

**STORMWATER  
MONITORING  
GUIDANCE  
MANUAL  
For  
Industrial  
Activities**



**ARIZONA DEPARTMENT OF TRANSPORTATION**

July 2009

### ***Disclaimer***

*The manual may contain references to equipment, materials, or patented processes by manufacturer, trade name, make, or catalog number. Such references shall be regarded as establishing a standard of quality, finish, appearance, performance, or as indicating a selection based upon compatibility with existing equipment or materials and shall not be construed as limiting selection to a specific item or source.*

## TABLE OF CONTENTS

<b>1.0</b>	<b>INTRODUCTION.....</b>	<b>1</b>
1.1	Purpose of this Document .....	1
<b>2.0</b>	<b>GENERAL REQUIREMENTS .....</b>	<b>3</b>
2.1	Non-Stormwater Discharge.....	3
2.2	Qualifying Rainfall Event.....	3
2.3	When and How to Sample.....	4
2.4	Representative Discharge.....	4
2.5	Sampling Waivers .....	5
2.5.1	Adverse Weather Conditions .....	5
2.5.2	Unstaffed and Inactive Sites.....	5
2.6	When the Sampled Storm Does Not Meet Criteria.....	5
<b>3.0</b>	<b>MONITORING POINT LOCATIONS.....</b>	<b>6</b>
<b>4.0</b>	<b>VISUAL MONITORING REQUIREMENTS .....</b>	<b>8</b>
4.1	Visual Monitoring Parameters .....	8
4.2	Visual Monitoring Documentation .....	9
<b>5.0</b>	<b>ANALYTICAL MONITORING REQUIREMENTS.....</b>	<b>11</b>
5.1	Analytical Monitoring Schedule .....	11
5.2	Analytical Monitoring Parameters.....	11
5.3	Analytical Monitoring Documentation .....	12
<b>6.0</b>	<b>MAINTENANCE FACILITIES LOCATED WITHIN ¼ MILE OF IMPAIRED OR UNIQUE WATERS.....</b>	<b>13</b>
6.1	Analytical Monitoring .....	13
6.1.1	Analytical Monitoring Schedule .....	13
6.1.2	Analytical Monitoring Parameters.....	13
<b>7.0</b>	<b>MONITORING RESULTS .....</b>	<b>14</b>
7.1	Visual Monitoring Results.....	14
7.2	Analytical Monitoring Results.....	14
<b>8.0</b>	<b>QUALITY ASSURANCE AND QUALITY CONTROL.....</b>	<b>15</b>
<b>9.0</b>	<b>REPORTING REQUIREMENTS.....</b>	<b>16</b>
9.1	Visual Examination Reporting Requirements.....	16
9.2	Analytical Monitoring Reporting Requirements .....	16
9.3	Reporting Non-compliance .....	16
<b>10.0</b>	<b>REFERENCES.....</b>	<b>17</b>
<b>11.0</b>	<b>GLOSSARY.....</b>	<b>19</b>

**APPENDICES**

**APPENDIX A: Arizona’s 2004 303(d) and Other Impaired Waters List**

**APPENDIX B: Visual Monitoring Report Form**

**APPENDIX C: Analytical Monitoring Report Form**

**APPENDIX D: Discharge Monitoring Report Form**

**LIST OF TABLES**

<b>1. ADOT Industrial Facilities with Monitoring Requirements .....</b>	<b>1</b>
<b>2. Visual and Analytical Monitoring Requirements for ADOT Facilities.....</b>	<b>8</b>
<b>3. Analytical Monitoring Parameters for the ADOT Durango Sign Factory .....</b>	<b>11</b>
<b>4. Analytical Monitoring Parameters for ADOT Material Source Mining Sites within ¼ Mile of a Unique or Impaired Water.....</b>	<b>12</b>

## 1.0 INTRODUCTION

On August 15, 2008, the Arizona Department of Environmental Quality (ADEQ) issued a consolidated individual stormwater permit (AZS000018-2008) for the Arizona Department of Transportation (ADOT) operations (ADOT Permit). The ADOT Permit (revised June 22, 2009) covers stormwater and other discharges from activities associated with the municipal separate storm sewer system (MS4), construction activities, and industrial or maintenance facilities within ¼ mile of impaired or unique waters. This permit replaces the original National Pollutant Discharge Elimination System (NPDES) permit issued by U.S. Environmental Protection Agency (USEPA) on September 30 1999.

