, car washes, and service stations. When significant stormwater issues are noted, the Commercial Inspector forwards the information to the Stormwater Section for follow-up. Stormwater assessments are also conducted by IPP inspectors when they do their annual inspection for permit compliance. Facilities are referred to the stormwater section for follow-up when necessary.

- **An overview of inspection findings and note significant findings.**

In reporting year 2018/19, the City conducted 551 industrial stormwater inspections, 968 commercial stormwater assessments, and 147 IPP screening. A total of 223 informal (i.e., level one action, or inspection with requirements) and 35 formal enforcement letters were issued for stormwater-related violations.

The most common violations identified were the lack of secondary containment, and other container management issues, as well as the lack of inspections and training records. Most stormwater issues noted during commercial (e.g., restaurant) inspections involved housekeeping related issues that were easily corrected (e.g., spills around tallow bins and open dumpsters).

- **Corrective and enforcement actions needed and taken in response to inspections.**

Informal enforcement actions included 223 inspection letters where requirements were made. Formal enforcement actions included NOVs (10), Field NOVs (22), one (1) Show Cause meeting, and two (2) Civil Citations. Most enforcement actions were resolved quickly, with 100 percent of all industrial inspections closed within one year of the initial inspection. The following cases went into escalated enforcement:

Colmenero's Pallets: On September 18, 2018, an Inspector noticed a hose coming from an industrial building and going into a catch basin at 2947 E. Illini Street. During the investigation, inspectors found out that the company was pumping their septic tank into the catch basin. Inspectors issued a Field NOV, and directed the Manager to cease and desist from further discharge immediately and to clean the storm drain. The company was brought in for a Show Cause Meeting on October 31, 2019, and required to stop discharging sanitary wastewater to the storm drain, and pay a $1,000 penalty.

Cartz Partz, LLC: Ongoing compliance problems at this location (14634 North Cave Creek Road) resulted in escalated enforcement, including a Field NOV and two Civil Citations. On October 31, 2018, fuel was spilled/washed into the alley, resulting in a hazardous materials response by the Phoenix Fire Department and subsequent remediation by the City's environmental contractor. On December 5, 2018 Inspectors observed a dry weather discharge of process water, while following-up on the October 31 spill. The owner was taken to court on April 9, 2019. He was fined $2,500, and required to reimburse the City over $7,400 in cleanup costs.

City Hall: On March 26, 2019, while investigating a dry-weather flow, Inspectors identified a potential cross-connection between a vent line to the underground stormwater holding tank and a vent line to the sanitary sewer. When the sewer line backs up, wastewater flows into the vent line, and down into the stormwater holding tank. The stormwater tank automatically discharges to the storm drain when the contents reach a set level. On May 2, 2019, a Stormwater Inspection Report was issued, requiring the discharge to immediately cease and a permanent remedy be implemented. An interim measure to prevent the discharge of wastewater into the stormwater holding tank was implemented, and a mechanical contractor is developing the technical specification to permanently eliminate the cross-connection. The project is expected to be completed by August 31, 2019.

F. Construction Program Activities

The *City of Phoenix Stormwater Policies and Standards Manual* requires retention areas for buildings to account for drainage collected from the roof tops, parking lots, and other drainage areas. When the PDD reviews grading plans, staff ensure that the site retention volume is adequate to prevent runoff for the required storm event. If inspectors find that the plans are not being followed, they may stop work on the project. If the problem continues, court-ordered injunctions may be served or civil penalties assessed.

Chapter 32A, the City's Grading and Drainage Ordinance, establishes minimum requirements for regulating grading and drainage and establishes implementation and enforcement procedures. Grading and Drainage Permits are issued to applicants who fulfill the application requirements, including the submittal of a SWMP, when applicable. Activities regulated by the Grading and Drainage Ordinance are subject to inspection and enforcement action. Enforcement steps begin with a verbal warning, and may lead to a written warning, halting project inspections on the building, and/or a civil citation. The PDD Civil and Site Inspection team includes 28 members tasked with enforcing the ordinance.

Staff from PDD hold pre-construction meetings with private developers to discuss many issues, including on-site retention of stormwater, controlling erosion, and the installation of other BMPs. Communications with developers occur during periodic observations by inspection staff and during formal inspections.

An overview of the PDD process for stormwater related submittals is provided below:

- The customer submits grading/drainage and stormwater plans for review
- PDD provides red lines on plans
- The customer addresses the red lines
- Plans are approved for construction by PDD
- The customer applies for required permits
- Permits are created by PDD, including Civil Grading and Drainage and Civil Stormwater
- PDD office staff request a copy of the Arizona Pollutant Discharge Elimination System (AZPDES) Construction General Permit authorization number, which comes from submitting a Notice of Intent (NOI) before the customer can purchase permits
- The customer schedules a Pre-Construction Meeting prior to beginning work
- BMPs are implemented by the customer prior to the start of construction
- Inspector verifies that trackout and BMPs are properly maintained during each inspection
- The customer submits an Notice of Termination (NOT) when the project is completed
- Warranty inspection is performed by PDD, one-year after completion.

➢ **Status of inventory/plan review of these facilities.**

The PDD database contains a comprehensive inventory of developments for which permits have been issued, plans have been reviewed, and inspections have been conducted. The permits are categorized in the database according to the type of work requested to be performed. In reporting year 2018/19, 1070 Construction/Grading Plans were reviewed.

➢ **An overview of Inspection findings and significant findings.**

Inspection findings are documented in the PDD database. During reporting year 2018/19, a total of 495 construction sites were inspected for stormwater. There were 48 permits with noted deficiencies where corrective action was requested at least one time, along with seven that required multiple requests to achieve compliance. The counts specific to the four types of deficiencies listed below are:

- 7 – Stormwater controls missing, not per plan, or started work without notification
- 15 – Trackout control not working
- 14 – Failure to maintain stormwater controls
- 12 – Paperwork or other administrative correction cleared.

Some linear and utility municipal construction projects are not subject to PDD's stormwater permitting process and are inspected by either OEP or WSD staff to ensure BMPs and compliance with the local stormwater ordinance. There were seven documented deficiencies at five of the 24 municipal projects inspected, including:

- Chemical storage lacking cover and/or secondary containment; no spill kit on-site
- Refuse/litter control/storage
- Sediment/erosion control BMPs installed incorrectly
- Missing or insufficient sediment or erosion controls, such as around perimeter of material stockpiles not actively being worked and at discharge points.

➢ **Corrective and enforcement actions needed and taken in response to inspections.**

Most documented deficiencies were corrected by the next day. One written notice was issued. No other escalated enforcement was required to bring projects into compliance (i.e., suspension of work), and most violations were corrected upon first request.

For municipal projects, inspection reports showing the specific deficiencies are sent to project managers who work with the contractor to correct the problem and send follow-up documentation that deficiencies have been corrected. For all of the municipal projects with findings in 2018/19, deficiencies were corrected promptly and additional enforcement steps were not necessary.

PDD requires that the developer provide a "letter of explanation" when they cannot obtain a NOT at the end of the project. These are forwarded to ADEQ twice a year. In reporting year 2018/19, PDD had zero projects that did not file with ADEQ.

Staff Training: The PDD Municipal Stormwater Inspection Training for Construction Inspectors trains plan review and inspection staff on administrative procedures (NOI and SWPPP), compliance, and appropriate BMPs to reduce pollution from construction activities.

PDD civil plan reviewers are trained on stormwater pollution prevention plans, Notice of Intent applications, and Maricopa County Flood Control District's Erosion Control Manual. Training occurs twice a year.

Details on training dates and number of attendees are included in Section C.

G. Post Construction Controls

➢ **Summary of any new post-construction controls for municipal projects.**

22nd Avenue Service Center: The PWD 22nd Avenue Service Center is classified as a high-risk facility that discharges stormwater directly to the MS4. Funding from Fiscal Years 2016 and 2017 was provided by OEP and PWD to locate and design a stormwater pretreatment device to prevent oil and grease from entering the MS4 at three existing storm drain inlets, and to provide a drainage design report for the site. The design and evaluations options phase was completed in reporting year 2017/18. Funding was approved for purchase and installation of three Oldcastle Catch Basin filter inserts which were installed at the facility in September/October 2018. The PWD Facilities Management Division manages the site and maintains the filter inserts. City staff at the 22nd Avenue Service Center have also improved internal processes at the facility, including vehicle storage locations and re-use of repair vehicle parts to minimize discharge of pollutants to the MS4.

Sky Harbor Airport:

- The Sky Harbor Airport reconstruction of the T3 North Apron includes installation of two additional Stormceptor stormwater pretreatment devices north of Terminal 3.

Low Impact Development (LID) / Green Infrastructure (GI) Studies/Activities:

- The City conducted a study to evaluate the effectiveness of several existing GI features installed in the City over the past few years. The study was completed in January 2019, and the final report is included in the attachment section of this Annual Report. Bioswales, permeable pavers, and pervious concrete were studied at several locations in the City using field testing and existing City plans/records. Some conclusions of the study include the need for proper installation and design (including materials, product specifications), location suitability, and maintenance procedures.

- The City of Phoenix worked with the Arizona State University Sustainable Cities Network, the City of Scottsdale, and other local Member Communities on the Greater Phoenix Metro Green Infrastructure Handbook. The handbook was released in January 2019.

- The City is participating in a study conducted in partnership with The Nature Conservancy, the Bureau of Reclamation, the Flood Control District of Maricopa County, and the Maricopa County Air Quality Department. The study's aim is to identify key areas in the City of Phoenix that would benefit most (be most suitable) for stormwater infiltration and retention with LID using GIS spatial analysis. Catchment basins in the City of Phoenix are being analyzed using the criteria of: flooding, urban heat, water quality, and air quality. It is anticipated that the study will be completed in the third quarter of 2021.

- The City of Phoenix, in partnership with EPA Region 9, the Flood Control District of Maricopa County, and City of Tempe, has received an EPA Technical Assistance Grant to integrate GI and LID into our local plan updates for the 2020 Maricopa County Multi-Jurisdictional Hazard Mitigation Plans update. Including GI/LID in these plan updates will expand the range of tools used to mitigate flood risk to include natural and nature-based solutions, institutionalize GI/LID into hazard mitigation and stormwater management planning, enhance opportunities for FEMA funds to be directed to GI/LID projects, and enable co-planning management of flooding, nonpoint source water quality, and protection of areas important to the hydrologic connectivity of the local watersheds. This effort is expected to be complete by Summer 2020.

- **An overview of the City's post-construction inspection program.**

PDD inspectors conduct a one-year warranty inspection on each construction project within their jurisdiction. This inspection provides an opportunity to identify corrective action to be implemented by the developer or responsible sub-contractor for a variety of items, including stormwater and grading and drainage controls.

For municipal projects not subject to PDD's stormwater permit program, OEP or WSD staff conducts post-construction stormwater inspections within one year of the project completion.

During reporting year 2018/19, post-construction stormwater inspections were conducted by PDD at 199 private construction projects and by OEP or WSD at 26 municipal construction projects.

- **Corrective and enforcement actions needed and taken in response to post-construction inspections.**

The PDD database contains directives for items identified for follow-up during the warranty inspection. The PDD and municipal post-construction inspections had no findings.

- **Summary of any new or revised post-construction requirements related to permits the City issues.**

No new or revised post-construction requirements were identified by PDD personnel.

H. Outfall inspection program; describe the status of

- **Staff training.**

Stormwater staff members are trained on sampling procedures and techniques when they are assigned to the Outfall Inspection rotation, typically within the first year of employment. As part of this, they are required to familiarize themselves with the applicable Code of Federal Regulations at 40 CFR 122 and 40 CFR 136 and the Standard Operating Procedures (SOPs) concerning sampling and Quality Assurance/Quality Control (QA/QC). Refresher training is provided informally throughout the year and formally at least once every two years.

Details on training dates and number of attendees are included in Section C.

- **Outfall inventory.**

The City maintains a database to document stormwater outfalls. At the time of this report, the inventory includes 906 total outfalls with 432 of these designated as "Major" outfalls according to Environmental Protection Agency (EPA) guidelines. Seventeen outfalls are designated as "priority," either due to observed flow within the past five years, or because they received an illicit discharge in the past five years. The City no longer has outfalls that discharge to an impaired water, because the Salt River, from the 23rd Avenue Wastewater Treatment Plant to the Gila River has been delisted. Other priority outfalls have been removed because we found (and eliminated) the source of an illicit discharge.

In 2018, the City began to re-evaluate each outfall's designation, using the drainage area from the recently completed GIS upgrade. This effort, which will continue for the next three years, has resulted in a decrease in the total number of major outfalls. The outfall inventory is included as an attachment to this report.

- **Inspection tracking system.**

  Each outfall inspection is conducted by a trained team of inspectors who use a form specifically designed to capture the data as they are observed. Once the inspection is completed and the inspectors return to the office, all data are entered into a database. Entered data include the documentation and tracking of all (both major and minor) outfall inspections. All items required in 40 CFR 122 are found on the form including both visual and field screening activities.

- **Inspection and screening procedures and significant findings.**

  The inspection crew visits each "priority" outfall annually and the remaining major outfalls at least once every five years. The inspection begins with an overall visual observation of the outfall structure and surrounding area. Visual items are noted such as residue, staining, dead animals, and differences in plant life near the outfall. If a flow (greater than 0.03 gallons per minute) is observed, a sample is collected for field screening, which includes pH, temperature, total chlorine, sulfide, ammonia, phenol, detergent, lead, and copper. All observations are recorded on a standard inspection checklist and entered into a database.

  In reporting year 2018/19, staff inspected major outfalls along the Indian Bend Wash, Old Cross Cut Canal, Papago Diversion Channel, Salt River, and Upper Cave Creek Wash. All priority outfalls were inspected, regardless of location.

  Twenty outfalls had two days of consecutive dry-weather flow, which triggered the field screening process at those locations. Twenty IDDE investigations were initiated based upon the results of those field screening activities and flow amounts.

I. Description of any new or revised ordinances, rules or policies related to stormwater management or control, if applicable.

- **Complete Streets Design Manual and Policy –** In alignment with the Complete Streets Policy and Design Guidelines, which includes a chapter providing guidance on use of green infrastructure and low-impact development principles in the right-of-way for stormwater management (primarily adopted from, with permission, Watershed Management Group's *Green Infrastructure for Southwestern Neighborhoods (2012))*, standard details for common GI/LID features are being incorporated into the update of the overarching STR Design Manual.

J. Fiscal Expenditures; provide a brief report on expenditures related to implementation of the City's stormwater program for the previous fiscal year.

The City collects a stormwater fee to defray the costs of operating the stormwater management program.

Stormwater program charges from STR, WSD, and OEP are paid out of the Stormwater Fund. The fee does not cover the costs for most maintenance of the drainage system or infrastructure improvements, nor does it cover ancillary stormwater activities, such as street sweeping or the HHW program. Stormwater program costs for PDD are funded by construction inspection fees.

<u>Water Services Department</u>
WSD coordinates the City's Stormwater Program. In addition to overall program administration, WSD conducts stormwater outreach, complaint investigations, outfall inspections and IDDE investigations, industrial inspections, wet-weather monitoring, and reporting. Expenditures totaled over $1.8M in reporting year 2018/19.

<u>Street Transportation Department</u>
STR conducts storm drain maintenance and inspections, wash maintenance, and is responsible for the stormwater GIS. The stormwater budget for STR was over $2,400,000 in reporting year 2018/19. The budget included more than $1,800,000 for wash maintenance and approximately $600,000 for the stormwater GIS.

<u>Office of Environmental Programs</u>
OEP conducts environmental assessments of municipal facilities and operations and oversees the stormwater training plan. OEP also advises city departments on regulatory compliance issues. OEP also conducts stormwater inspections for those municipal construction and post-construction projects that did not go through the PDD permit process. The stormwater operating expenditures for OEP was almost $160,000 in reporting year 2018/19. An additional $95,000 was spent on capital improvement program projects, and an additional $155,000 was carried-over from 2018/19 to 2019/20 for additional capital improvement project costs not completed in 2018/19.

<u>Planning and Development Department</u>
PDD conducts grading and drainage plan reviews and inspections. PDD costs are covered by plan review fees and construction permit fees, and their budget may vary significantly depending on the number of permitted construction projects. The grading and draining budget for PDD in reporting year 2018/19 was over $1.8M with stormwater expenditures at $353,000.

Table 3-3 Stormwater Management Program Fiscal Expenditures

City of Phoenix Department	Reporting Year 2018/19 Actual	Reporting Year 2019/20 Projected
Water Services Department		
Stormwater Program Support	$1,890,122	2,317,431
Street Transportation Department		
Wash Maintenance	$1,725,408	$2,688,241
Geographic Information System	$634,692	$705,159
Planning and Development Department		
Grading and Drainage – Plan Review	$1,430,000	1,460,000
Grading and Drainage – Inspections	$445,175	454,000
Office of Environmental Programs		
Stormwater Program Support	$159,786	$177,775
Capital Improvement Projects	$95,154	$405,000
*This includes carry-over of $155,000 from fiscal year 2019/20		

PART 4: SUMMARY OF STORMWATER MANAGEMENT PROGRAM ACTIVITIES (NUMERIC)

Provide a summary of stormwater management practices and activities performed each year as indicated in the Table below.

	REPORTING YEAR (July 1-June 30)						
STORMWATER MANAGEMENT PRACTICE OR ACTIVITY	**2012/13**	**2013/14**	**2014/15**	**2015/16**	**2016/17**	**2017/18**	**2018/19**
Illicit Discharge Detection and Elimination Program							
1. Municipal Employee Training							
Number of training sessions (on non-stormwater discharges and the IDDE program)	**34**	**20**	**9**	**17**	**10**	**15**	**48**
Number of employees attending training	**726**	**515**	**302**	**527**	**357**	**287**	**976**
2. Spill Prevention							
Number of municipal facilities identified with hazardous materials	**307**	**303**	**301**	**298**	**313**	**294**	**287**
Number of spills at municipal facilities with hazardous materials, that occurred in outside areas	**2**	**2**	**1**	**1**	**1**[c]	**2**	**3**
Number of Facility Assessments completed* *(*identify any issues found requiring follow-up in narrative and summarize new practices to minimize exposure)*	**120**	**107**	**112**	**111**	**143**	**119**	**95**
Date of last review of HMMP* (*Identify committee participant with stormwater expertise in narrative)	**06/2013**	**06/2014**	**05/2015**	**05/2016**	**06/2017**	**06/2018**	**06/2019**
3. Outfall Inspections							
Total Number inspected* *(*attach or forward electronic copy of inventory or map of major out falls and priority outfalls)*	**202**	**170**	**214**	**307**	**251**	**169**	**175**
Number of 'Priority Outfalls' identified to date* *(*summarize findings and follow-up actions in narrative)*	**38**	**31**	**27**	**31**	**13**	**13**	**17**
Number of 'Priority outfalls' inspected* *(*summarize findings and follow-up actions in narrative)*	**38**	**31**	**27**	**30**	**13**	**13**	**17**
Number of dry weather flows detected	**18**	**10**	**15**	**24**	**14**	**10**	**20**
Number of dry weather flows investigated	**18**	**10**	**15**	**24**	**14**	**9**	**20**
Number of major outfalls sampled	**18**	**10**	**15**	**24**	**14**	**9**	**20**
Number of illicit discharges identified	**4**	**1**	**6**	**7**	**5**	**8**	**14**
Number of illicit discharges eliminated	**3**[b]	**1**	**2**	**7**	**5**	**7**	**10**
Amount of storm drain inspected (length)	**0.61 miles**	**.076**[d]	**3.8 miles**	**4.04 miles**	**5.76 miles**	**0.41 miles**	**7.73 miles**
Number of storm drain cross connection investigations	**0**	**0**	**1**	**1**	**0**	**5**	**1**

	REPORTING YEAR (July 1-June 30)						
STORMWATER MANAGEMENT PRACTICE OR ACTIVITY	**2012/13**	**2013/14**	**2014/15**	**2015/16**	**2016/17**	**2017/18**	**2018/19**
Number of illicit connections detected	0	1	1	1	1	2	3
Number of illicit connections eliminated	2	1	0	1	1	2	1
Number of corrective or enforcement actions initiated within 60 days of identification	1	1	1	2	5	2	3
Percent of cases resolved within 1 calendar year of original Level One action*	100	90%	100%	100%	80%	100%	100%
Number of illicit discharge reports received from public	236	213	195	186	188	286	120
Percent of illicit discharge reports responded to	99%	100%	100%	98%	100%	100%	99%
Percent of responses initiated within 15 days of receipt	100%	100%	98%	100%	100%	100%	98%
Municipal Facilities							
1. Employee Training							
Number of training events* *(*dates and topics to be included in narrative)*	77	48	484	37	61	40	39
Number of staff trained	2416	1208	1354	753	1989	1056	1568
2. Inventory/Map/Database of MS4 Owned and Operated Facilities							
Total number of facilities on inventory	307	303	301	298	313	294	287
Date identification of “high risk” facilities completed	6/30/2011	6/30/2011	6/30/2011	6/30/2011	6/30/2011	6/30/2011	6/30/2011
Date prioritization of municipal facilities completed	6/30/2011	6/30/2011	6/30/2011	6/30/2011	6/30/2011	6/30/2011	6/30/2011
3. Inspections							
Miles of MS4 drainage system prioritized for inspection	0[a]	0[a]	0[a]	0[a]	0[a]	0[a]	0[a]
Miles visually inspected	0.61 (city) 12.66 (contractor)	9.55	14.08	10.06	18.72	20.24	10.66
Number of ‘high risk’ municipal facilities inspected	38	12	24	18	19	24	18
Number of ‘high risk’ municipal facilities found needing improved stormwater controls	11	6	8	5	6	7	9
4. System Maintenance							
Linear miles of drainage system cleaned each year* (*City to maintain records documenting specific street cleaning events)	116,413	176,970	146,315	191,318	205,299	209,992	204,816
Record amount of waste collected from street and lot sweeping (reported in tons)	14,198	12,386	16,120	18,509	14,628	17,286	15,257
Total number of catch basins	18,641	18,943	19,648	20,644	21,015	33,829	36,576
Number of catch basins cleaned	4,613	5,674	10,552	6,682	4,441	3,402	2,431
Industrial Sites Not Owned by the MS4							
Number of training events for MS4 staff	2	2	1	2	1	3	2

	REPORTING YEAR (July 1-June 30)						
STORMWATER MANAGEMENT PRACTICE OR ACTIVITY	**2012/13**	**2013/14**	**2014/15**	**2015/16**	**2016/17**	**2017/18**	**2018/19**
Number of municipal staff trained	**12**	**46**	**13**	**45**	**9**	**55**	**5**
Number of industrial facilities on Part V.B. Inventory inspected	**686**	**540**	**780**	**636**	**567**	**688**	**551**
Number of corrective or enforcement actions initiated on industrial facilities	**285**	**281**	**171**	**101**	**97**	**223**	**199**
Percent of cases resolved within 1 calendar year of original Level One action	**>95%**	**95%**	**99%**	**99%**	**99%**	**96%**	**100%**
Construction Program Activities							
Number of training events for MS4 staff* (*include topics in narrative summary)	**1**	**2**	**7**	**3**	**3**	**2**	**5**
Number of municipal staff trained	**4**	**20**	**28**	**41**	**15**	**26**	**46**
Number of construction/grading plans submitted for review	**153**	**164**	**335**	**634**	**481**	**735**	**1,070**
Number of construction/grading plans reviewed	**153**	**164**	**335**	**634**	**481**	**735**	**1,070**
Number of construction sites inspected	**334** **14** **(municipal)**	**344** **19** **(municipal)**	**353** **10** **(municipal)**	**390** **9** **(municipal)**	**533** **16** **(municipal)**	**354** **21** **(municipal)**	**688** **24** **(municipal)**
Number of corrective or enforcement actions initiated on construction facilities* (*identify the type of actions in narrative summary)	**36** **17** **(municipal)**	**34** **9** **(municipal)**	**118** **12** **(municipal)**	**83** **19** **(municipal)**	**51** **23** **(municipal)**	**46** **24** **(municipal)**	**48** **7** **(municipal)**
Post Construction Program Activities							
Number of post-construction inspections completed	**82** **12** **(municipal)**	**91** **14** **(municipal)**	**130** **6** **(municipal)**	**121** **3** **(municipal)**	**176** **15** **(municipal)**	**168** **13** **(municipal)**	**199** **26** **(municipal)**
Number of corrective or enforcement actions initiated for post-construction activities * (*identify the type of actions in narrative summary)	**0** **4** **(municipal)**	**0** **2** **(municipal)**	**0** **0** **(municipal)**	**0** **0** **(municipal)**	**0** **1** **(municipal)**	**0** **6** **(municipal)**	**0** **0** **(municipal)**

(a) The City does not measure linear miles of drainage system prioritized for inspection. Rather, these areas are listed by location. The lists are included in the SWMP and updated annually.
(b) Some of the illicit discharges investigated were found to be allowable under City Code and thus not eliminated.
(c) This value was corrected from 13 to 1, to address a typo in the 2016/2017 report.
(d) 400 feet of televised line was inspected under contract by Pro Pipe. The City did not have the ability to televise storm drain lines due to inoperative camera equipment.

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PART 5: EVALUATION OF THE STORMWATER MANAGEMENT PROGRAM

In accordance with Section 5.4 of the permit, provide an evaluation of the progress and success of the stormwater management program each year, including an assessment of the effectiveness of stormwater management practices in reducing the discharge of pollutants to and from the municipal storm sewer system.

Program Management

The Stormwater Working Group (Working Group), which includes representatives from WSD, STR, OEP, PDD, PWD, and Law, continues to meet on a monthly basis. The Working Group discusses ongoing issues, such as IDDE investigations, municipal stormwater projects, the GIS database, and stormwater training. An Executive Committee composed of Management from the five key departments meets quarterly to discuss the stormwater budget and any ongoing issues that require management decisions.

Monthly Working Group and quarterly Executive Committee meetings are an efficient and effective way to communicate program requirements. It is anticipated that this meeting structure will greatly benefit the City of Phoenix during the Phase I MS4 General Permit stakeholder process.

Public Education and Outreach

WSD has developed a new division that is focused on community education and outreach (CEO). Staff from other WSD divisions support CEO, which continues to include stormwater messaging to school-aged children and citizens at City-sponsored or attended events. The City continues to utilize multi-media efforts, such as print advertisement, mailers, and surveys, as well as actively participating in AZSTORM on a monthly basis.

This reporting year more than 700 storm drain awareness surveys were completed. A majority of the respondents answered the 14-question survey online via Survey Monkey distributed via NextDoor. The City uses Survey Monkey to track analytics over time and help determine whether awareness is increasing.

In summary:

This year 46% answered that runoff goes to a treatment plant or sewer system (less than 3% decrease over last year), and 76% chose wash or river (a 47% increase over last year.)

80% believe there is a problem in the Valley with pollution entering storm drains; a 7% decrease over last year.

Nearly all responses *deny* that they dispose of household chemicals, pesticides, automotive fluids, yard waste, and pet waste in storm drains; same as last year’s measurements.

While most indicate that they would seek information on these topics by going to the City, ADEQ, or internet nearly 35% were not sure where to go when observing someone dumping pollutants into the storm drain; (statistic is unchanged from last year).

Demographic questions were added to the survey to assist in narrowing down information on the audience. These questions are:

- What is your gender: Female (57%), Male (40%), Prefer not to answer (3%)

- What is your age group: Under 21 (1%), 21-39 (17%), 40-59 (37%), 60+ (40%); generally, more mature audiences took this year's survey than last.

Last, we ask how they heard about us, which may be used in the future to direct our method of contact:

60% indicated NextDoor; 15% said email, 15% from events; a few said Facebook, Twitter, Website and Other.

The survey response summary is included in the attachments section of this annual report.

Pollutant Load

Annual and seasonal pollutant load estimates have been calculated for pollutants identified in Section 7.4 of the City's AZPDES Permit. Total pollutant load estimates for all watershed basins within the Phoenix MS4 are presented in Part 11 of this report.

As included in the 2013 MS4 Permit renewal application, City GIS staff acquired County land-use spatial data and combined them with sub-watershed boundaries developed by the Flood Control District of Maricopa County (FCDMC 2013). These sub-watershed boundaries are very similar to the Watershed Boundary Dataset 10-digit Hydrologic Unit Code (HUC), with exceptions made for local flood control and other man-made diversions (for example, White Tanks A Basin). Clipping these data to the City permit boundaries produced a watershed-based land-use map that was used to define 12 new areas, now sub-watersheds, used in the pollutant load estimate. Data from reporting years 2013/14 through 2017/18 are presented for comparison to the reporting year 2018/19 pollutant load analysis.

Pollutant load analysis does not offer much insight to BMP effectiveness as there appears to be a direct correlation between pollutant loading and quantity of flow, not necessarily program implementation measures.

PART 6: STORMWATER MANAGEMENT PROGRAM MODIFICATIONS

In accordance with Section 5.5 of the permit, provide a description of modifications, if applicable, to the stormwater management program each year as follows:

1. **<u>Addition of New BMPs:</u> Summarize the development and implementation of any new stormwater management practices or pollution controls each year.**

   No BMPs were added during this reporting year.

2. **<u>Addition of Temporary BMPs</u>: Specify the occasions when these controls were initiated and terminated, and the perceived success of these temporary BMPs.**

   No temporary BMPs were added this reporting year.

3. **<u>Increase of Existing BMPs:</u> Summarize modifications to existing stormwater management practices that increase the number of activities, increase the frequency of activities, or other increases in the level of implementation.**

   No existing BMPs were increased during this reporting year.

4. **<u>Replacement of Existing BMPs</u>: Briefly summarize any replacements made with prior approval of ADEQ per section 5.5(4) of the permit.**

   No existing BMPs were replaced this reporting year.

<u>Programmatic Changes</u>

Environmental Services Division migrated to a new database application, which came online in April 2017. The transition included moving data from an access database to a proprietary system that was in use by other sections within the division. The project required months of testing functionality and process control to ensure that reports would provide necessary results to include in regulatory compliance reports, such as this annual report. Though the data has been migrated, and the new application is being utilized, work on the reports continued into FY 18/19.

The Environmental Quality Specialist (EQS) position added to the program in 2016 was changed to a half Stormwater, half Industrial Pretreatment Program position. The position is still involved with reporting, data review, and outreach for the Stormwater Program. However, the Water Services Department's Community Education and Outreach Division is now handling most Stormwater outreach activities.

Note: Modifications to reduce number of stormwater management practices or activities, frequencies, time frames, level of implementation, or any other program standard specified in Appendix A of the permit requires permit modification (refer to Section 5.6 of the permit).

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PART 7: MONITORING LOCATIONS

For the year one Annual Report**,** provide a brief description of each stormwater monitoring location (outfall), including the following information. For subsequent Annual Reports, advise if any of the information has changed or is updated.

No changes to the stormwater monitoring locations were made in reporting year 2018/19.

The monitoring sites are described on the following pages. The information for each site corresponds to the requirements in Part 7 of Appendix B of the Permit. Latitude and longitude coordinates have been revised for some outfalls. Land-use data and catchment area information are approximate values based on a review of the available data and best engineering judgment. Maps of the drainage areas are included as an attachment to this report.

It should be noted that SR049 catchment area changed as a result of the 202 Connect Project. The revised catchment area map is included as an attachment to this report. Other catchment areas were also reviewed and updated as needed.

Note: Modifications to monitoring locations shall not be implemented without permit modification.

Name and Description of Receiving Water

New River, via the Arizona Canal Diversion Channel (ACDC)

Outfall Identification Number

AC033

Address/Physical Location of the Site

Dunlap and 7th Avenue just south of Hatcher

Latitude/Longitude

33° 34' 8.016 "

-112° 4' 58.348"

Discharge Structure

60-inch box outlet

Size (acres) of Drainage Area

1084 acres

Land Uses

Industrial	0.3%
Commercial	11.9%
Open Land	21.2%
Institutional	1.9%
Residential	47.9%
Heavy Residential	2.3%
Pavement	14%
Miscellaneous	0.5%

Type of Monitoring Equipment

Automated composite sampler (Isco Environmental model 6712), an Isco rain gauge, and an Isco flow meter for depth and flow measurement. Installed solar panels to augment battery performance.

Name and Description of Receiving Water

Indian Bend Wash

Outfall Identification Number

IB008

Address/Physical Location of the Site

12499 North 40th Street

Latitude/Longitude

33° 35' 58.218"

-111° 59' 44.292"

Discharge Structure

66-inch round inlet pipe (original) discharging to two 30-inch outlet pipes

48-inch round inlet pipe (new in 2005) discharging to one 48-inch outlet pipe

Size (acres) of Drainage Area

804.5 acres

Land Uses

Industrial	0.3%
Commercial	6.0%
Open Land	4.1%
Institutional	6.2%
Residential	64.5%
Heavy Residential	3.5%
Pavement	15.1%
Miscellaneous	0.3%

Type of Monitoring Equipment

Automated composite sampler (Isco Environmental model 6712), an Isco rain gauge, and an Isco flow meter for depth and flow measurement. Installed solar panels to augment battery performance. Adjusted flow meter device within the pipe, Winter 2018/19.

Name and Description of Receiving Water

Salt River

Outfall Identification Number

SR003

Address/Physical Location of the Site

3501 West Elwood Street

Latitude/Longitude

33° 24' 43.025"

-112° 8' 5.004"

Discharge Structure

75-inch round pipe

Size (acres) of Drainage Area

1886 acres

Land Uses

Industrial	10.3%
Commercial	13.8%
Transportation	0.8%
Open Land	11.5%
Institutional	20.1%
Residential	29.6%
Heavy Residential	3.0%
Utilities	0.7%
Pavement	10.2%

Type of Monitoring Equipment

Automated composite sampler (Isco Environmental model 6712), an Isco rain gauge, and an Isco flow meter for depth and flow measurement. Installed solar panels to augment battery performance.

Name and Description of Receiving Water

Salt River

Outfall Identification Number

SR030

Address/Physical Location of the Site

27th Avenue at the Salt River (south bank)

Latitude/Longitude

33° 24' 31.447"

-112° 06' 59.142"

Discharge Structure

108-inch round pipe

Size (acres) of Drainage Area

1620 acres

Land Uses

Industrial	14.1%
Commercial	4.5%
Open Land	33.4%
Institutional	2.8%
Residential	35.6%
Heavy Residential	0.3%
Pavement	9.2%
Miscellaneous	0.1%

Type of Monitoring Equipment

Automated composite sampler (Isco Environmental model 6712), an Isco rain gauge, and an Isco flow meter for depth and flow measurement. Installed solar panels to augment battery performance.

Name and Description of Receiving Water

Salt River

Outfall Identification Number

SR045

Address/Physical Location of the Site

2401 South 40th Street

Latitude/Longitude

33° 25' 34.082"

-111° 59' 44.274"

Discharge Structure

54-inch round pipe

Size (acres) of Drainage Area

879.7 acres

Land Uses

Industrial	27.1%
Commercial	43.0%
Open Land	5.7%
Institutional	4.3%
Residential	0.9%
Heavy Residential	0.0%
Pavement	19%

Type of Monitoring Equipment

Automated composite sampler (Isco Environmental model 6712), an Isco rain gauge, and an Isco flow meter for depth and flow measurement. Installed solar panels to augment battery performance.

Name and Description of Receiving Water

Salt River

Outfall Identification Number

SR049

Address/Physical Location of the Site

5400 South 67th Avenue

Latitude/Longitude

33° 24' 0.510"

-112° 12' 15.095"

Discharge Structure

96-inch round pipe

Size (acres) of Drainage Area

1974 acres

Land Uses

Industrial	16.6%
Commercial	6.8%
Transportation	0.1%
Open Land	26.3%
Institutional	3.2%
Residential	35.2%
Heavy Residential	1.1%
Utilities	0.1%
Pavement	8.8%
Miscellaneous	1.7%

Type of Monitoring Equipment

Automated composite sampler (Isco Environmental model 6712), an Isco rain gauge, and an Isco flow meter for depth and flow measurement. Installed solar panels to augment battery performance.

Note: The drainage area for this outfall changed significantly as part of the Connect 202 Project.

Name and Description of Receiving Water

Skunk Creek Wash (Tributary to New River)

Outfall Identification Number

SC046

Address/Physical Location of the Site

35206 North 27th Avenue

Latitude/Longitude

33° 48' 11.171"

-112° 7' 7.380"

Discharge Structure

Three 36-inch round pipes

Size (acres) of Drainage Area

46 acres

Land Uses

Industrial	0.0%
Commercial	0.0%
Transportation	0.0%
Open Land	24.7%
Residential	62.8%
Heavy Residential	0.0%
Pavement	12.4%

Type of Monitoring Equipment

Automated composite sampler (Isco Environmental model 6712), an Isco rain gauge, and an Isco flow meter for depth and flow measurement. Installed solar panels to augment battery performance.

PART 8: STORM EVENT RECORDS

For each outfall identified in Part 7.0, Table 1.0 of the permit, summarize all measurable storm events (greater than 0.1-inch rainfall) occurring in the drainage area of each outfall within the winter and summer wet seasons, respectively, until samples have been collected for the outfall. Include the date of each event, the amount of precipitation (inches) for each event, and whether a sample was collected, or if not collected, information on the conditions that prevented sampling. (Note: If unable to collect stormwater samples due to adverse climatic conditions, provide, in lieu of sampling data, a description of the conditions that prevented sampling. Adverse climatic conditions which may prevent the collection of samples include weather conditions that create dangerous conditions for personnel, such as local flooding, high winds, electrical storms, etc.).

In accordance with 40 CFR Part 122.21(g) (7), the City AZPDES Permit Section 7.3.1 defines a representative storm as rainfall in the amount of 0.2 inches or more. The section further directs that "Stormwater samples shall be collected from discharges resulting from a storm event producing 0.2 inches or more of rainfall and at least 72 hours after the previously measured storm event (greater than 0.1-inch rainfall)." Rainfall totals and sample collection information by outfall are provided in Table 8-1 in this section.

Summer Wet Season Sampling Summary

July 9, 2018: Grab and composite samples were collected from SR003, SR030, IB008, and AC033. Although there was sufficient flow, the sampler at SR045 failed and no samples were collected.

July 11, 2018: Grab and composite samples were collected from SC046.

August 7, 2018: Grab and composite samples were collected from SR045.

August 11, 2018: Grab and composite samples were collected from SR049.

Winter Wet Season Sampling Summary

November 29-30, 2018: Grab and composite samples were collected at SR045, AC033, and IB008.

February 14, 2019: Grab and composite samples were collected from SC046.

February 21-22, 2019: Grab and composite samples were collected from SR003 and SR030.

March 11-12, 2019 - Grab and composite samples were collected from SR049.

Between December 22, 2018 and January 25, 2019, the Federal Government was shutdown. During this time period, there was a representative rain event on January 6, which was not collected at outfalls SR003, SR030, SR049 and SC046. Samples were collected at outfalls SR003, SR030, and SC046 during the first representative rain event in February. The sample at outfall SR049 was not collected due to a sampler failure and was subsequently collected at the next rain event in March.

All reported data were validated by the USGS to ensure that the data quality objectives of the AZPDES program have been met. The data validation was reviewed by AECOM to determine whether the data and associated quality assurance and quality control (QAQC) information appear to be complete. Based on the QAQC presented, the analytical results appear to be generally usable for their intended purpose.

The following procedures were used in validating the data:

- Analytical methods used in the monitoring program were reviewed to assess the appropriateness of sample collection, transport methods, and holding times.
- Original laboratory reports and the corresponding chain of custody forms were reviewed to determine if quality assurance/quality control requirements were met. Evaluation criteria including holding times, duplicate results, field blank results, method blank results, matrix spike results, equipment calibration information, and sample collection and transport information (to the extent practical.)

Table 8-1 Storm Event Data for Reporting Year 2018/19

Season	Date	Outfall IB008	Rainfall inches	Outfall SR049	Rainfall inches	Outfall SR045	Rainfall inches	Outfall SR003	Rainfall inches	Outfall SR030	Rainfall inches	Outfall AC033	Rainfall inches	Outfall SC046	Rainfall inches
Summer (Jun 1 – Oct 31)	7/9/2018	SC	0.26	-	-	EM	0.61	SC	0.73	SC	0.80	SC	0.30	-	-
	7/11/2018	-	-	-	-	-	-	-	-	-	-	-	-	SC	0.39
	8/7/2018	-	-	-	-	SC	0.25	-	-	-	-	-	-	-	-
	8/11/2018	-	-	SC	0.21	-	-	-	-	-	-	-	-	-	-
Winter (Nov 1 – May 31)	11/29-30/2018	SC	0.39	-	-	SC	0.39	-	-	-	-	SC	0.24	-	-
	1/6/2019	-	-	GS	0.33	-	-	GS	0.40	GS	0.45	-	-	GS	0.56
	2/14/2019	-	-	-	-	-	-	-	-	-	-	-	-	SC	0.40
	2/21-22/2019	--	--	EM	0.91	-	-	SC	0.72	SC	0.90	--	--	--	--
	3/11-12/2019	-	-	SC	0.20	-	-	-	-	-	-	-	-	-	-

SC – Sample Collected; EM – Equipment Malfunction; GS – Government Shutdown

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PART 9: SUMMARY OF MONITORING DATA (BY LOCATION)

Use a separate table for each outfall monitoring location. Provide the outfall identification number, the receiving water designated uses, and the lowest surface water quality standards applicable to the receiving water. Enter the analytical results for the stormwater samples collected for each season of the reporting period for each year. Enter subsequent monitoring data for each location on the same form. Include, as an attachment, the laboratory reports for stormwater samples.

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OUTFALL ID: IB008	MONITORING SEASONS																									
RECEIVING WATER: Indian Bend Wash	Summer: June 1 - October 31																									
	Winter: November 1 - May 31																									
DESIGNATED USES: PBC and A&We	Winter 2012/13		Summer 2013		Winter 2013/14		Summer 2014		Winter 2014/15		Summer 2015		Winter 2015/16		Summer 2016		Winter 2016/17		Summer 2017		Winter 2017/18		Summer 2018		Winter 2018/19	
SAMPLING DATE(S):	SWQS	12/14/2012	SWQS	7/19/2013	SWQS	11/22/2013	SWQS	8/2/2014	SWQS	12/4/2014	SWQS	6/29/2015	SWQS	1/4/2016	SWQS	8/5/2016	SWQS	12/22/2016	SWQS	7/16/2017	SWQS	12/17/2017	SWQS	7/9/2018	SWQS	11/29/2018
MONITORING PARAMETERS [1,2]																										
Conventional Parameters																										
Flow [3] (cfs)	NS	4.62	NS	1.223	NS	12.34	NS	9.4	NS	0.212	NS	5.341	NS	2.296	NS	19.83	NS	59.094	NS	156.6	NS	6.33	NS	3.734	NS	0.001
pH	6.5-9	7.75	6.5-9	7.18	6.5-9	8.38	6.5-9	7.46	6.5-9	7.49	6.5-9	7.3	6.5-9	7.51	6.5-9	7.14	6.5-9	6.83	6.5-9	7.25	6.5-9	7.56	6.5-9	7.42	6.5-9	7.64
Temperature (ºC)	Varies	16.5	Varies	31	Varies	15.5	Varies	30.5	Varies	17	Varies	29	Varies	14.1	Varies	25	Varies	16.5	Varies	28.9	Varies	14.5	Varies	29.9	Varies	18.6
Hardness (mg/L)	400	33.8	400	224	400	60.8	400	39.9	400	16.6	400	91.2	400	25.1	400	27.6	400	27.3	400	82.1	400	71.4	400	76.5	400	54.5
Total Dissolved Solids (TDS) (mg/L) [2]	NS	110	NS	674	NS	182	NS	92	NS	56	NS	274	NS	60	NS	86	NS	60	NS	320	NS	216	NS	270	NS	154
Total Suspended Solids (TSS) (mg/L) [2]	NS	180	NS	279	NS	192	NS	212	NS	71	NS	252	NS	76	NS	458	NS	55	NS	804	NS	40	NS	376	NS	242
Biochemical Oxygen Demand (BOD) (mg/L) [2]	NS	24	NS	123	NS	41	NS	17	NS	7	NS	67	NS	10	NS	23	NS	7	NS	108	NS	46	NS	76	NS	33
Chemical Oxygen Demand (COD) (mg/L) [2]	NS	140	NS	600	NS	250	NS	110	NS	<50	NS	300	NS	90	NS	190	NS	<50	NS	560	NS	200	NS	390	NS	190

IB008	Winter 2012/13		Summer 2013		Winter 2013/14		Summer 2014		Winter 2014/15		Summer 2015		Winter 2015/16		Summer 2016		Winter 2016/17		Summer 2017		Winter 2017/18		Summer 2018		Winter 2018/19	
SAMPLING DATE(S):	SWQS	12/14/2012	SWQS	7/19/2013	SWQS	11/22/2013	SWQS	8/2/2014	SWQS	12/2/2014	SWQS	6/29/2015	SWQS	1/4/2016	SWQS	8/5/2016	SWQS	12/22/2016	SWQS	7/16/2017	SWQS	12/17/2017	SWQS	7/9/2018	SWQS	11/29/2018
Inorganics																										
Cyanide, total (µg/L) [2]	84	<5	84	<50	84	<5	84	<5	84	<5	84	<5	84	<5	84	<5	84	<5	84	<5	84	<5	84	<5	84	<5
Nutrients (mg/L) [2]																										
Nitrate + Nitrite as N	NS	0.9	NS	6.9	NS	1.3	NS	1.4	NS	0.4	NS	2.1	NS	0.5	NS	1.1	NS	0.4	NS	2.3	NS	1.8	NS	1.6	NS	1.3
Ammonia as N	NS	1.2	NS	3.7	NS	1.7	NS	1.7	NS	0.61	NS	2.7	NS	0.45	NS	1.5	NS	0.35	NS	3.1	NS	1.9	NS	2.4	NS	1.9
Total Kjeldahl Nitrogen (TKN)	NS	3.9	NS	15	NS	4.5	NS	3.1	NS	1.4	NS	7.7	NS	1.4	NS	4.7	NS	1.3	NS	11	NS	5.8	NS	11	NS	6.0
Total Phosphorus as P	NS	0.7	NS	0.83	NS	0.64	NS	0.44	NS	0.35	NS	0.82	NS	0.44	NS	3.3	NS	0.24	NS	0.48	NS	0.64	NS	1.8	NS	0.66
Ortho-Phosphorus as P	NS	0.2	NS	0.9	NS	0.3	NS	0.1	NS	0.1	NS	0.3	NS	0.1	NS	0.2	NS	0.1	NS	0.7	NS	0.4	NS	0.6	NS	0.1
Microbiological																										
Escherichia coli (*E. coli*) (CFU/100 mg or MPN/100 mL) [2]	575	**2,419.60**	575	**>2,419.6**	575	**>2,419.6**	575	**>2,419.6**	575	**>2,419.6**	575	**2,419.60**	575	**2,650.00**	575	**1,986.30**	575	**2,419.60**	575	**1,986.30**	575	**20,350**	575	456.9	575	**24,810**
Total Metals (µg/L) [2]																										
Antimony	747 T	1.5 T 0.7 D	747 T	3.7 T 1.9 D	747 T	1.7 T 0.8 D	747 T	1.5 T 1.1 D	747 T	1.2 T 0.4 D	747 T	2 T <5 D	747 T	1.4 T <5.0 D	747 T	2.3 T >5 D	747 T	0.69T <5 D	747 T	4.3 T <5 D	747 T	2.1 T <5 D	747 T	3.3 T <5.0 D	747 T	2.4 T <5.0 D
Arsenic	280 T 440 D	2.7 T 0.9 D	280 T 440 D	5.9 T 2.8 D	280 T 440 D	2.0 T 1.0 D	280 T 440 D	2.5 T 1.2 D	280 T 440 D	1.6 T 0.5 D	280 T 440 D	3.3 T <5 D	280 T 440 D	2.0 T <5.0 D	280 T 440 D	6.2 T <5 D	280 T 440 D	1.7 T <5 D	280 T 440 D	7.8 T <5 D	280 T 440 D	2.3 T <5 D	280 T 440 D	6.7 T <5.0 D	280 T 440 D	3.5 T <5.0 D
Barium	98,000 T	84 T 14 D	98,000 T	225 T 90 D	98,000 T	86 T 26 D	98,000 T	55 T 22 D	98,000 T	40 T 8 D	98,000 T	106 T 50 D	98,000 T	58 T 12 D	98,000 T	176 T 19 D	98,000 T	42 T 12 D	98,000 T	271 T 58 D	98,000 T	74 T 33 D	98,000 T	260 T 49 D	98,000 T	121 T 26 D
Beryllium	1,867 T	0.28 T <0.15 D	1,867 T	0.46 T <0.15 D	1,867 T	<0.15 T <0.06 D	1,867 T	0.15 T <0.06 D	1,867 T	0.12 T <0.06 D	1,867 T	0.22 T <5 D	1,867 T	0.10 T <5.0 D	1,867 T	0.53 T <5 D	1,867 T	<0.25 T <5 D	1,867 T	0.73 T <5 D	1,867 T	<0.15 T <5 D	1,867 T	0.69 T <5.0 D	1,867 T	0.29 T <5.0 D
Cadmium	700 T 7.93 D	1.0 T 0.3 D	700 T 49.92 D	0.6 T <0.25 D	700 T 14.05 D	0.3 T <0.10 D	700 T 9.33 D	<0.30 T <0.12 D	700 T 3.67 D	<0.12 T <0.12 D	700 T 20.85 D	0.2 T <5 D	700 T 5.93 D	0.2 T <5.0	700 T 15.98 D	0.3 T <0.25 D	700 T 15.79 D	<0.25 T <0.25 D	700 T 52.16 D	0.8 T <0.2 D	700 T 44.83 D	<0.20 T <0.2	700 T 48.31	0.7 T <0.2 D	700 T 33.44	0.3 T <0.25 D
Chromium	NS	7.2 T <2.00 D	NS	20.1 T 3.3 D	NS	5.9 T 1.0 D	NS	5 T 1 D	NS	3.7 T 0.4 D	NS	6.8 T <5 D	NS	5.1 T <5.0 D	NS	17.2 T <5 D	NS	3.8 T <5 D	NS	20.7 T <5 D	NS	5 T <5 D	NS	18.9 T <5.0 D	NS	8.4 T <5.0 D
Copper	1,300 T 8.37	40.3 T **11.8 D**	1,300 T 49.73 D	147 T **75.5 D**	1,300 T 14.55 D	51.2 T **20.8 D**	1,300 T 9.79 D	25.2 T **13.7 D**	1,300 T 4.28 D	16.0 T **5.8 D**	1,300 T 21.32 D	62.5 T **40.6 D**	1,300 T 6.32 D	40.0 T **14.8 D**	1,300 T 2.98 D	61.3 T **12.8 D**	1,300 T 6.85 D	12 T 5.5 D	1,300 T 19.32 D	156 T **34.5 D**	1,300 T 16.93 D	46.5 T **28.4 D**	1,300 T 18.07	116 T **35.2 D**	1,300 T 13.13	53.7 T **16.2 D**
Lead	15 T 41.11D	12.9 T 0.5 D	15 T 323.97 D	**27.8 T** 2.4 D	15 T 78.97 D	11.0 T 0.5 D	15 T 49.48 D	7.3 T 0.7 D	15 T 18.45 D	7.6 T 0.3 D	15 T 123.27 D	10.4 T < 5 D	15 T 29.43 D	10.7 T <5.0 D	15 T 32.75 D	**24.3 T** 0.7 D	15 T 32.35 D	5.2 T <0.55 D	15 T 109.89 D	**41.5 T** 3.4 D	15 T 94.27 D	8 T 0.7 D	15 T 101.70	**37.6 T** 2.8 D	15 T 69.98	**17.3 T** 0.3 D
Mercury	280 T 5 D	<0.040 T <0.040 D	280 T 5 D	0.06 T 0.037 D	280 T 5 D	<0.020 T <0.020D	280 T 5 D	<0.092 T <0.2 D	280 T 5 D	<0.092 T <0.092 D	280 T 5 D	<0.2 T <0.2 D	280 T 5 D	<0.062 T <0.2 D	280 T 5 D	<0.068 T <0.068 D	280 T 5 D	<0.068 T <0.2D	280 T 5 D	0.132 T <0.2 D	280 T 5 D	<0.066 T <0.2 D	280 T 5 D	<0.080 T <0.080 D	280 T 5 D	0.043 T <0.2 D
Nickel	28,000 T 1,661 D	7.9 T 2.3 D	28,000 T 8,227 D	34.0 T 18.0 D	28,000 T 2,729.4 D	10.0 T 4.6 D	28,000 T 1,911 D	5.7 T 2.7 D	28,000 T 910.2 D	3.5 T 0.7 D	28,000 T 3,846 D	11.7 T 6.3 D	28,000 T 1,291 D	5.1 T <5.0 D	28,000 T 1,399 D	16.6 T <5 D	280,000 T 1,386 D	3.6 T <5 D	280,000 T 3519.29 D	25.7 T 8.4 D	280,000 T 3127.15 D	7 T <5 D	28,000 T 3,315.11	25.8 T 8.1 D	28,000 T 2,488.35	9.4 T <5.0 D
Selenium	33 T	0.65 T 0.6 D	33 T	1.5 T 1.3 D	33 T	<0.60 T 0.3 D	33 T	0.64 T 0.4 D	33 T	0.25 T 0.1 D	33 T	0.99 T <5 D	33 T	<0.40 T <5.0 D	33T	1.6 T <5 D	33T	0.51 T <5 D	33T	1.2 T <5.0 D	33T	0.71 T <5 D	33 T	0.86 T <5.0 D	33 T	0.69 T <5.0 D

IB008	Winter 2012/13		Summer 2013		Winter 2013/14		Summer 2014		Winter 2014/15		Summer 2015		Winter 2015/16		Summer 2016		Winter 2016/17		Summer 2017		Winter 2017/18		Summer 2018		Winter 2018/19	
SAMPLING DATE(S):	SWQS	12/14/2012	SWQS	7/19/2013	SWQS	11/22/2013	SWQS	8/2/2014	SWQS	12/2/2014	SWQS	6/29/2015	SWQS	1/4/2016	SWQS	8/5/2016	SWQS	12/22/2016	SWQS	7/16/2017	SWQS	12/17/2017	SWQS	7/9/2018	SWQS	11/29/2018
Silver	4,667 T 0.496 D	<0.15 T <0.15 D	4,667 T 12.88 D	0.4 T <0.15 D	4,667 T 1.364 D	<0.15 T <0.15 D	4,667 T 0.667D	<0.20 T <0.20 D	4,667 T 0.146 D	<0.08 T <0.08 D	4,667 T 2.75 D	<0.25 T *<5 D*	4,667 T 0.30 D	<0.25 T *<5.0 D*	4,667 T 0.35 D	<0.45 T <5 D	4,667 T 0.34 D	<0.45 T *<5 D*	4,667 T 2.29 D	0.5 T *<5.0 D*	4,667 T 1.80 D	<0.10 T *<5.0 D*	4,667 T 2.03	0.3 T *<5.0 D*	4,667 T 1.13	0.2 T *<5.0 D*
Thallium	75 T	<0.20 T <0.20 D	75 T	<0.20 T <0.20 D	75 T	<0.20 T <0.08 D	75 T	0.12 T <0.04 D	75 T	0.07 T <0.04 D	75 T	0.4 T <5 D	75 T	<0.15 T <5.0 D	75 T	0.26 T <5 D	75 T	0.34 T <5 D	75 T	0.35 T <5 D	75 T	<0.10 T <5.0 D	75 T	0.19 T <5.0 D	75 T	<0.15 T <5.0 D
Zinc	280,000 T 443.8 D	148 T 16.2 D	280,000 T 2,202 D	362 T 109 D	280,000 T 729.8 D	211 T 61.6 D	280,000 T 510.9 D	77 T 19.2 D	280,000 T 242.8 D	63.3 T 8.4 D	280,000 T 1,029 D	209 T 70 D	280,000 T 345 D	141 T 12.0 D	280,000 T 374 D	261 T 15.4 D	280,000 T 370 D	42.5 T <8	280,000 T 940.87 D	476 T 90.5 D	280,000 T 835.88 D	151 T 53.2 D	280,000 T 886.20	464 T 68.5 D	280,000 T 664.90	271 T 34.1 D
Organic Toxic Pollutants																									
Total Petroleum Hydrocarbons (TPH) (mg/L) [2]	NS	<10	NS	<11	NS	<11	NS	<10	NS	<12	NS	<11	NS	<5.7	NS	<5.6	NS	<4.5	NS	<7.1	NS	<7.0	NS	<6.8	NS	<6.0
Total Oil and Grease (mg/L) [2]	NS	5.3	NS	<5.6	NS	<5.7	NS	<5.0	NS	<6.0	NS	<5.6	NS	<5.7	NS	<5.6	NS	<4.5	NS	<5.9	NS	<5.9	NS	<5.6	NS	<6.0
VOCs, Semi-VOCs, and Pesticides (µg/L) [2]																									
Acrolein	467	<0.20	467	<2.0	467	<0.20	467	<2.00	467	<0.40	467	<3.90	467	<0.78	467	<0.41	467	<0.41	467	<3.95	467	<0.79	467	<5.0	467	0.67
Acrylonitrile	37,333	<0.16	37,333	<1.6	37,333	<0.16	37,333	<0.70	37,333	<0.14	37,333	<2.65	37,333	<0.53	37,333	<0.42	37,333	<0.42	37,333	<2.95	37,333	<0.59	37,333	<5.0	37,333	<0.57
Benzene	3,733	<0.75	3,733	<1.20	3,733	<0.24	3,733	<1.20	3,733	<0.13	3,733	<0.65	3,733	<0.46	3,733	<0.29	3,733	<0.29	3,733	<1.30	3,733	<0.26	3,733	<1.30	3,733	<0.33
Bromoform	18,667	<2.15	18,667	<2.35	18,667	<0.47	18,667	<2.35	18,667	<0.28	18,667	<1.40	18,667	<0.68	18,667	<0.33	18,667	<0.33	18,667	<1.05	18,667	<0.21	18,667	<1.05	18,667	<0.81
Carbon tetrachloride	1,307	<1.65	1,307	<1.30	1,307	<0.26	1,307	<1.30	1,307	<0.23	1,307	<1.15	1,307	<0.31	1,307	<0.20	1,307	<0.20	1,307	<1.50	1,307	<0.30	980	<1.50	980	<0.27
Chlorobenzene	18,667	<1.40	18,667	<0.80	18,667	<0.16	18,667	<0.80	18,667	<0.13	18,667	<0.65	18,667	<0.50	18,667	<0.33	18,667	<0.33	18,667	<1.15	18,667	<0.23	18,667	<1.15	18,667	<0.70
Chlorodibromomethane	18,667	<1.30	18,667	<0.90	18,667	<0.18	18,667	<0.90	18,667	<0.24	18,667	<1.20	18,667	<0.61	18,667	<0.32	18,667	<0.32	18,667	<1.20	18,667	<0.24	18,667	<1.20	18,667	<0.70
Chloroethane (ethyl chloride)	NS	<1.35	NS	<1.10	NS	<0.22	NS	<1.10	NS	<0.19	NS	<0.95	NS	<0.40	NS	<0.33	NS	<0.33	NS	<1.40	NS	<0.28	NS	<1.40	NS	<0.33
2-Chloroethylvinyl ether	NS	<0.184	NS	<2.2	NS	<0.22	NS	<0.95	NS	<0.19	NS	<2.65	NS	<0.53	NS	<0.43	NS	<0.43	NS	<3.25	NS	<0.65	NS	<5.0	NS	<0.52
Chloroform	9,333	<1.05	9,333	<1.15	9,333	<0.23	9,333	<1.15	9,333	<0.14	9,333	<0.70	9,333	<0.49	9,333	<0.32	9,333	<0.32	9,333	<1.20	9,333	<0.24	9,333	<1.20	9,333	<0.31
Dichlorobromomethane	18,667	<0.75	18,667	<1.15	18,667	<0.23	18,667	<1.15	18,667	<0.15	18,667	<0.75	18,667	<0.49	18,667	<0.29	18,667	<0.29	18,667	<1.30	18,667	<0.26	18,667	<1.30	18,667	<0.52
1,1-Dichloroethane	NS	<0.65	NS	<1.30	NS	<0.26	NS	<1.30	NS	<0.19	NS	<0.95	NS	<0.42	NS	<0.29	NS	<0.29	NS	<1.35	NS	<0.27	NS	<1.35	NS	<0.32
1,2-Dichloroethane	186,667	<0.80	186,667	<1.25	186,667	<0.25	186,667	<1.25	186,667	<0.11	186,667	<0.55	186,667	<0.51	186,667	<0.35	186,667	<0.35	186,667	<1.35	186,667	<0.27	186,667	<1.30	186,667	<0.28
1,1-Dichloroethylene	46,667	<1.85	46,667	<1.40	46,667	<0.28	46,667	<1.40	46,667	<0.27	46,667	<1.35	46,667	<0.34	46,667	<0.19	46,667	<0.19	46,667	<1.60	46,667	<0.32	46,667	<1.60	46,667	<0.40
1,2-Dichloropropane	84,000	<0.75	84,000	<1.25	84,000	<0.25	84,000	<1.25	84,000	<0.18	84,000	<0.90	84,000	<0.49	84,000	<0.32	84,000	<0.32	84,000	<1.60	84,000	<0.32	84,000	<1.60	84,000	<0.93
1,3-Dichloropropylene[8]	28,000	cis<0.50 trans<0.75	28,000	cis <1.20 trans <1.10	28,000	cis <0.24 trans <0.22	28,000	cis <1.20 trans <1.10	28,000	cis <0.13 trans <0.13	28,000	cis <0.65 trans <0.65	28,000	cis <0.51 trans <0.50	28,000	<0.28	28,000	<0.28	28,000	<1.05	28,000	<0.21	28,000	<1.05	28,000	<0.43
Ethylbenzene	93,333	<1.45	93,333	<0.65	93,333	<0.13	93,333	<0.65	93,333	<0.15	93,333	<0.75	93,333	<0.46	93,333	<0.29	93,333	<0.29	93,333	<1.15	93,333	<0.23	93,333	<1.15	93,333	<0.61
Methyl bromide	1,307	<0.95	1,307	<0.95	1,307	<0.19	1,307	<0.95	1,307	<0.18	1,307	<0.90	1,307	<0.46	1,307	<0.28	1,307	<0.28	1,307	<1.15	1,307	<0.23	1,307	<1.15	1,307	<0.33
Methyl chloride	NS	<1.85	NS	<1.40	NS	<0.28	NS	<01.40	NS	<0.23	NS	<1.15	NS	<0.46	NS	<0.28	NS	<0.28	NS	<1.85	NS	<0.37	NS	<1.85	NS	<0.33
Methylene chloride	56,000	1.8	56,000	<1.00	56,000	<0.20	56,000	<1.00	56,000	<0.20	56,000	<1.00	56,000	<0.81	56,000	<0.31	56,000	<0.31	56,000	<4.00	56,000	<0.80	56,000	<4.00	56,000	<0.44
1,1,2,2-Tetrachloroethane	93,333	<2.45	93,333	<2.00	93,333	<0.40	93,333	<2.00	93,333	<0.35	93,333	<1.75	93,333	<0.80	93,333	<0.33	93,333	<0.33	93,333	<1.55	93,333	<0.31	56,000	<1.55	56,000	<0.83
Tetrachloroethylene	9,333	<1.15	9,333	<1.05	9,333	<0.21	9,333	<1.05	9,333	<0.13	9,333	<0.65	9,333	<0.35	9,333	<0.23	9,333	<0.23	9,333	<1.45	9,333	<0.29	9,333	<1.45	9,333	<0.38
Toluene	373,333	<0.60	373,333	<0.95	373,333	<0.19	373,333	<0.95	373,333	<0.11	373,333	<0.55	373,333	<0.43	373,333	<0.28	373,333	<0.28	373,333	<1.25	373,333	<0.25	280,000	<1.25	280,000	<0.38
trans-1,2-Dichloroethylene	18,667	<0.85	18,667	<1.25	18,667	<0.25	18,667	<1.25	18,667	<0.18	18,667	<0.90	18,667	<0.38	18,667	<0.24	18,667	<0.24	18,667	<1.25	18,667	<0.25	18,667	<1.25	18,667	<0.32
1,1,1-Trichloroethane	$1.867\times10^{+6}$	<1.15	$1.867\times10^{+6}$	<1.00	$1.867\times10^{+6}$	<0.20	$1.867\times10^{+6}$	<1.00	$1.867\times10^{+6}$	<0.14	$1.867\times10^{+6}$	<0.70	$1.867\times10^{+6}$	<0.34	$1.867\times10^{+6}$	<0.23	$1.867\times10^{+6}$	<0.23	$1.867\times10^{+6}$	<1.40	$1.867\times10^{+6}$	<0.28	$1.867\times10^{+6}$	<1.40	$1.867\times10^{+6}$	<0.31
1,1,2-Trichloroethane	3,733	<1.20	3,733	<0.75	3,733	<0.15	3,733	<0.75	3,733	<0.13	3,733	<0.65	3,733	<0.60	3,733	<0.29	3,733	<0.29	3,733	<1.50	3,733	<0.30	3,733	<1.50	3,733	<0.68
Trichloroethylene	280	<1.20	280	<0.75	280	<0.15	280	<0.75	280	<0.22	280	<1.10	280	<0.48	280	<0.28	280	0.28	280	<1.80	280	<0.36	280	<1.80	280	<0.46
1,2,4-Trimethylbenzene	NS	<5.0	NS	<5.0	NS	<1.0	NS	<5.0	NS	<1.0	NS	<5.0	NS	<1.0	NS	<1.0	NS	<1.0	NS	<5.0	NS	<1.0	NS	<5.0	NS	<1.0
1,3,5-Trimethylbenzene	NS	<5.0	NS	<5.0	NS	<1.0	NS	<5.0	NS	<1.0	NS	<5.0	NS	<1.0	NS	<1.0	NS	<1.0	NS	<5.0	NS	<1.0	NS	<5.0	NS	<1.0
Vinyl chloride	2,800	<2.50	2,800	<1.00	2,800	<0.20	2,800	<1.00	2,800	<0.22	2,800	<1.10	2,800	<0.35	2,800	<0.24	2,800	<0.24	2,800	<2.10	2,800	<0.42	2,800	<2.10	2,800	<0.35
Xylenes, Total	186,667	<2.90	186,667	<1.50	186,667	<0.30	186,667	<1.50	186,667	<0.13	186,667	<0.65	186,667	<0.52	186,667	<0.32	186,667	<0.32	186,667	<1.15	186,667	<0.23	186,667	<1.15	186,667	<0.70
Acid Compounds (µg/L) [2]																									
2-Chlorophenol	4,667	<22.8	4,667	<214.5	4,667	<90.1	4,667	<29.6	4,667	<1.48	4,667	<3.13	4,667	<3.10	4,667	<2.92	4,667	<2.92	4,667	<42.3	4,667	<84.6	4,667	<4.52	4,667	<4.52
2,4-Dichlorophenol	2,800	<24.4	2,800	<211.0	2,800	<88.6	2,800	<33.0	2,800	<1.65	2,800	<2.84	2,800	<2.81	2,800	<3.21	2,800	<3.21	2,800	<48.2	2,800	<96.4	2,800	<4.77	2,800	<4.77
2,4-Dimethylphenol	18,667	<29.2	18,667	<114.0	18,667	<47.9	18,667	<44.0	18,667	<2.20	18,667	<2.67	18,667	<2.64	18,667	<1.32	18,667	<1.32	18,667	<70.7	18,667	<141.4	18,667	<2.04	18,667	<2.04
4,6-Dinitro-o-cresol	3,733	<27.6	3,733	<149.0	3,733	<62.6	3,733	<24.4	3,733	<1.22	3,733	<1.50	3,733	<1.49	3,733	<2.27	3,733	<2.27	3,733	<46.9	3,733	<93.8	3,733	<3.36	3,733	<3.36
2,4-Dinitrophenol	1,867	<27.8	1,867	<129.5	1,867	<54.4	1,867	<22.6	1,867	<1.13	1,867	<2.23	1,867	<2.21	1,867	<2.64	1,867	<2.64	1,867	<51.1	1,867	<102.2	1,867	<3.41	1,867	<3.41
2-Nitrophenol	NS	<55.6	NS	<205.5	NS	<86.3	NS	<31.4	NS	<1.57	NS	<2.87	NS	<2.84	NS	<2.61	NS	<2.61	NS	<78.3	NS	<156.6	NS	<4.68	NS	<4.68
4-Nitrophenol	NS	<163.2	NS	<233.5	NS	<98.1	NS	<22.8	NS	<1.14	NS	<3.01	NS	<2.98	NS	<2.03	NS	<2.03	NS	<40.3	NS	<80.6	NS	<3.52	NS	<3.52
p-Chloro-m-cresol	48,000	<37.2	48,000	<220.5	48,000	<92.6	48,000	<33.0	48,000	<1.65	48,000	<1.89	48,000	<1.87	48,000	<3.10	48,000	<3.10	48,000	<40.5	48,000	<81.0	48,000	<4.76	48,000	<4.76
Pentachlorophenol	78.211	<41.4	44.084	*<168.0*	147.244	<70.6	58.434	<27.8	60.177	<1.39	46.695	<1.48	61.4	<1.47	61.4	<3.44	61.4	<3.44	47.26	*<73.6*	64.53	*<147.2*	56.06	<4.00	69.94	<4.00
Phenol	180,000	<23.8	180,000	<177.5	180,000	<74.6	180,000	<26.8	180,000	<1.34	180,000	<2.32	180,000	<2.30	180,000	2.8	180,000	<1.84	180,000	<39.9	180,000	<79.8	180,000	<4.08	180,000	<4.08
2,4,6-Trichlorophenol	130	<56.0	130	*<239.5*	130	<100.6	130	<37.8	130	<1.89	130	<2.63	130	<2.60	130	<3.28	130	<3.28	130	<47.4	130	<94.8	130	<5.27	130	<5.27

IB008	Winter 2012/13		Summer 2013		Winter 2013/14		Summer 2014		Winter 2014/15		Summer 2015		Winter 2015/16		Summer 2016		Winter 2016/17		Summer 2017		Winter 2017/18		Summer 2018		Winter 2018/19	
SAMPLING DATE(S):	SWQS	12/14/2012	SWQS	7/19/2013	SWQS	11/22/2013	SWQS	8/2/2014	SWQS	12/2/2014	SWQS	6/29/2015	SWQS	1/4/2016	SWQS	8/5/2016	SWQS	12/22/2016	SWQS	7/16/2017	SWQS	12/17/2017	SWQS	7/9/2018	SWQS	11/29/2018
Bases/Neutrals (µg/L) [2]																										
Acenaphthene	56,000	<34.0	56,000	<67.0	56,000	<28.1	56,000	<20.6	56,000	<1.03	56,000	<0.35	56,000	<0.35	56,000	<1.02	56,000	<1.02	56,000	<18.8	56,000	<37.6	56,000	<1.19	56,000	<1.19
Acenaphthylene	NS	<25.4	NS	<86.5	NS	<36.3	NS	<20.0	NS	<1.00	NS	<1.24	NS	<1.23	NS	<6.10	NS	<6.10	NS	<17.5	NS	<35.0	NS	<1.41	NS	<1.41
Anthracene	280,000	<17.8	280,000	<86.5	280,000	<36.3	280,000	<57.6	280,000	<2.88	280,000	<0.44	280,000	<0.44	280,000	<1.96	280,000	<1.96	280,000	<26.2	280,000	<52.4	280,000	<1.20	280,000	<1.20
Benzo(a)anthracene	0.2	<31.4	0.2	<86.5	0.2	<36.3	0.2	<21.6	0.2	<1.08	0.2	<0.38	0.2	<0.38	0.2	<1.57	0.2	<1.57	0.2	<19.6	0.2	<39.2	0.2	<1.02	0.2	<1.02
Benzo(a)pyrene	0.2	<38.6	0.2	<93.5	0.2	<39.3	0.2	<75.4	0.2	<3.77	0.2	<1.42	0.2	<1.41	0.2	<3.12	0.2	<3.12	0.2	<37.7	0.2	<75.4	0.2	<1.08	0.2	<1.08
Benzo(b)fluoranthene	NS	<67.8	NS	<121.5	NS	<51.0	NS	<29.2	NS	<1.46	NS	<1.07	NS	<1.06	NS	<1.28	NS	<1.28	NS	<21.7	NS	<43.4	NS	<0.38	NS	<0.38
Benzo(g,h,i)perylene	NS	<28.2	NS	<86.5	NS	<36.3	NS	<25.8	NS	<1.29	NS	<0.73	NS	<0.72	NS	<2.83	NS	<2.83	NS	<25.1	NS	<50.2	NS	<1.14	NS	<1.14
Benzo(k)fluoranthene	1.9	<23.0	1.9	<70.0	1.9	<29.4	1.9	<20.8	1.9	<1.04	1.9	<0.35	1.9	<0.35	1.9	<1.76	1.9	<1.76	1.9	<23.3	1.9	<46.6	1.9	<1.03	1.9	<1.03
Chrysene	19	<17.8	19	<74.0	19	<31.1	19	<28.2	19	<1.41	19	<0.46	19	<0.46	19	<1.08	19	<1.08	19	<19.6	19	<39.2	19	<1.16	19	<1.16
Dibenz(a,h)anthracene	1.9	<81.0	1.9	<99.0	1.9	<41.6	1.9	<24.8	1.9	<1.24	1.9	<0.47	1.9	<0.47	1.9	<1.93	1.9	<1.93	1.9	<60.4	1.9	<120.8	1.9	<1.02	1.9	<1.02
1,2-Dichlorobenzene	5,900	<43.4	5,900	<13.5	5,900	<5.7	5,900	<35.2	5,900	<1.76	5,900	<1.05	5,900	<1.04	5,900	<0.58	5,900	<0.58	5,900	<1.50	5,900	<0.30	5,900	<1.43	5,900	<1.43
1,3-Dichlorobenzene	NS	<48.4	NS	<56.5	NS	<23.7	NS	<34.8	NS	<1.74	NS	<0.47	NS	<0.47	NS	<0.52	NS	<0.52	NS	<1.25	NS	<0.25	NS	<1.39	NS	<1.39
1,4-Dichlorobenzene	6,500	<42.6	6,500	<52.5	6,500	<22.0	6,500	<31.2	6,500	<1.56	6,500	<1.29	6,500	<1.28	6,500	<0.50	6,500	<0.50	6,500	<1.45	6,500	<0.29	6,500	<1.48	6,500	<1.48
3,3-Dichlorobenzidine	3	<147.6	3	<1363.5	3	<572.7	3	<121.2	3	<6.06	3	<11.72	3	<11.60	3	<23.45	3	<23.45	3	<254.3	3	<508.6	3	<6.99	3	<6.99
Diethyl phthalate	746,667	<29.6	746,667	<95.0	746,667	<39.9	746,667	<47.4	746,667	<2.37	746,667	<0.36	746,667	<0.36	746,667	<1.07	746,667	<1.07	746,667	<19.9	746,667	<39.8	746,667	<1.08	746,667	<1.08
Dimethyl phthalate	NS	<24.2	NS	<89.5	NS	<37.6	NS	<48.4	NS	<2.42	NS	<0.47	NS	<0.47	NS	<0.58	NS	<0.58	NS	<19.1	NS	<38.2	NS	<1.17	NS	<1.17
Di-n-butyl phthalate	1,100	<45.8	1,100	<111.5	1,100	<46.8	1,100	<37.0	1,100	<1.85	1,100	<0.31	1,100	<0.31	1,100	<1.37	1,100	<1.37	1,100	<23.5	1,100	<47.0	1,100	<1.12	1,100	<1.12
2,4-Dinitrotoluene	1,867	<26.2	1,867	<102.5	1,867	<43.0	1,867	<42.4	1,867	<2.12	1,867	<0.26	1,867	<0.26	1,867	<1.30	1,867	<1.30	1,867	<31.0	1,867	<62.0	1,867	<1.17	1,867	<1.17
2,6-Dinitrotoluene	3,733	<37.4	3,733	<126.0	3,733	<52.9	3,733	<22.4	3,733	<1.12	3,733	<0.38	3,733	<0.38	3,733	<1.39	3,733	<1.39	3,733	<28.9	3,733	<57.8	3,733	<1.13	3,733	<1.13
Di-n-octyl phthalate	373,333	<82.6	373,333	<144.0	373,333	<60.5	373,333	<22.0	373,333	<1.10	373,333	<1.29	373,333	<1.28	373,333	<1.67	373,333	<1.67	373,333	<55.0	373,333	<110.0	373,333	<2.05	373,333	<2.05
1,2-Diphenylhydrazine (as azobenzene)	NS	<21.4	NS	<116.5	NS	<48.9	NS	<134.0	NS	<6.70	NS	<1.07	NS	<1.06	NS	<7.46	NS	<7.46	NS	<21.5	NS	<43.0	1.8	<1.11	1.8	<1.11
Fluoranthene	37,333	<13.4	37,333	<89.5	37,333	<37.6	37,333	<27.0	37,333	<1.35	37,333	<0.27	37,333	<0.27	37,333	<1.06	37,333	<1.06	37,333	<30.8	37,333	<61.6	37,333	<1.27	37,333	<1.27
Fluorene	37,333	<33.6	37,333	<77.0	37,333	<32.3	37,333	<96.2	37,333	<4.81	37,333	<0.29	37,333	<0.29	37,333	<0.51	37,333	<0.51	37,333	<28.7	37,333	<57.4	37,333	<1.18	37,333	<1.18
Hexachlorobenzene	747	<26.0	747	<69.5	747	<29.2	747	<24.6	747	<1.23	747	<0.34	747	<0.34	747	<0.47	747	<0.47	747	<15.7	747	<31.4	747	<1.01	747	<1.01
Hexachlorobutadiene	187	<27.4	187	<16.5	187	<6.9	187	<36.4	187	<1.82	187	<1.69	187	<1.67	187	<0.41	187	<0.41	187	<10.0	187	<20.0	187	<1.20	187	<1.20
Hexachlorocyclopentadiene	11,200	<26.4	11,200	<113.5	11,200	<47.7	11,200	<24.6	11,200	<1.23	11,200	<1.55	11,200	<1.53	11,200	<2.16	11,200	<2.16	11,200	<61.0	11,200	<122.0	9,800	<3.07	9,800	<3.07
Hexachloroethane	850	<28.0	850	<20.0	850	<8.4	850	<32.4	850	<1.62	850	<1.24	850	<1.23	850	<0.54	850	<0.54	850	<14.9	850	<29.8	850	<1.35	850	<1.35
Indeno(1,2,3-cd)pyrene	1.9	<66.6	1.9	<101.5	1.9	<42.6	1.9	<27.8	1.9	<1.39	1.9	<0.63	1.9	<0.62	1.9	<2.38	1.9	<2.38	1.9	<61.1	1.9	<122.2	1.9	<1.07	1.9	<1.07
Isophorone	186,667	<38.0	186,667	<70.5	186,667	<29.6	186,667	<42.8	186,667	<2.14	186,667	<0.37	186,667	<0.37	186,667	<0.51	186,667	<0.51	186,667	<17.7	186,667	<35.4	186,667	<1.32	186,667	<1.32
Naphthalene	18,667	<28.4	18,667	<60.0	18,667	<25.2	18,667	<36.6	18,667	<1.83	18,667	<0.36	18,667	<0.36	18,667	<0.49	18,667	<0.49	18,667	<15.4	18,667	<30.8	18,667	<1.48	18,667	<1.48
Nitrobenzene	467	<26.2	467	<61.5	467	<25.8	467	<42.0	467	<2.10	467	<1.27	467	<1.26	467	<0.44	467	<0.44	467	<18.0	467	<36.0	467	<1.55	467	<1.55
n-Nitrosodimethylamine	0.03	<32.8	0.03	<60.0	0.03	<25.2	0.03	<20.0	0.03	<1.00	0.03	<1.14	0.03	<1.13	0.03	<0.54	0.03	<0.54	0.03	<16.2	0.03	<32.4	0.03	<1.67	0.03	<1.67
n-Nitrosodi-n-propylamine	88,667	<37.6	88,667	<75.5	88,667	<31.7	88,667	<23.0	88,667	<1.15	88,667	<1.18	88,667	<1.17	88,667	<1.02	88,667	<1.02	88,667	<16.5	88,667	<33.0	88,667	<1.65	88,667	<1.65
n-Nitrosodiphenylamine	290	<20.0	290	<152.0	290	<63.8	290	<71.4	290	<3.57	290	<1.16	290	<1.15	290	<1.67	290	<1.67	290	<31.3	290	<62.6	290	<1.07	290	<1.07
Phenanthrene	NS	<15.2	NS	<81.5	NS	<34.2	NS	<27.8	NS	<1.39	NS	<0.31	NS	<0.31	NS	<0.49	NS	<0.49	NS	<30.2	NS	<60.4	NS	<1.33	NS	<1.33
Pyrene	28,000	<46.6	28,000	<82.0	28,000	<34.4	28,000	<77.2	28,000	<3.86	28,000	<0.68	28,000	<0.67	28,000	<3.21	28,000	<3.21	28,000	<33.8	28,000	<67.6	28,000	<1.20	28,000	<1.20
1,2,4-Trichlorobenzene	9,333	<53.2	9,333	<16.0	9,333	<6.7	9,333	<33.8	9,333	<1.69	9,333	<1.05	9,333	<1.04	9,333	<0.55	9,333	<0.55	9,333	<12.1	9,333	<24.2	9,333	<1.34	9,333	<1.34
Pesticides (µg/L) [2]																										
Aldrin	4.5	<0.046	4.5	<0.047	4.5	0.043	4.5	<0.027	4.5	<0.027	4.5	<0.012	4.5	0.078	4.5	<0.019	4.5	<0.019	4.5	<0.013	4.5	<0.013	4.5	<0.010	4.5	<0.010
Alpha-BHC	1,600	<0.038	1,600	<0.039	1,600	<0.017	1,600	<0.021	1,600	<0.021	1,600	<0.058	1,600	<0.058	1,600	<0.010	1,600	<0.010	1,600	<0.015	1,600	0.065	1,600	<0.012	1,600	0.022
Beta-BHC	560	<0.095	560	<0.098	560	<0.092	560	<0.072	560	<0.072	560	<0.063	560	<0.063	560	<0.049	560	<0.049	560	<0.083	560	<0.083	560	<0.099	560	<0.099
Gamma-BHC	11	<0.033	11	<0.034	11	<0.023	11	<0.034	11	<0.034	11	<0.058	11	<0.058	11	<0.019	11	<0.019	11	<0.020	11	<0.020	11	<0.013	11	0.095
Delta-BHC	1,600	<0.032	1,600	<0.033	1,600	<0.018	1,600	<0.021	1,600	<0.021	1,600	<0.066	1,600	<0.066	1,600	<0.035	1,600	<0.035	1,600	<0.012	1,600	<0.012	1,600	<0.045	1,600	<0.045
Chlordane	3.2	<0.16	3.2	<0.16	3.2	<0.020	3.2	<0.14	3.2	<0.14	3.2	<0.36	3.2	<0.36	3.2	<0.61	3.2	<0.61	3.2	<0.29	3.2	<0.29	3.2	<0.33	3.2	<0.33
4,4'-DDT	1.1	<0.029	1.1	<0.030	1.1	<0.016	1.1	<0.025	1.1	<0.025	1.1	<0.017	1.1	<0.017	1.1	<0.011	1.1	<0.011	1.1	<0.020	1.1	<0.020	1.1	<0.009	1.1	<0.009
4,4'-DDE	1.1	<0.034	1.1	<0.035	1.1	<0.018	1.1	<0.010	1.1	<0.010	1.1	<0.013	1.1	<0.013	1.1	<0.020	1.1	<0.020	1.1	<0.019	1.1	<0.019	1.1	<0.015	1.1	<0.015
4,4'-DDD	1.1	<0.023	1.1	<0.024	1.1	<0.014	1.1	<0.031	1.1	<0.031	1.1	<0.021	1.1	<0.021	1.1	<0.021	1.1	<0.021	1.1	<0.023	1.1	<0.023	1.1	<0.017	1.1	<0.017
Dieldrin	4	0.033	4	<0.029	4	<0.022	4	<0.030	4	<0.030	4	<0.060	4	<0.060	4	<0.019	4	<0.019	4	<0.015	4	<0.015	4	<0.012	4	0.032
Alpha-endosulfan	3 T	<0.034	3 T	0.09	3 T	<0.018	3 T	0.054	3 T	0.061	3 T	<0.072	3 T	<0.072	3 T	0.083	3 T	0.061	3 T	<0.015	3 T	0.077	3 T	<0.020	3 T	<0.020
Beta-endosulfan	3 T	<0.034	3 T	<0.035	3 T	<0.013	3 T	<0.032	3 T	<0.032	3 T	<0.019	3 T	<0.019	3 T	<0.021	3 T	<0.021	3 T	<0.014	3 T	<0.014	3 T	<0.014	3 T	<0.014
Endosulfan sulfate	3	<0,.025	3	<0.026	3	<0.014	3	<0.008	3	<0.008	3	<0.016	3	<0.016	3	<0.022	3	<0.022	3	<0.019	3	<0.019	3	<0.017	3	<0.017
Endrin	0.7	<0.035	0.7	<0.036	0.7	<0.016	0.7	<0.017	0.7	<0.017	0.7	<0.023	0.7	<0.023	0.7	<0.042	0.7	<0.042	0.7	<0.040	0.7	<0.040	0.7	<0.042	0.7	<0.042
Endrin aldehyde	0.7	<0.038	0.7	<0.039	0.7	<0.023	0.7	<0.032	0.7	<0.032	0.7	<0.026	0.7	<0.026	0.7	<0.024	0.7	<0.024	0.7	<0.034	0.7	<0.034	0.7	<0.068	0.7	<0.068
Heptachlor	0.9	<0.035	0.9	<0.036	0.9	<0.018	0.9	<0.027	0.9	<0.027	0.9	<0.035	0.9	<0.035	0.9	<0.023	0.9	<0.023	0.9	<0.019	0.9	<0.019	0.9	<0.011	0.9	0.048
Heptachlor epoxide	0.9	<0.032	0.9	<0.033	0.9	<0.020	0.9	<0.008	0.9	<0.008	0.9	<0.062	0.9	<0.062	0.9	<0.020	0.9	<0.020	0.9	<0.016	0.9	<0.016	0.9	<0.012	0.9	<0.012
PCB-1242	[4]	<0.41	[4]	<0.42	[4]	<0.55	[4]	<0.37	[4]	<0.37	[4]	<0.14	[4]	<0.14	[4]	<0.72	[4]	<0.72	[4]	<0.33	[4]	<0.33	[4]	<0.28	[4]	<0.28
PCB-1254	[4]	<0.20	[4]	<0.21	[4]	<0.28	[4]	<0.23	[4]	<0.23	[4]	<0.20	[4]	<0.20	[4]	<0.22	[4]	<0.22	[4]	<0.17	[4]	<0.17	[4]	<0.21	[4]	<0.21

IB008	Winter 2012/13		Summer 2013		Winter 2013/14		Summer 2014		Winter 2014/15		Summer 2015		Winter 2015/16		Summer 2016		Winter 2016/17		Summer 2017		Winter 2017/18		Summer 2018		Winter 2018/19	
SAMPLING DATE(S):	SWQS	12/14/2012	SWQS	7/19/2013	SWQS	11/22/2013	SWQS	8/2/2014	SWQS	12/2/2014	SWQS	6/29/2015	SWQS	1/4/2016	SWQS	8/5/2016	SWQS	12/22/2016	SWQS	7/16/2017	SWQS	12/17/2017	SWQS	7/9/2018	SWQS	11/29/2018
PCB-1221	[4]	<0.68	[4]	<0.70	[4]	<0.85	[4]	<0.22	[4]	<0.22	[4]	<0.64	[4]	<0.64	[4]	<0.46	[4]	<0.46	[4]	<0.36	[4]	<0.36	[4]	<0.50	[4]	<0.50
PCB-1232	[4]	<0.66	[4]	<0.68	[4]	<0.34	[4]	<0.55	[4]	<0.55	[4]	<0.37	[4]	<0.37	[4]	<0.90	[4]	<0.90	[4]	<0.40	[4]	<0.40	[4]	<0.48	[4]	<0.48
PCB-1248	[4]	<0.78	[4]	<0.80	[4]	<0.27	[4]	<0.19	[4]	<0.19	[4]	<0.22	[4]	<0.22	[4]	<0.24	[4]	<0.24	[4]	<0.21	[4]	<0.21	[4]	<0.35	[4]	<0.35
PCB-1260	[4]	<0.21	[4]	<0.22	[4]	<0.23	[4]	<0.32	[4]	<0.32	[4]	<0.59	[4]	<0.59	[4]	<0.26	[4]	<0.26	[4]	<0.34	[4]	<0.34	[4]	<0.28	[4]	<0.28
PCB-1016	[4]	<0.36	[4]	<0.37	[4]	<0.33	[4]	<0.18	[4]	<0.18	[4]	<0.55	[4]	<0.55	[4]	<0.29	[4]	<0.29	[4]	<0.33	[4]	<0.33	[4]	<0.40	[4]	<0.40
Toxaphene	11	<0.53	11	<0.55	11	<0.34	11	<0.22	11	<0.22	11	<0.60	11	<0.60	11	<0.48	11	<0.48	11	<0.47	11	<0.47	11	<0.482	11	<0.482

Notes:

NS = no standard applicable to the designated use

T = total

D = dissolved

Bold text indicates a sample result greater than the WQS

Italicized text indicates a laboratory detection limit higher than the WQS

Footnotes:

[1] The Permittee shall report on any additional parameters that were monitored for seasonal stormwater sampling as required by Section 6.0 of this permit (Special Conditions).

[2] Analytical results shall be reported in the units specified for each category or parameter.

[3] Report the average flow rate for the sampling period (no more than 6 hours).

[4] Standard for total PCBs of 11 µg/L A&We and 19 µg/L PBC.

[5] The sample was lost during extraction at the laboratory due to the glassware breaking.

[6] There were no representative storm events (>0.20 inches) that occurred or no representative events without a measurable rain event in the previous 72 hours.

[7] A representative event occurred on 8/2; however, the sampler malfunctioned. Then next event was on 8/5 but due to the 72-hour rule, no sample was taken. Another measurable event on 9/22 did not result in a qualifying rain event. No samples were taken at this outfall during Summer 2016.

[8] Prior to FY2016, the lab was reporting cis and trans for 1-3-dichloropropylene; this reporting year, an upgrade has resulted in providing the result as a total.

[9] Data flagged due to contamination in the lab reagent blank; therefore, these are not true detections or exceedances.

OUTFALL ID: SC046	MONITORING SEASONS																									
RECEIVING WATER: Skunk Creek Wash	Summer: June 1 - October 31 Winter: November 1 - May 31																									
DESIGNATED USES: A&We and PBC	Winter 2012/13		Summer 2013		Winter 2013/14		Summer 2014		Winter 2014/15		Summer 2015		Winter 2015/16		Summer 2016		Winter 2016/17		Summer 2017		Winter 2017/18		Summer 2018		Winter 2018/19	
SAMPLING DATE(S):	SWQS	1/26/2013	SWQS	8/24/2013	SWQS	11/22/2013	SWQS	8/2/2014	SWQS	12/4/2014	SWQS	10/6/2015	SWQS	4/8/2016	SWQS	8/23/2016	SWQS	11/3/2016	SWQS	7/16/2017	SWQS	1/9/2018	SWQS	7/11/2018	SWQS	2/14/2019
MONITORING PARAMETERS [1,2]																										
Conventional Parameters																										
Flow [3] (cfs)	NS	0.69	NS	0.996	NS	0.16	NS	0.245	NS	0.088	NS	4.852	NS	3.363	NS	6.367	NS	2.519	NS	10.266	NS	8.01	NS	2.566	NS	4.62
pH	6.5-9	7.6	6.5-9	8	6.5-9	8.01	6.5-9	7.06	6.5-9	7.26	6.5-9	7.51	6.5-9	6.87	6.5-9	6.96	6.5-9	7.54	6.5-9	6.8	6.5-9	6.5	6.5-9	**6.22**	6.5-9	6.67
Temperature (ºC)	Varies	14.5	Varies	27.5	Varies	14.5	Varies	28.5	Varies	16	Varies	20.5	Varies	19.2	Varies	25.5	Varies	19.5	Varies	29.1	Varies	13.7	Varies	27.5	Varies	13.5
Hardness (mg/L)	400	18.2	400	23.7	400	17.4	400	176	400	24.6	400	23.8	400	43	400	29.6	400	35.3	400	63.2	400	81.4	400	24.8	400	22.1
Total Dissolved Solids (TDS) (mg/L) [2]	NS	36	NS	88	NS	48	NS	534	NS	56	NS	118	NS	178	NS	50	NS	96	NS	262	NS	190	NS	-	NS	32
Total Suspended Solids (TSS) (mg/L) [2]	NS	38	NS	291	NS	57.2	NS	72	NS	14.7	NS	2,490	NS	133	NS	77	NS	226	NS	168	NS	324	NS	127	NS	14.0
Biochemical Oxygen Demand (BOD) (mg/L) [2]	NS	8	NS	21	NS	8	NS	167	NS	8	NS	15	NS	100	NS	16	NS	29	NS	115	NS	42	NS	26	NS	<17
Chemical Oxygen Demand (COD) (mg/L) [2]	NS	<50	NS	150	NS	<50	NS	620	NS	<50	NS	310	NS	300	NS	90	NS	190	NS	420	NS	270	NS	130	NS	<50

SC046	Winter 2012/13		Summer 2013		Winter 2013/14		Summer 2014		Winter 2014/15		Summer 2015		Winter 2015/16		Summer 2016		Winter 2016/17		Summer 2017		Winter 2017/18		Summer 2018		Winter 2018/19	
SAMPLING DATE(S):	SWQS	1/26/2013	SWQS	8/24/2013	SWQS	11/22/2013	SWQS	8/2/2014	SWQS	12/4/2014	SWQS	10/6/2015	SWQS	4/8/2016	SWQS	8/23/2016	SWQS	11/3/2016	SWQS	7/16/2017	SWQS	1/9/2018	SWQS	7/11/2018	SWQS	2/14/2019
Inorganics																										
Cyanide, total (µg/L) [2]	84	<5	84	<5	84	<5	84	<5	84	<5	84	<5	84	<5	84	<5	84	<5	84	<5	84	<5	84	<5	84	<5
Nutrients (mg/L) [2]																										
Nitrate + Nitrite as N	NS	1.9	NS	1.2	NS	0.5	NS	<0.1	NS	0.6	NS	1.1	NS	0.7	NS	0.7	NS	0.8	NS	2.2	NS	1	NS	0.8	NS	0.3
Ammonia as N	NS	0.32	NS	1.3	NS	0.3	NS	3.7	NS	0.29	NS	0.5	NS	1.2	NS	0.77	NS	0.96	NS	2.7	NS	1.7	NS	1.5	NS	<0.20
Total Kjeldahl Nitrogen (TKN)	NS	1.3	NS	3.1	NS	0.98	NS	17	NS	0.75	NS	5.6	NS	10	NS	1.8	NS	3.1	NS	9.9	NS	4.2	NS	4.2	NS	0.76
Total Phosphorus as P	NS	0.32	NS	0.9	NS	0.26	NS	1.5	NS	0.19	NS	5.3	NS	0.86	NS	0.34	NS	0.42	NS	0.56	NS	0.33	NS	0.57	NS	0.21
Ortho-Phosphorus as P	NS	<0.1	NS	0.2	NS	0.1	NS	0.5	NS	<0.1	NS	0.2	NS	0.7	NS	0.2	NS	0.2	NS	0.7	NS	0.2	NS	0.3	NS	<0.1
Microbiological																										
Escherichia coli (*E. coli*) (CFU/100 mg or MPN/100 mL) [2]	575	**>2,419.6**	575	61.6	575	**>2,419.6**	575	**>2,419.6**	575	**1,413.60**	575	**1,046.20**	575	**1,732.90**	575	27.5	575	**1,986.30**	575	**1,553.10**	575	461.1	575	248.9	575	111.9
Total Metals (µg/L) [2]																										
Antimony	747 T	<0.25 T 0.2 D	747 T	0.71 T 0.3 D	747 T	0.27 T 0.2 D	747 T	2.8 T 1 D	747 T	0.24 T 0.2 D	747 T	0.38 T <5.0 D	747 T	0.70 T <5.0 D	747 T	0.3 T <5 D	747 T	1.1 T <5 D	747 T	1.2 T <5 D	747 T	1.2 T <5 D	747 T	3.4 T <5.0 D	747 T	0.37 T <5.0 D
Arsenic	280 T 440 D	0.95 T 0.6 D	280 T 440 D	3.2 T 0.8 D	280 T 440 D	<1.0 T 0.5 T	280 T 440 D	4.4 T 3.6 D	280 T 440 D	1.0 T 0.6 D	280 T 440 D	13.4 T <5.0 D	280 T 440 D	1.9 T <5.0 D	280 T 440 D	2.2 T <5 D	280 T 440 D	3.3 T <5 D	280 T 440 D	3.4 T <5 D	280 T 440 D	3.9 T <5 D	280 T 440 D	2.6 T <5.0 D	280 T 440 D	0.97 T <5.0 D
Barium	98,000 T	25 T 6 D	98,000 T	119 T 12 D	98,000 T	21 T 5 T	98,000 T	113 T 94 D	98,000 T	12 T 7 D	98,000 T	831 T 14 D	98,000 T	64 T 19 D	98,000 T	34 T 13 D	98,000 T	113 T 14 D	98,000 T	102 T 36 D	98,000 T	140 T 28 D	98,000 T	67 T 16 D	98,000 T	13 T 7 D
Beryllium	1,867 T	<0.15 T <0.06 D	1,867 T	0.36 T <0.06 D	1,867 T	<0.15 T <0.06 D	1,867 T	<0.15 T <0.06 D	1,867 T	<0.06 T <0.06 D	1,867 T	3.5 T <5.0 D	1,867 T	0.15 T <5.0 D	1,867 T	<0.25 T <5 D	1,867 T	0.33 T <5 D	1,867 T	0.3 T <5.0 D	1,867 T	0.43 T <5.0 D	1,867 T	0.16 T <5.0 D	1,867 T	<0.15 T <5.0 D
Cadmium	700 T 4.34 D	<0.25 T <0.10 D	700 T 5.61 D	<0.25 T <0.10 D	700 T 4.15 D	<0.25 T <0.10 D	700 T 39.50 D	<0.30 T <0.12 D	700 T 5.82 D	0.2 T <0.12 D	700 T 5.63 D	1.2 T <5.0 D	700 T 10.03 D	<0.15 T <5.0 D	700 T 17.24 D	<0.25 T <5 D	700 T 20.87 D	<0.25 T <0.25 D	700 T 39.27 D	<0.20 T <0.2 D	700 T 51.67 D	<0.20 T <0.5 D	700 T 14.23	<0.20 T <0.2 D	700 T 12.55	<0.25 T <0.25 D
Chromium	NS	<2.00 T <0.80 D	NS	9.4 T <0.80 D	NS	<2.00 T <0.80 D	NS	3.2 T 1 D	NS	1.2 T <0.36 D	NS	36.4 T <5.0 D	NS	6.0 T <5.0 D	NS	2.6 T <5 D	NS	9.2 T <5 D	NS	7.8 T <5.0 D	NS	11.2 T <5.0 D	NS	5.1 T <5.0 D	NS	1.9 T <5.0 D
Copper	1,300 T 4.67 D	9.3 T 2.9 D	1,300 T 5.99 D	35.7 T **7.1 D**	1,300 T 4.48 D	14.0 T **5.6 D**	1,300 T 39.62 D	33.3 T 24.1 D	1,300 T 6.20 D	6.6 T 5.2 D	1,300 T 6.01 D	88.5 T **8.9 D**	1,300 T 10.50 D	33.5 T **32.1 D**	1,300 T 7.39 D	11.3 T **21.3 D**	1,300 T 8.72 D	39.8 T **10 D**	1,300 T 15.10 D	44.0 T **31.6 D**	1,300 T 19.16 D	38.9 T 9 D	1,300 T 6.25	22.3 T **12.9 D**	1,300 T 5.61	7.2 T **8.6 D**
Lead	15 T 20.47 D	2.3 T <0.18 D	15 T 27.59 D	9.4 T 0.2 D	15 T 19.45 D	1.8 T <0.18 D	15 T 250.76 D	4.1 T 1.7 D	15 T 27.77 D	0.7 T 0.1 D	15 T 27.72 D	**140 T** <5.0 D	15 T 53.78 D	14.1 T <5.0 D	15 T 35.42 D	3.1 T <5 D	15 T 43.15 D	11 T <0.55 D	15 T 82.42 D	8.3 T 1.3 D	15 T 108.86 D	11.7 T 0.2 D	15 T 29.03	8.0 T 0.9 D	15 T 25.49	0.74 T 0.1 D
Mercury	280 T 5 D	<0.040 T&D	280 T 5 D	0.09 T 0.047 D	280 T 5 D	<0.020 T <0.020 D	280 T 5 D	<0.092 T <0.2 D	280 T 5 D	<0.092 T <0.092 D	280 T 5 D	0.12 T <0.2 D	280 T 5 D	<0.062 T <0.2 D	280 T 5 D	<0.068 T <0.2 D	280 T 5 D	<0.068 T <0.2 D	280 T 5 D	0.116 T <0.2 D	280 T 5 D	<0.066 T <0.2 D	280 T 5 D	<0.080 T <0.080 D	280 T 5 D	<0.042 T <0.2 D
Nickel	28,000 T 984 D	1.9 T 0.6 D	28,000 T 1,229.8 D	11.3 T 1.4 D	28,000 T 947.4 D	2.0 T 0.7 D	28,000 T 6,708 D	7.5 T 6.1 D	28,000 T 1,269.4 D	1.2 T 0.7 D	28,000 T 1,234.2 D	42.9 T <5.0 D	28,000 T 2,036 D	6.4 T <5.0 D	28,000 T 14.85 D	3.1 T <5 D	280,000 T 1723 D	10.8 T <5 D	280,000 T 2820.51 D	11.6 T 5.4 D	280,000 T 3493.88 D	12.2 T <5.0 D	28,000 T 1,278.28	7.4 T <5.0 D	28,000 T 1,159.51	1.5 T <5.0 D
Selenium	33 T	<0.60 T <0.24 D	33 T	<0.60 T 0.3 D	33 T	<0.60 T <0.24 D	33 T	1 T 0.7 D	33 T	0.19 T 0.1 D	33 T	2.2 T <5.0 D	33 T	0.45 T <5.0 D	33T	2.5 T <5 D	33T	<0.4 T <5 D	33T	0.97 T <5.0 D	33T	0.56 T <5.0 D	33 T	0.29 T <5.0 D	33 T	<0.55 T <5.0 D

SC046	Winter 2012/13		Summer 2013		Winter 2013/14		Summer 2014		Winter 2014/15		Summer 2015		Winter 2015/16		Summer 2016		Winter 2016/17		Summer 2017		Winter 2017/18		Summer 2018		Winter 2018/19	
SAMPLING DATE(S):	SWQS	1/26/2013	SWQS	8/24/2013	SWQS	11/22/2013	SWQS	8/2/2014	SWQS	12/4/2014	SWQS	10/6/2015	SWQS	4/8/2016	SWQS	8/23/2016	SWQS	11/3/2016	SWQS	7/16/2017	SWQS	1/9/2018	SWQS	7/11/2018	SWQS	2/14/2019
Silver	4,667 T 0.17 D	<0.15 T <0.15 D	4,667 T 0.274 D	<0.15 T <0.15 D	4,667 T 0.158 D	<0.15 T <0.15 D	4,667 T 8.51 D	<0.20 T <0.20 D	4,667 T 0.292 D	0.2 T <0.08 D	4,667 T 0.28 D	0.4 T *<5.0 D*	4,667 T 0.75 D	<0.25 T *<5.0 D*	4,667 T 0.40 D	<0.45 T *<5 D*	4,667 T 0.54 D	<0.45 T *<5 D*	4,667 T 1.46 D	0.1 T *<5.0 D*	4,667 T 2.26 D	0.1 T *<5.0 D*	4,667 T 0.29	<0.10 T *<5.0 D*	4,667 T 0.24	<0.15 T *<5.0 D*
Thallium	75 T	<0.20 T <0.08 D	75 T	<0.20 T <0.08 D	75 T	<0.20 T <0.08 D	75 T	<0.10 T <0.04 D	75 T	<0.04 T <0.04 D	75 T	0.46 T <5.0 D	75 T	0.19 T <5.0 D	75 T	<0.2 T <5 D	75 T	<0.2 T <5 D	75 T	<0.10 T <5.0 D	75 T	<0.10 T <5.0 D	75 T	<0.10 T <5.0 D	75 T	<0.15 T <5.0 D
Zinc	280,000 T 262 D	52.8 T 14.1 D	280,000 T 328.4 D	193 T 31.7 D	280,000 T 252.8 D	50.1 T 17.1 D	280,000 T 1,795 D	174 T 128 D	280,000 T 339.2 D	30.5 T 17.6 D	280,000 T 329.6 D	566 T 7.3 D	280,000 T 544 D	178 T 93.6 D	280,000 T 396.4 D	73.5 T <50 D	280,000 T 460.2 D	176 T 33.8 D	280,000 T 753.79 D	195 T 104 D	280,000 T 934.06 D	179 T 29.3 D	280,000 T 341.21	213 T 113 D	280,000 T 309.46	62.8 T 41.2 D
Organic Toxic Pollutants																									
Total Petroleum Hydrocarbons (TPH) (mg/L) [2]	NS	<10	NS	<11	NS	<11	NS	<10	NS	<10	NS	<5.4	NS	<5.9	NS	<5.7	NS	<4.5	NS	<6.7	NS	<7.1	NS	<7.0	NS	4.4
Total Oil and Grease (mg/L) [2]	NS	<5.0	NS	<5.4	NS	<5.7	NS	<5.0	NS	<5.0	NS	<5.4	NS	<5.9	NS	<5.7	NS	<4.5	NS	<5.6	NS	<5.9	NS	<5.8	NS	4.4
VOCs, Semi-VOCs, and Pesticides (µg/L) [2]																									
Acrolein	467	<0.293	467	<0.20	467	<0.20	467	<2.00	467	<0.40	467	<0.78	467	<0.41	467	<0.41	467	<0.41	467	<3.95	467	<0.79	467	<1.0	467	-
Acrylonitrile	37,333	<0.226	37,333	<0.16	37,333	<0.16	37,333	<0.70	37,333	<0.14	37,333	<0.53	37,333	<0.42	37,333	<0.42	37,333	<0.42	37,333	<2.95	37,333	<0.59	37,333	<1.0	37,333	<0.57
Benzene	3,733	<0.15	3,733	<1.20	3,733	<0.24	3,733	<1.20	3,733	<0.13	3,733	<2.30	3,733	<2.30	3,733	<0.29	3,733	<0.29	3,733	<1.30	3,733	<0.26	3,733	<1.30	3,733	<0.33
Bromoform	18,667	<0.43	18,667	<2.35	18,667	<0.47	18,667	<2.35	18,667	<0.28	18,667	<3.40	18,667	<3.40	18,667	<0.33	18,667	<0.33	18,667	<1.05	18,667	<0.21	18,667	<1.05	18,667	<0.81
Carbon tetrachloride	1,307	<0.33	1,307	<1.30	1,307	<0.26	1,307	<1.30	1,307	<0.23	1,307	<1.55	1,307	<1.55	1,307	<0.20	1,307	<0.20	1,307	<1.50	1,307	<0.30	980	<1.50	980	<0.27
Chlorobenzene	18,667	<0.28	18,667	<0.80	18,667	<0.16	18,667	<0.80	18,667	<0.13	18,667	<2.50	18,667	<2.50	18,667	<0.33	18,667	<0.33	18,667	<1.15	18,667	<0.23	18,667	<1.15	18,667	<0.70
Chlorodibromomethane	18,667	<0.26	18,667	<0.90	18,667	<0.18	18,667	<0.90	18,667	<0.24	18,667	<3.05	18,667	<3.05	18,667	<0.32	18,667	<0.32	18,667	<1.20	18,667	<0.24	18,667	<1.20	18,667	<0.70
Chloroethane (ethyl chloride)	NS	<0.27	NS	<1.10	NS	<0.22	NS	<1.10	NS	<0.19	NS	<2.00	NS	<2.00	NS	<0.33	NS	<0.33	NS	<1.40	NS	<0.28	NS	<1.40	NS	<0.33
2-Chloroethylvinyl ether	NS	<0.22	NS	<0.22	NS	<0.22	NS	<0.95	NS	<0.19	NS	<0.53	NS	<0.43	NS	<0.43	NS	<0.43	NS	<3.25	NS	<0.65	NS	<1.0	NS	<0.52
Chloroform	9,333	<0.21	9,333	<1.15	9,333	<0.23	9,333	<1.15	9,333	<0.14	9,333	<2.45	9,333	<2.45	9,333	<0.32	9,333	<0.32	9,333	<1.20	9,333	<0.24	9,333	<1.20	9,333	<0.31
Dichlorobromomethane	18,667	<0.15	18,667	<1.15	18,667	<0.23	18,667	<1.15	18,667	<0.15	18,667	<2.45	18,667	<2.45	18,667	<0.29	18,667	<0.29	18,667	<1.30	18,667	<0.26	18,667	<1.30	18,667	<0.52
1,1-Dichloroethane	NS	<0.13	NS	<1.30	NS	<0.26	NS	<1.30	NS	<0.19	NS	<2.10	NS	<2.10	NS	<0.29	NS	<0.29	NS	<1.35	NS	<0.27	NS	<1.35	NS	<0.32
1,2-Dichloroethane	186,667	<0.16	186,667	<1.25	186,667	<0.25	186,667	<1.25	186,667	<0.11	186,667	<2.55	186,667	<2.55	186,667	<0.35	186,667	<0.35	186,667	<1.30	186,667	<0.26	186,667	<1.30	186,667	<0.28
1,1-Dichloroethylene	46,667	<0.37	46,667	<1.40	46,667	<0.28	46,667	<1.40	46,667	<0.27	46,667	<1.70	46,667	<1.70	46,667	<0.19	46,667	<0.19	46,667	<1.60	46,667	<0.32	46,667	<1.60	46,667	<0.40
1,2-Dichloropropane	84,000	<0.15	84,000	<1.25	84,000	<0.25	84,000	<1.25	84,000	<0.18	84,000	<2.45	84,000	<2.45	84,000	<0.32	84,000	<0.32	84,000	<1.60	84,000	<0.32	84,000	<1.60	84,000	<0.93
1,3-Dichloropropylene[8]	28,000	<0.10	28,000	<1.20	28,000	<0.24	28,000	<1.20	28,000	<0.13	28,000	cis <2.55 trans <2.50	28,000	cis <2.55 trans <2.50	28,000	<0.28	28,000	<0.28	28,000	<1.05	28,000	<0.21	28,000	<1.05	28,000	<0.43
Ethylbenzene	93,333	<0.29	93,333	<0.65	93,333	<0.13	93,333	<0.65	93,333	<0.15	93,333	<2.30	93,333	<2.30	93,333	<0.29	93,333	<0.29	93,333	<1.15	93,333	<0.23	93,333	<1.15	93,333	<0.61
Methyl bromide	1,307	<0.19	1,307	<0.95	1,307	<0.19	1,307	<0.95	1,307	<0.18	1,307	<2.30	1,307	<2.30	1,307	<0.28	1,307	<0.28	1,307	<1.15	1,307	<0.23	1,307	<1.15	1,307	<0.33
Methyl chloride	NS	<0.37	NS	<1.40	NS	<0.28	NS	<1.40	NS	<0.23	NS	<2.30	NS	<2.30	NS	<0.28	NS	<0.28	NS	<1.85	NS	<0.37	NS	<1.85	NS	<0.33
Methylene chloride	56,000	<0.28	56,000	<1.00	56,000	<0.20	56,000	<1.00	56,000	<0.20	56,000	<4.05	56,000	<4.05	56,000	<0.31	56,000	<0.31	56,000	<4.00	56,000	<0.80	56,000	<4.00	56,000	<0.44
1,1,2,2-Tetrachloroethane	93,333	<0.49	93,333	<2.00	93,333	<0.40	93,333	<2.00	93,333	<0.35	93,333	<4.00	93,333	<4.00	93,333	<0.33	93,333	<0.33	93,333	<1.55	93,333	<0.31	56,000	<1.55	56,000	<0.83
Tetrachloroethylene	9,333	<0.23	9,333	<1.05	9,333	<0.21	9,333	<1.05	9,333	<0.13	9,333	<1.75	9,333	<1.75	9,333	<0.23	9,333	<0.23	9,333	<1.45	9,333	<0.29	9,333	<1.45	9,333	<0.38
Toluene	373,333	<0.12	373,333	<0.95	373,333	<0.19	373,333	<0.95	373,333	<0.11	373,333	<2.15	373,333	<2.15	373,333	<0.28	373,333	<0.28	373,333	<1.25	373,333	<0.25	280,000	<1.25	280,000	<0.38
trans-1,2-Dichloroethylene	18,667	<0.17	18,667	<1.25	18,667	<0.25	18,667	<1.25	18,667	<0.18	18,667	<1.90	18,667	<1.90	18,667	<0.24	18,667	<0.24	18,667	<1.25	18,667	<0.25	18,667	<1.25	18,667	<0.32
1,1,1-Trichloroethane	$1.867x10^{6}$	<0.23	$1.867x10^{6}$	<1.00	$1.867x10^{6}$	<0.20	$1.867x10^{6}$	<1.00	$1.867x10^{6}$	<0.14	$1.867x10^{6}$	<1.70	$1.867x10^{6}$	<1.70	$1.867x10^{6}$	<0.23	$1.867x10^{6}$	<0.23	$1.867x10^{6}$	<1.40	$1.867x10^{6}$	<0.28	$1.867x10^{6}$	<1.40	$1.867x10^{6}$	<0.31
1,1,2-Trichloroethane	3,733	<0.24	3,733	<0.75	3,733	<0.15	3,733	<0.75	3,733	<0.13	3,733	<3.00	3,733	<3.00	3,733	<0.29	3,733	<0.29	3,733	<1.50	3,733	<0.30	3,733	<1.50	3,733	<0.68
Trichloroethylene	280	<0.24	280	<0.75	280	<0.15	280	<0.75	280	<0.22	280	<2.40	280	<2.40	280	<0.28	280	<0.28	280	<1.80	280	<0.36	280	<1.80	280	<0.46
1,2,4-Trimethylbenzene	NS	<1.0	NS	<5.0	NS	<1.0	NS	<5.0	NS	<1.0	NS	<5.0	NS	<5.0	NS	<1.0	NS	<1.0	NS	<5.0	NS	<5.0	NS	<5.0	NS	<1.0
1,3,5-Trimethylbenzene	NS	<1.0	NS	<5.0	NS	<1.0	NS	<5.0	NS	<1.0	NS	<5.0	NS	<5.0	NS	<1.0	NS	<1.0	NS	<1.0	NS	<1.0	NS	<5.0	NS	<1.0
Vinyl chloride	2,800	<0.50	2,800	<1.00	2,800	<0.20	2,800	<1.00	2,800	<0.22	2,800	<1.75	2,800	<1.75	2,800	<0.24	2,800	<0.24	2,800	<2.10	2,800	<0.42	2,800	<2.10	2,800	<0.35
Xylenes, Total	186,667	<0.58	186,667	<1.50	186,667	<0.30	186,667	<1.50	186,667	<0.13	186,667	<2.60	186,667	<2.60	186,667	<0.32	186,667	<0.32	186,667	<1.15	186,667	<0.23	186,667	<1.15	186,667	<0.70
Acid Compounds (µg/L) [2]																									
2-Chlorophenol	4,667	<1.14	4,667	<85.8	4,667	<42.9	4,667	<14.8	4,667	<1.48	4,667	<3.10	4,667	<3.26	4,667	<2.92	4,667	<2.92	4,667	<42.3	4,667	<211.5	4,667	<4.52	4,667	<4.52
2,4-Dichlorophenol	2,800	<1.22	2,800	<84.4	2,800	<42.2	2,800	<16.5	2,800	<1.65	2,800	<2.81	2,800	<2.95	2,800	<3.21	2,800	<3.21	2,800	<48.2	2,800	<241.0	2,800	<4.77	2,800	<4.77
2,4-Dimethylphenol	18,667	<1.46	18,667	<45.6	18,667	<22.8	18,667	<22.0	18,667	<2.20	18,667	<2.64	18,667	<2.77	18,667	<1.32	18,667	<1.32	18,667	<70.7	18,667	<353.5	18,667	<2.04	18,667	<2.04
4,6-Dinitro-o-cresol	3,733	<1.38	3,733	<59.6	3,733	<29.8	3,733	<12.2	3,733	<1.22	3,733	<1.49	3,733	<1.56	3,733	<2.27	3,733	<2.27	3,733	<46.9	3,733	<234.5	3,733	<3.36	3,733	<3.36
2,4-Dinitrophenol	1,867	<1.39	1,867	<51.8	1,867	<25.9	1,867	<11.3	1,867	<1.13	1,867	<2.21	1,867	<2.32	1,867	<2.64	1,867	<2.64	1,867	<51.1	1,867	<255.5	1,867	<3.41	1,867	<3.41
2-Nitrophenol	NS	<2.78	NS	<82.2	NS	<41.1	NS	<15.7	NS	<1.57	NS	<2.84	NS	<2.98	NS	<2.61	NS	<2.61	NS	<78.3	NS	<391.5	NS	<4.68	NS	<4.68
4-Nitrophenol	NS	<8.16	NS	<93.4	NS	<46.7	NS	<11.4	NS	<1.14	NS	<2.98	NS	<3.13	NS	<2.03	NS	<2.03	NS	<40.3	NS	<201.5	NS	<3.52	NS	<3.52
p-Chloro-m-cresol	48,000	<1.86	48,000	<88.2	48,000	<44.1	48,000	<16.5	48,000	<1.65	48,000	<1.87	48,000	<1.96	48,000	<3.10	48,000	<3.10	48,000	<40.5	48,000	<202.5	48,000	<4.76	48,000	<4.76
Pentachlorophenol	67.18	<2.07	100.424	<67.2	101.486	<33.6	39.092	<13.9	47.794	<1.39	61.4	<1.47	32.29	<1.54	35.31	<3.44	63.25	<3.44	30.07	*<73.6*	22.4	*<368.0*	16.79	<4.00	26.38	<4.00
Phenol	180,000	<1.19	180,000	<71.0	180,000	<35.5	180,000	<13.4	180,000	<1.34	180,000	<2.30	180,000	<2.42	180,000	<1.84	180,000	<1.84	180,000	<39.9	180,000	<199.5	180,000	<4.08	180,000	<4.08
2,4,6-Trichlorophenol	130	<2.80	130	<95.8	130	<47.9	130	<18.9	130	<1.89	130	<2.60	130	<2.73	130	<3.28	130	<3.28	130	<47.4	130	*<237.0*	130	<5.27	130	<5.27

SC046	Winter 2012/13		Summer 2013		Winter 2013/14		Summer 2014		Winter 2014/15		Summer 2015		Winter 2015/16		Summer 2016		Winter 2016/17		Summer 2017		Winter 2017/18		Summer 2018		Winter 2018/19	
SAMPLING DATE(S):	SWQS	1/26/2013	SWQS	8/24/2013	SWQS	11/22/2013	SWQS	8/2/2014	SWQS	12/4/2014	SWQS	10/6/2015	SWQS	4/8/2016	SWQS	8/23/2016	SWQS	11/3/2016	SWQS	7/16/2017	SWQS	1/9/2018	SWQS	7/11/2018	SWQS	2/14/2019
Bases/Neutrals (µg/L) [2]																										
Acenaphthene	56,000	<1.70	56,000	<26.8	56,000	<13.4	56,000	<10.3	56,000	<1.03	56,000	<0.35	56,000	<0.37	56,000	<1.02	56,000	<1.02	56,000	<18.8	56,000	<94.0	56,000	<1.19	56,000	<1.19
Acenaphthylene	NS	<1.27	NS	<34.6	NS	<17.3	NS	<10.0	NS	<1.00	NS	<1.23	NS	<1.29	NS	<6.10	NS	<6.10	NS	<17.5	NS	<87.5	NS	<1.41	NS	<1.41
Anthracene	280,000	<0.89	280,000	<34.6	280,000	<17.3	280,000	<28.8	280,000	<2.88	280,000	<0.44	280,000	<0.46	280,000	<1.96	280,000	<1.96	280,000	<26.2	280,000	<131.0	280,000	<1.20	280,000	<1.20
Benzo(a)anthracene	0.2	<1.57	0.2	<34.6	0.2	<17.3	0.2	<10.8	0.2	<1.08	0.2	<0.38	0.2	<0.40	0.2	<1.57	0.2	<1.57	0.2	<19.6	0.2	<98.0	0.2	<1.02	0.2	<1.02
Benzo(a)pyrene	0.2	<1.93	0.2	<37.4	0.2	<18.7	0.2	<37.7	0.2	<3.77	0.2	<1.41	0.2	<1.48	0.2	<3.12	0.2	<3.12	0.2	<37.7	0.2	<188.5	0.2	<1.08	0.2	<1.08
Benzo(b)fluoranthene	NS	<3.39	NS	<48.6	NS	<24.3	NS	<14.6	NS	<1.46	NS	<1.06	NS	<1.11	NS	<1.28	NS	<1.28	NS	<21.7	NS	<108.5	NS	<0.38	NS	<0.38
Benzo(g,h,i)perylene	NS	<1.41	NS	<34.6	NS	<17.3	NS	<12.9	NS	<1.29	NS	<0.72	NS	<0.76	NS	<2.83	NS	<2.83	NS	<25.1	NS	<125.5	NS	<1.14	NS	<1.14
Benzo(k)fluoranthene	1.9	<1.15	1.9	<28.0	1.9	<14.0	1.9	<10.4	1.9	<1.04	1.9	<0.35	1.9	<0.37	1.9	<1.76	1.9	<1.76	1.9	<23.3	1.9	<116.5	1.9	<1.03	1.9	<1.03
Chrysene	19	<0.89	19	<29.6	19	<14.8	19	<14.1	19	<1.41	19	<0.46	19	<0.48	19	<1.08	19	<1.08	19	<19.6	19	<98.0	19	<1.16	19	<1.16
Dibenz(a,h)anthracene	1.9	<4.05	1.9	<39.6	1.9	<19.8	1.9	<12.4	1.9	<1.24	1.9	<0.47	1.9	<0.49	1.9	<1.93	1.9	<1.93	1.9	<60.4	1.9	<302.0	1.9	<1.02	1.9	<1.02
1,2-Dichlorobenzene	5,900	<2.17	5,900	<5.4	5,900	<2.7	5,900	<17.6	5,900	<1.76	5,900	<1.04	5,900	<1.09	5,900	<0.58	5,900	<0.58	5,900	<1.50	5,900	<0.30	5,900	<1.43	5,900	<1.43
1,3-Dichlorobenzene	NS	<2.42	NS	<22.6	NS	<11.3	NS	<17.4	NS	<1.74	NS	<0.47	NS	<0.49	NS	<0.52	NS	<0.52	NS	<1.25	NS	<0.25	NS	<1.39	NS	<1.39
1,4-Dichlorobenzene	6,500	<2.13	6,500	<21.0	6,500	<10.5	6,500	<15.6	6,500	<1.56	6,500	<1.28	6,500	<1.34	6,500	<0.50	6,500	<0.50	6,500	<1.45	6,500	<0.29	6,500	<1.48	6,500	<1.48
3,3-Dichlorobenzidine	3	<7.38	3	<545.4	3	<272.7	3	<60.6	3	<6.06	3	<11.60	3	<12.18	3	<23.45	3	<23.45	3	<254.3	3	<1271.5	3	<6.99	3	<6.99
Diethyl phthalate	746,667	<1.48	746,667	<38.0	746,667	<19.0	746,667	<23.7	746,667	<2.37	746,667	<0.36	746,667	<0.38	746,667	<1.07	746,667	<1.07	746,667	<19.9	746,667	<99.5	746,667	<1.08	746,667	<1.08
Dimethyl phthalate	NS	<1.21	NS	<35.8	NS	<17.9	NS	<24.2	NS	<2.42	NS	<0.47	NS	<0.49	NS	<0.58	NS	<0.58	NS	<19.1	NS	<95.5	NS	<1.17	NS	<1.17
Di-n-butyl phthalate	1,100	<2.29	1,100	<44.6	1,100	<22.3	1,100	<18.5	1,100	<1.85	1,100	<0.31	1,100	<0.33	1,100	<1.37	1,100	<1.37	1,100	<23.5	1,100	<117.5	1,100	<1.12	1,100	<1.12
2,4-Dinitrotoluene	1,867	<1.31	1,867	<41.0	1,867	<20.5	1,867	<21.2	1,867	<2.12	1,867	<0.26	1,867	<0.27	1,867	<1.30	1,867	<1.30	1,867	<31.0	1,867	<155.0	1,867	<1.17	1,867	<1.17
2,6-Dinitrotoluene	3,733	<1.87	3,733	<50.4	3,733	<25.2	3,733	<11.2	3,733	<1.12	3,733	<0.38	3,733	<0.40	3,733	<1.39	3,733	<1.39	3,733	<28.9	3,733	<144.5	3,733	<1.13	3,733	<1.13
Di-n-octyl phthalate	373,333	<4.13	373,333	<57.6	373,333	<28.8	373,333	<11.0	373,333	<1.10	373,333	<1.28	373,333	<1.34	373,333	<1.67	373,333	<1.67	373,333	<55.0	373,333	<275.0	373,333	<2.05	373,333	<2.05
1,2-Diphenylhydrazine (as azobenzene)	NS	<1.07	NS	<46.6	NS	<23.3	NS	<67.0	NS	<6.70	NS	<1.06	NS	<1.11	NS	<7.46	NS	<7.46	NS	<21.5	NS	<107.5	1.8	<1.11	1.8	<1.11
Fluoranthene	37,333	<0.67	37,333	<35.8	37,333	<17.9	37,333	<13.5	37,333	<1.35	37,333	<0.27	37,333	<0.28	37,333	<1.06	37,333	<1.06	37,333	<30.8	37,333	<154.0	37,333	<1.27	37,333	<1.27
Fluorene	37,333	<1.68	37,333	<30.8	37,333	<15.4	37,333	<48.1	37,333	<4.81	37,333	<0.29	37,333	<0.30	37,333	<0.51	37,333	<0.51	37,333	<28.7	37,333	<143.5	37,333	<1.18	37,333	<1.18
Hexachlorobenzene	747	<1.30	747	<27.8	747	<13.9	747	<12.3	747	<1.23	747	<0.34	747	<0.36	747	<0.47	747	<0.47	747	<15.7	747	<78.5	747	<1.01	747	<1.01
Hexachlorobutadiene	187	<1.37	187	<6.6	187	<3.3	187	<18.2	187	<1.82	187	<1.67	187	<1.75	187	<0.41	187	<0.41	187	<10.0	187	<50.0	187	<1.20	187	<1.20
Hexachlorocyclopentadiene	11,200	<1.32	11,200	<45.4	11,200	<22.7	11,200	<12.3	11,200	<1.23	11,200	<1.53	11,200	<1.61	11,200	<2.16	11,200	<2.16	11,200	<61.0	11,200	<305.0	9,800	<3.07	9,800	<3.07
Hexachloroethane	850	<1.40	850	<8.0	850	<4.0	850	<16.2	850	<1.62	850	<1.23	850	<1.29	850	<0.54	850	<0.54	850	<14.9	850	<74.5	850	<1.35	850	<1.35
Indeno(1,2,3-cd)pyrene	1.9	<3.33	1.9	<40.6	1.9	<20.3	1.9	<13.9	1.9	<1.39	1.9	<0.62	1.9	<0.65	1.9	<2.38	1.9	<2.38	1.9	<61.1	1.9	<305.5	1.9	<1.07	1.9	<1.07
Isophorone	186,667	<1.90	186,667	<28.2	186,667	<14.1	186,667	<21.4	186,667	<2.14	186,667	<0.37	186,667	<0.39	186,667	<0.51	186,667	<0.51	186,667	<17.7	186,667	<88.5	186,667	<1.32	186,667	<1.32
Naphthalene	18,667	<1.42	18,667	<24.0	18,667	<12.0	18,667	<18.3	18,667	<1.83	18,667	<0.36	18,667	<0.38	18,667	<0.49	18,667	<0.49	18,667	<15.4	18,667	<77.0	18,667	<1.48	18,667	<1.48
Nitrobenzene	467	<1.31	467	<24.6	467	<12.3	467	<21.0	467	<2.10	467	<1.26	467	<1.32	467	<0.44	467	<0.44	467	<18.0	467	<90.0	467	<1.55	467	<1.55
n-Nitrosodimethylamine	0.03	<1.64	0.03	<24.0	0.03	<12.0	0.03	<10.0	0.03	<1.00	0.03	<1.13	0.03	<1.19	0.03	<0.54	0.03	<0.54	0.03	<16.2	0.03	<81.0	0.03	<1.67	0.03	<1.67
n-Nitrosodi-n-propylamine	88,667	<1.88	88,667	<30.2	88,667	<15.1	88,667	<11.5	88,667	<1.15	88,667	<1.17	88,667	<1.23	88,667	<1.02	88,667	<1.02	88,667	<16.5	88,667	<82.5	88,667	<1.65	88,667	<1.65
n-Nitrosodiphenylamine	290	<1.00	290	<60.8	290	<30.4	290	<35.7	290	<3.57	290	<1.15	290	<1.21	290	<1.67	290	<1.67	290	<31.3	290	<156.5	290	<1.07	290	<1.07
Phenanthrene	NS	<0.76	NS	<32.6	NS	<16.3	NS	<13.9	NS	<1.39	NS	<0.31	NS	<0.33	NS	<0.49	NS	<0.49	NS	<30.2	NS	<151.0	NS	<1.33	NS	<1.33
Pyrene	28,000	<2.33	28,000	<32.8	28,000	<16.4	28,000	<38.6	28,000	<3.86	28,000	<0.67	28,000	<0.70	28,000	<3.21	28,000	<3.21	28,000	<33.8	28,000	<169.0	28,000	<1.20	28,000	<1.20
1,2,4-Trichlorobenzene	9,333	<2.66	9,333	<6.4	9,333	<3.2	9,333	<16.9	9,333	<1.69	9,333	<1.04	9,333	<1.09	9,333	<0.55	9,333	<0.55	9,333	<12.1	9,333	<60.5	9,333	<1.34	9,333	<1.34
Pesticides (µg/L) [2]																										
Aldrin	4.5	<0.046	4.5	<0.046	4.5	<0.015	4.5	<0.027	4.5	<0.027	4.5	0.06	4.5	<0.012	4.5	<0.019	4.5	<0.019	4.5	<0.013	4.5	<0.013	4.5	<0.010	4.5	<0.010
Alpha-BHC	1,600	<0.038	1,600	<0.038	1,600	<0.016	1,600	<0.021	1,600	<0.021	1,600	<0.058	1,600	<0.058	1,600	<0.010	1,600	<0.010	1,600	<0.015	1,600	<0.015	1,600	<0.012	1,600	<0.012
Beta-BHC	560	<0.095	560	<0.095	560	<0.090	560	<0.072	560	<0.072	560	<0.063	560	<0.063	560	<0.049	560	<0.049	560	<0.083	560	<0.083	560	<0.099	560	<0.099
Gamma-BHC	11	<0.033	11	<0.033	11	<0.022	11	<0.034	11	<0.034	11	<0.058	11	<0.058	11	<0.019	11	<0.019	11	<0.020	11	<0.020	11	<0.013	11	<0.013
Delta-BHC	1,600	<0.032	1,600	<0.032	1,600	0.041	1,600	<0.021	1,600	<0.021	1,600	<0.066	1,600	<0.066	1,600	<0.035	1,600	<0.035	1,600	<0.012	1,600	<0.012	1,600	<0.045	1,600	<0.045
Chlordane	3.2	<0.16	3.2	<0.16	3.2	<0.19	3.2	<0.14	3.2	<0.14	3.2	<0.36	3.2	<0.36	3.2	<0.61	3.2	<0.61	3.2	<0.29	3.2	<0.29	3.2	<0.33	3.2	<0.33
4,4'-DDT	1.1	0.07	1.1	<0.029	1.1	<0.015	1.1	<0.025	1.1	<0.025	1.1	<0.017	1.1	<0.017	1.1	<0.011	1.1	<0.011	1.1	<0.020	1.1	<0.020	1.1	<0.009	1.1	<0.009
4,4'-DDE	1.1	<0.034	1.1	<0.034	1.1	<0.017	1.1	<0.010	1.1	<0.010	1.1	<0.013	1.1	<0.013	1.1	<0.020	1.1	<0.020	1.1	<0.019	1.1	<0.019	1.1	<0.015	1.1	<0.015
4,4'-DDD	1.1	<0.023	1.1	<0.023	1.1	<0.013	1.1	<0.031	1.1	<0.031	1.1	<0.021	1.1	<0.021	1.1	<0.021	1.1	<0.021	1.1	<0.023	1.1	<0.023	1.1	<0.017	1.1	<0.017
Dieldrin	4	<0.028	4	<0.028	4	<0.021	4	<0.030	4	<0.030	4	<0.060	4	<0.060	4	<0.019	4	<0.019	4	<0.015	4	0.026	4	<0.012	4	<0.012
Alpha-endosulfan	3 T	<0.034	3 T	<0.034	3 T	<0.017	3 T	<0.018	3 T	0.019	3 T	<0.072	3 T	<0.072	3 T	0.037	3 T	<0.018	3 T	<0.015	3 T	<0.015	3 T	0.039	3 T	<0.020
Beta-endosulfan	3 T	<0.034	3 T	<0.034	3 T	<0.012	3 T	<0.032	3 T	<0.032	3 T	<0.019	3 T	<0.019	3 T	<0.021	3 T	<0.021	3 T	<0.014	3 T	<0.014	3 T	<0.014	3 T	<0.014
Endosulfan sulfate	3	<0.025	3	<0.025	3	<0.013	3	<0.008	3	<0.008	3	<0.016	3	<0.016	3	<0.022	3	<0.022	3	<0.019	3	<0.019	3	<0.017	3	<0.017
Endrin	0.7	<0.035	0.7	<0.035	0.7	<0.015	0.7	<0.017	0.7	<0.017	0.7	<0.023	0.7	<0.023	0.7	<0.042	0.7	<0.042	0.7	<0.040	0.7	<0.040	0.7	<0.042	0.7	<0.042
Endrin aldehyde	0.7	<0.038	0.7	<0.038	0.7	<0.022	0.7	<0.032	0.7	<0.032	0.7	<0.026	0.7	<0.026	0.7	<0.024	0.7	<0.024	0.7	<0.034	0.7	<0.034	0.7	<0.068	0.7	<0.068
Heptachlor	0.9	<0.035	0.9	<0.035	0.9	<0.017	0.9	<0.027	0.9	<0.027	0.9	<0.035	0.9	<0.035	0.9	<0.023	0.9	<0.023	0.9	<0.019	0.9	<0.019	0.9	<0.011	0.9	<0.011
Heptachlor epoxide	0.9	<0.032	0.9	<0.032	0.9	<0.019	0.9	<0.008	0.9	<0.008	0.9	<0.062	0.9	<0.062	0.9	<0.020	0.9	<0.020	0.9	<0.016	0.9	<0.016	0.9	<0.012	0.9	<0.012
PCB-1242	[4]	<0.41	[4]	<0.41	[4]	<0.53	[4]	<0.37	[4]	<0.37	[4]	<0.14	[4]	<0.14	[4]	<0.72	[4]	<0.72	[4]	<0.33	[4]	<0.33	[4]	<0.28	[4]	<0.28
PCB-1254	[4]	<0.20	[4]	<0.20	[4]	<0.28	[4]	<0.23	[4]	<0.23	[4]	<0.20	[4]	<0.20	[4]	<0.22	[4]	<0.22	[4]	<0.17	[4]	<0.17	[4]	<0.21	[4]	<0.21

SC046	Winter 2012/13		Summer 2013		Winter 2013/14		Summer 2014		Winter 2014/15		Summer 2015		Winter 2015/16		Summer 2016		Winter 2016/17		Summer 2017		Winter 2017/18		Summer 2018		Winter 2018/19	
SAMPLING DATE(S):	SWQS	1/26/2013	SWQS	8/24/2013	SWQS	11/22/2013	SWQS	8/2/2014	SWQS	12/4/2014	SWQS	10/6/2015	SWQS	4/8/2016	SWQS	8/23/2016	SWQS	11/3/2016	SWQS	7/16/2017	SWQS	1/9/2018	SWQS	7/11/2018	SWQS	2/14/2019
PCB-1221	[4]	<0.68	[4]	<0.68	[4]	<0.83	[4]	<0.22	[4]	<0.22	[4]	<0.64	[4]	<0.64	[4]	<0.46	[4]	<0.46	[4]	<0.36	[4]	<0.36	[4]	<0.50	[4]	<0.50
PCB-1232	[4]	<0.66	[4]	<0.66	[4]	<0.33	[4]	<0.55	[4]	<0.55	[4]	<0.37	[4]	<0.37	[4]	<0.90	[4]	<0.90	[4]	<0.40	[4]	<0.40	[4]	<0.48	[4]	<0.48
PCB-1248	[4]	<0.78	[4]	<0.78	[4]	<0.27	[4]	<0.19	[4]	<0.19	[4]	<0.22	[4]	<0.22	[4]	<0.24	[4]	<0.24	[4]	<0.21	[4]	<0.21	[4]	<0.35	[4]	<0.35
PCB-1260	[4]	<0.21	[4]	<0.21	[4]	<0.22	[4]	<0.32	[4]	<0.32	[4]	<0.59	[4]	<0.59	[4]	<0.26	[4]	<0.26	[4]	<0.34	[4]	<0.34	[4]	<0.28	[4]	<0.28
PCB-1016	[4]	<0.36	[4]	<0.36	[4]	<0.32	[4]	<0.18	[4]	<0.18	[4]	<0.55	[4]	<0.55	[4]	<0.29	[4]	<0.29	[4]	<0.33	[4]	<0.33	[4]	<0.40	[4]	<0.40
Toxaphene	11	<0.53	11	<0.53	11	<0.33	11	<0.22	11	<0.22	11	<0.60	11	<0.60	11	<0.48	11	<0.48	11	<0.47	11	<0.47	11	<0.482	11	<0.482

Notes:

NS = no standard applicable to the designated use

T = total

D = dissolved

Bold text indicates a sample result greater than the WQS

Italicized text indicates a laboratory detection limit higher than the WQS

Footnotes:

[1] The Permittee shall report on any additional parameters that were monitored for seasonal stormwater sampling as required by Section 6.0 of this permit (Special Conditions).

[2] Analytical results shall be reported in the units specified for each category or parameter.

[3] Report the average flow rate for the sampling period (no more than 6 hours).

[4] Standard for total PCBs of 11 µg/L A&We and 19 µg/L PBC.

[5] The sample was lost during extraction at the laboratory due to the glassware breaking.

[6] There were no representative storm events (>0.20 inches) that occurred or no representative events without a measurable rain event in the previous 72 hours.

[7] A representative event occurred on 8/2; however, the sampler malfunctioned. Then next event was on 8/5 but due to the 72-hour rule, no sample was taken. Another measurable event on 9/22 did not result in a qualifying rain event. No samples were taken at this outfall during Summer 2016.

[8] Prior to FY2016, the lab was reporting cis and trans for 1-3-dichloropropylene; this reporting year, an upgrade has resulted in providing the result as a total.

[9] Data flagged due to contamination in the lab reagent blank; therefore, these are not true detections or exceedances.

OUTFALL ID: AC033	MONITORING SEASONS																									
RECEIVING WATER: New River	Summer: June 1 - October 31 Winter: November 1 - May 31																									
DESIGNATED USES: A&We and PBC [10]	Winter 2012/13		Summer 2013		Winter 2013/14		Summer 2014		Winter 2014/15		Summer 2015		Winter 2015/16		Summer 2016		Winter 2016/17		Summer 2017		Winter 2017/18		Summer 2018		Winter 2018/19	
SAMPLING DATE(S):	SWQS	12/14/2012	SWQS	7/20/2013	SWQS	11/22/2013	SWQS	8/12/2014	SWQS	12/4/2014	SWQS	10/6/2015	SWQS	1/4/2016	SWQS	8/22/2016	SWQS	11/3/2016	SWQS	7/16/2017	SWQS	1/9/2018	SWQS	7/9/2018	SWQS	11/29/2018
MONITORING PARAMETERS [1,2]																										
Conventional Parameters																										
Flow [3] (cfs)	NS	0.76	NS	4.788	NS	2	NS	2.7	NS	0.364	NS	3.01	NS	1.466	NS	1.548	NS	0.582	NS	6.094	NS	6.59	NS	0.038	NS	0.017
pH	4.5-9.0	7.83	4.5-9.0	8.36	4.5-9.0	8.11	4.5-9.0	8.52	4.5-9.0	7.45	4.5-9.0	7.39	4.5-9.0	7.73	4.5-9.0	7.53	4.5-9.0	7.32	6.5-9	7.21	6.5-9	7.19	6.5-9	7.48	6.5-9	7.38
Temperature (ºC)	Varies	14	Varies	28.5	Varies	16.5	Varies	24.8	Varies	17	Varies	24	Varies	14	Varies	31	Varies	22	Varies	29.6	Varies	15.6	Varies	29.7	Varies	17.1
Hardness (mg/L)	400	25.7	400	56.6	400	25.7	400	33.9	400	19.4	400	34	400	16.9	400	49.8	400	46.3	400	64.6	400	28.9	400	44.9	400	63.5
Total Dissolved Solids (TDS) (mg/L) [2]	NS	92	NS	182	NS	72	NS	104	NS	42	NS	88	NS	46	NS	120	NS	144	NS	276	NS	96	NS	152	NS	168
Total Suspended Solids (TSS) (mg/L) [2]	NS	296	NS	573	NS	242	NS	352	NS	210	NS	182	NS	108	NS	305	NS	182	NS	620	NS	204	NS	724	NS	101
Biochemical Oxygen Demand (BOD) (mg/L) [2]	NS	19	NS	54	NS	18	NS	20	NS	12	NS	13	NS	10	NS	16	NS	50	NS	113	NS	31	NS	41	NS	35
Chemical Oxygen Demand (COD) (mg/L) [2]	NS	210	NS	370	NS	140	NS	180	NS	140	NS	140	NS	120	NS	160	NS	350	NS	570	NS	200	NS	400	NS	180

AC033	Winter 2012/13		Summer 2013		Winter 2013/14		Summer 2014		Winter 2014/15		Summer 2015		Winter 2015/16		Summer 2016		Winter 2016/17		Summer 2017		Winter 2017/18		Summer 2018		Winter 2018/19	
SAMPLING DATE(S):	SWQS	12/14/2012	SWQS	7/20/2013	SWQS	11/22/2013	SWQS	8/12/2014	SWQS	12/4/2014	SWQS	10/6/2015	SWQS	1/4/2016	SWQS	8/22/2016	SWQS	11/3/2016	SWQS	7/16/2017	SWQS	1/9/2018	SWQS	7/9/2018	SWQS	11/29/2018
Inorganics																										
Cyanide, total (µg/L) [2]	200 T	<5	200 T	<50	200 T	<5	200 T	<5	200 T	<5	200 T	<5	200 T	<5	200 T	<5	200 T	<5	84	<5	84	<5	84	<5	84	<5
Nutrients (mg/L) [2]																										
Nitrate + Nitrite as N	NS	0.6	NS	1.7	NS	0.6	NS	1.2	NS	0.5	NS	0.8	NS	0.5	NS	2.1	NS	1.2	NS	1.8	NS	1	NS	1.2	NS	1.5
Ammonia as N	NS	1.2	NS	1.9	NS	0.86	NS	1.4	NS	0.85	NS	0.58	NS	0.52	NS	1.5	NS	2	NS	2.5	NS	1.6	NS	1.9	NS	2.1
Total Kjeldahl Nitrogen (TKN)	NS	3.6	NS	7.2	NS	2.2	NS	3.2	NS	2	NS	2.2	NS	1.3	NS	4.5	NS	5.3	NS	10	NS	4.6	NS	7.3	NS	4.7
Total Phosphorus as P	NS	0.74	NS	0.48	NS	0.8	NS	1	NS	0.38	NS	0.67	NS	0.48	NS	1.3	NS	0.66	NS	0.48	NS	1.3	NS	1.8	NS	0.59
Ortho-Phosphorus as P	NS	0.2	NS	0.5	NS	0.2	NS	0.2	NS	0.1	NS	0.1	NS	0.1	NS	0.3	NS	0.3	NS	0.6	NS	0.3	NS	0.3	NS	0.3
Microbiological																										
Escherichia coli (*E. coli*) (CFU/100 mg or MPN/100 mL) [2]	NS	>2,419.6	NS	2419.6	NS	>2,419.6	NS	727	NS	>2,419.6	NS	9,590	NS	1,610.00	NS	6,500	NS	57,940	575	**10,140**	575	**3,310**	575	**26,130**	575	**4,640**
Total Metals (µg/L) [2]																										
Antimony	NS	1.8 T 0.6 D	NS	1.9 T 0.9 D	NS	1.1 T 0.5 D	NS	1.6 T 1.0 D	NS	2.3 T 0.6 D	NS	2.1 T <5.0 D	NS	1.6 T <5.0 D	NS	1.7 T <5 D	NS	3.7 T <5 D	747 T	5.3 T <5 D	747 T	3.1 T <5 D	747 T	3.3 T <5.0 D	747 T	2.7 T <5.0 D
Arsenic	200 T	4.0 T 0.8 D	200 T	7.4 T 1.4 D	200 T	2.5 T 0.7 D	200 T	4.1 T 1.4 D	200 T	2.6 T 0.6 D	200 T	3.7 T <5.0 D	200 T	2.1 T <5.0 D	200 T	5.4 T <5 D	200 T	3 T <5 D	280 T 440 D	5 T <5.0 D	280 T 440 D	4.5 T <5.0 D	280 T 440 D	7.7 T <5.0 D	280 T 440 D	2.3 T <5.0 D
Barium	NS	125 T 12 D	NS	283 T 39 D	NS	91 T 11 D	NS	126 T 20 D	NS	104 T 11 D	NS	92 T 18 D	NS	61 T 10 D	NS	176 T 28 D	NS	136 T 29 D	98,000 T	202 T 52 D	98,000 T	131 T 19 D	98,000 T	286 T 33 D	98,000 T	80 T 30 D
Beryllium	NS	0.38 T <0.15 D	NS	0.73 T <0.15 D	NS	0.22 T <0.06 D	NS	0.29 T <0.15 D	NS	0.22 T <0.06	NS	0.15 T <5.0 D	NS	<0.10 T <5.0 D	NS	0.49 T <5 D	NS	<0.25 T <5 D	1,867 T	<0.15 T <5.0 D	1,867 T	0.37 T <5.0 D	1,867 T	0.78 T <5.0 D	1,867 T	<0.15 T <5.0 D
Cadmium	50 T	0.4 T <0.25 D	50 T	0.7 T <0.25 D	50 T	0.4 T <0.10 D	50 T	0.4 T <0.30 D	50 T	0.3 T <0.12 D	50 T	0.2 T 5.7 D	50 T	0.2 T <5.0 D	50 T	0.5 T <5 D	50 T	0.3 T <0.25 D	700 T 40.22 D	0.6 T <5.0D	700 T 16.80 D	0.2 T <5.0 D	700 T 27.10	0.6 T <5.0 D	700 T 39.48	<0.25 T <5.0 D
Chromium	NS CrIII CrVI 1,000 T	12.6 T <2.00 D	NS CrIII CrVI 1,000 T	27.5 T <2.00	NS CrIII CrVI 1,000 T	8.1 T <0.80 D	NS CrIII CrVI 1,000 T	14.0 T 0.9 D	NS CrIII CrVI 1,000 T	9.0 T 0.8 D	NS CrIII CrVI 1,000 T	8.7 T <5.0 D	NS CrIII CrVI 1,000 T	5.3 T <5.0 D	NS CrIII CrVI 1,000 T	16.9 T <5 D	NS CrIII CrVI 1,000 T	9 T <5 D	NS	13.8 T <5.0 D	NS	14 T <5.0 D	NS	29.2 T <5.0 D	NS	6.0 T <5.0 D
Copper	500 T	51.9 T 8.4 D	500 T	97.0 T 26.9 D	500 T	32.7 T 10.1 D	500 T	49.6 T 13.6 D	500 T	40.2 T 8.0 D	500 T	39.7 T 11.9 D	500 T	28.7 T 10.2 D	500 T	62.2 T 17.9 D	500 T	55.7 T 24.6 D	1,300 T 15.41 D	97.5 T **51.8 D**	1,300 T 7.22 D	51.5 T **16.2 D**	1,300 T 10.94	96.4 T **28.2 D**	1,300 T 15.16	35.1 T **23.5 D**
Lead	100 T	33.2 T 0.6 D	100 T	71.1 T 3.1 D	100 T	15.3 T 0.4 D	100 T	37.5 T 1.1 D	100 T	25.2 T 0.7 D	100 T	19.7 T <5.0 D	100 T	13.3 T <5.0 D	100 T	43.4 T <5 D	100 T	15.7 T 0.8 D	15 T 84.44 D	**32.2 T** <5.0 D	15 T 34.49 D	**25.2 T** <5.0 D	15 T 56.43	**61.6 T** 1.5 D	15 T 82.85	**15.2 T** <5.0 D
Mercury	10 T	<0.040 T <0.040 D	10 T	0.03 T 0.024 D	10 T	<0.020 T <0.020 D	10 T	<0.092 T <0.2 D	10 T	<0.092 T <0.092 D	10 T	<0.062 T <0.2 D	10 T	<0.062 T <0.2 D	10 T	<0.068 T <0.2 D	10 T	<0.068 T <0.2 D	280 T 5 D	0.084 T <0.2 D	280 T 5 D	<0.066 T <0.2 D	280 T 5 D	<0.080 T <0.080 D	280 T 5 D	<0.042 T <0.2 D
Nickel	NS	14.0 T 2.3 D	NS	29.2 T 6.4 D	NS	9.2 T 1.9 D	NS	13.4 T 2.3 D	NS	9.2 T 1.2 D	NS	9.0 T <5.0 D	NS	4.8 T <5.0 D	NS	15.8 T <5 D	NS	11.1 T <5 D	280,000 T 2873.27 D	20.2 T 8.8 D	280,000 T 1454.92 D	12.8 T <5.0 D	28,000 T 2,112.13	29.1 T <5.0 D	28,000 T 2,831.83	7.0 T <5.0 D
Selenium	20 T	0.6 T <0.60 D	20 T	<0.60 T <0.60 D	20 T	<0.60 T <0.24 D	20 T	0.3 T <0.25 D	20 T	0.29 T 0.1 D	20 T	0.67 T <5.0 D	20 T	<0.40 T <5.0 D	20 T	1 T <5 D	20 T	<0.4 T <5 D	33T	0.86 T <5.0 D	33T	0.27 T <5.0 D	33 T	0.53 T <5.0 D	33 T	0.72 T <5.0 D

AC033	Winter 2012/13		Summer 2013		Winter 2013/14		Summer 2014		Winter 2014/15		Summer 2015		Winter 2015/16		Summer 2016		Winter 2016/17		Summer 2017		Winter 2017/18		Summer 2018		Winter 2018/19	
SAMPLING DATE(S):	SWQS	12/14/2012	SWQS	7/20/2013	SWQS	11/22/2013	SWQS	8/12/2014	SWQS	12/4/2014	SWQS	10/6/2015	SWQS	1/4/2016	SWQS	8/22/2016	SWQS	11/3/2016	SWQS	7/16/2017	SWQS	1/9/2018	SWQS	7/9/2018	SWQS	11/29/2018
Silver	NS	0.2 T <0.15 D	NS	0.3 T <0.15 D	NS	<0.15 T <0.15 D	NS	<0.20 T <0.20 D	NS	0.1 T <0.08 D	NS	<0.25 T <5.0 D	NS	<0.25 T <5.0 D	NS	<0.45 T <5 D	NS	<0.45 T <5 D	4,667 T 1.52 D	0.2 T <5.0 D	4,667 T 0.38 D	0.2 T <5.0 D	4,667 T 0.81	0.3 T *<5.0 D*	4,667 T 1.47	<0.15 T *<5.0 D*
Thallium	NS	<0.20 T <0.20 D	NS	0.34 T <0.20 D	NS	<0.20 T <0.08 D	NS	<0.10 T <0.10 D	NS	0.08 T <0.04 D	NS	<0.15 T <5.0 D	NS	<0.15 T <5.0 D	NS	0.45 T <5 D	NS	<0.2 T <5 D	75 T	0.1 T <5.0 D	75 T	<0.10 T <5.0 D	75 T	0.23 T <5.0 D	75 T	0.24 T <5.0 D
Zinc	10,000 T	272 T 26.0 D	10,000 T	424 T 80.6 D	10,000 T	170 T 32.1 D	10,000 T	197 T 19.8 D	10,000 T	195 T 15.0 D	10,000 T	180 T 26.6 D	10,000 T	173 T 18.0 D	10,000 T	232 T <50 D	10,000 T	284 T 96.8 D	280,000 T 767.92 D	562 T 217 D	280,000 T 388.44 D	211 T 23.8 D	280,000 T 564.23	422 T 40.8 D	280,000 T 756.82	209 T 66.5 D
Organic Toxic Pollutants																										
Total Petroleum Hydrocarbons (TPH) (mg/L) [2]	NS	<10	NS	<11	NS	<11	NS	<10.0	NS	<10	NS	<5.6	NS	<5.7	NS	<6.1	NS	<4.5	NS	<6.7	NS	<7.0	NS	<6.8	NS	6.1
Total Oil and Grease (mg/L) [2]	NS	<5.0	NS	<5.5	NS	6	NS	<5.0	NS	<5.0	NS	<5.6	NS	<5.7	NS	<6.1	NS	<4.5	NS	<5.6	NS	<5.8	NS	<5.7	NS	6.1
VOCs, Semi-VOCs, and Pesticides (µg/L) [2]																										
Acrolein	NS	<0.293	NS	1.1	NS	<0.20	NS	4.1	NS	<0.40	NS	<0.78	NS	<0.78	NS	<0.41	NS	0.74	467	<3.95	467	<0.79	467	<5.0	467	0.89
Acrylonitrile	NS	<0.226	NS	<0.16	NS	<0.16	NS	<0.70	NS	<0.14	NS	<0.53	NS	<0.53	NS	<0.42	NS	<0.42	37,333	<2.95	37,333	<0.59	37,333	<5.0	37,333	<0.57
Benzene	NS	<0.75	NS	<1.20	NS	<1.20	NS	<0.65	NS	<0.13	NS	<2.30	NS	<0.46	NS	<0.29	NS	<0.29	3,733	<1.30	3,733	<0.26	3,733	<1.30	3,733	<0.33
Bromoform	NS	<2.15	NS	<2.35	NS	<2.35	NS	<1.40	NS	<0.28	NS	<3.40	NS	<0.68	NS	<0.33	NS	<0.33	18,667	<1.05	18,667	<0.21	18,667	<1.05	18,667	<0.81
Carbon tetrachloride	NS	<1.65	NS	<1.30	NS	<1.30	NS	<1.15	NS	<0.23	NS	<1.55	NS	<0.31	NS	<0.20	NS	<0.20	1,307	<1.50	1,307	<0.30	980	<1.50	980	<0.27
Chlorobenzene	NS	<1.40	NS	<0.80	NS	<0.80	NS	<0.65	NS	<0.13	NS	<2.50	NS	<0.50	NS	<0.33	NS	<0.33	18,667	<1.15	18,667	<0.23	18,667	<1.15	18,667	<0.70
Chlorodibromomethane	NS	<1.30	NS	<0.90	NS	<0.90	NS	<1.20	NS	<0.24	NS	<3.05	NS	<0.61	NS	<0.32	NS	<0.32	18,667	<1.20	18,667	<0.24	18,667	<1.20	18,667	<0.70
Chloroethane (ethyl chloride)	NS	<1.35	NS	<1.10	NS	<1.10	NS	<0.95	NS	<0.19	NS	<2.00	NS	<0.40	NS	<0.33	NS	<0.33	NS	<1.40	NS	<0.28	NS	<1.40	NS	<0.33
2-Chloroethylvinyl ether	NS	<0.22	NS	<0.22	NS	<0.22	NS	<0.95	NS	<0.19	NS	<0.53	NS	<0.53	NS	<0.43	NS	<0.43	NS	<3.25	NS	<0.65	NS	<5.0	NS	<0.52
Chloroform	NS	<1.05	NS	<1.15	NS	<1.15	NS	<0.70	NS	<0.14	NS	<2.45	NS	<0.49	NS	<0.32	NS	<0.32	9,333	<1.20	9,333	<0.24	9,333	<1.20	9,333	<0.31
Dichlorobromomethane	NS	<0.75	NS	<1.15	NS	<1.15	NS	<0.75	NS	<0.15	NS	<2.45	NS	<0.49	NS	<0.29	NS	<0.29	18,667	<1.30	18,667	<0.26	18,667	<1.30	18,667	<0.52
1,1-Dichloroethane	NS	<0.65	NS	<1.30	NS	<1.30	NS	<0.95	NS	<0.19	NS	<2.10	NS	<0.42	NS	<0.29	NS	<0.29	NS	<1.35	NS	<0.27	NS	<1.35	NS	<0.32
1,2-Dichloroethane	NS	<0.80	NS	<1.25	NS	<1.25	NS	<0.55	NS	<0.11	NS	<2.55	NS	<0.51	NS	<0.35	NS	<0.35	186,667	<1.30	186,667	<0.26	186,667	<1.30	186,667	<0.28
1,1-Dichloroethylene	NS	<1.85	NS	<1.40	NS	<1.40	NS	<1.35	NS	<0.27	NS	<1.70	NS	<0.34	NS	<0.19	NS	<0.19	46,667	<1.60	46,667	<0.32	46,667	<1.60	46,667	<0.40
1,2-Dichloropropane	NS	<0.75	NS	<1.25	NS	<1.25	NS	<0.90	NS	<0.18	NS	<2.45	NS	<0.49	NS	<0.32	NS	<0.32	84,000	<1.60	84,000	<0.32	84,000	<1.60	84,000	<0.93
1,3-Dichloropropylene[8]	NS	<0.75	NS	<1.10	NS	<1.10	NS	<0.65	NS	<0.13	NS	cis <2.55 trans <2.50	NS	cis <0.51 trans <0.50	NS	<0.28	NS	<0.28	28,000	<1.05	28,000	<0.21	28,000	<1.05	28,000	<0.43
Ethylbenzene	NS	<1.45	NS	<0.65	NS	<0.65	NS	<0.75	NS	<0.15	NS	<2.30	NS	<0.46	NS	<0.29	NS	<0.29	93,333	<1.15	93,333	<0.23	93,333	<1.15	93,333	<0.61
Methyl bromide	NS	<0.95	NS	<0.95	NS	<0.95	NS	<0.90	NS	<0.18	NS	<2.30	NS	<0.46	NS	<0.28	NS	<0.28	1,307	<1.15	1,307	<0.32	1,307	<1.15	1,307	<0.33
Methyl chloride	NS	<1.85	NS	<1.40	NS	<1.40	NS	<1.15	NS	<0.23	NS	<2.30	NS	<0.46	NS	<0.28	NS	<0.28	NS	<1.85	NS	<0.37	NS	<1.85	NS	<0.33
Methylene chloride	NS	1.5	NS	<1.00	NS	<1.00	NS	<1.00	NS	<0.20	NS	<4.05	NS	<0.81	NS	<0.31	NS	<0.31	56,000	<4.00	56,000	>0.80	56,000	<4.00	56,000	<0.44
1,1,2,2-Tetrachloroethane	NS	<2.45	NS	<2.00	NS	<2.00	NS	<1.75	NS	<0.35	NS	<4.00	NS	<0.80	NS	<0.33	NS	<0.33	93,333	<1.55	93,333	<0.31	56,000	<1.55	56,000	<0.83
Tetrachloroethylene	NS	<1.15	NS	<1.05	NS	<1.05	NS	<0.65	NS	<0.13	NS	<1.75	NS	<0.35	NS	<0.23	NS	<0.23	9,333	<1.45	9,333	<0.29	9,333	<1.45	9,333	<0.38
Toluene	NS	<0.60	NS	<0.95	NS	<0.95	NS	<0.55	NS	<0.11	NS	<2.15	NS	<0.43	NS	0.42	NS	<0.28	373,333	<1.25	373,333	<0.25	280,000	<1.25	280,000	<0.38
trans-1,2-Dichloroethylene	NS	<0.85	NS	<1.25	NS	<1.25	NS	<0.90	NS	<0.18	NS	<1.90	NS	<0.38	NS	<0.24	NS	<0.24	18,667	<1.25	18,667	<0.25	18,667	<1.25	18,667	<0.32
1,1,1-Trichloroethane	1,000	<1.15	1,000	<1.00	1,000	<1.00	1,000	<0.70	1,000	<0.14	1,000	<1.70	1,000	<0.34	1,000	<0.23	1,000	<0.23	$1.867 \times 10^{+6}$	<1.40	$1.867 \times 10^{+6}$	<0.28	$1.867 \times 10^{+6}$	<1.40	$1.867 \times 10^{+6}$	<0.31
1,1,2-Trichloroethane	NS	<1.20	NS	<0.75	NS	<0.75	NS	<0.65	NS	<0.13	NS	<3.00	NS	<0.60	NS	<0.29	NS	<0.29	3,733	<1.50	3,733	<0.30	3,733	<1.50	3,733	<0.68
Trichloroethylene	NS	<1.20	NS	<0.75	NS	<0.75	NS	<1.10	NS	<0.22	NS	<2.40	NS	<0.48	NS	<0.28	NS	<0.28	280	<1.80	280	<0.36	280	<1.80	280	<0.46
1,2,4-Trimethylbenzene	NS	<5.0	NS	<5.0	NS	<5.0	NS	<10.0	NS	<1.0	NS	<5.0	NS	<1.0	NS	<1.0	NS	<1.0	NS	<5.0	NS	<5.0	NS	<5.0	NS	<1.0
1,3,5-Trimethylbenzene	NS	<5.0	NS	<5.0	NS	<5.0	NS	<5.0	NS	<1.0	NS	<5.0	NS	<1.0	NS	<1.0	NS	<1.0	NS	<1.0	NS	<1.0	NS	<5.0	NS	<1.0
Vinyl chloride	NS	<2.50	NS	<1.00	NS	<1.00	NS	<1.10	NS	<0.22	NS	<1.75	NS	<0.35	NS	<0.24	NS	<0.24	2,800	<2.10	2,800	<0.42	2,800	<2.10	2,800	<0.35
Xylenes, Total	NS	<2.90	NS	<1.50	NS	<1.50	NS	<1.25	NS	<0.13	NS	<2.60	NS	<0.52	NS	<0.32	NS	<0.32	186,667	<1.15	186,667	<0.23	186,667	<1.15	186,667	<0.70
Acid Compounds (µg/L) [2]																										
2-Chlorophenol	NS	<57.0	NS	<223.1	NS	<90.9	NS	<1.48	NS	<1.48	NS	<3.10	NS	<3.10	NS	<2.92	NS	<2.92	4,667	<42.3	4,667	<211.5	4,667	<4.52	4,667	<4.52
2,4-Dichlorophenol	NS	<61.0	NS	<219.4	NS	<89.5	NS	<1.65	NS	<1.65	NS	<2.81	NS	<2.81	NS	<3.21	NS	<3.21	2,800	<48.2	2,800	<241.0	2,800	<4.77	2,800	<4.77
2,4-Dimethylphenol	NS	<73.0	NS	<118.6	NS	<48.3	NS	<2.20	NS	<2.20	NS	<2.64	NS	<2.64	NS	<1.32	NS	<1.32	18,667	<70.7	18,667	<353.5	18,667	<2.04	18,667	<2.04
4,6-Dinitro-o-cresol	NS	<69.0	NS	<155.0	NS	<63.2	NS	<1.22	NS	<1.22	NS	<1.49	NS	<1.49	NS	<2.27	NS	<2.27	3,733	<46.9	3,733	<234.5	3,733	<3.36	3,733	<3.36
2,4-Dinitrophenol	NS	<69.5	NS	<134.7	NS	<54.9	NS	<1.13	NS	<1.13	NS	<2.21	NS	<2.21	NS	<2.64	NS	<2.64	1,867	<51.1	1,867	<255.5	1,867	<3.41	1,867	<3.41
2-Nitrophenol	NS	<139.0	NS	<213.7	NS	<87.1	NS	<1.57	NS	<1.57	NS	<2.84	NS	<2.84	NS	<2.61	NS	<2.61	NS	<78.3	NS	<391.5	NS	<4.68	NS	<4.68
4-Nitrophenol	NS	<408.0	NS	<242.8	NS	<99.0	NS	5.2	NS	2.1	NS	<2.98	NS	<2.98	NS	<2.03	NS	<2.03	NS	<40.3	NS	<201.5	NS	<3.52	NS	<3.52
p-Chloro-m-cresol	NS	<93.0	NS	<229.3	NS	<93.5	NS	<1.65	NS	<1.65	NS	<1.87	NS	<1.87	NS	<3.10	NS	<3.10	48,000	<40.5	48,000	<202.5	48,000	<4.76	48,000	<4.76
Pentachlorophenol	NS	<103.5	NS	<174.7	NS	<71.2	NS	<1.39	NS	<1.39	NS	<1.47	NS	<1.47	NS	<3.44	NS	<3.44	45.4	<73.6	44.49	*<368.0*	59.55	<4.00	53.86	<4.00
Phenol	NS	<59.5	NS	<184.6	NS	<75.3	NS	1.4	NS	<1.34	NS	<2.30	NS	<2.30	NS	<1.84	NS	1.9	180,000	<39.9	180,000	<199.5	180,000	<4.08	180,000	<4.08
2,4,6-Trichlorophenol	NS	<140.0	NS	<249.1	NS	<101.5	NS	<1.89	NS	<1.89	NS	<2.60	NS	<2.60	NS	<3.28	NS	<3.28	130	<47.4	130	*<237.0*	130	<5.27	130	<5.27