Industrial facilities covered by this permit include material sources that are owned, operated, permitted, or leased by ADOT (Table 1).

In addition, any ADOT maintenance facility that is located within ¼ mile of an impaired or unique water (303d list) must implement a monitoring program. The Nogales Maintenance Yard, Superior Maintenance Yard and Superior Storage and Fuel Yard fall into this category and are required to monitor stormwater outfalls. Details of these facilities are provided in Section 6.0 of this manual.

**Table 1. ADOT Industrial Facilities with Monitoring Requirements**

ADOT Facility	Address	Lat/Long	Potential Pollutant Sources
ADOT material source mining and material sites within ¼ mile of impaired or unique waters	Statewide	N/A	Sediment, process water, groundwater mixed with stormwater
Grand Canyon National Park Airport	Hwy 64, Tusayan, AZ 86023	35° 57' 25" / 112° 08' 03"	Deicing chemicals, solvent, oils
Durango Sign Factory	2104 S. 22nd Ave., Phoenix, AZ 85009	33° 26' 42" / 112° 02' 47"	Aluminum, solvent, paints, oils, coolants
Print Shop	1655 W. Jackson St., Phoenix, AZ 85007	33° 26' 42" / 112° 02' 47"	<b>Conditional exclusion for no exposure</b>
Maintenance facility within ¼ of a unique or impaired water	Statewide	N/A	Sediment, paints, oils, solvents, coolants

It should be noted that ADEQ is replacing the term “Unique Water” with “outstanding Arizona water” in the impending revision to the Arizona Water Quality Standards (Arizona Administrative Code [A.A.C.] R18-11). This manual will continue to use the term “Unique Water” until the new Arizona Water Quality Standards are approved and published.

### 1.1 Purpose of this Document

This manual presents guidance for ADOT management, staff, and contractors to use in the implementation of stormwater monitoring programs conducted at industrial sites in order to comply with the following regulatory requirements:

- ADOT Individual Stormwater Permit (AZS00018-2008)
- ADOT Statewide Stormwater Management Plan (SSWMP)

The manual is designed and organized to provide descriptions of the processes used to plan and implement a successful water quality monitoring program specific to runoff from industrial sites (not including construction, which is covered under another manual), material stockpile sites, and identified maintenance yards.

The main objective of this manual is to provide consistency in monitoring methods between ADOT's various industrial sites, as well as consistency in monitoring protocols over time. Such consistency is essential to provide for data comparability. In addition to consistency of monitoring methods, it is essential that monitoring data be collected in such a way that ensures that the data are accurate and precise. The ADOT Quality Assurance Manual (QAM) features detailed information on quality assurance and quality control (QA/QC) procedures.

Please consult the ADOT Permit for official requirements. Further references to stormwater monitoring protocols and instructions will be available in the ADOT QAM. For further guidance and/or direction about what must be accomplished to comply with the ADOT Permit, the ADOT Water Quality Group can be contacted.

This manual identifies the following:

- The ADOT industrial activities that are required to report stormwater discharge monitoring results under the ADOT Permit
- The water quality parameters to be monitored
- When to monitor
- How to monitor
- Documentation requirements
- Instructions on how to record monitoring results on a Visual Monitoring Report (VMR), an Analytical Monitoring Report (AMR), and a Discharge Monitoring Report (DMR)
- When and where to report monitoring results

## **2.0 GENERAL REQUIREMENTS**

This section presents the general requirements detailed in the ADOT Permit, and Section 3 describes general sampling procedures at monitoring point locations. Specific monitoring requirements for ADOT facilities are located in Sections 4, 5, and 6 of this manual. The ADOT QAM, data management, and reporting considerations for all facilities are described in Sections 7, 8, and 9 of this manual.

According to the ADOT Permit facilities are required to perform two types of monitoring at stormwater outfalls: visual and analytical. The monitoring parameters required vary between ADOT facilities. ADOT facilities that have discharges subject to analytical monitoring must coordinate with the ADOT Water Quality Group in order to report their results to ADEQ.