AC033	Winter 2012/13		Summer 2013		Winter 2013/14		Summer 2014		Winter 2014/15		Summer 2015		Winter 2015/16		Summer 2016		Winter 2016/17		Summer 2017		Winter 2017/18		Summer 2018		Winter 2018/19	
SAMPLING DATE(S):	SWQS	12/14/2012	SWQS	7/20/2013	SWQS	11/22/2013	SWQS	8/12/2014	SWQS	12/4/2014	SWQS	10/6/2015	SWQS	1/4/2016	SWQS	8/22/2016	SWQS	11/3/2016	SWQS	7/16/2017	SWQS	1/9/2018	SWQS	7/9/2018	SWQS	11/29/2018
Bases/Neutrals (µg/L) [2]																										
Acenaphthene	NS	<85.0	NS	<69.7	NS	<28.4	NS	<1.03	NS	<1.03	NS	<0.35	NS	<0.35	NS	<1.02	NS	<1.02	56,000	<18.8	56,000	<94.0	56,000	<1.19	56,000	<1.19
Acenaphthylene	NS	<63.5	NS	<90.0	NS	<36.7	NS	<1.00	NS	<1.00	NS	<1.23	NS	<1.23	NS	<6.10	NS	<6.10	NS	<17.5	NS	<87.5	NS	<1.41	NS	<1.41
Anthracene	NS	<44.5	NS	<90.0	NS	<36.7	NS	<2.88	NS	<2.88	NS	<0.44	NS	<0.44	NS	<1.96	NS	<1.96	280,000	<26.2	280,000	<131.0	280,000	<1.20	280,000	<1.20
Benzo(a)anthracene	NS	<78.5	NS	<90.0	NS	<36.7	NS	<1.08	NS	<1.08	NS	<0.38	NS	<0.38	NS	<1.57	NS	<1.57	0.2	<19.6	0.2	<98.0	0.2	<1.02	0.2	<1.02
Benzo(a)pyrene	NS	<96.5	NS	<97.2	NS	<39.6	NS	<3.77	NS	<3.77	NS	<1.41	NS	<1.41	NS	<3.12	NS	<3.12	0.2	<37.7	0.2	<188.5	0.2	<1.08	0.2	<1.08
Benzo(b)fluoranthene	NS	<169.5	NS	<126.4	NS	<51.5	NS	<1.46	NS	<1.46	NS	<1.06	NS	<1.06	NS	<1.28	NS	<1.28	NS	<21.7	NS	<108.5	NS	<0.38	NS	<0.38
Benzo(g,h,i)perylene	NS	<70.5	NS	<90.0	NS	<36.7	NS	<1.29	NS	<1.29	NS	<0.72	NS	<0.72	NS	<2.83	NS	<2.83	NS	<25.1	NS	<125.5	NS	<1.14	NS	<1.14
Benzo(k)fluoranthene	NS	<57.5	NS	<72.8	NS	<29.7	NS	<1.04	NS	<1.04	NS	<0.35	NS	<0.35	NS	<1.76	NS	<1.76	1.9	<23.3	1.9	<116.5	1.9	<1.03	1.9	<1.03
Chrysene	NS	<44.5	NS	<77.0	NS	<31.4	NS	<1.41	NS	<1.41	NS	<0.46	NS	<0.46	NS	<1.08	NS	<1.08	19	<19.6	19	<98.0	19	<1.16	19	<1.16
Dibenz(a,h)anthracene	NS	<202.5	NS	<103.0	NS	<42.0	NS	<1.24	NS	<1.24	NS	<0.47	NS	<0.47	NS	<1.93	NS	<1.93	1.9	<60.4	1.9	<302.0	1.9	<1.02	1.9	<1.02
1,2-Dichlorobenzene	NS	<108.5	NS	<14.0	NS	<5.7	NS	<1.76	NS	<1.76	NS	<1.04	NS	<1.04	NS	<0.58	NS	<0.58	5,900	<1.50	5,900	<0.30	5,900	<1.43	5,900	<1.43
1,3-Dichlorobenzene	NS	<121.0	NS	<58.8	NS	<24.0	NS	<1.74	NS	<1.74	NS	<0.47	NS	<0.47	NS	<0.52	NS	<0.52	NS	<1.25	NS	<0.25	NS	<1.39	NS	<1.39
1,4-Dichlorobenzene	NS	<106.5	NS	<54.6	NS	<22.3	NS	<1.56	NS	<1.56	NS	<1.28	NS	<1.28	NS	<0.50	NS	<0.50	6,500	<1.45	6,500	<0.29	6,500	<1.48	6,500	<1.48
3,3-Dichlorobenzidine	NS	<369.0	NS	<1418.0	NS	<578.1	NS	<6.06	NS	<6.06	NS	<11.60	NS	<11.60	NS	<23.45	NS	<23.45	3	<254.3	3	<1,271.5	3	<6.99	3	<6.99
Diethyl phthalate	NS	<74.0	NS	<98.8	NS	<40.3	NS	<2.37	NS	<2.37	NS	0.4	NS	0.4	NS	<1.07	NS	<1.07	746,667	<19.9	746,667	<99.5	746,667	<1.08	746,667	1.9
Dimethyl phthalate	NS	<60.5	NS	<93.1	NS	<37.9	NS	<2.42	NS	<2.42	NS	<0.47	NS	<0.47	NS	<0.58	NS	<0.58	NS	<19.1	NS	<95.5	NS	<1.17	NS	<1.17
Di-n-butyl phthalate	NS	<114.5	NS	<116.0	NS	<47.3	NS	<1.85	NS	<1.85	NS	<0.31	NS	<0.31	NS	<1.37	NS	<1.37	1,100	<23.5	1,100	<117.5	1,100	<1.12	1,100	<1.12
2,4-Dinitrotoluene	NS	<65.5	NS	<106.6	NS	<43.5	NS	<2.12	NS	<2.12	NS	<0.26	NS	<0.26	NS	<1.30	NS	<1.30	1,867	<31.0	1,867	<155.0	1,867	<1.17	1,867	<1.17
2,6-Dinitrotoluene	NS	<93.5	NS	<131.0	NS	<53.4	NS	<1.12	NS	<1.12	NS	<0.38	NS	<0.38	NS	<1.39	NS	<1.39	3,733	<28.9	3,733	<144.5	3,733	<1.13	3,733	<1.13
Di-n-octyl phthalate	NS	<206.5	NS	<149.8	NS	<61.1	NS	<1.10	NS	<1.10	NS	<1.28	NS	<1.28	NS	<1.67	NS	<1.67	373,333	<55.0	373,333	<275.0	373,333	<2.05	373,333	<2.05
1,2-Diphenylhydrazine (as azobenzene)	NS	<53.5	NS	<121.2	NS	<49.4	NS	<6.70	NS	<6.70	NS	<1.06	NS	<1.06	NS	<7.46	NS	<7.46	NS	<21.5	NS	<107.5	1.8	<1.11	1.8	<1.11
Fluoranthene	NS	<33.5	NS	<93.1	NS	<37.9	NS	<1.35	NS	<1.35	NS	<0.27	NS	<0.27	NS	<1.06	NS	<1.06	37,333	<30.8	37,333	<154.0	37,333	<1.27	37,333	<1.27
Fluorene	NS	<84.0	NS	<80.1	NS	<32.6	NS	<4.81	NS	<4.81	NS	<0.29	NS	<0.29	NS	<0.51	NS	<0.51	37,333	<28.7	37,333	<143.5	37,333	<1.18	37,333	<1.18
Hexachlorobenzene	NS	<65.0	NS	<72.3	NS	<29.5	NS	<1.23	NS	<1.23	NS	<0.34	NS	<0.34	NS	<0.47	NS	<0.47	747	<15.7	747	<78.5	747	<1.01	747	<1.01
Hexachlorobutadiene	NS	<68.5	NS	<17.2	NS	<7.0	NS	<1.82	NS	<1.82	NS	<1.67	NS	<1.67	NS	<0.41	NS	<0.41	187	<10.0	187	<50.0	187	<1.20	187	<1.20
Hexachlorocyclopentadiene	NS	<66.0	NS	<118.0	NS	<48.1	NS	<1.23	NS	<1.23	NS	<1.53	NS	<1.53	NS	<2.16	NS	<2.16	11,200	<61.0	11,200	<305.0	9,800	<3.07	9,800	<3.07
Hexachloroethane	NS	<70.0	NS	<20.8	NS	<8.5	NS	<1.62	NS	<1.62	NS	<1.23	NS	<1.23	NS	<0.54	NS	<0.54	850	<14.9	850	<74.5	850	<1.35	850	<1.35
Indeno(1,2,3-cd)pyrene[9]	NS	<166.5	NS	<105.6	NS	<43.0	NS	<1.39	NS	<1.39	NS	<0.62	NS	<0.62	NS	<2.38	NS	**3.99**	1.9	<61.1	1.9	<305.5	1.9	<1.07	1.9	<1.07
Isophorone	NS	<95.0	NS	<73.3	NS	<29.9	NS	<2.14	NS	<2.14	NS	<0.37	NS	<0.37	NS	<0.51	NS	<0.51	186,667	<17.7	186,667	<88.5	186,667	<1.32	186,667	<1.32
Naphthalene	NS	<71.0	NS	<62.4	NS	<25.4	NS	<1.83	NS	<1.83	NS	<0.36	NS	<0.36	NS	<0.49	NS	<0.49	18,667	<15.4	18,667	<77.0	18,667	<1.48	18,667	<1.48
Nitrobenzene	NS	<65.5	NS	<64.0	NS	<26.1	NS	<2.10	NS	<2.10	NS	<1.26	NS	<1.26	NS	<0.44	NS	<0.44	467	<18.0	467	<90.0	467	<1.55	467	<1.55
n-Nitrosodimethylamine	NS	<82.0	NS	<62.4	NS	<25.4	NS	<1.00	NS	<1.00	NS	<1.13	NS	<1.13	NS	<0.54	NS	<0.54	0.03	<16.2	0.03	<81.0	0.03	<1.67	0.03	<1.67
n-Nitrosodi-n-propylamine	NS	<94.0	NS	<78.5	NS	<32.0	NS	<1.15	NS	<1.15	NS	<1.17	NS	<1.17	NS	<1.02	NS	<1.02	88,667	<16.5	88,667	<82.5	88,667	<1.65	88,667	<1.65
n-Nitrosodiphenylamine	NS	<50.0	NS	<158.1	NS	<64.4	NS	<3.57	NS	<3.57	NS	<1.15	NS	<1.15	NS	<1.67	NS	<1.67	290	<31.3	290	<156.5	290	<1.07	290	<1.07
Phenanthrene	NS	<38.0	NS	<84.8	NS	<34.6	NS	<1.39	NS	<1.39	NS	<0.31	NS	<0.31	NS	<0.49	NS	<0.49	NS	<30.2	NS	<151.0	NS	<1.33	NS	<1.33
Pyrene	NS	<116.5	NS	<85.3	NS	<34.8	NS	<3.86	NS	<3.86	NS	<0.67	NS	<0.67	NS	<3.21	NS	<3.21	28,000	<33.8	28,000	<169.0	28,000	<1.20	28,000	<1.20
1,2,4-Trichlorobenzene	NS	<133.0	NS	<16.6	NS	<6.8	NS	<1.69	NS	<1.69	NS	<1.04	NS	<1.04	NS	<0.55	NS	<0.55	9,333	<12.0	9,333	<60.5	9,333	<1.34	9,333	<1.34
Pesticides (µg/L) [2]																										
Aldrin	0.003	**0.082**	0.003	<0.048	0.003	**0.028**	0.003	<0.027	0.003	<0.027	0.003	<0.012	0.003	<0.012	0.003	**0.077**	0.003	<0.019	4.5	0.071	4.5	<0.013	4.5	0.068	4.5	<0.010
Alpha-BHC	NS	<0.038	NS	<0.040	NS	<0.017	NS	<0.021	NS	<0.021	NS	<0.058	NS	<0.058	NS	<0.010	NS	<0.010	1,600	<0.015	1,600	0.019	1,600	<0.012	1,600	<0.012
Beta-BHC	NS	<0.095	NS	<0.099	NS	<0.094	NS	<0.072	NS	<0.072	NS	0.078	NS	<0.063	NS	<0.049	NS	<0.049	560	<0.083	560	<0.083	560	<0.099	560	<0.099
Gamma-BHC	NS	<0.033	NS	0.074	NS	<0.024	NS	<0.034	NS	<0.034	NS	<0.058	NS	<0.058	NS	<0.019	NS	<0.019	11	<0.020	11	<0.020	11	<0.013	11	0.074
Delta-BHC	NS	<0.032	NS	<0.033	NS	<0.018	NS	<0.021	NS	<0.021	NS	<0.066	NS	<0.066	NS	<0.035	NS	<0.035	1,600	<0.012	1,600	<0.012	1,600	<0.045	1,600	<0.045
Chlordane	NS	<0.16	NS	<0.17	NS	<0.20	NS	<0.14	NS	<0.14	NS	<0.36	NS	<0.36	NS	<0.61	NS	<0.61	3.2	<0.29	3.2	<0.29	3.2	<0.33	3.2	<0.33
4,4'-DDT	0.001	<0.029	0.001	<0.030	0.001	<0.016	0.001	<0.025	0.001	<0.025	0.001	<0.017	0.001	<0.017	0.001	<0.011	0.001	<0.011	1.1	<0.020	1.1	<0.020	1.1	<0.009	1.1	<0.009
4,4'-DDE	0.001	<0.034	0.001	<0.035	0.001	<0.018	0.001	<0.010	0.001	<0.010	0.001	<0.013	0.001	<0.013	0.001	<0.020	0.001	<0.020	1.1	<0.019	1.1	<0.019	1.1	<0.015	1.1	<0.015
4,4'-DDD	0.001	<0.023	0.001	<0.024	0.001	<0.014	0.001	<0.031	0.001	<0.031	0.001	<0.021	0.001	<0.021	0.001	<0.021	0.001	<0.021	1.1	<0.023	1.1	<0.023	1.1	<0.017	1.1	<0.017
Dieldrin	0.003	<0.028	0.003	<0.029	0.003	<0.022	0.003	<0.030	0.003	<0.030	0.003	<0.060	0.003	<0.060	0.003	**0.035**	0.003	<0.019	4	<0.015	4	<0.015	4	0.037	4	0.039
Alpha-endosulfan	NS	<0.034	NS	<0.035	NS	0.084	NS	0.072	NS	<0.018	NS	<0.072	NS	<0.072	NS	0.089	NS	<0.018	3 T	<0.015	3 T	<0.015	3 T	0.082	3 T	0.061
Beta-endosulfan	NS	<0.034	NS	<0.035	NS	<0.013	NS	<0.032	NS	<0.032	NS	<0.019	NS	<0.019	NS	<0.021	NS	<0.021	3 T	<0.014	3 T	<0.014	3 T	<0.014	3 T	<0.014
Endosulfan sulfate	NS	<0.025	NS	<0.026	NS	<0.014	NS	<0.008	NS	<0.008	NS	<0.016	NS	<0.016	NS	<0.022	NS	<0.022	3	<0.019	3	<0.019	3	<0.017	3	<0.017
Endrin	0.004	<0.035	0.004	<0.036	0.004	<0.016	0.004	<0.017	0.004	<0.017	0.004	<0.023	0.004	<0.023	0.004	<0.042	0.004	<0.042	0.7	<0.040	0.7	<0.040	0.7	<0.042	0.7	<0.042
Endrin aldehyde	NS	<0.038	NS	<0.040	NS	<0.024	NS	<0.032	NS	<0.032	NS	<0.026	NS	<0.026	NS	<0.024	NS	<0.024	0.7	<0.034	0.7	<0.034	0.7	<0.068	0.7	<0.068
Heptachlor	NS	<0.035	NS	0.092	NS	<0.018	NS	<0.027	NS	<0.027	NS	<0.035	NS	<0.035	NS	<0.023	NS	<0.023	0.9	<0.019	0.9	<0.019	0.9	<0.011	0.9	0.054
Heptachlor epoxide	NS	<0.032	NS	<0.033	NS	<0.020	NS	<0.008	NS	<0.008	NS	<0.062	NS	<0.062	NS	<0.020	NS	<0.020	0.9	<0.016	0.9	<0.016	0.9	<0.012	0.9	<0.012
PCB-1242	0.001	<0.41	0.001	<0.43	0.001	<0.56	0.001	<0.37	0.001	<0.37	0.001	<0.14	0.001	<0.14	0.001	<0.72	0.001	<0.72	[4]	<0.33	[4]	<0.33	[4]	<0.28	[4]	<0.28
PCB-1254	0.001	<0.20	0.001	<0.21	0.001	<0.29	0.001	<0.23	0.001	<0.23	0.001	<0.20	0.001	<0.20	0.001	<0.22	0.001	<0.22	[4]	<0.17	[4]	<0.17	[4]	<0.21	[4]	<0.21

AC033	Winter 2012/13		Summer 2013		Winter 2013/14		Summer 2014		Winter 2014/15		Summer 2015		Winter 2015/16		Summer 2016		Winter 2016/17		Summer 2017		Winter 2017/18		Summer 2018		Winter 2018/19	
SAMPLING DATE(S):	SWQS	12/14/2012	SWQS	7/20/2013	SWQS	11/22/2013	SWQS	8/12/2014	SWQS	12/4/2014	SWQS	10/6/2015	SWQS	1/4/2016	SWQS	8/22/2016	SWQS	11/3/2016	SWQS	7/16/2017	SWQS	1/9/2018	SWQS	7/9/2018	SWQS	11/29/2018
PCB-1221	0.001	*<0.68*	0.001	*<0.71*	0.001	<0.87	0.001	*<0.22*	0.001	*<0.22*	0.001	*<0.64*	0.001	*<0.64*	0.001	*<0.46*	0.001	*<0.46*	[4]	<0.36	[4]	<0.36	[4]	<0.50	[4]	<0.50
PCB-1232	0.001	*<0.66*	0.001	*<0.69*	0.001	<0.34	0.001	*<0.55*	0.001	*<0.55*	0.001	*<0.37*	0.001	*<0.37*	0.001	*<0.90*	0.001	*<0.90*	[4]	<0.40	[4]	<0.40	[4]	<0.48	[4]	<0.48
PCB-1248	0.001	*<0.78*	0.001	*<0.81*	0.001	<0.28	0.001	*<0.19*	0.001	*<0.19*	0.001	*<0.22*	0.001	*<0.22*	0.001	*<0.24*	0.001	*<0.24*	[4]	<0.21	[4]	<0.21	[4]	<0.35	[4]	<0.35
PCB-1260	0.001	*<0.21*	0.001	*<0.22*	0.001	<0.24	0.001	*<0.32*	0.001	*<0.32*	0.001	*<0.59*	0.001	*<0.59*	0.001	*<0.26*	0.001	*<0.26*	[4]	<0.34	[4]	<0.34	[4]	<0.28	[4]	<0.28
PCB-1016	0.001	*<0.36*	0.001	*<0.37*	0.001	<0.33	0.001	*<0.18*	0.001	*<0.18*	0.001	*<0.55*	0.001	*<0.55*	0.001	*<0.29*	0.001	*<0.29*	[4]	<0.33	[4]	<0.33	[4]	<0.40	[4]	<0.40
Toxaphene	0.005	*<0.53*	0.005	*<0.55*	0.005	<0.34	0.005	*<0.22*	0.005	*<0.22*	0.005	*<0.60*	0.005	*<0.60*	0.005	*<0.48*	0.005	*<0.48*	11	<0.47	11	<0.47	11	<0.482	11	<0.482

Notes:

NS = no standard applicable to the designated use

T = total

D = dissolved

Bold text indicates a sample result greater than the WQS

Italicized text indicates a laboratory detection limit higher than the WQS

Footnotes:

[1] The Permittee shall report on any additional parameters that were monitored for seasonal stormwater sampling as required by Section 6.0 of this permit (Special Conditions).

[2] Analytical results shall be reported in the units specified for each category or parameter.

[3] Report the average flow rate for the sampling period (no more than 6 hours).

[4] Standard for total PCBs of 11 µg/L A&We and 19 µg/L PBC.

[5] The sample was lost during extraction at the laboratory due to the glassware breaking.

[6] There were no representative storm events (>0.20 inches) that occurred or no representative events without a measurable rain event in the previous 72 hours.

[7] A representative event occurred on 8/2; however, the sampler malfunctioned. Then next event was on 8/5 but due to the 72-hour rule, no sample was taken. Another measurable event on 9/22 did not result in a qualifying rain event. No samples were taken at this outfall during Summer 2016.

[8] Prior to FY2016, the lab was reporting cis and trans for 1-3-dichloropropylene; this reporting year, an upgrade has resulted in providing the result as a total.

[9] Data flagged due to contamination in the lab reagent blank; therefore, these are not true detections or exceedances.

[10] Review of SWQS during triennial review, this site was reclassified as PBC and A&We according to R18-11-105 Tributary; designated uses. From FY2018 forward will have modified SWQS for comparison.

OUTFALL ID: SR003	**MONITORING SEASONS**																									
	Summer: June 1 - October 31																									
RECEIVING WATER: Salt River	Winter: November 1 - May 31																									
DESIGNATED USES: A&Wedw, PBC, FC, AgI, AgL	Winter 2012/13		Summer 2013		Winter 2013/14		Summer 2014		Winter 2014/15		Summer 2015		Winter 2015/16		Summer 2016		Winter 2016/17		Summer 2017		Winter 2017/18		Summer 2018		Winter 2018/19	
SAMPLING DATE(S):	SWQS	12/14/2012	SWQS	7/21/2013	SWQS	11/23/2013	SWQS	8/12/2014	SWQS	12/4/2014	SWQS	7/31/2015	SWQS	1/4/2016	SWQS	7/29/2016	SWQS	11/3/2016	SWQS	7/24/2017	SWQS	1/9/2018	SWQS	7/9/2018	SWQS	2/21/2019
MONITORING PARAMETERS [1,2]																										
Conventional Parameters																										
Flow [3] (cfs)	NS	0.55	NS	2.93	NS	2.23	NS	1.162	NS	1.116	NS	5.167	NS	2.656	NS	2.377	NS	6.224	NS	21.462	NS	18.08	NS	1.24	NS	12.6
pH	6.5-9	8.48	6.5-9	7.78	6.5-9	8.54	6.5-9	7.67	6.5-9	8.47	6.5-9	7.63	6.5-9	7.94	6.5-9	7.62	6.5-9	6.96	6.5-9	7.42	6.5-9	7.62	4.5-9	8.14	4.5-9	8.89
Temperature (ºC)	Varies	20	Varies	27.5	Varies	20	Varies	29.5	Varies	19.5	Varies	30.8	Varies	15.5	Varies	30.5	Varies	21.5	Varies	29	Varies	18	Varies	31.1	Varies	9.6
Hardness (mg/L)	400	47.8	400	39.1	400	74	400	38.9	400	32.5	400	46	400	41.4	400	63.5	400	69.9	400	38.1	400	62.4	400	101	400	40.7
Total Dissolved Solids (TDS) (mg/L) [2]	NS	210	NS	130	NS	186	NS	130	NS	112	NS	172	NS	124	NS	260	NS	212	NS	138	NS	200	NS	432	NS	152
Total Suspended Solids (TSS) (mg/L) [2]	NS	142	NS	178	NS	84	NS	314	NS	1,600	NS	684	NS	196	NS	212	NS	192	NS	162	NS	130	NS	518	NS	285
Biochemical Oxygen Demand (BOD) (mg/L) [2]	NS	34	NS	27	NS	10	NS	18	NS	36	NS	30	NS	21	NS	43	NS	33	NS	24	NS	>59.48	NS	34	NS	18
Chemical Oxygen Demand (COD) (mg/L) [2]	NS	190	NS	160	NS	74	NS	200	NS	400	NS	330	NS	200	NS	240	NS	250	NS	200	NS	270	NS	350	NS	280

SR003	Winter 2012/13		Summer 2013		Winter 2013/14		Summer 2014		Winter 2014/15		Summer 2015		Winter 2015/16		Summer 2016		Winter 2016/17		Summer 2017		Winter 2017/18		Summer 2018		Winter 2018/19	
SAMPLING DATE(S):	SWQS	12/14/2012	SWQS	7/21/2013	SWQS	11/23/2013	SWQS	8/12/2014	SWQS	12/4/2014	SWQS	7/31/2015	SWQS	1/4/2016	SWQS	7/29/2016	SWQS	11/3/2016	SWQS	7/24/2017	SWQS	1/9/2018	SWQS	7/9/2018	SWQS	2/21/2019
Inorganics																										
Cyanide, total (µg/L) [2]	41 T	<5	41 T	*<50*	41 T	<5	41 T	<5	41 T	<5	41 T	<5	41 T	<5	41 T	<5	41 T	<5	41 T	<5.0	41 T	<5.0	41 T	<5	41 T	<5
Nutrients (mg/L) [2]																										
Nitrate + Nitrite as N	NS	1.2	NS	1.6	NS	0.9	NS	0.9	NS	0.7	NS	0.7	NS	0.6	NS	2	NS	1.4	NS	0.8	NS	1.4	NS	1.0	NS	1.2
Ammonia as N	3.34	2.1	12.56	1.2	2.98	0.47	10.18	0.98	2.28	1.1	16.2	1.6	9.42	0.78	16.5	2.3	37.3	1.3	22.3	0.98	16.5	2.3	6.4	1.1	1.6	0.43
Total Kjeldahl Nitrogen (TKN)	NS	5	NS	4	NS	1.2	NS	2.8	NS	4.2	NS	4.3	NS	2.5	NS	7.3	NS	3.7	NS	3.2	NS	5.5	NS	5.0	NS	2.4
Total Phosphorus as P	NS	0.65	NS	0.79	NS	0.4	NS	1.1	NS	0.37	NS	1.8	NS	0.98	NS	1.4	NS	0.69	NS	0.72	NS	0.43	NS	2.0	NS	1.1
Ortho-Phosphorus as P	NS	0.3	NS	0.4	NS	0.1	NS	0.1	NS	0.2	NS	<0.1	NS	0.1	NS	0.4	NS	0.3	NS	0.2	NS	0.4	NS	0.2	NS	0.1
Microbiological																										
Escherichia coli (*E. coli*) (CFU/100 mg or MPN/100 mL) [2]	575	**>2,419.6**	575	**>2,419.6**	575	**2,419.60**	575	**>2419.6**	575	**>2,419.6**	575	**10,710**	575	**8,130.00**	575	**1,986.30**	575	**5,940**	575	**104,620**	575	**4,140**	575	**34,480**	575	**6,970**
Total Metals (µg/L) [2]																										
Antimony	640 T 1,000 D	2.2 T 1.3 D	640 T 1,000 D	1.6 T 0.8 D	640 T 1,000 D	1.2 T 0.6 D	640 T 1,000 D	1.8 T 1.0 D	640 T 1,000 D	1.4 T 1.0 D	640 T 1,000 D	2.9 T <5.0 D	640 T 1,000 D	2.6 T <5.0 D	640 T 1,000 D	2.7 T <5 D	640 T 1,000 D	6 T <5 D	640 T 1,000 D	3.7 T <5.0 D	640 T 1,000 D	3.5 T <5.0 D	640 T 1,000 D	8.8 T <5.0 D	640 T 1,000 D	2.8 T <5.0 D
Arsenic	80 T 340 D	4.0 T 1.4 D	80 T 340 D	4.6 T 1.4 D	80 T 340 D	3.6 T 2.8 D	80 T 340 D	3.8 T 1.4 D	80 T 340 D	12.2 T 1.2 D	80 T 340 D	8.8 T <5.0 D	80 T 340 D	4.8 T <5.0 D	80 T 340 D	8.4 T <5 D	80 T 340 D	4.9 T <5 D	80 T 340 D	4.2 T <5.0 D	80 T 340 D	4.6 T <5.0 D	80 T 340 D	8.2 T <5.0 D	80 T 340 D	4.9 T <5.0 D
Barium	98,000 T	113 T 20 D	98,000 T	119 T 22 D	98,000 T	67 T 26 D	98,000 T	136 T 21 D	98,000 T	538 T 14 D	98,000 T	293 T 25 D	98,000 T	161 T 18 D	98,000 T	275 T 35 D	98,000 T	187 T 34 D	98,000 T	118 T 23 D	98,000 T	120 T 30 D	98,000 T	369 T 56 D	98,000 T	183 T 18 D
Beryllium	84 T	0.34 T <0.15 D	84 T	0.48 T <0.15 D	84 T	<0.15 <0.06 D	84 T	0.3 T <0.15 D	84 T	1.7 T <0.06 D	84 T	0.95 T <5.0 D	84 T	0.32 T <5.0 D	84 T	0.87 T <5 D	84 T	0.38 T <5 D	84 T	0.36 T <5.0 D	84 T	0.28 T <5.0 D	84 T 65 D	0.52 T <5.0 D	84 T 65 D	0.34 T <5.0 D
Cadmium	50 T 3.97 D	0.5 T <0.25 D	50 T 3.158 D	0.6 T <0.25 D	50 T 5.87 D	<0.3 T <0.10 D	50 T 3.14 D	0.8 T <0.30 D	50 T 2.64 D	2.7 T <0.12 D	50 T 3.70 D	1.1 T *<5.0 D*	50 T 3.33 D	1.2 T *<5.0 D*	50 T 2.61 D	1.4 T <0.25 D	50 T 2.89 D	1 T <0.25 D	50 T 1.5 D	0.8 T <0.2 D	50 T 2.56 D	0.3 T *<5.0 D*	50 T 4.31	4.3 T <0.2 D	50 T 1.61	0.6 T <0.25 D
Chromium	1,000 T	12.1 T <2.00 D	1,000 T	14.5 T <2.00 D	1,000 T	5.2 T 1.1 D	1,000 T	11.6 T 1.1 D	1,000 T	45.6 T 0.8 D	1,000 T	31.4 T <5.0 D	1,000 T	14.4 T <5.0 D	1,000 T	30.5 T <5 D	1,000 T	16.1 T <5 D	1,000 T	12.7 T <5.0 D	1,000 T	13.1 T <5.0 D	1,000 T	28.8 T <5.0 D	1,000 T	16.2 T <5.0 D
Copper	500 T 6.93 D	60.1 T **18.5 D**	500 T 5.54 D	49.1 T **16.8 D**	500 T 10.12 D	25.1 T 6.8 D	500 T 5.52 D	78.3 T **9.6 D**	500 T 4.66 D	219 T **10.6 D**	500 T 6.47 D	147 T **16.6 D**	500 T 5.85 D	95.2 T **17.3 D**	500 T 8.76 D	180 T **28.6 D**	500 T 9.59 D	139 T **34.8 D**	500 T 5.41 D	59 T **18 D**	500 T 8.62 D	70.7 T **19.5 D**	500 T 13.57	340 T **64.5 D**	500 T 5.76	88.2 T **12.6 D**
Lead	15 T 29.81 D	**26.1 T** 0.8 D	15 T 22.93 D	**34.4 T** 1.5 D	15 T 46.46 D	14.4 T 0.6 D	15 T 22.79 D	**49.6 T** 1.4 D	15 T 18.64 D	**110 T** 0.6 D	15 T 27.47 D	**64.4 T** 1.0 D	15 T 24.43 D	**44.1 T** <5.0 D	15 T 39.26 D	**79 T** 1.8 D	15 T 43.64 D	**58.4 T** 1 D	15 T 22.27 D	**28 T** 1.2 D	15 T 38.51 D	**28.7 T** 1.1 D	15 T 65.28	**299 T** 3.6 D	15 T 23.97	**57.4 T** 0.9 D
Mercury	10 T 2.4 D	<0.040 T <0.040 D	10 T 2.4 D	0.02 T 0.023 D	10 T 2.4 D	<0.020 T <0.020 D	10 T 2.4 D	<0.092 T <0.2 D	10 T 2.4 D	<0.092 T <0.092 D	10 T 2.4 D	0.08 T <0.2 D	10 T 2.4 D	0.08 T <0.2 D	10 T 2.4 D	0.191 T <0.068 D	10 T 2.4 D	0.101 T <0.2 D	10 T 2.4 D	<0.20 T <0.20 D	10 T 2.4 D	<0.066 T <0.2 D	10 T 2.4 D	0.28 T <0.080 D	10 T 2.4 D	0.046 T <0.2 D
Nickel	511 T 258 D	15.6 T 3.6 D	511 T 211.5 D	18.8 T 3.3 D	511 T 363 D	6.1 T 1.3 D	511 T 210.6 D	16.4 T 2.5 D	511 T 181 D	60.6 D 2.2 D	511 T 243 D	36.8 T 3.4 D	511 T 222 D	18.9 T <5.0 D	511 T 318.87 D	38 T 5 D	511 T 345.85 D	19.6 T <5 D	511 T 206.98 D	15.1 T <5.0 D	511 T 314.19 D	16.9 T <5.0 D	4,600 T 472.19	42.7 T <5.0 D	4,600 T 218.87	18.3 T <5.0 D
Selenium	20 T	0.86 T <0.60 D	20 T	<0.60 T <0.60 D	20 T	<0.60 T 0.7 D	20 T	<0.25 T <0.25 D	20 T	0.79 T 0.3 D	20 T	<0.40 T <5.0 D	20 T	<0.40 T <5.0 D	20 T	<0.4 T <5 D	20 T	0.64 T <5 D	20 T	0.79 T <5.0 D	20 T	0.37 T <5.0 D	20 T	0.75 T <5.0 D	20 T	<0.55 T <5.0 D

SR003	Winter 2012/13		Summer 2013		Winter 2013/14		Summer 2014		Winter 2014/15		Summer 2015		Winter 2015/16		Summer 2016		Winter 2016/17		Summer 2017		Winter 2017/18		Summer 2018		Winter 2018/19	
SAMPLING DATE(S):	SWQS	12/14/2012	SWQS	7/21/2013	SWQS	11/23/2013	SWQS	8/12/2014	SWQS	12/4/2014	SWQS	7/31/2015	SWQS	1/4/2016	SWQS	7/29/2016	SWQS	11/3/2016	SWQS	7/24/2017	SWQS	1/9/2018	SWQS	7/9/2018	SWQS	2/21/2019
Silver	4,667 T 0.96 D	0.2 T <0.15 D	4,667 T 0.643 D	0.2 T <0.15 D	4,667 T 1.92 D	<0.15 T <0.15 D	4,667 T 0.637 D	<0.20 T <0.20 D	4,667 T 0.465 D	0.5 T <0.08 D	4,667 T 0.85 D	0.4 T *<5.0 D*	4,667 T 0.70 D	<0.25 T *<5.0 D*	4,667 T 1.47 D	0.5 T *<5 D*	4,667 T 1.74 D	<0.45 T *<5 D*	4,667 T 0.61 D	0.2 T *<5.0 D*	4,667 T 1.43 D	0.2 T *<5.0 D*	4,667 T 3.27	1.0 T *<5.0 D*	4,667 T 0.69	0.2 T *<5.0 D*
Thallium	1 T 700 D	<0.20 T <0.20 D	1 T 700 D	<0.20 T <0.20 D	1 T 700 D	<0.2 T <0.08 D	1 T 700 D	0.13 T <0.10 D	1 T 700 D	0.61 T <0.04 D	1 T 700 D	0.22 T <5.0 D	1 T 700 D	<0.15 T <5.0 D	1 T 700 D	0.5 T <5 D	1 T 700 D	<0.2 T <5 D	1 T 700 D	0.1 T <5.0 D	1 T 700 D	0.13 T <5.0 D	7.2 T 700 D	0.21 T <5.0 D	7.2 T 700 D	<0.15 T <5.0 D
Zinc	5,106 T 64.6 D	277 T 38.2 D	5,106 T 52.9 D	213 T 27.4 D	5,106 T 90.8 D	120 T 18.6 D	5,106 T 52.7 D	391 T 30.4 D	5,106 T 45.2 D	919 T 12.9 D	5,106 T 60.7 D	688 T 29.5 D	5,106 T 55.5 D	395 T 27.4 D	5,106 T 79.75 D	858 T **79.8 D**	5,106 T 86.51 D	538 T 62 D	5,106 T 51.73 D	255 T 42.8 D	5,106 T 78.58 D	279 T 52.3 D	5,106 T 118.17	1,970 T 73.4 D	5,106 T 54.71	383 T 16.3 D
Organic Toxic Pollutants																										
Total Petroleum Hydrocarbons (TPH) (mg/L) [2]	NS	<10	NS	<11	NS	<11	NS	<13	NS	<10	NS	<12	NS	<5.4	NS	<5.7	NS	<4.4	NS	<7.0	NS	<6.6	NS	<7.0	NS	<4.2
Total Oil and Grease (mg/L) [2]	NS	14	NS	<5.5	NS	<5.6	NS	<6.3	NS	5.4	NS	<5.8	NS	<5.4	NS	<5.7	NS	<4.4	NS	<5.8	NS	<5.5	NS	<5.8	NS	<4.2
VOCs, Semi-VOCs, and Pesticides (µg/L) [2]																										
Acrolein	1.9	<1.465	1.9	<0.20	1.9	<0.20	1.9	<2.00	1.9	<0.40	1.9	<0.78	1.9	<0.78	1.9	<0.41	1.9	1.3	1.9	<3.95	1.9	<0.79	1.9	*<5.0*	1.9	<0.55
Acrylonitrile	0.2	*<1.130*	0.2	<0.16	0.2	<0.16	0.2	<0.70	0.2	<0.14	0.2	*<0.53*	0.2	*<0.53*	0.2	*<0.42*	0.2	*<0.42*	0.2	<2.95	0.2	<0.59	0.2	*<5.0*	0.2	*<0.57*
Benzene	114	<0.75	114	<1.20	114	<0.24	114	<0.65	114	<0.13	114	<0.46	114	<0.46	114	<0.46	114	<0.29	114	<1.30	114	<0.26	140	<1.30	140	<0.33
Bromoform	133	<2.15	133	<2.35	133	<0.47	133	<1.40	133	<0.28	133	<0.68	133	<0.68	133	<0.68	133	<0.33	133	<1.05	133	<0.21	133	<1.05	133	<0.81
Carbon tetrachloride	2	<1.65	2	<1.30	2	<0.26	2	<1.15	2	<0.23	2	<0.31	2	<0.31	2	<0.31	2	<0.20	2	<1.50	2	<0.30	2	<1.50	2	<0.27
Chlorobenzene	1,553	<1.40	1,553	<0.80	1,553	<0.16	1,553	<0.65	1,553	<0.13	1,553	<0.50	1,553	<0.50	1,553	<0.50	1,553	<0.33	1,553	<1.15	1,553	<0.23	1,553	<1.15	1,553	<0.70
Chlorodibromomethane	13	<1.30	13	<0.90	13	<0.18	13	<1.20	13	<0.24	13	<0.61	13	<0.61	13	<0.61	13	<0.32	13	<1.20	13	<0.24	13	<1.20	13	<0.70
Chloroethane (ethyl chloride)	NS	<1.35	NS	<1.10	NS	<0.22	NS	<0.95	NS	<0.19	NS	<0.40	NS	<0.40	NS	<0.40	NS	<0.33	NS	<1.40	NS	<0.28	NS	<1.40	NS	<0.33
2-Chloroethylvinyl ether	180,000	<0.22	180,000	<0.22	180,000	<0.22	180,000	<0.95	180,000	<0.19	180,000	<0.53	180,000	<0.53	180,000	<0.43	180,000	<0.43	180,000	<3.25	180,000	<0.65	180,000	<5.0	180,000	<0.52
Chloroform	2,133	<1.05	2,133	<1.15	2,133	<0.23	2,133	0.72	2,133	<0.14	2,133	<0.49	2,133	<0.49	2,133	<0.49	2,133	<0.32	2,133	<1.20	2,133	<0.24	470	<1.20	470	<0.31
Dichlorobromomethane	17	<0.75	17	<1.15	17	<0.23	17	<0.75	17	<0.15	17	<0.49	17	<0.49	17	<0.49	17	<0.29	17	<1.20	17	<0.24	17	<1.30	17	<0.52
1,1-Dichloroethane	NS	<0.65	NS	<1.30	NS	<0.26	NS	<0.95	NS	<0.19	NS	<0.42	NS	<0.42	NS	<0.42	NS	<0.29	NS	<1.35	NS	<0.27	NS	<1.35	NS	<0.32
1,2-Dichloroethane	37	<0.80	37	<1.25	37	<0.25	37	<0.55	37	<0.11	37	<0.51	37	<0.51	37	<0.51	37	<0.35	37	<1.30	37	<0.26	37	<1.30	37	<0.28
1,1-Dichloroethylene	7,143	<1.85	7,143	<1.40	7,143	<0.28	7,143	<1.35	7,143	<0.27	7,143	<0.34	7,143	<0.34	7,143	<0.34	7,143	<0.19	7,143	<1.60	7,143	<0.32	7,143	<1.60	7,143	<0.40
1,2-Dichloropropane	17,518	<0.75	17,518	<1.25	17,518	<0.25	17,518	<0.90	17,518	<0.18	17,518	<0.49	17,518	<0.49	17,518	<0.49	17,518	<0.32	17,518	<1.60	17,518	<0.32	17,518	<1.60	17,518	<0.93
1,3-Dichloropropylene[8]	42	cis<0.50 trans<0.75	42	cis<1.20 trans<1.10	42	cis<0.24 trans<0.22	42	<0.65	42	<0.13	42	cis <0.51 trans <0.50	42	cis <0.51 trans <0.50	42	<0.51	42	<0.28	42	<1.05	42	<0.21	42	<1.05	42	<0.43
Ethylbenzene	2,133	<1.45	2,133	<0.65	2,133	<0.13	2,133	<0.75	2,133	<0.15	2,133	<0.46	2,133	<0.46	2,133	<0.46	2,133	<0.29	2,133	<1.15	2,133	<0.23	2,133	<1.15	2,133	<0.61
Methyl bromide	299	<0.95	299	<0.95	299	<0.19	299	<0.90	299	<0.18	299	<0.46	299	<0.46	299	<0.46	299	<0.28	299	<1.15	299	<0.23	299	<1.15	299	<0.33
Methyl chloride	270,000	<1.85	270,000	<1.40	270,000	<0.28	270,000	<1.15	270,000	<0.23	270,000	<0.46	270,000	<0.46	270,000	<0.46	270,000	<0.28	270,000	<1.85	270,000	<0.37	270,000	<1.85	270,000	<0.33
Methylene chloride	593	1.8	593	<1.00	593	<0.20	593	<1.00	593	<0.20	593	<0.81	593	<0.81	593	<0.81	593	<0.31	593	<4.00	593	<0.80	593	<4.00	593	<0.44
1,1,2,2-Tetrachloroethane	4	<2.45	4	<2.00	4	<0.40	4	<1.75	4	<0.35	4	<0.80	4	<0.80	4	<0.80	4	<0.33	4	<1.55	4	<0.31	4	<1.55	4	<0.83
Tetrachloroethylene	261	<1.15	261	<1.05	261	<0.21	261	<0.65	261	<0.13	261	<0.35	261	<0.35	261	<0.35	261	<0.23	261	<1.45	261	<0.29	261	<1.45	261	<0.38
Toluene	8,700	<0.60	8,700	<0.95	8,700	<0.19	8,700	<0.55	8,700	<0.11	8,700	<0.43	8,700	<0.43	8,700	<0.43	8,700	<0.28	8,700	<1.25	8,700	<0.25	8,700	<1.25	8,700	<0.38
trans-1,2-Dichloroethylene	10,127	<0.85	10,127	<1.25	10,127	<0.25	10,127	<0.90	10,127	<0.18	10,127	<0.38	10,127	<0.38	10,127	<0.38	10,127	<0.24	10,127	<1.25	10,127	<0.25	10,127	<1.25	10,127	<0.32
1,1,1-Trichloroethane	1,000	<1.15	1,000	<1.00	1,000	<0.20	1,000	<0.70	1,000	<0.14	1,000	<0.34	1,000	<0.34	1,000	<0.34	1,000	<0.23	1,000	<1.40	1,000	<0.28	1,000	<1.40	1,000	<0.31
1,1,2-Trichloroethane	16	<1.20	16	<0.75	16	<0.15	16	<0.65	16	<0.13	16	<0.60	16	<0.60	16	<0.60	16	<0.29	16	<1.50	16	<0.30	16	<1.50	16	<0.68
Trichloroethylene	29	<1.20	29	<0.75	29	<0.15	29	<1.10	29	<0.22	29	<0.48	29	<0.48	29	<0.48	29	<0.28	29	<1.80	29	<0.36	29	<1.80	29	<0.46
1,2,4-Trimethylbenzene	NS	<5.0	NS	<5.0	NS	<1.0	NS	<10.0	NS	<1.0	NS	<1.0	NS	<1.0	NS	<1.0	NS	<1.0	NS	<5.0	NS	<1.0	NS	<5.0	NS	<1.0
1,3,5-Trimethylbenzene	NS	<5.0	NS	<5.0	NS	<1.0	NS	<5.0	NS	<1.0	NS	<1.0	NS	<1.0	NS	<1.0	NS	<1.0	NS	<5.0	NS	<1.0	NS	<5.0	NS	<1.0
Vinyl chloride	5	<2.50	5	<1.00	5	<0.20	5	<1.10	5	<0.22	5	<0.35	5	<0.35	5	<0.35	5	<0.24	5	<2.10	5	<0.42	5	<2.10	5	<0.35
Xylenes, Total	186,667	<2.90	186,667	<1.50	186,667	<0.30	186,667	<1.25	186,667	<0.13	186,667	<0.52	186,667	<0.52	186,667	<0.52	186,667	<0.32	186,667	<1.15	186,667	<0.23	186,667	<1.15	186,667	<0.70
Acid Compounds (µg/L) [2]																										
2-Chlorophenol	30	<22.8	30	*<89.2*	30	*<43.3*	30	<1.48	30	<1.48	30	<3.10	30	<3.10	30	<2.92	30	<2.92	30	<4.23	30	*<84.6*	30	<4.52	30	<4.52
2,4-Dichlorophenol	59	<24.4	59	*<87.8*	59	<42.6	59	<1.65	59	<1.65	59	<2.81	59	<2.81	59	<3.21	59	<3.21	59	<4.82	59	*<96.4*	59	<4.77	59	<4.77
2,4-Dimethylphenol	171	<29.2	171	<47.4	171	<23.0	171	<2.20	171	<2.20	171	<2.64	171	<2.64	171	<1.32	171	<1.32	171	<7.07	171	<141.4	171	<2.04	171	<2.04
4,6-Dinitro-o-cresol	310	<27.6	310	<62.0	310	<30.1	310	<1.22	310	<1.22	310	<1.49	310	<1.49	310	<2.27	310	<2.27	310	<4.69	310	<93.8	310	<3.36	310	<3.36
2,4-Dinitrophenol	110	<27.8	110	<53.9	110	<26.2	110	<1.13	110	<1.13	110	<2.21	110	<2.21	110	<2.64	110	<2.64	110	<5.11	110	<102.2	110	<3.41	110	<3.41
2-Nitrophenol	NS	<55.6	NS	<85.5	NS	<41.5	NS	<1.57	NS	<1.57	NS	<2.84	NS	<2.84	NS	<2.61	NS	<2.61	NS	<7.83	NS	<156.6	NS	<4.68	NS	<4.68
4-Nitrophenol	4,100	<163.2	4,100	<97.1	4,100	<47.2	4,100	3	4,100	3.7	4,100	<2.98	4,100	3.6	4,100	<2.03	4,100	<2.03	4,100	<4.03	4,100	<80.6	4,100	<3.52	4,100	<3.52
p-Chloro-m-cresol	15	*<37.2*	15	*<91.7*	15	*<44.5*	15	<1.65	15	<1.65	15	<1.87	15	<1.87	15	<3.10	15	<3.10	15	<4.05	15	*<81.0*	15	<4.76	15	<4.76
Pentachlorophenol	40.17	*<41.4*	19.879	*<69.9*	42.688	<33.9	17.803	<1.39	39.781	<1.39	17.1	6.7	23.36	<1.47	16.91	<3.44	8.71	<3.44	13.83	<7.36	16.91	*<147.2*	28.52	<4.00	60.61	<4.00
Phenol	37	<23.8	37	*<73.8*	37	<35.9	37	1.6	37	<1.34	37	<2.30	37	<2.30	37	3.7	37	2.1	37	<3.99	37	*<79.8*	37	<4.08	37	<4.08
2,4,6-Trichlorophenol	2	*<56.0*	2	*<99.6*	2	*<48.4*	2	<1.89	2	<1.89	2	*<2.60*	2	*<2.60*	2	*<3.28*	2	*<3.28*	2	*<4.74*	2	*<94.8*	2	*<5.27*	2	*<5.27*

SR003	Winter 2012/13		Summer 2013		Winter 2013/14		Summer 2014		Winter 2014/15		Summer 2015		Winter 2015/16		Summer 2016		Winter 2016/17		Summer 2017		Winter 2017/18		Summer 2018		Winter 2018/19	
SAMPLING DATE(S):	SWQS	12/14/2012	SWQS	7/21/2013	SWQS	11/23/2013	SWQS	8/12/2014	SWQS	12/4/2014	SWQS	7/31/2015	SWQS	1/4/2016	SWQS	7/29/2016	SWQS	11/3/2016	SWQS	7/24/2017	SWQS	1/9/2018	SWQS	7/9/2018	SWQS	2/21/2019
Bases/Neutrals (µg/L) [2]																										
Acenaphthene	198	<34.0	198	<27.9	198	<13.5	198	<1.03	198	<1.03	198	<0.35	198	<0.35	198	<1.02	198	<1.02	198	<1.88	198	<37.6	198	<1.19	198	<1.19
Acenaphthylene	NS	<25.4	NS	<36.0	NS	<17.5	NS	<1.00	NS	<1.00	NS	<1.23	NS	<1.23	NS	<6.10	NS	<6.10	NS	<1.75	NS	<35.0	NS	<1.41	NS	<1.41
Anthracene	74	<17.8	74	<36.0	74	<17.5	74	<2.88	74	<2.88	74	<0.44	74	<0.44	74	<1.96	74	<1.96	74	<2.62	74	<52.4	74	<1.20	74	<1.20
Benzo(a)anthracene	0.02	<31.4	0.02	<36.0	0.02	<17.5	0.02	<1.08	0.02	<1.08	0.02	<0.38	0.02	<0.38	0.02	<1.57	0.02	<1.57	0.02	<1.96	0.02	<39.2	0.02	<1.02	0.02	<1.02
Benzo(a)pyrene	0.02	<38.6	0.02	<38.9	0.02	<18.9	0.02	<3.77	0.02	<3.77	0.02	<1.41	0.02	<1.41	0.02	<3.12	0.02	<3.12	0.02	<3.77	0.02	<75.4	0.02	<1.08	0.02	<1.08
Benzo(b)fluoranthene	0.02	<67.8	0.02	<50.5	0.02	<24.5	0.02	<1.46	0.02	<1.46	0.02	<1.06	0.02	<1.06	0.02	<1.28	0.02	<1.28	0.02	<2.17	0.02	<43.4	0.02	<0.38	0.02	<0.38
Benzo(g,h,i)perylene	NS	<28.2	NS	<36.0	NS	<17.5	NS	<1.29	NS	<1.29	NS	<0.72	NS	<0.72	NS	<2.83	NS	<2.83	NS	<2.51	NS	<50.2	NS	<1.14	NS	<1.14
Benzo(k)fluoranthene	0.02	<23.0	0.02	<29.1	0.02	<14.1	0.02	<1.04	0.02	<1.04	0.02	<0.35	0.02	<0.35	0.02	<1.76	0.02	<1.76	0.02	<2.33	0.02	<46.6	0.02	<1.03	0.02	<1.03
Chrysene	0.02	<17.8	0.02	<30.8	0.02	<14.9	0.02	<1.41	0.02	<1.41	0.02	<0.46	0.02	<0.46	0.02	<1.08	0.02	<1.08	0.02	<1.96	0.02	<39.2	0.02	<1.16	0.02	<1.16
Dibenz(a,h)anthracene	0.02	<81.0	0.02	<41.2	0.02	<20.0	0.02	<1.24	0.02	<1.24	0.02	<0.47	0.02	<0.47	0.02	<1.93	0.02	<1.93	0.02	<6.04	0.02	<120.8	0.02	<1.02	0.02	<1.02
1,2-Dichlorobenzene	205	<43.4	205	<5.6	205	<2.7	205	<1.76	205	<1.76	205	<1.04	205	<1.04	205	<0.58	205	<0.58	205	<1.33	205	<0.30	205	<1.43	205	<1.43
1,3-Dichlorobenzene	2,500	<48.4	2,500	<23.5	2,500	<11.4	2,500	<1.74	2,500	<1.74	2,500	<0.47	2,500	<0.47	2,500	<0.52	2,500	<0.52	2,500	<1.25	2,500	<0.25	2,500	<1.39	2,500	<1.39
1,4-Dichlorobenzene	2,000	<42.6	2,000	<21.8	2,000	<10.6	2,000	<1.56	2,000	<1.56	2,000	<1.28	2,000	<1.28	2,000	<0.50	2,000	<0.50	2,000	<1.25	2,000	<0.29	2,000	<1.48	2,000	<1.48
3,3-Dichlorobenzidine	0.03	<147.6	0.03	<567.2	0.03	<275.4	0.03	<6.06	0.03	<6.06	0.03	<11.60	0.03	<11.60	0.03	<23.45	0.03	<23.45	0.03	<25.43	0.03	<508.6	0.03	<6.99	0.03	<6.99
Diethyl phthalate	8,767	<29.6	8,767	<39.5	8,767	<19.2	8,767	<2.37	8,767	<2.37	8,767	0.4	8,767	<0.36	8,767	1.1	8,767	<1.07	8,767	<1.99	8,767	<39.8	8,767	<1.08	8,767	<1.08
Dimethyl phthalate	17,000	<24.2	17,000	<37.2	17,000	<18.1	17,000	<2.42	17,000	<2.42	17,000	<0.47	17,000	<0.47	17,000	<0.58	17,000	<0.58	17,000	<1.91	17,000	<38.2	17,000	<1.17	17,000	<1.17
Di-n-butyl phthalate	470	<45.8	470	<46.4	470	<22.5	470	<1.85	470	<1.85	470	<0.31	470	<0.31	470	<1.37	470	<1.37	470	<2.35	470	<47.0	470	<1.12	470	<1.12
2,4-Dinitrotoluene	421	<26.2	421	<42.6	421	<20.7	421	<2.12	421	<2.12	421	<0.26	421	<0.26	421	<1.30	421	<1.30	421	<3.10	421	<62.0	421	<1.17	421	<1.17
2,6-Dinitrotoluene	3,733	<37.4	3,733	<52.4	3,733	<25.5	3,733	<1.12	3,733	<1.12	3,733	<0.38	3,733	<0.38	3,733	<1.39	3,733	<1.39	3,733	<2.89	3,733	<57.8	3,733	<1.13	3,733	<1.13
Di-n-octyl phthalate	373,333	<82.6	373,333	<59.9	373,333	<29.1	373,333	<1.10	373,333	<1.10	373,333	<1.28	373,333	<1.28	373,333	<1.67	373,333	<1.67	373,333	<5.50	373,333	<110.0	373,333	<2.05	373,333	<2.05
1,2-Diphenylhydrazine (as azobenzene)	NS	<21.4	NS	<48.5	NS	<23.5	NS	<6.70	NS	<6.70	NS	<1.06	NS	<1.06	NS	<7.46	NS	<7.46	NS	<2.15	NS	<43.0	0.2	<1.11	0.2	<1.11
Fluoranthene	28	<13.4	28	<37.2	28	<18.1	28	<1.35	28	<1.35	28	0.3	28	<0.27	28	<1.06	28	<1.06	28	<3.08	28	<61.6	28	<1.27	28	<1.27
Fluorene	1,067	<33.6	1,067	<32.0	1,067	<15.6	1,067	<4.81	1,067	<4.81	1,067	<0.29	1,067	<0.29	1,067	<0.51	1,067	<0.51	1,067	<2.87	1,067	<57.4	1,067	<1.18	1,067	<1.18
Hexachlorobenzene	0.0003	<26.0	0.0003	<28.9	0.0003	<14.0	0.0003	<1.23	0.0003	<1.23	0.0003	<0.34	0.0003	<0.34	0.0003	<0.47	0.0003	<0.47	0.0003	<1.57	0.0003	<31.4	0.0003	<1.01	0.0003	<1.01
Hexachlorobutadiene	18	<27.4	18	<6.9	18	<3.3	18	<1.82	18	<1.82	18	<1.67	18	<1.67	18	<0.41	18	<0.41	18	<1.00	18	<20.0	18	<1.20	18	<1.20
Hexachlorocyclopentadiene	3.5	<26.4	3.5	<47.2	3.5	<22.9	3.5	<1.23	3.5	<1.23	3.5	<1.53	3.5	<1.53	3.5	<2.16	3.5	<2.16	3.5	<6.10	3.5	<122.0	3.5	<3.07	3.5	<3.07
Hexachloroethane	3.3	<28.0	3.3	<8.3	3.3	<4.0	3.3	<1.62	3.3	<1.62	3.3	<1.23	3.3	<1.23	3.3	<0.54	3.3	<0.54	3.3	<1.49	3.3	<29.8	3.3	<1.35	3.3	<1.35
Indeno(1,2,3-cd)pyrene	0.2	<66.6	0.2	<42.2	0.2	<20.5	0.2	<1.39	0.2	<1.39	0.2	<0.62	0.2	<0.62	0.2	<2.38	0.2	**3.89**	0.2	<6.11	0.2	<122.2	0.49	<1.07	0.49	<1.07
Isophorone	961	<38.0	961	<29.3	961	<14.2	961	<2.14	961	<2.14	961	<0.37	961	<0.37	961	<0.51	961	<0.51	961	<1.77	961	<35.4	961	<1.32	961	<1.32
Naphthalene	1,524	<28.4	1,524	<25.0	1,524	<12.1	1,524	<1.83	1,524	<1.83	1,524	<0.36	1,524	0.6	1,524	<0.49	1,524	<0.49	1,524	<1.54	1,524	<30.8	1,524	<1.48	1,524	<1.48
Nitrobenzene	138	<26.2	138	<25.6	138	<12.4	138	<2.10	138	<2.10	138	<1.26	138	<1.26	138	<0.44	138	<0.44	138	<1.80	138	<36.0	138	<1.55	138	<1.55
n-Nitrosodimethylamine	0.03	<32.8	0.03	<25.0	0.03	<12.1	0.03	<1.00	0.03	<1.00	0.03	<1.13	0.03	<1.13	0.03	<0.54	0.03	<0.54	0.03	<1.62	0.03	<32.4	0.03	<1.67	0.03	<1.67
n-Nitrosodi-n-propylamine	0.5	<37.6	0.5	<31.4	0.5	<15.3	0.5	<1.15	0.5	<1.15	0.5	<1.17	0.5	<1.17	0.5	<1.02	0.5	<1.02	0.5	<1.65	0.5	<33.0	0.5	<1.65	0.5	<1.65
n-Nitrosodiphenylamine	6	<20.0	6	<63.2	6	<30.7	6	<3.57	6	<3.57	6	<1.15	6	<1.15	6	<1.67	6	<1.67	6	<3.13	6	<62.6	6	<1.07	6	<1.07
Phenanthrene	30	<15.2	30	<33.9	30	<16.5	30	<1.39	30	<1.39	30	<0.31	30	<0.31	30	<0.49	30	<0.49	30	<3.02	30	<60.4	30	<1.33	30	<1.33
Pyrene	800	<46.6	800	<34.1	800	<16.6	800	<3.86	800	<3.86	800	<0.67	800	<0.67	800	<3.21	800	<3.21	800	<3.38	800	<67.6	800	<1.20	800	<1.20
1,2,4-Trichlorobenzene	70	<53.2	70	<6.7	70	<3.2	70	<1.69	70	<1.69	70	<1.04	70	<1.04	70	<0.55	70	<0.55	70	<1.21	70	<24.2	70	<1.34	70	<1.34
Pesticides (µg/L) [2]																										
Aldrin	0.00005	<0.046	0.00005	<0.046	0.00005	[5]	0.00005	<0.027	0.00005	<0.027	0.00005	<0.012	0.00005	<0.012	0.00005	<0.019	0.00005	<0.019	0.00005	<0.013	0.00005	<0.013	0.00005	<0.010	0.00005	<0.010
Alpha-BHC	0.005	<0.038	0.005	<0.038	0.005	[5]	0.005	<0.021	0.005	<0.021	0.005	<0.058	0.005	<0.058	0.005	<0.010	0.005	<0.010	0.005	<0.015	0.005	0.036	0.005	<0.012	0.005	<0.012
Beta-BHC	0.02	<0.095	0.02	<0.095	0.02	[5]	0.02	<0.072	0.02	<0.072	0.02	<0.063	0.02	<0.063	0.02	<0.049	0.02	<0.049	0.02	<0.083	0.02	<0.083	0.02	<0.099	0.02	<0.099
Gamma-BHC	1	<0.033	1	<0.033	1	[5]	1	<0.034	1	<0.034	1	<0.058	1	<0.058	1	<0.019	1	<0.019	1	<0.020	1	<0.020	1	<0.013	1	<0.013
Delta-BHC	1,600	<0.032	1,600	<0.032	1,600	[5]	1,600	<0.021	1,600	<0.021	1,600	<0.066	1,600	<0.066	1,600	<0.035	1,600	<0.035	1,600	0.093	1,600	<0.012	1,600	<0.045	1,600	<0.045
Chlordane	0.0008	<0.16	0.0008	<0.16	0.0008	[5]	0.0008	<0.14	0.0008	<0.14	0.0008	<0.36	0.0008	<0.36	0.0008	<0.61	0.0008	<0.61	0.0008	<0.29	0.0008	<0.29	0.0008	<0.33	0.0008	<0.33
4,4'-DDT	0.0002	<0.029	0.0002	<0.029	0.0002	[5]	0.0002	<0.025	0.0002	<0.025	0.0002	<0.017	0.0002	<0.017	0.0002	<0.011	0.0002	<0.011	0.0002	<0.020	0.0002	<0.020	0.0002	**0.029**	0.0002	<0.009
4,4'-DDE	0.0002	<0.034	0.0002	<0.034	0.0002	[5]	0.0002	<0.010	0.0002	<0.010	0.0002	<0.013	0.0002	<0.013	0.0002	<0.020	0.0002	<0.020	0.0002	<0.019	0.0002	<0.019	0.0002	<0.015	0.0002	<0.015
4,4'-DDD	0.0002	<0.023	0.0002	<0.023	0.0002	[5]	0.0002	<0.031	0.0002	<0.031	0.0002	<0.021	0.0002	<0.021	0.0002	<0.021	0.0002	<0.021	0.0002	<0.023	0.0002	<0.023	0.0002	<0.017	0.0002	<0.017
Dieldrin	0.00005	<0.028	0.00005	<0.028	0.00005	[5]	0.00005	<0.030	0.00005	<0.030	0.00005	<0.060	0.00005	<0.060	0.00005	<0.019	0.00005	<0.019	0.00005	<0.015	0.00005	<0.015	0.00005	<0.012	0.00005	<0.012
Alpha-endosulfan	0.2	<0.034	0.2	<0.034	0.2	[5]	0.2	<0.018	0.2	<0.018	0.2	<0.072	0.2	<0.072	0.2	<0.018	0.2	<0.018	0.2	<0.015	0.2	<0.015	0.2	<0.020	0.2	<0.020
Beta-endosulfan	0.2	<0.034	0.2	<0.034	0.2	[5]	0.2	<0.032	0.2	<0.032	0.2	<0.019	0.2	<0.019	0.2	<0.021	0.2	<0.021	0.2	<0.014	0.2	<0.014	0.2	<0.014	0.2	<0.014
Endosulfan sulfate	0.2	<0.025	0.2	<0.025	0.2	[5]	0.2	<0.008	0.2	0.078	0.2	<0.016	0.2	0.051	0.2	<0.022	0.2	<0.022	0.2	<0.019	0.2	<0.019	0.2	<0.017	0.2	0.028
Endrin	0.004	<0.035	0.004	<0.035	0.004	[5]	0.004	<0.017	0.004	<0.017	0.004	<0.023	0.004	<0.023	0.004	<0.042	0.004	<0.042	0.004	<0.040	0.004	<0.040	0.004	<0.042	0.004	<0.042
Endrin aldehyde	0.09	<0.038	0.09	<0.038	0.09	[5]	0.09	<0.032	0.09	<0.032	0.09	<0.026	0.09	<0.026	0.09	<0.024	0.09	<0.024	0.09	<0.034	0.09	<0.034	0.09	<0.068	0.09	<0.068
Heptachlor	0.00008	**0.099**	0.00008	<0.035	0.00008	[5]	0.00008	<0.027	0.00008	**0.063**	0.00008	<0.035	0.00008	**0.059**	0.00008	**0.073**	0.00008	<0.023	0.00008	<0.019	0.00008	<0.019	0.00008	**0.043**	0.00008	**0.046**
Heptachlor epoxide	0.00004	<0.032	0.00004	<0.032	0.00004	[5]	0.00004	<0.008	0.00004	<0.008	0.00004	<0.062	0.00004	<0.062	0.00004	<0.020	0.00004	<0.020	0.00004	<0.016	0.00004	<0.016	0.00004	<0.012	0.00004	<0.012
PCB-1242	[4]	<0.41	[4]	<0.41	[4]	[5]	[4]	<0.37	[4]	<0.37	[4]	<0.14	[4]	<0.14	[4]	<0.72	[4]	<0.72	[4]	<0.33	[4]	<0.33	[4]	<0.28	[4]	<0.28
PCB-1254	[4]	<0.20	[4]	<0.20	[4]	[5]	[4]	<0.23	[4]	<0.23	[4]	<0.20	[4]	<0.20	[4]	<0.22	[4]	<0.22	[4]	<0.17	[4]	<0.17	[4]	<0.21	[4]	<0.21

SR003	Winter 2012/13		Summer 2013		Winter 2013/14		Summer 2014		Winter 2014/15		Summer 2015		Winter 2015/16		Summer 2016		Winter 2016/17		Summer 2017		Winter 2017/18		Summer 2018		Winter 2018/19	
SAMPLING DATE(S):	SWQS	12/14/2012	SWQS	7/21/2013	SWQS	11/23/2013	SWQS	8/12/2014	SWQS	12/4/2014	SWQS	7/31/2015	SWQS	1/4/2016	SWQS	7/29/2016	SWQS	11/3/2016	SWQS	7/24/2017	SWQS	1/9/2018	SWQS	7/9/2018	SWQS	2/21/2019
PCB-1221	[4]	<0.68	[4]	<0.68	[4]	[5]	[4]	<0.22	[4]	<0.22	[4]	<0.64	[4]	<0.64	[4]	<0.46	[4]	<0.46	[4]	*<0.36*	[4]	*<0.36*	[4]	*<0.50*	[4]	*<0.50*
PCB-1232	[4]	<0.66	[4]	<0.66	[4]	[5]	[4]	<0.55	[4]	<0.55	[4]	<0.37	[4]	<0.37	[4]	<0.90	[4]	<0.90	[4]	*<0.40*	[4]	*<0.40*	[4]	*<0.48*	[4]	*<0.48*
PCB-1248	[4]	<0.78	[4]	<0.78	[4]	[5]	[4]	<0.19	[4]	<0.19	[4]	<0.22	[4]	<0.22	[4]	<0.24	[4]	<0.24	[4]	*<0.21*	[4]	*<0.21*	[4]	*<0.35*	[4]	*<0.35*
PCB-1260	[4]	<0.21	[4]	<0.21	[4]	[5]	[4]	<0.32	[4]	<0.32	[4]	<0.59	[4]	<0.59	[4]	<0.26	[4]	<0.26	[4]	*<0.34*	[4]	*<0.34*	[4]	*<0.28*	[4]	*<0.28*
PCB-1016	[4]	<0.36	[4]	<0.36	[4]	[5]	[4]	<0.18	[4]	<0.18	[4]	<0.55	[4]	<0.55	[4]	<0.29	[4]	<0.29	[4]	*<0.33*	[4]	*<0.33*	[4]	*<0.40*	[4]	*<0.40*
Toxaphene	0.0003	*<0.53*	0.0003	*<0.53*	0.0003	[5]	0.0003	*<0.22*	0.0003	*<0.22*	0.0003	*<0.60*	0.0003	*<0.60*	0.0003	<0.48	0.0003	*<0.48*	0.0003	*<0.47*	0.0003	*<0.47*	0.0003	*<0.482*	0.0003	*<0.482*

Notes:

NS = no standard applicable to the designated use

T = total

D = dissolved

Bold text indicates a sample result greater than the WQS

Italicized text indicates a laboratory detection limit higher than the WQS

Footnotes:

[1] The Permittee shall report on any additional parameters that were monitored for seasonal stormwater sampling as required by Section 6.0 of this permit (Special Conditions).

[2] Analytical results shall be reported in the units specified for each category or parameter.

[3] Report the average flow rate for the sampling period (no more than 6 hours).

[4] Standard for total PCBs of 0.00006 µg/L FC, 19 µg/L PBC, 2 µg/L A&Wedw, and 0.001 µg/L AgI and AgL.

[5] The sample was lost during extraction at the laboratory due to the glassware breaking.

[6] There were no representative storm events (>0.20 inches) that occurred or no representative events without a measurable rain event in the previous 72 hours.

[7] A representative event occurred on 8/2; however, the sampler malfunctioned. Then next event was on 8/5 but due to the 72-hour rule, no sample was taken. Another measurable event on 9/22 did not result in a qualifying rain event. No samples were taken at this outfall during Summer 2016.

[8] Prior to FY2016, the lab was reporting cis and trans for 1-3-dichloropropylene; this reporting year, an upgrade has resulted in providing the result as a total.

[9] Data flagged due to contamination in the lab reagent blank; therefore, these are not true detections or exceedances.

OUTFALL ID: SR030	MONITORING SEASONS																									
RECEIVING WATER: Salt River	Summer: June 1 - October 31 Winter: November 1 - May 31																									
DESIGNATED USES: A&Wedw, PBC, FC, AgI, AgL	Winter 2012/13		Summer 2013		Winter 2013/14		Summer 2014		Winter 2014/15		Summer 2015		Winter 2015/16		Summer 2016 [6]		Winter 2016/17		Summer 2017		Winter 2017/18		Summer 2018		Winter 2018/19	
SAMPLING DATE(S):	SWQS	12/14/2012	SWQS	7/21/2013	SWQS	11/22/2013	SWQS	8/12/2014	SWQS	12/4/2014	SWQS	7/31/2015	SWQS	1/31/2016	-	-	SWQS	11/27/2016	SWQS	7/24/2017	SWQS	1/9/2018	SWQS	7/9/2018	SWQS	2/21/2019
MONITORING PARAMETERS [1,2]																										
Conventional Parameters																										
Flow [3] (cfs)	NS	1.62	NS	40.52	NS	7.51	NS	69.2	NS	3.094	NS	30.58	NS	6.438	-	-	NS	0.387	NS	1.496	NS	1.14	NS	Trickle	NS	1.322
pH	6.5-9	8.33	6.5-9	8.14	6.5-9	8.49	6.5-9	8.17	6.5-9	8.15	6.5-9	7.9	6.5-9	8.09	-	-	6.5-9	7.96	6.5-9	6.68	6.5-9	7.59	4.5-9	7.53	4.5-9	8.63
Temperature (ºC)	Varies	17	Varies	26.5	Varies	18.5	Varies	26.2	Varies	19	Varies	30.5	Varies	13.5	-	-	Varies	17	Varies	29.8	Varies	17.4	Varies	28.2	Varies	9.4
Hardness (mg/L)	400	49.5	400	33.1	400	64.3	400	85.5	400	31	400	64.5	400	33.1	-	-	400	38	400	40.5	400	55.6	400	55.0	400	27.3
Total Dissolved Solids (TDS) (mg/L) [2]	NS	206	NS	120	NS	204	NS	332	NS	96	NS	240	NS	114	-	-	NS	112	NS	134	NS	170	NS	210	NS	58
Total Suspended Solids (TSS) (mg/L) [2]	NS	440	NS	392	NS	355	NS	251	NS	296	NS	124	NS	712	-	-	NS	145	NS	70	NS	528	NS	720	NS	270
Biochemical Oxygen Demand (BOD) (mg/L) [2]	NS	35	NS	17	NS	53	NS	9	NS	14	NS	38	NS	20	-	-	NS	16	NS	15	NS	55	NS	41	NS	8
Chemical Oxygen Demand (COD) (mg/L) [2]	NS	310	NS	140	NS	340	NS	94	NS	160	NS	220	NS	250	-	-	NS	110	NS	120	NS	360	NS	380	NS	70

SR030	Winter 2012/13		Summer 2013		Winter 2013/14		Summer 2014		Winter 2014/15		Summer 2015		Winter 2015/16		Summer 2016 [6]		Winter 2016/17		Summer 2017		Winter 2017/18		Summer 2018		Winter 2018/19	
SAMPLING DATE(S):	SWQS	12/14/2012	SWQS	7/21/2013	SWQS	11/22/2013	SWQS	8/12/2014	SWQS	12/4/2014	SWQS	7/31/2015	SWQS	1/31/2016	-	-	SWQS	11/27/2016	SWQS	7/24/2017	SWQS	1/9/2018	SWQS	7/9/2018	SWQS	2/21/2019
Inorganics																										
Cyanide, total (µg/L) [2]	41T	<5	41 T	*<50*	41 T	<5	41 T	<5	41 T	<5	41 T	<5	41 T	<5	-	-	41 T	<5	41 T	<5.0	41 T	<5.0	41 T	<5.0	41 T	<5
Nutrients (mg/L) [2]																										
Nitrate + Nitrite as N	NS	1.4	NS	1.2	NS	2.1	NS	1	NS	0.8	NS	1.3	NS	1.5	-	-	NS	1	NS	0.8	NS	1.5	NS	1.3	NS	0.6
Ammonia as N	4.46	1.6	6.46	1.2	3.27	2.3	4.07	0.56	4.24	0.76	10.1	1.8	7.09	0.87	-	-	9.2	0.69	45	0.49	17.4	2.4	19.0	2.0	2.5	0.26
Total Kjeldahl Nitrogen (TKN)	NS	5.3	NS	4.2	NS	6.3	NS	1.7	NS	2.3	NS	4.2	NS	3.8	-	-	NS	2.6	NS	2	NS	6.4	NS	7.2	NS	1.1
Total Phosphorus as P	NS	0.79	NS	0.46	NS	1.4	NS	0.83	NS	0.39	NS	0.77	NS	1.8	-	-	NS	0.16	NS	0.43	NS	1.7	NS	3.0	NS	0.57
Ortho-Phosphorus as P	NS	0.3	NS	0.4	NS	0.3	NS	0.1	NS	0.2	NS	<0.1	NS	0.2	-	-	NS	0.2	NS	0.1	NS	0.3	NS	0.3	NS	0.1
Microbiological																										
Escherichia coli (*E. coli*) (CFU/100 mg or MPN/100 mL) [2]	575	**>2,419.6**	575	**>2419.6**	575	**2419.6**	575	**>2,419.6**	575	**>2,419.6**	575	**1,553.10**	575	**4,320.00**	-	-	575	**9,320**	575	**20,140**	575	**1,986.30**	575	**21,870**	575	**3,690**
Total Metals (µg/L) [2]																										
Antimony	640 T 1,000 D	2.5 T 1.0 D	640 T 1,000 D	1.2 T 0.4 D	640 T 1,000 D	2.4 T 1.2 D	640 T 1,000 D	<25 TandD	640 T 1,000 D	<25 TandD	640 T 1,000 D	3.9 T <5.0 D	640 T 1,000 D	1.9 T <5.0 D	-	-	640 T 1,000 D	2 T <5 D	640 T 1,000 D	2 T <5.0 D	640 T 1,000 D	3.8 T <5.0 D	640 T 1,000 D	2.4 T <5.0 D	640 T 1,000 D	1.6 T <5.0 D
Arsenic	80 T 340 D	5.3 T 1.7 D	80 T 340 D	8.0 T 1.2 D	80 T 340 D	4.9 T 1.5 D	80 T 340 D	35 T <10 D	80 T 340 D	<10 TandD	80 T 340 D	4.2 T <5.0 D	80 T 340 D	7.8 T <5.0 D	-	-	80 T 340 D	3.2 T <5 D	80 T 340 D	3 T <5.0 D	80 T 340 D	6.2 T <5.0 D	80 T 340 D	11 T <5.0 D	80 T 340 D	2.3 T <5.0 D
Barium	98,000 T	175 T 20 D	98,000 T	236 T 14 D	98,000 T	160 T 28 D	98,000 T	670 T 13 D	98,000 T	206 T 38 D	98,000 T	110 T 33 D	98,000 T	256 T 16 D	-	-	98,000 T	69 T 16 D	98,000 T	58 T 21 D	98,000 T	221 T 28 D	98,000 T	407 T 31 D	98,000 T	5.8 T 10 D
Beryllium	84 T 3.17 D	0.57 T <0.15 D	84 T	0.94 T <0.15 D	84 T	0.45 T <0.06 D	84 T	2.2 T <2.0 D	84 T	<2 TandD	84 T	0.29 T <5.0 D	84 T	0.95 T <5.0 D	-	-	84 T	0.25 T <5 D	84 T	0.19 T <5.0 D	84 T	0.66 T <5.0 D	84 T 65 D	1.3 T <5.0 D	84 T 65 D	<0.15 T <5.0 D
Cadmium	50 T 3.97 D	0.8 T <0.25 D	50 T 2.68 D	0.8 T <0.25 D	50 T 5.12 D	0.5 T <0.10 D	50 T 30.23 D	4.6 T <3.0 D	50 T 13.10 D	<3 TandD	50 T 5.14 D	0.5 T <5.0 D	50 T 2.68 D	0.7 T *<5.0 D*	-	-	50 T 1.49 D	0.3 T <0.25 D	50 T 1.60 D	<0.20 T <0.2 D	50 T 2.26 D	0.6 T <5.0 D	50 T 2.23	1.1 T <0.2 D	50 T 1.04	<0.25 T <0.25 D
Chromium	1,000 T	14.3 T 2.8 D	1,000 T	23.9 T <2.00 D	1,000 T	13.7 T 1.5 D	1,000 T	57 T <10 D	1,000 T	17.8 T <10 D	1,000 T	11.6 T <5.0 D	1,000 T	24.8 T <5.0 D	-	-	1,000 T	28.1 T <5 D	1,000 T	6.3 T <5.0 D	1,000 T	21 T <5.0 D	1,000 T	37.3 T <5.0 D	1,000 T	6.8 T <5.0 D
Copper	500 T 6.93 D	75.0 T **20.2 D**	500 T 4.74 D	65.8 T **10.6 D**	500 T 8.87 D	75.2 T **30.9 D**	500 T 49.62 D	210 T 10 D	500 T 22.03 D	75 T 14 D	500 T 8.89 D	58.6 T **33.5 D**	500 T 4.74 D	79.2 T **14.0 D**	-	-	500 T 5.40 D	26.6 T **10.3 D**	500 T 5.73 D	26.1 T **13.4 D**	500 T 7.73 D	87 T **28.5 D**	500 T 7.65	136 T **39.8 D**	500 T 3.95	23.2 T **12.4 D**
Lead	15 T 29.81 D	**41.4 T** 0.7 D	15 T 19.03 D	**60.8 T** 1.1 D	15 T 39.80 D	**27.6 T** 0.9 D	15 T 280.85 D	**110 T** <10 D	15 T 113.78 D	**71 T** <10 D	15 T 39.94 D	**38.6 T** 2.4 D	15 T 19.02 D	**45.0 T** <5.0 D	-	-	15 T 22.20 D	11.9 T <0.55 D	15 T 23.84 D	10.8 T 0.5 D	15 T 33.90 D	**49.3 T** 2.1 D	15 T 33.49	**104 T** 1.4 D	15 T 15.33	**17.3 T** 5 D
Mercury	10 T 2.4 D	<0.040 T <0.040 D	10 T 2.4 D	0.04 T <0.020 D	10 T 2.4 D	<0.020 T <0.020 D	10 T 2.4 D	<0.2 TandD	10 T 2.4 D	<0.20 T <0.20 D	10 T 2.4 D	0.08 T <0.2 D	10 T 2.4 D	<0.062 T <0.2 D	-	-	10 T 2.4 D	<0.068 T <0.2 D	10 T 2.4 D	<0.20 T <0.20 D	10 T 2.4 D	<0.066 T <0.2 D	10 T 2.4 D	0.62 T <0.080 D	10 T 2.4 D	<0.042 T <0.2 D
Nickel	511 T 258 D	19.6 T 3.5 D	511 T 183.5 D	30.6 T 2.1 D	511 T 322.2 D	18.9 T 4.6 D	511 T 1,513 D	110 T <10 D	511 T 730 D	23 T <10 D	511 T 323 D	12.1 T 4.6 D	511 T 184 D	31.4 T <5.0 D	-	-	511 T 205.52 D	9 T <5	511 T 217.96 D	7.3 T <5.0 D	511 T 284.97 D	24.3 T <5.0 D	4,600 T 282.37	47.7 T <5.0 D	4,600 T 282.37	6.5 T <5.0 D
Selenium	20 T	0.65 T <0.60 D	20 T	<0.60 T <0.60 D	20 T	0.66 T 0.4 D	20 T	<2.0 TandD	20 T	<2.00 T <2.00 D	20 T	0.41 T <5.0 D	20 T	0.62 T <5.0 D	-	-	20 T	0.62 T <5 D	20 T	0.49 T <5.0 D	20 T	0.69 T <5.0 D	20 T	0.82 T <5.0 D	20 T	<0.55 T <5.0 D

SR030	Winter 2012/13		Summer 2013		Winter 2013/14		Summer 2014		Winter 2014/15		Summer 2015		Winter 2015/16		Summer 2016 [6]		Winter 2016/17		Summer 2017		Winter 2017/18		Summer 2018		Winter 2018/19	
SAMPLING DATE(S):	SWQS	12/14/2012	SWQS	7/21/2013	SWQS	11/22/2013	SWQS	8/12/2014	SWQS	12/4/2014	SWQS	7/31/2015	SWQS	1/31/2016	-	-	SWQS	11/27/2016	SWQS	7/24/2017	SWQS	1/9/2018	SWQS	7/9/2018	SWQS	2/21/2019
Silver	4,667 T	0.2 T	4,667 T	0.2 T	4,667 T	0.2 T	4,667 T	<5	4,667 T	<5	4,667 T	<0.25 T	4,667 T	0.3 T	-	-	4,667 T	<0.45 T	4,667 T	<0.10 T	4,667 T	0.4 T	4,667 T	0.5 T	4,667 T	<0.15 T
	0.96 D	<0.15 D	0.482 D	<0.15 D	1.502 D	<0.15 D	34.91 D	TandD	7.93 D	TandD	1.51 D	*<5.0 D*	0.48 D	*<5.0 D*			0.61 D	*<5 D*	0.68 D	*<5.0 D*	1.17 D	*<5.0 D*	1.15	*<5.0 D*	0.34	*<5.0 D*
Thallium	1 T	<0.20 T	1 T	0.20 T	1 T	<0.20 T	1 T	0.9 T	1 T	<0.5	1 T	0.26 T	1 T	0.37 T	-	-	1 T	<0.2 T	1 T	<0.10 T	1 T	0.18 T	7.2 T	0.31 T	7.2 T	<0.15 T
	700 D	<0.20 D	700 D	<0.20 D	700 D	<0.08 D	700 D	<0.5 D	700 D	TandD	700 D	<5.0 D	700 D	<5.0 D			700 D	<5 D	700 D	<5.0 D	700 D	<5.0 D	700 D	<5.0 D	700 D	<5.0 D
Zinc	5,106 T	374 T	5,106 T	452 T	5,106 T	302 T	5,106 T	770 T	5,106 T	397 T	5,106 T	195 T	5,106 T	390 T	-	-	5,106 T	106 T	5,106 T	127 T	5,106 T	433 T	5,106 T	1,020 T	5,106 T	114 T
	64.55 D	19.2 D	45.92 D	13.7 D	80.6 D	31.4 D	379.3 D	<50 D	182.8 D	<50 D	80.8 D	38.0 D	45.9 D	11.0 D			51.62 D	11.1 D	54.48 D	19.9 D	71.26 D	28.8 D	70.61	33.3 D	39.00	7.8 D
Organic Toxic Pollutants																										
Total Petroleum Hydrocarbons (TPH) (mg/L) [2]	NS	<10	NS	<11	NS	<11	NS	<10	NS	<10	NS	<12	NS	<5.8	-	-	NS	<4.2	NS	<6.9	NS	<6.6	NS	<7.4	NS	<4.3
Total Oil and Grease (mg/L) [2]	NS	8.4	NS	<5.7	NS	6.4	NS	<5.0	NS	<5.0	NS	11	NS	<5.8	-	-	NS	<4.2	NS	<5.8	NS	<5.5	NS	<6.2	NS	<4.3
VOCs, Semi-VOCs, and Pesticides (µg/L) [2]																										
Acrolein	1.9	<1.465	1.9	<0.20	1.9	<0.20	1.9	*<2.00*	1.9	<0.40	1.9	<0.78	1.9	<0.41	-	-	1.9	0.44	1.9	0.79	1.9	<0.79	1.9	*<5.0*	1.9	<0.55
Acrylonitrile	0.2	*<1.130*	0.2	<0.16	0.2	<0.16	0.2	*<0.70*	0.2	<0.14	0.2	*<0.53*	0.2	*<0.42*	-	-	0.2	*<0.42*	0.2	*<0.59*	0.2	*<0.59*	0.2	*<5.0*	0.2	*<0.57*
Benzene	114	<0.75	114	<1.20	114	<0.24	114	<0.65	114	<0.13	114	<0.46	114	<0.46	-	-	114	<0.29	114	<1.30	114	<0.26	140	<1.30	140	<0.33
Bromoform	133	<2.15	133	<2.35	133	<0.47	133	<1.40	133	<0.28	133	<0.68	133	<0.68	-	-	133	<0.33	133	<1.05	133	<0.21	133	<1.05	133	<0.81
Carbon tetrachloride	2	<1.65	2	<1.30	2	<0.26	2	<1.15	2	<0.23	2	<0.31	2	<0.31	-	-	2	<0.20	2	<1.50	2	<0.30	2	<1.50	2	<0.27
Chlorobenzene	1,553	<1.40	1,553	<0.80	1,553	<0.16	1,553	<0.65	1,553	<0.13	1,553	<0.50	1,553	<0.50	-	-	1,553	<0.33	1,553	<1.15	1,553	<0.23	1,553	<1.15	1,553	<0.70
Chlorodibromomethane	13	<1.30	13	<0.90	13	<0.18	13	2.6	13	<0.24	13	<0.61	13	<0.61	-	-	13	<0.32	13	<1.20	13	<0.24	13	<1.20	13	<0.70
Chloroethane (ethyl chloride)	NS	<1.35	NS	<1.10	NS	<0.22	NS	<0.95	NS	<0.19	NS	<0.40	NS	<0.40	-	-	NS	<0.33	NS	<1.40	NS	<0.28	NS	<1.40	NS	<0.33
2-Chloroethylvinyl ether	180,000	<0.22	180,000	<0.22	180,000	<0.22	180,000	<0.95	180,000	<0.19	180,000	<0.53	180,000	<0.43	-	-	180,000	<0.43	180,000	<0.65	180,000	<0.65	180,000	<5.0	180,000	<0.52
Chloroform	2,133	<1.05	2,133	<1.15	2,133	<0.23	2,133	0.92	2,133	<0.14	2,133	<0.49	2,133	<0.49	-	-	2,133	<0.32	2,133	<1.20	2,133	<0.24	470	<1.20	470	<0.31
Dichlorobromomethane	17	<0.75	17	<1.15	17	<0.23	17	2.2	17	<0.15	17	<0.49	17	<0.49	-	-	17	<0.29	17	<1.30	17	<0.26	17	<1.30	17	<0.52
1,1-Dichloroethane	NS	<0.65	NS	<1.30	NS	<0.26	NS	<0.95	NS	<0.19	NS	<0.42	NS	<0.42	-	-	NS	<0.29	NS	<1.35	NS	<0.27	NS	<1.35	NS	<0.32
1,2-Dichloroethane	37	<0.80	37	<1.25	37	<0.25	37	<0.55	37	<0.11	37	<0.51	37	<0.51	-	-	37	<0.35	37	<1.30	37	<0.26	37	<1.30	37	<0.28
1,1-Dichloroethylene	7,143	<1.85	7,143	<1.40	7,143	<0.28	7,143	<1.35	7,143	<0.27	7,143	<0.34	7,143	<0.34	-	-	7,143	<0.19	7,143	<1.60	7,143	<0.32	7,143	<1.60	7,143	<0.40
1,2-Dichloropropane	17,518	<0.75	17,518	<1.25	17,518	<0.25	17,518	<0.90	17,518	<0.18	17,518	<0.49	17,518	<0.49	-	-	17,518	<0.32	17,518	<1.60	17,518	<0.32	17,518	<1.60	17,518	<0.93
1,3-Dichloropropylene[8]	42	cis <0.50 trans <0.75	42	cis<1.20 trans<1.10	42	cis<0.24 trans<0.22	42	<0.65	42	<0.13	42	cis <0.51 trans <0.50	42	cis <0.51 trans <0.50	-	-	42	<0.28	42	<1.05	42	<0.21	42	<1.05	42	<0.43
Ethylbenzene	2,133	<1.45	2,133	<0.65	2,133	<0.13	2,133	<0.75	2,133	<0.15	2,133	<0.46	2,133	<0.46	-	-	2,133	<0.29	2,133	<1.15	2,133	<0.23	2,133	<1.15	2,133	<0.61
Methyl bromide	299	<0.95	299	<0.95	299	<0.19	299	<0.90	299	<0.18	299	<0.46	299	<0.46	-	-	299	<0.28	299	<1.15	299	<0.23	299	<1.15	299	<0.33
Methyl chloride	270,000	<1.85	270,000	<1.40	270,000	<0.28	270,000	<1.15	270,000	<0.23	270,000	<0.46	270,000	<0.46	-	-	270,000	<0.28	270,000	<1.85	270,000	<0.37	270,000	<1.85	270,000	<0.33
Methylene chloride	593	1.8	593	<1.00	593	<0.20	593	<1.00	593	<0.20	593	<0.81	593	<0.81	-	-	593	<0.31	593	<4.00	593	<0.80	593	<4.00	593	<0.44
1,1,2,2-Tetrachloroethane	4	<2.45	4	<2.00	4	<0.40	4	<1.75	4	<0.35	4	<0.80	4	<0.80	-	-	4	<0.33	4	<1.55	4	<0.31	4	<1.55	4	<0.83
Tetrachloroethylene	261	<1.15	261	<1.05	261	<0.21	261	<0.65	261	<0.13	261	<0.35	261	<0.35	-	-	261	<0.23	261	<1.45	261	<0.29	261	<1.45	261	<0.38
Toluene	8,700	<0.60	8,700	<0.95	8,700	<0.19	8,700	<0.55	8,700	<0.11	8,700	<0.43	8,700	<0.43	-	-	8,700	<0.28	8,700	<1.25	8,700	<0.25	8,700	<1.25	8,700	<0.38
trans-1,2-Dichloroethylene	10,127	<0.85	10,127	<1.25	10,127	<0.25	10,127	<0.90	10,127	<0.18	10,127	<0.38	10,127	<0.38	-	-	10,127	<0.24	10,127	<1.25	10,127	<0.25	10,127	<1.25	10,127	<0.32
1,1,1-Trichloroethane	1,000	<1.15	1,000	<1.00	1,000	<0.20	1,000	<0.70	1,000	<0.14	1,000	<0.34	1,000	<0.34	-	-	1,000	<0.23	1,000	<1.40	1,000	<0.28	1,000	<1.40	1,000	<0.31
1,1,2-Trichloroethane	16	<1.20	16	<0.75	16	<0.15	16	<0.65	16	<0.13	16	<0.60	16	<0.60	-	-	16	<0.29	16	<1.50	16	<0.30	16	<1.50	16	<0.68
Trichloroethylene	29	<1.20	29	<0.75	29	<0.15	29	<1.10	29	<0.22	29	<0.48	29	<0.48	-	-	29	<0.28	29	<1.80	29	<0.36	29	<1.80	29	<0.46
1,2,4-Trimethylbenzene	NS	<5.0	NS	<5.0	NS	<1.0	NS	<10.0	NS	<1.0	NS	<1.0	NS	<1.0	-	-	NS	<1.0	NS	<5.0	NS	<1.0	NS	<5.0	NS	<1.0
1,3,5-Trimethylbenzene	NS	<5.0	NS	<5.0	NS	<1.0	NS	<5.0	NS	<1.0	NS	<1.0	NS	<1.0	-	-	NS	<1.0	NS	<5.0	NS	<1.0	NS	<5.0	NS	<1.0
Vinyl chloride	5	<2.50	5	<1.00	5	<0.20	5	<1.10	5	<0.22	5	<0.35	5	<0.35	-	-	5	<0.24	5	<2.10	5	<0.42	5	<2.10	5	<0.35
Xylenes, Total	186,667	<2.90	186,667	<1.50	186,667	<0.30	186,667	<1.25	186,667	<0.13	186,667	<0.52	186,667	<0.52	-	-	186,667	<0.32	186,667	<1.15	186,667	<0.23	186,667	<1.15	186,667	<0.70
Acid Compounds (µg/L) [2]																										
2-Chlorophenol	30	<22.8	30	*<214.5*	30	*<45.5*	30	<1.48	30	<1.48	30	<3.10	30	<3.10	-	-	30	<2.92	30	<4.23	30	*<211.5*	30	<4.52	30	<4.52
2,4-Dichlorophenol	59	<24.4	59	*<211.0*	59	<44.7	59	<1.65	59	<1.65	59	<2.81	59	<2.81	-	-	59	<3.21	59	<4.82	59	*<241.0*	59	<4.77	59	<4.77
2,4-Dimethylphenol	171	<29.2	171	<114.0	171	<24.2	171	<2.20	171	<2.20	171	<2.64	171	<2.64	-	-	171	<1.32	171	<7.07	171	*<353.5*	171	<2.04	171	<2.04
4,6-Dinitro-o-cresol	310	<27.6	310	<149.0	310	<31.6	310	<1.22	310	<1.22	310	<1.49	310	<1.49	-	-	310	<2.27	310	<4.69	310	*<234.5*	310	<3.36	310	<3.36
2,4-Dinitrophenol	110	<27.8	110	*<129.5*	110	<27.5	110	<1.13	110	<1.13	110	<2.21	110	<2.21	-	-	110	<2.64	110	<5.11	110	*<255.5*	110	<3.41	110	<3.41
2-Nitrophenol	NS	<55.6	NS	<205.5	NS	<43.6	NS	<1.57	NS	<1.57	NS	<2.84	NS	<2.84	-	-	NS	<2.61	NS	<7.83	NS	*<391.5*	NS	<4.68	NS	<4.68
4-Nitrophenol	4,100	<163.2	4,100	<233.5	4,100	<49.5	4,100	<1.14	4,100	2.6	4,100	<2.98	4,100	<2.98	-	-	4,100	<2.03	4,100	<4.03	4,100	*<201.5*	4,100	<3.52	4,100	<3.52
p-Chloro-m-cresol	15	*<37.2*	15	*<220.5*	15	*<46.7*	15	<1.65	15	<1.65	15	<1.87	15	<1.87	-	-	15	<3.10	15	<4.05	15	*<202.5*	15	<4.76	15	<4.76
Pentachlorophenol	34.561	*<41.4*	28.558	<168.0	40.564	<35.6	29.427	<1.39	28.848	<1.39	22.41	7.4	27.137	<1.47	-	-	23.8	<3.44	6.58	*<7.36*	16.41	*<368.0*	15.45	<4.00	46.67	<4.00
Phenol	37	<23.8	37	*<177.5*	37	*<37.6*	37	<1.34	37	<1.34	37	<2.30	37	<2.30	-	-	37	2.2	37	<3.99	37	*<199.5*	37	<4.08	37	<4.08
2,4,6-Trichlorophenol	2	*<56.0*	2	*<239.5*	2	*<50.8*	2	<1.89	2	<1.89	2	*<2.60*	2	*<2.60*	-	-	2	<3.28	2	*<4.74*	2	*<237.0*	2	*<5.27*	2	*<5.27*