### **2.1 Non-Stormwater Discharge**

Non-stormwater discharge is any discharge that is not composed entirely of stormwater. Non-stormwater includes illicit discharges, discharges that are authorized under the ADOT Permit, or discharges that are authorized under a separate Arizona Pollutant Discharge Elimination System (AZPDES) permit.

Only those non-stormwater discharges listed in Table 1.3 of the ADOT Permit are authorized to be discharged by ADOT. For any authorized non-stormwater discharge at an industrial facility, the stormwater pollution prevention plan (SWPPP) must identify the discharge, the discharge location, and the best management practice (BMP) that will be used to minimize discharge pollutants. ADOT may request approval for additional sources of non-stormwater discharges by submitting a written request to ADEQ at least 60 days prior to discharge per Section 1.3.8 of the permit. The ADOT Permit does not authorize non-stormwater discharges to receiving waters listed as impaired on Arizona's 2004 303(d) and Other Impaired Waters List (Appendix A) or to unique waters listed in A.A.C. R18-11-112.

### **2.2 Qualifying Rainfall Event**

Visual and analytical monitoring must be completed during a discharge that occurs as a result of a qualifying rainfall event. For purposes of the ADOT Permit, a qualifying rainfall event is defined as a rainstorm that:

- produces 0.1 inch or more in measured rainfall
- causes runoff to be present at the outfall
- occurs at least 72 hours from the previous 0.1-inch rainfall

Because the rainfall depth of 0.1 inch is a condition of the ADOT Permit, conducting visual and analytical monitoring without evaluating the strength of a storm beforehand could waste considerable effort. The chances of meeting the criterion for rainfall at a minimum of effort increase if weather forecasts are evaluated before deciding whether or not to sample a particular rainfall event.

Keeping up with the weather forecast and planning so that visual and analytical monitoring can be carried out on short notice are the keys to successful sampling. Local forecasts, including televised satellite and radar images, can give an indication of the expected intensity of coming storms. The National Weather Service is an excellent source of information on upcoming storms. It also includes local current radar and satellite images. Their website is <http://www.wrh.noaa.gov>. A number of commercial websites, such as <http://www.weather.com> and <http://www.Yahoo.com>, also provide weather information and forecasts.

When evaluating a weather forecast, consider indications of expected rainfall amounts. For example, “90% chance” rather than “50% chance” and “rain” rather than “showers”. Over the telephone, National Weather Service personnel can often provide estimates of anticipated rainfall amounts. In addition, consider the predicted duration of the storm. It will be helpful to spend time observing rainfall events at the ADOT facility with close attention to how different rainfall depths relate to storm-water discharges from the facility before sampling.

Once the decision has been made to attempt to sample a rainfall event, the monitoring personnel should be notified and they should prepare to sample. If it does rain, they should be at the monitoring points before stormwater begins discharging so they can document the time of discharge and be ready to perform visual and analytical monitoring.

Every ADOT facility is required to maintain a rain gauge on site. Monitoring personnel will be responsible for maintaining the rain gauge, preparing the gauge for rainfall events, recording rainfall amounts, and cleaning the gauge after rainfall events.

### **2.3 When and How to Sample**

Analytical monitoring must consist of two samples of stormwater discharges from each facility’s representative outfall during qualifying precipitation events. ADOT shall collect one sample between June 1 and October 31 and one sample between November 1 and May 31. Visual monitoring must consist of four samples of stormwater discharges from each facility’s representative outfall during qualifying precipitation events. ADOT shall collect two samples between June 1 and October 31 and two samples between November 1 and May 31. Visual and analytical monitoring may be conducted during the same qualifying rainfall event. A minimum of one grab sample shall be taken from the discharge resulting from a representative storm event. The grab sample (see QAM) shall be taken during the first 30 minutes of the discharge event, except if it is not practicable. If not practicable, the sample shall be taken as soon as practicable during the discharge, and an explanation shall be documented in the monitoring report. Refer to the QAM for ADOT protocol on obtaining a grab sample.