SR030	Winter 2012/13		Summer 2013		Winter 2013/14		Summer 2014		Winter 2014/15		Summer 2015		Winter 2015/16		Summer 2016 [6]		Winter 2016/17		Summer 2017		Winter 2017/18		Summer 2018		Winter 2018/19	
SAMPLING DATE(S):	SWQS	12/14/2012	SWQS	7/21/2013	SWQS	11/22/2013	SWQS	8/12/2014	SWQS	12/4/2014	SWQS	7/31/2015	SWQS	1/31/2016	-	-	SWQS	11/27/2016	SWQS	7/24/2017	SWQS	1/9/2018	SWQS	7/9/2018	SWQS	2/21/2019
Bases/Neutrals (µg/L) [2]																										
Acenaphthene	198	<34.0	198	<67.0	198	<14.2	198	<1.03	198	<1.03	198	<0.35	198	<0.35	-	-	198	<1.02	198	<1.88	198	<94.0	198	<1.19	198	<1.19
Acenaphthylene	NS	<25.4	NS	<86.5	NS	<18.3	NS	<1.00	NS	<1.00	NS	<1.23	NS	<1.23	-	-	NS	<6.10	NS	<1.75	NS	<87.5	NS	<1.41	NS	<1.41
Anthracene	74	<17.8	74	<86.5	74	<18.3	74	<2.88	74	<2.88	74	<0.44	74	<0.44	-	-	74	<1.96	74	<2.62	74	<131.0	74	<1.20	74	<1.20
Benzo(a)anthracene	0.02	<31.4	0.02	<86.5	0.02	<18.3	0.02	<1.08	0.02	<1.08	0.02	<0.38	0.02	<0.38	-	-	0.02	<1.57	0.02	<1.96	0.02	<98.0	0.02	<1.02	0.02	<1.02
Benzo(a)pyrene	0.02	<38.6	0.02	<93.5	0.02	<19.8	0.02	<3.77	0.02	<3.77	0.02	<1.41	0.02	<1.41	-	-	0.02	<3.12	0.02	<3.77	0.02	<188.5	0.02	<1.08	0.02	<1.08
Benzo(b)fluoranthene	0.02	<67.8	0.02	<121.5	0.02	<25.8	0.02	<1.46	0.02	<1.46	0.02	<1.06	0.02	<1.06	-	-	0.02	<1.28	0.02	<2.17	0.02	<108.5	0.02	<0.38	0.02	<0.38
Benzo(g,h,i)perylene	NS	<28.2	NS	<86.5	NS	<18.3	NS	<1.29	NS	<1.29	NS	<0.72	NS	<0.72	-	-	NS	<2.83	NS	<2.51	NS	<125.5	NS	<1.14	NS	<1.14
Benzo(k)fluoranthene	0.02	<23.0	0.02	<70.0	0.02	<14.8	0.02	<1.04	0.02	<1.04	0.02	<0.35	0.02	<0.35	-	-	0.02	<1.76	0.02	<2.33	0.02	<116.5	0.02	<1.03	0.02	<1.03
Chrysene	0.02	<17.8	0.02	<74.0	0.02	<15.7	0.02	<1.41	0.02	<1.41	0.02	<0.46	0.02	<0.46	-	-	0.02	<1.08	0.02	<1.96	0.02	<98.0	0.02	<1.16	0.02	<1.16
Dibenz(a,h)anthracene	0.02	<81.0	0.02	<99.0	0.02	<21.0	0.02	<1.24	0.02	<1.24	0.02	<0.47	0.02	<0.47	-	-	0.02	<1.93	0.02	<6.04	0.02	<302.0	0.02	<1.02	0.02	<1.02
1,2-Dichlorobenzene	205	<43.4	205	<13.5	205	<2.9	205	<1.76	205	<1.76	205	<1.04	205	<1.04	-	-	205	<0.58	205	<1.33	205	<0.30	205	<1.43	205	<1.43
1,3-Dichlorobenzene	2,500	<48.4	2,500	<56.5	2,500	<12.0	2,500	<1.74	2,500	<1.74	2,500	<0.47	2,500	<0.47	-	-	2,500	<0.52	2,500	<1.25	2,500	<0.25	2,500	<1.39	2,500	<1.39
1,4-Dichlorobenzene	2,000	<42.6	2,000	<52.5	2,000	<11.1	2,000	<1.56	2,000	<1.56	2,000	<1.28	2,000	<1.28	-	-	2,000	<0.50	2,000	<1.25	2,000	<0.29	2,000	<1.48	2,000	<1.48
3,3-Dichlorobenzidine	0.03	<147.6	0.03	<1363.5	0.03	<289.1	0.03	<6.06	0.03	<6.06	0.03	<11.60	0.03	<11.60	-	-	0.03	<23.45	0.03	<25.43	0.03	<1,271.5	0.03	<6.99	0.03	<6.99
Diethyl phthalate	8,767	<29.6	8,767	<95.0	8,767	<20.1	8,767	<2.37	8,767	<2.37	8,767	0.6	8,767	0.5	-	-	8,767	<1.07	8,767	<1.99	8,767	<99.5	8,767	<1.08	8,767	<1.08
Dimethyl phthalate	17,000	<24.2	17,000	<89.5	17,000	<19.0	17,000	<2.42	17,000	<2.42	17,000	<0.47	17,000	<0.47	-	-	17,000	<0.58	17,000	<1.91	17,000	<95.5	17,000	<1.17	17,000	<1.17
Di-n-butyl phthalate	470	<45.8	470	<111.5	470	<23.6	470	<1.85	470	<1.85	470	<0.31	470	<0.31	-	-	470	<1.37	470	<2.35	470	<117.5	470	<1.12	470	<1.12
2,4-Dinitrotoluene	421	<26.2	421	<102.5	421	<21.7	421	<2.12	421	<2.12	421	<0.26	421	<0.26	-	-	421	<1.30	421	<3.10	421	<155.0	421	<1.17	421	<1.17
2,6-Dinitrotoluene	3,733	<37.4	3,733	<126.0	3,733	<26.7	3,733	<1.12	3,733	<1.12	3,733	<0.38	3,733	<0.38	-	-	3,733	<1.39	3,733	<2.89	3,733	<144.5	3,733	<1.13	3,733	<1.13
Di-n-octyl phthalate	373,333	<82.6	373,333	<144.0	373,333	<30.5	373,333	<1.10	373,333	<1.10	373,333	<1.28	373,333	<1.28	-	-	373,333	<1.67	373,333	<5.50	373,333	<275.0	373,333	<2.05	373,333	<2.05
1,2-Diphenylhydrazine (as azobenzene)	NS[8]	<21.4	NS	<116.5	NS	<24.7	NS	<6.70	NS	<6.70	NS	<1.06	NS	<1.06	-	-	NS	<7.46	NS	<2.15	NS	<107.5	0.2	<1.11	0.2	<1.11
Fluoranthene	28	<13.4	28	<89.5	28	<19.0	28	<1.35	28	<1.35	28	<0.27	28	<0.27	-	-	28	<1.06	28	<3.08	28	<154.0	28	<1.27	28	<1.27
Fluorene	1,067	<33.6	1,067	<77.0	1,067	<16.3	1,067	<4.81	1,067	<4.81	1,067	<0.29	1,067	<0.29	-	-	1,067	<0.51	1,067	<2.87	1,067	<143.5	1,067	<1.18	1,067	<1.18
Hexachlorobenzene	0.0003	<26.0	0.0003	<69.5	0.0003	<14.7	0.0003	<1.23	0.0003	<1.23	0.0003	<0.34	0.0003	<0.34	-	-	0.0003	<0.47	0.0003	<1.57	0.0003	<78.5	0.0003	<1.01	0.0003	<1.01
Hexachlorobutadiene	18	<27.4	18	<16.5	18	<3.5	18	<1.82	18	<1.82	18	<1.67	18	<1.67	-	-	18	<0.41	18	<1.00	18	<50.0	18	<1.20	18	<1.20
Hexachlorocyclopentadiene	3.5	<26.4	3.5	<113.5	3.5	<24.1	3.5	<1.23	3.5	<1.23	3.5	<1.53	3.5	<1.53	-	-	3.5	<2.16	3.5	<6.10	3.5	<305.0	3.5	<3.07	3.5	<3.07
Hexachloroethane	3.3	<28.0	3.3	<20.0	3.3	<4.2	3.3	<1.62	3.3	<1.62	3.3	<1.23	3.3	<1.23	-	-	3.3	<0.54	3.3	<1.49	3.3	<74.5	3.3	<1.35	3.3	<1.35
Indeno(1,2,3-cd)pyrene	0.2	<66.6	0.2	<101.5	0.2	<21.5	0.2	<1.39	0.2	<1.39	0.2	<0.62	0.2	<0.62	-	-	0.2	**4.89**	0.2	<6.11	0.2	<305.5	0.49	<1.07	0.49	<1.07
Isophorone	961	<38.0	961	<70.5	961	<14.9	961	<2.14	961	<2.14	961	<0.37	961	<0.37	-	-	961	<0.51	961	<1.77	961	<88.5	961	<1.32	961	<1.32
Naphthalene	1,524	<28.4	1,524	<60.0	1,524	<12.7	1,524	<1.83	1,524	<1.83	1,524	<0.36	1,524	<0.36	-	-	1,524	<0.49	1,524	<1.54	1,524	<77.0	1,524	<1.48	1,524	<1.48
Nitrobenzene	138	<26.2	138	<61.5	138	<13.0	138	<2.10	138	<2.10	138	<1.26	138	<1.26	-	-	138	<0.44	138	<1.80	138	<90.0	138	<1.55	138	<1.55
n-Nitrosodimethylamine	0.03	<32.8	0.03	<60.0	0.03	<12.7	0.03	<1.00	0.03	<1.00	0.03	<1.13	0.03	<1.13	-	-	0.03	<0.54	0.03	<1.62	0.03	<81.0	0.03	<1.67	0.03	<1.67
n-Nitrosodi-n-propylamine	0.5	<37.6	0.5	<75.5	0.5	<16.0	0.5	<1.15	0.5	<1.15	0.5	<1.17	0.5	<1.17	-	-	0.5	<1.02	0.5	<1.65	0.5	<82.5	0.5	<1.65	0.5	<1.65
n-Nitrosodiphenylamine	6	<20.0	6	<152.0	6	<32.2	6	<3.57	6	<3.57	6	<1.15	6	<1.15	-	-	6	<1.67	6	<3.13	6	<156.5	6	<1.07	6	<1.07
Phenanthrene	30	<15.2	30	<81.5	30	<17.3	30	<1.39	30	<1.39	30	<0.31	30	<0.31	-	-	30	<0.49	30	<3.02	30	<151.0	30	<1.33	30	<1.33
Pyrene	800	<46.6	800	<82.0	800	<17.4	800	<3.86	800	<3.86	800	<0.67	800	<0.67	-	-	800	<3.21	800	<3.38	800	<169.0	800	<1.20	800	<1.20
1,2,4-Trichlorobenzene	70	<53.2	70	<16.0	70	<3.4	70	<1.69	70	<1.69	70	<1.04	70	<1.04	-	-	70	<0.55	70	<1.21	70	<60.5	70	<1.34	70	<1.34
Pesticides (µg/L) [2]																										
Aldrin	0.00005	<0.046	0.00005	<0.046	0.00005	<0.016	0.00005	<0.027	0.00005	<0.027	0.00005	<0.012	0.00005	<0.012	-	-	0.00005	<0.019	0.00005	<0.013	0.00005	<0.013	0.00005	**0.099**	0.00005	<0.010
Alpha-BHC	0.005	<0.038	0.005	<0.038	0.005	<0.017	0.005	<0.021	0.005	<0.021	0.005	<0.058	0.005	<0.058	-	-	0.005	<0.010	0.005	<0.015	0.005	**0.036**	0.005	<0.012	0.005	<0.012
Beta-BHC	0.02	<0.095	0.02	<0.095	0.02	<0.092	0.02	<0.072	0.02	<0.072	0.02	<0.063	0.02	<0.063	-	-	0.02	<0.049	0.02	<0.083	0.02	<0.083	0.02	<0.099	0.02	<0.099
Gamma-BHC	1	<0.033	1	<0.033	1	<0.023	1	<0.034	1	<0.034	1	<0.058	1	<0.058	-	-	1	<0.019	1	<0.020	1	<0.020	1	<0.013	1	<0.013
Delta-BHC	1,600	<0.032	1,600	<0.032	1,600	<0.018	1,600	<0.021	1,600	<0.021	1,600	<0.066	1,600	<0.066	-	-	1,600	<0.035	1,600	<0.012	1,600	<0.012	1,600	<0.045	1,600	<0.045
Chlordane	0.0008	<0.16	0.0008	<0.16	0.0008	<0.020	0.0008	<0.14	0.0008	<0.14	0.0008	<0.36	0.0008	<0.36	-	-	0.0008	<0.61	0.0008	<0.29	0.0008	<0.29	0.0008	<0.33	0.0008	<0.33
4,4'-DDT	0.0002	<0.029	0.0002	<0.029	0.0002	<0.016	0.0002	<0.025	0.0002	<0.025	0.0002	<0.017	0.0002	<0.017	-	-	0.0002	<0.011	0.0002	<0.020	0.0002	<0.020	0.0002	<0.009	0.0002	<0.009
4,4'-DDE	0.0002	**0.041**	0.0002	**0.037**	0.0002	<0.018	0.0002	<0.010	0.0002	**0.027**	0.0002	<0.013	0.0002	<0.013	-	-	0.0002	<0.020	0.0002	<0.019	0.0002	**0.076**	0.0002	<0.015	0.0002	<0.015
4,4'-DDD	0.0002	<0.023	0.0002	<0.023	0.0002	<0.014	0.0002	<0.031	0.0002	<0.031	0.0002	<0.021	0.0002	<0.021	-	-	0.0002	<0.021	0.0002	<0.023	0.0002	<0.023	0.0002	<0.017	0.0002	<0.017
Dieldrin	0.00005	<0.028	0.00005	<0.028	0.00005	<0.022	0.00005	<0.030	0.00005	<0.030	0.00005	<0.060	0.00005	<0.060	-	-	0.00005	<0.019	0.00005	<0.015	0.00005	<0.015	0.00005	<0.012	0.00005	<0.012
Alpha-endosulfan	0.2	<0.034	0.2	<0.034	0.2	<0.018	0.2	<0.018	0.2	<0.018	0.2	<0.072	0.2	<0.072	-	-	0.2	<0.018	0.2	<0.015	0.2	0.085	0.2	<0.020	0.2	0.075
Beta-endosulfan	0.2	<0.034	0.2	<0.034	0.2	<0.013	0.2	<0.032	0.2	<0.032	0.2	<0.019	0.2	<0.019	-	-	0.2	<0.021	0.2	<0.014	0.2	<0.014	0.2	<0.014	0.2	<0.014
Endosulfan sulfate	0.2	<0.025	0.2	<0.025	0.2	<0.014	0.2	<0.008	0.2	0.028	0.2	<0.016	0.2	<0.016	-	-	0.2	<0.022	0.2	<0.019	0.2	<0.019	0.2	<0.017	0.2	<0.017
Endrin	0.004	<0.035	0.004	<0.035	0.004	<0.016	0.004	<0.017	0.004	<0.017	0.004	<0.023	0.004	<0.023			0.004	<0.042	0.004	<0.040	0.004	<0.040	0.004	<0.042	0.004	<0.042
Endrin aldehyde	0.09	<0.038	0.09	<0.038	0.09	<0.023	0.09	<0.032	0.09	<0.032	0.09	<0.026	0.09	<0.026	-	-	0.09	<0.024	0.09	<0.034	0.09	<0.034	0.09	<0.068	0.09	<0.068
Heptachlor	0.00008	<0.035	0.00008	<0.035	0.00008	<0.018	0.00008	<0.027	0.00008	<0.027	0.00008	<0.035	0.00008	<0.035	-	-	0.00008	**0.04**	0.00008	0.031	0.00008	<0.019	0.00008	**0.056**	0.00008	<0.011
Heptachlor epoxide	0.00004	<0.032	0.00004	<0.032	0.00004	<0.020	0.00004	<0.008	0.00004	<0.008	0.00004	<0.062	0.00004	<0.062	-	-	0.00004	<0.020	0.00004	<0.016	0.00004	<0.016	0.00004	<0.012	0.00004	<0.012
PCB-1242	[4]	<0.41	[4]	<0.41	[4]	<0.55	[4]	<0.37	[4]	<0.37	[4]	<0.14	[4]	<0.14	-	-	[4]	<0.72	[4]	<0.33	[4]	<0.33	[4]	<0.28	[4]	<0.28
PCB-1254	[4]	<0.20	[4]	<0.20	[4]	<0.28	[4]	<0.23	[4]	<0.23	[4]	<0.20	[4]	<0.20	-	-	[4]	<0.22	[4]	<0.17	[4]	<0.17	[4]	<0.21	[4]	<0.21

SR030	Winter 2012/13		Summer 2013		Winter 2013/14		Summer 2014		Winter 2014/15		Summer 2015		Winter 2015/16		Summer 2016 [6]		Winter 2016/17		Summer 2017		Winter 2017/18		Summer 2018		Winter 2018/19	
SAMPLING DATE(S):	SWQS	12/14/2012	SWQS	7/21/2013	SWQS	11/22/2013	SWQS	8/12/2014	SWQS	12/4/2014	SWQS	7/31/2015	SWQS	1/31/2016	-	-	SWQS	11/27/2016	SWQS	7/24/2017	SWQS	1/9/2018	SWQS	7/9/2018	SWQS	2/21/2019
PCB-1221	[4]	<0.68	[4]	<0.68	[4]	<0.85	[4]	<0.22	[4]	<0.22	[4]	<0.64	[4]	<0.64	-	-	[4]	<0.46	[4]	*<0.36*	[4]	*<0.36*	[4]	*<0.50*	[4]	*<0.50*
PCB-1232	[4]	<0.66	[4]	<0.66	[4]	<0.34	[4]	<0.55	[4]	<0.55	[4]	<0.37	[4]	<0.37	-	-	[4]	<0.90	[4]	*<0.40*	[4]	*<0.40*	[4]	*<0.48*	[4]	*<0.48*
PCB-1248	[4]	<0.78	[4]	<0.78	[4]	<0.27	[4]	<0.19	[4]	<0.19	[4]	<0.22	[4]	<0.22	-	-	[4]	<0.24	[4]	*<0.21*	[4]	*<0.21*	[4]	*<0.35*	[4]	*<0.35*
PCB-1260	[4]	<0.21	[4]	<0.21	[4]	<0.23	[4]	<0.32	[4]	<0.32	[4]	<0.59	[4]	<0.59	-	-	[4]	<0.26	[4]	*<0.34*	[4]	*<0.34*	[4]	*<0.28*	[4]	*<0.28*
PCB-1016	[4]	<0.36	[4]	<0.36	[4]	<0.33	[4]	<0.18	[4]	<0.18	[4]	<0.55	[4]	<0.55	-	-	[4]	<0.29	[4]	*<0.33*	[4]	*<0.33*	[4]	*<0.40*	[4]	*<0.40*
Toxaphene	0.0003	*<0.53*	0.0003	*<0.53*	0.0003	*<0.34*	0.0003	*<0.22*	0.0003	*<0.22*	0.0003	*<0.60*	0.0003	*<0.60*	-	-	0.0003	*<0.48*	0.0003	*<0.47*	0.0003	*<0.47*	0.0003	*<0.482*	0.0003	*<0.482*

Notes:

NS = no standard applicable to the designated use

T = total

D = dissolved

Bold text indicates a sample result greater than the WQS

Italicized text indicates a laboratory detection limit higher than the WQS

Footnotes:

[1] The Permittee shall report on any additional parameters that were monitored for seasonal stormwater sampling as required by Section 6.0 of this permit (Special Conditions).

[2] Analytical results shall be reported in the units specified for each category or parameter.

[3] Report the average flow rate for the sampling period (no more than 6 hours).

[4] Standard for total PCBs of 0.00006 µg/L FC, 19 µg/L PBC, 2 µg/L A&Wedw, and 0.001 µg/L AgI and AgL.

[5] The sample was lost during extraction at the laboratory due to the glassware breaking.

[6] There were no representative storm events (>0.20 inches) that occurred or no representative events without a measurable rain event in the previous 72 hours.

[7] A representative event occurred on 8/2; however, the sampler malfunctioned. Then next event was on 8/5 but due to the 72-hour rule, no sample was taken. Another measurable event on 9/22 did not result in a qualifying rain event. No samples were taken at this outfall during Summer 2016.

[8] Prior to FY2016, the lab was reporting cis and trans for 1-3-dichloropropylene; this reporting year, an upgrade has resulted in providing the result as a total.

[9] Data flagged due to contamination in the lab reagent blank; therefore, these are not true detections or exceedances.

OUTFALL ID: SR045	**MONITORING SEASONS**																									
RECEIVING WATER: Salt River	Summer: June 1 - October 31 Winter: November 1 - May 31																									
DESIGNATED USES: A&We and PBC	Winter 2012/13		Summer 2013		Winter 2013/14		Summer 2014		Winter 2014/15		Summer 2015		Winter 2015/16 [6]		Summer 2016		Winter 2016/17		Summer 2017		Winter 2017/18		Summer 2018		Winter 2018/19	
SAMPLING DATE(S):	SWQS	12/14/2012	SWQS	7/21/2013	SWQS	11/22/2013	SWQS	8/12/2014	SWQS	12/4/2014	SWQS	7/31/2015	-	-	SWQS	7/29/2016	SWQS	11/3/2016	SWQS	7/16/2017	SWQS	2/14/2018	SWQS	8/7/2019	SWQS	11/29/2019
MONITORING PARAMETERS [1,2]																										
Conventional Parameters																										
Flow [3] (cfs)	NS	0.67	NS	8.88	NS	1.01	NS	0.725	NS	1.371	NS	1.898	-	-	NS	7.105	NS	1.251	NS	11.503	NS	1.38	NS	0.648	NS	Trickle
pH	6.5-9	7.45	6.5-9	8.24	6.5-9	8.3	6.5-9	7.94	6.5-9	7.73	6.5-9	7.62	-	-	6.5-9	7.09	6.5-9	**6.34**	6.5-9	7.36	6.5-9	7.82	6.5-9	7.89	6.5-9	7.41
Temperature (ºC)	Varies	20.5	Varies	28	Varies	19.5	Varies	30.1	Varies	19	Varies	30.5	-	-	Varies	30	Varies	21	Varies	30.3	Varies	17.8	Varies	31.2	Varies	16.9
Hardness (mg/L)	400	72.1	400	40.1	400	31.2	400	96.1	400	42.2	400	42.4	-	-	400	45.4	400	87.8	400	102	400	152	400	63.9	400	81.5
Total Dissolved Solids (TDS) (mg/L) [2]	NS	266	NS	98	NS	82	NS	340	NS	124	NS	126	-	-	NS	166	NS	302	NS	408	NS	514	NS	228	NS	250
Total Suspended Solids (TSS) (mg/L) [2]	NS	332	NS	60	NS	420	NS	192	NS	1070	NS	126	-	-	NS	80	NS	162	NS	668	NS	486	NS	133	NS	110
Biochemical Oxygen Demand (BOD) (mg/L) [2]	NS	127	NS	13	NS	56	NS	45	NS	175	NS	25	-	-	NS	35	NS	127	NS	141	NS	388	NS	<120	NS	104
Chemical Oxygen Demand (COD) (mg/L) [2]	NS	540	NS	100	NS	540	NS	280	NS	950	NS	160	-	-	NS	150	NS	410	NS	700	NS	1,100	NS	220	NS	290

SR045	Winter 2012/13		Summer 2013		Winter 2013/14		Summer 2014		Winter 2014/15		Summer 2015		Winter 2015/16 [6]		Summer 2016		Winter 2016/17		Summer 2017		Winter 2017/18		Summer 2018		Winter 2018/19	
SAMPLING DATE(S):	SWQS	12/14/2012	SWQS	7/21/2013	SWQS	11/22/2013	SWQS	8/12/2014	SWQS	12/4/2014	SWQS	7/31/2015	-	-	SWQS	7/29/2016	SWQS	11/3/2016	SWQS	7/16/2017	SWQS	2/14/2018	SWQS	8/7/2018	SWQS	11/30/2019
Inorganics																										
Cyanide, total (µg/L) [2]	84	5	84	<50	84	<5	84	<5	84	<5	84	<5	-	-	84	<5	84	<5	84	<5	84	<5	84	<5	84	<5
Nutrients (mg/L) [2]																										
Nitrate + Nitrite as N	NS	1.7	NS	0.8	NS	0.6	NS	1.7	NS	0.5	NS	1.2	-	-	NS	1.4	NS	1.4	NS	1.9	NS	1.6	NS	1.7	NS	1.2
Ammonia as N	NS	1.5	NS	0.64	NS	0.42	NS	1.4	NS	0.51	NS	1.4	-	-	NS	1.3	NS	1.1	NS	1.4	NS	1.6	NS	1.3	NS	1.6
Total Kjeldahl Nitrogen (TKN)	NS	7.6	NS	3.3	NS	6.9	NS	4.5	NS	14	NS	2.9	-	-	NS	3.9	NS	6.8	NS	9.3	NS	15	NS	4.9	NS	6.7
Total Phosphorus as P	NS	0.7	NS	0.41	NS	1.5	NS	0.91	NS	0.58	NS	0.55	-	-	NS	1.3	NS	0.89	NS	0.46	NS	1.1	NS	0.49	NS	0.70
Ortho-Phosphorus as P	NS	0.3	NS	<0.1	NS	0.2	NS	0.2	NS	0.1	NS	<0.1	-	-	NS	0.2	NS	0.3	NS	0.2	NS	0.7	NS	0.3	NS	0.3
Microbiological																										
Escherichia coli (*E. coli*) (CFU/100 mg or MPN/100 mL) [2]	575	**1,986.30**	575	**2,419.60**	575	**>2,419.6**	575	**>2,419.6**	575	**>2,419.6**	575	**34,480**	-	-	575	**5,040**	575	**2,419.60**	575	**17,230**	575	**14,390**	575	**4,480**	575	**3,930**
Total Metals (µg/L) [2]																										
Antimony	747 T	3.2 T 1.3 D	747 T	1.8 T 0.9 D	747 T	2.6 T 0.6 D	747 T	3.5 T 3.1 D	747 T	4.8 T 1.0 D	747 T	3.2 T <5.0 D	-	-	747 T	1.8 T <5 D	747 T	3.7 T <5 D	747 T	4.7 T <5 D	747 T	7.1 T <5 D	747 T	2.7 T <5.0 D	747 T	3.0 T <5.0 D
Arsenic	280 T 440 D	5.5 T 1.7 D	280 T 440 D	2.6 T 1.0 D	280 T 440 D	8.1 T 1.1 D	280 T 440 D	5.0 T 3.2 D	280 T 440 D	10.5 T 1.2 D	280 T 440 D	3.5 T <5.0 D	-	-	280 T 440 D	2.5 T <5 D	280 T 440 D	3.8 T <5 D	280 T 440 D	7.2 T <5.0 D	280 T 440 D	8.1 T <5 D	280 T 440 D	3.1 T <5.0 D	280 T 440 D	2.4 T <5.0 D
Barium	98,000 T	173 T 20 D	98,000 T	86 T 22 D	98,000 T	344 T 8 D	98,000 T	98 T 39 D	98,000 T	599 T 11 D	98,000 T	120 T 19 D	-	-	98,000 T	62 T 18 D	98,000 T	160 T 25 D	98,000 T	241 T 7 D	98,000 T	255 T 22 D	98,000 T	89 T 24 D	98,000 T	88 T 22 D
Beryllium	1,867 T	0.32 T <0.15 D	1,867 T	0.22 T <0.15 D	1,867 T	0.53 T <0.06 D	1,867 T	<0.15 T <0.15 D	1,867 T	0.75 T <0.06 D	1,867 T	0.21 T <5.0 D	-	-	1,867 T	<0.25 T <5 D	1,867 T	<0.25 T <5 D	1,867 T	0.53 T <5 D	1,867 T	0.44 T <5 D	1,867 T	0.26 T <5.0 D	1,867 T	<0.15 T <5.0 D
Cadmium	700 T 16.59 D	1.0 T <0.25 D	700 T 9.37 D	0.4 T <0.25 D	700 T 7.34 D	2.1 T <0.10 D	700 T 21.94 D	<0.30 T <0.30 D	700 T 9.85 D	2.2 T <0.12 D	700 T 9.89 D	0.4 T <5.0 D	-	-	700 T 27.43 D	0.3 T <0.25 D	700 T 56.09 D	0.4 T <0.25	700 T 65.99 D	0.9 T <0.2 D	700 T 101.65 D	1.3 T <0.2 D	700 T 39.74	0.3 T <0.25 D	700 T 51.74	0.4 T <0.25 D
Chromium	NS	12.6 T 2.5 D	NS	7.3 T <2.00 D	NS	23.8 T 0.8 D	NS	7.7 T 2.5 D	NS	34.6 T 1.9 D	NS	10.4 T <5.0 D	-	-	NS	6.5 T <5 D	NS	10.4 T <5 D	NS	21.1 T <5 D	NS	26.4 T 6.2 D	NS	8.3 T <5.0 D	NS	7.2 T <5.0 D
Copper	1,300 T 17.09 D	124 T **40.8 D**	1,300 T 9.83 D	72.0 T **23.8 D**	1,300 T 7.77 D	206 T **12.2 D**	1,300 T 22.40 D	60.6 T **32.7 D**	1,300 T 10.32 D	263 T **16.7** D	1,300 T 10.36 D	66.6 T **21.6 D**	-	-	1,300 T 11.05 D	44.4 T **30.9 D**	1,300 T 20.58 D	76.2 T **38.4 D**	1,300 T 23.70 D	150 T 11.3 D	1,300 T 34.51 D	178 T **70.6 D**	1,300 T 15.25	56.8 T **34 D**	1,300 T 19.18	51.2 T **31.4 D**
Lead	15 T 95.29 D	**31.4 T** 0.8 D	15 T 49.76 D	**21.4 T** 1.2 D	15 T 37.58 D	**75.3 T** 0.6 D	15 T 130.52 D	14.3 T 1.4 D	15 T 52.67 D	**97.9 T** 0.6 D	15 T 52.95 D	**19.4 T** <0.8 D	-	-	15 T 57.13 D	10.9 T 0.9 D	15 T 118.26 D	**17.3 T** 0.9 D	15 T 139.27 D	**50.4 T** 0.2 D	15 T 214.34 D	**50 T** 2 D	15 T 83.43	11.7 T 0.8 D	15 T 109.01	13.8 T 1.2 D
Mercury	280 T 5 D	0.06 T <0.040 D	280 T 5 D	0.02 T <0.020 D	280 T 5 D	0.20 T 0.026 D	280 T 5 D	<0.092 T <0.2 D	280 T 5 D	0.30 T <0.092 D	280 T 5 D	0.08 T <0.2 D	-	-	280 T 5 D	0.094 T <0.068 D	280 T 5 D	0.095 T <0.2 D	280 T 5 D	0.134 T <0.2 D	280 T 5 D	0.26 T <0.20 D	280 T 5 D	<0.080 T <0.080 D	280 T 5 D	<0.042 T <0.2 D
Nickel	28,000 T 3,153 D	16.7 T 5.4 D	28,000 T 1,919 D	10.3 T 3.5 D	28,000 T 1,552 D	32.3 T 1.7 D	28,000 T 4021 D	14.6 T 8.4 D	28,000 T 2004 D	37.9 T 2.1 D	28,000 T 2,012 D	11.2 T 2.7 D	-	-	28,000 T 2,132 D	7.9 T <5 D	28,000 T 3725 D	13.4 T 6.9 D	28,000 T 4,229 D	28.1 T <5 D	28,000 T 5,926 D	29 T 13.2 D	28,000 T 2,846.91	11.4 T 5.7 D	28,000 T 3,497.52	9.1 T <5.0 D
Selenium	33 T	1.1 T 0.7 D	33 T	<0.60 T <0.60 D	33 T	0.69 T <0.24 D	33 T	0.76 T 0.5 D	33 T	0.87 T 0.4 D	33 T	0.51 T <5.0 D	-	-	33 T	0.96 T <5 D	33 T	0.87 T <5 D	33 T	1.3 T <5 D	33 T	1.3 T <5 D	33 T	1.1 T <5.0 D	33 T	0.71 T <5.0 D

SR045	Winter 2012/13		Summer 2013		Winter 2013/14		Summer 2014		Winter 2014/15		Summer 2015		Winter 2015/16 [6]		Summer 2016		Winter 2016/17		Summer 2017		Winter 2017/18		Summer 2018		Winter 2018/19	
SAMPLING DATE(S):	SWQS	12/14/2012	SWQS	7/21/2013	SWQS	11/22/2013	SWQS	8/12/2014	SWQS	12/4/2014	SWQS	7/31/2015	-	-	SWQS	7/29/2016	SWQS	11/3/2016	SWQS	7/16/2017	SWQS	2/14/2018	SWQS	8/7/2018	SWQS	11/30/2019
Silver	4,667 T 1.834 D	0.3 T 0.3 D	4,667 T 0.672 D	0.2 T <0.15 D	4,667 T 0.434 D	0.5 T <0.15 D	4,667 T 3.005 D	<0.20 T <0.20 D	4,667 T 0.726 D	0.8 T <0.08 D	4,667 T 0.73 D	0.3 T *<5.0 D*	-	-	4,667 T 0.83 D	<0.45 T *<5 D*	4,667 T 2.57 D	<0.45 T *<5 D*	4,667 T 3.33 D	0.4 T *<5 D*	4,667 T 6.61 D	0.8 T <5 D	4,667 T 1.49	<0.15 T *<5.0 D*	4,667 T 2.26	0.2 T *<5.0 D*
Thallium	75 T	<0.20 T <0.20 D	75 T	<0.20 T <0.20 D	75 T	<0.20 T <0.08 D	75 T	<0.10 T <0.10 D	75 T	0.25 T <0.04 D	75 T	<0.15 T <5.0 D	-	-	75 T	0.32 T <5 D	75 T	<0.2 T <5 D	75 T	0.23 T <5 D	75 T	0.18 T <5 D	75 T	<0.15 T <5.0 D	75 T	<0.15 T <5.0 D
Zinc	280,000 T 843 D	469 T 60.6 D	280,000 T 513 D	207 T 63.2 D	280,000 T 414 D	1020 T 23.0 D	280,000 T 1075 D	192 T 66.4 D	280,000 T 535.2 D	1,410 T 32.8 D	280,000 T 537 D	288 T 50.9 D	-	-	280,000 T 570 D	202 T 58.2 D	280,000 T 996 D	274 T 82.4 D	280,000 T 1,131 D	633 T 22.3 D	280,000 T 1,586 D	662 T 109 D	280,000 T 760.86	218 T 58.8 D	280,000 T 935.04	269 T 90.7 D
Organic Toxic Pollutants																										
Total Petroleum Hydrocarbons (TPH) (mg/L) [2]	NS	<10	NS	<11	NS	15	NS	<10	NS	<10	NS	<11	-	-	NS	<5.7	NS	<4.3	NS	<7.3	NS	<7.1	NS	<7.2	NS	<5.5
Total Oil and Grease (mg/L) [2]	NS	29	NS	<5.7	NS	42	NS	<5.0	NS	6	NS	5.8	-	-	NS	<5.7	NS	<4.3	NS	7.8	NS	7.6	NS	<6.0	NS	<5.5
VOCs, Semi-VOCs, and Pesticides (µg/L) [2]																										
Acrolein	467	7.5	467	<0.20	467	<0.20	467	2.7	467	<0,40	467	<0.78	-	-	467	<0.41	467	1.3	467	<3.95	467	<0.79	467	<2.75	467	1.5
Acrylonitrile	37,333	<1.130	37,333	<0.16	37,333	<0.16	37,333	<0.70	37,333	<0.14	37,333	<0.53	-	-	37,333	<0.42	37,333	<0.42	37,333	<2.95	37,333	<0.59	37,333	<2.85	37,333	<0.57
Benzene	3,733	<0.75	3,733	<0.15	3,733	<1.20	3,733	<0.65	3,733	<0.13	3,733	<0.46	-	-	3,733	<0.46	3,733	<0.29	3,733	<1.30	3,733	<0.26	3,733	<1.65	3,733	0.36
Bromoform	18,667	<2.15	18,667	<0.43	18,667	<2.35	18,667	<1.40	18,667	<0.28	18,667	<0.68	-	-	18,667	<0.68	18,667	<0.33	18,667	<1.05	18,667	<0.21	18,667	<4.05	18,667	<0.81
Carbon tetrachloride	1,307	<1.65	1,307	<0.33	1,307	<1.30	1,307	<1.15	1,307	<0.23	1,307	<0.31	-	-	1,307	<0.31	1,307	<0.20	1,307	<1.50	1,307	<0.30	980	<1.35	980	<0.27
Chlorobenzene	18,667	<1.40	18,667	<0.28	18,667	<0.80	18,667	<0.65	18,667	<0.13	18,667	<0.50	-	-	18,667	<0.50	18,667	<0.33	18,667	<1.15	18,667	<0.23	18,667	<3.50	18,667	<0.70
Chlorodibromomethane	18,667	<1.30	18,667	<0.26	18,667	<0.90	18,667	<1.20	18,667	<0.24	18,667	<0.61	-	-	18,667	<0.61	18,667	<0.32	18,667	<1.20	18,667	<0.24	18,667	<3.50	18,667	<0.70
Chloroethane (ethyl chloride)	NS	<1.35	NS	<0.27	NS	<1.10	NS	<0.95	NS	<0.19	NS	<0.40	-	-	NS	<0.40	NS	<0.33	NS	<1.40	NS	<0.28	NS	<1.65	NS	<0.33
2-Chloroethylvinyl ether	NS	<0.22	NS	<0.22	NS	<0.22	NS	<0.95	NS	<0.19	NS	<0.53	-	-	NS	<0.43	NS	<0.43	NS	<3.25	NS	<0.65	NS	<2.60	NS	<0.52
Chloroform	9,333	<1.05	9,333	<0.21	9,333	<1.15	9,333	<0.70	9,333	<0.14	9,333	<0.49	-	-	9,333	<0.49	9,333	<0.32	9,333	<1.20	9,333	<0.24	9,333	<1.55	9,333	<0.31
Dichlorobromomethane	18,667	<0.75	18,667	<0.15	18,667	<1.15	18,667	<0.75	18,667	<0.15	18,667	<0.49	-	-	18,667	<0.49	18,667	<0.29	18,667	<1.30	18,667	<0.26	18,667	<2.60	18,667	<0.52
1,1-Dichloroethane	NS	<0.65	NS	<0.13	NS	<1.30	NS	<0.95	NS	<0.19	NS	<0.42	-	-	NS	<0.42	NS	<0.29	NS	<1.35	NS	<0.27	NS	<1.60	NS	<0.32
1,2-Dichloroethane	186,667	<0.80	186,667	<0.16	186,667	<1.25	186,667	<0.55	186,667	<0.11	186,667	<0.51	-	-	186,667	<0.51	186,667	<0.35	186,667	<1.30	186,667	<0.26	186,667	<1.40	186,667	<0.28
1,1-Dichloroethylene	46,667	<1.85	46,667	<0.37	46,667	<1.40	46,667	<1.35	46,667	<0.27	46,667	<0.34	-	-	46,667	<0.34	46,667	<0.19	46,667	<1.60	46,667	<0.32	46,667	<2.00	46,667	<0.40
1,2-Dichloropropane	84,000	<0.75	84,000	<0.15	84,000	<1.25	84,000	<0.90	84,000	<0.18	84,000	<0.49	-	-	84,000	<0.49	84,000	<0.32	84,000	<1.60	84,000	<0.32	84,000	<4.65	84,000	<0.93
1,3-Dichloropropylene[8]	28,000	cis <0.50 trans <0.75	28,000	cis <0.10 trans <0.15	28,000	cis <1.20 trans <1.10	28,000	<0.65	28,000	<0.13	28,000	cis <0.51 trans <0.50	-	-	28,000	cis <0.51 trans <0.50	28,000	<0.28	28,000	<1.45	28,000	<0.21	28,000	<2.15	28,000	<0.43
Ethylbenzene	93,333	<1.45	93,333	<0.29	93,333	<0.65	93,333	<0.75	93,333	<0.15	93,333	<0.46	-	-	93,333	<0.46	93,333	<0.29	93,333	<1.15	93,333	<0.23	93,333	<3.05	93,333	<0.61
Methyl bromide	1,307	<0.95	1,307	<0.19	1,307	<0.95	1,307	<0.90	1,307	<0.18	1,307	<0.46	-	-	1,307	<0.46	1,307	<0.28	1,307	<1.15	1,307	<0.23	1,307	<1.65	1,307	<0.33
Methyl chloride	NS	<1.85	NS	<0.37	NS	<1.40	NS	<1.15	NS	<0.23	NS	<0.46	-	-	NS	<0.46	NS	<0.28	NS	<1.85	NS	<0.37	NS	<1.65	NS	<0.33
Methylene chloride	56,000	1.6	56,000	<0.28	56,000	<1.00	56,000	<1.00	56,000	<0.20	56,000	<0.81	-	-	56,000	<0.81	56,000	<0.31	56,000	<4.00	56,000	<0.80	56,000	<2.20	56,000	<0.44
1,1,2,2-Tetrachloroethane	93,333	<2.45	93,333	<0.49	93,333	<2.00	93,333	<1.75	93,333	<0.35	93,333	<0.80	-	-	93,333	<0.80	93,333	<0.33	93,333	<1.55	93,333	<0.31	56,000	<4.15	56,000	<0.83
Tetrachloroethylene	9,333	<1.15	9,333	<0.23	9,333	<1.05	9,333	<0.65	9,333	<0.13	9,333	<0.35	-	-	9,333	<0.35	9,333	<0.23	9,333	<1.45	9,333	<0.29	9,333	<1.90	9,333	<0.38
Toluene	373,333	<0.60	373,333	<0.12	373,333	<0.95	373,333	<0.55	373,333	<0.11	373,333	<0.43	-	-	373,333	<0.43	373,333	<0.28	373,333	<1.25	373,333	<0.25	280,000	<1.90	280,000	<0.38
trans-1,2-Dichloroethylene	18,667	<0.85	18,667	<0.17	18,667	<1.25	18,667	<0.90	18,667	<0.18	18,667	<0.38	-	-	18,667	<0.38	18,667	<0.24	18,667	<1.25	18,667	<0.25	18,667	<1.60	18,667	<0.32
1,1,1-Trichloroethane	1,866,667	<1.15	1,866,667	<0.23	1,866,667	<1.00	1,866,667	<0.70	1,866,667	<0.14	1,866,667	<0.34	-	-	1,866,667	<0.34	1,866,667	<0.23	1,866,667	<1.40	1,866,667	<0.28	$1.867x10^{+6}$	<1.55	$1.867x10^{+6}$	<0.31
1,1,2-Trichloroethane	3,733	<1.20	3,733	<0.24	3,733	<0.75	3,733	<0.65	3,733	<0.13	3,733	<0.60	-	-	3,733	<0.60	3,733	<0.29	3,733	<1.50	3,733	<0.30	3,733	<3.40	3,733	<0.68
Trichloroethylene	280	<1.20	280	<0.24	280	<0.75	280	<1.10	280	<0.22	280	<0.48	-	-	280	<0.48	280	<0.28	280	<1.80	280	<0.36	280	<2.30	280	<0.46
1,2,4-Trimethylbenzene	NS	<5.0	NS	<1.0	NS	<5.0	NS	<10.0	NS	<1.0	NS	<1.0	-	-	NS	<1.0	NS	<1.0	NS	<5.0	NS	<1.0	NS	<5.0	NS	<1.0
1,3,5-Trimethylbenzene	NS	<5.0	NS	<1.0	NS	<5.0	NS	<5.0	NS	<1.0	NS	<1.0	-	-	NS	<1.0	NS	<1.0	NS	<5.0	NS	<1.0	NS	<5.0	NS	<1.0
Vinyl chloride	2,800	<2.50	2,800	<0.50	2,800	<1.00	2,800	<1.10	2,800	<0.22	2,800	<0.35	-	-	2,800	<0.35	2,800	<0.24	2,800	<2.10	2,800	<0.42	2,800	<1.75	2,800	<0.35
Xylenes, Total	186,667	<2.90	186,667	<0.58	186,667	<1.50	186,667	<1.25	186,667	<0.13	186,667	<0.52	-	-	186,667	<0.52	186,667	<0.32	186,667	<1.15	186,667	<0.23	186,667	<3.50	186,667	<0.70
Acid Compounds (µg/L) [2]																										
2-Chlorophenol	4,667	<57.0	4,667	<85.8	4,667	<214.5	4,667	<1.48	4,667	<1.48	4,667	<3.10	-	-	4,667	<2.92	4,667	<2.92	4,667	<42.3	4,667	<84.6	4,667	<45.2	4,667	<4.52
2,4-Dichlorophenol	2,800	<61.0	2,800	<84.4	2,800	<211.0	2,800	<1.65	2,800	<1.65	2,800	<2.81	-	-	2,800	<3.21	2,800	<3.21	2,800	<48.2	2,800	<96.4	2,800	<47.7	2,800	<4.77
2,4-Dimethylphenol	18,667	<73.0	18,667	<45.6	18,667	<114.0	18,667	<2.20	18,667	<2.20	18,667	<2.64	-	-	18,667	<1.32	18,667	<1.32	18,667	<70.7	18,667	<141.4	18,667	<20.4	18,667	<2.04
4,6-Dinitro-o-cresol	3,733	<69.0	3,733	<59.6	3,733	<149.0	3,733	<1.22	3,733	<1.22	3,733	<1.49	-	-	3,733	<2.27	3,733	<2.27	3,733	<46.9	3,733	<93.8	3,733	<33.6	3,733	<3.36
2,4-Dinitrophenol	1,867	<69.5	1,867	<51.8	1,867	<129.5	1,867	<1.13	1,867	<1.13	1,867	<2.21	-	-	1,867	<2.64	1,867	<2.64	1,867	<51.1	1,867	<102.2	1,867	<34.1	1,867	<3.41
2-Nitrophenol	NS	<139.0	NS	<82.2	NS	<205.5	NS	<1.57	NS	<1.57	NS	<2.84	-	-	NS	<2.61	NS	<2.61	NS	<78.3	NS	<156.6	NS	<46.8	NS	<4.68
4-Nitrophenol	NS	<408.0	NS	<93.4	NS	<233.5	NS	<1.14	NS	3.1	NS	<2.98	-	-	NS	<2.03	NS	<2.03	NS	<40.3	NS	<80.6	NS	<35.2	NS	<3.52
p-Chloro-m-cresol	48,000	<93.0	48,000	<88.2	48,000	<220.5	48,000	<1.65	48,000	<1.65	48,000	<1.87	-	-	48,000	<3.10	48,000	<3.10	48,000	<40.5	48,000	<81.0	48,000	<47.6	48,000	<4.76
Pentachlorophenol	57.85	*<103.5*	127.97	<67.2	135.76	*<168.0*	94.663	<1.39	76.64	<1.39	68.6	6.6	-	-	40.24	3.8	18.94	<3.44	52.78	*<73.6*	83.81	*<147.2*	89.91	<40.0	55.50	<4.00
Phenol	180,000	<59.5	180,000	<71.0	180,000	<177.5	180,000	2.8	180,000	1.9	180,000	<2.30	-	-	180,000	2.7	180,000	2.4	180,000	<39.9	180,000	<79.8	180,000	<40.8	180,000	<4.08
2,4,6-Trichlorophenol	130	*<140.0*	130	<95.8	130	*<239.5*	130	<1.89	130	<1.89	130	<2.60	-	-	130	<3.28	130	<3.28	130	<47.4	130	<94.8	130	<52.7	130	<5.27

SR045	Winter 2012/13		Summer 2013		Winter 2013/14		Summer 2014		Winter 2014/15		Summer 2015		Winter 2015/16 [6]		Summer 2016		Winter 2016/17		Summer 2017		Winter 2017/18		Summer 2018		Winter 2018/19	
SAMPLING DATE(S):	SWQS	12/14/2012	SWQS	7/21/2013	SWQS	11/22/2013	SWQS	8/12/2014	SWQS	12/4/2014	SWQS	7/31/2015	-	-	SWQS	7/29/2016	SWQS	11/3/2016	SWQS	7/16/2017	SWQS	2/14/2018	SWQS	8/7/2018	SWQS	11/30/2019
Bases/Neutrals (µg/L) [2]																										
Acenaphthene	56,000	<85.0	56,000	<26.8	56,000	<67.0	56,000	<1.03	56,000	<1.03	56,000	<0.35	-	-	56,000	<1.02	56,000	<1.02	56,000	<18.8	56,000	<37.6	56,000	<11.9	56,000	<1.19
Acenaphthylene	NS	<63.5	NS	<34.6	NS	<86.5	NS	<1.00	NS	<1.00	NS	<1.23	-	-	NS	<6.10	NS	<6.10	NS	<17.5	NS	<35.0	NS	<14.1	NS	<1.41
Anthracene	280,000	<44.5	280,000	<34.6	280,000	<86.5	280,000	<2.88	280,000	<2.88	280,000	<0.44	-	-	280,000	<1.96	280,000	<1.96	280,000	<26.2	280,000	<52.4	280,000	<12.0	280,000	<1.20
Benzo(a)anthracene	0.2	<78.5	0.2	<34.6	0.2	<86.5	0.2	<1.08	0.2	<1.08	0.2	<0.38	-	-	0.2	<1.57	0.2	<1.57	0.2	<19.6	0.2	<39.2	0.2	<10.2	0.2	<1.02
Benzo(a)pyrene	0.2	<96.5	0.2	<37.4	0.2	<93.5	0.2	<3.77	0.2	<3.77	0.2	<1.41	-	-	0.2	<3.12	0.2	<3.12	0.2	<37.7	0.2	<75.4	0.2	<10.8	0.2	<1.08
Benzo(b)fluoranthene	1.9	<169.5	1.9	<48.6	1.9	<121.5	1.9	<1.46	1.9	<1.46	1.9	<1.06	-	-	1.9	<1.28	1.9	<1.28	1.9	<21.7	1.9	<43.4	NS	<3.8	NS	<0.38
Benzo(g,h,i)perylene	NS	<70.5	NS	<34.6	NS	<86.5	NS	<1.29	NS	<1.29	NS	<0.72	-	-	NS	<2.83	NS	<2.83	NS	<25.1	NS	<50.2	NS	<11.4	NS	<1.14
Benzo(k)fluoranthene	1.9	<57.5	1.9	<28.0	1.9	<70.0	1.9	<1.04	1.9	<1.04	1.9	<0.35	-	-	1.9	<1.76	1.9	<1.76	1.9	<23.3	1.9	<46.6	1.9	<10.3	1.9	<1.03
Chrysene	19	<44.5	19	<29.6	19	<74.0	19	<1.41	19	<1.41	19	<0.46	-	-	19	<1.08	19	<1.08	19	<19.6	19	<39.2	19	<11.6	19	<1.16
Dibenz(a,h)anthracene	1.9	<202.5	1.9	<39.6	1.9	<99.0	1.9	<1.24	1.9	<1.24	1.9	<0.47	-	-	1.9	<1.93	1.9	<1.93	1.9	<60.4	1.9	<120.8	1.9	<10.2	1.9	<1.02
1,2-Dichlorobenzene	5,900	<108.5	5,900	<5.4	5,900	<13.5	5,900	<1.76	5,900	<1.76	5,900	<1.04	-	-	5,900	<0.58	5,900	<0.58	5,900	<1.50	5,900	<0.30	5,900	<14.3	5,900	<1.43
1,3-Dichlorobenzene	NS	<121.0	NS	<22.6	NS	<56.5	NS	<1.74	NS	<1.74	NS	<0.47	-	-	NS	<0.52	NS	<0.52	NS	<1.25	NS	<0.25	NS	<13.9	NS	<1.39
1,4-Dichlorobenzene	6,500	<106.5	6,500	<21.0	6,500	<52.5	6,500	<1.56	6,500	<1.56	6,500	<1.28	-	-	6,500	<0.50	6,500	<0.50	6,500	<1.25	6,500	<0.29	6,500	<14.8	6,500	<1.48
3,3-Dichlorobenzidine	3	<369.0	3	<545.4	3	<1363.5	3	<6.06	3	<6.06	3	<11.60	-	-	3	<23.45	3	<23.45	3	<254.3	3	<508.6	3	<69.9	3	<6.99
Diethyl phthalate	746,667	<74.0	746,667	<38.0	746,667	<95.0	746,667	<2.37	746,667	<2.37	746,667	0.7	-	-	746,667	<1.07	746,667	<1.07	746,667	<19.9	746,667	<39.8	746,667	<10.8	746,667	1.1
Dimethyl phthalate	NS	<60.5	NS	<35.8	NS	<89.5	NS	<2.42	NS	<2.42	NS	<0.47	-	-	NS	<0.58	NS	<0.58	NS	<19.1	NS	<39.2	NS	<11.7	NS	<1.17
Di-n-butyl phthalate	1,100	<114.5	1,100	<44.6	1,100	<111.5	1,100	<1.85	1,100	<1.85	1,100	<0.31	-	-	1,100	<1.37	1,100	<1.37	1,100	<23.5	1,100	<47.0	1,100	<11.2	1,100	<1.12
2,4-Dinitrotoluene	1,867	<65.5	1,867	<41.0	1,867	<102.5	1,867	<2.12	1,867	<2.12	1,867	<0.26	-	-	1,867	<1.30	1,867	<1.30	1,867	<31.0	1,867	<62.0	1,867	<11.7	1,867	<1.17
2,6-Dinitrotoluene	3,733	<93.5	3,733	<50.4	3,733	<126.0	3,733	<1.12	3,733	<1.12	3,733	<0.38	-	-	3,733	<1.39	3,733	<1.39	3,733	<28.9	3,733	<57.8	3,733	<11.3	3,733	<1.13
Di-n-octyl phthalate	373,333	<206.5	373,333	<57.6	373,333	<144.0	373,333	<1.10	373,333	<1.10	373,333	<1.28	-	-	373,333	<1.67	373,333	<1.67	373,333	<55.0	373,333	<110.0	373,333	<20.5	373,333	<2.05
1,2-Diphenylhydrazine (as azobenzene)	NS[8]	<53.5	NS	<46.6	NS	<116.5	NS	<6.70	NS	<6.70	NS	<1.06	-	-	NS	<7.46	NS	<7.46	NS	<21.5	NS	<43.0	1.8	<11.1	1.8	<1.11
Fluoranthene	37,333	<33.5	37,333	<35.8	37,333	<89.5	37,333	<1.35	37,333	<1.35	37,333	<0.27	-	-	37,333	<1.06	37,333	<1.06	37,333	<30.8	37,333	<61.6	37,333	<12.7	37,333	<1.27
Fluorene	37,333	<84.0	37,333	<30.8	37,333	<77.0	37,333	<4.81	37,333	<4.81	37,333	<0.29	-	-	37,333	<0.51	37,333	<0.51	37,333	<28.7	37,333	<57.4	37,333	<11.8	37,333	<1.18
Hexachlorobenzene	747	<65.0	747	<27.8	747	<69.5	747	<1.23	747	<1.23	747	<0.34	-	-	747	<0.47	747	<0.47	747	<15.7	747	<31.4	747	<10.1	747	<1.01
Hexachlorobutadiene	187	<68.5	187	<6.6	187	<16.5	187	<1.82	187	<1.82	187	<1.67	-	-	187	<0.41	187	<0.41	187	<10.0	187	<20.0	187	<12.0	187	<1.20
Hexachlorocyclopentadiene	11,200	<66.0	11,200	<45.4	11,200	<113.5	11,200	<1.23	11,200	<1.23	11,200	<1.53	-	-	11,200	<2.16	11,200	<2.16	11,200	<61.0	11,200	<122.0	9,800	<30.7	9,800	<3.07
Hexachloroethane	850	<70.0	850	<8.0	850	<20.0	850	<1.62	850	<1.62	850	<1.23	-	-	850	<0.54	850	<0.54	850	<14.9	850	<29.8	850	<13.5	850	<1.35
Indeno(1,2,3-cd)pyrene[9]	1.9	<166.5	1.9	<40.6	1.9	<101.5	1.9	<1.39	1.9	<1.39	1.9	<0.62	-	-	1.9	<2.38	1.9	**3.89**	1.9	<61.1	1.9	<122.2	1.9	<10.7	1.9	<1.07
Isophorone	186,667	<95.0	186,667	<28.2	186,667	<70.5	186,667	<2.14	186,667	<2.14	186,667	<0.37	-	-	186,667	<0.51	186,667	<0.51	186,667	<17.7	186,667	<35.4	186,667	<13.2	186,667	<1.32
Naphthalene	18,667	<71.0	18,667	<24.0	18,667	<60.0	18,667	<1.83	18,667	<1.83	18,667	<0.36	-	-	18,667	<0.49	18,667	<0.49	18,667	<15.4	18,667	<30.8	18,667	<14.8	18,667	<1.48
Nitrobenzene	467	<65.5	467	<24.6	467	<61.5	467	<2.10	467	<2.10	467	<1.26	-	-	467	<0.44	467	<0.44	467	<18.0	467	<36.0	467	<15.5	467	<1.55
n-Nitrosodimethylamine	0.03	<82.0	0.03	<24.0	0.03	<60.0	0.03	<1.00	0.03	<1.00	0.03	<1.13	-	-	0.03	<0.54	0.03	<0.54	0.03	<16.2	0.03	<32.4	0.03	<16.7	0.03	<1.67
n-Nitrosodi-n-propylamine	86,667	<94.0	86,667	<30.2	86,667	<75.5	86,667	<1.15	86,667	<1.15	86,667	<1.17	-	-	86,667	<1.02	86,667	<1.02	86,667	<16.5	86,667	<33.0	88,667	<16.5	88,667	<1.65
n-Nitrosodiphenylamine	290	<50.0	290	<60.8	290	<152.0	290	<3.57	290	<3.57	290	<1.15	-	-	290	<1.67	290	<1.67	290	<31.3	290	<62.6	290	<10.7	290	<1.07
Phenanthrene	NS	<38.0	NS	<32.6	NS	<81.5	NS	<1.39	NS	<1.39	NS	<0.31	-	-	NS	<0.49	NS	<0.49	NS	<30.2	NS	<60.4	NS	<13.3	NS	<1.33
Pyrene	28,000	<116.5	28,000	<32.8	28,000	<82.0	28,000	<3.86	28,000	<3.86	28,000	<0.67	-	-	28,000	<3.21	28,000	<3.21	28,000	<33.8	28,000	<67.6	28,000	<12.0	28,000	<1.20
1,2,4-Trichlorobenzene	9,333	<133.0	9,333	<6.4	9,333	<16.0	9,333	<1.69	9,333	<1.69	9,333	<1.04	-	-	9,333	<0.55	9,333	<0.55	9,333	<12.1	9,333	<24.2	9,333	<13.4	9,333	<1.34
Pesticides (µg/L) [2]																										
Aldrin	4.5	<0.046	4.5	<0.048	4.5	<0.015	4.5	<0.027	4.5	<0.027	4.5	<0.012	-	-	4.5	<0.019	4.5	<0.019	4.5	<0.013	4.5	<0.014	4.5	<0.010	4.5	<0.010
Alpha-BHC	1,600	<0.038	1,600	<0.040	1,600	<0.016	1,600	<0.021	1,600	<0.021	1,600	<0.058	-	-	1,600	<0.010	1,600	<0.010	1,600	<0.015	1,600	<0.016	1,600	<0.012	1,600	0.041
Beta-BHC	560	<0.095	560	<0.100	560	<0.088	560	<0.072	560	<0.072	560	<0.063	-	-	560	<0.049	560	<0.049	560	<0.083	560	<0.086	560	<0.099	560	<0.099
Gamma-BHC	11	<0.033	11	0.052	11	<0.022	11	<0.034	11	<0.034	11	<0.058	-	-	11	<0.019	11	<0.019	11	<0.020	11	<0.021	11	<0.013	11	<0.013
Delta-BHC	1,600	<0.032	1,600	<0.034	1,600	<0.017	1,600	<0.021	1,600	<0.021	1,600	<0.066	-	-	1,600	<0.035	1,600	<0.035	1,600	<0.012	1,600	<0.012	1,600	<0.045	1,600	<0.045
Chlordane	3.2	<0.16	3.2	<0.17	3.2	<0.19	3.2	<0.14	3.2	<0.14	3.2	<0.36	-	-	3.2	<0.61	3.2	<0.61	3.2	<0.029	3.2	<0.030	3.2	<0.33	3.2	<0.33
4,4'-DDT	1.1	<0.029	1.1	<0.030	1.1	<0.015	1.1	<0.025	1.1	<0.025	1.1	<0.017	-	-	1.1	<0.011	1.1	<0.011	1.1	<0.020	1.1	<0.021	1.1	<0.009	1.1	<0.009
4,4'-DDE	1.1	<0.034	1.1	<0.036	1.1	<0.017	1.1	<0.010	1.1	<0.010	1.1	<0.013	-	-	1.1	<0.020	1.1	<0.020	1.1	<0.019	1.1	<0.020	1.1	<0.015	1.1	<0.015
4,4'-DDD	1.1	<0.023	1.1	<0.024	1.1	<0.013	1.1	<0.031	1.1	<0.031	1.1	<0.021	-	-	1.1	<0.021	1.1	<0.021	1.1	<0.023	1.1	<0.024	1.1	<0.017	1.1	<0.017
Dieldrin	4	<0.028	4	<0.029	4	0.07	4	<0.030	4	<0.030	4	<0.060	-	-	4	<0.019	4	<0.019	4	<0.015	4	<0.041	4	<0.012	4	<0.012
Alpha-endosulfan	3 T	<0.034	3 T	0.089	3 T	<0.017	3 T	<0.018	3 T	<0.018	3 T	<0.072	-	-	3 T	<0.018	3 T	<0.018	3 T	<0.015	3 T	<0.016	3 T	<0.020	3 T	<0.020
Beta-endosulfan	3 T	<0.034	3 T	<0.036	3 T	<0.012	3 T	<0.032	3 T	<0.032	3 T	<0.019	-	-	3 T	<0.021	3 T	<0.021	3 T	<0.014	3 T	<0.015	3 T	<0.014	3 T	<0.014
Endosulfan sulfate	3	<0.025	3	<0.026	3	<0.013	3	<0.008	3	<0.008	3	0.028	-	-	3	<0.022	3	<0.022	3	<0.019	3	<0.020	3	<0.017	3	<0.017
Endrin	0.7	<0.035	0.7	<0.037	0.7	<0.015	0.7	<0.017	0.7	<0.017	0.7	<0.023	-	-	0.7	<0.042	0.7	<0.042	0.7	<0.040	0.7	<0.042	0.7	<0.042	0.7	<0.042
Endrin aldehyde	0.7	<0.038	0.7	<0.040	0.7	<0.022	0.7	<0.032	0.7	<0.032	0.7	<0.026	-	-	0.7	<0.024	0.7	<0.024	0.7	<0.034	0.7	<0.035	0.7	<0.068	0.7	<0.068
Heptachlor	0.9	<0.035	0.9	<0.037	0.9	<0.017	0.9	<0.027	0.9	0.045	0.9	<0.035	-	-	0.9	<0.023	0.9	<0.023	0.9	<0.019	0.9	<0.020	0.9	0.095	0.9	<0.011
Heptachlor epoxide	0.9	<0.032	0.9	<0.034	0.9	<0.019	0.9	<0.008	0.9	<0.008	0.9	<0.062	-	-	0.9	<0.020	0.9	<0.020	0.9	<0.016	0.9	<0.017	0.9	<0.012	0.9	<0.012
PCB-1242	[4]	<0.41	[4]	<0.43	[4]	<0.52	[4]	<0.37	[4]	<0.37	[4]	<0.14	-	-	[4]	<0.72	[4]	<0.72	[4]	<0.33	[4]	<0.34	[4]	<0.28	[4]	<0.28
PCB-1254	[4]	<0.20	[4]	<0.21	[4]	<0.27	[4]	<0.23	[4]	<0.23	[4]	<0.20	-	-	[4]	<0.22	[4]	<0.22	[4]	<0.17	[4]	<0.18	[4]	<0.21	[4]	<0.21

SR045	Winter 2012/13		Summer 2013		Winter 2013/14		Summer 2014		Winter 2014/15		Summer 2015		Winter 2015/16 [6]		Summer 2016		Winter 2016/17		Summer 2017		Winter 2017/18		Summer 2018		Winter 2018/19	
SAMPLING DATE(S):	SWQS	12/14/2012	SWQS	7/21/2013	SWQS	11/22/2013	SWQS	8/12/2014	SWQS	12/4/2014	SWQS	7/31/2015	-	-	SWQS	7/29/2016	SWQS	11/3/2016	SWQS	7/16/2017	SWQS	2/14/2018	SWQS	8/7/2018	SWQS	11/30/2019
PCB-1221	[4]	<0.68	[4]	<0.71	[4]	<0.81	[4]	<0.22	[4]	<0.22	[4]	<0.64	-	-	[4]	<0.46	[4]	<0.46	[4]	<0.36	[4]	<0.37	[4]	<0.50	[4]	<0.50
PCB-1232	[4]	<0.66	[4]	<0.69	[4]	<0.32	[4]	<0.55	[4]	<0.55	[4]	<0.37	-	-	[4]	<0.90	[4]	<0.90	[4]	<0.40	[4]	<0.42	[4]	<0.48	[4]	<0.48
PCB-1248	[4]	<0.78	[4]	<0.82	[4]	<0.26	[4]	<0.19	[4]	<0.19	[4]	<0.22	-	-	[4]	<0.24	[4]	<0.24	[4]	<0.21	[4]	<0.22	[4]	<0.35	[4]	<0.35
PCB-1260	[4]	<0.21	[4]	<0.22	[4]	<0.22	[4]	<0.32	[4]	<0.32	[4]	<0.59	-	-	[4]	<0.26	[4]	<0.26	[4]	<0.34	[4]	<0.35	[4]	<0.28	[4]	<0.28
PCB-1016	[4]	<0.36	[4]	<0.38	[4]	<0.31	[4]	<0.18	[4]	<0.18	[4]	<0.55	-	-	[4]	<0.29	[4]	<0.29	[4]	<0.33	[4]	<0.34	[4]	<0.40	[4]	<0.40
Toxaphene	11	<0.53	11	<0.56	11	<0.32	11	<0.22	11	<0.22	11	<0.60	-	-	11	<0.48	11	<0.48	11	<0.47	11	<0.49	11	<0.482	11	<0.482

Notes:

NS = no standard applicable to the designated use

T = total

D = dissolved

Bold text indicates a sample result greater than the WQS

Italicized text indicates a laboratory detection limit higher than the WQS

Footnotes:

[1] The Permittee shall report on any additional parameters that were monitored for seasonal stormwater sampling as required by Section 6.0 of this permit (Special Conditions).

[2] Analytical results shall be reported in the units specified for each category or parameter.

[3] Report the average flow rate for the sampling period (no more than 6 hours).

[4] Standard for total PCBs of 11 µg/L A&We and 19 µg/L PBC.

[5] The sample was lost during extraction at the laboratory due to the glassware breaking.

[6] There were no representative storm events (>0.20 inches) that occurred or no representative events without a measurable rain event in the previous 72 hours.

[7] A representative event occurred on 8/2; however, the sampler malfunctioned. Then next event was on 8/5 but due to the 72-hour rule, no sample was taken. Another measurable event on 9/22 did not result in a qualifying rain event. No samples were taken at this outfall during Summer 2016.

[8] Prior to FY2016, the lab was reporting cis and trans for 1-3-dichloropropylene; this reporting year, an upgrade has resulted in providing the result as a total.

[9] Data flagged due to contamination in the lab reagent blank; therefore, these are not true detections or exceedances.