### **2.4 Representative Discharge**

When a facility has two or more outfalls that discharge substantially identical effluents, monitoring personnel may examine a sample from one of such outfalls and report that the monitoring data applies to the substantially identical outfall. The monitoring personnel must document the rationale for this in the facility’s SWPPP, including consideration of activity, significant materials, and stormwater management practices in the drainage areas that flow to the respective outfalls. The

following information must be documented in the facility's SWPPP and included in applicable monitoring reports:

- location of the outfalls
- why the outfalls are expected to discharge substantially identical effluents
- estimated size of the drainage area (in square feet) for each outfall
- estimate of the runoff coefficient of the drainage area (low: under 40%; medium: 40%–65%; high: above 65%)

## **2.5 Sampling Waivers**

The ADOT Permit allows for waivers from visual and analytical monitoring requirements under two circumstances: adverse weather conditions and unstaffed and inactive sites.

### **2.5.1 Adverse Weather Conditions**

When a facility is unable to collect samples over the course of the quarter as a result of adverse climatic conditions, the reason for not performing the visual or analytical monitoring must be documented and retained onsite with the SWPPP. Adverse weather conditions that may prohibit the collection of samples include weather conditions that create dangerous conditions for personnel (such as local flooding, high winds, hurricanes, tornadoes, electrical storms, etc.) or otherwise make the collection of a sample impracticable (drought, extended frozen conditions, etc.).

### **2.5.2 Unstaffed and Inactive Sites**

If a facility with discharges is both unstaffed and inactive, the discharger may exercise a waiver as long as the facility remains unstaffed and inactive. The facility must maintain a certification with the SWPPP that states that the site is unstaffed and inactive and that performing visual or analytical monitoring during a qualifying rainfall event is not feasible.

## **2.6 When the Sampled Storm Does Not Meet Criteria**

There may be times when sampling has commenced but the rainfall stops and the rainfall intensity does not meet the criterion of the ADOT Permit. When this happens it may be best to dispose of the samples to save unnecessary lab expenses and to sample again during another qualifying rainfall event.

If, despite best efforts, it is not possible to collect samples during the first hour of a rainfall event (or as soon thereafter as practical) that meets the criteria for preceding dry conditions and rainfall intensity, the ADOT Permit states that the facility may submit the sample results but must include an explanation with the DMR that identifies what criteria were not met and why.

### 3.0 MONITORING POINT LOCATIONS

All stormwater outfalls are identified in the facility's SWPPP. Monitoring points will be located at selected outfalls and should be assigned unique identifiers to be used for each consecutive monitoring event. For example, a monitoring point for the Phoenix Sign Shop for the first stormwater sampling event on June 18, 2009, could be named as follows: PHXSN-S1-061809. (As previously described in Section 2.4 Representative Discharge, if the facility has two or more outfalls that discharge substantially identical effluents, a single visual and analytical monitoring sample from one of the outfalls is sufficient as long as the collected monitoring data are representative of all outfalls.)

It is important that the selected monitoring points will provide samples that contain only the stormwater that comes from the facility. If the stormwater discharge to be sampled contains a discharge from other sources, move the monitoring point upstream to a point where the discharge is wholly from the facility. Also, verify that there is no base flow during dry periods. The SWPPP should identify the presence of any base flow and provide a specific measurement or an estimate of the flow rate. If it is not possible to collect a sample that contains discharge only from the facility, document the reason for this and provide detailed information concerning the source(s) of the discharge that is being sampled.

Potential Monitoring Points may include the following:

- Stormwater runoff that enters the dry wells at the facility.
- Pipes discharging the facility stormwater offsite.
- Ditches carrying the facility stormwater offsite.
- Manhole access points to storm sewers carrying the facility stormwater. For example, a sampling bottle attached to a pole can be lowered into the manhole access point. (Manhole access on ADOT property may be simpler and safer than manhole access off ADOT property and will be more readily verifiable as carrying only the facility stormwater.)

These four types of monitoring points are not too difficult to access and the discharge within them tends to be fast enough, with enough turbulence, to allow for the collection of well mixed, representative samples.

Examples of situations in which you *should not* sample:

- A ditch that carries additional stormwater from properties upstream. In this case, the stormwater from the facility is mixed with other water. Find a location or locations where the facility stormwater alone can be sampled.
- Shallow sheet flow, which is more difficult to sample. Find a location where the flow is deeper and can accommodate a sample bottle.
- A stormwater sewer or pipe (culvert) discharges to a creek or other surface receiving water, and the pipe is partially submerged where it discharges into the receiving water. In this case, this final discharge point will not be able to be used as a monitoring point because the stormwater discharge is mixed with the surface receiving water. Keep in mind that

changing flow conditions in surface receiving waters, including flood stages, may occur during storm events.