OUTFALL ID: SR049	**MONITORING SEASONS**																									
	Summer: June 1 - October 31																									
RECEIVING WATER: Salt River	Winter: November 1 - May 31																									
DESIGNATED USES: A&Wedw, PBC, FC, AgI, AgL	Winter 2012/13		Summer 2013		Winter 2013/14		Summer 2014		Winter 2014/15		Summer 2015		Winter 2015/16		Summer 2016 [7]		Winter 2016/17		Summer 2017		Winter 2017/18		Summer 2018		Winter 2018/19	
SAMPLING DATE(S):	SWQS	12/14/2012	SWQS	7/21/2013	SWQS	11/22/2013	SWQS	8/1/2014	SWQS	12/4/2014	SWQS	7/31/2015	SWQS	1/4/2016	-	-	SWQS	11/3/2016	SWQS	7/14/2017	SWQS	1/9/2018	SWQS	8/11/2018	SWQS	3/12/2019
MONITORING PARAMETERS [1,2]																										
Conventional Parameters																										
Flow [3] (cfs)	NS	3.56	NS	18.84	NS	13.48	NS	10.791	NS	10.166	NS	24.5	NS	22.997	-	-	NS	55.936	NS	101.82	NS	13.82	NS	22.3	NS	2.27
pH	6.5-9	7.45	6.5-9	8.03	6.5-9	8.54	6.5-9	7.64	6.5-9	8.01	6.5-9	7.5	6.5-9	7.73	-	-	6.5-9	7.16	6.5-9	7.29	6.5-9	7.95	4.5-9	8.55	4.5-9	7.55
Temperature (ºC)	Varies	20	Varies	28.6	Varies	17	Varies	28.5	Varies	18	Varies	30.8	Varies	16.5	-	-	Varies	21.5	Varies	27.8	Varies	18.3	Varies	25.3	Varies	18.4
Hardness (mg/L)	400	103	400	39.9	400	32.8	400	74.8	400	142	400	66.8	400	48.9	-	-	400	171	400	57.3	400	68.9	400	42.8	400	56.3
Total Dissolved Solids (TDS) (mg/L) [2]	NS	402	NS	134	NS	100	NS	290	NS	362	NS	270	NS	146	-	-	NS	486	NS	190	NS	216	NS	188	NS	158
Total Suspended Solids (TSS) (mg/L) [2]	NS	226	NS	440	NS	420	NS	508	NS	200	NS	2,290	NS	420	-	-	NS	256	NS	295	NS	488	NS	1,220	NS	127
Biochemical Oxygen Demand (BOD) (mg/L) [2]	NS	69	NS	35	NS	22	NS	66	NS	33	NS	61	NS	25	-	-	NS	35	NS	26	NS	45	NS	23	NS	24
Chemical Oxygen Demand (COD) (mg/L) [2]	NS	430	NS	270	NS	200	NS	440	NS	210	NS	750	NS	280	-	-	NS	260	NS	230	NS	310	NS	280	NS	150

SR049	Winter 2012/13		Summer 2013		Winter 2013/14		Summer 2014		Winter 2014/15		Summer 2015		Winter 2015/16		Summer 2016 [7]		Winter 2016/17		Summer 2017		Winter 2017/18		Summer 2018		Winter 2018/19	
SAMPLING DATE(S):	SWQS	12/14/2012	SWQS	7/21/2013	SWQS	11/22/2013	SWQS	8/1/2014	SWQS	12/4/2014	SWQS	7/31/2015	SWQS	1/4/2016	-	-	SWQS	11/3/2016	SWQS	7/14/2017	SWQS	1/9/2018	SWQS	8/11/2018	SWQS	3/12/2019
Inorganics																										
Cyanide, total (µg/L) [2]	41 T	<5	41 T	<50	41 T	<5	41 T	<5	41 T	<5	41 T	<5	41 T	<5	-	-	41 T	<5	41 T	<5	41 T	<5	41 T	<5	41 T	<5
Nutrients (mg/L) [2]																										
Nitrate + Nitrite as N	NS	3.2	NS	1.2	NS	0.8	NS	2.8	NS	1.9	NS	1.3	NS	1.0	-	-	NS	1.5	NS	1.2	NS	1.4	NS	1.0	NS	1.0
Ammonia as N	21.45	4.1	5.33	1.3	1.99	1.1	10.7	2.8	5.52	1.4	19.9	2.5	13.7	1.2	-	-	30.9	2	26.5	0.9	9.2	2.5	2.9	2.4	18.4	0.96
Total Kjeldahl Nitrogen (TKN)	NS	11	NS	5.3	NS	3.8	NS	8	NS	4.7	NS	5.2	NS	3.9	-	-	NS	5.3	NS	3.6	NS	6.3	NS	5.0	NS	2.7
Total Phosphorus as P	NS	0.8	NS	0.46	NS	1.5	NS	2.1	NS	0.35	NS	3.5	NS	1.4	-	-	NS	0.6	NS	0.83	NS	1.6	NS	0.65	NS	0.55
Ortho-Phosphorus as P	NS	0.4	NS	0.3	NS	0.2	NS	0.6	NS	0.1	NS	<0.1	NS	0.2	-	-	NS	0.3	NS	0.1	NS	0.4	NS	0.2	NS	0.1
Microbiological																										
Escherichia coli (*E. coli*) (CFU/100 mg or MPN/100 mL) [2]	575	**1,553.10**	575	**>2,419.6**	575	**>2,419.6**	575	**>2,419.6**	575	**>2,419.6**	575	**8,570**	575	**5,040.00**	-	-	575	**48,840**	575	**141,360**	575	**4,040**	575	**5,560**	575	**>2,419.6**
Total Metals (µg/L) [2]																										
Antimony	640 T 1,000 D	3.3 T 1.5 D	640 T 1,000 D	1.8 T 0.7 D	640 T 1,000 D	1.8 T 0.3 D	640 T 1,000 D	4.3 T 1.9 D	640 T 1,000 D	2.7 T 1.6 D	640 T 1,000 D	2.6 T <5.0 D	640 T 1,000 D	3.0 T <5.0 D	-	-	640 T 1,000 D	3.6 T <5 D	640 T 1,000 D	1.4 T <5 D	640 T 1,000 D	2.9 T <5 D	640 T 1,000 D	1.2 T <5.0 D	640 T 1,000 D	2.0 T <5.0 D
Arsenic	80 T 340 D	5.8 T 2.2 D	80 T 340 D	6.5 T 1.4 D	80 T 340 D	4.2 T 0.6 D	80 T 340 D	7.7 T 2.3 D	80 T 340 D	4.4 T 2.0 D	80 T 340 D	16.6 T <5.0 D	80 T 340 D	6.0 T <5.0 D	-	-	80 T 340 D	5.4 T <5 D	80 T 340 D	5 T <5 D	80 T 340 D	7.4 T <5 D	80 T 340 D	12.7 T <5.0 D	80 T 340 D	4.0 T <5.0 D
Barium	98,000 T	230 T 48 D	98,000 T	241 T 25 D	98,000 T	157 T 8 D	98,000 T	251 T 44 D	98,000 T	160 T 56 D	98,000 T	572 T 43 D	98,000 T	244 T 27 D	-	-	98,000 T	187 T 83 D	98,000 T	137 T 33 D	98,000 T	212 T 37 D	98,000 T	443 T 38 D	98,000 T	155 T 63 D
Beryllium	84 T	0.59 T <0.15 D	84 T	0.79 T <0.15 D	84 T	0.4 T <0.06 D	84 T	0.74 T <0.06 D	84 T	0.3 T <0.06 D	84 T	2.1 T <5.0 D	84 T	0.53 T <5.0 D	-	-	84 T	0.35 T <5 D	84 T	0.43 T <5 D	84 T	0.69 T <5 D	84 T 65 D	1.7 T <5.0	84 T 65 D	0.24 T <5.0 D
Cadmium	50 T 8.10 D	1.1 T <0.25 D	50 T 3.22 D	1.0 T <0.25 T	50 T 2.66 D	0.9 T <0.10 D	50 T 5.93 D	0.9 T <0.12 D	50 T 11.07 D	0.4 T <0.12 D	50 T 5.31 D	2.4 T <5.0 D	50 T 3.92 D	1.1 T *<5.0 D*	-	-	50 T 7.62 D	0.4 T <0.25 D	50 T 2.33 D	0.4 T <0.2 D	50 T 2.85 D	0.5 T *<5.0 D*	50 T 1.70	1.0 T <0.25 D	50 T 2.29	0.3 T <0.25 D
Chromium	1,000 T	17.3 T <2.00 D	1,000 T	26.3 T <2.00 D	1,000 T	14.4 T <0.80 D	1,000 T	27.3 T 2.2 D	1,000 T	11.2 T 1.4 D	1,000 T	67.0 T <5.0 D	1,000 T	20.1 T <5.0 D	-	-	1,000 T	12.8 T <5 D	1,000 T	18 T <5 D	1,000 T	25 T <5 D	1,000 T	57.4 T <5.0 D	1,000 T	11.8 T <5.0 D
Copper	500 T 13.82 D	152 T **45.2 D**	500 T 5.66 D	149 T **11.8 D**	500 T 4.70 D	79.1 T **5.5 D**	500 T 10.22 D	127 T **18.4 D**	500 T 18.7	75.6 T **19.8 D**	500 T 9.19 D	268 T **17.2 D**	500 T 6.85 D	137 T **10.5 D**	-	-	500 T 22.28 D	66.8 T 9.3 D	500 T 7.95 D	49.1 T **13.2 D**	500 T 9.46 D	82.6 T **22.8 D**	500 T 6.04	133 T **15.6 D**	500 T 7.82	35.8 T **15.8 D**
Lead	15 T 66.69 D	**38.9 T** 0.8 D	15 T 23.45 D	**48.2 T** 2.3 D	15 T 18.83 D	**39.5 T** 0.3 D	15 T 47.01 D	**35.4 T** 2.0 D	15 T 94.4	**16.0 T** 0.5 D	15 T 41,51 D	**93.5 T** 2.1 D	15 T 29.40 D	**38.4 T** <5.0 D	-	-	15 T 115.22 D	14 T 0.7 D	15 T 35.05 D	12.8 T 0.2 D	15 T 42.95 D	**19.6 T** 0.8 D	15 T 25.35	**45.4 T** 0.4 D	15 T 34.37	10.6 T 0.2 D
Mercury	10 T 2.4 D	<0.040 T <0.040 D	10 T 2.4 D	0.06 T <0.020 D	10 T 2.4 D	0.04 T <0.020 D	10 T 2.4 D	0.13 T <0.2 D	10 T 2.4 D	<0.092 T <0.092 D	10 T 2.4 D	0.11 T <0.2 D	10 T 2.4 D	0.08 T <0.2 D	-	-	10 T 2.4 D	<0.068 T <0.2 D	10 T 2.4 D	<0.20 T <0.20 D	10 T 2.4 D	<0.066 T <0.2 D	10 T 2.4 D	0.105 T <0.2 D	10 T 2.4 D	<0.042 T <0.2 D
Nickel	511 T 480 D	26.4 T 8.6 D	511 T 215.5 D	34.8 T 4.4 D	511 T 182.2 D	18.5 T 1.1 D	511 T 366.2 D	34.6 T 7.2 D	511 T 630	16.0 T 4.3 D	511 T 333 D	86.7 T 8.1 D	511 T 256 D	27.8 T <5.0 D	-	-	511 T 737.19 D	16.7 T <5 D	511 T 292.32 D	22.6 T <5 D	511 T 341.66 D	30.5 T <5 D	4,600 T 228.38	70.4 T <5.0 D	4,600 T 288.00	13.5 T <5.0 D
Selenium	20 T	1.3 T 0.8 D	20 T	<0.60 T <0.60 D	20 T	<0.60 T <0.24 D	20 T	1.1 T 0.7 D	20 T	0.78 T 0.6 D	20 T	1.2 T <5.0 D	20 T	0.59 T <5.0 D	-	-	20 T	0.44 T <5 D	20 T	0.53 T <5 D	20 T	0.65 T <5 D	20 T	1.0 T <5.0 D	20 T	<0.55 T <5.0 D

SR049	Winter 2012/13		Summer 2013		Winter 2013/14		Summer 2014		Winter 2014/15		Summer 2015		Winter 2015/16		Summer 2016 [7]		Winter 2016/17		Summer 2017		Winter 2017/18		Summer 2018		Winter 2018/19	
SAMPLING DATE(S):	SWQS	12/14/2012	SWQS	7/21/2013	SWQS	11/22/2013	SWQS	8/1/2014	SWQS	12/4/2014	SWQS	7/31/2015	SWQS	1/4/2016	-	-	SWQS	11/3/2016	SWQS	7/14/2017	SWQS	1/9/2018	SWQS	8/11/2018	SWQS	3/12/2019
Silver	4,667 T 3.38 D	0.5 T <0.15 D	4,667 T 0.667 D	0.3 T <0.15 D	4,667 T 0.474 D	0.2 T <0.15 D	4,667 T 1.952 D	0.2 T <0.20 D	4,667 T 5.88 D	0.1 T <0.08 D	4,667 T 1.61 D	0.4 T <5.0 D	4,667 T 0.94 D	<0.25 T <5.0 D	-	-	4,667 T 8.09 D	<0.45 T <5 D	4,667 T 1.23 D	<0.1 T <5 D	4,667 T 1.69 D	<0.2 T <5 D	4,667 T 0.75	0.3 T <5.0 D	4,667 T 1.20	<0.15 T <5.0 D
Thallium	1 T 700 D	<0.20 T <0.20 D	1 T 700 D	<0.20 T <0.20 D	1 T 700 D	0.29 T <0.08 D	1 T 700 D	0.37 T <0.04 D	1 T 700 D	0.30 T <0.04 D	1 T 700 D	0.41 T <5.0 D	1 T 700 D	0.15 T <5.0 D	-	-	1 T 700 D	<0.2 T <5 D	1 T 700 D	<0.10 T <5 D	1 T 700 D	<0.26 T <5 D	7.2 T 700 D	0.39 T <5.0 D	7.2 T 700 D	<0.15 T <5.0 D
Zinc	5,106 T 120.2 D	528 T 99.2 D	5,106 T 53.79 D	458 T 39.5 D	5,106 T 45.56 D	349 T 11.6 D	5,106 T 91.6 D	502 T 51.4 D	5,106 T 157.7	180 T 25.6 D	5,106 T 83.3 D	1,510 T 70.8 D	5,106 T 63.9 D	740 T 21.2 D	-	-	5,106T 184.62 D	259 T 34.9 D	5,106 T 73.10 D	210 T 18.6 D	5,106 T 85.46 D	308 T 34.7 D	5,106 T 57.09	529 T 8.3 D	5,106 T 72.02	134 T 17 D
Organic Toxic Pollutants																										
Total Petroleum Hydrocarbons (TPH) (mg/L) [2]	NS	<10	NS	<11	NS	<11	NS	<10	NS	<10	NS	<10	NS	<6	-	-	NS	<4.6	NS	<6.9	NS	<7.1	NS	<7.2	NS	<4.6
Total Oil and Grease (mg/L) [2]	NS	8.1	NS	<5.7	NS	<5.7	NS	7	NS	7.6	NS	<5.1	NS	<6	-	-	NS	<4.6	NS	<5.8	NS	<5.9	NS	<6.0	NS	<4.6
VOCs, Semi-VOCs, and Pesticides (µg/L) [2]																										
Acrolein	1.9	<1.465	1.9	<0.20	1.9	<0.20	1.9	<2.00	1.9	<0.40	1.9	<0.78	1.9	<0.78	-	-	1.9	<0.41	1.9	<3.95	1.9	<0.79	1.9	<0.55	1.9	0.94
Acrylonitrile	0.2	<1.130	0.2	<0.16	0.2	<0.16	0.2	<0.70	0.2	<0.14	0.2	<0.53	0.2	<0.53	-	-	0.2	<0.42	0.2	<2.95	0.2	<0.59	0.2	<0.57	0.2	<0.57
Benzene	114	<0.75	114	<1.20	114	<0.24	114	<1.20	114	<0.13	114	<0.46	114	<0.46	-	-	114	<0.29	114	<1.30	114	<0.26	140	<0.33	140	<0.33
Bromoform	133	<2.15	133	<2.35	133	<0.47	133	<2.35	133	<0.28	133	<0.68	133	<0.68	-	-	133	<0.33	133	<1.05	133	<0.21	133	<0.81	133	<0.81
Carbon tetrachloride	2	<1.65	2	<1.30	2	<0.26	2	<1.30	2	<0.23	2	<0.31	2	<0.31	-	-	2	<0.20	2	<1.50	2	<0.30	2	<0.27	2	<0.27
Chlorobenzene	1,553	<1.40	1,553	<0.80	1,553	<0.16	1,553	<0.80	1,553	<0.13	1,553	<0.50	1,553	<0.50	-	-	1,553	<0.33	1,553	<1.15	1,553	<0.23	1,553	<0.70	1,553	<0.70
Chlorodibromomethane	13	<1.30	13	<0.90	13	<0.18	13	<0.90	13	<0.24	13	<0.61	13	<0.61	-	-	13	<0.32	13	<1.20	13	<0.24	13	<0.70	13	<0.70
Chloroethane (ethyl chloride)	NS	<1.35	NS	<1.10	NS	<0.22	NS	<1.10	NS	<0.19	NS	<0.40	NS	<0.40	-	-	NS	<0.33	NS	<1.40	NS	<0.28	NS	<0.33	NS	<0.33
2-Chloroethylvinyl ether	180,000	<0.22	180,000	<0.22	180,000	<0.22	180,000	<0.95	180,000	<0.19	180,000	<0.53	180,000	<0.53	-	-	180,000	<0.43	180,000	<3.25	180,000	<0.65	180,000	<0.52	180,000	<0.52
Chloroform	2,133	<1.05	2,133	<1.15	2,133	<0.23	2,133	<1.15	2,133	<0.14	2,133	<0.49	2,133	<0.49	-	-	2,133	<0.32	2,133	<1.20	2,133	<0.24	470	<0.31	470	<0.31
Dichlorobromomethane	17	<0.75	17	<1.15	17	<0.23	17	<1.15	17	<0.15	17	<0.49	17	<0.49	-	-	17	<0.29	17	<1.30	17	<0.26	17	<0.52	17	<0.52
1,1-Dichloroethane	NS	<0.65	NS	<1.30	NS	<0.26	NS	<1.30	NS	<0.19	NS	<0.42	NS	<0.42	-	-	NS	<0.29	NS	<1.35	NS	<0.27	NS	<0.32	NS	<0.32
1,2-Dichloroethane	37	<0.80	37	<1.25	37	<0.25	37	<1.25	37	<0.11	37	<0.51	37	<0.51	-	-	37	<0.35	37	<1.30	37	<0.26	37	<0.28	37	<0.28
1,1-Dichloroethylene	7,143	<1.85	7,143	<1.40	7,143	<0.28	7,143	<1.40	7,143	<0.27	7,143	<0.34	7,143	<0.34	-	-	7,143	<0.19	7,143	<1.60	7,143	<0.32	7,143	<0.40	7,143	<0.40
1,2-Dichloropropane	17,518	<0.75	17,518	<1.25	17,518	<0.25	17,518	<1.25	17,518	<0.18	17,518	<0.49	17,518	<0.49	-	-	17,518	<0.32	17,518	<1.60	17,518	<0.32	17,518	<0.93	17,518	<0.93
1,3-Dichloropropylene[8]	42	cis <0.50 trans <0.75	42	cis<1.20 trans<1.10	42	cis<0.24 trans<0.22	42	cis<1.20 trans<1.10	42	<0.13	42	cis <0.51 trans <0.50	42	cis <0.51 trans <0.50	-	-	42	cis <0.28 trans <0.28	42	<1.05	42	<0.21	42	<0.43	42	<0.43
Ethylbenzene	2,133	<1.45	2,133	<0.65	2,133	<0.13	2,133	<0.65	2,133	<0.15	2,133	<0.46	2,133	<0.46	-	-	2,133	<0.29	2,133	<1.15	2,133	<0.23	2,133	<0.61	2,133	<0.61
Methyl bromide	299	<0.95	299	<0.95	299	<0.19	299	<0.95	299	<0.18	299	<0.46	299	<0.46	-	-	299	<0.28	299	<1.15	299	<0.23	299	<0.33	299	<0.33
Methyl chloride	270,000	<1.85	270,000	<1.40	270,000	<0.28	270,000	<1.40	270,000	<0.23	270,000	<0.46	270,000	<0.46	-	-	270,000	<0.28	270,000	<1.85	270,000	<0.37	270,000	<0.33	270,000	<0.33
Methylene chloride	593	1.6	593	<1.00	593	<0.20	593	<1.00	593	<0.20	593	<0.81	593	<0.81	-	-	593	<0.31	593	<4.00	593	<0.80	593	<0.44	593	<0.44
1,1,2,2-Tetrachloroethane	4	<2.45	4	<2.00	4	<0.40	4	<2.00	4	<0.35	4	<0.80	4	<0.80	-	-	4	<0.33	4	<1.55	4	<0.31	4	<0.83	4	<0.83
Tetrachloroethylene	261	<1.15	261	<1.05	261	<0.21	261	<1.05	261	<0.13	261	<0.35	261	<0.35	-	-	261	<0.23	261	<1.45	261	<0.29	261	<0.38	261	<0.38
Toluene	8,700	<0.60	8,700	<0.95	8,700	<0.19	8,700	<0.95	8,700	0.16	8,700	<0.43	8,700	<0.43	-	-	8,700	0.43	8,700	<1.25	8,700	<0.25	8,700	0.53	8,700	<0.38
trans-1,2-Dichloroethylene	10,127	<0.85	10,127	<1.25	10,127	<0.25	10,127	<1.25	10,127	<0.18	10,127	<0.38	10,127	<0.38	-	-	10,127	<0.24	10,127	<1.25	10,127	<0.25	10,127	<0.32	10,127	<0.32
1,1,1-Trichloroethane	1,000	<1.15	1,000	<1.00	1,000	<0.20	1,000	<1.00	1,000	<0.14	1,000	<0.34	1,000	<0.34	-	-	1,000	<0.23	1,000	<1.40	1,000	<0.28	1,000	<0.31	1,000	<0.31
1,1,2-Trichloroethane	16	<1.20	16	<0.75	16	<0.15	16	<0.75	16	<0.13	16	<0.60	16	<0.60	-	-	16	<0.29	16	<1.50	16	<0.30	16	<0.68	16	<0.68
Trichloroethylene	29	<1.20	29	<0.75	29	<0.15	29	<0.75	29	<0.22	29	<0.48	29	<0.48	-	-	29	<0.28	29	<1.80	29	<0.36	29	<0.46	29	<0.46
1,2,4-Trimethylbenzene	NS	<5.0	NS	<5.0	NS	<1.0	NS	<5.0	NS	<1.0	NS	<1.0	NS	<1.0	-	-	NS	<1.0	NS	<5.0	NS	<1.0	NS	<1.0	NS	<1.0
1,3,5-Trimethylbenzene	NS	<5.0	NS	<5.0	NS	<1.0	NS	<5.0	NS	<1.0	NS	<1.0	NS	<1.0	-	-	NS	<1.0	NS	<5.0	NS	<1.0	NS	<1.0	NS	<1.0
Vinyl chloride	5	<2.50	5	<1.00	5	<0.20	5	<1.00	5	<0.22	5	<0.35	5	<0.35	-	-	5	<0.24	5	<2.10	5	<0.42	5	<0.35	5	<0.35
Xylenes, Total	186,667	<2.90	186,667	<1.50	186,667	<0.30	186,667	<1.50	186,667	<0.13	186,667	<0.52	186,667	<0.52	-	-	186,667	<0.32	186,667	<1.15	186,667	<0.23	186,667	<0.70	186,667	<0.70
Acid Compounds (µg/L) [2]																										
2-Chlorophenol	30	<57.0	30	<220.9	30	<220.9	30	<74.0	30	<1.48	30	<3.10	30	<3.10	-	-	30	<2.92	30	<4.23	30	<84.6	30	<90.4	30	<4.52
2,4-Dichlorophenol	59	<61.0	59	<217.3	59	<217.3	59	<82.5	59	<1.65	59	<2.81	59	<2.81	-	-	59	<3.21	59	<4.82	59	<96.4	59	<95.4	59	<4.77
2,4-Dimethylphenol	171	<73.0	171	<117.4	171	<117.4	171	<110.0	171	<2.20	171	<2.64	171	<2.64	-	-	171	<1.32	171	<7.07	171	<141.4	171	<40.8	171	<2.04
4,6-Dinitro-o-cresol	310	<69.0	310	<153.5	310	<153.5	310	<61.0	310	<1.22	310	<1.49	310	<1.49	-	-	310	<2.27	310	<4.69	310	<93.8	310	<67.2	310	<3.36
2,4-Dinitrophenol	110	<69.5	110	<133.4	110	<133.4	110	<56.6	110	<1.13	110	<2.21	110	<2.21	-	-	110	<2.64	110	<5.11	110	<102.2	110	<68.2	110	<3.41
2-Nitrophenol	NS	<139.0	NS	<211.7	NS	<211.7	NS	<78.5	NS	<1.57	NS	<2.84	NS	<2.84	-	-	NS	<2.61	NS	<7.83	NS	<156.6	NS	<93.6	NS	<4.68
4-Nitrophenol	4,100	<408.0	4,100	<240.5	4,100	<240.5	4,100	<57.0	4,100	<1.14	4,100	<2.98	4,100	3.6	-	-	4,100	<2.03	4,100	<4.03	4,100	<80.6	4,100	<70.4	4,100	<3.52
p-Chloro-m-cresol	15	<93.0	15	<227.1	15	<227.1	15	<82.5	15	<1.65	15	<1.87	15	<1.87	-	-	15	<3.10	15	<4.05	15	<81.0	15	<95.2	15	<4.76
Pentachlorophenol	14.28	<103.5	25.56	<173.0	42.69	<173.0	17.278	<69.5	25.041	<1.39	14.992	7.5	18.91	<1.47	-	-	10.65	<3.44	12.14	<7.36	23.56	<147.2	43.07	<80.0	15.76	<4.00
Phenol	37	<59.5	37	<182.8	37	<182.8	37	<67.0	37	2.1	37	<2.30	37	<2.30	-	-	37	<1.84	37	<3.99	37	<79.8	37	<81.6	37	<4.08
2,4,6-Trichlorophenol	2	<140.0	2	<246.7	2	<246.7	2	<94.5	2	<1.89	2	<2.60	2	<2.60	-	-	2	<3.28	2	<4.74	2	<94.8	2	<105.4	2	<5.27

SR049	Winter 2012/13		Summer 2013		Winter 2013/14		Summer 2014		Winter 2014/15		Summer 2015		Winter 2015/16		Summer 2016 [7]		Winter 2016/17		Summer 2017		Winter 2017/18		Summer 2018		Winter 2018/19	
SAMPLING DATE(S):	SWQS	12/14/2012	SWQS	7/21/2013	SWQS	11/22/2013	SWQS	8/1/2014	SWQS	12/4/2014	SWQS	7/31/2015	SWQS	1/4/2016	-	-	SWQS	11/3/2016	SWQS	7/14/2017	SWQS	1/9/2018	SWQS	8/11/2018	SWQS	3/12/2019
Bases/Neutrals (µg/L) [2]																										
Acenaphthene	198	<85.0	198	<69.0	198	<69.0	198	<51.5	198	<1.03	198	<0.35	198	<0.35	-	-	198	<1.02	198	<1.88	198	<37.6	198	<23.8	198	<1.19
Acenaphthylene	NS	<63.5	NS	<89.1	NS	<89.1	NS	<50.0	NS	<1.00	NS	<1.23	NS	<1.23	-	-	NS	<6.10	NS	<1.75	NS	<35.0	NS	<28.2	NS	<1.41
Anthracene	74	<44.5	74	<89.1	74	<89.1	74	<144.0	74	<2.88	74	<0.44	74	<0.44	-	-	74	<1.96	74	<2.62	74	<52.4	74	<24.0	74	<1.20
Benzo(a)anthracene	0.02	<78.5	0.02	<89.1	0.02	<89.1	0.02	<54.0	0.02	<1.08	0.02	<0.38	0.02	<0.38	-	-	0.02	<1.57	0.02	<1.96	0.02	<39.2	0.02	<20.4	0.02	<1.02
Benzo(a)pyrene	0.02	<96.5	0.02	<96.3	0.02	<96.3	0.02	<188.5	0.02	<3.77	0.02	<1.41	0.02	<1.41	-	-	0.02	<3.12	0.02	<3.77	0.02	<75.4	0.02	<21.6	0.02	<1.08
Benzo(b)fluoranthene	0.02	<169.5	0.02	<125.1	0.02	<125.1	0.02	<73.0	0.02	<1.46	0.02	<1.06	0.02	<1.06	-	-	0.02	<1.28	0.02	<2.17	0.02	<43.4	0.02	<7.6	0.02	<0.38
Benzo(g,h,i)perylene	NS	<70.5	NS	<89.1	NS	<89.1	NS	<64.5	NS	<1.29	NS	<0.72	NS	<0.72	-	-	NS	<2.83	NS	<2.51	NS	<50.2	NS	<22.8	NS	<1.14
Benzo(k)fluoranthene	0.02	<57.5	0.02	<72.1	0.02	<72.1	0.02	<52.0	0.02	<1.04	0.02	<0.35	0.02	<0.35	-	-	0.02	<1.76	0.02	<2.33	0.02	<46.4	0.02	<20.6	0.02	<1.03
Chrysene	0.02	<44.5	0.02	<76.2	0.02	<76.2	0.02	<70.5	0.02	<1.41	0.02	<0.46	0.02	<0.46	-	-	0.02	<1.08	0.02	<1.96	0.02	<39.2	0.02	<23.2	0.02	<1.16
Dibenz(a,h)anthracene	0.02	<202.5	0.02	<102.0	0.02	<102.0	0.02	<62.0	0.02	<1.24	0.02	<0.47	0.02	<0.47	-	-	0.02	<1.93	0.02	<6.04	0.02	<120.8	0.02	<20.4	0.02	<1.02
1,2-Dichlorobenzene	205	<108.5	205	<13.9	205	<13.9	205	<88.0	205	<1.76	205	<1.04	205	<1.04	-	-	205	<0.58	205	<1.33	205	<0.30	205	<28.6	205	<1.43
1,3-Dichlorobenzene	2,500	<121.0	2,500	<58.2	2,500	<58.2	2,500	<87.0	2,500	<1.74	2,500	<0.47	2,500	<0.47	-	-	2,500	<0.52	2,500	<1.25	2,500	<0.25	2,500	<27.8	2,500	<1.39
1,4-Dichlorobenzene	2,000	<106.5	2,000	<54.1	2,000	<54.1	2,000	<78.0	2,000	<1.56	2,000	<1.28	2,000	<1.28	-	-	2,000	<0.50	2,000	<1.25	2,000	<0.29	2,000	<29.6	2,000	<1.48
3,3-Dichlorobenzidine	0.03	<369.0	0.03	<1404.4	0.03	<1404.4	0.03	<303.0	0.03	<6.06	0.03	<11.60	0.03	<11.60	-	-	0.03	<23.45	0.03	<25.43	0.03	<508.6	0.03	<139.8	0.03	<6.99
Diethyl phthalate	8,767	<74.0	8,767	<97.8	8,767	<97.8	8,767	<118.5	8,767	<2.37	8,767	<0.36	8,767	<0.36	-	-	8,767	<1.07	8,767	<1.99	8,767	<39.8	8,767	<21.6	8,767	<1.08
Dimethyl phthalate	17,000	<60.5	17,000	<92.2	17,000	<92.2	17,000	<121.0	17,000	<2.42	17,000	<0.47	17,000	<0.47	-	-	17,000	<0.58	17,000	<1.91	17,000	<38.2	17,000	<23.4	17,000	<1.17
Di-n-butyl phthalate	470	<114.5	470	<114.8	470	<114.8	470	<92.5	470	<1.85	470	<0.31	470	<0.31	-	-	470	<1.37	470	<2.35	470	<47.0	470	<22.4	470	<1.12
2,4-Dinitrotoluene	421	<65.5	421	<105.6	421	<105.6	421	<106.0	421	<2.12	421	<0.26	421	<0.26	-	-	421	<1.30	421	<3.10	421	<62.0	421	<23.4	421	<1.17
2,6-Dinitrotoluene	3,733	<93.5	3,733	<129.8	3,733	<129.8	3,733	<56.0	3,733	<1.12	3,733	<0.38	3,733	<0.38	-	-	3,733	<1.39	3,733	<2.89	3,733	<57.8	3,733	<22.6	3,733	<1.13
Di-n-octyl phthalate	373,333	<206.5	373,333	<148.3	373,333	<148.3	373,333	<55.0	373,333	<1.10	373,333	<1.28	373,333	<1.28	-	-	373,333	<1.67	373,333	<5.50	373,333	<110.0	373,333	<41.0	373,333	<2.05
1,2-Diphenylhydrazine (as azobenzene)	NS [8]	<53.5	NS	<120.0	NS	<120.0	NS	<335.0	NS	<6.70	NS	<1.06	NS	<1.06	-	-	NS	<7.46	NS	<2.15	NS	<43.0	0.2	<22.2	0.2	<1.11
Fluoranthene	28	<33.5	28	<92.2	28	<92.2	28	<67.5	28	<1.35	28	<0.27	28	<0.27	-	-	28	<1.06	28	<3.08	28	<61.6	28	<25.4	28	<1.27
Fluorene	1,067	<84.0	1,067	<79.3	1,067	<79.3	1,067	<240.5	1,067	<4.81	1,067	<0.29	1,067	<0.29	-	-	1,067	<0.51	1,067	<2.87	1,067	<57.4	1,067	<23.6	1,067	<1.18
Hexachlorobenzene	0.0003	<65.0	0.0003	<71.6	0.0003	<71.6	0.0003	<61.5	0.0003	<1.23	0.0003	<0.34	0.0003	<0.34	-	-	0.0003	<0.47	0.0003	<1.57	0.0003	<31.4	0.0003	<20.2	0.0003	<1.01
Hexachlorobutadiene	18	<68.5	18	<17.0	18	<17.0	18	<91.0	18	<1.82	18	<1.67	18	<1.67	-	-	18	<0.41	18	<1.00	18	<20.0	18	<24.0	18	<1.20
Hexachlorocyclopentadiene	3.5	<66.0	3.5	<116.9	3.5	<116.9	3.5	<61.5	3.5	<1.23	3.5	<1.53	3.5	<1.53	-	-	3.5	<2.16	3.5	<6.10	3.5	<122.0	3.5	<61.4	3.5	<3.07
Hexachloroethane	3.3	<70.0	3.3	<20.6	3.3	<20.6	3.3	<81.0	3.3	<1.62	3.3	<1.23	3.3	<1.23	-	-	3.3	<0.54	3.3	<1.49	3.3	<29.8	3.3	<27.0	3.3	<1.35
Indeno(1,2,3-cd)pyrene	0.2	<166.5	0.2	<104.5	0.2	<104.5	0.2	<69.5	0.2	<1.39	0.2	<0.62	0.2	<0.62	-	-	0.2	**4.19**	0.2	<6.11	0.2	<122.2	0.49	<21.4	0.49	<1.07
Isophorone	961	<95.0	961	<72.6	961	<72.6	961	<107.0	961	<2.14	961	<0.37	961	<0.37	-	-	961	<0.51	961	<1.77	961	<35.4	961	<26.4	961	<1.32
Naphthalene	1,524	<71.0	1,524	<61.8	1,524	<61.8	1,524	<91.5	1,524	<1.83	1,524	<0.36	1,524	<0.36	-	-	1,524	<0.49	1,524	<1.54	1,524	<30.8	1,524	<29.6	1,524	<1.48
Nitrobenzene	138	<65.5	138	<63.3	138	<63.3	138	<105.0	138	<2.10	138	<1.26	138	<1.26	-	-	138	<0.44	138	<1.80	138	<36.0	138	<31.0	138	<1.55
n-Nitrosodimethylamine	0.03	<82.0	0.03	<61.8	0.03	<61.8	0.03	<50.0	0.03	<1.00	0.03	<1.13	0.03	<1.13	-	-	0.03	<0.54	0.03	<1.62	0.03	<32.4	0.03	<33.4	0.03	<1.67
n-Nitrosodi-n-propylamine	0.5	<94.0	0.5	<77.8	0.5	<77.8	0.5	<57.5	0.5	<1.15	0.5	<1.17	0.5	<1.17	-	-	0.5	<1.02	0.5	<1.65	0.5	<33.0	0.5	<33.0	0.5	<1.65
n-Nitrosodiphenylamine	6	<50.0	6	<156.6	6	<156.6	6	<178.5	6	<3.57	6	<1.15	6	<1.15	-	-	6	<1.67	6	<3.13	6	<62.6	6	<21.4	6	<1.07
Phenanthrene	30	<38.0	30	<83.9	30	<83.9	30	<69.5	30	<1.39	30	<0.31	30	<0.31	-	-	30	<0.49	30	<3.02	30	<60.4	30	<26.6	30	<1.33
Pyrene	800	<116.5	800	<84.5	800	<84.5	800	<193.0	800	<3.86	800	<0.67	800	<0.67	-	-	800	<3.21	800	<3.38	800	<67.6	800	<24.0	800	<1.20
1,2,4-Trichlorobenzene	70	<133.0	70	<16.5	70	<16.5	70	<84.5	70	<1.69	70	<1.04	70	<1.04	-	-	70	<0.55	70	<1.21	70	<24.2	70	<26.8	70	<1.34
Pesticides (µg/L) [2]																										
Aldrin	0.00005	<0.046	0.00005	<0.046	0.00005	<0.016	0.00005	<0.027	0.00005	<0.027	0.00005	<0.012	0.00005	<0.012	-	-	0.00005	<0.019	0.00005	<0.013	0.00005	<0.013	0.00005	<0.010	0.00005	<0.010
Alpha-BHC	0.005	<0.038	0.005	<0.038	0.005	<0.017	0.005	<0.021	0.005	<0.021	0.005	<0.058	0.005	<0.058	-	-	0.005	<0.010	0.005	<0.015	0.005	**0.023**	0.005	<0.012	0.005	<0.012
Beta-BHC	0.02	<0.095	0.02	<0.095	0.02	<0.093	0.02	<0.072	0.02	<0.072	0.02	<0.063	0.02	<0.063	-	-	0.02	<0.049	0.02	<0.083	0.02	<0.083	0.02	<0.099	0.02	<0.099
Gamma-BHC	1	<0.033	1	0.062	1	<0.023	1	<0.034	1	<0.034	1	<0.058	1	<0.058	-	-	1	<0.019	1	<0.020	1	<0.020	1	<0.013	1	<0.013
Delta-BHC	1,600	<0.032	1,600	<0.032	1,600	<0.018	1,600	<0.021	1,600	<0.021	1,600	<0.066	1,600	<0.066	-	-	1,600	<0.035	1,600	<0.012	1,600	<0.012	1,600	<0.045	1,600	<0.045
Chlordane	0.0008	<0.16	0.0008	<0.16	0.0008	<0.20	0.0008	<0.14	0.0008	<0.14	0.0008	<0.36	0.0008	<0.36	-	-	0.0008	<0.61	0.0008	<0.029	0.0008	<0.029	0.0008	<0.33	0.0008	<0.33
4,4'-DDT	0.0002	<0.029	0.0002	<0.029	0.0002	<0.016	0.0002	<0.025	0.0002	<0.025	0.0002	<0.017	0.0002	<0.017	-	-	0.0002	<0.011	0.0002	<0.020	0.0002	<0.020	0.0002	<0.009	0.0002	<0.009
4,4'-DDE	0.0002	<0.034	0.0002	<0.034	0.0002	<0.018	0.0002	<0.010	0.0002	<0.010	0.0002	0.033	0.0002	<0.013	-	-	0.0002	<0.020	0.0002	<0.019	0.0002	<0.019	0.0002	<0.015	0.0002	<0.015
4,4'-DDD	0.0002	<0.023	0.0002	<0.023	0.0002	<0.014	0.0002	<0.031	0.0002	<0.031	0.0002	<0.021	0.0002	<0.021	-	-	0.0002	<0.021	0.0002	<0.023	0.0002	<0.023	0.0002	<0.017	0.0002	<0.017
Dieldrin	0.00005	<0.028	0.00005	<0.028	0.00005	<0.022	0.00005	<0.030	0.00005	<0.030	0.00005	<0.060	0.00005	<0.060	-	-	0.00005	<0.019	0.00005	<0.015	0.00005	<0.015	0.00005	<0.012	0.00005	<0.012
Alpha-endosulfan	0.2	<0.034	0.2	<0.034	0.2	<0.018	0.2	<0.018	0.2	<0.018	0.2	<0.072	0.2	<0.072	-	-	0.2	<0.018	0.2	<0.015	0.2	<0.015	0.2	<0.020	0.2	<0.020
Beta-endosulfan	0.2	<0.034	0.2	<0.034	0.2	<0.013	0.2	<0.032	0.2	<0.032	0.2	<0.019	0.2	<0.019	-	-	0.2	<0.021	0.2	<0.014	0.2	<0.014	0.2	<0.014	0.2	<0.014
Endosulfan sulfate	0.2	<0.025	0.2	<0.025	0.2	<0.014	0.2	<0.008	0.2	0.071	0.2	<0.016	0.2	0.08	-	-	0.2	<0.022	0.2	0.021	0.2	0.048	0.2	<0.017	0.2	0.034
Endrin	0.004	<0.035	0.004	<0.035	0.004	<0.016	0.004	<0.017	0.004	<0.017	0.004	<0.023	0.004	<0.023	-	-	0.004	<0.042	0.004	<0.040	0.004	<0.040	0.004	<0.042	0.004	<0.042
Endrin aldehyde	0.09	<0.038	0.09	<0.038	0.09	<0.023	0.09	<0.032	0.09	<0.032	0.09	<0.026	0.09	<0.026	-	-	0.09	<0.024	0.09	<0.034	0.09	<0.034	0.09	<0.068	0.09	<0.068
Heptachlor	0.00008	**0.087**	0.00008	<0.035	0.00008	<0.018	0.00008	<0.027	0.00008	**0.063**	0.00008	<0.035	0.00008	<0.035	-	-	0.00008	<0.023	0.00008	<0.019	0.00008	<0.019	0.00008	**0.033**	0.00008	**0.081**
Heptachlor epoxide	0.00004	<0.032	0.00004	<0.032	0.00004	<0.020	0.00004	<0.008	0.00004	<0.008	0.00004	<0.062	0.00004	<0.062	-	-	0.00004	<0.020	0.00004	<0.016	0.00004	<0.016	0.00004	<0.012	0.00004	<0.012
PCB-1242	[4]	<0.41	[4]	<0.41	[4]	<0.55	[4]	<0.37	[4]	<0.37	[4]	<0.14	[4]	<0.14	-	-	[4]	<0.72	[4]	<0.33	[4]	<0.33	[4]	<0.28	[4]	<0.28
PCB-1254	[4]	<0.20	[4]	<0.20	[4]	<0.29	[4]	<0.23	[4]	<0.23	[4]	<0.20	[4]	<0.20	-	-	[4]	<0.22	[4]	<0.17	[4]	<0.17	[4]	<0.21	[4]	<0.21

SR049	Winter 2012/13		Summer 2013		Winter 2013/14		Summer 2014		Winter 2014/15		Summer 2015		Winter 2015/16		Summer 2016 [7]		Winter 2016/17		Summer 2017		Winter 2017/18		Summer 2018		Winter 2018/19	
SAMPLING DATE(S):	SWQS	12/14/2012	SWQS	7/21/2013	SWQS	11/22/2013	SWQS	8/1/2014	SWQS	12/4/2014	SWQS	7/31/2015	SWQS	1/4/2016	-	-	SWQS	11/3/2016	SWQS	7/14/2017	SWQS	1/9/2018	SWQS	8/11/2018	SWQS	3/12/2019
PCB-1221	[4]	<0.68	[4]	<0.68	[4]	<0.86	[4]	<0.22	[4]	<0.22	[4]	<0.64	[4]	<0.64	-	-	[4]	<0.46	[4]	*<0.36*	[4]	*<0.36*	[4]	*<0.50*	[4]	*<0.50*
PCB-1232	[4]	<0.66	[4]	<0.66	[4]	<0.34	[4]	<0.55	[4]	<0.55	[4]	<0.37	[4]	<0.37	-	-	[4]	<0.90	[4]	*<0.40*	[4]	*<0.40*	[4]	*<0.48*	[4]	*<0.48*
PCB-1248	[4]	<0.78	[4]	<0.78	[4]	<0.28	[4]	<0.19	[4]	<0.19	[4]	<0.22	[4]	<0.22	-	-	[4]	<0.24	[4]	*<0.21*	[4]	*<0.21*	[4]	*<0.35*	[4]	*<0.35*
PCB-1260	[4]	<0.21	[4]	<0.21	[4]	<0.23	[4]	<0.32	[4]	<0.32	[4]	<0.59	[4]	<0.59	-	-	[4]	<0.26	[4]	*<0.34*	[4]	*<0.34*	[4]	*<0.28*	[4]	*<0.28*
PCB-1016	[4]	<0.36	[4]	<0.36	[4]	<0.33	[4]	<0.18	[4]	<0.18	[4]	<0.55	[4]	<0.55	-	-	[4]	<0.29	[4]	*<0.33*	[4]	*<0.33*	[4]	*<0.40*	[4]	*<0.40*
Toxaphene	0.0003	*<0.53*	0.0003	*<0.53*	0.0003	*<0.34*	0.0003	*<0.22*	0.0003	*<0.22*	0.0003	*<0.60*	0.0003	*<0.60*	-	-	0.0003	*<0.48*	0.0003	*<0.47*	0.0003	*<0.47*	0.0003	*<0.482*	0.0003	*<0.482*

Notes:

NS = no standard applicable to the designated use
T = total
D = dissolved
Bold text indicates a sample result greater than the WQS
Italicized text indicates a laboratory detection limit higher than the WQS

Footnotes:

[1] The Permittee shall report on any additional parameters that were monitored for seasonal stormwater sampling as required by Section 6.0 of this permit (Special Conditions).
[2] Analytical results shall be reported in the units specified for each category or parameter.
[3] Report the average flow rate for the sampling period (no more than 6 hours).
[4] Standard for total PCBs of 0.00006 µg/L FC, 19 µg/L PBC, 2 µg/L A&Wedw, and 0.001 µg/L AgI and AgL.
[5] The sample was lost during extraction at the laboratory due to the glassware breaking.
[6] There were no representative storm events (>0.20 inches) that occurred or no representative events without a measurable rain event in the previous 72 hours.
[7] A representative event occurred on 8/2; however, the sampler malfunctioned. Then next event was on 8/5 but due to the 72-hour rule, no sample was taken. Another measurable event on 9/22 did not result in a qualifying rain event. No samples were taken at this outfall during Summer 2016.
[8] Prior to FY2016, the lab was reporting cis and trans for 1-3-dichloropropylene; this reporting year, an upgrade has resulted in providing the result as a total.
[9] Data flagged due to contamination in the lab reagent blank; therefore, these are not true detections or exceedances.

PART 10: ASSESSMENT OF MONITORING DATA

A. Stormwater Quality: Provide an evaluation of the sampling results for each outfall monitoring location, including an assessment of any improvements or degradation of stormwater quality from each drainage area. In the year 4, Annual Report, discuss possible explanations for stormwater quality trends, including the implementation of stormwater management practices to reduce the discharge of pollutants to and from the storm sewer system.

Escherichia Coli (*E. coli*) has been detected at concentrations greater than the applicable SWQS at all monitored outfalls throughout the permit term.

Total lead and dissolved copper have been observed in elevated concentrations at all monitored outfalls. A few of the monitored outfalls occasionally have elevated detections of pesticides including 4,4' DDE, 4,4' DDT, heptachlor, Alpha-BHC, and Aldrin.

A discussion of the historical exceedances by outfall is provided below. (Note: the data in the tables in Part 9 of this report begin in 2013, so exceedances that occurred early in the permit term included below are no longer present in Part 9.)

AC033

The primary land uses are open land and residential. The designated uses for the receiving water for this outfall, the ACDC, were modified this reporting year. Prior to 2018, the City was viewing AC033 as discharging to a Phoenix Area Canal. However, upon further review of the City's sampling locations during the ADEQ Triennial Review, it was decided that, since the ACDC is a diversion channel and not a canal, we utilize the standard for a tributary to New River, below Interstate 17 to confluence with Agua Fria River. As a result, we have updated the applicable uses for AC033 to include only aquatic and wildlife ephemeral (A&We) and partial body contact (PBC). Over the last decade, we had compared laboratory results to the Water Quality Standards for designated uses that include agricultural irrigation (AgI) and agricultural livestock watering (AgL), which resulted in a different set of parameters being above the standard. Elevated concentrations of dissolved copper, total lead and *E. coli* have been detected.

IB008

Stormwater runoff from this outfall discharges to the Indian Bend Wash. Applicable designated uses are A&We and PBC. The dominant land use category in this area is residential. Elevated concentrations of dissolved copper, total lead and *E. coli* have been detected. Endrin Aldehyde was detected once (2009).

SR003

The receiving water for SR003 is the Salt River. Designated uses include aquatic and wildlife effluent dependent water (A&Wedw), PBC, Fish Consumption (FC), AgI and AgL. Land use for this outfall is divided amongst residential, institutional, commercial, and open land. Elevated concentrations of dissolved copper, total lead, *E. coli* and occasional pesticides, including heptachlor, alpha-BHC, beta-BHC and 4,4'-DDT have been detected in this outfall.

SR030

This outfall discharges to the Salt River. Designated uses for this segment of the Salt River are the same as those listed for SR003. Primary land use categories are open land, residential, and commercial. Elevated concentrations of dissolved copper, total lead, *E. coli*, ammonia (2010), hardness (2009/2010) and occasional pesticides including heptachlor, Aldrin, alpha-BHC and 4,4' DDE have been detected in this outfall.

SR045

This outfall discharges stormwater to the Salt River. The designated uses for this segment of the Salt River are A&We and PBC. The properties in this area are primarily commercial, industrial, and institutional. Elevated concentrations of dissolved copper, total lead, *E. coli*, and pH (2016) have been detected in this outfall.

SR049

The receiving water for this outfall is the Salt River. The applicable designated uses are A&Wedw, PBC, FC, AgI and AgL. Inspectors noted that this catchment area includes several agricultural properties, (used for grazing by horses, cows, goats, and sheep), along with newer residential, commercial, and light industrial properties. Elevated concentrations of dissolved copper, total lead, *E. coli*, dissolved zinc (2009), high pH (2010), and occasional pesticides including heptachlor, dieldrin, alpha-BHC, beta-BHC, and 4,4' DDE have been detected in this outfall.

SC046

Skunk Creek Wash (a tributary to New River) is the receiving water for this outfall, with designated uses of A&We and PBC. This area is primarily residential with some open land. Elevated concentrations of dissolved copper, total lead and *E. coli* have been detected.

B. Water Quality Standards (SWQS): Compare the sampling results for each outfall monitoring location with the applicable SWQS for the receiving water.

The applicable SWQS for each monitoring station are dependent upon the designated uses for the specific receiving water. Prior to 2018, the City was viewing AC033 as discharging to a Phoenix Area Canal. However, upon further review, it was decided that ACDC is a tributary to New River, below Interstate 17 to confluence with Agua Fria River. As a result, we have updated the applicable uses for AC033 as being A&We and PBC, only. Table 10-1 includes the designated uses for each monitoring location:

Table 10-1 Designated Uses for Monitoring Locations

Outfall	Receiving Water	Designated Uses
AC033	ACDC, Skunk Creek, New River	A&We, PBC
IB008	Indian Bend Wash	A&We, PBC
SR003	Salt River at 35th Avenue	A&Wedw, PBC, FC, AgI, and AgL
SR030	Salt River at 27th Avenue	A&Wedw, PBC, FC, AgI, and AgL
SR045	Salt River at 40th Street	A&We, PBC
SR049	Salt River at 67th Avenue	A&Wedw, PBC, FC, AgI, and AgL
SC046	Skunk Creek Wash, New River	A&We, PBC

AgI = Agricultural Irrigation
AgL = Agricultural Livestock Watering
A&We = Aquatic and Wildlife, Ephemeral
A&Wedw =Aquatic and Wildlife, Effluent Dependent Water (acute)
PBC = Partial Body Contact
FC = Fish Consumption

The analytical results reported were compared to the lowest applicable standard, as documented in Part 9.

C. Exceeding a SWQS: Note any exceedance of a surface water quality standard (as measured at the outfall) during the reporting year, including, at a minimum, the following information:

1. Sampling dates: See Table 10-2
2. Monitoring location (outfall identification number): See Table 10-2
3. Receiving water and surface water quality standard exceeded: See Table 10-2
4. Outfall monitoring results (laboratory reports): See Table 10-2 and Part 13

Table 10-2 Analytical Results Exceeding SWQS for Reporting Year 2018/19

Outfall	Sample Date	Parameter	Desig Use	SWQS	Result	Unit
AC033	7/9/18	Copper (D)	A&We	10.94	28.2	ug/L
	7/9/18	E. coli	PBC	575	26,130	MPN
	7/9/18	Lead (T)	PBC	15	61.6	ug/L
	11/29/18	Copper (D)	A&We	15.16	23.5	ug/L
	11/29/18	E. coli	PBC	575	4,640	MPN
	11/29/18	Lead (T)	PBC	15	15.2	ug/L
IB008	7/9/18	Copper (D)	A&We	18.07	35.2	ug/L
	7/9/18	Lead (T)	PBC	15	37.6	ug/L
	11/30/18	E. coli	PBC	575	24,810	MPN
	11/29/18	Lead (T)	PBC	15	17.3	ug/L
	11/29/18	Copper (D)	A&We	13.13	16.2	ug/L
SC046	7/11/18	Copper (D)	A&We	6.25	12.9	ug/L
	2/14/19	Copper (D)	A&We	5.61	8.6	ug/L
SR003	7/9/18	E. coli	PBC	575	34,480	MPN
	7/9/18	Copper (D)	A&Wedw	13.57	64.5	ug/L
	7/9/18	Lead (T)	PBC	15	299	ug/L
	7/9/18	4,4'-DDT	FC	0.0002	0.029	ug/L
	7/9/18	Heptachlor	FC	0.00008	0.043	ug/L
	2/21/19	E. Coli	PBC	575	6,970	MPN
	2/21/19	Copper (D)	A&Wedw	5.76	12.6	ug/L
	2/21/19	Lead (T)	PBC	15	57.4	ug/L
	2/21/19	Heptachlor	FC	0.00008	0.046	ug/L

Outfall	Sample Date	Parameter	Desig Use	SWQS	Result	Unit
SR030	7/9/18	E. coli	PBC	575	21,870	MPN
	7/9/18	Copper (D)	A&Wedw	7.65	39.8	ug/L
	7/9/18	Lead (T)	PBC	15	104	ug/L
	7/9/18	Aldrin	FC	0.00005	0.099	ug/L
	7/9/18	Heptachlor	FC	0.00008	0.056	ug/L
	2/21/19	E. Coli	PBC	575	3,690	MPN
	2/21/19	Copper (D)	A&Wedw	3.95	12.4	ug/L
	2/21/19	Lead (T)	PBC	15	17.3	ug/L
SR045	8/8/18	E. coli	PBC	575	4,480	MPN
	8/7/18	Copper (D)	A&We	15.25	34	ug/L
	11/30/18	E. coli	PBC	575	3,930	MPN
	11/29/18	Copper (D)	A&We	19.18	31.4	ug/L
SR049	8/11/18	E. coli	PBC	575	5,560	MPN
	8/11/18	Copper (D)	A&Wedw	6.04	15.6	ug/L
	8/11/18	Lead (T)	PBC	15	45.4	ug/L
	8/11/18	Heptachlor	FC	0.00008	0.033	ug/L
	3/12/19	E. coli	PBC	575	>2.419.6	MPN
	3/12/19	Copper (D)	A&Wedw	7.82	15.8	ug/L
	3/12/19	Heptachlor	FC	0.00008	0.081	ug/L
ug/L-micrograms per liter; mg/L-milligrams per liter; MPN-most probable number; mL-milliliter; D-dissolved; T-total; SU-standard units						

5. A description of the circumstances that may have caused or contributed to the exceedance of an applicable surface water quality standard:

NOTE: anticipated non-compliance for sampling was reported to ADEQ on December 24, 2018 due to the federal government shut down and a 30 to 40 percent chance of rain forecasted on Christmas. Four of seven sample locations were outstanding at the time (SC046, SR003, SR030, and SR049). On December 26, it was confirmed that no rainfall occurred within the monitoring locations. However, there was a representative rain event on January 6, 2019, and samples were missed as a result of the government shut down.

All monitoring stations showed elevated *E. coli* levels in one season, or both, with the exception of SC046. These exceedances seem to be independent of predominant land uses and varied from site to site and season to season. E. *coli* can be associated with pets, humans, and wildlife, such as birds, rodents, and mammals. It can accumulate between rain events causing results to be elevated locally.

Dissolved copper was elevated at all outfalls. Copper is a common component in pesticides, fungicides, and insecticides. This includes algaecides commonly used in pools, spas, and fountains. Copper is also used in automotive parts such as brake pads, brake linings, and moving engine parts. Consequently, sources of elevated copper could include automotive repair shops, roadway run-off, and pool backwashing. In addition, copper occurs naturally in Arizona soils (also known as "The Copper State").

All monitoring stations, except SC046 and SR045, showed elevated lead levels. Lead is used in automotive parts, including tires and batteries. Lead-based paint is sometimes used on buildings and road stripping, and lead was a common additive in gasoline until the 1970's and early 1980's. Therefore, sources of elevated lead could include automotive repair shops, lead tire weights, roadway runoff, and lead-containing sediment deposited in the past from automotive exhaust.

Heptachlor has historically been detected in four of the City's outfalls, all associated with the Salt River. Heptachlor was detected in SR003, SR030 and SR049 this reporting year. Levels are elevated downstream of the airport, where the designated use of fish consumption is applied. Stormwater runoff has exceeded the fish consumption designated use, 0.00008 ug/L, at SR030, SR003, and SR049. Heptachlor, an organochlorine compound (and a component of technical grade chlordane), was widely used as an insecticide prior to 1974 when it was banned in most countries. It remains available for use, when registered with the Arizona Department of Agriculture for fire ant control in pad mounted transformers, cable television boxes, and telephone cable boxes located underground. In response to an ADEQ inquiry in January 2017, the City undertook an investigation to 1) verify the parameter is in fact heptachlor, and 2) find potential sources. It was determined that the results were likely false positives, attributed to the method limitations. A copy of the Heptachlor Investigation Report was submitted to ADEQ in the FY17/18 Annual Report.

Aldrin (SR030) and DDT (SR003) were detected in the Summer wet-season samples. However, since this was a new detection at these locations, the City will not perform a full evaluation until another occurrence for these analytes are detected at these sites.

6. If a pollutant is noted at levels above the SWQS at a particular outfall, more than 1X ('reoccurs'), describe actions taken to determine the source(s) of the pollutant per Sections 4.3 and 4.4 of the permit. Also state any proposed follow-up actions or additional and/or revised management practices or pollution controls to prevent the discharge from causing or contributing to an exceedance of a surface water quality standard in the future.

The City follows an internal Standard Operating Procedure (COP #6004) "Stormwater Quality Evaluation and Action Plan," to identify the source of pollutants. The purpose of the procedure is to ensure compliance with Sections 4.2, 4.4, and 8.3 of the MS4 Permit. The procedure discusses how a SWQS exceedance is identified, assigns the responsibility for attempting to identify potential sources of the pollutant(s) of concern and evaluating existing BMPs that may require revision to address the issue(s), provides a schedule for implementation, and outlines the requirements for reporting the occurrence to ADEQ.

This reporting year, the City identified recurring exceedances of *E. coli* at all monitoring stations in one season, or both, with the exception of SC046. The city identified recurring exceedances for total lead at five of the seven monitoring stations. The city also identified all monitoring stations with recurring exceedances of dissolved copper this year.

The first step in evaluating each exceedance was to research potential sources of these pollutants in stormwater. A summary of these findings is discussed in Part 10, Section C.5. Water Quality Inspectors were provided with a summary of the potential sources, along with information on the catchment area for each outfall in question. The inspectors then drove through each catchment area, looking for any obvious causes of the exceedances. In most situations, the inspectors were unable to confirm a specific source of the elevated levels. A summary of their findings is included below:

SC046

Samples at this outfall contained pollutants in exceedance of the SWQS for dissolved copper.

<u>Copper</u>
During the investigation, it was noted that landscaping is primarily rock. The catchment area is in a mountainous drainage area, including a natural wash, could be the source of naturally occurring copper. Additional sources could be from automotive brake pads of numerous cars observed in driveways and on streets.

IB008

Samples at this outfall contained pollutants in exceedance of the SWQS for *E. coli,* total lead, and dissolved copper.

<u>E. coli</u>

Potential sources of E. coli could be from properties with livestock privileges. Other sources could be parks and pet waste.

<u>Lead and Copper</u>

The lead and copper exceedances may be the result of the vehicular traffic in this area. There are also nurseries which may use pesticides. Active construction may have contributed to overall pollutant levels.

AC033

Samples at this outfall contained pollutants in exceedance of the SWQS for *E. coli,* total lead, and dissolved copper.

<u>E. coli</u>

Potential sources of E. coli could be from homeless camps, previous SSO’s and parks and pet waste.

Lead and Copper

The lead and copper exceedances may be the result of the vehicular traffic in this area. Other sources can be pesticides or roofing remodels.

SR003

Samples at this outfall contained pollutants in exceedance of the SWQS for *E. coli*, total lead, dissolved copper, 4,4'-DDT and heptachlor.

E. coli
A possible source of e-coli may be goats that are kept on a palm tree orchard located on southwest corner of Buckeye and 35th Avenue (irrigated property).

Lead and Copper
The lead and copper exceedances may be the result of the high traffic and trucking in this area, as well as heavy industry. Active construction may have contributed to overall pollutant levels.

Heptachlor
This is the first detection at this location since 2016. The likely source is historical activities.

4,4'-DDT
This is the first detection at this location. No investigation required.

SR030

Samples at this outfall contained pollutants in exceedance of the SWQS for *E. coli*, total lead, dissolved copper, Aldrin and heptachlor.

E. coli
Possible sources are the wildlife and domestic animals around the parks, neighborhood, and industrial areas.

Copper and Lead
This drainage area is 75% industrial and 25% residential. The main source of copper may include vehicle brake pads, vehicle fluids, leaks, dumping, and soil erosion.

Heptachlor
The likely source is historical land use.

Aldrin
This is the first detection at this location. No investigation required.

SR045

Samples at this outfall contained pollutants in exceedance of the SWQS for dissolved copper and *E. coli*.

E. coli
The north border of this catchment is the Salt River, which is the home of wildlife and transient, human populations. Animal feces, and homeless activity could contribute to the elevated E. *coli* in runoff.

Copper
The area is dense with industrial, commercial, construction, auto body, auto repair, and waste transfer and recycling facilities. It's a high traffic area adjacent to businesses and major transportation, and includes numerous potential sources, such as wood, oil or coal combustion, refuse incineration, fertilizers, heavy industry, industrial part cleaning operations, and junkyards.

SR049

Samples at this outfall contained pollutants in exceedance of the SWQS for *E. coli*, total lead, dissolved copper and heptachlor.

E. coli
There is a cattle feed lot and several residences with livestock (including goats and horses), as well as various wildlife in the vicinity. Pet waste was also observed.

Copper and Lead
Moderate vehicular traffic was observed, and there is construction of the 202 highway within this drainage area and a lot of construction traffic was observed.

Heptachlor
The likely source is historical land use.

7. A schedule for implementing the proposed follow-up, stormwater or non-stormwater management practices or pollution controls:

As described above, city inspectors conducted thorough visual reconnaissance of each catchment area, searching for potential sources of the elevated levels. No obvious cause of the elevated constituents was identified.

The potential sources for these pollutants are varied. *E. coli* can come from a variety of sources, including pet waste and bird droppings. Though the city cannot control wild birds, the PWD does enforce pet waste requirements. Phoenix City Code, Chapter 27, Section 27-12 requires all animal owners and custodians to immediately clean up and properly dispose of animal waste left on any public street, alley, gutter, sidewalk, right-of-way, or park. Staff hangs notices on doorknobs to educate the public regarding the need to clean up and properly dispose of pet wastes. The door hangers or similarly worded placards are posted at public facilities such as parks, libraries, and other locations. Pet waste bags are also provided at city parks.

Lead and copper can come from a variety of residential, commercial, and industrial sources. Therefore, the City had decided to use these chemical constituents as one criterion to prioritize industrial facility inspections. These facilities, along with permit-required facilities, made up the 'high priority' industrial facility inventory. Because there were no significant findings related to lead or copper, these facilities were dropped from the high priority category. Instead, the City is attempting to inspect all industrial facilities in the stormwater inventory on a five to six-year schedule, depending on staffing.

The City will continue to evaluate reduction strategies for these pollutants. However, metals such as lead and copper can come from automotive sources such as dust from brake pads, rubber tires, lead tire weights, and engine exhaust. Since these sources are ubiquitous, they may be best controlled at the state or national level.

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PART 11: ESTIMATE OF ANNUAL POLLUTANT LOADINGS

Provide an estimate of the pollutant loadings each year from the municipal storm sewer system to waters of the U.S. for each constituent listed in Section 7.4 of the permit detected by stormwater monitoring within the permit term. Pollutant loadings and event mean concentrations may be estimated from sampling data collected at the representative monitoring locations, taking into consideration land uses and drainage areas for the outfall. Include a description of the procedures for estimating pollutant loads and concentrations, including any modeling, data analysis, and calculation methods. Compare the pollutant loadings estimated each year to previous estimates of pollutant loadings.

Seasonal and annual pollutant load estimates were developed for all of the City's twelve stormwater sub-watersheds (Table 11-1). Winter, summer, and total annual loads were computed for all water quality parameters where sufficient validated data is available. As in past years, results from the City's monitoring data were used to correlate pollutant concentrations with land uses for twelve stormwater sub-watersheds in Phoenix. Where data were insufficient to perform this evaluation, information from past annual reports was used. The "Simple Method" as described in USEPA's guidance documents was used in performing this analysis[1].

Table 11-1 Seasonal and Total Annual Pollutant Load

Constituent	Summer Pollutant Load (pounds)	Winter Pollutant Load (pounds)	Total Annual Pollutant Load (pounds)
BOD_5	2,147,983	1,192,343	3,340,326
COD	10,529,445	5,855,325	16,384,770
TDS	12,017,322	6,596,290	18,613,613
Nitrogen, NO2 + NO3, Total	196,716	111,858	308,574
Nitrogen, Organic, Total Kjeldahl	311,272	160,329	471,601
Phosphorous, Total	39,373	21,462	60,836
Arsenic, Total	434	231	665
Antimony, Total	190	99	289
Barium, Total	11,029	5,704	16,733
Beryllium, Total	22.7	12.3	35.0
Cadmium, Total	310	160	470
Chromium, Total	1,604	911	2,515
Copper, Total	4,051	2,111	6,162
Lead, Total	2,316	1,260	3,575
Mercury, Total	51.6	30.2	81.9
Nickel, Total	1,845	1,029	2,875
Selenium, Total	300	178	478
Silver, Total	42.6	23.4	66.1
Thallium, Total	21.6	11.9	33.5
Zinc, Total	13,884	7,387	21,271

1 *Guidance Manual for the Preparation of Part 2 of the NPDES Permit Applications for Discharges from Municipal Separate Storm Sewer System, November 1992.*

The following methodology was used in developing pollutant loads:

In the Part 1 MS4 NPDES Permit Application, the City was divided into 13 stormwater sub-watersheds, based upon outfall locations that impacted specific water conveyance structures or tributaries of the Salt River. This division of the permit area was followed until the last AZPDES permit application in 2012. Through annexation, the City had acquired by this time substantial new undeveloped land, primarily in the north. In order to integrate this new land into the load calculation and to provide a consistent basis for analysis, a watershed-based approach was developed.

City GIS staff acquired County land-use spatial data and combined them with sub-watershed boundaries developed by the Maricopa County Flood Control District (MCFCD 2013). These sub-watershed boundaries are very similar to the Watershed Boundary Dataset 10-digit Hydrologic Unit Code (HUC), with exceptions made for local flood control and other man-made diversions (for example, White Tanks A Basin). Clipping these data to the City permit boundaries produced a watershed-based, land-use map that was used to define 12 new areas, now sub-watersheds, used in the pollutant load estimate.

For the purposes of this model, four land-uses were defined from the data: Industrial, Commercial, Residential, and Open Space. The Part 1 application demonstrated that, on a city-wide scale, these four land-use types provide the strongest distinction in stormwater composition.

The Part 1 application also developed pollutant-specific, rainfall-event-normalized, stormwater loading factors for each of the four land-use categories. These factors, called *event-mean concentrations* or EMCs, represent the concentration of each pollutant of concern in the runoff from the four land-use types. The concentration is normalized to the amount of rainfall in the sampling event to accommodate the dynamic nature of runoff chemistry, including a first flush of pollutant buildup between events.

Rainfall/runoff estimates were generated from data collected by the fifty-six Maricopa County Flood Control District (MCFCD) ALERT meteorological stations. Stations were located on GIS projections and rainfall records spatially correlated to each of the twelve sub-watersheds. Monthly rainfall depths were averaged by sub-watershed for the summer (June 2018 to October 2018) and winter (November 2018 to May 2019) total amounts for the permit year.

Rainfall was translated to runoff as part of the load calculation, using Schuler (1987),

$$R = P_j (P)(R_v)(A)$$

where, P = rainfall depth (inches)

P_j = fraction of events that produce runoff (0.9)

R_v = runoff coefficient

A = sub-watershed area (acres)

Sub-watershed areas were measured from GIS projections. Runoff coefficients that were utilized for each land use are as follows (developed specially for Phoenix under the 2001 Permit Renewal Application effort):

Industrial: 0.053

Commercial: 0.745

Residential: 0.236

Open Space: 0.040

The current AZPDES permit indicates that, if possible, annual monitoring data be used to generate concentration factors in the load model. As in past years, EMCs were taken from the COP Part 1 NPDES MS4 characterization data. These values were compared to USGS monitoring results (Table 11-2) from representative storms.

EMCs were determined for each land-use type and pollutant of concern, as possible (Table 11-2). For each of the twelve stormwater sub-watersheds, EMCs were weighted by the percentage of land-use type, or

$$\begin{aligned} EMC_{k,\,j} = \; & (EMC_{j,\,industrial} * \%\ area_{k,\,industrial}) + \\ & (EMC_{j,\,commercial} * \%\ area_{k,\,commercial}) + \\ & (EMC_{j,\,residential} * \%\ area_{k,\,residential}) + \\ & (EMC_{j,\,open\ space} * \%\ area_{k,\,open\ space}) \end{aligned}$$

where, $EMC_{k,\,j}$ = event mean concentration for the kth sub-watershed and the jth pollutant

Thus, each sub-watershed has a unique EMC for each pollutant, dependent upon land use.

For each of the twelve stormwater sub-watersheds, total runoff was calculated for the summer and winter seasons. These volumes were multiplied by the EMCs and the seasonal load was calculated (Tables 11-3 through 11-14). Seasonal loads were added to give the annual load per pollutant per sub-watershed. Summation over the twelve stormwater sub-watersheds produced the estimated annual load to the Salt River from stormwater for each pollutant over the permit year.

Table 11-2 Land-Use Based Event Mean Concentrations

Pollutants	2018-19 data (ave all sites)[1]	EMC_O	EMC_R	EMC_I	EMC_C
BOD_5 (mg/L)	37.6	31.0	12.0	55.3	0.00
COD High Level (mg/L)	248	130	42.3	68.8	148
Residue, Total at 105 Deg. C (TDS)	186	120	111	123	84.0
Nitrogen NO_2 + NO_3, Total, (mg/L as N)	1.11	3.12	1.24	1.14	0.70
Nitrogen Organic, Total Kjeldahl (mg/L as N)	4.79	0.11	5.19	7.24	1.67
Phosphorous, Total, (mg/L as P)	1.01	0.41	0.26	0.78	0.30
Arsenic, Total, (µg/L as As)	5.09	2.40	5.24	7.77	2.95
Antimony Total (µg/L as Sb)	2.81	0.64	1.96	4.81	2.12
Barium Total (µg/L as Ba)	186	20.0	170	311	35.6
Beryllium, Total Recoverable, (µg/L as Be)	0.60	0.20	0.12	0.22	0.39
Cadmium, Total Recoverable, (µg/L as Cd)	0.92	0.00	3.38	3.68	6.63
Chromium, Total Recoverable, (µg/L as Cr)	17.1	24.3	12.3	3.68	5.71
Copper, Total Recoverable, (µg/L as Cu)	82.3	29.0	23.3	204	15.0
Lead, Total Recoverable, (µg/L as Pb)	47.4	19.9	25.2	29.7	12.5
Mercury, Total Recoverable, (µg/L as Hg)	0.22	1.08	0.20	0.08	0.04
Nickel, Total Recoverable, (µg/L as Ni)	21.0	23.4	13.4	15.4	12.1
Selenium Total Recoverable, (µg/L as Se)	0.75	7.13	0.09	1.20	0.39
Silver, Total Recoverable, (µg/L as Ag)	0.38	0.45	0.37	0.42	0.32
Thallium Total Recoverable, (µg/L as Th)	0.26	0.20	0.21	0.04	0.21
Zinc, Total Recoverable, (µg/L as Zn)	429	96.0	109	346	135

NOTES: [1]Censored non detects included in mean as per USACOE 2008, Manual 1110-1-4014, ENVIRONMENTAL STATISTICS
[2] Event mean concentrations from 2001 MS4 application, as modified by monitoring data to date. See text.
O = open space land use, R = residential land use, I = industrial land use, C = commercial land use

Table 11-3 Lower Arizona Canal Diversion Channel Watershed Pollutant Loadings

Total area, acres: 94,321 | Residential: 41.14% | Industrial: 13.58% | Undeveloped: 19.67% | Commercial: 25.60%

Total Summer (June-Oct) Runoff, cubic feet: 733,856,984 | Total Winter (Nov-May) Runoff, cubic feet: 316,818,544

Constituent	Land Use weighted concentrations	Summer Pollutant Load (pounds)	Winter Pollutant Load (pounds)	Total Annual Pollutant Load (pounds)
BOD_5 (mg/L)	18.6	849,858	366,898	1,216,756
COD High Level (mg/L)	90.2	4,132,258	1,783,966	5,916,224
Residue, Total at 105 Deg. C (TDS)	107	4,921,941	2,124,886	7,046,827
Nitrogen $NO_2 + NO_3$, Total, (mg/L as N)	1.46	66,798	28,838	95,636
Nitrogen Organic, Total Kjeldahl (mg/L as N)	3.57	163,512	70,591	234,103
Phosphorous, Total, (mg/L as P)	0.37	16,968	7,325	24,293
Arsenic, Total, (µg/L as As)	4.44	203	87.8	291
Antimony Total (µg/l as Sb)	2.13	97.5	42.1	140
Barium Total (µg/l as Ba)	125	5,744	2,480	8,223
Beryllium, Total Recoverable, (µg/L as Be)	0.22	9.96	4.30	14.3
Cadmium, Total Recoverable, (µg/L as Cd)	3.59	164	70.9	235
Chromium, Total Recoverable, (µg/L as Cr)	11.8	541	233	774
Copper, Total Recoverable, (µg/L as Cu)	46.8	2,143	925	3,068
Lead, Total Recoverable, (µg/L as Pb)	21.5	986	425	1,411
Mercury, Total Recoverable, (µg/L as Hg)	0.31	14.4	6.21	20.6
Nickel, Total Recoverable, (µg/L as Ni)	15.3	701	303	1,004
Selenium Total Recoverable, (µg/L as Se)	1.70	78.0	33.7	112
Silver, Total Recoverable, (µg/L as Ag)	0.38	17.3	7.46	24.7
Thallium Total Recoverable, (µg/L as Th)	0.19	8.61	3.72	12.3
Zinc, Total Recoverable, (µg/L as Zn)	145	6,649	2,870	9,519

Table 11-4 Upper Arizona Canal Diversion Channel Watershed Pollutant Loadings

Total area, acres: 63,903 Residential: 46.30% Industrial: 3.90% Undeveloped: 31.91% Commercial: 17.88%

Total Summer (June-Oct) Runoff, cubic feet: 337,479,388 Total Winter (Nov-May) Runoff, cubic feet: 208,886,390

Constituent	Land Use weighted concentrations	Summer Pollutant Load (pounds)	Winter Pollutant Load (pounds)	Total Annual Pollutant Load (pounds)
BOD_5 (mg/L)	17.6	370,955	229,606	600,561
COD High Level (mg/L)	90.2	1,900,392	1,176,268	3,076,660
Residue, Total at 105 Deg. C (TDS)	109	2,306,882	1,427,869	3,734,751
Nitrogen $NO_2 + NO_3$, Total, (mg/L as N)	1.74	36,647	22,683	59,331
Nitrogen Organic, Total Kjeldahl (mg/L as N)	3.02	63,656	39,400	103,056
Phosphorous, Total, (mg/L as P)	0.34	7,064	4,373	11,437
Arsenic, Total, (μg/L as As)	4.02	84.7	52.4	137
Antimony Total (μg/l as Sb)	1.68	35.4	21.9	57.3
Barium Total (μg/l as Ba)	104	2,185	1,353	3,538
Beryllium, Total Recoverable, (μg/L as Be)	0.20	4.12	2.55	6.67
Cadmium, Total Recoverable, (μg/L as Cd)	2.89	60.9	37.7	98.6
Chromium, Total Recoverable, (μg/L as Cr)	14.6	308	191	498
Copper, Total Recoverable, (μg/L as Cu)	30.6	646	400	1,045
Lead, Total Recoverable, (μg/L as Pb)	21.4	451	279	730
Mercury, Total Recoverable, (μg/L as Hg)	0.45	9.38	5.81	15.2
Nickel, Total Recoverable, (μg/L as Ni)	16.4	346	214	561
Selenium Total Recoverable, (μg/L as Se)	2.43	51.3	31.7	83.0
Silver, Total Recoverable, (μg/L as Ag)	0.39	8.11	5.02	13.1
Thallium Total Recoverable, (µg/L as Th)	0.20	4.29	2.66	6.95
Zinc, Total Recoverable, (μg/L as Zn)	119	2,499	1,547	4,046

Table 11-5 South Mountain Watershed Basin Pollutant Loadings

Total area, acres: 61,998 Residential: 27.30% Industrial: 4.37% Undeveloped: 52.98% Commercial: 15.35%
Total Summer (June-Oct) Runoff, cubic feet: 291,548,276 Total Winter (Nov-May) Runoff, cubic feet: 137,503,447

Constituent	Land Use weighted concentrations	Summer Pollutant Load (pounds)	Winter Pollutant Load (pounds)	Total Annual Pollutant Load (pounds)
BOD_5 (mg/L)	22.1	402,596	189,877	592,473
COD High Level (mg/L)	106	1,931,717	911,059	2,842,776
Residue, Total at 105 Deg. C (TDS)	112	2,040,895	962,551	3,003,446
Nitrogen $NO_2 + NO_3$, Total, (mg/L as N)	2.15	39,110	18,446	57,556
Nitrogen Organic, Total Kjeldahl (mg/L as N)	2.05	37,314	17,599	54,913
Phosphorous, Total, (mg/L as P)	0.37	6,704	3,162	9,866
Arsenic, Total, (µg/L as As)	3.49	63.6	30.0	93.6
Antimony Total (µg/l as Sb)	1.41	25.7	12.1	37.8
Barium Total (µg/l as Ba)	76.2	1,386	654	2,040
Beryllium, Total Recoverable, (µg/L as Be)	0.21	3.75	1.77	5.52
Cadmium, Total Recoverable, (µg/L as Cd)	2.10	38.2	18.0	56.2
Chromium, Total Recoverable, (µg/L as Cr)	17.3	314	148	463
Copper, Total Recoverable, (µg/L as Cu)	32.9	599	283	882
Lead, Total Recoverable, (µg/L as Pb)	20.6	376	177	553
Mercury, Total Recoverable, (µg/L as Hg)	0.63	11.6	5.45	17.0
Nickel, Total Recoverable, (µg/L as Ni)	18.6	338	160	498
Selenium Total Recoverable, (µg/L as Se)	3.92	71.3	33.6	105
Silver, Total Recoverable, (µg/L as Ag)	0.40	7.34	3.46	10.8
Thallium Total Recoverable, (µg/L as Th)	0.20	3.66	1.73	5.39
Zinc, Total Recoverable, (µg/L as Zn)	116	2,118	999	3,117

Table 11-6 Upper Indian Bend Wash Watershed Pollutant Loadings

Total area, acres: 17,187	Residential: 12.38%	Industrial: 2.10%	Undeveloped: 70.78%	Commercial: 14.73%
Total Summer (June-Oct) Runoff, cubic feet: 88,018,106	Total Winter (Nov-May) Runoff, cubic feet: 51,365,960			

Constituent	Land Use weighted concentrations	Summer Pollutant Load (pounds)	Winter Pollutant Load (pounds)	Total Annual Pollutant Load (pounds)
BOD_5 (mg/L)	24.6	135,120	78,854	213,973
COD High Level (mg/L)	121	662,126	386,406	1,048,53
Residue, Total at 105 Deg. C (TDS)	114	624,409	364,395	988,804
Nitrogen $NO_2 + NO_3$, Total, (mg/L as N)	2.49	13,677	7,982	21,659
Nitrogen Organic, Total Kjeldahl (mg/L as N)	1.12	6,160	3,595	9,754
Phosphorous, Total, (mg/L as P)	0.38	2,104	1,228	3,333
Arsenic, Total, (µg/L as As)	2.94	16.2	9.44	25.6
Antimony Total (µg/l as Sb)	1.11	6.11	3.56	9.67
Barium Total (µg/l as Ba)	47.0	258	151	409
Beryllium, Total Recoverable, (µg/L as Be)	0.22	1.19	0.69	1.88
Cadmium, Total Recoverable, (µg/L as Cd)	1.47	8.09	4.72	12.8
Chromium, Total Recoverable, (µg/L as Cr)	19.6	108	63.0	171
Copper, Total Recoverable, (µg/L as Cu)	29.9	164	95.9	260
Lead, Total Recoverable, (µg/L as Pb)	19.7	108	63.1	171
Mercury, Total Recoverable, (µg/L as Hg)	0.80	4.37	2.55	6.92
Nickel, Total Recoverable, (µg/L as Ni)	20.3	112	65.2	177
Selenium Total Recoverable, (µg/L as Se)	5.14	28.3	16.5	44.8
Silver, Total Recoverable, (µg/L as Ag)	0.42	2.29	1.34	3.62
Thallium Total Recoverable, (µg/L as Th)	0.20	1.12	0.65	1.77
Zinc, Total Recoverable, (µg/L as Zn)	109	597	348	945

Table 11-7 Middle Indian Bend Wash Watershed Pollutant Loadings

Total area, acres: 19,142 Residential: 64.54% Industrial: 0.35% Undeveloped: 22.42% Commercial: 12.69%
Total Summer (June-Oct) Runoff, cubic feet: 115,230,902
Total Winter (Nov-May) Runoff, cubic feet: 67,761,694

Constituent	Land Use weighted concentrations	Summer Pollutant Load (pounds)	Winter Pollutant Load (pounds)	Total Annual Pollutant Load (pounds)
BOD_5 (mg/L)	14.9	107,103	62,982	170,086
COD High Level (mg/L)	75	542,690	319,130	861,820
Residue, Total at 105 Deg. C (TDS)	110	788,652	463,768	1,252,420
Nitrogen $NO_2 + NO_3$, Total, (mg/L as N)	1.59	11,457	6,737	18,195
Nitrogen Organic, Total Kjeldahl (mg/L as N)	3.61	25,996	15,287	41,283
Phosphorous, Total, (mg/L as P)	0.30	2,162	1,271	3,433
Arsenic, Total, (μg/L as As)	4.32	31.1	18.3	49.3
Antimony Total (μg/l as Sb)	1.69	12.2	7.17	19.4
Barium Total (μg/l as Ba)	120	863	507	1,370
Beryllium, Total Recoverable, (μg/L as Be)	0.17	1.22	0.72	1.94
Cadmium, Total Recoverable, (μg/L as Cd)	3.03	21.8	12.8	34.6
Chromium, Total Recoverable, (μg/L as Cr)	14.1	102	60	161
Copper, Total Recoverable, (μg/L as Cu)	24.1	174	102	276
Lead, Total Recoverable, (μg/L as Pb)	22.4	161	95	256
Mercury, Total Recoverable, (μg/L as Hg)	0.37	2.69	1.58	4.3
Nickel, Total Recoverable, (μg/L as Ni)	15.5	111	66	177
Selenium Total Recoverable, (μg/L as Se)	1.71	12.3	7.2	19.5
Silver, Total Recoverable, (μg/L as Ag)	0.38	2.72	1.60	4.32
Thallium Total Recoverable, (μg/L as Th)	0.21	1.52	0.89	2.41
Zinc, Total Recoverable, (μg/L as Zn)	110	792	466	1,257

Table 11-8 Cave Creek Watershed Pollutant Loadings

Total area, acres: 18,009 Residential: 16.83% Industrial: 0.28% Undeveloped: 77.63% Commercial: 5.26%

Total Summer (June-Oct) Runoff, cubic feet: 40,903,332 Total Winter (Nov-May) Runoff, cubic feet: 33,840,420

Constituent	Land Use weighted concentrations	Summer Pollutant Load (pounds)	Winter Pollutant Load (pounds)	Total Annual Pollutant Load (pounds)
BOD_5 (mg/L)	26.2	67,001	55,431	122,432
COD High Level (mg/L)	116	296,237	245,085	541,322
Residue, Total at 105 Deg. C (TDS)	117	297,733	246,323	544,056
Nitrogen $NO_2 + NO_3$, Total, (mg/L as N)	2.67	6,820	5,642	12,462
Nitrogen Organic, Total Kjeldahl (mg/L as N)	1.07	2,731	2,260	4,991
Phosphorous, Total, (mg/L as P)	0.38	970	803	1,773
Arsenic, Total, (µg/L as As)	2.92	7.46	6.17	13.6
Antimony Total (µg/l as Sb)	0.95	2.44	2.02	4.45
Barium Total (µg/l as Ba)	46.9	120	99.2	219
Beryllium, Total Recoverable, (µg/L as Be)	0.19	0.49	0.41	0.90
Cadmium, Total Recoverable, (µg/L as Cd)	0.93	2.37	1.96	4.33
Chromium, Total Recoverable, (µg/L as Cr)	21.2	54.2	44.9	99.1
Copper, Total Recoverable, (µg/L as Cu)	27.8	70.9	58.7	130
Lead, Total Recoverable, (µg/L as Pb)	20.4	52.2	43.2	95.3
Mercury, Total Recoverable, (µg/L as Hg)	0.87	2.23	1.84	4.07
Nickel, Total Recoverable, (µg/L as Ni)	21.1	53.9	44.6	98.5
Selenium Total Recoverable, (µg/L as Se)	5.58	14.2	11.8	26.0
Silver, Total Recoverable, (µg/L as Ag)	0.43	1.09	0.90	1.99
Thallium Total Recoverable, (µg/L as Th)	0.21	0.53	0.44	0.96
Zinc, Total Recoverable, (µg/L as Zn)	101	258	213	471

Table 11-9 Skunk Creek Watershed Pollutant Loadings

Total area, acres: 26,174 Residential: 19.12% Industrial: 1.15% Undeveloped: 59.46% Commercial: 20.26%

Total Summer (June-Oct) Runoff, cubic feet: 88,096,542 Total Winter (Nov-May) Runoff, cubic feet: 86,918,150

Constituent	Land Use weighted concentrations	Summer Pollutant Load (pounds)	Winter Pollutant Load (pounds)	Total Annual Pollutant Load (pounds)
BOD_5 (mg/L)	21.4	117,499	115,928	233,427
COD High Level (mg/L)	116	638,860	630,315	1,269,175
Residue, Total at 105 Deg. C (TDS)	111	610,543	602,377	1,212,920
Nitrogen NO_2 + NO_3, Total, (mg/L as N)	2.25	12,360	12,194	24,554
Nitrogen Organic, Total Kjeldahl (mg/L as N)	1.48	8,149	8,040	16,190
Phosphorous, Total, (mg/L as P)	0.36	1,998	1,971	3,969
Arsenic, Total, (µg/L as As)	3.12	17.1	16.9	34.0
Antimony Total (µg/l as Sb)	1.24	6.83	6.74	13.6
Barium Total (µg/l as Ba)	55.3	304	300	604
Beryllium, Total Recoverable, (µg/L as Be)	0.22	1.22	1.20	2.42
Cadmium, Total Recoverable, (µg/L as Cd)	2.03	11.2	11.0	22.2
Chromium, Total Recoverable, (µg/L as Cr)	18.0	99.0	97.7	197
Copper, Total Recoverable, (µg/L as Cu)	27.1	149	147	296
Lead, Total Recoverable, (µg/L as Pb)	19.5	107	106	213
Mercury, Total Recoverable, (µg/L as Hg)	0.69	3.78	3.73	7.51
Nickel, Total Recoverable, (µg/L as Ni)	19.1	105	104	209
Selenium Total Recoverable, (µg/L as Se)	4.35	23.9	23.6	47.5
Silver, Total Recoverable, (µg/L as Ag)	0.40	2.22	2.19	4.42
Thallium Total Recoverable, (µg/L as Th)	0.21	1.13	1.12	2.25
Zinc, Total Recoverable, (µg/L as Zn)	109	601	593	1,193

Table 11-10 Upper New River Watershed Pollutant Loadings

Total area, acres: 30,056	Residential: 14.35%	Industrial: 0.64%	Undeveloped: 80.59%	Commercial: 4.42%
Total Summer (June-Oct) Runoff, cubic feet: 54,667,889	Total Winter (Nov-May) Runoff, cubic feet: 51,838,558			

Constituent	Land Use weighted concentrations	Summer Pollutant Load (pounds)	Winter Pollutant Load (pounds)	Total Annual Pollutant Load (pounds)
BOD_5 (mg/L)	27.1	92,350	87,570	179,920
COD High Level (mg/L)	118	402,063	381,254	783,317
Residue, Total at 105 Deg. C (TDS)	117	399,758	379,068	778,826
Nitrogen $NO_2 + NO_3$, Total, (mg/L as N)	2.73	9,319	8,837	18,156
Nitrogen Organic, Total Kjeldahl (mg/L as N)	0.96	3,265	3,096	6,360
Phosphorous, Total, (mg/L as P)	0.39	1,317	1,249	2,566
Arsenic, Total, (µg/L as As)	2.87	9.78	9.27	19.1
Antimony Total (µg/l as Sb)	0.92	3.15	2.99	6.14
Barium Total (µg/l as Ba)	44.1	151	143	294
Beryllium, Total Recoverable, (µg/L as Be)	0.19	0.66	0.63	1.29
Cadmium, Total Recoverable, (µg/L as Cd)	0.80	2.73	2.59	5.33
Chromium, Total Recoverable, (µg/L as Cr)	21.6	73.8	70.0	144
Copper, Total Recoverable, (µg/L as Cu)	28.7	97.9	92.8	191
Lead, Total Recoverable, (µg/L as Pb)	20.4	69.6	66.0	136
Mercury, Total Recoverable, (µg/L as Hg)	0.90	3.07	2.91	5.98
Nickel, Total Recoverable, (µg/L as Ni)	21.4	73.1	69.3	142
Selenium Total Recoverable, (µg/L as Se)	5.79	19.8	18.7	38.5
Silver, Total Recoverable, (µg/L as Ag)	0.43	1.46	1.39	2.85
Thallium Total Recoverable, (µg/L as Th)	0.21	0.70	0.66	1.36
Zinc, Total Recoverable, (µg/L as Zn)	101	345	327	673

Table 11-11 Lower New River Watershed Pollutant Loadings

Total area, acres: 1,395 | Residential: 37.20% | Industrial: 2.48% | Undeveloped: 53.59% | Commercial: 6.74%

Total Summer (June-Oct) Runoff, cubic feet: 3,229,506 | Total Winter (Nov-May) Runoff, cubic feet: 3,053,750

Constituent	Land Use weighted concentrations	Summer Pollutant Load (pounds)	Winter Pollutant Load (pounds)	Total Annual Pollutant Load (pounds)
BOD_5 (mg/L)	22.4	4,525	4,279	8,805
COD High Level (mg/L)	97.1	19,567	18,503	38,070
Residue, Total at 105 Deg. C (TDS)	114	23,042	21,788	44,831
Nitrogen $NO_2 + NO_3$, Total, (mg/L as N)	2.21	445	421	866
Nitrogen Organic, Total Kjeldahl (mg/L as N)	2.28	460	435	896
Phosphorous, Total, (mg/L as P)	0.36	71.8	67.9	140
Arsenic, Total, (μg/L as As)	3.63	0.73	0.69	1.42
Antimony Total (μg/l as Sb)	1.34	0.27	0.25	0.52
Barium Total (μg/l as Ba)	84.2	17.0	16.0	33.0
Beryllium, Total Recoverable, (μg/L as Be)	0.18	0.04	0.03	0.07
Cadmium, Total Recoverable, (μg/L as Cd)	1.79	0.36	0.34	0.70
Chromium, Total Recoverable, (μg/L as Cr)	18.1	3.64	3.44	7.09
Copper, Total Recoverable, (μg/L as Cu)	30.2	6.10	5.77	11.9
Lead, Total Recoverable, (μg/L as Pb)	21.6	4.36	4.12	8.48
Mercury, Total Recoverable, (μg/L as Hg)	0.66	0.13	0.13	0.26
Nickel, Total Recoverable, (μg/L as Ni)	18.7	3.77	3.57	7.34
Selenium Total Recoverable, (μg/L as Se)	3.91	0.79	0.75	1.53
Silver, Total Recoverable, (μg/L as Ag)	0.41	0.08	0.08	0.16
Thallium Total Recoverable, (μg/L as Th)	0.20	0.04	0.04	0.08
Zinc, Total Recoverable, (μg/L as Zn)	110	22.1	20.9	43.0

Table 11-12 Upper Agua Fria River Watershed Pollutant Loadings

Total area, acres: 492 | Residential: 0.00% | Industrial: 0.00% | Undeveloped: 100.00% | Commercial: 0.00%

Total Summer (June-Oct) Runoff, cubic feet: 398,343 | Total Winter (Nov-May) Runoff, cubic feet: 378,104

Constituent	Land Use weighted concentrations	Summer Pollutant Load (pounds)	Winter Pollutant Load (pounds)	Total Annual Pollutant Load (pounds)
BOD_5 (mg/L)	31.0	771	732	1,503
COD High Level (mg/L)	130	3,233	3,069	6,301
Residue, Total at 105 Deg. C (TDS)	120	2,984	2,833	5,817
Nitrogen $NO_2 + NO_3$, Total, (mg/L as N)	3.12	77.6	73.6	151
Nitrogen Organic, Total Kjeldahl (mg/L as N)	0.11	2.81	2.67	5.48
Phosphorous, Total, (mg/L as P)	0.41	10.2	9.68	19.9
Arsenic, Total, (µg/L as As)	2.40	0.06	0.06	0.12
Antimony Total (µg/l as Sb)	0.64	0.02	0.02	0.03
Barium Total (µg/l as Ba)	20.0	0.50	0.47	0.97
Beryllium, Total Recoverable, (µg/L as Be)	0.20	0.00	0.00	0.01
Cadmium, Total Recoverable, (µg/L as Cd)	0.00	0.00	0.00	0.00
Chromium, Total Recoverable, (µg/L as Cr)	24.3	0.60	0.57	1.18
Copper, Total Recoverable, (µg/L as Cu)	29.0	0.72	0.68	1.41
Lead, Total Recoverable, (µg/L as Pb)	19.9	0.49	0.47	0.96
Mercury, Total Recoverable, (µg/L as Hg)	1.08	0.03	0.03	0.05
Nickel, Total Recoverable, (µg/L as Ni)	23.4	0.58	0.55	1.13
Selenium Total Recoverable, (µg/L as Se)	7.13	0.18	0.17	0.35
Silver, Total Recoverable, (µg/L as Ag)	0.45	0.01	0.01	0.02
Thallium Total Recoverable, (µg/L as Th)	0.20	0.01	0.00	0.01
Zinc, Total Recoverable, (µg/L as Zn)	96.0	2.39	2.27	4.65

Table 11-13 Lower Agua Fria River Watershed Pollutant Loadings

Total area, acres: 24 | Residential: 0.00% | Industrial: 89.39% | Undeveloped: 10.61% | Commercial: 0.00%

Total Summer (June-Oct) Runoff, cubic feet: 16,332 | Total Winter (Nov-May) Runoff, cubic feet: 14,685

Constituent	Land Use weighted concentrations	Summer Pollutant Load (pounds)	Winter Pollutant Load (pounds)	Total Annual Pollutant Load (pounds)
BOD_5 (mg/L)	52.7	53.8	48.4	102
COD High Level (mg/L)	75.3	76.8	69.1	146
Residue, Total at 105 Deg. C (TDS)	122	125	112	237
Nitrogen $NO_2 + NO_3$, Total, (mg/L as N)	1.35	1.38	1.24	2.61
Nitrogen Organic, Total Kjeldahl (mg/L as N)	6.48	6.61	5.94	12.6
Phosphorous, Total, (mg/L as P)	0.74	0.76	0.68	1.43
Arsenic, Total, (μg/L as As)	7.20	0.01	0.01	0.01
Antimony Total (μg/l as Sb)	4.37	0.00	0.00	0.01
Barium Total (μg/l as Ba)	280	0.29	0.26	0.54
Beryllium, Total Recoverable, (μg/L as Be)	0.22	0.00	0.00	0.00
Cadmium, Total Recoverable, (μg/L as Cd)	3.29	0.00	0.00	0.01
Chromium, Total Recoverable, (μg/L as Cr)	5.87	0.01	0.01	0.01
Copper, Total Recoverable, (μg/L as Cu)	185	0.19	0.17	0.36
Lead, Total Recoverable, (μg/L as Pb)	28.6	0.03	0.03	0.06
Mercury, Total Recoverable, (μg/L as Hg)	0.19	0.00	0.00	0.00
Nickel, Total Recoverable, (μg/L as Ni)	16.3	0.02	0.01	0.03
Selenium Total Recoverable, (μg/L as Se)	1.83	0.00	0.00	0.00
Silver, Total Recoverable, (μg/L as Ag)	0.43	0.00	0.00	0.00
Thallium Total Recoverable, (μg/L as Th)	0.06	0.00	0.00	0.00
Zinc, Total Recoverable, (μg/L as Zn)	319	0.33	0.29	0.62

Table 11-14 White Tanks A Watershed Pollutant Loadings

Total area, acres: 39	Residential: 0.00%	Industrial: 90.30%	Undeveloped: 4.26%	Commercial: 5.44%
Total Summer (June-Oct) Runoff, cubic feet: 47,528	Total Winter (Nov-May) Runoff, cubic feet: 42,735			

Constituent	Land Use weighted concentrations	Summer Pollutant Load (pounds)	Winter Pollutant Load (pounds)	Total Annual Pollutant Load (pounds)
BOD_5 (mg/L)	51.3	152	137	289
COD High Level (mg/L)	75.7	225	202	427
Residue, Total at 105 Deg. C (TDS)	120	357	321	678
Nitrogen $NO_2 + NO_3$, Total, (mg/L as N)	1.20	3.56	3.20	6.76
Nitrogen Organic, Total Kjeldahl (mg/L as N)	6.63	19.7	17.7	37.4
Phosphorous, Total, (mg/L as P)	0.74	2.19	1.97	4.16
Arsenic, Total, (µg/L as As)	7.28	0.02	0.02	0.04
Antimony Total (µg/l as Sb)	4.49	0.01	0.01	0.03
Barium Total (µg/l as Ba)	284	0.84	0.76	1.60
Beryllium, Total Recoverable, (µg/L as Be)	0.23	0.00	0.00	0.00
Cadmium, Total Recoverable, (µg/L as Cd)	3.69	0.01	0.01	0.02
Chromium, Total Recoverable, (µg/L as Cr)	4.67	0.01	0.01	0.03
Copper, Total Recoverable, (µg/L as Cu)	186	0.55	0.50	1.05
Lead, Total Recoverable, (µg/L as Pb)	28.3	0.08	0.08	0.16
Mercury, Total Recoverable, (µg/L as Hg)	0.12	0.00	0.00	0.00
Nickel, Total Recoverable, (µg/L as Ni)	15.6	0.05	0.04	0.09
Selenium Total Recoverable, (µg/L as Se)	1.41	0.00	0.00	0.01
Silver, Total Recoverable, (µg/L as Ag)	0.42	0.00	0.00	0.00
Thallium Total Recoverable, (µg/L as Th)	0.06	0.00	0.00	0.00
Zinc, Total Recoverable, (µg/L as Zn)	324	0.96	0.86	1.82

ASSESSMENT OF POLLUTANT LOADS

The City uses a pollutant load model that estimates individual pollutant loads by basin and season. As discussed at the end of Part 5 of this report, land use data obtained from the FCDMC is used because it is viewed as more accurate and consistent.

The load is a function of rainfall amounts in each basin, the areal percentage of four land-use classifications (undeveloped, residential, commercial and industrial) and a set of event mean concentrations (EMCs). For each of the City sub-watersheds, the same land-use classifications, rainfall-runoff relationship, and EMCs have been used. The only variable has been the amount of rainfall. In this way, the load has decreased or increased as rainfall has changed from year to year and only reflects this variation.

Because rainfall and runoff in central Arizona follow a discontinuous and unpredictable pattern, especially during summer monsoon season when local convection patterns drive rainfall patterns, the volume of runoff observed at a specific outfall can vary by several orders of magnitude from year to year, and can vary just as much from one outfall location to another (i.e., rainfall associated with a specific storm event will vary widely across the COP system). Although some sampled outfalls may receive abundant runoff, precipitation may not occur at others. These factors skew data obtained via statistical analysis; thus efforts to identify overall patterns or trends in pollutant concentrations based on statistical analysis is not meaningful.

Table 11-15 contains a summary of the pollutant load data calculated for reporting years 2014 through the current reporting year. As discussed above, the data demonstrate that changes in pollutant load calculations vary strictly with rainfall volume.

Table 11-15 Pollutant Load Comparison 2014-2019

Constituent	Total Annual Pollutant Load 2013/14 (pounds)	Total Annual Pollutant Load 2014/15 (pounds)	Total Annual Pollutant Load 2015/16 (pounds)	Total Annual Pollutant Load 2016/17 (pounds)	Total Annual Pollutant Load 2017/18 (pounds)	Total Annual Pollutant Load 2018/19 (pounds)
BOD_5 (mg/L)	2,127,604	3,733,690	1,839,037	2,372,602	1,004,453	3,340,326
COD High Level (mg/L)	10,426,176	18,377,162	8,971,215	11,578,413	4,889,256	16,384,770
Residue, Total at 105 Deg. C (TDS)	11,704,768	20,634,575	10,081,558	12,988,914	5,515,942	18,613,613
Nitrogen NO2 + NO3, Total, (mg/L as N)	199,774	352,787	171,979	222,705	92,876	308,574
Nitrogen Organic, Total Kjeldahl (mg/L as N)	281,558	494,542	242,821	309,620	136,068	471,601
Phosphorous, Total, (mg/L as P)	38,294	67,305	32,947	42,339	18,082	60,836
Arsenic, Total, (mg/L as As)	404	726	43,969	57,037	21,358	665
Antimony Total (mg/l as Sb)	175	309	151	192	83.98	289
Barium Total (mg/l as Ba)	10,054	17,722	8,669	11,057	4,846	16,733
Beryllium, Total Recoverable, (mg/L as Be)	46	81.2	39.9	52.2	10.29	35.0
Cadmium, Total Recoverable, (mg/L as Cd)	280	492	241	309	135.26	470
Chromium, Total Recoverable, (mg/L as Cr)	1,610	2,844	1,395	1,812	750.26	2,515
Copper, Total Recoverable, (mg/L as Cu)	3,784	6,588	3,260	4,149	1,817	6,162
Lead, Total Recoverable, (mg/L as Pb)	2,220	3,908	1,920	2,474	1,051	3,575
Mercury, Total Recoverable, (mg/L as Hg)	54	94.9	46.6	60.7	24.76	81.9
Nickel, Total Recoverable, (mg/L as Ni)	1,819	3,206	1,574	2,037	853.39	2,875
Selenium Total Recoverable, (mg/L as Se)	317	560	275	359	145.59	478
Silver, Total Recoverable, (mg/L as Ag)	0	0.00	0.00	0.00	19.5	66.1
Thallium Total Recoverable, (mg/L as Th)	NC	NC	NC	NC	6.2	33.5
Zinc, Total Recoverable, (mg/L as Zn)	13,083	22,934	11,294	14,475	6,265	21,271
Total Annual Runoff (millions of cubic feet)	1,633.2	2,882.6	1,404.1	1,819.7	1,169,043	2,711,915,563

NC - A statistically representative event mean concentration for thallium could not be calculated as thallium occurs infrequently in stormwater samples regionally.

PART 12: ANNUAL EXPENDITURES

Provide a brief statement of the expenditures incurred each reporting period (July 1-June 30) to implement and maintain the stormwater management program, including associated monitoring and reporting activities. This figure should include funds related exclusively to implementation of the stormwater program. Provide the estimated budget for implementing and maintaining the stormwater program in the subsequent reporting period. Include a statement of the funding sources used to support program expenditures.

Personnel from the City departments responsible for implementation of the stormwater program provided actual and estimated expenditure data for each fiscal year. The expenditures are included in Table 12-1.

Table 12-1 Annual Expenditures Stormwater Program Implementation

	Fiscal Year 2013	Fiscal Year 2014	Fiscal Year 2015	Fiscal Year 2016	Fiscal Year 2017	Fiscal Year 2018	Fiscal Year 2019	Fiscal Year 2020 (estimated)
Street Transportation Department	$1,805,029	$2,407,926 (revised)	$1,886,898	$1,949,181	$2,464,300	$2,919,870	$2,490,040	$3,393,400
Water Services Department	$1,646,649 (revised)	$1,947,736	$1,867,870	$1,702,105	$1,842,748	$1,792,284	$1,890,000	$2,300,000
Planning and Development Department	$484,000	$487,100	$910,900	$1,288,398	$1,563,702	$1,846,831	$1,914,000	$1,952,000
Office of Environmental Programs	$131,845 (revised)	$119,840 (revised)	$121,232 (revised)	$139,424	$132,627	$147,219	$159,786	$177,775
Office of Environmental Programs – Capital Improvement Projects*	$232,556 (revised)	$231,076 (revised)	$240,854 (revised)	$231,716	$173,421	$99,276	$95,154	$405,000
TOTALS	$4,300,079 (revised)	$5,193,678 (revised)	$5,027,754 (revised)	$5,310,824	$6,176,798	$6,805,480	$5,440,161	$8,231,175

* Up to $250,000 in capital improvement project funding is made available each year, and used as necessary to ensure compliance and/or enhance the City's overall stormwater program. Revisions to prior year's expenditures are based on a recent re-evaluation of program expense tracking. FY 20 includes $155,000 carryover.

The City collects a stormwater fee to defray the costs of operating the stormwater management program. Stormwater program charges from the WSD, STD, and OEP are paid out of these funds. The fee does not cover the costs for maintenance of the storm drain system, infrastructure improvements, or other ancillary programs (e.g., HHW, street sweeping, etc.). Stormwater program costs for PDD are funded by construction permit fees.

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PART 13: ATTACHMENTS

Attach a copy of each of the following documents for the first year Annual Report, and each subsequent year if changes are made. If no changes are made to these during a reporting period, indicate, *'no changes were made this period, the 2009 submittal is current'.*

☒ Drainage System Maps

The City considers the storm drains to be protected critical infrastructure. As such, the City has not provided an electronic copy of the GIS maps as an attachment. GIS maps are available for review by ADEQ upon request. Hard copies of the drainage basin maps are provided.

☒ List of major outfalls

☒ List of changes to the major outfall inventory (new outfalls, outfalls out of service), including drainage area and coordinates for the outfalls listed in Table 1 of the permit (4^{th} year report).

☒ Laboratory reports for stormwater monitoring performed in the reporting period.

☐ New or revised ordinances associated with stormwater management.

☒ New or revised public outreach documents.

The following attachments to the Annual Report are in addition to those required as listed above:

☒ STORM Annual Report

☒ GI Effectiveness Study

☒ Select Outreach Images

☒ Public Awareness Survey

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Attachments

Drainage System Maps

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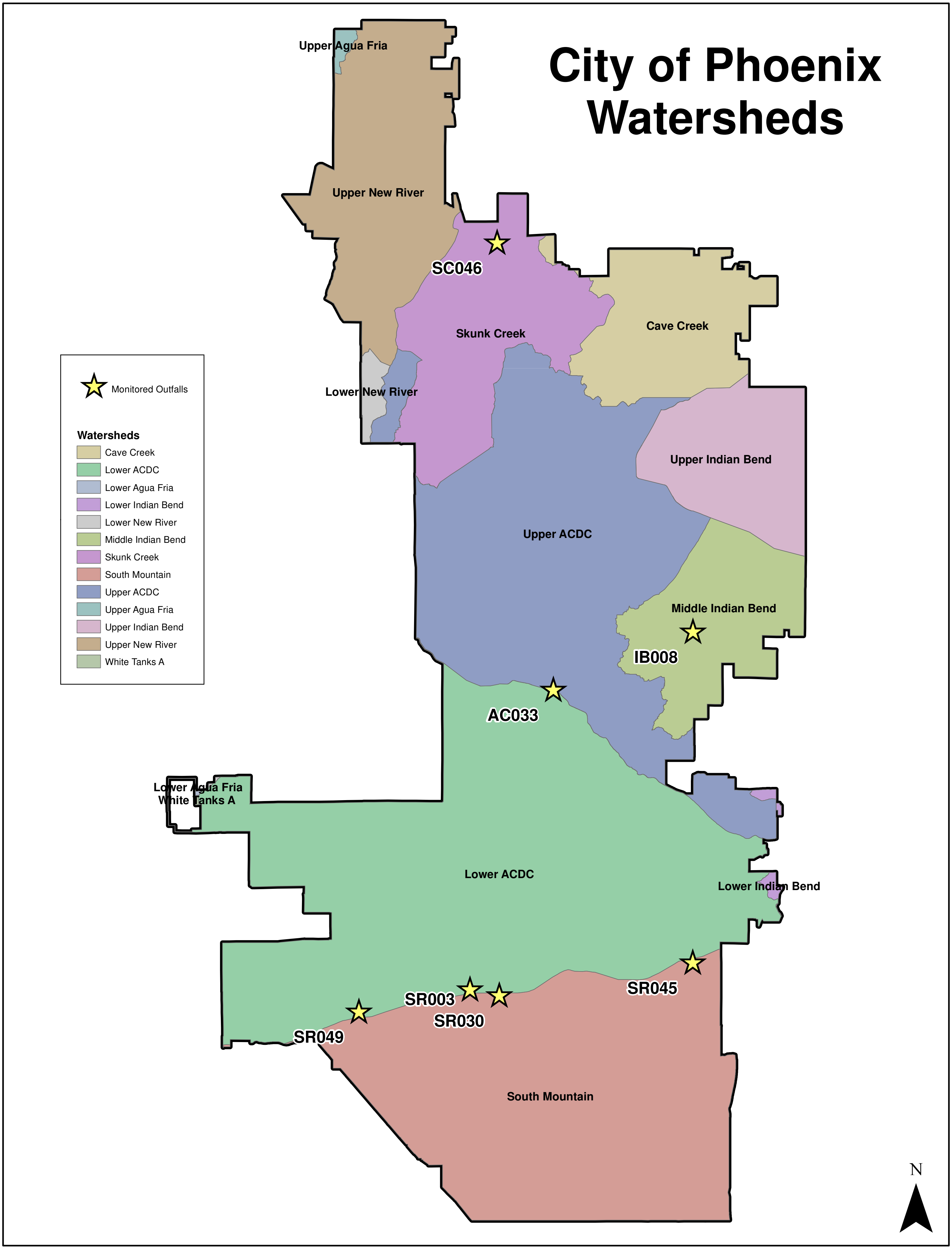

City of Phoenix Watersheds
Upper Agua Fria
Upper New River
SC046
Skunk Creek
Cave Creek
Lower New River
Upper Indian Bend
Upper ACDC
Middle Indian Bend
IB008
AC033
Lower Agua Fria
White Tanks A
Lower ACDC
Lower Indian Bend
SR003
SR030
SR045
SR049
South Mountain
Monitored Outfalls
Watersheds
Cave Creek
Lower ACDC
Lower Agua Fria
Lower Indian Bend
Lower New River
Middle Indian Bend
Skunk Creek
South Mountain
Upper ACDC
Upper Agua Fria
Upper Indian Bend
Upper New River
White Tanks A
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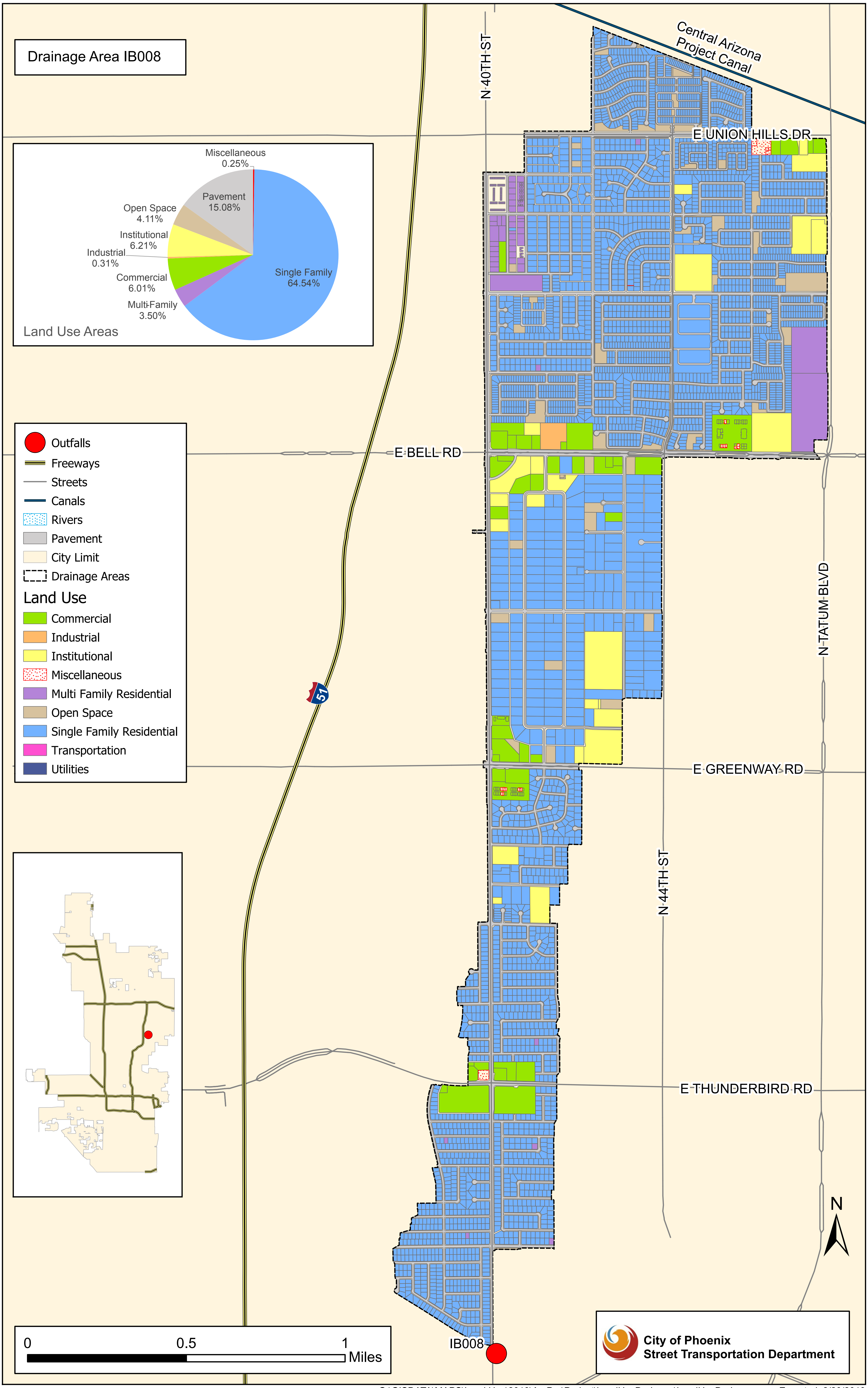

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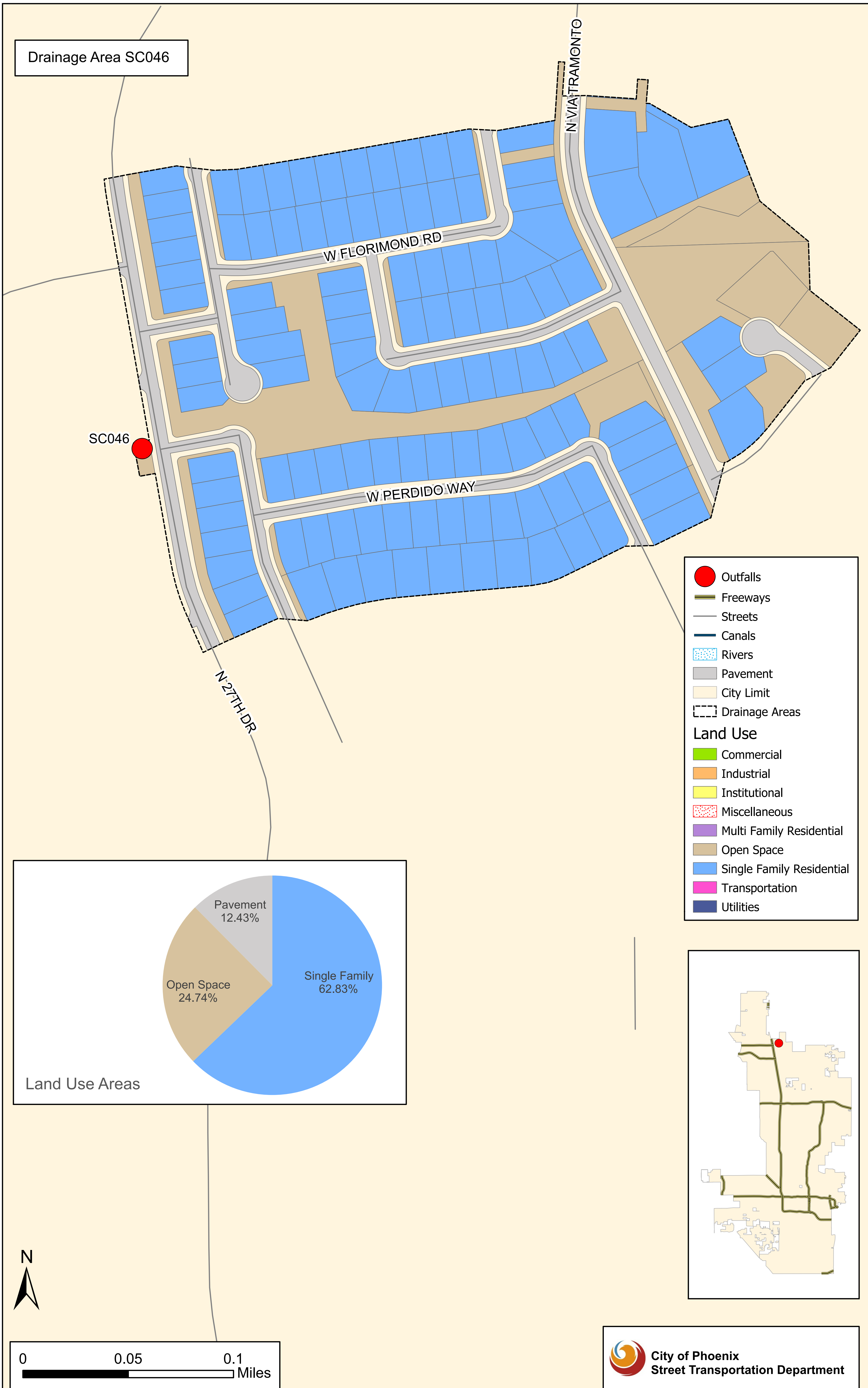

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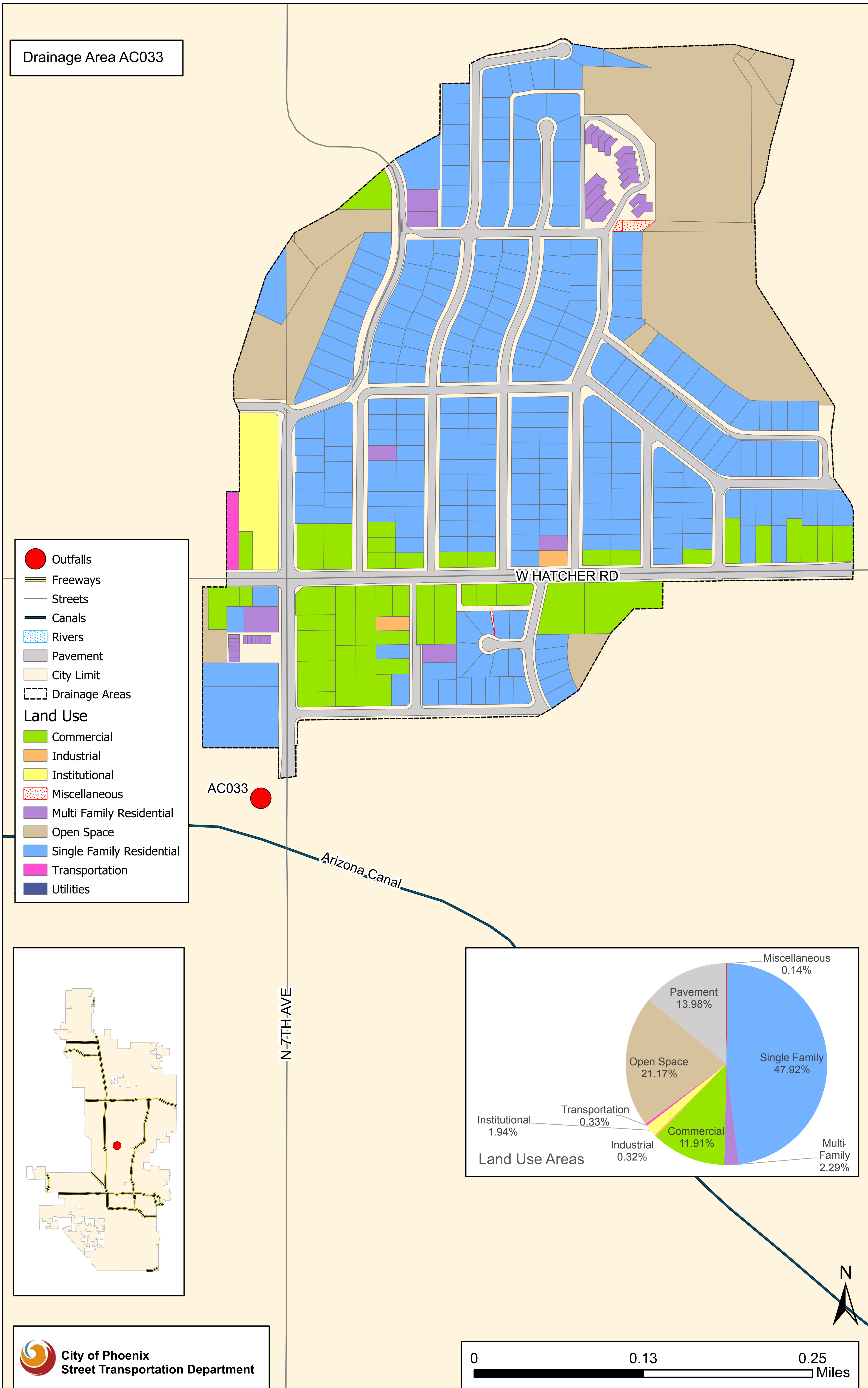

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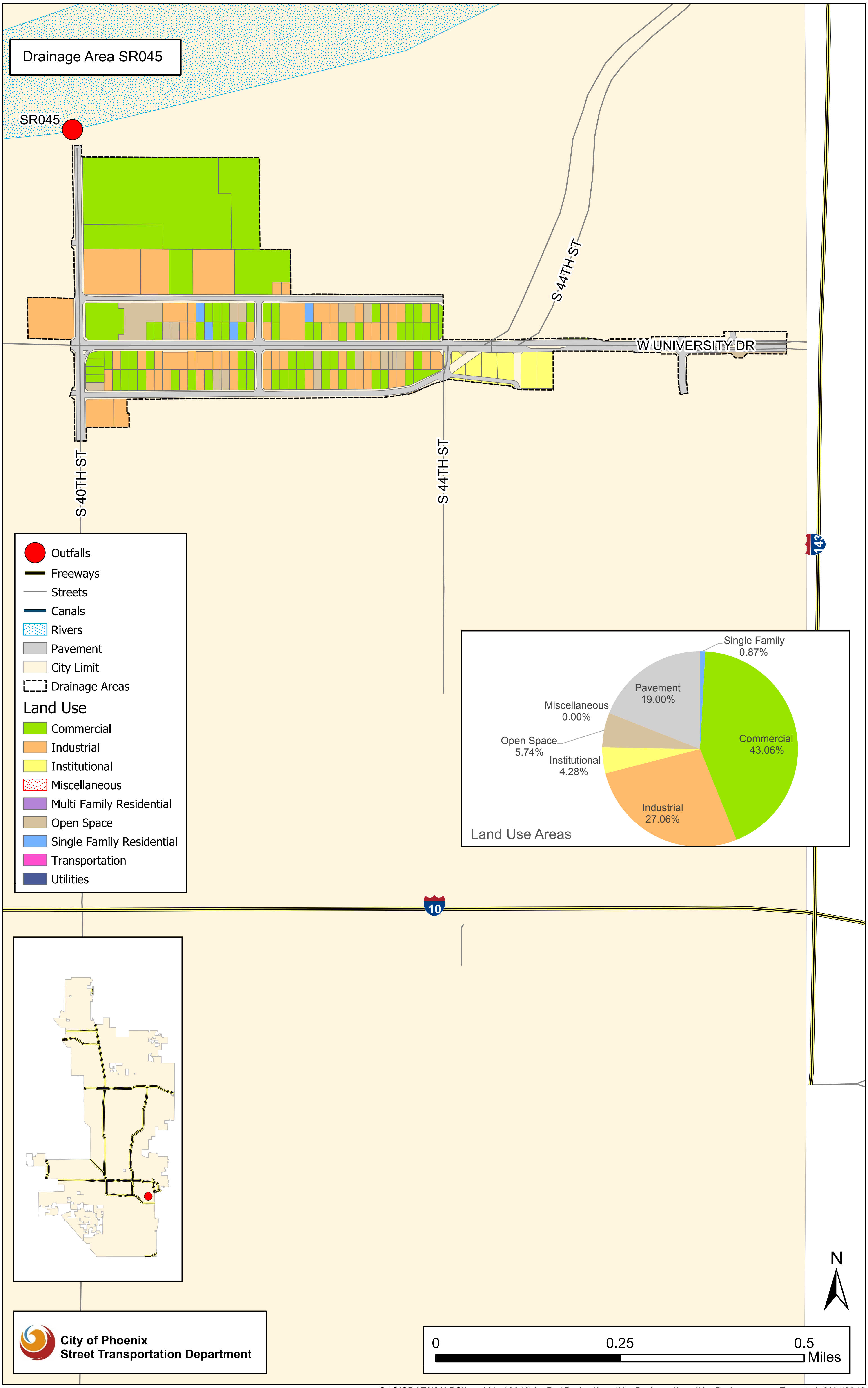

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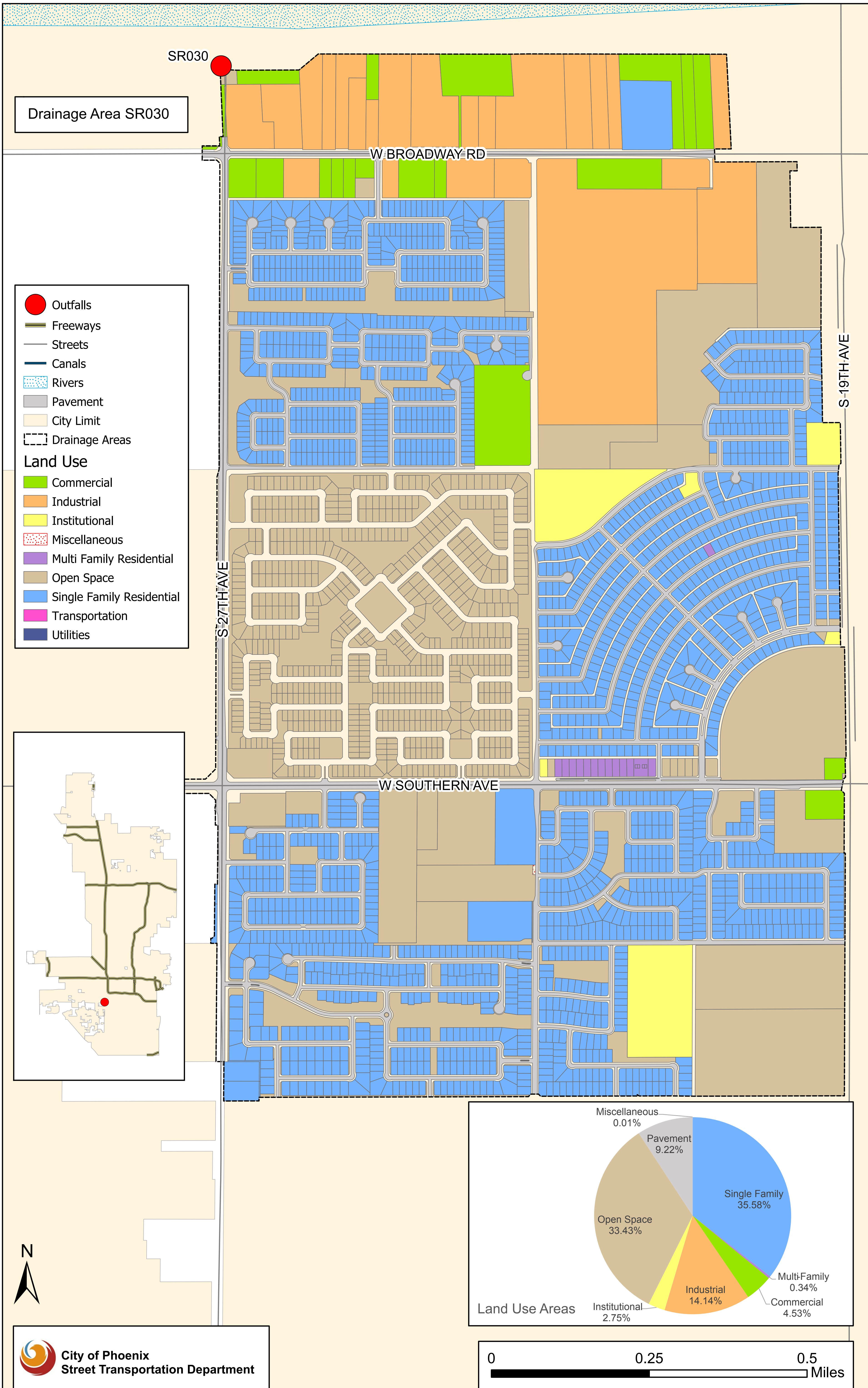

Drainage Area SR030
SR030
W BROADWAY RD
W SOUTHERN AVE
S 27TH AVE
S 19TH AVE
Outfalls
Freeways
Streets
Canals
Rivers
Pavement
City Limit
Drainage Areas
Land Use
Commercial
Industrial
Institutional
Miscellaneous
Multi Family Residential
Open Space
Single Family Residential
Transportation
Utilities
Miscellaneous
0.01%
Pavement
9.22%
Single Family
35.58%
Open Space
33.43%
Multi-Family
0.34%
Commercial
4.53%
Industrial
14.14%
Institutional
2.75%
Land Use Areas
N
City of Phoenix
Street Transportation Department
0
0.25
0.5
Miles

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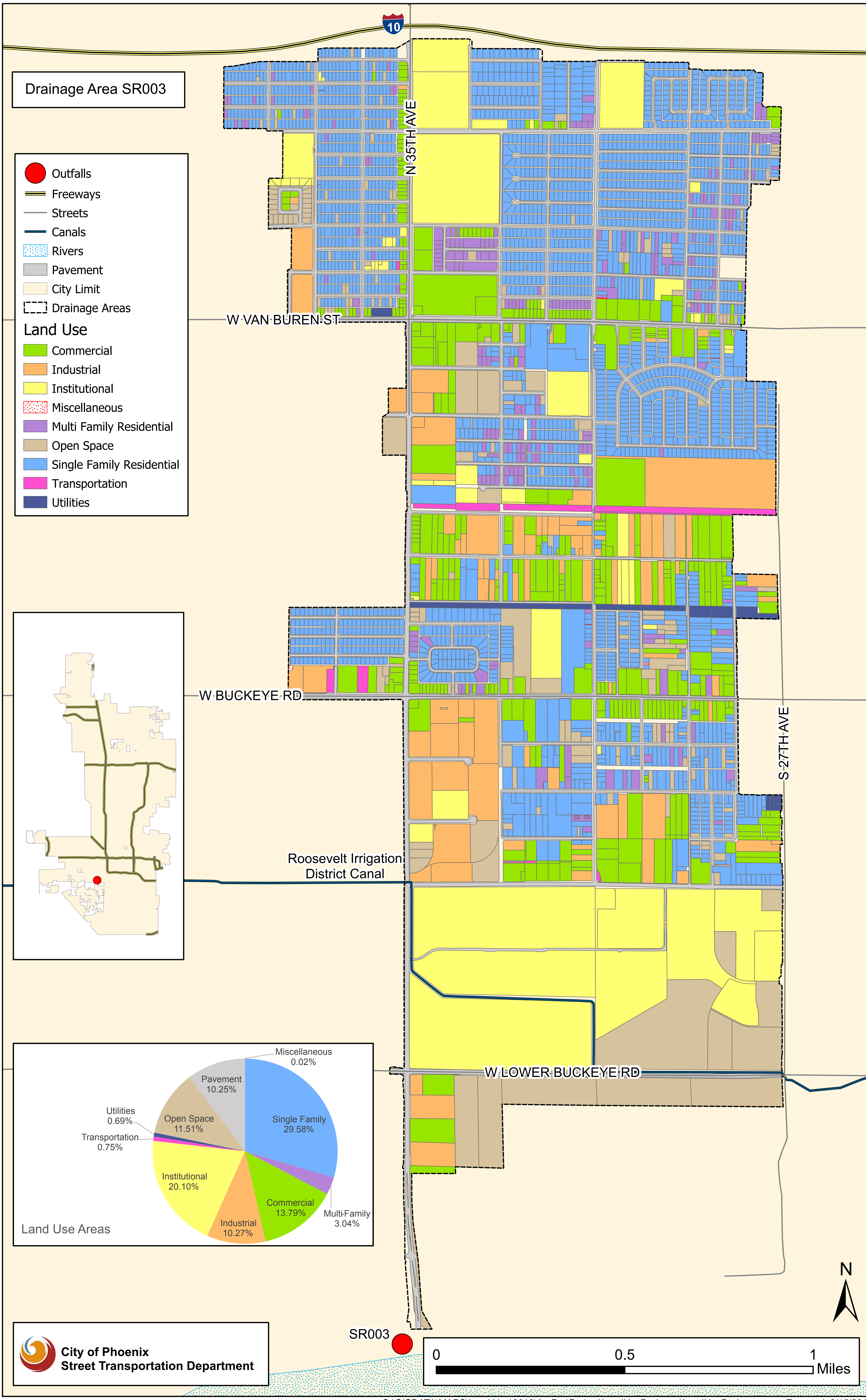
Drainage Area SR003
Outfalls
Freeways
Streets
Canals
Rivers
Pavement
City Limit
Drainage Areas
Land Use
Commercial
Industrial
Institutional
Miscellaneous
Multi Family Residential
Open Space
Single Family Residential
Transportation
Utilities
10
N 35TH AVE
W VAN BUREN ST
W BUCKEYE RD
S 27TH AVE
Roosevelt Irrigation District Canal
W LOWER BUCKEYE RD
Miscellaneous 0.02%
Pavement 10.25%
Utilities 0.69%
Open Space 11.51%
Transportation 0.75%
Single Family 29.58%
Institutional 20.10%
Commercial 13.79%
Multi-Family 3.04%
Industrial 10.27%
Land Use Areas
SR003
N
0
0.5
1
Miles
City of Phoenix
Street Transportation Department

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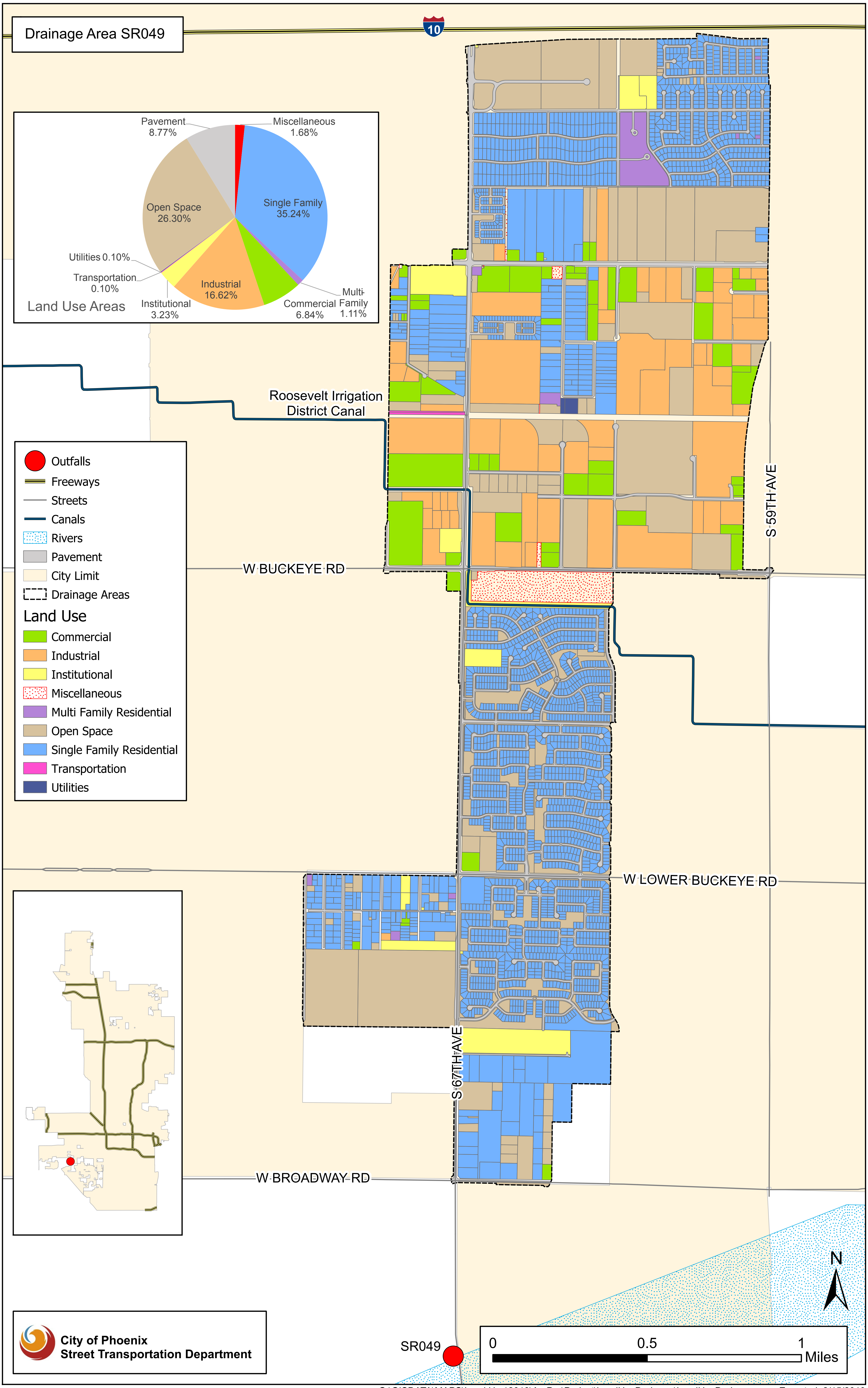

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List of Major Outfalls

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Outfall ID	Site Address	Latitude	Longitude	Drain Type	Drain Size	Last Inspection	Target Inspection
AC/DC-Arizona Canal Diversion Channel	**Count 89**						
AC195	9th Avenue And Acdc Channel N/A, Phoenix, AZ	33.57	112.08	Pipe	72 Inches	09/07/2016	2021
AC196	1330 North State Ave And Acdc N/A, Phoenix, AZ	33.54	112.05	Spillway	5 Feet	02/24/2017	2022
AC005	30th Ave And Metrocenter N/A, Phoenix, AZ	33.57	-111.87	Pipe	53 Inches	03/28/2017	2022
AC006	29th Ave And Metrocenter N/A, Phoenix, AZ	33.57	-111.88	Pipe	48 Inches	02/11/2016	2021
AC007	29th Ave And Metrocenter N/A, Phoenix, AZ	33.57	-111.88	Pipe	43 Inches	02/24/2016	2021
AC008	I-17 (Black Canyon Fwy) And Acdc Channel N/A, Phoe	33.57	-111.88	Pipe	27 Inches	02/23/2016	2021
AC010	19th Ave And Acdc Channel N/A, Phoenix, AZ	33.57	-111.90	Pipe	36 Inches	02/23/2016	2021
AC011	7th St And Acdc Channel N/A, Phoenix, AZ	33.60	-111.17	Pipe	42 Inches	02/23/2016	2021
AC128	7th Ave And Dunlap Ave N/A, Phoenix, AZ	33.57	-111.92	Pipe	12 Inches	02/15/2017	2022
AC130	Paradise Dr And Acdc N/A, Phoenix, AZ	33.59	-111.83	Spillway	64 Feet	02/11/2016	2021
AC131	47th Ave And Acdc N/A, Phoenix, AZ	33.59	-111.84	Spillway	64 Feet	02/11/2016	2021
AC132	46th Ave And Acdc N/A, Phoenix, AZ	33.58	-111.84	Spillway	32 Feet	02/11/2016	2021
AC133	43rd Ave And Acdc N/A, Phoenix, AZ	33.58	-111.85	Spillway	32 Feet	02/11/2016	2021
AC134	43rd Ave And Acdc N/A, Phoenix, AZ	33.58	-111.85	Spillway	32 Feet	02/11/2016	2021
AC135	43rd Ave And Acdc N/A, Phoenix, AZ	33.58	-111.85	Spillway	24 Feet	02/11/2016	2021
AC136	North Ln And Acdc N/A, Phoenix, AZ	33.58	-111.85	Spillway	24 Feet	02/11/2016	2021
AC137	41st Dr And Acdc N/A, Phoenix, AZ	33.58	-111.85	Spillway	24 Feet	02/11/2016	2021
AC138	41st Ln And Acdc N/A, Phoenix, AZ	33.58	-111.85	Spillway	24 Feet	02/11/2016	2021
AC139	41st Ave And Acdc N/A, Phoenix, AZ	33.58	-111.85	Spillway	24 Feet	02/11/2016	2021
AC140	40th Dr And Acdc N/A, Phoenix, AZ	33.58	-111.85	Spillway	24 Feet	02/11/2016	2021
AC141	40th Ln And Acdc N/A, Phoenix, AZ	33.58	-111.85	Spillway	24 Feet	02/11/2016	2021
AC142	40th Ave And Acdc N/A, Phoenix, AZ	33.58	-111.85	Spillway	24 Feet	02/11/2016	2021
AC143	39th Ln And Acdc N/A, Phoenix, AZ	33.58	-111.86	Spillway	24 Feet	02/11/2016	2021
AC144	37th Ave And Acdc N/A, Phoenix, AZ	33.57	-111.86	Spillway	64 Feet	02/11/2016	2021
AC145	36th Ave And Acdc N/A, Phoenix, AZ	33.57	-111.86	Spillway	40 Feet	02/23/2016	2021
AC146	33rd Ave And Acdc N/A, Phoenix, AZ	33.57	-111.13	Spillway	48 Feet	02/23/2016	2021
AC147	23rd Ave And Acdc N/A, Phoenix, AZ	33.57	-111.89	Spillway	40 Feet	02/23/2016	2021

Outfall ID	Site Address	Latitude	Longitude	Drain Type	Drain Size	Last Inspection	Target Inspection
AC/DC-Arizona Canal Diversion Channel	**Count 89**						
AC148	21st Dr And Acdc N/A, Phoenix, AZ	33.57	-111.90	Spillway	40 Feet	02/23/2016	2021
AC150	20th Dr And Acdc N/A, Phoenix, AZ	33.57	-111.90	Spillway	50 Feet	02/23/2016	2021
AC151	20th Ave And Acdc N/A, Phoenix, AZ	33.57	-111.90	Spillway	40 Feet	02/23/2016	2021
AC152	20th Dr And Acdc N/A, Phoenix, AZ	33.57	-111.90	Spillway	24 Feet	02/23/2016	2021
AC153	16th Ave And Acdc N/A, Phoenix, AZ	33.57	-111.91	Spillway	36 Feet	02/23/2016	2021
AC154	15th Ave And Acdc N/A, Phoenix, AZ	33.57	-111.91	Spillway	60 Feet	02/23/2016	2021
AC155	14th Ave And Acdc N/A, Phoenix, AZ	33.57	-111.91	Spillway	60 Feet	02/23/2016	2021
AC156	13th Ave And Acdc N/A, Phoenix, AZ	33.57	-111.91	Spillway	60 Feet	02/23/2016	2021
AC157	9th Ave And Acdc N/A, Phoenix, AZ	33.57	-111.91	Spillway	46 Feet	02/23/2016	2021
AC158	8th Ave And Acdc N/A, Phoenix, AZ	33.57	-111.92	Spillway	48 Feet	02/23/2016	2021
AC159	Central Ave And Short Channel N/A, Phoenix, AZ	33.56	-111.93	Spillway	30 Feet	02/23/2016	2021
AC160	8th St And Acdc N/A, Phoenix, AZ	33.56	-111.94	Spillway	24 Feet	02/23/2016	2021
AC161	8th Pl And Acdc N/A, Phoenix, AZ	33.56	-111.94	Spillway	24 Feet	02/23/2016	2021
AC162	Harmont Dr And Acdc N/A, Phoenix, AZ	33.55	-111.94	Spillway	56 Feet	02/23/2016	2021
AC163	Northern Ave And Acdc N/A, Phoenix, AZ	33.55	-111.94	Spillway	80 Feet	02/23/2016	2021
AC165	E Desert Park Ln And Acdc N/A, Phoenix, AZ	33.55	-111.94	Spillway	40 Feet	02/23/2016	2021
AC166	Haywood Ave And Acdc N/A, Phoenix, AZ	33.55	-111.94	Spillway	40 Feet	02/23/2016	2021
AC070	Dunlap Ave And Short Tunnel N/A, Phoenix, AZ	33.57	-111.88	Pipe	60 Inches	02/23/2016	2021
AC012	18th Pl And Acdc Channel N/A, Phoenix, AZ	33.54	-111.96	Pipe	48 Inches	03/29/2016	2021
AC013	24th St. Water Treatment Plant And Acdc Channel N	33.53	-111.97	Pipe	36 Inches	03/09/2016	2021
AC014	2 Mile Tunnel And Acdc Channel N/A, Phoenix, AZ	33.60	-111.83	Pipe	36 Inches	03/09/2016	2021
AC015	33rd Dr And Acdc Channel N/A, Phoenix, AZ	33.57	-111.87	Pipe	12 Inches	02/11/2016	2021
AC018	18th Ave And Hatcher N/A, Phoenix, AZ	33.57	-111.90	Pipe	36 Inches	02/23/2016	2021
AC021	49th Dr And Acdc Channel N/A, Phoenix, AZ	33.59	-111.84	Spillway	50 Feet	02/11/2016	2021
AC022	Lupine Dr And Acdc Channel N/A, Phoenix, AZ	33.59	-111.84	Spillway	50 Feet	02/11/2016	2021
AC023	Yucca St And ACDC Channel N/A, Phoenix, AZ	33.59	-111.84	Spillway	27 Feet	02/11/2016	2021
AC024	39th Ave And Acdc Channel N/A, Phoenix, AZ	33.58	-111.86	Spillway	30 Feet	02/11/2016	2021
AC025	Ironwood Dr And Acdc Channel N/A, Phoenix, AZ	33.58	-111.86	Spillway	30 Feet	02/11/2016	2021
AC026	3rd St And Acdc Channel N/A, Phoenix, AZ	33.56	-111.94	Spillway	70 Feet	02/23/2016	2021
AC028	10th St And Acdc Channel N/A, Phoenix, AZ	33.56	-111.94	Spillway	100 Feet	02/23/2016	2021

Outfall ID	Site Address	Latitude	Longitude	Drain Type	Drain Size	Last Inspection	Target Inspection
AC/DC-Arizona Canal Diversion Channel	**Count 89**						
AC029	12th St And Acdc Channel N/A, Phoenix, AZ	33.55	-111.94	Spillway	16 Feet	02/23/2016	2021
AC030	13th St And Orangewood N/A, Phoenix, AZ	33.54	-111.95	Spillway	50 Feet	02/23/2016	2021
AC031	14th St And State Ave N/A, Phoenix, AZ	33.54	-111.95	Spillway	90 Feet	03/29/2016	2021
AC169	Morten Ave And Acdc N/A, Phoenix, AZ	33.55	-111.94	Spillway	40 Feet	02/23/2016	2021
AC171	15th St And Acdc N/A, Phoenix, AZ	33.54	-111.95	Spillway	320 Feet	03/29/2016	2021
AC173	17th St And Acdc N/A, Phoenix, AZ	33.54	-111.96	Spillway	40 Feet	03/29/2016	2021
AC176	19th St And Acdc N/A, Phoenix, AZ	33.53	-111.96	Spillway	80 Feet	03/29/2016	2021
AC177	20th St And Acdc N/A, Phoenix, AZ	33.53	-111.96	Spillway	40 Feet	03/29/2016	2021
AC033	7th Ave And Acdc Channel N/A, Phoenix, AZ	33.57	-111.92	Pipe	42 Inches	02/23/2016	2021
AC033	7th Ave And Acdc Channel N/A, Phoenix, AZ	33.57	-111.92	Pipe	42 Inches	02/23/2016	2021
AC033	7th Ave And Acdc Channel N/A, Phoenix, AZ	33.57	-111.92	Pipe	42 Inches	02/23/2016	2021
AC033	7th Ave And Acdc Channel N/A, Phoenix, AZ	33.57	-111.92	Pipe	42 Inches	02/23/2016	2021
AC034	12th Ave And Acdc Channel N/A, Phoenix, AZ	33.57	-111.91	Pipe	36 Inches	02/23/2016	2021
AC039	14th St And Acdc Channel N/A, Phoenix, AZ	33.58	-111.85	Pipe	36 Inches	03/29/2016	2021
AC044	6th St And Acdc Channel N/A, Phoenix, AZ	33.56	-111.93	Pipe	36 Inches	02/23/2016	2021
AC081	Hwy 51 And Acdc Channel N/A, Phoenix, AZ	33.57	-111.88	Box	6 x 6 Feet	03/29/2016	2021
AC083	24th St. Water Treatment Plant And Acdc Channel N	33.57	-111.88	Pipe	36 Inches	03/29/2016	2021
AC085	2 Mile Tunnel And Acdc Channel N/A, Phoenix, AZ	33.57	-111.88	Pipe	30 Inches	03/09/2016	2021
AC178	Maryland Ave And Acdc N/A, Phoenix, AZ	33.53	-111.96	Spillway	24 Feet	03/29/2016	2021
AC179	Maryland Ave And Acdc N/A, Phoenix, AZ	33.53	-111.04	Spillway	40 Feet	03/29/2016	2021
AC180	Maryland Ave And Acdc N/A, Phoenix, AZ	33.53	-111.96	Spillway	32 Feet	03/29/2016	2021
AC181	Maryland Ave And Acdc N/A, Phoenix, AZ	33.53	-111.96	Spillway	40 Feet	03/29/2016	2021
AC182	Marlette Ave And Acdc N/A, Phoenix, AZ	33.53	-111.96	Spillway	32 Feet	03/29/2016	2021
AC183	Claremont St And Acdc N/A, Phoenix, AZ	33.53	-111.96	Spillway	32 Feet	03/29/2016	2021
AC184	Squaw Peak Water Treatment Plant And Acdc N/A, Pho	33.53	-111.97	Spillway	72 Feet	03/29/2016	2021
AC191	I-17 And Acdc Channel N/A, Phoenix, AZ	33.57	-111.88	Spillway	31 Feet	03/29/2016	2021
AC192	3858 W Malapai Dr, Phoenix, AZ 85051	33.58	-112.14	Spillway	25 Feet	02/11/2016	2021
AC193	3848 W Malapai Dr, Phoenix, AZ	33.58	-111.86	Spillway	25 Feet	02/11/2016	2021
AC194	3832 W Malapai Dr. N/A, Phoenix, AZ	33.58	-111.86	Spillway	25 Feet	02/11/2016	2021
AC048	10th St And Acdc Channel N/A, Phoenix, AZ	33.56	-111.94	Pipe	96 Inches	02/23/2016	2021

Outfall ID	Site Address	Latitude	Longitude	Drain Type	Drain Size	Last Inspection	Target Inspection
AC/DC-Arizona Canal Diversion Channel	**Count 89**						
AC001	51st Ave And Cactus Road N/A, Phoenix, AZ	33.60	-111.83	Pipe	78 Inches	02/12/2016	2021
AC002	43rd Ave And Peoria Ave N/A, Phoenix, AZ	33.58	-111.85	Pipe	90 Inches	03/29/2017	2022
AC003	43rd Ave And Peoria Ave N/A, Phoenix, AZ	33.58	-111.85	Pipe	42 Inches	02/11/2016	2021
AC004	35th Ave And Acdc Channel N/A, Phoenix, AZ	33.57	-111.87	Pipe	96 Inches	03/29/2017	2022
AC106	2 Mile Tunnel And Acdc Channel N/A, Phoenix, AZ	33.52	-111.99	Pipe	36 Inches	03/09/2016	2021
AF-Agua Fria	**Count 4**						
AF006	Camelback Road And 114th Aveune N/A, Phoenix, AZ	33.51	-111.70	Pipe	60 Inches	07/16/2015	2020
AF002	Encanto Blvd And Sr101 West (9500 W) N/A, Phoenix,	33.47	-111.73	Pipe	42 Inches	07/16/2015	2020
AF003	Mcdowell Rd And Sr101 West (9700 W) N/A, Phoenix,	33.47	-111.73	Box	4 x 11 Feet	07/16/2015	2020
AF005	Camelback Rd And Sr Loop 101 N/A, Phoenix, AZ	33.51	-111.73	Pipe	35 Inches	07/16/2015	2020
AZ-Arizona Canal	**Count 7**						
AZ001	Arizona Canal And 42nd St N/A, Phoenix, AZ	33.51	-110.01	Pipe	36 Inches	11/21/2014	2019
AZ002	Arizona Canal And 56th St N/A, Phoenix, AZ	33.49	-110.04	Pipe	48 Inches	11/21/2014	2019
AZ003	Arizona Canal And 57th St N/A, Phoenix, AZ	33.49	-110.04	Pipe	48 Inches	11/21/2014	2019
AZ024	Arizona Canal And 21st St N/A, Phoenix, AZ	33.53	-111.97	Pipe	36 Inches	12/03/2014	2019
AZ025	Arizona Canal And 21st St N/A, Phoenix, AZ	33.53	-111.97	Pipe	36 Inches	12/03/2014	2019
AZ028	Arizona Canal And 56th St N/A, Phoenix, AZ	33.49	-110.04	Spillway	6 Feet	11/21/2014	2019
AZ030	Arizona Canal And 44th St N/A, Phoenix, AZ	33.50	-110.01	Spillway	6 Feet	11/21/2014	2019
CC-Cave Creek Wash	**Count 47**						
CC066	301 E Wikieup Ln, Phoenix, AZ 85024	33.67	-111.93	Spillway	9 Feet	07/31/2014	2019
CC067	301 E Sequoia Dr, Phoenix, AZ 85024	33.66	-112.07	Spillway	9 Feet	07/31/2014	2019
CC068	301 E Oraibi Dr, Phoenix, AZ 85024	33.66	-112.07	Spillway	9 Feet	07/31/2014	2019
CC069	301 E Piute Ave, Phoenix, AZ 85024	33.66	-112.07	Spillway	9 Feet	07/31/2014	2019
CC070	301 E Utopia Rd, Phoenix, AZ 85024	33.66	-112.07	Spillway	9 Feet	07/31/2014	2019
CC071	401 E Wescott Dr, Phoenix, AZ 85024	33.66	-112.07	Spillway	13 Feet	07/31/2014	2019
CC072	18650 N 2nd Ave, Phoenix, AZ	33.66	-111.92	Spillway	12 Feet	08/01/2014	2019
CC073	18819 N 2nd Ave, Phoenix, AZ	33.66	-111.92	Spillway	10 Feet	07/31/2014	2019
CC074	18802 N 2nd Dr, Phoenix, AZ	33.66	-111.92	Spillway	9 Feet	07/31/2014	2019
CC075	201 W Taro Ln, Phoenix, AZ 85027	33.66	-112.08	Spillway	10 Feet	07/31/2014	2019
CC076	27th Ave And Cholla Rd N/A, Phoenix, AZ	33.59	-111.89	Spillway	62 Feet	07/22/2014	2019
CC077	519 W Helena Dr, Phoenix, AZ 85023	33.64	-112.08	Spillway	15 Feet	07/22/2014	2019

Outfall ID	Site Address	Latitude	Longitude	Drain Type	Drain Size	Last Inspection	Target Inspection
CC-Cave Creek Wash	**Count 47**						
CC078	4th Ave And Muriel Dr N/A, Phoenix, AZ	33.65	-111.92	Spillway	24 Feet	07/22/2014	2019
CC079	4th Ave And Angela Dr N/A, Phoenix, AZ	33.65	-111.92	Spillway	16 Feet	07/22/2014	2019
CC080	4th Ave And Angela Dr N/A, Phoenix, AZ	33.65	-111.92	Spillway	16 Feet	07/22/2014	2019
CC081	17415 N 6th Ave, Phoenix, AZ	33.64	-111.92	Spillway	19 Feet	07/22/2014	2019
CC094	7th St And Lone Cactus N/A, Phoenix, AZ	33.68	112.07	Pipe	54 Inches	10/13/2015	2020
CC087	Deer Valley Road And 11th Pl N/A, Phoenix, AZ	33.68	-111.94	Pipe	66 Inches	11/14/2014	2019
CC024	Shangri-La Rd And Cave Creek Wash N/A, Phoenix, AZ	33.59	-111.89	Pipe	36 Inches	11/06/2014	2019
CC041	901 W Danbury Rd, Phoenix, AZ 85023	33.64	-112.09	Spillway	10 Feet	07/30/2014	2019
CC082	Cave Creek Gc And Cave Creek Wash N/A, Phoenix, AZ	33.62	-111.89	Pipe	42 Inches	09/19/2014	2019
CC083	23rd Ave And Greenway Rd N/A, Phoenix, AZ	33.62	112.11	Pipe	48 Inches	09/19/2014	2019
CC042	17407 N 8th Ave, Phoenix, AZ	33.64	-111.92	Spillway	10 Feet	07/30/2014	2019
CC043	7th Ave And Cave Creek Wash N/A, Phoenix, AZ	33.64	-111.92	Pipe	60 Inches	10/22/2014	2019
CC044	3rd Ave And Grovers Ave N/A, Phoenix, AZ	33.65	-111.92	Spillway	16 Feet	07/30/2014	2019
CC045	5th Ave And Michelle Dr N/A, Phoenix, AZ	33.65	-111.92	Spillway	10 Feet	07/30/2014	2019
CC046	5th Ave And Michigan Ave N/A, Phoenix, AZ	33.65	-111.92	Spillway	10 Feet	07/30/2014	2019
CC047	232 W Michigan Ave, Phoenix, AZ 85023	33.65	-112.08	Spillway	14 Feet	07/30/2014	2019
CC048	5th Ave And Bluefield Cir N/A, Phoenix, AZ	33.65	-111.92	Spillway	10 Feet	07/30/2014	2019
CC049	237 W Wagoner Rd, Phoenix, AZ 85023	33.65	-112.08	Spillway	8 Feet	07/30/2014	2019
CC050	Union Hills Dr And Cave Creek Wash N/A, Phoenix, A	33.65	-111.92	Pipe	72 Inches	10/22/2014	2019
CC052	15478 N 13th Ave, Phoenix, AZ	33.63	-111.91	Spillway	10 Feet	07/30/2014	2019
CC055	19th Ave And Greenway Rd N/A, Phoenix, AZ	33.62	-111.90	Spillway	3 x 6 Feet	07/30/2014	2019
CC056	19th Ave And Greenway Rd N/A, Phoenix, AZ	33.62	-111.90	Spillway	3 x 6 Feet	07/30/2014	2019
CC057	Cave Creek Golf Course At Acoma Dr N/A, Phoenix, A	33.62	-111.89	Pipe	42 Inches	09/19/2014	2019
CC060	18019 N Villa Rita Dr, Phoenix, AZ	33.65	-111.92	Spillway	18 Feet	07/30/2014	2019
CC062	19823 N 3rd St, Phoenix, AZ	33.67	-111.93	Spillway	29 Feet	07/31/2014	2019
CC063	19819 N 3rd St, Phoenix, AZ	33.66	-111.93	Spillway	20 Feet	07/31/2014	2019
CC064	19801 N 3rd St, Phoenix, AZ	33.67	-111.93	Spillway	7 Feet	07/31/2014	2019
CC065	301 E Behrend Dr, Phoenix, AZ 85024	33.67	-112.07	Spillway	9 Feet	07/31/2014	2019
CC002	23rd Ave And Vogel Ave N/A, Phoenix, AZ	33.57	-111.89	Pipe	48 Inches	08/29/2014	2019
CC003	Peoria Ave And Cave Creek Wash N/A, Phoenix, AZ	33.58	-111.89	Pipe	84 Inches	03/28/2017	2022

Outfall ID	Site Address	Latitude	Longitude	Drain Type	Drain Size	Last Inspection	Target Inspection
CC-Cave Creek Wash	**Count 47**						
CC004	25th Ave And Cholla Rd N/A, Phoenix, AZ	33.59	-111.89	Pipe	78 Inches	08/29/2014	2019
CC005	25th Ave And Cactus Rd N/A, Phoenix, AZ	33.60	-111.89	Pipe	48 Inches	08/26/2014	2019
CC006	25th Ave And Larkspur Dr N/A, Phoenix, AZ	33.60	-111.89	Pipe	30 Inches	08/26/2014	2019
CC008	23rd Ave And Thunderbird Rd N/A, Phoenix, AZ	33.61	-111.89	Pipe	72 Inches	08/29/2014	2019
CC010	19th Ave And Greenway Rd N/A, Phoenix, AZ	33.62	-111.90	Pipe	90 Inches	08/29/2014	2019
CO-Charter Oak	**Count 18**						
CO001	Nisbet Rd And 42nd St N/A, Phoenix, AZ	33.62	111.99	Spillway	5 Feet	12/13/2016	2021
CO003	42nd St And Whitney Ln N/A, Phoenix, AZ	33.62	111.99	Spillway	11 Feet	12/13/2016	2021
CO005	42nd St. South Of Acoma Dr. East Side Of Channel N	33.62	111.99	Spillway	5 Feet	12/13/2016	2021
CO006	Located At 14245 N. 42nd St. East Side Of Channel	33.62	111.99	Spillway	5 Feet	12/13/2016	2021
CO007	42nd St And Hearn Rd. East Side Of Channel N/A, Ph	33.62	111.99	Spillway	9 Feet	12/13/2016	2021
CO008	41st Place And Gelding Dr. N/A, Phoenix, AZ	33.62	111.99	Spillway	30 Feet	12/14/2016	2021
CO009	41st Place And Sheena Dr. N/A, Phoenix, AZ	33.61	111.99	Spillway	9 Feet	12/14/2016	2021
CO010	Thunderbird Rd And 41st Pl N/A, Phoenix, AZ	33.61	111.99	Spillway	5 Feet	12/14/2016	2021
CO011	Thunderbird Rd And 41st Place N/A, Phoenix, AZ	33.61	111.99	Spillway	5 Feet	12/14/2016	2021
CO012	4202 E 4202 East Sheena Dr. Dr, Phoenix, AZ	33.61	111.99	Spillway	10 Feet	12/14/2016	2021
CO013	4202 E Redfield Dr, Phoenix, AZ	33.61	111.99	Spillway	10 Feet	12/14/2016	2021
CO014	Thunderbird Rd And 41st Place N/A, Phoenix, AZ	33.61	111.99	Spillway	5 Feet	12/14/2016	2021
CO015	Thunderbird Rd And 41st Place N/A, Phoenix, AZ	33.61	111.99	Spillway	5 Feet	12/14/2016	2021
CO017	4215 E Andora Dr, Phoenix, AZ	33.61	111.99	Spillway	4 Feet	12/14/2016	2021
CO018	13221 N 42nd St, Phoenix, AZ	33.61	111.99	Spillway	9 Feet	12/14/2016	2021
CO019	13021 N 42nd St, Phoenix, AZ	33.61	111.99	Spillway	9 Feet	12/15/2016	2021
CO020	4156 E Sweetwater Ave, Phoenix, AZ	33.60	111.99	Spillway	5 Feet	12/15/2016	2021
CO021	4127 E Windrose Dr, Phoenix, AZ	33.60	111.99	Spillway	9 Feet	12/15/2016	2021
EF-East Fork of Cave Creek	**Count 57**						
EF069	Utopia Rd Between 27th And 28th Street N/A, Phoeni	33.66	112.02	Pipe	48 Inches	07/22/2015	2020
EF070	Utopia Road Between 27th And 28th St. N/A, Phoenix	33.66	112.02	Pipe	96 Inches	07/22/2015	2020
EF011	7th St And Greenway Pkwy N/A, Phoenix, AZ	33.64	-111.93	Pipe	36 Inches	08/20/2015	2020
EF001	Cave Creek Rd And Greenway Pkwy N/A, Phoenix, AZ	33.63	-111.97	Pipe	72 Inches	09/30/2015	2020
EF002	16th St And Greenway Pkwy N/A, Phoenix, AZ	33.63	-111.96	Pipe	84 Inches	09/30/2015	2020
EF003	18th St And Greenway Pkwy N/A, Phoenix, AZ	33.63	-111.96	Pipe	84 Inches	09/30/2015	2020

Outfall ID	Site Address	Latitude	Longitude	Drain Type	Drain Size	Last Inspection	Target Inspection
EF-East Fork of Cave Creek	**Count 57**						
EF004	20th St And Greenway Pkwy N/A, Phoenix, AZ	33.63	-111.96	Pipe	96 Inches	09/30/2015	2020
EF006	9th St And Greenway Pkwy N/A, Phoenix, AZ	33.64	-111.94	Pipe	96 Inches	08/20/2015	2020
EF007	9th St And Greenway Pkwy N/A, Phoenix, AZ	33.64	-111.94	Pipe	36 Inches	08/27/2015	2020
EF008	Cave Creek Rd And Greenway Pkwy N/A, Phoenix, AZ	33.63	-111.97	Pipe	72 Inches	10/01/2015	2020
EF009	16th St And Greenway Pkwy N/A, Phoenix, AZ	33.64	-111.95	Pipe	48 Inches	09/30/2015	2020
EF010	7th St And Greenway Pkwy N/A, Phoenix, AZ	33.64	-111.93	Pipe	84 Inches	08/21/2015	2020
EF086	20300 N 26th St, Phoenix, AZ	33.67	112.04	Pipe	76 Inches	07/24/2015	2020
EF087	20300 N 26th St, Phoenix, AZ	33.67	112.02	Pipe	76 Inches	07/24/2015	2020
EF088	Cave Creek And 101 N/A, Phoenix, AZ	33.67	112.04	Pipe	58 Inches	07/24/2015	2020
EF091	2302 E Grovers Ave, Phoenix, AZ	33.66	112.04	Pipe	96 Inches	08/04/2015	2020
EF012	7th St And Greenway Pkwy N/A, Phoenix, AZ	33.64	-111.93	Pipe	36 Inches	08/20/2015	2020
EF013	Cave Creek Rd And Greenway Pkwy N/A, Phoenix, AZ	33.63	-111.97	Spillway	22 Feet	08/19/2015	2020
EF014	22nd Pl And Monte Cristo N/A, Phoenix, AZ	33.63	-111.97	Spillway	50 Feet	08/19/2015	2020
EF015	22nd St And East Fork N/A, Phoenix, AZ	33.63	-111.97	Pipe	36 Inches	09/30/2015	2020
EF016	22nd St And East Fork N/A, Phoenix, AZ	33.63	-111.97	Pipe	36 Inches	09/30/2015	2020
EF017	22nd St And Monte Cristo N/A, Phoenix, AZ	33.63	-111.96	Spillway	40 Feet	08/19/2015	2020
EF018	21st St And East Fork N/A, Phoenix, AZ	33.63	-111.96	Pipe	36 Inches	09/30/2015	2020
EF019	21st St And East Fork N/A, Phoenix, AZ	33.63	-111.96	Pipe	42 Inches	09/30/2015	2020
EF020	20th Pl And Monte Cristo N/A, Phoenix, AZ	33.63	-111.96	Spillway	12 Feet	08/19/2015	2020
EF021	2012 E Monte Cristo Ave, Phoenix, AZ 85022	33.63	-112.04	Spillway	21 Feet	08/19/2015	2020
EF022	20th St And Greenway Pkwy N/A, Phoenix, AZ	33.63	-111.96	Spillway	15 Feet	08/19/2015	2020
EF023	19th St And East Fork (1926 E Monte Cristo) N/A, P	33.63	-111.96	Spillway	10 Feet	08/19/2015	2020
EF025	1410 E Sandra Ter, Phoenix, AZ	33.64	-111.95	Spillway	15 Feet	08/19/2015	2020
EF026	14th St And Grandview Rd N/A, Phoenix, AZ	33.64	-111.95	Spillway	21 Feet	08/19/2015	2020
EF027	12th St And East Fork N/A, Phoenix, AZ	33.64	-111.94	Box	36 Feet	08/26/2015	2020
EF028	16431 N 12th St, Phoenix, AZ	33.64	-111.94	Spillway	50 Feet	08/19/2015	2020
EF033	301 W Lemarche Ave, Phoenix, AZ	33.63	-111.92	Spillway	10 Feet	08/27/2015	2020
EF034	301 W Monte Cristo Ave, Phoenix, AZ 85023	33.63	-112.08	Pipe	6 Feet	08/27/2015	2020
EF035	15802 N 4th Ave, Phoenix, AZ	33.63	-111.92	Spillway	12 Feet	08/27/2015	2020
EF065	Union Hills And 25th Way N/A, Phoenix, AZ	33.65	112.03	Pipe	48 Inches	07/22/2015	2020

Outfall ID	Site Address	Latitude	Longitude	Drain Type	Drain Size	Last Inspection	Target Inspection
EF-East Fork of Cave Creek	**Count 57**						
EF066	Union Hills And 25th Way N/A, Phoenix, AZ	33.65	112.03	Pipe	63 Inches	07/22/2015	2020
EF036	15803 N 4th Dr, Phoenix, AZ	33.63	-111.92	Spillway	14 Feet	08/27/2015	2020
EF037	Moon Valley Park N/A, Phoenix, AZ	33.63	-111.92	Pipe	5 Feet	08/27/2015	2020
EF038	214 W Kathleen Rd, Phoenix, AZ 85023	33.63	-112.08	Spillway	10 Feet	08/27/2015	2020
EF039	16042 N 1st St, Phoenix, AZ	33.63	-111.93	Pipe	8 Feet	08/27/2015	2020
EF040	1407 W Beck Ln, Phoenix, AZ 85023	33.63	-112.09	Spillway	21 Feet	08/26/2015	2020
EF041	1101 W Beck Ln, Phoenix, AZ 85023	33.63	-112.09	Spillway	19 Feet	08/26/2015	2020
EF042	15406 N 7th Dr, Phoenix, AZ	33.63	-111.92	Spillway	25 Feet	08/26/2015	2020
EF043	1527 W Caribbean Ln, Phoenix, AZ 85023	33.62	-112.09	Spillway	10 Feet	08/26/2015	2020
EF044	1445 W Caribbean Ln, Phoenix, AZ 85023	33.62	-112.09	Spillway	6 Feet	08/26/2015	2020
EF045	1455 W Caribbean Ln, Phoenix, AZ 85023	33.62	-112.09	Spillway	10 Feet	08/26/2015	2020
EF046	1503 W Caribbean Ln, Phoenix, AZ 85023	33.62	-112.09	Spillway	6 Feet	08/26/2015	2020
EF051	19th Pl And Greenway Pkwy N/A, Phoenix, AZ	33.63	-111.96	Pipe	36 Inches	09/30/2015	2020
EF052	Cave Creek Rd And Greenway Pkwy N/A, Phoenix, AZ	33.63	-111.97	Spillway	48 Feet	08/19/2015	2020
EF053	1802 E Paradise Ln, Phoenix, AZ 85022	33.63	-112.04	Spillway	18 Feet	08/20/2015	2020
EF054	16th St And Greenway Pkwy N/A, Phoenix, AZ	33.64	-111.95	Spillway	23 Feet	08/20/2015	2020
EF055	16th St And Greenway Pkwy N/A, Phoenix, AZ	33.64	-111.95	Spillway	14 Feet	08/20/2015	2020
EF056	1610 E Sandra Ter, Phoenix, AZ	33.64	-111.95	Spillway	6 Feet	08/20/2015	2020
EF057	1526 W Caribbean Ln, Phoenix, AZ 85023	33.62	-112.09	Spillway	12 Feet	08/26/2015	2020
EF058	15406 N 7th Dr, Phoenix, AZ	33.63	-111.92	Pipe	90 Inches	08/26/2015	2020
EF063	7th St And Greenway Pkwy N/A, Phoenix, AZ	33.64	-111.93	Spillway	150 Feet	08/27/2015	2020
GC-Grand Canal	**Count 3**						
GC001	Grand Ave And Grand Canal N/A, Phoenix, AZ	33.49	-111.87	Pipe	24 Inches	01/07/2015	2020
GC002	Grand Ave And Grand Canal N/A, Phoenix, AZ	33.49	-111.87	Pipe	36 Inches	01/07/2015	2020
GC033	Grand Canal And E Of Pueblo Grande Museum Park N/A	33.44	-110.02	Spillway	14 Feet	01/07/2015	2020
IB-Indian Bend Wash	**Count 24**						
IB027	4150 E Cactus Rd, Phoenix, AZ 85032	33.60	-111.99	Spillway	11 Feet	09/11/2018	2023
IB035	Thunderbird Rd And Indian Bend Wash N/A, Phoenix,	33.61	-112.01	Pipe	60 Inches	08/22/2018	2023
IB036	Thunderbird Rd And Indian Bend Wash N/A, Phoenix,	33.61	-112.01	Pipe	60 Inches	08/22/2018	2023
IB037	Thunderbird Rd And Indian Bend Wash N/A, Phoenix,	33.61	-112.01	Box	6 x 10 Feet	08/22/2018	2023
IB038	Thunderbird Rd And Indian Bend Wash N/A, Phoenix,	33.61	-112.01	Pipe	84 Inches	08/22/2018	2023

Outfall ID	Site Address	Latitude	Longitude	Drain Type	Drain Size	Last Inspection	Target Inspection
IB-Indian Bend Wash	**Count 24**						
IB043	10811 N 52nd St, Phoenix, AZ 85254	33.58	-111.97	Spillway	18 Feet	09/26/2018	2023
IB044	11016 N 50th St, Phoenix, AZ 85254	33.59	-111.97	Spillway	12 Feet	09/26/2018	2023
IB045	4943 E Cholla St, Phoenix, AZ 85254	33.59	-111.97	Spillway	7 Feet	10/11/2018	2023
IB001	52nd St And Shea Blvd N/A, Phoenix, AZ 85253	33.58	-111.97	Pipe	36 Inches	09/26/2018	2023
IB002	52nd St And Shea Blvd N/A, Phoenix, AZ 85253	33.58	-111.97	Pipe	84 Inches	09/26/2018	2023
IB003	Tatum Blvd And Cholla St N/A, Phoenix, AZ 85254	33.59	-111.98	Pipe	66 Inches	09/26/2018	2023
IB004	Tatum Blvd And Cholla St N/A, Phoenix, AZ 85028	33.59	-111.98	Pipe	66 Inches	09/26/2018	2023
IB005	52nd St And Indian Bend Wash N/A, Phoenix, AZ 8525	33.58	-111.97	Box	14 x 3 Feet	09/26/2018	2023
IB007	36th St And Sweetwater Ave N/A, Phoenix, AZ	33.60	-112.00	Pipe	78 Inches	09/11/2018	2023
IB008	40th St And Indian Bend Wash N/A, Phoenix, AZ 8503	33.60	-112.00	Pipe	66 Inches	09/11/2018	2019
IB008	40th St And Indian Bend Wash N/A, Phoenix, AZ 8503	33.60	-112.00	Pipe	66 Inches	09/11/2018	2019
IB008	40th St And Indian Bend Wash N/A, Phoenix, AZ 8503	33.60	-112.00	Pipe	66 Inches	09/11/2018	2019
IB008	40th St And Indian Bend Wash N/A, Phoenix, AZ 8503	33.60	-112.00	Pipe	66 Inches	09/11/2018	2019
IB010	40th Street And Indian Bend Wash. North Side Of Wa	33.60	-112.00	Pipe	36 Inches	09/11/2018	2023
IB011	56th St And Indian Bend Wash N/A, Phoenix, AZ 8525	33.57	-111.96	Pipe	66 Inches	10/11/2018	2023
IB013	Cactus Rd And Indian Bend Wash N/A, Phoenix, AZ 85	33.60	-111.99	Pipe	72 Inches	09/12/2018	2023
IB016	Tatum Blvd And Cholla St N/A, Phoenix, AZ 85254	33.59	-111.98	Pipe	36 Inches	09/26/2018	2023
IB018	Cactus Rd And Indian Bend Wash N/A, Phoenix, AZ 85	33.60	-111.99	Pipe	72 Inches	09/12/2018	2019
IB021	10202 N 54th Pl, Phoenix, AZ 85253	33.58	-111.96	Pipe	36 Inches	10/11/2018	2023
IB024	3631 E Dahlia Dr, Phoenix, AZ 85032	33.60	-112.00	Spillway	21 Feet	08/23/2018	2023
IB026	12806 N 37th Ct, Phoenix, AZ 85032	33.60	-112.00	Spillway	8 Feet	08/23/2018	2023
IB050	40th St And Indian Bend Wash. North Side Of Wash.	33.60	-112.00	Pipe	48 Inches	09/11/2018	2023
LC-Laveen Channel	**Count 12**						
LC001	4532 W Alta Vista Rd, Phoenix, AZ	33.39	-111.84	Spillway	9 Feet	09/15/2016	2021
LC002	6616 S 46th Gn N/A, Phoenix, AZ	33.39	-111.84	Spillway	13 Feet	09/15/2016	2021
LC003	46th Dr And Vineyard Rd N/A, Phoenix, AZ	33.38	-111.84	Spillway	32 Feet	09/15/2016	2021
LC008	53rd Ln And Baseline Rd N/A, Phoenix, AZ	33.38	-111.83	Pipe	66 Inches	09/15/2016	2021
LC015	63rd Land And Beverly Rd N/A, Phoenix, AZ	33.37	112.20	Pipe	26 Inches	09/27/2016	2021
LC017	7377 W Magdalena Ln N/A, Phoenix, AZ	33.37	112.21	Pipe	34 Inches	09/27/2016	2021
LC018	7810 S 74th Ave, Phoenix, AZ	33.37	-111.78	Pipe	36 Inches	09/27/2016	2021