- A manhole that carries stormwater not only from the facility but also from other stormwater sources as well. If collecting a sample from a manhole but from the point where a storm sewer from the Sign Factory ends at a municipal manhole, make sure that the discharge in that pipe is entirely from the facility, that the pipe is not submerged or partly submerged, and that collecting stormwater from the facility only is otherwise not prevented. If unsure that a storm sewer carries only discharge from the facility, the local municipality may have storm sewer plans to help make this determination. Contact the municipality beforehand to discuss sampling from the manhole and associated safety issues, particularly for manholes in areas with vehicular traffic.

It is a good idea to observe the monitoring point(s) that have been chosen at the facility during actual stormwater runoff conditions to see how readily stormwater can be sampled.

## 4.0 VISUAL MONITORING REQUIREMENTS

Visual monitoring provides a simple and inexpensive means of obtaining a rough assessment of stormwater quality. Identified facilities and qualifying material sources (Table 2) are required to perform four visual examinations (monitoring) of their stormwater discharges: two between June 1 and October 31 and two between November 1 and May 31.

Visual monitoring will be conducted on discharges resulting from a qualifying rainfall event (an event that produces 0.1 inch or more in measured rainfall, causes runoff to be present at the outfall, and occurs at least 72 hours from the previous 0.1-inch rainfall). If a qualifying rainfall event does not occur during daylight hours from the facility during a monitoring period, it shall be documented on the VMR (Appendix B). The VMR shall include the examination date and time, examination personnel, the nature of discharge, visual quality of the discharge (color, odor, clarity, floating solids, settled solids, suspended solids, foam, and oil sheen), and probable sources of any observed stormwater contamination.

Grab samples for visual monitoring must be taken in the first 30 minutes of the discharge produced by a qualifying rainfall event. If the collection of a grab sample during the first 30 minutes is impracticable, a grab sample can be taken when practicable, as long as an explanation of why a grab sample during the first 30 minutes was impracticable is thoroughly documented.

Visual monitoring must be conducted during daylight hours in a well-lit area to accurately observe and document the results.

**Table 2. Visual and Analytical Monitoring Requirements for ADOT Facilities**

ADOT Facilities	Visual Monitoring Required?	Analytical Monitoring Parameter(s)	Discharge Limitations
ADOT material source (mining and stockpile sites within ¼ mile of impaired or unique waters)	Yes	Nitrate plus Nitrogen Total Suspended Solids pH	pH Total Suspended Solids
Grand Canyon National Park Airport	Yes	None	None
Durango Sign Factory	Yes	Aluminum Iron Zinc Nitrate plus Nitrogen Total Suspended Solids	None

### 4.1 Visual Monitoring Parameters

Grab samples will be collected in a clear glass jar at each monitoring point on a quarterly basis. The contents of the jar shall be observed and documented for the following nine visual monitoring parameters, discussed below:

1. Color
2. Odor
3. Clarity

4. Floating solids
5. Settled solids
6. Suspended solids
7. Foam
8. Oily sheen
9. Other indicators of possible stormwater pollution

Color – Water that is colorless lacks pollutants that affect water color. Water that is slightly milky or light brown in color usually indicates the presence of suspended sediment. Suspended sediment will impart the same color to water as the surrounding soil (e.g., the Red Rock area of Sedona may have red stormwater runoff). The presence of a color that is different from the surrounding soil color may indicate the presence of a chemical pollutant.

Odor – Most water is either odorless or has a slight “earthy” odor. Odors such as gasoline fumes, solvents, sulfur or rotten eggs, sewage, or a sour smell may be indicative of chemical pollutants.

Clarity – Clarity refers to the amount of suspended material present that causes the water to be opaque and limits the amount of light that can pass through the water. The cloudier the water is, the more likely it is to contain suspended material.

Floating solids – Solids may float if they are buoyant in water. Observe the surface of the grab sample for floating solids and describe them.

Settled solids – Solids may settle to the bottom if they are heavier than water. Observe the bottom of the grab sample for settled solids and describe them.

Suspended solids – Solids may remain in suspension if they have the same buoyancy as water or if their physical shape allows them to remain in suspension for long periods of time. Observe the entire water column of the grab sample for suspended solids and describe them.

Foam – The presence of foam on the water surface may indicate the presence of industrial foaming agents or surfactants.

Oily sheen – An oily sheen is present if a film of iridescent color is observed on the water surface. Look for a rainbow effect that can appear to be floating on the surface of the water. Usually an oily sheen indicates the presence of oil or grease. On rare occasions, and usually in the fall, an oily sheen can be the result of the decomposition of fallen leaves.

Other indicators of possible stormwater pollution – Document any other phenomena that do not fall under any of the other categories.

## **4.2 Visual Monitoring Documentation**

Visual monitoring documentation is required by the ADOT Permit. The following information will be recorded on a VMR, which is found in Appendix A:

- Facility name
- Date and time of examination
- Monitoring personnel
- Monitoring point location (complete one VMR per monitoring point as listed in the SWPPP)
- Nature of discharge (rainfall or snowmelt)
- Time that the rainfall event began
- Duration of the rainfall event
- Inches of rainfall from the rainfall event
- Length of time since the last qualifying rainfall event as described in Section 2.2
- Description of the nine visual monitoring parameters

Entries on the VMR should be made with waterproof ink; if an error is made, cross it out rather than whiting out or erasing.

## 5.0 ANALYTICAL MONITORING REQUIREMENTS

Analytical monitoring is required only for the industrial activities that ADEQ determined to have a high potential to discharge a pollutant at concentrations of concern. Analytical monitoring provides feedback to ADOT in assessing the effectiveness of the SWPPP. Table 2 (Section 4.0) identifies the ADOT facilities that are required to perform analytical monitoring. All analytical work shall be performed as described in 40 Code of Federal Regulations (CFR) 136 in accordance with ADOT quality control standards. Proper collection and analyses procedures for all ADOT monitoring will be presented in the ADOT QAM. The QAM will describe project management, sample collection procedures, approved analytical methods to be used, and data review process.

### 5.1 Analytical Monitoring Schedule

For each year of permit coverage, ADOT must collect and analyze two stormwater samples at each representative stormwater outfall during precipitation events. One sample must be collected between June 1 and October 31 and one sample must be collected between November 1 and May 31.

Analytical monitoring will be performed on discharges resulting from a qualifying rainfall event (an event that produces 0.1 inch or more in measured rainfall, causes runoff to be present at the outfall, and occurs at least 72 hours from the previous 0.1-inch rainfall). Analytical monitoring may be performed at the same time as visual examinations.

Analytical monitoring samples must be taken in the first 30 minutes of the discharge produced by a qualifying rainfall event. If the collection of a grab sample during the first 30 minutes is impracticable, a sample can be taken when practicable, as long as an explanation of why a grab sample during the first 30 minutes was impracticable is thoroughly documented.

### 5.2 Analytical Monitoring Parameters

Tables 3 and 4 list the specific parameters that will be monitored at the Sign Factory and the ADOT material sources. Per the ADOT Permit, the Grand Canyon National Park Airport does not have any analytical monitoring requirements (see Table 2). For approved analytical methods and reporting limits, see the QAM.

**Table 3. Analytical Monitoring Parameters for the ADOT Durango Sign Factory**

Parameter	Maximum Holding Time*	Assessment Level
Aluminum, T	6 months	0.75 mg/L
Iron, T	6 months	1.0 mg/L
Nitrate plus Nitrogen	48 hours	0.68 mg/L
Total Suspended Solids	7 days	100 mg/L
Zinc, T	6 months	0.12 mg/L

T = total recoverable.

\* CFR Part 136.

**Table 4. Analytical Monitoring Parameters for ADOT Material Source Mining Sites within ¼ Mile of a Unique or Impaired Water**

<b>Parameter</b>	<b>Maximum Holding Time*</b>	<b>Assessment Level</b>
Total Suspended Solids	7 days	100 mg/L
pH	Immediately	Reserved
Nitrate plus Nitrogen	48 hours	0.68 mg/L

\* CFR Part 136.