Outfall ID	Site Address	Latitude	Longitude	Drain Type	Drain Size	Last Inspection	Target Inspection
LC-Laveen Channel	**Count 12**						
LC020	S 63rd Ave And Lacc N/A, Phoenix, AZ	33.37	112.19	Pipe	60 Inches	09/21/2016	2021
LC022	4724 W Carson Rd, Phoenix, AZ	33.38	-111.84	Spillway	8 Feet	09/15/2016	2021
LC023	North Side Of Channel. About 50 Ft. West Of 51st S	33.38	-111.83	Pipe	62 Inches	09/15/2016	2021
LC026	Inside West Tunnel Culvert @ Baseline And Lacc N/A	33.38	-111.82	Pipe	48 Inches	09/20/2016	2021
LC028	74th Lane And Fawn N/A, Phoenix, AZ	33.37	112.22	Spillway	10 Feet	09/28/2016	2021
MV-Moon Valley	**Count 7**						
MV001	19th Ave And Sweetwater Ave N/A, Phoenix, AZ 85009	33.60	112.10	Pipe	48 Inches	07/12/2017	2022
MV005	12th Ave And Thunderbird Rd N/A, Phoenix, AZ 85029	33.61	112.09	Pipe	54 Inches	07/12/2017	2022
MV007	7th St And Hearn Rd N/A, Phoenix, AZ	33.62	-111.93	Pipe	48 Inches	08/02/2017	2022
MV019	7th St. And E. Roberts Rd. West Side Of Street N/A	33.61	112.06	Pipe	50 Inches	08/09/2017	2022
MV020	7th St. And E. Roberts Rd. West Side Of Street. N/	33.61	112.06	Pipe	50 Inches	08/09/2017	2022
MV016	13th Ln And Thunderbird Rd N/A, Phoenix, AZ	33.61	-111.91	Spillway	11 Feet	07/12/2017	2022
MV023	23rd Avenue And Wood Drive Ave, Phoenix, AZ 85029	33.60	-112.11	Spillway	46 Feet	07/12/2017	2022
NR-New River	**Count 3**						
NR004	4640 W Heyerdahl Ct, Phoenix, AZ	33.87	112.16	Pipe	40 Inches	08/31/2016	2021
NR005	N 45th Ave And W Emily Dr N/A, Phoenix, AZ	33.88	112.16	Pipe	40 Inches	08/31/2016	2021
NR006	45th Ave And Judson Drive N/A, Phoenix, AZ	33.88	112.16	Pipe	36 Inches	08/31/2016	2021
OC-Old Cross-Cut Canal	**Count 17**						
OC001	Old Cross Cut And Washington St, South Tunnel N/A,	33.45	-111.98	Pipe	36 Inches	12/13/2018	2023
OC002	Old Cross Cut And Van Buren St, South Tunnel N/A,	33.45	-111.98	Pipe	42 Inches	12/13/2018	2023
OC004	46th St And Mcdowell Rd N/A, Phoenix, AZ 85008	33.47	-111.98	Pipe	42 Inches	01/16/2019	2024
OC005	48th St And Thomas Rd N/A, Phoenix, AZ 85008	33.48	-111.98	Pipe	36 Inches	01/30/2019	2024
OC006	48th St And Earll Dr N/A, Phoenix, AZ 85018	33.48	-111.98	Pipe	52 Inches	01/30/2019	2024
OC007	48th St And Indian School Rd N/A, Phoenix, AZ 8501	33.49	-111.98	Pipe	36 Inches	01/31/2019	2024
OC008	46th St And Mcdowell Rd N/A, Phoenix, AZ 85008	33.47	-111.98	Pipe	54 Inches	01/16/2019	2024
OC022	48th St And Oak St N/A, Phoenix, AZ 85008	33.47	-111.98	Pipe	48 Inches	01/31/2019	2024
OC039	46th Street And Roosevelt Street - Old Cross Cut N	33.46	-111.98	Box	6 x 5 Feet	12/13/2018	2023
OC053	48th St And Osborn Rd N/A, Phoenix, AZ 85018	33.49	-111.98	Pipe	52 Inches	01/29/2019	2024
OC054	48th St And Osborn Rd N/A, Phoenix, AZ 85018	33.49	-111.98	Box	8 x 6 Feet	01/29/2019	2024
OC055	48th St And Weldon Ave N/A, Phoenix, AZ 85018	33.49	-111.98	Pipe	48 Inches	01/29/2019	2024
OC062	48th St And Thomas Rd N/A, Phoenix, AZ 85008	33.48	-111.98	Pipe	36 Inches	01/30/2019	2024

Outfall ID	Site Address	Latitude	Longitude	Drain Type	Drain Size	Last Inspection	Target Inspection
OC-Old Cross-Cut Canal	**Count 17**						
OC072	Old Cross Cut And Granada N/A, Phoenix, AZ 85008	33.47	-111.98	Pipe	42 Inches	01/17/2019	2024
OC074	46th St And Taylor St N/A, Phoenix, AZ 85008	33.45	-111.98	Spillway	28 Feet	10/23/2018	2023
OC091	48th st And Osborn Rd, Phoenix, AZ 85018			Pipe	48 Inches	02/01/2019	2024
OC090	48th St. And Indian School N/A, Phoenix, AZ 85018			Pipe	102 Inches	01/31/2019	2024
PD-Papago Diversion Channel	**Count 16**						
PD014	31st Ave And Papago Diversion Channel N/A, Phoenix	33.46	-112.13	Pipe	48 Inches	03/27/2019	2024
PD015	32nd Ave And Papago Diversion Channel N/A, Phoenix	33.46	-112.13	Pipe	40 Inches	03/27/2019	2024
PD016	34th Ave And Papago Diversion Channel N/A, Phoenix	33.46	-112.13	Pipe	42 Inches	03/26/2019	2024
PD017	43rd Ave And Papago Diversion Channel N/A, Phoenix	33.46	-112.15	Pipe	18 Inches	03/26/2019	2024
PD001	91st Ave And Papago Diversion Channel N/A, Phoenix	33.46	-112.26	Pipe	90 Inches	02/27/2019	2024
PD002	83rd Ave And Papago Diversion Channel N/A, Phoenix	33.46	-112.24	Pipe	90 Inches	02/27/2019	2024
PD003	75th Ave And Papago Diversion Channel N/A, Phoenix	33.46	-112.22	Pipe	90 Inches	02/27/2019	2024
PD004	67th Ave And Papago Diversion Channel N/A, Phoenix	33.46	-112.20	Pipe	90 Inches	02/27/2019	2024
PD005	59th Ave And Papago Diversion Channel N/A, Phoenix	33.46	-112.19	Pipe	90 Inches	02/27/2019	2024
PD006	51st Ave And Papago Diversion Channel N/A, Phoenix	33.46	-112.17	Pipe	84 Inches	02/27/2019	2024
PD007	43rd Ave And Papago Diversion Channel N/A, Phoenix	33.46	-112.15	Pipe	96 Inches	03/26/2019	2024
PD008	43rd Ave And Papago Diversion Channel N/A, Phoenix	33.46	-112.15	Pipe	54 Inches	03/26/2019	2024
PD009	39th Ave And Papago Diversion Channel N/A, Phoenix	33.46	-112.14	Pipe	78 Inches	03/21/2019	2024
PD010	35th Ave And Papago Diversion Channel N/A, Phoenix	33.46	-112.13	Pipe	54 Inches	03/26/2019	2024
PD011	31st Ave And Papago Diversion Channel N/A, Phoenix	33.46	-112.13	Box	10 x 4 Feet	03/27/2019	2024
PD023	2901 W Culver St In Papago Diversion N/A, Phoenix,	33.46	-112.12	Spillway	14 Feet	03/06/2019	2024
PV-Paradise Valley	**Count 2**						
PV002	34th St And Lincoln Dr N/A, Phoenix, AZ 85253	33.53	112.00	Pipe	48 Inches	08/23/2017	2022
PV004	35th St And Lincoln Dr N/A, Phoenix, AZ 85253	33.53	112.00	Pipe	48 Inches	08/23/2017	2022
SC-Skunk Creek	**Count 42**						
SC002	51st Ave And Skunk Creek, Near Norhtwest Bike Lane	33.66	-111.83	Pipe	36 Inches	07/07/2016	2021
SC006	19432 N 50th Ave, Phoenix, AZ	33.66	-111.83	Spillway	10 Feet	07/07/2016	2021
SC008	19653 N 48th Ln, Phoenix, AZ	33.66	-111.84	Spillway	16 Feet	07/13/2016	2021
SC009	19623 N 48th Ave, Phoenix, AZ	33.66	-111.84	Spillway	24 Feet	07/07/2016	2021
SC010	47th Dr And Behrend Dr N/A, Phoenix, AZ	33.66	-111.84	Spillway	6 Feet	07/07/2016	2021
SC012	4790 W Oraibi Dr, Phoenix, AZ 85308	33.66	-112.16	Spillway	6 Feet	07/13/2016	2021

Outfall ID	Site Address	Latitude	Longitude	Drain Type	Drain Size	Last Inspection	Target Inspection
SC-Skunk Creek	**Count 42**						
SC013	19634 N 47th Dr, Phoenix, AZ	33.66	-111.84	Spillway	4 Feet	07/07/2016	2021
SC014	19640 N 47th Ave, Phoenix, AZ	33.66	-111.84	Pipe	6 Feet	07/07/2016	2021
SC015	46th Dr And Behrend Dr N/A, Phoenix, AZ	33.67	-111.84	Pipe	6 Feet	07/07/2016	2021
SC016	19810 N 46th Ave, Phoenix, AZ	33.67	-111.84	Pipe	6 Feet	07/07/2016	2021
SC017	19828 N 45th Ln, Phoenix, AZ	33.67	112.16	Spillway	6 Feet	07/13/2016	2021
SC022	2749 W Darien Way, Phoenix, AZ	33.80	-111.88	Spillway	10 Feet	07/12/2016	2021
SC023	27th Ct And Florimond Rd N/A, Phoenix, AZ	33.80	-111.88	Spillway	50 Feet	07/12/2016	2021
SC024	27th Ln And Via Aquila N/A, Phoenix, AZ	33.81	-111.88	Box	4 x 2 Feet	07/12/2016	2021
SC025	27th Ln And Via Aquila, West Side N/A, Phoenix, AZ	33.81	-111.88	Box	4 x 2 Feet	07/12/2016	2021
SC027	Carefree Hwy And 27th Dr N/A, Phoenix, AZ	33.80	-111.88	Pipe	36 Inches	07/12/2016	2021
SC031	35th Dr And Soft Wind Dr N/A, Phoenix, AZ	33.70	-111.86	Pipe	30 Inches	08/16/2016	2021
SC032	20659 N 41st Ln, Phoenix, AZ	33.67	-111.85	Spillway	18 Feet	07/26/2016	2021
SC033	20669 N 41st Ln, Phoenix, AZ	33.67	-111.85	Spillway	17 Feet	07/26/2016	2021
SC034	20657 N 42nd Ave, Phoenix, AZ	33.67	-111.85	Spillway	18 Feet	07/26/2016	2021
SC035	20622 N 42nd Ave, Phoenix, AZ	33.67	-111.85	Spillway	17 Feet	07/26/2016	2021
SC036	20670 N 41st Ave, Phoenix, AZ	33.67	-111.85	Spillway	45 Feet	07/26/2016	2021
SC037	Sc Wash And Sr101 Frontage Rd N/A, Phoenix, AZ	33.67	-111.85	Pipe	36 Inches	07/26/2016	2021
SC040	Via Puzzola And Via Del Deserto N/A, Phoenix, AZ	33.81	-111.88	Pipe	36 Inches	07/12/2016	2021
SC043	2761 W Via Calabria N/A, Phoenix, AZ	33.80	0.00	Spillway	19 Feet	07/12/2016	2021
SC067	35th Avenue And Williams Drive N/A, Phoenix, AZ	112.21	34.16	Pipe	56 Inches	08/16/2016	2021
SC049	Pinnacle Peack Road And 40th Lane N/A, Phoenix, A	33.70	112.15	Pipe	62 Inches	08/17/2016	2021
SC050	South Side Of Pinnacle Peak Road At 40th Lane. N/A	33.70	112.15	Pipe	60 Inches	08/17/2016	2021
SC052	Southside Of Pinnacle Peak Road Just Before 47th A	33.70	112.16	Pipe	54 Inches	08/17/2016	2021
SC001	56th Ave And Union Hills Dr N/A, Phoenix, AZ	33.66	-111.82	Box	10x11 Feet	07/13/2016	2021
SC053	Southside Of Pinnacle Peak Road Just Before 47th A	33.70	112.16	Pipe	48 Inches	08/17/2016	2021
SC054	Southside Of Pinnacle Peak Road Just Before 47th A	33.70	112.16	Pipe	42 Inches	08/17/2016	2021
SC055	Southside Of Pinnacle Peak Road And 51st Avenue. N	33.70	112.17	Pipe	42 Inches	08/17/2016	2021
SC058	4531 W Soft Wind Dr, Phoenix, AZ	33.72	112.16	Spillway		08/17/2016	2021
SC059	23620 N 45th Ave, Phoenix, AZ	33.71	112.16	Pipe	24 Inches	08/17/2016	2021
SC060	23804 N 44th Ln, Phoenix, AZ	33.70	112.16	Spillway	6 Feet	08/17/2016	2021

Outfall ID	Site Address	Latitude	Longitude	Drain Type	Drain Size	Last Inspection	Target Inspection
SC-Skunk Creek	**Count 42**						
SC061	Mariposa Grande And 45th Dr N/A, Phoenix, AZ	33.70	112.16	Spillway	10 Feet	08/17/2016	2021
SC064	Alamedia Road Between 43rd Ave And 45th Dr N/A, Ph	33.71	112.16	Pipe	24 Inches	08/17/2016	2021
SC065	44th Ln And W Misty Willow Ln N/A, Phoenix, AZ	33.70	112.16	Spillway	9 Feet	08/17/2016	2021
SC048	W Oberlin Way And N 26th Ave N/A, Phoenix, AZ	33.74	112.11	Spillway	32 Feet	08/16/2016	2021
SC044	35th Ave And Parkside Ln N/A, Phoenix, AZ	33.69	112.13	Pipe	35 Inches	08/16/2016	2021
SC046	35206 N 27th Dr, Phoenix, AZ	33.80	-111.88	Pipe	36 Inches	07/12/2016	2021
SC046	35206 N 27th Dr, Phoenix, AZ	33.80	-111.88	Pipe	36 Inches	07/12/2016	2021
SC046	35206 N 27th Dr, Phoenix, AZ	33.80	-111.88	Pipe	36 Inches	07/12/2016	2021
SC046	35206 N 27th Dr, Phoenix, AZ	33.80	-111.88	Pipe	36 Inches	07/12/2016	2021
SR-Salt River	**Count 59**						
SR045	40th St And Salt River N/A, Phoenix, AZ 85040	33.43	-112.00	Pipe	54 Inches	05/21/2019	2024
SR045	40th St And Salt River N/A, Phoenix, AZ 85040	33.43	-112.00	Pipe	54 Inches	05/21/2019	2024
SR045	40th St And Salt River N/A, Phoenix, AZ 85040	33.43	-112.00	Pipe	54 Inches	05/21/2019	2024
SR045	40th St And Salt River N/A, Phoenix, AZ 85040	33.43	-112.00	Pipe	54 Inches	05/21/2019	2024
SR046	7th St And Salt River N/A, Phoenix, AZ	33.42	-111.94	Pipe	24 Inches	04/16/2015	2020
SR048	45th St And Salt River N/A, Phoenix, AZ	33.43	-110.02	Pipe	48 Inches	05/12/2015	2020
SR049	67th Ave And Salt River N/A, Phoenix, AZ 85043	33.40	-112.20	Pipe	96 Inches	04/09/2019	2020
SR049	67th Ave And Salt River N/A, Phoenix, AZ 85043	33.40	-112.20	Pipe	96 Inches	04/09/2019	2020
SR049	67th Ave And Salt River N/A, Phoenix, AZ 85043	33.40	-112.20	Pipe	96 Inches	04/09/2019	2020
SR049	67th Ave And Salt River N/A, Phoenix, AZ 85043	33.40	-112.20	Pipe	96 Inches	04/09/2019	2020
SR052	52nd St And Hohokam Frwy N/A, Phoenix, AZ	33.44	-110.03	Box	8 x 5 Feet	01/29/2015	2020
SR056	28th St And Salt River N/A, Phoenix, AZ	33.42	-111.98	Pipe	36 Inches	05/07/2015	2020
SR059	25th Ave And Salt River N/A, Phoenix, AZ	33.42	-112.11	Pipe	60 Inches	05/07/2019	2024
SR061	32nd St And Salt River N/A, Phoenix, AZ 85034	33.42	-112.01	Box	7 x 5 Feet	05/21/2019	2020
SR062	38th St And Salt River N/A, Phoenix, AZ	33.43	-112.00	Pipe	60 Inches	05/12/2015	2020
SR063	15th Ave And Salt River N/A, Phoenix, AZ	33.41	-112.09	Pipe	60 Inches	05/07/2019	2024
SR064	19th Ave And Salt River N/A, Phoenix, AZ	33.41	-111.90	Pipe	36 Inches	04/06/2015	2020
SR068	28th St And Salt River N/A, Phoenix, AZ 85034	33.42	-112.02	Box	8 x 8 Feet	05/21/2019	2020
SR069	31st St And Salt River N/A, Phoenix, AZ	33.42	-111.99	Pipe	60 Inches	05/12/2015	2020
SR070	33rd St And Salt River N/A, Phoenix, AZ	33.42	-111.99	Pipe	36 Inches	05/12/2015	2020

Outfall ID	Site Address	Latitude	Longitude	Drain Type	Drain Size	Last Inspection	Target Inspection
SR-Salt River	**Count 59**						
SR071	33rd St And Salt River N/A, Phoenix, AZ	33.42	-111.99	Pipe	60 Inches	05/12/2015	2020
SR072	45th St And Salt River N/A, Phoenix, AZ	33.43	-110.01	Pipe	48 Inches	05/12/2015	2020
SR073	45th St And Salt River N/A, Phoenix, AZ	33.43	-110.01	Pipe	60 Inches	05/12/2015	2020
SR075	43rd Ave And Broadway Rd N/A, Phoenix, AZ 85041	33.40	-112.15	Box	10 Feet	04/23/2019	2024
SR076	43rd Ave And Broadway Rd N/A, Phoenix, AZ 85041	33.40	-112.15	Pipe	48 Inches	04/23/2019	2024
SR077	22nd Ave And Rio Salado Service Yard N/A, Phoenix,	33.42	-111.89	Spillway	17 Feet	04/12/2017	2022
SR083	83rd Ave And Salt River N/A, Phoenix, AZ 85339	33.39	-112.23	Pipe	12 Inches	04/09/2019	2020
SR003	35th Ave And Salt River N/A, Phoenix, AZ 85043	33.41	-112.13	Pipe	75 Inches	04/23/2019	2020
SR003	35th Ave And Salt River N/A, Phoenix, AZ 85043	33.41	-112.13	Pipe	75 Inches	04/23/2019	2020
SR003	35th Ave And Salt River N/A, Phoenix, AZ 85043	33.41	-112.13	Pipe	75 Inches	04/23/2019	2020
SR003	35th Ave And Salt River N/A, Phoenix, AZ 85043	33.41	-112.13	Pipe	75 Inches	04/23/2019	2020
SR004	27th Ave And Salt River N/A, Phoenix, AZ 85009	33.42	-112.12	Pipe	72 Inches	05/07/2019	2020
SR005	25th Ave And Salt River N/A, Phoenix, AZ	33.42	-112.11	Pipe	102 Inches	05/07/2019	2024
SR006	22nd Ave And Salt River N/A, Phoenix, AZ	33.42	-111.89	Pipe	72 Inches	04/12/2017	2022
SR007	19th Ave And Salt River N/A, Phoenix, AZ	33.41	-111.90	Pipe	54 Inches	04/12/2017	2022
SR008	15th Ave And Salt River N/A, Phoenix, AZ	33.41	-112.09	Pipe	96 Inches	05/07/2019	2024
SR009	11th Ave And Salt River N/A, Phoenix, AZ	33.42	-111.91	Pipe	81 Inches	04/09/2015	2020
SR010	7th Ave And Salt River N/A, Phoenix, AZ	33.42	-112.08	Pipe	54 Inches	05/07/2019	2020
SR012	Central Ave And Salt River N/A, Phoenix, AZ	33.42	-112.07	Pipe	42 Inches	05/08/2019	2024
SR013	Central Ave And Salt River N/A, Phoenix, AZ	33.42	-111.93	Box	10 x 21 Feet	04/07/2015	2020
SR014	3rd St And Salt River N/A, Phoenix, AZ	33.42	-111.93	Pipe	36 Inches	05/21/2019	2024
SR015	3rd St And Salt River N/A, Phoenix, AZ	33.42	-111.93	Pipe	84 Inches	05/21/2019	2020
SR016	10th St And Salt River N/A, Phoenix, AZ	33.42	-112.06	Pipe	54 Inches	05/08/2019	2024
SR017	12th St And Salt River N/A, Phoenix, AZ	33.42	-112.06	Pipe	96 Inches	05/08/2019	2024
SR018	16th St And Salt River N/A, Phoenix, AZ	33.42	-112.05	Pipe	66 Inches	05/07/2019	2024
SR019	20th St And Salt River N/A, Phoenix, AZ	33.42	-111.96	Box	10 x 21 Feet	04/05/2016	2021
SR020	24th St And Salt River N/A, Phoenix, AZ	33.42	-112.03	Pipe	84 Inches	05/07/2019	2020
SR001	51st Ave And Salt River N/A, Phoenix, AZ	33.41	-112.17	Pipe	96 Inches	04/09/2019	2020
SR002	43rd Ave And Salt River N/A, Phoenix, AZ 85043	33.41	-112.15	Pipe	90 Inches	04/23/2019	2020
SR084	Sw Corner Of The 153 Expressway And The Salt River	33.43	-110.02	Pipe	72" Inches	05/12/2015	2020

Outfall ID	Site Address	Latitude	Longitude	Drain Type	Drain Size	Last Inspection	Target Inspection
SR-Salt River	**Count 59**						
SR082	75th Ave S/O Broadway Rd N/A, Phoenix, AZ	33.40	-112.22	Pipe	84 Inches	04/09/2019	2024
SR079	35th Ave And Salt River N/A, Phoenix, AZ 85043	33.41	-112.13	Pipe	42 Inches	04/23/2019	2024
SR080	51st Ave And Salt River N/A, Phoenix, AZ	33.40	-111.83	Pipe	42 Inches	04/04/2017	2022
SR024	28th St And Salt River N/A, Phoenix, AZ	33.42	-111.98	Pipe	90 Inches	05/07/2015	2020
SR026	37th St And Salt River N/A, Phoenix, AZ	33.43	-111.99	Pipe	42 Inches	05/12/2015	2020
SR027	36th St And Salt River, Under Sky Harbor N/A, Phoe	33.43	-112.00	Pipe	82 Inches	05/02/2017	2022
SR029	47th St And Salt River N/A, Phoenix, AZ	33.43	-110.02	Pipe	78 Inches	05/02/2017	2022
SR030	27th Ave And Salt River N/A, Phoenix, AZ	33.41	-111.88	Pipe	108 Inches	04/26/2019	2020
SR030	27th Ave And Salt River N/A, Phoenix, AZ	33.41	-111.88	Pipe	108 Inches	04/26/2019	2020
SR030	27th Ave And Salt River N/A, Phoenix, AZ	33.41	-111.88	Pipe	108 Inches	04/26/2019	2020
SR030	27th Ave And Salt River N/A, Phoenix, AZ	33.41	-111.88	Pipe	108 Inches	04/26/2019	2020
SR031	19th Ave And Salt River N/A, Phoenix, AZ	33.41	-111.90	Pipe	60 Inches	04/12/2017	2022
SR032	7th Ave And Salt River N/A, Phoenix, AZ	33.42	-111.92	Pipe	72 Inches	06/15/2016	2021
SR033	Central Ave And Salt River N/A, Phoenix, AZ	33.42	-111.93	Pipe	66 Inches	04/14/2015	2020
SR035	7th St And Salt River N/A, Phoenix, AZ 85009	33.42	-112.07	Pipe	72 Inches	10/24/2017	2022
SR036	15th St And Salt River N/A, Phoenix, AZ	33.42	-111.95	Pipe	72 Inches	05/07/2019	2024
SR037	16th St And Salt River N/A, Phoenix, AZ	33.42	-111.95	Pipe	36 Inches	05/07/2015	2020
SR038	24th St And Salt River N/A, Phoenix, AZ	33.42	-112.03	Pipe	72 Inches	05/07/2019	2024
SR039	28th St And Salt River N/A, Phoenix, AZ 85040	33.42	-112.02	Pipe	96 Inches	05/21/2019	2020
SR088	31st Ave. And Salt River N/A, Phoenix, AZ 85009	33.41	-112.12	Pipe	30 Inches	05/17/2019	2020
SR089	31st And Salt River N/A, Phoenix, AZ 85009	33.41	-112.12	Spillway	11 Feet	05/17/2019	2020
ST-Sweetwater Tributary of Indian Bend Wash	**Count 1**						
ST004	Sweetwater Ave And 35th St N/A, Phoenix, AZ 85032	33.60	112.01	Pipe	36 Inches	08/17/2017	2022
SW-Scatter Wash	**Count 10**						
SW001	33rd Ave And Deer Valley Rd N/A, Phoenix, AZ 85308	33.40	-112.07	Pipe	54 Inches	12/14/2017	2022
SW006	43rd Ave And Behrend Dr N/A, Phoenix, AZ	33.67	-111.85	Pipe	36 Inches	10/31/2017	2022
SW009	21041 N 33rd Ave, Phoenix, AZ 85027	33.68	-112.13	Pipe	8 Feet	12/28/2017	2022
SW011	33rd Ave And Deer Valley Rd N/A, Phoenix, AZ 85027	33.41	-112.07	Pipe	36 Inches	12/14/2017	2022
SW015	38th Ave And Beardsley Rd N/A, Phoenix, AZ	33.67	-111.86	Pipe	96 Inches	12/13/2017	2022
SW019	31st Dr And Deer Valley Rd N/A, Phoenix, AZ 85027	33.41	-112.07	Pipe	36 Inches	12/14/2017	2022
SW037	35th Avenue And Mohawk Lane N/A, Phoenix, AZ 85308	33.67	-112.14	Pipe	48 Inches	12/13/2017	2022

Outfall ID	Site Address	Latitude	Longitude	Drain Type	Drain Size	Last Inspection	Target Inspection
SW-Scatter Wash	**Count 10**						
SW026	31st Ave And Deer Valley Rd N/A, Phoenix, AZ 85027	33.41	-112.07	Pipe	36 Inches	12/14/2017	2022
SW032	22125 Sands Dr, Phoenix, AZ 85027	33.69	-112.12	Pipe	53 Inches	12/28/2017	2022
SW040	35th Avenue And Mohawk Lane N/A, Phoenix, AZ 85027	33.67	-112.13	Pipe	42 Inches	12/13/2017	2022
TD-Tempe Drainage Channel	**Count 3**						
TD008	3402 S 40th St, Phoenix, AZ 85040	33.42	-112.00	Pipe	36 Inches	10/17/2017	2022
TD010	3425 S 40th St, Phoenix, AZ 85040	33.42	-111.99	Pipe	18 Inches	10/17/2017	2022
TD013	3402 E Illini St, Phoenix, AZ 85040	33.41	-112.01	Pipe	24 Inches	10/17/2017	2022
TS-Tenth Street Wash	**Count 9**						
TS002	11421 N Cave Creek Rd, Phoenix, AZ	33.59	-111.95	Pipe	48 Inches	09/13/2016	2021
TS007	1425 E Desert Cove Rd, Phoenix, AZ	33.58	-111.95	Pipe	36 Inches	09/13/2016	2021
TS008	14th St And Desert Cove Ave N/A, Phoenix, AZ	33.59	-111.95	Spillway	52 Feet	09/13/2016	2021
TS009	15th Way And Sahauro Dr. N/A, Phoenix, AZ	33.58	-111.95	Spillway	36 Inches	09/13/2016	2021
TS011	10th St. And Townley Ave. N/A, Phoenix, AZ	33.57	-111.94	Spillway	36 Feet	10/11/2016	2021
TS013	11th Street And Townley Ave. N/A, Phoenix, AZ	33.57	112.04	Box	8 Feet	10/18/2016	2021
TS014	Dunlap And 11th Street N/A, Phoenix, AZ	33.57	112.06	Spillway	72 Inches	10/18/2016	2021
TS018	1107 Hatcher Rd, Phoenix, AZ	33.57	112.06	Spillway	45 Inches	10/19/2016	2021
TS025	1839 E Cinnabar Ave, Phoenix, AZ	33.58	112.06	Spillway	9 Feet	10/19/2016	2021
ZT-Emile Zola Tributary of Indian Bend Wash	**Count 2**						
ZT001	33rd Pl And Sharon Dr N/A, Phoenix, AZ	33.61	-111.99	Spillway	18 Feet	10/05/2016	2021
ZT002	33rd Pl And Emile Zola Ave N/A, Phoenix, AZ	33.61	-111.99	Spillway	46 Feet	10/05/2016	2021

List of Changes to the Major Outfall Inventory

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City of Phoenix
WATER SERVICES DEPARTMENT
ENVIRONMENTAL SERVICES DIVISION
Quality Reliability Value

The report contains all active major outfalls 36" or greater serving>50 acres or 12" or greater outfalls serving>2 acres of industrial land use . (Added or Removed from Inventory)

Total Outfall Added : 9
Total Outfall Removed : 6

Stormwater Management Outfall Status Change by Fiscal

Fiscal Year : 2019

Outfall Added : 9

Outfall ID	Site Address	Latitude	Longitude	Drain Type	Drain Size	Last Inspection	Target Inspection
OC-Old Cross-Cut Canal	**Count 5**						
OC089	E On Roosevelt From 48th st To 46th st N/A, Phoeni			Spillway	12 Feet	10/23/2018	2023
OC090	48th St. And Indian School N/A, Phoenix, AZ 85018			Pipe	102 Inches	1/31/2019	2024
OC092	48th Street And Indian School N/A, Phoenix, AZ 850	-111.98	33.50	Pipe	18 Inches	1/31/2019	2024
OC093	48th Street & Indian School Rd, Phoenix, AZ 85018	-111.98	33.50	Pipe	18 Inches	1/31/2019	2024
OC091	48th st And Osborn Rd, Phoenix, AZ 85018			Pipe	48 Inches	2/1/2019	2024
PD-Papago Diversion Channel	**Count 4**						
PD024	37th Drive And Culver N/A, Phoenix, AZ 85009	33.46	-112.14	Pipe	18 Inches	3/28/2019	2024
PD027	37th Avenue And Culver Street N/A, Phoenix, AZ 850	33.46	-112.14	Pipe	18 Inches	3/28/2019	2024
PD025	37th Drive And Culver N/A, Phoenix, AZ 85009	33.46	-112.14	Pipe	18 Inches	3/28/2019	2024
PD026	37th Ave And Culver st. N/A, Phoenix, AZ 85009	33.46	-112.14	Pipe	18 Inches	3/28/2019	2024

Outfall Removed : 6

Outfall ID	Site Address	Latitude	Longitude	Drain Type	Drain Size	Last Inspection	Target Inspection
OC-Old Cross-Cut Canal	**Count 5**						
OC031	Old Cross Cut, South Of Mcdowell Rd N/A, Phoenix,	33.46	-110.02	Pipe	26 Inches		
OC027	46th St And Mcdowell Rd N/A, Phoenix, AZ 85008	33.47	-111.98	Pipe	16 Inches		
OC028	48th St And Indian School Rd N/A, Phoenix, AZ 8501	33.50	-111.98	Spillway	5 Feet		
OC025	46th St And Mcdowell Rd N/A, Phoenix, AZ 85008	33.47	-111.98	Pipe	24 Inches		
OC042	Old Cross Cut And Taylor Street N/A, Phoenix, AZ 8	33.45	-111.98	Pipe	24 Inches		
PD-Papago Diversion Channel	**Count 1**						
PD018	79th Ave And Papago Diversion Channel N/A, Phoenix	33.46	-112.23	Pipe	24 Inches		

Laboratory Reports

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New or Revised
Public Outreach Documents
Including Public Awareness Survey

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City of Phoenix Water Services Department
Yesterday at 6:33 AM ·

#DYK that stormwater is a leading cause of water pollution? That's because #stormwater picks up pollutants on the ground and carries them to surface waters, untreated!

➡️Learn how to minimize stormwater pollution here: https://bit.ly/2Dvi6VD.

#PHXWaterSmart #PHXWater #PHX #PHXStormWater

Like Comment

1 Share

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City of Phoenix
WATER SERVICES DEPARTMENT
Quality. Reliability. Value.

Sorry, I missed you today_______________

I have observed

- ☐ Sprinklers flooding the street or sidewalk
- ☐ Missing sprinkler head
- ☐ Irrigation water overflowing into the street
- ☐ Draining swimming pool into the publicly owned right-of-way
- ☐ Other:

Comments: ____________________

Please make repairs or necessary adjustments.
Your cooperation is appreciated.

Employee ____________________

Telephone ____________________

Division ____________________

Please don't hesitate to contact us:
602-262-6251
Water Customer Services
Or visit: phoenix.gov/water

Español al reverso.

For more information about saving water please visit wateruseitwisely.com

To acquire this publication in Braille or large print, contact the City of Phoenix Water Services Department at 602-262-6251, or 711 for telecommunications Relay Service.

City of Phoenix Ordinances for Water Use Activity

Discharging water to the street, alley or other publicly owned right of way is a violation of City Code.

Section 37-27. Waste of Water; Failure of Consumer to Make Repairs to Pipes, Valves and Fixtures

Owners of property served by Phoenix Water Services Department are responsible for all leaks, or damages on account of leaks, from the service pipes leading from the consumer's side of the meter to the premises served. Every consumer must maintain in good repair all their water pipes, faucets, valves, plumbing fixtures or any other water appliances, to prevent waste of water.

For more information about saving water please visit: wateruseitwisely.com

Section 23-33. Escape of Water Prohibited

It is unlawful for any person to willfully or negligently permit or cause the escape or flow of water from any source in such quantity as to cause flooding, to impede vehicular or pedestrian traffic, to create a hazardous condition to traffic, to create a condition which constitutes a threat to the public health and safety, or to cause damage to the public streets or alleys.

For more information call Customer Service Division at: 602-262-6251 or visit phoenix.gov/water

Section 32C-103B. Stormwater Quality Protection

It is unlawful for any person to release to a publicly owned right-of-way, retention or detention basin, or public storm drain system any substance that is not composed entirely of stormwater except under limited situations approved by code.

Do not drain pool water into the storm drain which includes streets, alleyways, washes, ditches, parks, or other City of Phoenix property.

Instead, put it down the home's sanitary sewer clean-out.

For questions related to water use activity which may impact stormwater quality, please call the Stormwater Hotline at: **602-256-3190.**

PHX WATER SMART

For more information about stormwater please visit: **phoenix.gov/stormwater**

City of Phoenix
WATER SERVICES DEPARTMENT
Quality. Reliability. Value.

Siento no haberle encontrado hoy ______________

He observado lo siguiente:

- ☐ Rociadores que inundan la calle / acera
- ☐ Falta la cabeza del rociador
- ☐ Agua de riego se derrama a la calle
- ☐ Agua de la piscina drena a el sistema de drenaje público
- ☐ Otro:

Comentarios: ______________________________

____
____
____
____
____

Favor de realizar las reparaciones o ajustes necesarios.

Agradecemos su cooperación.

Empleado ______________________________

Teléfono ______________________________

División ______________________________

Para dudas por favor llamenos al:
602-262-6251

Departamento de Servicio al cliente del Departamento de Agua o, visite:
phoenix.gov/water

English on reverse side.

Para adquirir esta publicación en braille o letra grande, llame al Departamento de Servicios de Agua de Phoenix al 602-262-6251, ó 711 Servicio de Retransmisión de Comunicaciones.

Ordenanzas de la Municipalidad de Phoenix acerca del uso del agua

Derramar agua en la calle, callejón o alguna otro vía pública es una infracción del Código Municipal.

Sección 37-27. Desperdicio de Agua; el consumidor no ha reparado las tuberías, válvulas y accesorios.

Los dueños de propiedad que reciben servicios del Departamento de Servicios de Agua de Phoenix, son responsables por toda fuga o daño causado por la tubería de servicio que va del medidor del consumidor a la propiedad. Cada consumidor deberá mantener en buenas condiciones la tubería, grifo o llave, válvula, plomería y demás dispositivos, para evitar así el desperdicio de agua.

Para mas información sobre el ahorro de agua, visite: wateruseitwisely.com

Sección 23-33. Se prohíben fugas de Agua

Queda prohibido causar o permitir, intencional o negligentemente, el escape o fuga de agua en tal cantidad que ocasione inundación, obstruya el tráfico vehicular o peatonal, cree condiciones peligrosas para dicho tráfico; represente un peligro a la salud y seguridad pública o cause daños a los callejones y vías públicas.

Para mas información, llame al Servicio al Cliente, al: 602-262-6251 ó visite phoenix.gov/water

Sección 32C-103B. Protección de la Calidad de las Aguas Pluviales

La ley prohibe el derrame a una via pública, embalse de detención o retención o sistema de drenaje público, de cualquier sustancia que no sean aguas pluviales, excepto en situaciones limitadas aprobadas por el código.

No drene el agua de la piscina a la alcantarilla, que incluye calles, callejones, cuencas, zanjas, parques u otra propiedad de la Municipalidad de Phoenix; viértala a la válvula de limpieza del drenaje de su casa.

Para preguntas sobre el impacto a la calidad de aguas pluviales, llame por favor a la

Línea directa de aguas pluviales al: 602-256-3190

PHX WATER SMART

Para mas información acerca de las aguas pluviales, visite: phoenix.gov/stormwater

148-18D Rev. 3/19

STORMWATER GUIDELINES FOR **SPECIAL EVENTS**

PHOENIX CITY CODE

Event organizers are responsible for complying with Phoenix City Code, Chapter 32C, *Stormwater Quality Protection*, which prohibits discharging anything other than rainwater into the storm drains. This flyer includes tips to make sure that events follow city code and put practices in place to ensure that only rain goes in the storm drain.

POLLUTION PREVENTION

Water that flows into the storm drain system does not go to a treatment plant, like sanitary sewer water does. Instead, it flows directly into our rivers, lakes, washes, and other surface waters. Stormwater pollution is easily prevented by ensuring that materials such as detergents, paints, grease, fats, oils, trash, or mop and dish water are properly managed, and **NEVER** make their way into parking areas, streets, and storm drains.

POLLUTION PREVENTION

Best Management Practices (BMP's) are measures put in place to prevent potential pollutants from entering the storm drain. As an event organizer, you will need to implement BMPs to protect the storm drain, and may need to submit a Stormwater Management Plan (SWMP), based on your potential to discharge pollutants to the storm drain system. Below are examples of effective BMP's that you may use.

Below are examples of effective BMP's that you may use. Keep in mind that these examples are non-exhaustive, and you are expected to develop and implement your own BMP's that are applicable to your specific event.

- Train event staff, volunteers, and vendors on stormwater pollution control measures.
- Place wattles or other filtering and absorbent material over storm drains for the duration of your event.
- Create and clearly label spill-kit stations comprised of a dry cleanup method (sawdust, kitty litter, etc.), a broom, and a disposable bag.
- Properly contain/dispose all grease used by food vendors.
- Place fluids of five-gallons or more in secondary containment, away from storm drains, and cover when not in use.
- Place temporary tarps to catch any potential pollutants so they may be collected and disposed of properly.
- Notify the City of Phoenix of significant spills in the street or storm drains before, during, or after your event.
- Sweep your event site on a regular basis.
- Vendors must not discharge waste into the storm drain or sanitary sewer. Discharges from food vendors must be plumbed to a grease trap before discharging into the sanitary sewer.

EVENT BARRIERS

Due to Homeland Security stipulations, the City of Phoenix has new requirements for implementation of water-filled jersey barriers to protect crowds on City property during rallies, marches, and other such events.

USE CONSIDERATIONS

1. Fill containers with potable water.

2. Use best management practices, which include:

- Sweeping up trash and debris prior to emptying the containers so garbage and sediment are not carried into the storm drain system.
- Empty containers in a manner that does not damage or impact landscaping or create mud.
- Be courteous of neighboring businesses and public perception.

3. Limit discharges up to 1,000 gallons. If more than 1,000 gallons is expected to be discharged in a single setup, notify the City a minimum of 10 days prior to the event for approval and a discharge permit.

For more information and the permit email ask.water@phoenix.gov.

Special Events STORMWATER GUIDELINES

Failure to comply with Phoenix City Code, Chapter 32C may result in a Notice of Violation (NOV) and possible fines up to $2,500 per day, per violation. If you have any questions, comments, or concerns, please contact the City of Phoenix Stormwater Management Section at (602) 256-3190, English or Spanish. To learn more about BMP's, please visit our website at www.phoenix.gov/stormwater.

STORM Annual Report

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STORM – Fiscal Year 2019 Annual Report (July 1, 2018 – June 30, 2019)

SUMMARY

Arizona's Stormwater Outreach for Regional Municipalities (STORM) provides a platform for collaborative effort by which educational outreach may be provided to residents with the message of pollution prevention to keep our waters clean. In Fiscal Year 2019, STORM members completed outreach via web, print, social media, and public events. The coordination among the 25 member cities, towns, and non-traditional municipal separate storm sewer system owners or affiliates, resulted in:

- Social Media – Increased audience engagement on social media by 5% using ABC15 creative advertising; a combination of displays, Facebook ads and posts, and high-impact units.
- Website – Received a total of 10,021 webpage views by 7,726 users during 8,707 sessions. Webpage sessions increased by approximately 10% from FY18. A session is defined as a period of time a user is engaged in the website. Meaning, more people are actively using and searching the STORM website. Users, or individual visits increased when compared to FY18 by approximately 15%.
- Videos – Three educational videos were developed with information directed to home automotive maintenance, mobile carpet cleaners, and home painters. The target audience information and best practices to manage pollutant discharges were presented by Sparky, our talking spokesdog. The videos, which were produced with STORM and member organization branding in broadcast and social media specific formats, can be found on STORM's YouTube channel (https://www.youtube.com/channel/UC3pLhrbcSBB6A_EGc1B8rvA) and on member websites.
- Events – STORM members attended 64 events and made 20,300 direct contacts, an increase of 35% in direct contacts from FY18 (77 events with 13,000 direct contacts). The STORM organization attended three events (Odysea Conservation Expo, Tres Rios Nature Festival, and Arizona Game and Fish Outdoor Expo) and hosted two construction seminar events this fiscal year. Additionally, members continue to attend events and use their STORM branded promotional items independently.

MEMBERSHIP

ADOT, Apache Junction, Avondale, Buckeye, Casa Grande, Chandler, El Mirage, Fountain Hills, Gilbert, Glendale, Goodyear, Guadalupe, Litchfield Park, Luke Air Force Base, Maricopa County (Environmental Services and Flood Control District), Mesa, Paradise Valley, Peoria, Phoenix, Pinal County, Queen Creek, Scottsdale, Surprise, Tempe.

BUDGET

Table 1: Fiscal Year (FY) 2019 Financial Information

Total Revenue		**Total Expenditures**	
Beginning Balance FY19	$28,203.00	Website, Facebook, ABC15	$30,109.75
Membership Dues Received	$75,000.00	Educational Videos	$17,600.00
Less Dues Received in FY18	($15,500.00)	Promotional Items and Marketing	$28,566.00
		Administration and Accounting	$1,346.00
		Construction Seminars	$68.00
		NMSA Membership	$500.00
Total	$87,703.00	Total	$78,189.75

STORM
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STORM – Fiscal Year 2019 Annual Report (July 1, 2018 – June 30, 2019)

STATISTICS

Members meet monthly on the fourth Tuesday at 1:30PM. These working meetings are the primary method of sharing relevant information about regulatory issues, identifying potential outreach events, updating committee efforts, and reporting. Members track outreach events online for inclusion in this annual report, which supports a regional front, stretches municipal dollars, and coordinates consistent messages in the Middle Gila River Watershed.

STORM members conducted 64 events or workshops with an estimated 85,000 attendees, of which 20,300 engaged with STORM member staff about stormwater pollution prevention. At these events, over 11,000 print materials (brochures and activity books) and over 19,000 promotional items (STORM branded key chain carabiners, re-usable collapsible water bottles, magnets, color changing cups, and frisbees) were distributed. Table 1 identifies the month, number of events, estimated attendance and public engagement with our members.

Table 2. Distribution of events, attendance, engagement and website traffic.

2018					2019				
Month	Events	Attended	Engaged	Website	Month	Events	Attended	Engaged	Website
July	1	123	123	400	January	7	8,934	819	245
August	0	0	0	410	February	10	40,686	4,464	526
September	1	78	78	261	March	12	7,500	5,554	414
October	5	1,919	569	308	April	15	9,500	3,730	254
November	5	6,119	1,291	326	May	5	119	98	855
December	3	9,075	3,325	627	June	0	0	0	3,100

SOCIAL MEDIA CAMPAIGN

Social Media, specifically Facebook, campaigns were very successful. STORM contracted with ABC15, which ran regular banner ads, Facebook ads, Facebook posts, and large banner ads resulting in more than 213,700 ad views and almost 10,118 clicks (engagement). View the attachments for specifics.

In June of 2019, STORM helped author an article in *Phoenix Dog Magazine* which dealt with the proper practices associated with picking up dog waste to prevent pollution to stormwater systems. Phoenix Dog Magazine has a readership of approximately 50,000 in both print and digital formats as well as a social media following of around 7,000. The online version of the magazine article can be found at:

https://issuu.com/cathydavila/docs/phx_dog_may_june_2019_final/18

STORM members contributed time to post and interact with the public on the STORM social media page. STORM posted 234 times with a reach of 84,810. It is worthwhile to note that when Facebook posts were boosted, approximately 38,000 people were reached for a nominal fee of $524. Table 2 includes the top five posts, when they posted, how many reached and liked, and the topic.

Table 3. Top 5 Posts

Day	Reach	Engagement	Post
5/29/2019	10,032	694	Each year tons upon tons of trash, plastics, litter, sediment and other debris are removed from area storm drains. Be the solution to water pollution by putting trash where it belongs in the trash can not on the ground. #Bestormwatersmart #giveahootdontpollute #onlyraindownthestormdrain #keeparizonabeautiful #kazb
9/21/2018	7,445	66	Ready to Plant your winter grass? Here are a few tips to #bestormwatersmart and #airqualitysmart too - Avoid scalping on windy days and on High Pollution Advisory (HPA) days. - Don't over-dry the area prior to scalping. - Apply water to moisten the area prior to scalping. - Reduce the area to be overseeded and depth of scalping. - Keep dust collection screens and filters in good working order. - Moisten material piles before loading into dumpsters. - Sweep loose debris from paved surfaces instead of leaf blowing Thanks to Maricopa County Clean Air for the reminders
12/17/2018	6,735	81	Thinking of deep frying a turkey for the holidays? It'll be delicious!!! Don't clog your (or the communities) pipes. Put the waste grease to good use by having it recycled. 1. Cool it, 2. strain it, 3. Pour into resealable container, 4. Contact your public works department for recycling/collection locations in your community see STORM member contacts at http://azstorm.org You can also look up recycling locations
10/16/2018	6,446	418	Ready to Plant your winter grass? Here are a few tips to #bestormwatersmart and #airqualitysmart too - Avoid scalping on windy days and on High Pollution Advisory (HPA) days. - Don't over-dry the area prior to scalping. - Apply water to moisten the area prior to scalping. - Reduce the area to be overseeded and depth of scalping. - Moisten material piles before loading into dumpsters. - Make sure to apply fertilizers according to label directions. - Don't over water after seeding and applying fertilizer. - Sweep loose debris from paved surfaces instead of leaf blowing. Thanks to Maricopa County Clean Air for the reminders
8/7/2018	5,558	113	Mother Nature letting a little loose tonight and possibly the next couple of days. Bring on the rain!! Remember #onlyraindownthestormdrain Things you can do to prevent stormwater pollution: http://azstorm.org/what-can-i-do

MATERIALS: CONSTRUCTION POSTERS AND HANDOUTS

STORM's material subcommittee coordinated with Goldstreet Design Agency to produce three construction handouts for use by members. The handouts address construction Best Management Practices (BMP) guidelines, and post construction and facility stormwater maintenance. The bright and easily read posters and brochure feature custom graphics and are easily customizable to member specifications. The intent of the production of the handouts is for member organizations to provide to contractors prior to, during, and after construction activities. Copies of the materials are attached.

STORM – Fiscal Year 2019 Annual Report (July 1, 2018 – June 30, 2019)

ATTACHMENTS

EDUCATION, MARKETING, WEBSITE, FACEBOOK, AND ABC15 HIGHLIGHTS

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STORM – Fiscal Year 2019 Annual Report (July 1, 2018 – June 30, 2019)

Educational Videos: Automotive Maintenance, Carpet Cleaners, and Painters

Target Audience: Mobile Businesses

Total Cost: $17,600.00

STORM
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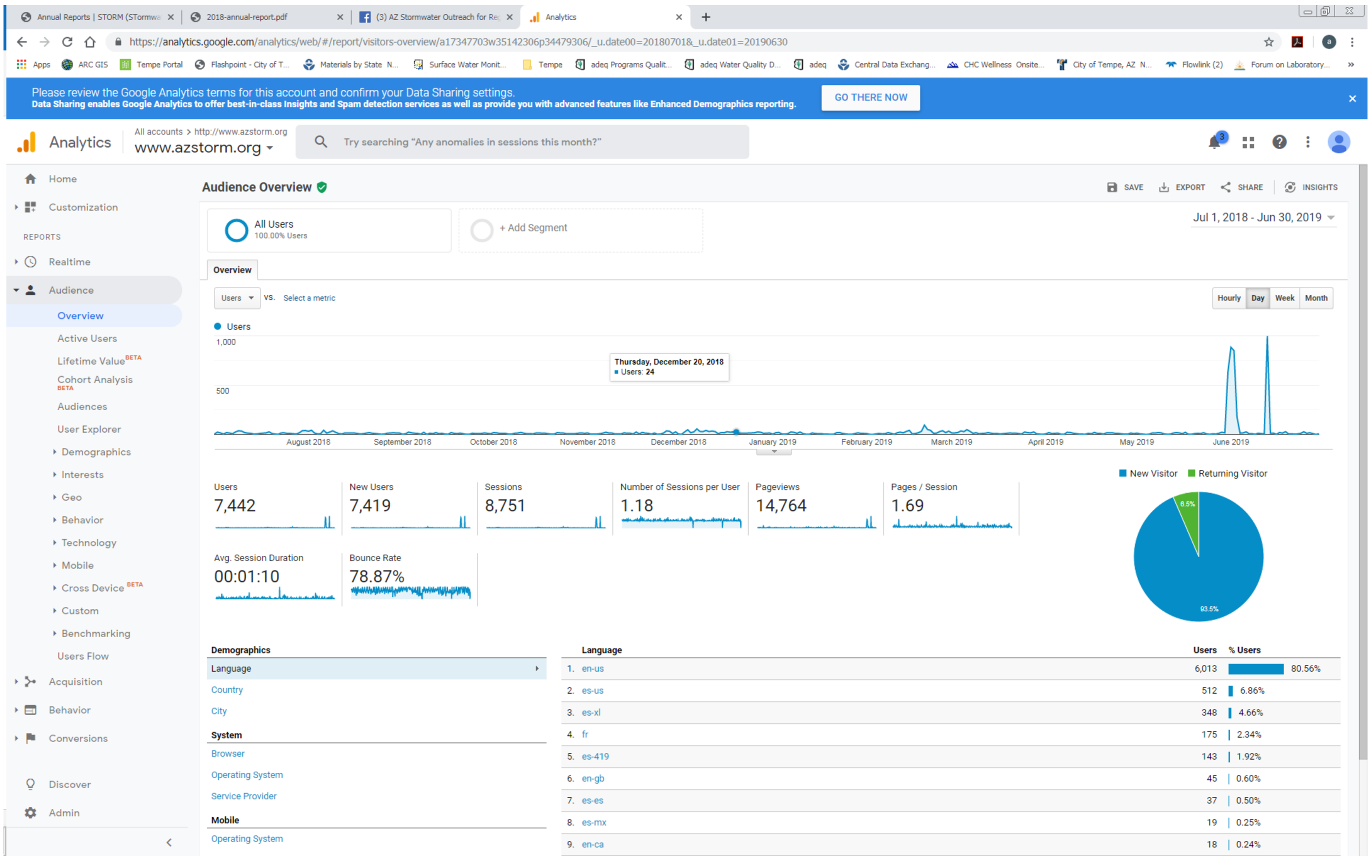
Promotional Items (10,000 Each): Total Cost $18,429.05

Key Chain Caribeners ($5,600 + Shipping)	*Collapsible Water Bottles ($9,600 + Shipping)*
	

STORM – Fiscal Year 2019 Annual Report (July 1, 2018 – June 30, 2019)

AZSTORM.ORG Website Analytics



STORM
Only rain in the stormdrain

Example Facebook Posts

Post Details

AZ Stormwater Outreach for Regional Municipalities
Published by Christina Hoppes [?] · May 29

Each year tons upon tons of trash, plastics, litter, sediment and other debris are removed from area storm drains. Be the solution to water pollution by putting trash where it belongs in the trash can not on the ground. #Bestormwatersmart #giveahootdontpollute #onlyraindownthestormdrain #keeparizonabeautiful #kazb

For more information visit https://www.azstorm.org/stormwater-101/what-you-can-do

AZ Stormwater Outreach for Regional Municipalities
Nonprofit Organization
Send Message

Performance for Your Post

9,893 People Reached

563 Reactions, Comments & Shares

146 Like	125 On Post	21 On Shares
4 Love	3 On Post	1 On Shares
18 Wow	16 On Post	2 On Shares
118 Sad	111 On Post	7 On Shares
139 Angry	130 On Post	9 On Shares
31 Comments	19 On Post	12 On Shares
109 Shares	108 On Post	1 On Shares

131 Post Clicks

28 Photo Views	3 Link Clicks	100 Other Clicks

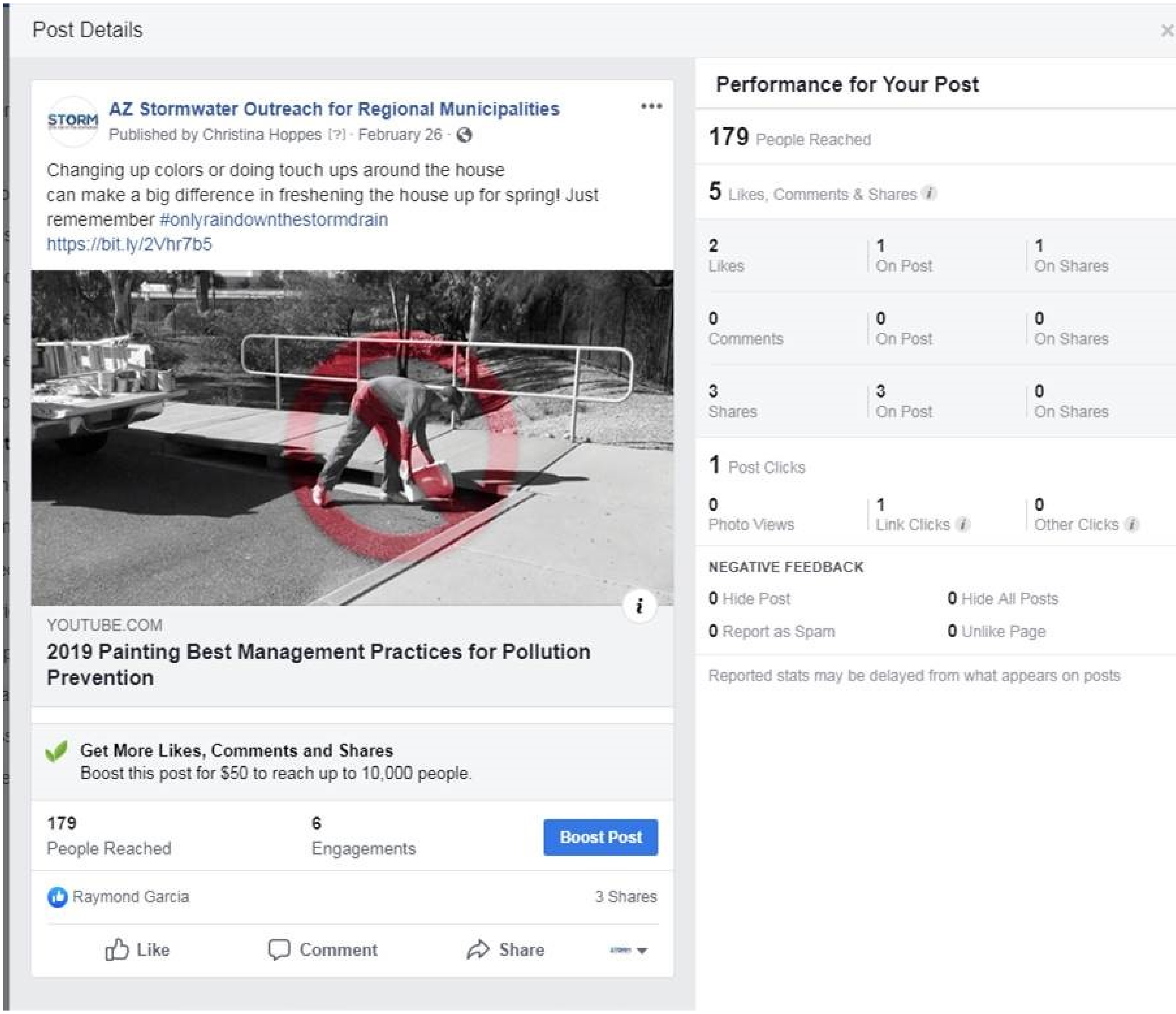
NEGATIVE FEEDBACK

1 Hide Post	1 Hide All Posts
0 Report as Spam	0 Unlike Page

Insights activity is reported in the Pacific time zone. Ads activity is reported in the time zone of your ad account.

STORM
Only rain in the stormdrain

Example Facebook Posts



STORM
Only rain in the stormdrain

Example Facebook Posts

Post Details

AZ Stormwater Outreach for Regional Municipalities
Published by Christina Hoppes [?] · February 21

Stormwater pollution prevention tip from the pumps at Costco is especially important on a rainy day like today!

Visit www.azstorm.org for more pollution prevention tips

Get More Likes, Comments and Shares
Boost this post for $50 to reach up to 10,000 people.

248 People Reached	23 Engagements	Boost Post

11 · 1 Share

Like · Comment · Share

Performance for Your Post

248 People Reached

13 Likes, Comments & Shares

12 Likes	11 On Post	1 On Shares
0 Comments	0 On Post	0 On Shares
1 Shares	1 On Post	0 On Shares

10 Post Clicks

2 Photo Views	0 Link Clicks	8 Other Clicks

NEGATIVE FEEDBACK

0 Hide Post	**0** Hide All Posts
0 Report as Spam	**0** Unlike Page

Reported stats may be delayed from what appears on posts

STORM
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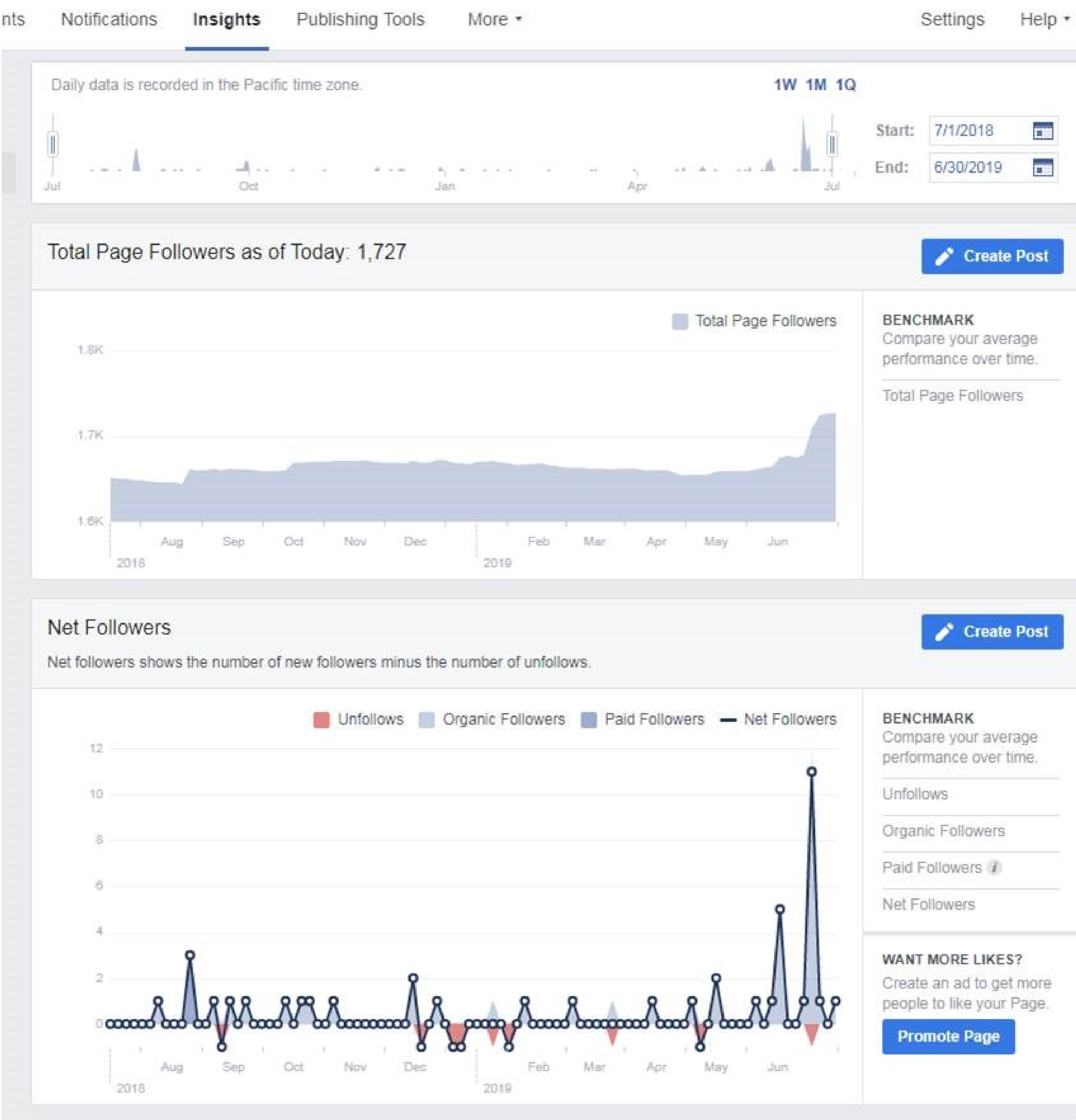
STORM – Fiscal Year 2019 Annual Report (July 1, 2018 – June 30, 2019)

Facebook Analytics



STORM
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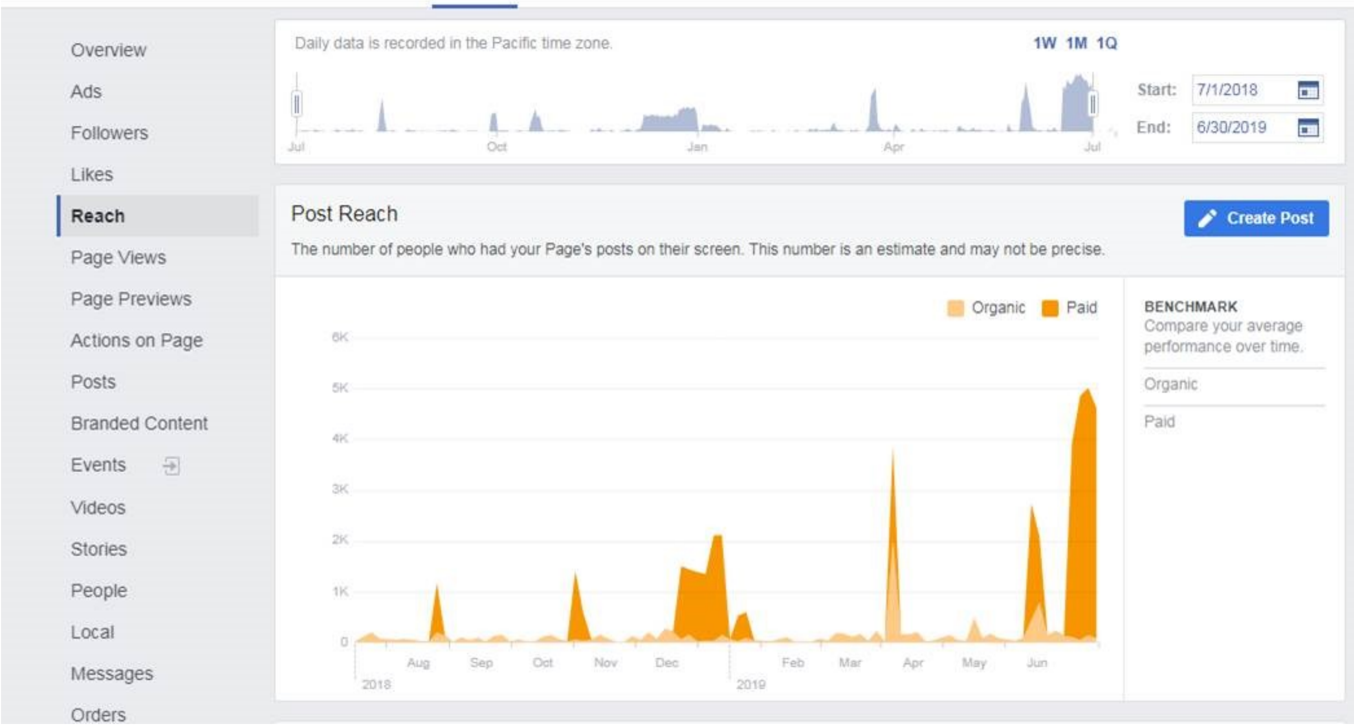
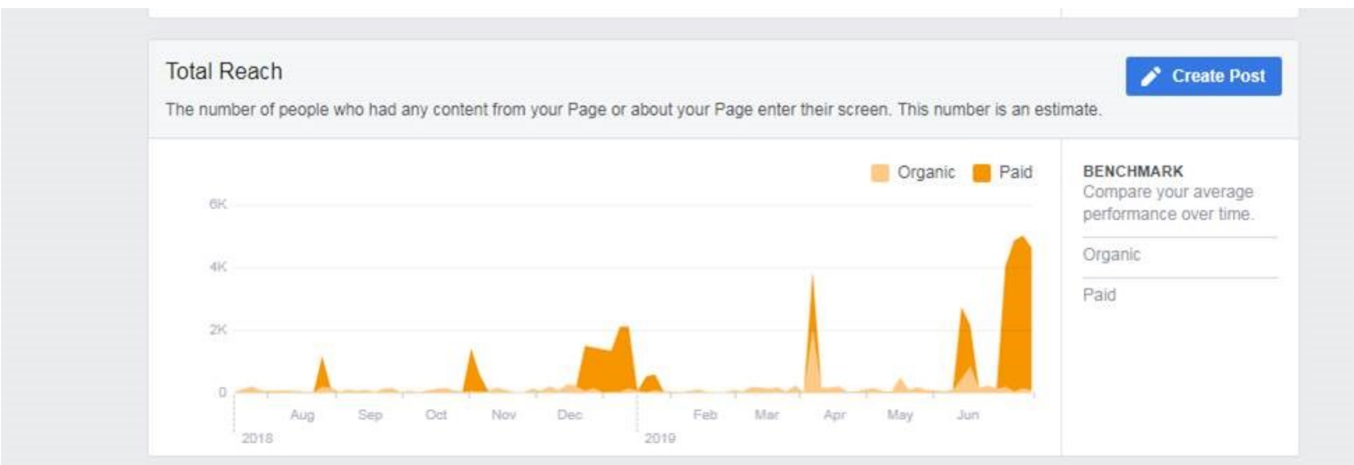
STORM – Fiscal Year 2019 Annual Report (July 1, 2018 – June 30, 2019)

Facebook Analytics





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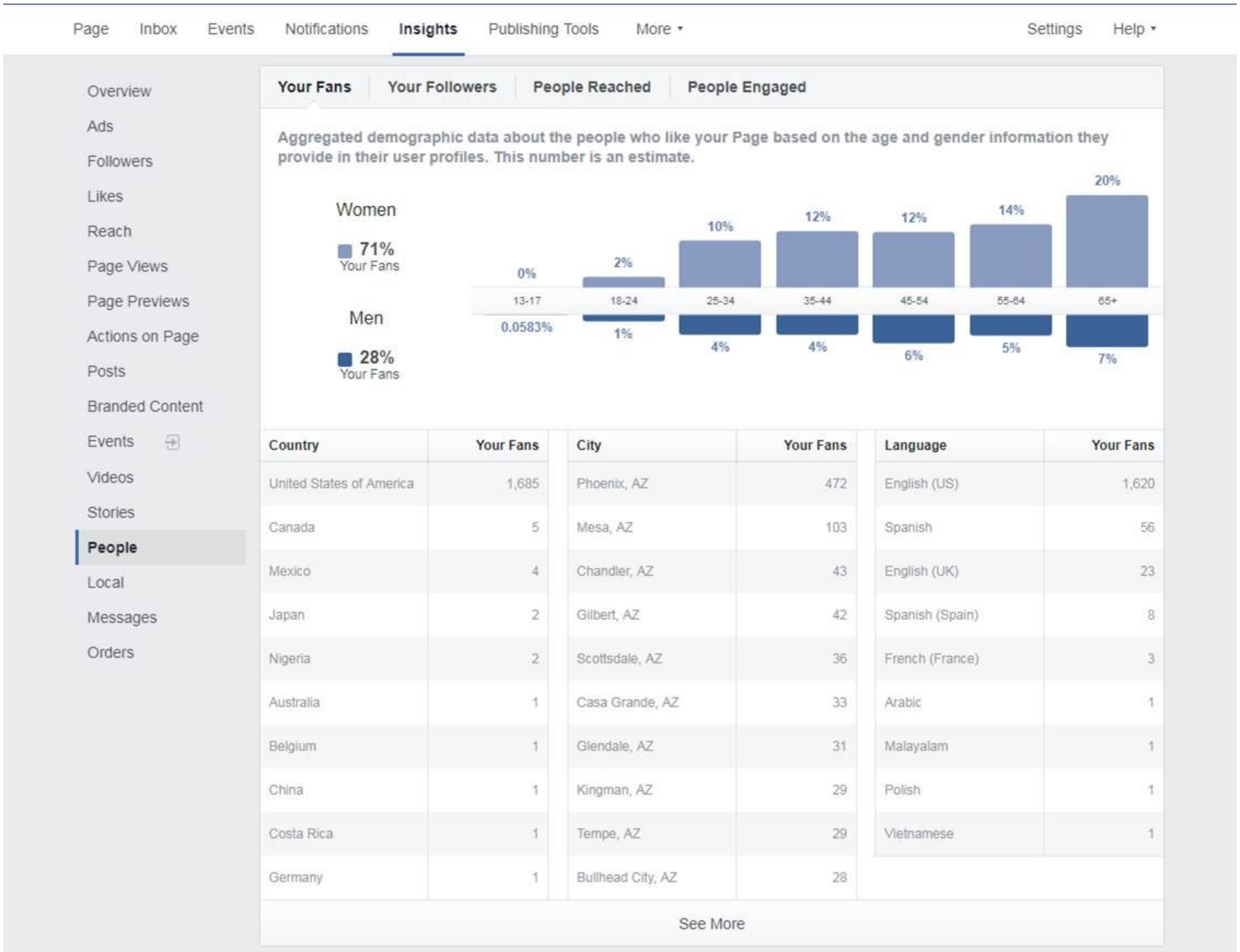
Facebook Analytics



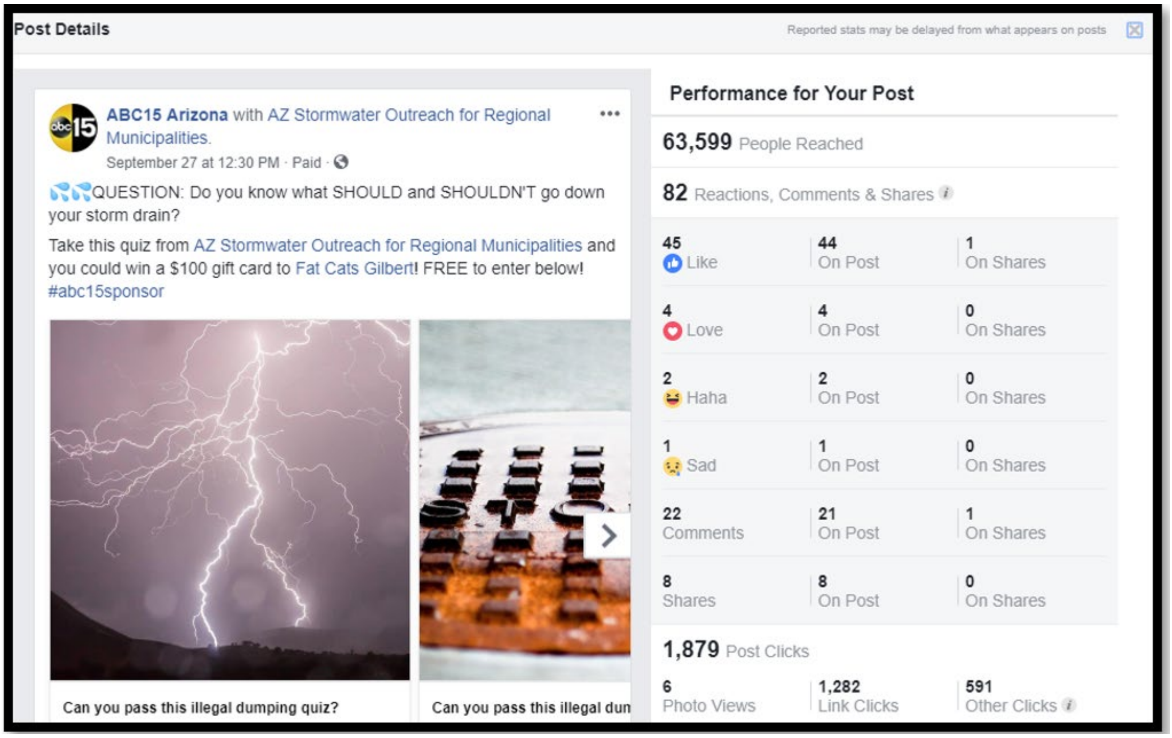
Country	Your Fans
United States of America	1,685
Canada	5
Mexico	4
Japan	2
Nigeria	2
Australia	1
Belgium	1
China	1
Costa Rica	1
Germany	1

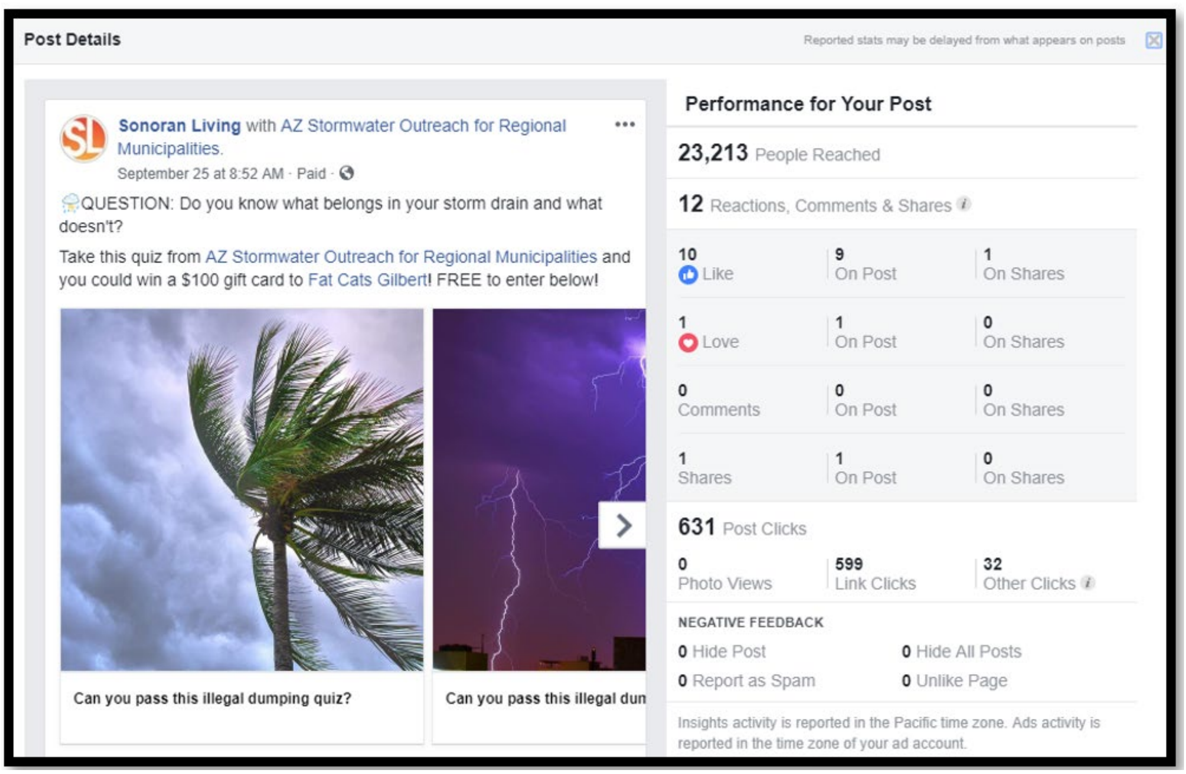
City	Your Fans
Phoenix, AZ	472
Mesa, AZ	103
Chandler, AZ	43
Gilbert, AZ	42
Scottsdale, AZ	36
Casa Grande, AZ	33
Glendale, AZ	31
Kingman, AZ	29
Tempe, AZ	29
Bullhead City, AZ	28

Language	Your Fans
English (US)	1,620
Spanish	56
English (UK)	23
Spanish (Spain)	8
French (France)	3
Arabic	1
Malayalam	1
Polish	1
Vietnamese	1

ABC15 Campaign

Illegal Dumping Quiz Overview

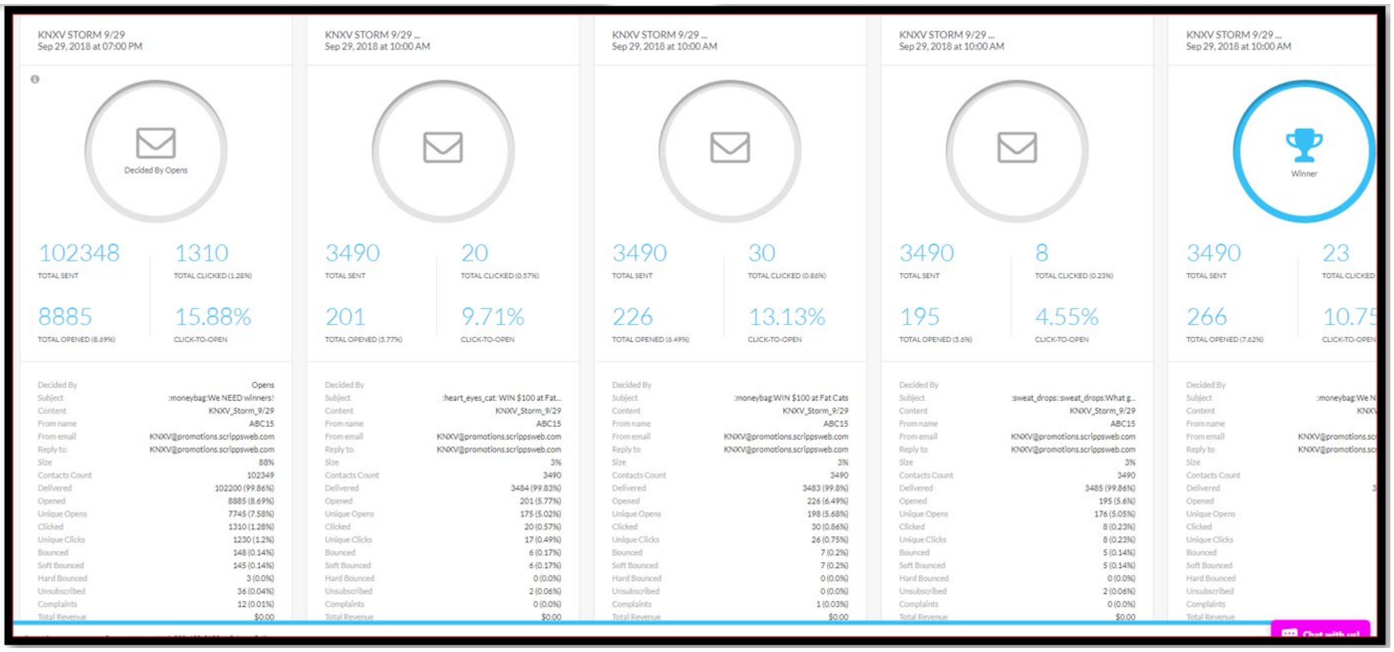




STORM – Fiscal Year 2019 Annual Report (July 1, 2018 – June 30, 2019)

ABC15 Campaign

Illegal Dumping Quiz Overview



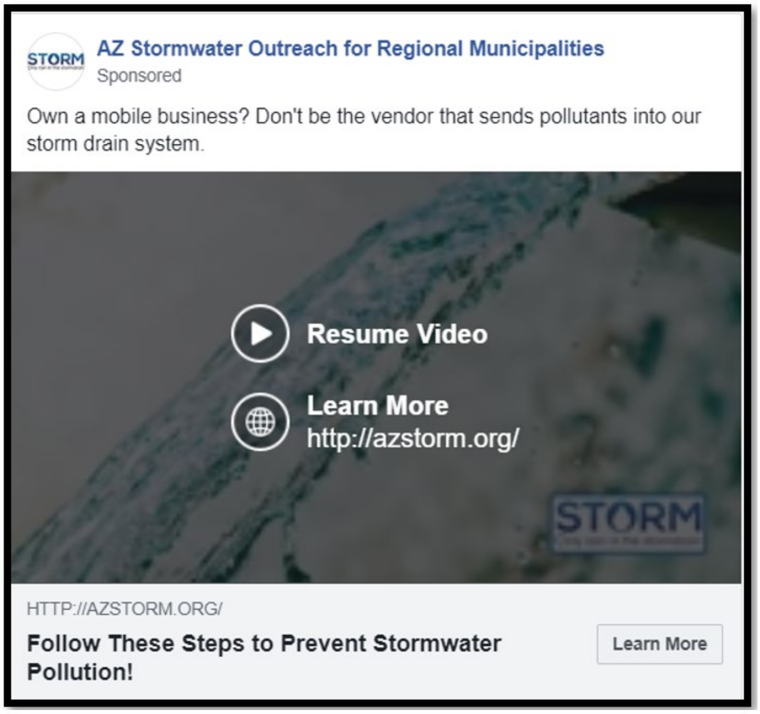
Connected TV Overview

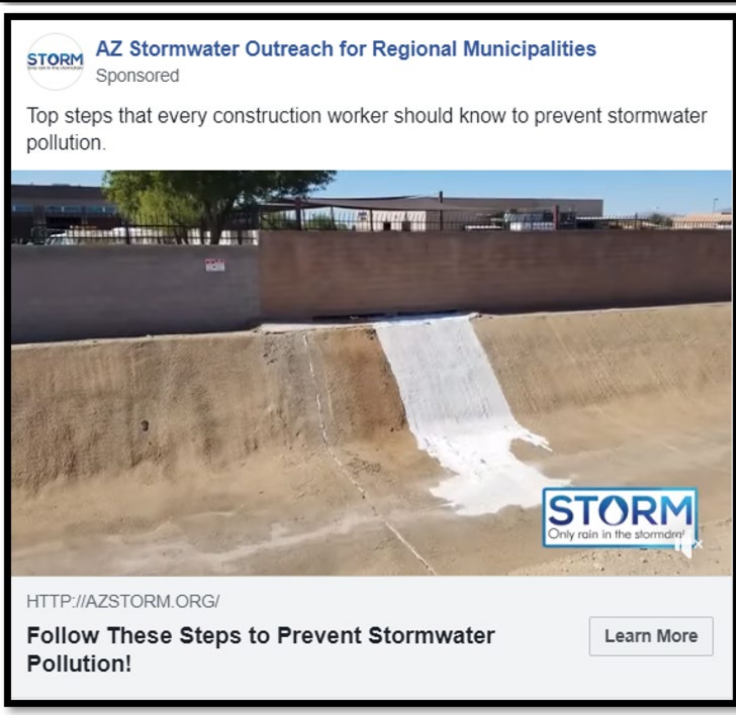
Impression	100% Completion
97,515	96.66%

Top Placements	Impressions
Roku	21,842
Pluto TV	18,578
Newsy	9,506
Weathernation	7,139
Discovery Go	1,776

ABC15 Campaign

December 2018 Facebook Advertisements Overview





ABC15 Campaign

STORM
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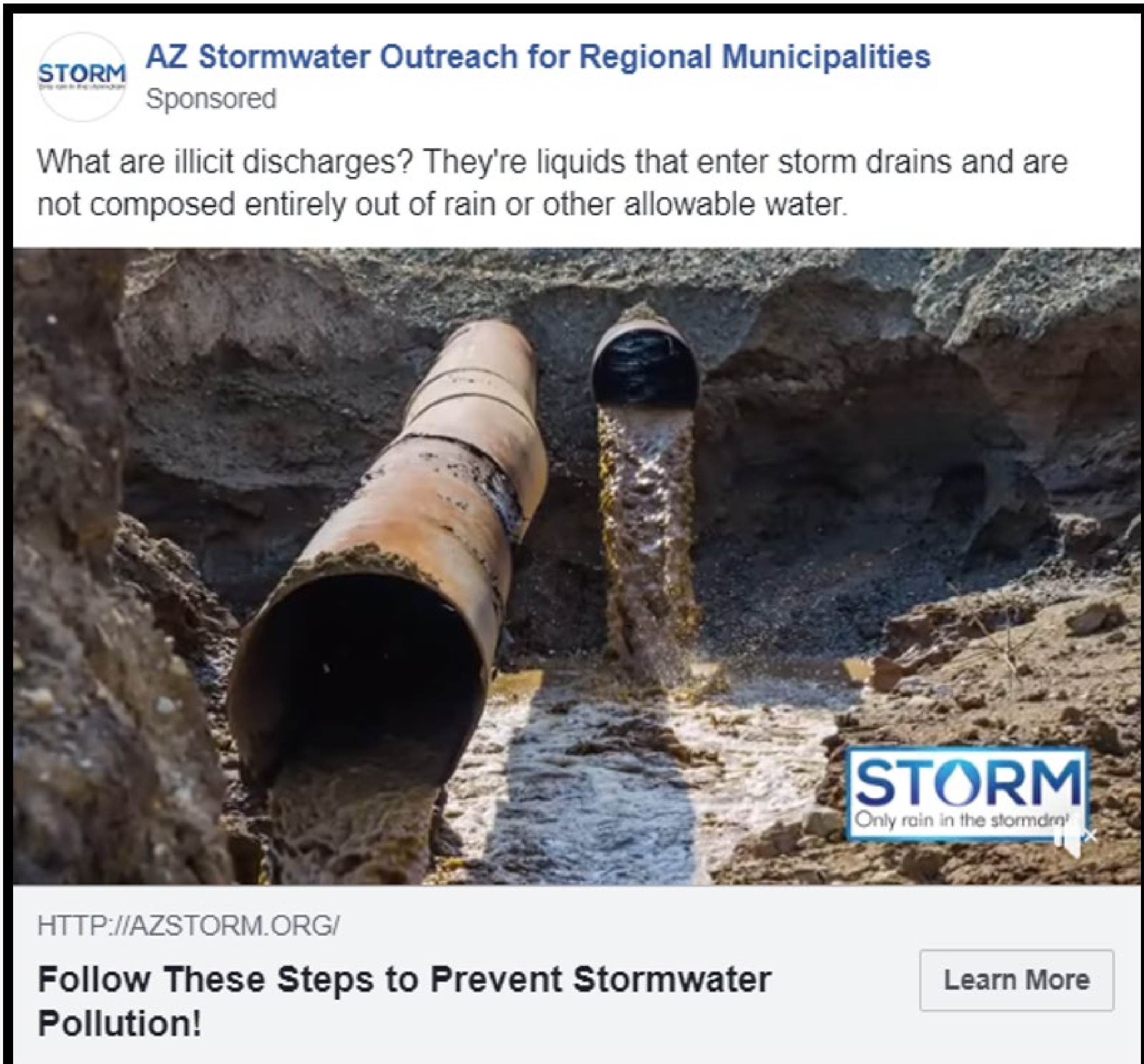
ABC15 Campaign

December 2018 Facebook Advertisements Overview



Impression	Clicks	Click Thru Rate	Video Views
37,966	734	1.93%	4,416

Top Ad: Mobile Businesses (2.10% Click Thru Rate)

STORM
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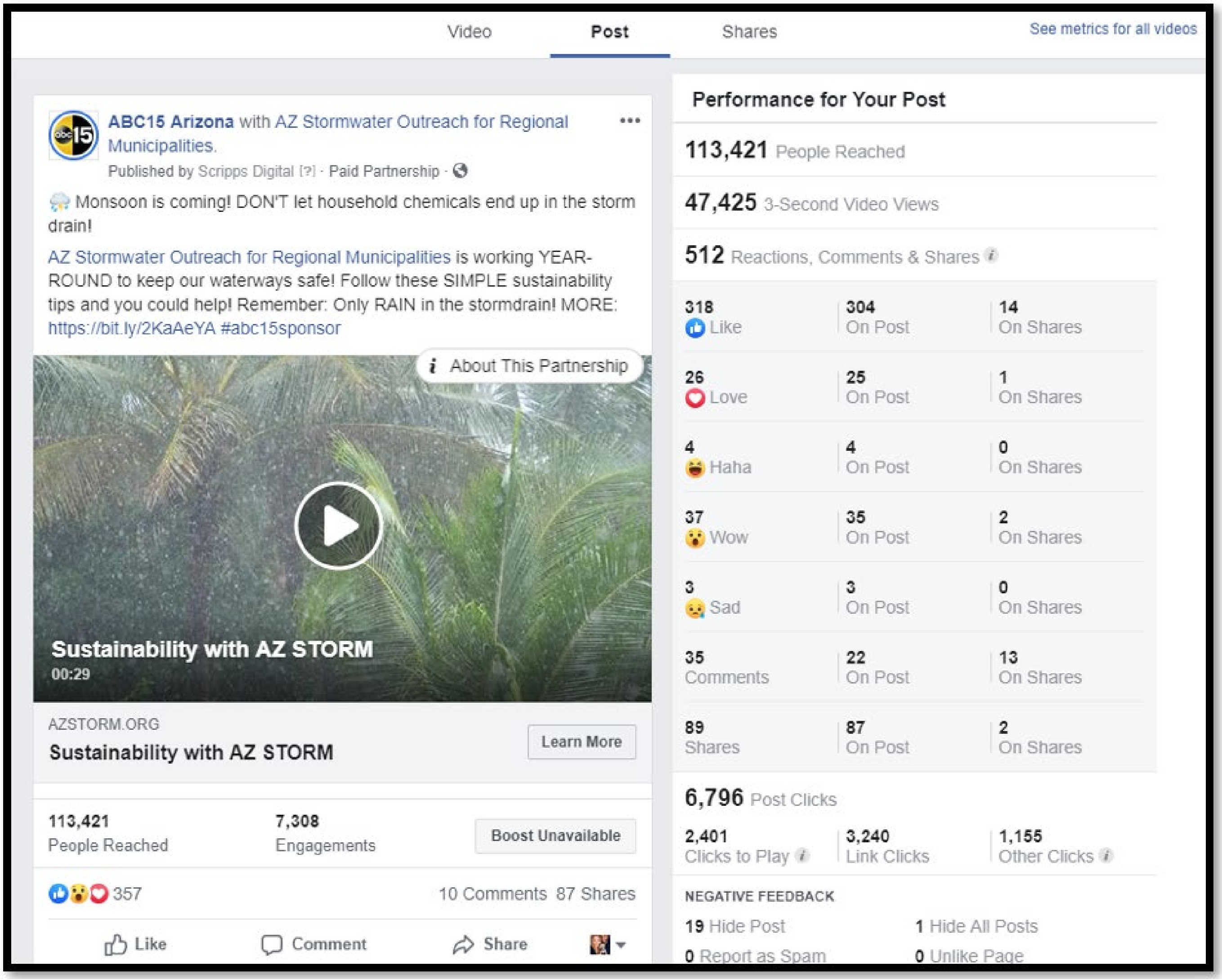
STORM – Fiscal Year 2019 Annual Report (July 1, 2018 – June 30, 2019)

ABC15 Campaign

May 2019 Facebook Advertisements Overview



People Reached	113, 421
Post Clicks	6,796
Link Clicks	3,240

STORM

Only rain in the stormdrain

Construction Posters and Brochure

Construction Posters and Brochure

STORM
Only rain in the stormdrain

Construction Posters and Brochure

STORM

Only rain in the stormdrain

Cost Benefit Analysis

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STUDY: EFFECTIVENESS OF EXISTING GREEN INFRASTRUCTURE IN PHOENIX

8426900000-4400000001

PHOENIX, ARIZONA

City of Phoenix Contract No. 143989

December 14, 2018

Prepared for:

City of Phoenix

200 W Washington Street

Phoenix, AZ 85003

Prepared by:

Coe & Van Loo Consultants, Inc.