### 5.3 Analytical Monitoring Documentation

Analytical monitoring documentation is required by the ADOT Permit. The following information will be recorded on an AMR, which may be found in Appendix C:

- Facility name
- Date and time of sample collection
- Monitoring personnel
- Monitoring point location (complete one AMR per monitoring point as listed in the SWPPP)
- Nature of discharge (rainfall or snowmelt)
- Time that the rainfall event began
- Duration of the rainfall event
- Inches of rainfall from the rainfall event
- Length of time since the last qualifying rainfall event as described in Section 2.2
- Description of sample collection method (i.e., grab sample from ditch, lowered bottle down manhole)
- Description of the samples collected (i.e., list of parameters, duplicates, splits)
- Unusual circumstances that may affect sample results

Entries on the AMR should be made with waterproof ink; if an error is made, cross it out rather than whiting out or erasing. AMRs will be included as part of the SWPPP.

## **6.0 MAINTENANCE FACILITIES LOCATED WITHIN ¼ MILE OF IMPAIRED OR UNIQUE WATERS**

A monitoring program is required for maintenance facilities located within ¼ mile of an impaired or unique water. Three maintenance facilities meeting this criterion (“designated facility”) have been identified and include, but are not limited to, the following:

- Nogales Maintenance Yard
- Superior Maintenance Yard
- Superior Storage and Fuel Yard

Some individual parameters may change following the approval of ADEQ’s amended state surface water quality standards (SWQS). Refer to the ADEQ website for the most current information (<http://azdeq.gov/environ/water/standards/index.html>).

### **6.1 Analytical Monitoring**

#### **6.1.1 Analytical Monitoring Schedule**

Analytical monitoring requires laboratory analysis of stormwater samples and must be performed for each year of permit coverage. ADOT shall collect and analyze a total of two samples from each representative outfall during precipitation events. ADOT shall collect one sample between June 1 and October 31 and one sample between November 1 and May 31.

Analytical monitoring will be performed on discharges resulting from a qualifying rainfall event (Section 2.2). Analytical monitoring may be performed at the same time as visual examinations.

Analytical monitoring samples must be taken in the first 30 minutes of the discharge produced by a qualifying rainfall event. If the collection of a grab sample during the first 30 minutes is impracticable, a sample can be taken as soon as practicable, as long as an explanation of why a grab sample during the first 30 minutes was impracticable is thoroughly documented.

#### **6.1.2 Analytical Monitoring Parameters**

Following is a list of the specific parameters that shall be monitored at the designated maintenance facilities:

- Total Dissolved Solids (TDS)
- Total Suspended Solids (TSS)
- Total Petroleum Hydrocarbons (TPH)
- Additional water quality parameters of concern (causes of impairment) for those impaired or not-attaining waters that are listed for parameters other than or in addition to turbidity and/or suspended sediment concentration

## **7.0 MONITORING RESULTS**

### **7.1 Visual Monitoring Results**

Results of visual monitoring should be used by ADOT monitoring personnel to immediately identify any problems that need to be addressed, such as oil or grease in the stormwater discharge. The ADOT monitoring personnel should also document any changes made to the SWPPP as a result of visual monitoring.

### **7.2 Analytical Monitoring Results**

Analytical monitoring results shall be reported on a DMR form (Appendix D). A separate DMR form is required for each monitoring point and shall be submitted to the ADOT Water Quality Group. DMRs will be included as an attachment to the Annual Report to ADEQ.

## **8.0 QUALITY ASSURANCE AND QUALITY CONTROL**

The ADOT Permit requires ADOT to develop and retain a QAM that documents ADOT policies and procedures and ensures adequate QA/QC for stormwater monitoring. The policies and procedures described in the QAM are intended to ensure that monitoring analytical data meet the requirements of the permit. The QAM shall be followed for all ADOT sites that require monitoring. The QAM shall be kept at facilities that conduct sampling and at the offices of the District Environmental Coordinators.

Sample collection protocol to be used is detailed in the ADOT QAM. Proper procedures such as collection methods, QA/QC samples, preservative to use, and holding times for the samples will be outlined in the ADOT QAM. All samples taken to meet the monitoring requirements in this permit shall conform to these procedures, whether collection and handling is performed directly by ADOT or contracted to a third party.