4550 N. 12th Street

Phoenix, AZ 85014

(602) 264-6831

Registered Professional Engineer (Civil)
CERTIFICATE NO.
37297
JASON K.
KELLEY
Date Signed 12-14-18
ARIZONA, U.S.A.
Expires 3-31-2020

City of Phoenix

CVL CONSULTANTS
CELEBRATING 60 YEARS

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CVL CONSULTANTS

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APPENDIX A –As-built Plans

APPENDIX B – Site Observations

APPENDIX C – Temperature Profiles

APPENDIX D – Geotechnical Report

APPENDIX E - As-built Comparisons

APPENDIX F - Stormwater Caluclations

1.0 INTRODUCTION

This study evaluates the function of existing green infrastructure (GI) in the City of Phoenix. Over the past several years, GI pilot projects have been implemented throughout the City. Currently, the City is involved in three concurrent efforts to evaluate and expand GI. These efforts (by others) include site favorability study, a cost benefit analysis and a technical standards book. This study provides field test and performance data on selected, existing GI features for the City's ongoing efforts in meeting sustainability goals, improving water quality and quantity outcomes, and providing green spaces for the community.

Three types of existing City GI features were evaluated: (i) bioswales (ii) permeable pavers and (iii) pervious concretes. Eleven sites were selected from the City's GI inventory. The project began with a data collection effort and field testing. Field testing does not include water quality measurements.

2.0 Data Collection

2.1 Existing Documents

The City provided CVL with available documentation for each site, including design plans/as-builts (see Appendix A). Plans have been reviewed and compared to site observations and field test data. This report documents a comparison of the original design and existing conditions for each GI. A summary of data collected includes:

- City of Phoenix Street Transportation Department, Record Drawings: *Buckeye Road Intersections and 24th Street Intersections,* AV14000019, 2008.
- As_Built Drawings for *University of Arizona Cancer Center*, Hensel Phelps Construction Co.; ZGF Architects, 2015.
- City of Phoenix, Public Transit Department, *Central Station Refurbishments*, PT0210001, 2010.
- City of Phoenix, Engineering & Architectural Services, As-built drawings: *Civic Space Park Phase 2*, PA75100126, 2011.
- City of Phoenix, Engineering & Architectural Services, Permit set: *Phoenix Fire Training Academy, Driver Training Building*, FD57120006, 2009.
- City of Phoenix Street Transportation Department, Record Drawings: *Hatcher Road Sidewalk Improvements, 19th Avenue to 7th Street*, ST87750001, 2000.
- DRW Engineering Inc., As-Builts: *Manzanita Senior Center*, KIVA 11-1465, 2010.
- City of Phoenix, Engineering & Architectural Services, As-Builts: *Unnamed City Park*, PA75200308, 2009.
- HDR, Sundt et al., *Taylor Street Mall Package,* KIVA 06-4981, 2008.
- HDR, Sundt et al., *Taylor Mall Extension at Cronkite School of Journalism and KAET 8,* KIVA 06-4981, 2008.
- City of Phoenix, *Off-Site Improvements with Drainage Facilities for ASU Downtown Student Housing*, Proj# 07-747, 2008
- City of Phoenix Street Transportation Department, Record Drawings: *Taylor Mall: Taylor Street Improvements*, CD30000010, AR84850012-4, WS85500324, 20070.
- City of Phoenix, Engineering & Architectural Services, As-Builts: *Tovrea Castle Parking Entry Project,* KIVA 05-1006; LPRR#1001609, 2012.

- City of Phoenix, Engineering & Architectural Services, *Employee Parking Lot for Union Hills Service Center,* PW24400002, 2001.

Further documentation regarding maintenance records were unavailable.

2.2 Field Observations

The purpose of the visits were to (i) note physical features such as plantings, soil types, irrigation systems, curbs, curb-cuts, drains, weepholes (ii) observe existing feature conditions such as sediment/trash/debris accumulation and pavement/paver conditions (iii) obtain photographs of site and features. Field observations are a key component of the evaluation. Field observation notes and photos for each GI can be found in Appendix B

3.0 Field Testing

3.1 Temperature Measurements

Temperature measurement at Helen Drake Center

Ground level temperature measurements were obtained using an infrared temperature gun. Measurements were taken in non-wetted conditions for each site. Using field measuring tape, a temperature measurement was obtained every foot to every four feet depending on the size of the GI. Location of measurement at each site was based on transecting differing surface types within the GI feature as well as beyond the GI feature. In some cases due to traffic, existing utilities, or vegetation, the location selected had anomalies such as sporadic shade or plastic electric box covers. These anomalies have been identified, noted and will be considered in the evaluation of each feature. Tests were conducted during sunlight hours in the range of 11am to 4pm. The first set of tests was conducted from July 23rd to 27th, 2018. The second set of tests was conducted from September 26th to 28th, 2018. Times, dates and ambient temperatures are contained in the field notes with the temperature measurement data. Temperature profiles were plotted for each measured feature (see Appendix C). Temperature profiles and review of data trends was used to identify any ground-level heat island/mitigation effects.

3.2 Subsurface Testing

Ninyo & Moore (N&M) was contracted to perform sub-surface testing of porous concrete, bioswales, bioretention and permeable pavers. Single-ring field infiltration tests were conducted to help evaluate infiltration function of each GI. Boring samples of the soil and/or pavement were collected from each site. Each of the samples collected were measured for unit weight, permeability and compressive strength. Additionally, soil boring samples were examined to determine soils index properties, including gradation and plasticity. N&M's test results and report are included in Appendix D.

Pavement boring at Central Station

4.0 Site Assessments

The components of each GI were observed, sampled and tested to assess general performance, field conditions compared to original design, heat island profile and any maintenance deficiencies. The comparison of field conditions to original design assessment was done by comparing as-built plans (as available) to field conditions observed and tested (see Appendix E). General performance parameters considered for all GI features included runoff reduction, stormwater infiltration, and associated drainage infrastructure such as weepholes, curb cuts, catch basins, etc. Additionally, a stormwater storage parameter was also considered in the general performance assessment of permeable pavement and pervious concrete sites. Stormwater calculations relating to runoff, storage and conveyance can be found in Appendix F. Heat temperature profiles were measured at each GI site as described in Section 3.1. Temperatures measurements were extended through adjacent non-GI infrastructure for comparison. Lastly, observations of field conditions were used to predict maintenance history and recommend maintenance measures. Maintenance history logs may become available, but were not obtained at the time of this report.

Sites were rated through a point system then compared to sites that shared like GI features. Scoring summary tables for each of the three GI features (1) bioswales (2) permeable pavers and (3) pervious concrete are provided in Sections 4.1, 4.2 and 4.3, respectively.

4.1 BIOSWALES

The Natural Resources Conservation Service (NCRS) defines bioswales as "storm water runoff conveyance systems that provide an alternative to storm sewers. They can absorb low flows or carry runoff from heavy rains to storm sewer inlets or directly to surface waters. Bioswales improve water quality by infiltrating the first flush of storm water runoff and filtering the large storm flows they convey."[1] City of Phoenix bioswales at Manzanita Park, University of Arizona Cancer Center, Union Hills Service Center and at Taylor Mall were evaluated for this study. Below is a scoring summary table for the four bioswale sites.

BIOSWALE SITE	SCORE	%
CANCER CENTER	17.5/18	97%
TAYLOR MALL	18/19	95%
UNION HILLS SERVICE CENTER	13/18	72%
MANZANITA PARK	13/19	68%

[1] Natural Resources Conservation Service. *Bioswales.* 2005. Print.

4.1.1 MANZANITA PARK

	YES	NO	PARTIALLY	SCORE
GENERAL PERFORMANCE				
Collects stormwater	✓			**1**
Infiltrates stormwater	✓			**1**
Reduces runoff	✓			**1**
Associated drainage infrastructure (i.e. curb-cuts, weepholes, drains, pipes, etc.) is performing adequately	✓			**1**
AS-BUILT COMPARISON				
Swale cross-section per plan	✓			**1**
Vegetation per plan	✓			**1**
Irrigation per plan	✓			**1**
Inert material per plan	✓			**1**
VEGETATION				
Vegetation is healthy			✓	**0.5**
Vegetation coverage is dense and evenly spaced		✓		**0**
Plant species are native or have low-water needs		✓		**0**
IRRIGATION				
Irrigation system in place	✓			**1**
Irrigation promotes water efficiency		✓		**0**
Irrigation appears to be in good working order		✓		**0**
HEAT ISLAND PROFILE				
Lower temperatures than surrounding non-GI infrastructure	✓			**1**
MAINTENANCE/CONDITION				
Bottom of basin is clean with minor to no sedimentation			✓	**0.5**
Encourages natural form and function of vegetation		✓		**0**
Basin is clear of garbage and debris	✓			**1**
Appears to be regularly maintained	✓			**1**
TOTAL SCORE:				**13/19**

Site Assessment Summary

- Captures and infiltrates stormwater runoff.
- Vegetation other than turf has 10%-15% coverage.
- Soil conditions match as-builts.
- Irrigation valve boxes need repair.
- Maintenance may not support the function of the bioretention.

Key Issues

- No understory or groundcover vegetation in/around swale that conveys water from street to the turf bioretention area. Benefits of slowing, filtering or cleaning stormwater may be reduced.
- Over 50% of trees in as-builts no longer exist.
- Bare spots in turf (assumption is from cars/heavy pedestrian-use) may decrease water infiltration rates.
- Flood irrigation and sprinkler systems may not promote efficient water use.

Notes

Site visit occurred within 24 hours of a rain event.

Manzanita Park Turf Bioretention

Manzanita Park Decomposed Granite Bioretention

4.1.2 Cancer Center

	YES	NO	PARTIALLY	SCORE
GENERAL PERFORMANCE				
Collects stormwater	✓			**1**
Infiltrates stormwater	✓			**1**
Reduces runoff	✓			**1**
Associated drainage infrastructure (i.e. curb-cuts, weepholes, drains, pipes, etc.) is performing adequately	✓			**1**
AS-BUILT COMPARISON				
Swale cross-section per plan	✓			**1**
Vegetation per plan			✓	**0.5**
Irrigation per plan	✓			**1**
Inert material per plan	n/a	n/a	n/a	**n/a**
VEGETATION				
Vegetation is healthy	✓			**1**
Vegetation coverage is dense and evenly spaced	✓			**1**
Plant species are native or have low-water needs	✓			**1**
IRRIGATION				
Irrigation system in place	✓			**1**
Irrigation promotes water efficiency	✓			**1**
Irrigation appears to be in good working order	✓			**1**
HEAT ISLAND PROFILE				
Lower temperatures than surrounding non-GI infrastructure	✓			**1**
MAINTENANCE/CONDITION				
Bottom of basin is clean with minor to no sedimentation	✓			**1**
Encourages natural form and function of vegetation	✓			**1**
Basin is clear of garbage and debris	✓			**1**
Appears to be regularly maintained	✓			**1**
TOTAL SCORE:				**17.5/18**

Site Assessment Summary

- The four scuppers along 7th Street have an interception capacity of 6.2-cfs.
- The bioswale stores up to 1,222-ft^3 of stormwater runoff.
- Stormwater runoff is reduced by 68% from 0.25-cfs to 0.08-cfs.
- Stormwater runoff is infiltrated at an average rate of 0.75 in/hr.
- Vegetation has 75%-80% coverage.
- Majority of vegetation looks healthy and has natural form.
- Soil conditions match as-builts.
- Irrigation is functioning efficiently. Maintenance supports the function of the bioswale.

Key Issues

- Some holes in bioswale appear to have been left from a tree that was damaged or died.

Notes

Site visit occurred within 24 hours of a rain event. As-builts were not available at time of visit, but have since been obtained and reviewed as part of the assessment.

Cancer Center Bioswale

4.1.3 Union Hills Service Center

	YES	NO	PARTIALLY	SCORE
GENERAL PERFORMANCE				
Collects stormwater	✓			**1**
Infiltrates stormwater	✓			**1**
Reduces runoff	✓			**1**
Associated drainage infrastructure (i.e. curb-cuts, weepholes, drains, pipes, etc.) is performing adequately	✓			**1**
AS-BUILT COMPARISON				
Swale cross-section per plan	✓			**1**
Vegetation per plan			✓	**0.5**
Irrigation per plan			✓	**0.5**
Inert material per plan	n/a	n/a	n/a	**n/a**
VEGETATION				
Vegetation is healthy			✓	**0.5**
Vegetation coverage is dense and evenly spaced		✓		**0**
Plant species are native or have low-water needs	✓			**1**
IRRIGATION				
Irrigation system in place	✓			**1**
Irrigation promotes water efficiency			✓	**0.5**
Irrigation appears to be in good working order			✓	**0.5**
HEAT ISLAND PROFILE				
Lower temperatures than surrounding non-GI infrastructure	✓			**1**
MAINTENANCE/CONDITION				
Bottom of basin is clean with minor to no sedimentation			✓	**0.5**
Encourages natural form and function of vegetation		✓		**0**
Basin is clear of garbage and debris	✓			**1**
Appears to be regularly maintained	✓			**1**
TOTAL SCORE:				**13/18**

Site Assessment Summary

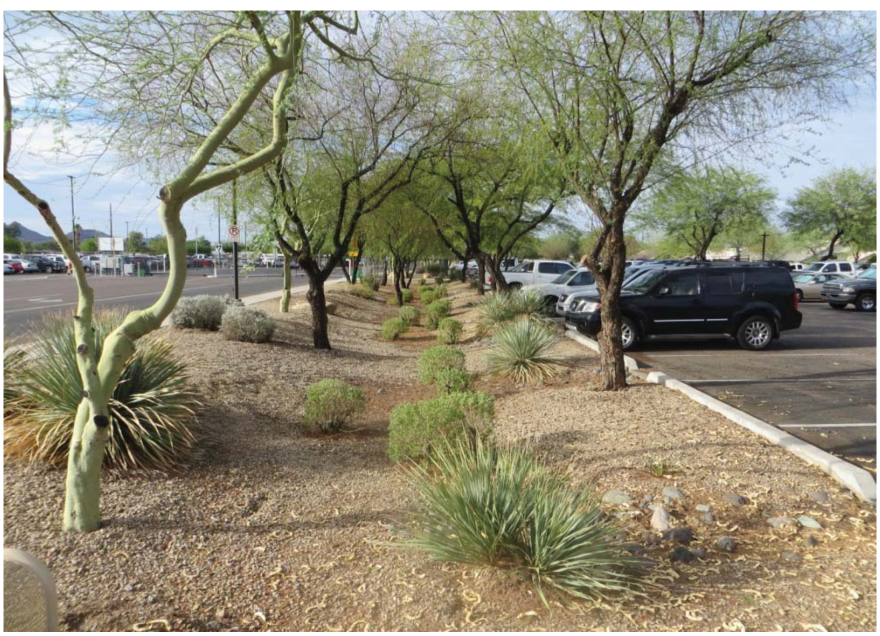
- Bioswale stores 5,063-ft^3 of stormwater runoff.
- Bioswale infiltrates stormwater runoff at an average rate of 4 in/hr.
- Bioswale reduced stormwater runoff by 68% from 0.28-cfs to 0.09-cfs.
- Vegetation has 25% coverage. Soil conditions match as-builts.
- Irrigation valve boxes need repairs.
- Maintenance may not support the function of the bioswale due to extreme uplimbing of trees and shearing of shrubs.

Key Issues

- Uplimbing of trees and continuous extreme shearing of shrubs has permanently stunted or killed vegetation.
- Majority of groundcover and mid-story plantings in as-builts were no longer on site.
- Large, open areas in the basin are bare and pedestrians cross through it to get across parking lot, possibly causing soil compaction and hindering filtration.

Notes

Union Hills is one of the oldest designs from the group of bioswale/bioretention test sites. This may have something to do with the condition of its irrigation and plant survival rate. Site visit occurred within 24 hours of a rain event.



Union Hills Service Bioswale

4.1.4 Taylor Mall

	YES	NO	PARTIALLY	SCORE
GENERAL PERFORMANCE				
Collects stormwater	✓			**1**
Infiltrates stormwater	✓			**1**
Reduces runoff	✓			**1**
Associated drainage infrastructure (i.e. curb-cuts, weepholes, drains, pipes, etc.) is performing adequately	✓			**1**
AS-BUILT COMPARISON				
Swale cross-section section per plan	✓			**1**
Vegetation per plan			✓	**0.5**
Irrigation per plan	✓			**1**
Inert material per plan			✓	**0.5**
VEGETATION				
Vegetation is healthy	✓			**1**
Vegetation coverage is dense and evenly spaced	✓			**1**
Plant species are native or have low-water needs	✓			**1**
IRRIGATION				
Irrigation system in place	✓			**1**
Irrigation promotes water efficiency	✓			**1**
Irrigation appears to be in good working order	✓			**1**
HEAT ISLAND PROFILE				
Lower temperatures than surrounding non-GI infrastructure	✓			**1**
MAINTENANCE/CONDITION				
Bottom of basin is clean with minor to no sedimentation	✓			**1**
Encourages natural form and function of vegetation	✓			**1**
Basin is clear of garbage and debris	✓			**1**
Appears to be regularly maintained	✓			**1**
TOTAL SCORE:				**18/19**

Site Assessment Summary

- Bioswales on Taylor Mall store 4,061-ft^3.
- Bioswales reduce stormwater runoff by 68% from 0.29-cfs to 0.09-cfs.
- Bioswales infiltrate stormwater at an average rate of 0.34 in/hr.
- Vegetation has 85%-95% coverage.
- Soil conditions match as-builts with some deposition of sediment at inlets.
- Irrigation is functioning efficiently.
- Maintenance supports the function of the bioswale.

Key Issues

- Erosion at some inlets was amended with large rock not specified in as-built.
- Missing vegetation in basin between 2nd Ave. and 3rd Ave. allows pedestrians to cross through, thus aggravating bare areas and compacting soil, possibly leading to reduced infiltration rates.

Notes

Site visit occurred within 24 hours of a rain event. Adjacent basins not tested had some understory vegetation that appeared to be struggling (chlorotic). This could be from malfunctioning irrigation, too much shade from surrounding buildings, but no cause could be determined from initial site visit.

Taylor Mall Bioswale

4.2 Permeable Pavers

Permeable pavers are a form of a permeable pavement composed of modular concrete blocks. The NRCS defines permeable pavers as "funnel-like openings installed over an infiltration storage bed of uniformly graded limestone."[2] These permeable paver systems allow stormwater to infiltrate to the paver subgrade then infiltrate into the soil below. The City of Phoenix permeable paver systems at Taylor Mall, Fire Training Academy, Central Station and at the intersection of Buckeye Road and 16th Street were evaluated for this study. Below is a scoring summary table for the four permeable paver sites.

PERMEABLE PAVER SITES	SCORE	%
CENTRAL STATION	7/10	70%
TAYLOR MALL	7.5/11	68%
FIRE TRAINING ACADEMY	5/9	56%
BUCKEYE ROAD & 16TH STREET	3.5/10	35%

[2] Natural Resources Conservations Service. *Pervious Paving.* 2009. Print.

4.2.1 Taylor Mall

	YES	NO	PARTIALLY	SCORE
GENERAL PERFORMANCE				
Stores stormwater in subgrade	✓			**1**
Infiltrates stormwater	✓			**1**
Reduces runoff		✓		**0**
Able to withstand traffic loads	✓			**1**
Associated drainage infrastructure (i.e. curb-cuts, weepholes, drains, pipes, etc.) is performing adequately	✓			**1**
AS-BUILT COMPARISON				
Permeable pavers constructed per plan	✓			**1**
Subgrade constructed per plan	n/a	n/a	n/a	**n/a**
HEAT ISLAND PROFILE				
Lower temperatures than surrounding non-GI infrastructure			✓	**0.5**
MAINTENANCE/CONDITION				
Clear of garbage and debris			✓	**0.5**
Clear of sediment	✓			**1**
Clear of oil/ grease		✓		**0**
Appears to be regularly maintained			✓	**0.5**
TOTAL SCORE:				**7.5/11**

Site Assessment Summary

- Collectively, the permeable pavement parking bays store 202-ft^3 of stormwater runoff.
- The permeable pavers are infiltrating stormwater at 1 in/hr.
- Stormwater runoff reduction is negligible from 0.09-cfs to 0.08-cfs.
- The temperatures were generally about the same as adjacent non-GI infrastructure.
- The pavers are in need of maintenance as oil and debris have collected.
- Subgrade specifications were not contained in As-built plans.
- Overall, the permeable pavers are in good functioning condition with some need of maintenance.

Key Issues

- Pavers around mid-section of parking bays are stained with oil drippings (see picture below) which may have seeped into paver joints
- Debris build-up is present in paver joints especially adjacent to trees (see picture on right)

Debris on Pavers

Notes

The two temperature sets were taken at different locations. One location was in complete shade while the other was in direct sunlight. The two sets of measurements had a significant temperature differential overall. Assumption is that the later summer measurement (end of September) and the GI being completely in the shade lowered total heat storage and surface temperature.

Oil on pavers

Oil on pavers

4.2.2 Fire Training Academy

	YES	NO	PARTIALLY	SCORE
GENERAL PERFORMANCE				
Stores stormwater in subgrade		✓		**0**
Infiltrates stormwater		✓		**0**
Reduces runoff		✓		**0**
Able to withstand traffic loads	✓			**1**
Associated drainage infrastructure (i.e. curb-cuts, weepholes, drains, pipes, etc.) is performing adequately	n/a	n/a	n/a	**n/a**
AS-BUILT COMPARISON				
Permeable pavers constructed per plan	n/a	n/a	n/a	**n/a**
Subgrade constructed per plan	n/a	n/a	n/a	**n/a**
HEAT ISLAND PROFILE				
Lower temperatures than surrounding non-GI infrastructure		✓		**0**
MAINTENANCE/CONDITION				
Clear of garbage and debris	✓			**1**
Clear of sediment	✓			**1**
Clear of oil/ grease	✓			**1**
Appears to be regularly maintained	✓			**1**
TOTAL SCORE:				**5/9**

Site Assessment Summary

- The permeable pavers could not be removed for geotechnical subgrade testing.
- The infiltration tests indicate water does not infiltrate through the joints of the pavers and down into the subgrade. Therefore the paver system cannot be considered as permeable.
- Due to the lack of infiltration and inability to remove one of the pavers, it is possible that the pavers were grouted instead of laid upon a sand subgrade.
- The temperatures were higher than adjacent non-GI infrastructure.
- The pavers appear to be regularly maintained.

- Plans specifying pavers and subgrade were not available for review.

Key Issues

- Pavers do not allow water to infiltrate
- Handicap parking symbols were painted onto pavers and may be detrimental to infiltration function in these areas (see picture below)

Notes

- This site experiences less traffic than the other permeable paver sites.

Painted Permeable Pavers

4.2.3 Central Station

	YES	NO	PARTIALLY	SCORE
GENERAL PERFORMANCE				
Stores stormwater in subgrade			✓	**0.5**
Infiltrates stormwater			✓	**0.5**
Reduces runoff			✓	**0.5**
Able to withstand traffic loads	✓			**1**
Associated drainage infrastructure (i.e. curb-cuts, weepholes, drains, pipes, etc.) is performing adequately	n/a	n/a	n/a	**n/a**
AS-BUILT COMPARISON				
Permeable pavers constructed per plan			✓	**0.5**
Subgrade constructed per plan	✓			**1**
HEAT ISLAND PROFILE				
Lower temperatures than surrounding non-GI infrastructure		✓		**0**
MAINTENANCE/CONDITION				
Clear of garbage and debris	✓			**1**
Clear of sediment	✓			**1**
Clear of oil/ grease	✓			**1**
Appears to be regularly maintained	✓			**1**
TOTAL SCORE:				**8/11**

Site Assessment Summary

- Infiltration testing was done at two permeable paver sites at Central Station. One site (CS-1 per Geotechnical Report in Appendix D) indicated no infiltration and the other site (CS-3) indicated infiltration of 17.1 in/hr.
- Collectively, permeable pavers at Central Station have a potential of storing 3,115-ft^3 assuming all permeable pavement sections infiltrate water.
- The permeable pavers reduce onsite stormwater runoff by 8% from 1.3-cfs to 1.2-cfs.
- Pavers were not able to be removed at either location for subgrade testing. Pavers located around the perimeter appeared to be cemented at bottom base.
- As-built comparison demonstrates subgrade parameters were generally met with the exception of a 4-inch ABC installed instead of 3-inch ABC per original plan design (see

Appendix A and E for more detail). No boring samples were able to be extracted for further comparison.

- The temperatures measured on the pavers were higher than adjacent non-GI infrastructure.
- The pavers appear to be regularly maintained.

Key Issues

- One of the two site tested indicated no infiltration
- Permeable pavers could not be removed for subgrade testing due to narrow joints, or grouting of pavers near the perimeter (see picture below)

Grouted pavers around edge (header)

4.2.4 Buckeye Road & 16th Street

	YES	NO	PARTIALLY	SCORE
GENERAL PERFORMANCE				
Stores stormwater in subgrade		✓		**0**
Infiltrates stormwater		✓		**0**
Reduces runoff		✓		**0**
Able to withstand traffic loads	✓			**1**
Associated drainage infrastructure (i.e. curb-cuts, weepholes, drains, pipes, etc.) is performing adequately	n/a	n/a	n/a	**n/a**
AS-BUILT COMPARISON				
Permeable pavers constructed per plan	n/a	n/a	n/a	**n/a**
Subgrade constructed per plan	n/a	n/a	n/a	**n/a**
HEAT ISLAND PROFILE				
Lower temperatures than surrounding non-GI infrastructure			✓	**0.5**
MAINTENANCE/CONDITION				
Clear of garbage and debris	✓			**1**
Clear of sediment		✓		**0**
Clear of oil/ grease		✓		**0**
Appears to be regularly maintained		✓		**0**
TOTAL SCORE:				**3.5/10**

Site Assessment Summary

- Permeable paver subgrade testing at Buckeye and 16th Street was not possible due to potential damage during removal of pavers for geotechnical testing.
- Documentation (i.e. as-built plans, maintenance history logs, original construction plans with paver specifications) was not available at this time.
- Infiltration tests indicate no water is able to infiltrate pavers through the joints and into the subgrade.
- Historical aerials indicate the pavers were installed sometime between December 1986 and June 1991. Older date of installation may indicate the pavers were installed for aesthetic purposes only.
- Stormwater runoff reduction is negligible.

Key Issues

- No infiltration through paver joints and into the subgrade
- Pavers in the intersection are stained with oil that appears to have built-up over the years
- Excavations for underground utility repairs conducted subsequent to installation of pavers have not replaced the pavers leaving areas of the intersection as asphalt (see picture below).
- Pavers located at the northeast and southeast corners are clear of oil and grease but do contain adjacent landscape dust and smaller decomposed granite in the joints
- A white substance has been spilled over an area of pavers located at the southeast corner (see picture below)
- Permeable pavers appear to be grouted and therefore would not allow stormwater to be infiltrated and stored in the subgrade
- Missing pavers in the middle of the intersection (see picture on following page)

Notes

Temperatures of the pavers were slightly lower than concrete in July, but were slightly higher in September (see Appendix C for temperature profiles). Measurements indicate shade is a significant factor.

Paint spill over pavers

Trenching at intersection

Intersection pavers missing and stained with oil and grease

4.3 PERVIOUS CONCRETE

Similar to permeable pavers, pervious concretes, also referred to as porous concretes, are another form of a permeable pavement accomplishing the same purposes. Through the voids in the pervious concrete, stormwater runoff is able to reach the subgrade and infiltrate. The voids also serve as stormwater storage for ordinary storm events. The City of Phoenix pervious concrete systems at Civic Space Park, Helen Drake Senior Center, Hatcher Road between Central and 3rd Street, Tovrea Castle, Fire Training Academy and Central Station were evaluated for this study. Below is a scoring summary table for the five pervious concrete sites.

PERVIOUS CONCRETE SITES	**SCORE**	**%**
HELEN DRAKE SENIOR CENTER	12/13	92%
TOVREA CASTLE	12/13	92%
HATCHER ROAD	7/11	64%
CENTRAL STATION	7.5/12	63%
CIVIC SPACE PARK	6/12	50%
FIRE TRAINING ACADEMY	4.5/10	45%

4.3.1 Civic Space Park

	YES	NO	PARTIALLY	SCORE
GENERAL PERFORMANCE				
Stores stormwater		✓		**0**
Infiltrates stormwater through subgrade		✓		**0**
Reduces runoff		✓		**0**
Able to withstand traffic loads	✓			**1**
Associated drainage infrastructure (i.e. curb-cuts, weepholes, drains, pipes, etc.) is performing adequately	n/a	n/a	n/a	**n/a**
AS-BUILT COMPARISON				
Pervious concrete constructed per plan			✓	**0.5**
Subgrade constructed per plan	✓			**1**
HEAT ISLAND PROFILE				
Lower temperatures than surrounding non-GI infrastructure		✓		**0**
MAINTENANCE/CONDITION				
Clear of garbage and debris	✓			**1**
Clear of sediment		✓		**0**
Clear of oil/grease	✓			**1**
Free of cracks, holes, pop-outs and/or spalling	✓			**1**
Appears to be regularly maintained			✓	**0.5**
TOTAL SCORE:				**6/12**

Site Assessment Summary

- The pervious concrete appeared to have sediment packed into the concrete and did not appear to be regularly maintained, which may prohibit infiltration and storage of stormwater (see picture on following page). As a result, the pervious concrete may perform like traditional concrete.

Key Issues

- Sediment build-up on pervious concrete throughout the park (see picture on following page)

Pervious concrete full of sediment

4.3.2 HELEN DRAKE SENIOR CENTER

	YES	NO	PARTIALLY	SCORE
GENERAL PERFORMANCE				
Stores stormwater	✓			**1**
Infiltrates stormwater through subgrade	✓			**1**
Reduces runoff	✓			**1**
Able to withstand traffic loads	✓			**1**
Associated drainage infrastructure (i.e. curb-cuts, weepholes, drains, pipes, etc.) is performing adequately	✓			**1**
AS-BUILT COMPARISON				
Pervious concrete constructed per plan	✓			**1**
Subgrade constructed per plan	✓			**1**
HEAT ISLAND PROFILE				
Lower temperatures than surrounding non-GI infrastructure		✓		**0**
MAINTENANCE/CONDITION				
Clear of garbage and debris	✓			**1**
Clear of sediment	✓			**1**
Clear of oil/grease	✓			**1**
Free of cracks, holes, pop-outs and/or spalling	✓			**1**
Appears to be regularly maintained	✓			**1**
TOTAL SCORE:				**12/13**

Site Assessment Summary

- The pervious concrete parking lot, with an average void content of 24% and an average depth of almost 7-inches, captures 5,991-ft^3, nearly 75% of the equivalent 100-yr, 2-hr stormwater retention requirement of the pervious concrete parking lot.
- Stormwater runoff is reduced by 90% from 3.05-cfs to 0.32-cfs.
- Infiltration test results indicate water is being infiltrated at an average rate of 120.9 in/hr.
- Concrete surface is free of oils but does have pockets of debris and sediment (see picture on following page).
- Pervious concrete appears to handle traffic loads.
- Maintenance appears to be up kept regularly. It is recommended to vacuum the pockets of sediment that have infiltrated the voids.

- Overall, the Helen Drake pervious concrete parking lot is performing well.

Key Issues

- Small areas of sediment and loose leaf debris (see pictures on following page)

Sediment filling surface voids

Loose leaf debris in pervious concrete

4.3.3 HATCHER ROAD

	YES	NO	PARTIALLY	SCORE
GENERAL PERFORMANCE				
Stores stormwater	✓			**1**
Infiltrates stormwater through subgrade			✓	**0.5**
Reduces runoff	✓			**1**
Able to withstand traffic loads	✓			**1**
Associated drainage infrastructure (i.e. curb-cuts, weepholes, drains, pipes, etc.) is performing adequately			✓	**0.5**
AS-BUILT COMPARISON				
Pervious concrete constructed per plan	n/a	n/a	n/a	**n/a**
Subgrade constructed per plan	n/a	n/a	n/a	**n/a**
HEAT ISLAND PROFILE				
Lower temperatures than surrounding non-GI infrastructure		✓		**0**
MAINTENANCE/CONDITION				
Clear of garbage and debris			✓	**0.5**
Clear of sediment			✓	**0.5**
Clear of oil/grease	✓			**1**
Free of cracks, holes, pop-outs and/or spalling	✓			**1**
Appears to be regularly maintained		✓		**0**
TOTAL SCORE:				**7/11**

Site Assessment Summary

- Pervious concrete sidewalk sections has an average void content of 28% and average depth of almost 5-inches; enough to store 609-ft^3, equivalent to 60% of the 100-yr, 2-hr stormwater storage requirement.
- Stormwater runoff is reduced by 90% from 0.38-cfs to 0.04-cfs.
- One of the three sites tested for infiltration showed no infiltration occurring. The other two sites averaged an infiltration rate of 32.6 in/hr.
- Concrete surface is free of oils but is full of debris and sediment mostly in the form of dead leaves coming from adjacent trees (see picture on following page).
- Regular maintenance may not have been kept up and is currently needed in order to return pervious concrete performance to peak level.

- As-built plans were not available.

Key Issues

- Small drainage inlets in the pervious concrete mostly on the south side of Hatcher were clogged with debris.
- Voids were partially clogged with debris.
- HR-3 boring site did not infiltrate (see Geotechnical Report in Appendix D)

Notes

There appears to be an under-drain system which was not found in the as-built plans. Pervious concrete sidewalk sections were intermixed with traditional concrete sidewalk sections with under-drain throughout.

Unclogged drain inlet

Pervious conc. partially clogged with debris

Clogged drain inlet

4.3.4 Tovrea Castle

	YES	NO	PARTIALLY	SCORE
GENERAL PERFORMANCE				
Stores stormwater	✓			**1**
Infiltrates stormwater through subgrade	✓			**1**
Reduces runoff	✓			**1**
Able to withstand traffic loads	✓			**1**
Associated drainage infrastructure (i.e. curb-cuts, weepholes, drains, pipes, etc.) is performing adequately	✓			**1**
AS-BUILT COMPARISON				
Pervious concrete constructed per plan	✓			**1**
Subgrade constructed per plan	✓			**1**
HEAT ISLAND PROFILE				
Lower temperatures than surrounding non-GI infrastructure		✓		**0**
MAINTENANCE/CONDITION				
Clear of garbage and debris	✓			**1**
Clear of sediment	✓			**1**
Clear of oil/grease	✓			**1**
Free of cracks, holes, pop-outs and/or spalling	✓			**1**
Appears to be regularly maintained	✓			**1**
TOTAL SCORE:				**12/13**

Site Assessment Summary

- Pervious concrete parking lot has an average void content of 15%, an average depth just over 6-inches and is able to store 635-ft^3, equivalent to 47% of the 100-yr-2-hr stormwater storage requirement.
- Stormwater runoff is reduced by 90% from 0.49-cfs to 0.05-cfs.
- Infiltration test results indicate water is being infiltrated at an average rate of 71.4 in/hr.
- One test location (TC-1) has a very slow infiltration rate. Excess cementitious material was noticed in this location potentially sealing the voids of the pavement. This would indicate a mix design issue or an installation issue.
- Concrete surface is free of oils but does have pockets of debris and sediment (see picture on following page).

- Feature appears to be handling traffic loads.
- Maintenance appears to be up kept regularly. It is recommended to vacuum the pockets of sediment that have infiltrated the surface voids.
- Overall, the Tovrea Castle pervious concrete parking lot is performing well.

Key Issues

- Small areas of sediment and loose leaf debris (see pictures on following page)
- Handicap parking symbols painted onto pervious concrete which prohibit infiltration (see picture below)

Debris buildup at sump locations

Sediment buildup at sump locations

Painted handicap symbol

4.3.5 Fire Training Academy

	YES	NO	PARTIALLY	SCORE
GENERAL PERFORMANCE				
Stores stormwater		✓		**0**
Infiltrates stormwater through subgrade		✓		**0**
Reduces runoff		✓		**0**
Able to withstand traffic loads	✓			**1**
Associated drainage infrastructure (i.e. curb-cuts, weepholes, drains, pipes, etc.) is performing adequately	N/A	N/A	N/A	**N/A**
AS-BUILT COMPARISON				
Pervious concrete constructed per plan	N/A	N/A	N/A	**N/A**
Subgrade constructed per plan	N/A	N/A	N/A	**N/A**
HEAT ISLAND PROFILE				
Lower temperatures than surrounding non-GI infrastructure		✓		**0**
MAINTENANCE/CONDITION				
Clear of garbage and debris	✓			**1**
Clear of sediment		✓		**0**
Clear of oil/grease	✓			**1**
Free of cracks, holes, pop-outs and/or spalling	✓			**1**
Appears to be regularly maintained			✓	**0.5**
TOTAL SCORE:				**4.5/10**

Site Assessment Summary

- The pervious concrete appeared to have sediment packed into the concrete and did not appear to be regularly maintained, which may prohibit infiltration and storage of stormwater (see picture on following page). As a result, the pervious concrete may perform like traditional concrete. It is recommended to vacuum the pockets of sediment that have infiltrated the surface voids.
- Feature appears to be handling traffic loads.

Key Issues

- Sediment build-up on pervious concrete throughout the pavement (see picture on following page)

Sediment filling surface voids

4.3.6 Central Station

	YES	NO	PARTIALLY	SCORE
GENERAL PERFORMANCE				
Stores stormwater		✓		**0**
Infiltrates stormwater through subgrade		✓		**0**
Reduces runoff		✓		**0**
Able to withstand traffic loads	✓			**1**
Associated drainage infrastructure (i.e. curb-cuts, weepholes, drains, pipes, etc.) is performing adequately	n/a	n/a	n/a	**n/a**
AS-BUILT COMPARISON				
Pervious concrete constructed per plan	✓			**1**
Subgrade constructed per plan			✓	**0.5**
HEAT ISLAND PROFILE				
Lower temperatures than surrounding non-GI infrastructure		✓		**0**
MAINTENANCE/CONDITION				
Clear of garbage and debris	✓			**1**
Clear of sediment	✓			**1**
Clear of oil/grease	✓			**1**
Free of cracks, holes, pop-outs and/or spalling	✓			**1**
Appears to be regularly maintained	✓			**1**
TOTAL SCORE:				**7.5/12**

Site Assessment Summary

- According to the Geotechnical Data Report provided by Ninyo & Moore and observations during testing, it is suspected that the mix design may have contained too much water, which, after hardening, would have sealed it and prohibit it from infiltrating and storing water (see picture). As a result, the pervious concrete performs like traditional concrete and

Pervious concrete at Central Station

would be considered a GI feature. City maintenance officials state that an integral color was mixed into the concrete.

- No sediment blockages were observed at this specific location.
- Further investigation is recommended to determine a precise cause for the lack of infiltration.

Key Issues

- The pervious concrete is not infiltrating.

5.0 MAINTENANCE MEASURES

5.1 BIOSWALES

Healthy vegetation and well-functioning infrastructure components are key features to address in establishing successful bioswales. Healthy vegetation can take several growing seasons to establish and often requires a temporary or permanent irrigation system to be installed and maintained during this establishment period. While desert-adapted and native plants should be selected for drought-tolerant characteristics in order to survive without supplemental irrigation at maturity, permanent supplemental irrigation may be preferred to maintain desired aesthetic plant qualities (longer, more frequent bloom periods, lusher appearance) in high-visibility public areas. Recommended vegetation maintenance measures include:

- Check and replenish organic or inorganic mulch to maintain adequate depth and coverage, reducing weed growth[3]
- Prune trees and shrubs as appropriate for the plant type to maintain health and meet safe public access and visibility requirements[4]
- Replace any plants lost to maintain adequate and intended vegetation coverage[5]- review plant type and location, replace with a type which ensures "the right plant for the right place."
- If irrigation system is in place, check the system is functioning as intended, including inspecting the following: emitters are in correct locations to provide water to plants; controller programming is correct for time of year; valves and valve boxes are damage-free.

While the design of bioswales can vary in terms of the size and depth of the basin and the volume of stormwater to be treated, several general bioswale infrastructure components should be monitored and addressed in a typical maintenance plan. These components include the stormwater inlet (how the water is entering the basin- this could be via a curb cut or graded slope), the intended shape of the basin (slope of basin sides, width across bottom), and the stormwater outlet (does the basin

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[3] MacAdam, James. *Green Infrastructure for Southwestern Neighborhoods.* Watershed Management Group: 2010. Digital. Version 1.2, Revised October 2012.
[4] MacAdam, 2012.
[5] MacAdam, 2012.

drain out into another area, or is the water intended to infiltrate and/or include a sediment trap). Recommended maintenance measures include:

- Check inlets and clear any debris or waste which may be blocking water from entering basin
- Clear any accumulated sediment in bottom of basin to allow for infiltration as intended or to maintain outlet access
- Smooth, regrade or refresh erosion control measures (ex. riprap apron) on basin slopes[6]

5.2 Permeable Pavers

Permeable pavers can become clogged with sediment over time, thereby decreasing the infiltration rate and storage capacity of the system. The rate of sedimentation depends on the amount of traffic and other sources that wash sediment into the joints, base and soil. Permeable paver systems provide 20 to 25 years of service, measured by the extent to which they continue to store runoff, when properly constructed and maintained[7]. Maintenance of permeable pavers consists of removing sediment buildup from the joints periodically. Owners and/or property managers should always follow good housekeeping practices to prevent accumulation of sediment, debris and trash in the joints. These good housekeeping practices include:

- Unpaved areas should generally drain away from permeable pavers
- Unpaved areas that do drain to permeable pavers should be kept seeded and well-maintained to minimize sediment deposition
- Blowing and collecting loose debris and trash from permeable pavers regularly
- Trimming adjacent vegetation regularly
- Keeping drainage infrastructure such as curb inlets and grates free from debris

The most effective way of removing sediment buildup within the joints is by vacuum street cleaning equipment that do not have brooms or water sprays. This type of equipment will loosen and remove sediment from the joints without pushing the sediment deeper into the joint or base. Vacuuming should be done when sediment is completely dry and should be avoided if there is moisture in the joints. Below is a simple checklist for inspection and maintenance operations:

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[6] MacAdam, 2012.
[7] Smith, David R. *Permeable Interlocking Concrete Pavements.* Interlocking Concrete Pavement Institute. 3rd Edition 2006.

1. Visual inspection of permeable paver system on a monthly basis and after every storm
2. No standing water on the surface after any storm event
3. Vacuum joints during dry conditions as needed; adjust suction of equipment as necessary
4. Replenish joint material (typically fine aggregate like sand) after vacuuming as needed
5. Repair ruts or deformations in pavers exceeding ½ inch as required

5.3 Pervious Concrete

Maintenance of pervious concrete as a stormwater control measure consists of monitoring and removing any surface buildup that would obstruct permeability such as sediment, debris and trash. Owners and/or property managers should follow good housekeeping practices to prevent accumulation of sediment, debris and trash onto pervious concrete surface. These good housekeeping practices include:

- Unpaved areas should generally drain away from pervious concrete
- Unpaved areas that do drain to pervious concrete should be kept seeded and well-maintained to minimize sediment deposition
- Blowing and collecting loose debris and trash from pervious concrete regularly
- Trimming adjacent vegetation regularly
- Keeping drainage infrastructure such as curb inlets and grates free from debris

A baseline infiltration rate for the permeable paver system should be established using an ASTM C1781: Standard Test Method for Surface Infiltration Rate of Permeable Unit Pavement Unit Systems. Ideally, this test should be done prior to the pavement being in service. The infiltration rate tested should be documented and considered as the optimal performance for any future testing comparison. Original testing location(s) should also be documented. Ultimately, frequency of maintenance will be determined by future test results compared with the initial baseline test.

Maintenance of permeable pavers /unclogging[8].

1. Routine Maintenance
    a. Visual inspections to ensure pavement is clean of debris and sediments and that pavement is dewatering between storms

[8] National Ready Mixed Concrete Association (NRMCA). *Pervious Concrete Pavement Maintenance and Operations Guide*

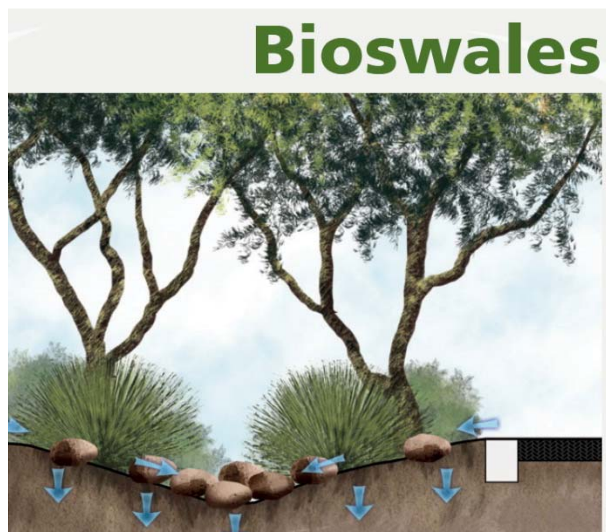
   b. Leaf blowers, truck-sweepers, and/or dry vacuuming should be utilized on a monthly basis to keep pavement area clean of sediment and debris
2. Periodic Maintenance
   a. Visual inspections after every storm should be conducted, especially during the monsoon season when dust storms are more prevalent
   b. Pressure washing and/or regenerative vacuum sweepers should be used once heavy sediment and/or oils and grease are observed on the pavement
   c. Care should be taken to avoid extremely high pressures with a pressure washer, as this can degrade the bonding cement paste and increase raveling of concrete
3. Deep Cleaning/Unclogging
   a. Deep cleaning/unclogging may become necessary, particularly if any of the following items is true:
      i. Routine and periodic maintenance not performed
      ii. Visual inspection of surface voids appear clogged
      iii. Infiltration test results indicate 25% or more below baseline infiltration rate
      iv. Infiltration test results indicate rates below 100 inches/hour (if no baseline infiltration data available)
      v. Puddling or ponding after storm has come and gone
   b. Deep cleaning/unclogging best accomplished by simultaneous pressure washing and vacuuming. Several equipment manufacturers have pressure washing/vacuum systems that have been proven to restore pore structure of pervious concrete. Follow manufacturer's recommendations for best results.
   c. Use of chemicals to clean pervious concrete should be done with caution as some chemicals can harm aquifers, biological organisms in subsurface, and/or pervious concrete itself

6.0 Conclusions and Recommendations

6.1 General Conclusions

Proper documentation of GI is necessary in order to ensure long-term performance. Notification and disbursement of documentation to key City departments in charge of promoting, implementing and maintaining the GI is crucial to ensure GI performance. Initial documentation should include GI site location, original plans, as-built plans, manufacturer's specifications, suggested maintenance and frequency, baseline infiltration test results, plant inventories and pictures of GI during and after construction is complete. Ongoing documentation of detailed maintenance records should be kept for future reference and comparison. Proper documentation and notification to key departments will ensure optimal GI performance and provide a better return on investment for the City of Phoenix.

6.1.1 Bioswales



Bioswale Infiltration

Bioswales, vegetated swales, and bioretention areas can serve as important green infrastructure features in an arid region.[9] While rainfall is less frequent here than in other areas of the country, arid regions such as metro Phoenix receive higher pollutant and sediment loads in a given storm event with greater impact to groundwater quality and therefore, vegetated drainage features can help to slow, filter and infiltrate this storm water volume.[10] Each of the four bioswale sites assessed in this research functioned effectively for stormwater management. The sites receive year-round supplemental support via permanent irrigation systems, which helps foster the plants' growth through dry seasons. The irrigation assessment was based on a visual inspection of each site, including review of accessible valve boxes and visible emitters and/or poly tubing. As a site feature, swales have been shown to be more cost-effective than pipes and the addition of vegetation, such as landscaping or turf, further

[9] Russ, Thomas H. *Site Planning and Design Handbook.* McGraw-Hill: 2009. Print.
[10] Russ. 2009.

reduces the cumulative impact of stormwater flowing downstream to an ultimate outfall point.[11] The heat profile study conducted at each test site indicated bioswale features can serve to reduce the ground-level urban heat island impact on a site scale. Further research into the capacity of bioswales to reduce heat and foster more comfortable microclimates is recommended to better understand design factors such as the size, sun exposure of the swale, vegetation coverage, method of irrigation and shade tree canopy size.

In conducting the four bioswale site visits, each swale had a varying level of vegetative coverage. The Taylor Mall bioswales appeared to be the most successful site in terms of relation to original design intent, integration with other green infrastructure design techniques such as permeable pavers, and successful mature plantings. The scale of the swale features appeared visually proportional to the street size and amount of shade and sun received by the site from adjacent buildings in a dense downtown streetscape. While the plantings were more homogeneous than would be present with a more natural diversity of arid plants, the combination of palo verde trees and ruellia shrubs has been effectively irrigated and the plants have been pruned to a healthy and mature condition. The Cancer Center bioswale was also appropriately sized for the streetscape context and had a greater diversity of native and desert-adapted plants. This bioswale received run-off from a larger street and had well-designed curb cuts with cobble drainage catchments. Located on the east side of the building, this bioswale performed well in the heat profile study. Further testing of a bioswale with western exposure is recommended to better understand the impact of sun exposure when determining an appropriate location for a bioswale in site design. The Manzanita Park bioretention areas included decomposed granite ("DG") and turf surface treatments. The turf bioretention areas performed better in the heat island profile test as compared to the DG surface. The site receives run-off from adjacent streets and while the swales and retention areas function effectively in managing the volume of storm water, the vegetation differed significantly from the original design intent. Few shrubs or understory plantings were present on the site, creating an imbalance in tree-shrub coverage. The Union Hills Service Center site captured storm water from the parking lot, was well-sized for functionality and had a balance of trees and shrubs present. However, the pruning techniques were more severe than recommended for these native and/or desert-adapted shrubs in such an intended naturalized swale setting and this along with evidence of damage to the irrigation system could have some impact on

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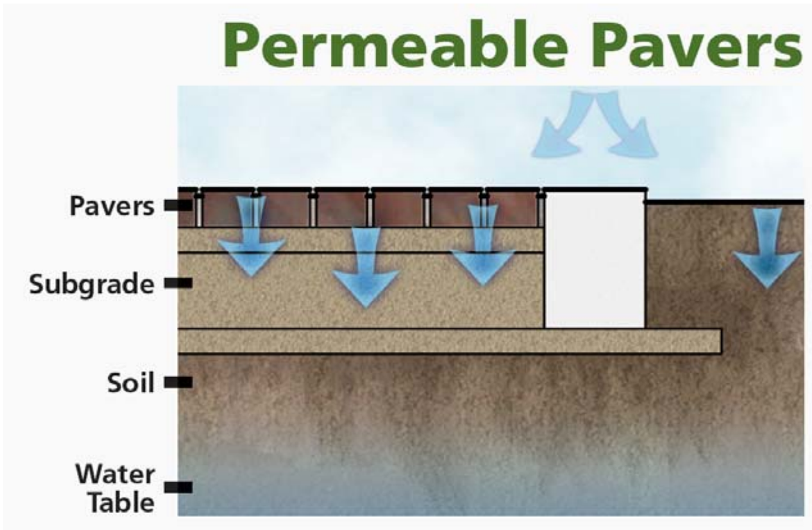
[11] Russ. 2009.

the plants' health. The varying vegetation coverage present across the four sites raises the question of how much biomaterial is necessary with this type of green infrastructure feature to merit being classified as a 'bioswale' as compared to a drainage swale with some level of landscaping present for aesthetic value. The theory of bioretention expands on the concept of bioretainment, or the benefits of slowing and collecting water on the leaves, bark and branches of a plant, by combining bioretainment with a designed soil to encourage infiltration.[12] Plants with larger leaves, such as broadleaf evergreen trees and shrubs, can provide more bioretainment benefits year-round than compared to cacti and succulents.[13] While more study is recommended to determine a suitable range of plant palette for bioswales in Phoenix, the four bioswales observed in this study indicate that a more standardized, tried-and-tested set of design guidelines specific for bioswale planting palettes would be helpful in ensuring this green infrastructure feature is designed, installed and maintained more cohesively across the city's streetscapes.

6.1.2 PERMEABLE PAVERS



Permeable Pavers Infiltration

Permeable pavers are a system of interlocking concrete blocks where runoff can infiltrate through the joints into a porous bed typically composed of sand for quicker infiltration. Permeable paver systems can offer a plethora of benefits to developers and residents alike such as mitigation of runoff volumes and peak flows, reduction of heat island effect, and enhanced community character. While the four City of Phoenix permeable paver sites studied in this report certainly benefit from an enhanced community

[12] Steven Strom, Kurt Nathan, and Jake Woland. *Site Engineering for Landscape Architects.* John Wiley and Sons, Inc: 2013. Print.
[13] Strom et al. 2013.

character, three of the four sites performed poorly on mitigation of runoff and reduction of heat island effect.

Taylor Mall parking bays performed satisfactory in these two categories. However, the heat island effect reduction may have been more of a shade factor from surrounding high-rise buildings and canopy cover than the pavers themselves. Temperature measurements were generally higher than adjacent non-GI infrastructure for the other sites. Permeable pavers at all four sites are generally darker-colored than traditional concrete. Darker colors have a lower solar reflectivity index (SRI) thereby absorbing more sunlight and generating higher temperatures. The lower SRI values of darker-colored pavers compared to higher SRI values of traditional concrete could explain higher temperatures than non-GI counterparts.

Subgrade assessment presented a challenge due to unavailable as-built plans and/or inability to remove permeable pavers without causing damage to pavers for subgrade testing[14]. Permeable pavers at the Fire Training Academy and Central Station could not be removed due to grouting/cementing of pavers[15] which indicate the pavers do not conform to a customary installation practice where a porous material such as compacted sand fills the joints and bed of the system. Infiltration test results for the Fire Training Academy and Central Station support this conclusion as no water was able to infiltrate. Permeable pavers at Buckeye Road and 16th Street also demonstrate no infiltration although pavers were not grouted at this location. Permeable pavers at Buckeye Road were adjoined edge to edge with narrow joints. Review of historical aerials indicates these pavers were installed prior to 1991. Over the years, the joints have been filled with sediment and other fines that may keep storm water from infiltrating.

Overall, permeable pavers performed subpar from a stormwater management perspective, did not reduce ground-level heat island effect, and had incorrect installation issues or modifications to original design. Infiltration testing for (the properly constructed) pavers at Taylor Mall indicates infiltration is much slower than pervious concrete.

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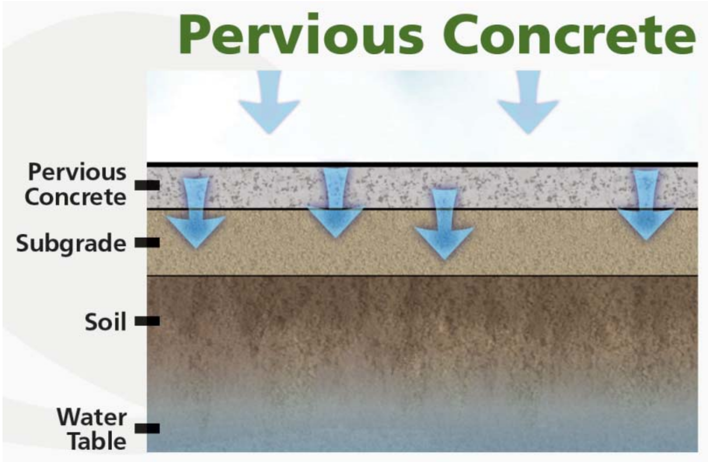
[14] Kenneth Rush and Steven Nowaczyk. *Geotechnical Data Report: Green Infrastructure Effectiveness Study*. Ninyo & Moore Geotechnical & Environmental Sciences Consultants: September 10, 2018.

[15] Kenneth Rush and Steven Nowaczyk. *Geotechnical Data Report: Green Infrastructure Effectiveness Study*. Ninyo & Moore Geotechnical & Environmental Sciences Consultants: September 10, 2018

6.1.3 Pervious Concrete



Pervious Concrete Infiltration

Pervious concrete is a mixture of Portland Cement, coarse aggregate rock and water. Because the mix contains little or no sand, the pore structure has many voids, allowing water and air to pass through allowing water to drain through. Pervious concrete is able to store stormwater in the pavement layer which reduces runoff and in turn can increase land utilization by reducing retention areas. The City of Phoenix pervious concrete sites studied exhibited varying degrees of performance ranging from poor to excellent.

The sites that performed poorly were Civic Space Park, Central Station, Hatcher Road, and Fire Training Academy. Central Station performed poorly either due to sediment or mix design issues (too much cement). Blockage is preventing runoff from infiltrating into the pervious concrete voids. Hatcher Road, Fire Training Academy, and Civic Space Park performed poorly mostly due to sediment and debris filling surface voids. The sites that performed excellent were Tovrea Castle and Helen Drake Senior Center. Both of these sites mostly exhibited high infiltration rates and were well maintained with the exception of a few pockets of sediment and debris occurring mostly at sump locations.

The City of Phoenix requires developers to store onsite runoff for the 100-yr, 2-hr storm event[16]. Using the pervious concrete footprint area for the three sites that demonstrated infiltration, a runoff coefficient of 0.95 for traditional impervious areas, and NOAA Atlas 14 rainfall depths for the corresponding area, the volume requirements were calculated and correlated to the storage capacity of each site. A minimum of two boring samples at each site were tested for void content and depth. The average depth and void content were used to calculate storage capacities in the pervious concrete. Calculations indicate that Helen Drake, Hatcher Road and Tovrea Castle store, respectively, 73%, 60% and 47% of the 100-yr, 2-hr storm (see Appendix F for storage calculations). Depth of pervious concrete remained consistent but void content fluctuated greatly

[16] City of Phoenix. *Storm Water Policies and Standards.* December 2013.

from site to site (see summary table on the following page)[17]. Potential reasons for fluctuations could be due to inconsistencies in mix design, installation issues or clogged voids in need of maintenance. Consistent mix design and installation would yield higher void content. Regular maintenance would sustain maximum void content.

PERVIOUS CONCRETE SITE	BORING NO.	DEPTH (in)	VOID CONTENT (%)	STORAGE CAPACITY (ft^3)	STORAGE REQUIREMENT (ft^3)	STORAGE RQUIREMENT MET
Helen Drake Senior Center	HD-1	7.15	25.5	5,991	8,177	73%
	HD-2	6.40	22.4			
Hatcher Road	HR-1	4.65	35.3	609	1,015	60%
	HR-2	4.64	19.7			
Tovrea Castle	TC-1	6.58	8.3	635	1,339	47%
	TC-2	5.57	22.4			

Temperature measurements at the pervious concrete sites indicated no reduction of ground-level heat island effect. Similar to permeable pavers, temperatures were higher for pervious concrete than adjacent non-GI features. Unlike permeable pavers however, the pervious concrete was not darker-colored than traditional concrete, ruling out solar reflectivity as a potential explanation. Although more research would be needed, the higher temperatures of the pervious concretes could be related to larger air voids and increased surface area[18]. Generally, pervious concrete "can lower temperatures through evaporative cooling" when it is wet or moist[19]. Under dry conditions, pervious concrete can exhibit increased daytime temperatures via convection in the larger air voids and limited heat transfer to the subsurface layer[20]. Thus, pervious concrete in the City would typically exhibit higher daytime surface temperatures as observed in this study. However, pervious concrete may dissipate stored heat more efficiently at nighttime "reducing bulk heat storage."[21] This study conducted summer temperature measurements during midday and would need further study in order to make a determination on how pervious concrete reacts during the nighttime.

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[17] Kenneth Rush and Steven Nowaczyk. *Geotechnical Data Report: Green Infrastructure Effectiveness Study.* Ninyo & Moore Geotechnical & Environmental Sciences Consultants: September 10, 2018
[18] U.S. Environmental Protection Agency (EPA). *Reducing Urban Heat Islands: Compendium of Strategies (Draft).* 2008.
[19] U.S. EPA. 2008
[20] U.S. EPA. 2008
[21] U.S. EPA. 2008

Overall, pervious concrete performed well from a stormwater management perspective excluding the sites where it had not been maintained or mix design may have been incorrect. The sites that were shown to infiltrate are capable of storing roughly 50% to 75% of the 100-yr, 2-hr storm storage requirement. Moreover, stormwater runoff was reduced by approximately 90% over using traditional impervious features.

6.2 Site Specific Recommendations

6.2.1 Manzanita Park

Manzanita Park has turf basins at the northern end and DG basins at the southern end. It is recommended that the intent and functionality of the basins, particularly the DG basins, to determine if use as a bioretention feature was intended. If so, recommend restoring understory plantings and or revegetation hydroseed mix to help establish initial cover. Additional shade trees would help foster understory growth and reduce the effect of radiant heat from the DG inert material surfacing covering.

- DG basins have little to no vegetation and require very low maintenance. If restoration of understory is implemented at DG basins, ongoing maintenance should be done with much more frequency. This ongoing maintenance would consist of pruning for plant health only, ensuring irrigation system is always functional, removing trash and debris that would be trapped in the denser understory. Maintenance would be required a minimum of every six months and following any storm event.
- Maintenance of the turf basins is to be done every six months and after any storm event. Maintenance is to implement:
    - Checking irrigation system is functional and restoring any malfunctioning elements
    - Clearing any trash, debris and/or sediment for drainage paths to the basins such as scuppers, stormdrain pipes and swales
    - Reseeding patches of dead grass as was observed adjacent to sidewalks

6.2.2 Cancer Center

Overall, the vegetation at the Cancer Center was in good condition. There was a couple instances where uprooted shrubs were observed and where holes were left open from a removed tree likely due to wind damage. It is recommended these sites be reviewed and that like-kind vegetation be replaced where these plants once stood. Further investigation of heat island profile is also recommended with data taken seasonally and during daily temperature extremes to better understand the visible oscillation in heat temperature results taken from two days in afternoon shade.

- Maintenance of bioswale should be continued in the existing manner and frequency as plant health is good and bioswale is clean and functional. Maintenance of bioswale should always incorporate:
  - Clearing bioswale and curb-cut inlets of any trash and debris (small amounts of trash were observed at the curb-cut inlets off of 7th Street)
  - Pruning vegetation for plant health only
  - Replanting uprooted or dead vegetation (uprooted and dead vegetation was observed at the Cancer Center)
  - Restoring irrigation elements so that system is fully functional
  - Inspect areas of bioswale where foot traffic is prominent for trash, damaged vegetation, broken irrigation elements, etc.

6.2.3 Union Hills Service Center

Uplimbing of trees and continuous extreme shearing of shrubs has permanently stunted or killed vegetation. It is recommended that maintenance practices and recommended best practices for sustainable landscaping be reviewed and implemented in order to allow existing vegetation to regain natural, fuller form and prune for plant health only. Reparation of faulty irrigation valve boxes along with a check of the irrigation to ensure fully functioning system is also highly recommended. Lastly, review areas where pedestrian foot traffic may be cutting across swale and consider measures to reduce traffic, such as boulders or cobble placement.

- Perform maintenance of bioswale every six months and inspect after any storm event. This ongoing maintenance includes:
  - Clearing bioswale and curb-cut inlets of any trash and debris
  - Pruning and shearing vegetation for plant health only (current conditions demonstrate extreme shearing of shrubs has stunted or killed vegetation)
  - Replanting uprooted or dead vegetation
  - Restoring irrigation elements so that system is fully functional (faulty irrigation valve boxes were observed)

- Inspect areas of bioswale where foot traffic is prominent for trash, damaged vegetation, broken irrigation elements, etc.

6.2.4 Taylor Mall

The bioswales at Taylor Mall were in good condition with only small patches of missing vegetation observed. It is recommended that certain measures be considered to reduce foot traffic cutting through and compacting soil. Measures may include either adding additional planting to this area or other means of blocking traffic, such as boulders.

The permeable pavers used in the parking bays along Taylor Mall were stained with oil and also contained pockets of debris particularly when adjacent to vegetation. Pressure washing pavers "is not recommended, as this can drive residue into the setting bed and base below."[22] Street sweeping with a conventional broom sweeper is recommended to remove the loose leaf debris found at Taylor Mall. Removal of oil and grease stains would require application of specialty cleaners designed to lift and absorb stains.

- Perform maintenance of Taylor Mall bioswales every six months and inspect after any storm event. This ongoing maintenance includes:
    - Clearing bioswale and curb-cut inlets of any trash and debris
    - Pruning and shearing vegetation for plant health only
    - Replanting uprooted or dead vegetation
    - Restoring irrigation elements so that system is fully functional
    - Inspect areas of bioswale where foot traffic is prominent for trash, damaged vegetation, broken irrigation elements, etc. (current conditions demonstrate narrow strips through bioswale where pedestrians have stepped on vegetation)
- Perform maintenance of Taylor Mall permeable pavers every six months and inspect after any storm event. This ongoing maintenance includes:
    - Pruning and shearing surrounding vegetation in order to reduce loose leaf debris
    - Cleaning surrounding open spaces in order to reduce sediment flowing onto pavers
    - Removing oil and grease stains using specialty cleaners designed to lift and absorb stains (never use power washers at permeable pavers as this can cause sand in the joints to wash away and be replaced by sediment and residue). Taylor Mall parking

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[22] UNI-Group U.S.A. *UNI ECO Maintenance Sheet.* 2014.

bays all had some degree of oil and grease stains. Oil and grease stains must be removed promptly in order to prevent future storms from disseminating those pollutants into the joints and potentially into the subgrade.
    - Removing sediment and debris using a conventional broom sweeper
- An infiltration test using ASTM C1781/C1781M should be performed every two to four years to check infiltration rates of permeable pavers are still at or above the minimum accepted infiltration rate as determined by the engineer of record.

6.2.5 Fire Training Academy

The Fire Training Academy has two GI-features, permeable pavers and pervious concrete. The pavers appeared well-maintained and as such in no need of maintenance for the time being. The key issue with the permeable pavers at the Fire Training Academy is that they did not permeate water. The pavers were not able to be removed for subgrade testing which could be indicative of grouted pavers. It is recommended that a small area of pavers be removed and inspected to see how they were constructed and to test the subgrade in order to determine there is a lack of infiltration. Current conditions of the pervious concrete at the Fire Training Academy indicate heavy sediment has filled surface voids and the concrete no longer functions as pervious. The pervious concrete needs to be vacuumed using a regenerative air vacuum that can remove the sediment then re-tested for infiltration.

- Perform maintenance every six months and inspect after any storm event. This ongoing maintenance includes:
    - Pruning and shearing surrounding vegetation in order to reduce loose leaf debris
    - Cleaning surrounding open spaces in order to reduce sediment flowing onto pavers
    - Removing oil and grease stains using specialty cleaners designed to lift and absorb stains (never use power washers at permeable pavers as this can cause sand in the joints to wash away and be replaced by sediment and residue)
    - Removing sediment and debris using a conventional broom sweeper. Regenerative air vacuum sweepers should be used when pavers are severely clogged. Restore sand between the joints as needed when using a regenerative air vacuum sweeper.
- An infiltration test using ASTM C1781/C1781M should be performed every two to four years to check infiltration rates of permeable pavers are still at or above the minimum accepted infiltration rate as determined by the engineer of record.

- If infiltration rates are determined to be deficient, use a regenerative air vacuum sweeper then test again. If infiltration rates are still deficient, remove pavers, relay base, place pavers and fill joints with new sand per manufacturer's specifications.

- Once pervious concrete has been restored and infiltrating, perform maintenance at least every six months due to heavily trafficked area and inspected after any major storm event. The ongoing maintenance includes:
  - Pruning and shearing surrounding vegetation in order to reduce loose leaf debris
  - Cleaning surrounding open spaces in order to reduce sediment flowing onto pervious concrete
  - Removing sediment and debris using a conventional broom sweeper
  - Using regenerative air vacuum sweepers when voids are severely clogged
- An infiltration test using ASTM C1701/C1701M should be performed every two to four years to check infiltration rates of pervious concrete are still at or above the minimum accepted infiltration rate as determined by the engineer of record.
  - If infiltration rates are determined to be deficient, use a regenerative air vacuum sweeper then test again. If infiltration rates are still deficient, subgrade could potentially be packed with sediment and residue. It is recommendable to extract subgrade boring sample(s) in order to evaluate subgrade content and density.

6.2.6 BUCKEYE ROAD & 16TH STREET

The pavers at the intersection of Buckeye and 16th Street were not infiltrating water. Review of historical aerials revealed pavers were installed prior to 1991. The joints in this paver system appear to be full of sediment and oil which has been compacted by traffic over the years such that no water is able to infiltrate. Regenerative air vacuum sweepers are the most effective form for permeable paver maintenance for severely clogged systems as they have demonstrated the ability to remove up to 3-inches or more of aggregate from openings and even restore systems to original infiltration rates[23] It is recommended that a small designated area of clogged pavers be treated by a regenerative air vacuum sweeper then retested for infiltration.

- Perform maintenance every six months and inspect after any storm event. This ongoing maintenance should consist of:

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[23] UNI-Group U.S.A. *UNI ECO Maintenance Sheet.* 2014.

  - Pruning and shearing surrounding vegetation in order to reduce loose leaf debris
  - Cleaning surrounding open spaces in order to reduce sediment flowing onto pavers
  - Removing oil and grease stains using specialty cleaners designed to lift and absorb stains (never use power washers at permeable pavers as this can cause sand in the joints to wash away and be replaced by sediment and residue)
  - Removing sediment and debris using a conventional broom sweeper. Regenerative air vacuum sweepers should be used when pavers are severely clogged as is the suspected current condition of the pavers. Restore sand between the joints as needed when using a regenerative air vacuum sweeper.
- An infiltration test using ASTM C1781/C1781M should be performed every two to four years to check infiltration rates of permeable pavers are still at or above the minimum accepted infiltration rate as determined by the engineer of record.
  - If infiltration rates are determined to be deficient, use a regenerative air vacuum sweeper then test again. If infiltration rates are still deficient, remove pavers, relay base, place pavers and fill joints with new sand per manufacturer's specifications.

6.2.7 Central Station

Central Station has two GI features, permeable pavers and pervious concrete. Two permeable paver locations were tested for infiltration of which only one demonstrated infiltration. Pavers were not able to be removed at either location. It is recommended that pavers be removed at the location where no infiltration occurred in order to investigate cause. The pervious concrete at Central Station is not functioning. Maintenance will have to be performed in order to function as intended. If maintenance does not alleviate the issue, then replacement may be necessary.

- Perform maintenance every six months and inspect after any storm event. This ongoing maintenance includes:
  - Pruning and shearing surrounding vegetation in order to reduce loose leaf debris
  - Cleaning surrounding open spaces in order to reduce sediment flowing onto pavers and pervious concrete
  - Removing oil and grease stains using specialty cleaners designed to lift and absorb stains (never use power washers at permeable pavers as this can cause sand in the joints to wash away and be replaced by sediment and residue)
  - Removing sediment and debris using a conventional broom sweeper

- Using regenerative air vacuum sweepers when pavers and pervious concretes are severely clogged

- An infiltration test using ASTM C1781/C1781M and ASTM C1701/C1701M for permeable pavers and pervious concrete, respectively, should be performed every two to four years to check infiltration rates are still at or above the minimum accepted infiltration rate as determined by the engineer of record.
  - If infiltration rates are determined to be deficient, use a regenerative air vacuum sweeper then test again.
  - If permeable paver infiltration rates are still deficient, remove pavers, relay base, place pavers and fill joints with new sand per manufacturer's specifications.
  - If pervious concrete infiltration rates are still deficient, subgrade could potentially be packed with sediment and residue. It is recommendable to extract subgrade boring sample(s) in order to evaluate subgrade content and density.

6.2.8 Civic Space Park

Current conditions of the pervious concrete at Civic Space Park indicate heavy sediment has filled surface voids and the concrete no longer functions as pervious.

- Once pervious concrete has been restored and is infiltrating, maintain at least every six months due to heavily trafficked area and inspect after any major storm event. The ongoing maintenance includes:
  - Pruning and shearing surrounding vegetation in order to reduce loose leaf debris
  - Mowing adjacent lawns
  - Cleaning surrounding open spaces in order to reduce sediment flowing onto pervious concrete
  - Removing oil and grease stains using specialty cleaners designed to lift and absorb stains
  - Removing sediment and debris using a conventional broom sweeper.
  - Using regenerative air vacuum when pervious concrete is severely clogged.
- An infiltration test using ASTM C1701/C1701M should be performed every two to four years to check infiltration rates of pervious concrete are still at or above the minimum accepted infiltration rate as determined by the engineer of record.

   - If infiltration rates are determined to be deficient, use a regenerative air vacuum sweeper then test again. If infiltration rates are still deficient, subgrade could potentially be packed with sediment and residue. It is recommendable to extract subgrade boring sample(s) in order to evaluate subgrade content and density.

6.2.9 Helen Drake Senior Center

Helen Drake is in good condition. The only recommended measure would be to conduct routine maintenance efforts in sump areas and areas adjacent to vegetation in order to remove sediment and debris build-up that is more prominent in these areas. Furthermore, ongoing maintenance to be performed as outlined below.

- The ongoing maintenance is to be done at least once per year and inspected after any storm to determine if unscheduled maintenance is required. The maintenance items include:
   - Inspecting associated drainage infrastructure such as grated catch basins and curb inlets for trash and debris that could inhibit proper function
   - Pruning and shearing surrounding vegetation in order to reduce loose leaf debris
   - Cleaning surrounding open spaces in order to reduce sediment flowing onto pervious concrete
   - Removing sediment and debris using a conventional broom sweeper
   - Using regenerative air vacuum sweepers when concrete is severely clogged
- An infiltration test using ASTM C1701/C1701M should be performed every two to four years to check infiltration rates of pervious concrete are still at or above the minimum accepted infiltration rate as determined by the engineer of record.
   - If infiltration rates are determined to be deficient, use a regenerative air vacuum sweeper then test again. If infiltration rates are still deficient, subgrade could potentially be packed with sediment and residue. It is recommendable to extract subgrade boring sample(s) in order to evaluate subgrade content and density.

6.2.10 Hatcher Road

Hatcher Road's pervious concrete sidewalk sections were laden with sediment and debris. The sidewalk is surrounded by trees and landscape tracts that wash out onto the pervious concrete clogging surface voids and under-drain system. It is recommended that the sidewalk be vacuumed thoroughly and be maintained with more regularity, especially before and after the monsoon season.

- The ongoing maintenance is to be done at least twice per year and inspected after any storm to determine if unscheduled maintenance is required. The maintenance items include:
  - Inspecting the small grated inlets for trash and debris that would inhibit proper function
  - Pruning and shearing surrounding vegetation in adjacent landscape tracts in order to reduce loose leaf debris, particularly on the south side of Hatcher Road
  - Cleaning the surrounding open spaces in order to reduce sediment flowing onto pervious concrete
  - Removing sediment and debris using a conventional broom sweeper
  - Using a regenerative air vacuum sweepers when concrete is severely clogged
- An infiltration test using ASTM C1701/C1701M should be performed every two to four years to check infiltration rates of pervious concrete are still at or above the minimum accepted infiltration rate as determined by the engineer of record.
  - If infiltration rates are determined to be deficient, use a regenerative air vacuum sweeper then test again. If infiltration rates are still deficient, subgrade could potentially be packed with sediment and residue. It is recommendable to extract subgrade boring sample(s) in order to evaluate subgrade content and density.

6.2.11 Tovrea Castle

Tovrea Castle is in a well-maintained condition. This is possibly due to less traffic as entry gates providing access are open for special events and tours only. One recommended measure would be to focus routine maintenance efforts in sump areas and areas adjacent to vegetation in order to remove sediment and debris build-up that is more prominent in these areas.

Geotechnical boring samples indicate a significant difference in void content in the two locations sampled. It is likely this difference is due to inconsistent concrete mix design or lack of quality control during construction. It is recommended that a well-defined quality control protocol be implemented for future pervious concrete designs to ensure maximum performance.

- The ongoing maintenance is to be done at least once per year and inspected after any storm to determine if unscheduled maintenance is required. The maintenance items include:

  - Inspecting the curb-cut inlets for sediment, trash and debris that would inhibit positive drainage towards the open space tracts
  - Pruning and shearing surrounding vegetation in adjacent landscape tracts in order to reduce loose leaf debris, particularly at the sump area located just east of the west entrance
  - Cleaning the surrounding open spaces in order to reduce sediment flowing onto pervious concrete
  - Removing sediment and debris using a conventional broom sweeper
  - Using a regenerative air vacuum sweepers when concrete is severely clogged
- An infiltration test using ASTM C1701/C1701M should be performed every two to four years to check infiltration rates of pervious concrete are still at or above the minimum accepted infiltration rate as determined by the engineer of record.
  - If infiltration rates are determined to be deficient, use a regenerative air vacuum sweeper then test again. If infiltration rates are still deficient, subgrade could potentially be packed with sediment and residue. It is recommendable to extract subgrade boring sample(s) in order to evaluate subgrade content and density.

6.3 Further Recommendations

Several of the permeable paver systems did not allow infiltration. Testing of more paver systems is recommended to obtain additional performance data.

Temperature profiles were taken in summer during midday. Studying temperatures of the GI features in the evening, nighttime and/or early morning is recommended to evaluate heat storage and dissipation. Studying temperatures of other non-GI land uses (such as natural desert) is recommended to provide further data for comparison.

It is recommended that arid region BMP details/specifications for design and construction be evaluated and prioritized. Suggested key elements for this evaluation include: (a) Review of field test data for local GI types; (b) Review of details and specifications by others; (c) Review of costs and (d) Determination of applicability of GI types to specific users and environments.

It is recommended that an approach to water and soil quality sampling at bioswale features be evaluated. Soil samples at curb-cut inlets (where oil, grease has accumulated) and grab samples or first-flush samples would provide further functionality data.

There has been continued interest by developers on increasing GI features within new residential and commercial sites. In turn, there is a desire to satisfy stormwater storage and first flush requirements by use of these features. To provide a basis for supplementing City policy in this regard, certain elements would need to defined. These elements need to be measurable and demonstrate continuous functionality. Elements would become the foundation for design and maintenance documents. It is recommended that further brainstorming be conducted to evaluate the basis for evaluating City policy to manage the implementation of GI. Some of these elements should include: (a) Field-testing based functionality data for existing, local GI features; (b) Applicability of GI types for private and public uses; (c) Quantification of stormwater quality and quantity mitigation by GI type; (d) Evaluation of life-cycle costs; (e) Development of a management program to handle policy changes (review, compliance).

7.0 REFERENCES

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[7] UNI-Group U.S.A., "UNI ECO Maintenance Sheet," 2014.

City of Phoenix

PHX WATER SMART