## **9.0 REPORTING REQUIREMENTS**

The ADOT Permit requires sampling results from the field sampling data forms (AMR) and the laboratory data to be recorded on DMR forms. Forms should be submitted to the ADOT Water Quality Group as they are completed. The compilation and submittal of the Annual Report is the responsibility of the ADOT Water Quality Manager. The Water Quality Manager will compare the analytical results to the applicable SWQS for the receiving water or to facility-specific Assessment Levels (ALs) as identified in the Permit.

### **9.1 Visual Examination Reporting Requirements**

A facility is not required to submit visual monitoring results unless requested to do so by ADEQ or the ADOT Water Quality Group. However, results from all visual monitoring must be documented and kept with the facility's SWPPP. A summary and status of corrective actions taken and SWPPP revisions as a result of the visual monitoring shall be prepared and kept in the SWPPP.

### **9.2 Analytical Monitoring Reporting Requirements**

AMRs are saved and all results are reported on a DMR and submitted to the ADOT Water Quality Group by July 1 of each year. A separate DMR is to be completed per outfall for each storm event sampled. Appendix D contains a blank DMR form that may be photocopied. Fillable forms are also available at the ADOT Water Quality Website ([http://azdot.gov/Highways/OES/Water\\_Quality/index.asp](http://azdot.gov/Highways/OES/Water_Quality/index.asp)). A copy of the completed DMR is also kept onsite with the SWPPP. The AMRs, DMRs, and analytical data package shall be reviewed by the ADOT Water Quality Group for unacceptable procedures in the field or laboratory. Analytical data shall be reviewed as soon as they are received from the laboratory.

Documents shall be submitted to ADOT Water Quality Group at the following address:

ADOT Office of Environmental Services  
Water Quality Group  
1611 W Jackson Street, MD EM02  
Phoenix, AZ 85007

### **9.3 Reporting Non-compliance**

Any non-compliance should be reported to the ADOT Water Quality Group immediately upon discovery.

## 10.0 REFERENCES

- Ameritech Environmental Laboratories. 2004. *Laboratory Quality Manual*. Phoenix, Arizona.
- American Public Health Association, American Water Works Association, and Water Pollution Control Federation. 1998. *Standard Methods for the Examination of Water and Wastewater*. 20th ed. Washington, D.C.
- Aquatic Consulting and Testing, Inc. 2003. *Quality Assurance Plan*. Tempe, Arizona.
- Arizona Administrative Code (A.A.C.) Title 18, Chapter 11, Article 1, *Water Quality Standards for Surface Waters*, adopted March 31, 2003.
- A.A.C. Title 18, Chapter 9 Article 9, *Arizona Pollutant Discharge Elimination System US EPA, Preamble to the federal stormwater permit application regulations*, November 16, 1990, *Federal Register* Vol. 55, No. 222.
- Arizona Department of Environmental Quality. 2008. *Statewide Permit to Discharge to Waters of the United States under the AZPDES Program*. Permit No. AZS000018-2008 ADOT PERMIT. Phoenix, Arizona.
- . 2008. *Arizona Pollutant Discharge Elimination System Fact Sheet: ADOT AZPDES Stormwater Permit No. AZS000018-2008ADOT PERMIT*.
- Arizona Department of Transportation, 2005. *ADOT Erosion and Pollution Control Manual*. ADOT Roadside Development, Phoenix, Arizona.
- . 2005. *ADOT Statewide Storm Water Management Plan*. Phoenix, Arizona.
- Code of Federal Regulations Title 40, Part 122, *EPA Administered Permit Programs: The National Pollutant Discharge Elimination System*.
- Del Mar Analytical. 2003. *Quality Assurance Program Manual*. Phoenix, Arizona.
- U.S. Environmental Protection Agency. 1992. *NPDES Storm Water Sampling Guidance Document (EPA 833/B-92-001)*. Washington, D.C.
- . 1993. *Methods for the Determination of Inorganic Substances in Environmental Samples (EPA 600/R-93/100)*. Washington, D.C.
- . 1994. *Methods for the Determination of Metals in Environmental Samples (EPA 600/R-94/111)*. Washington, D.C.
- . 1996. *Test Methods for Evaluating Solid Waste Physical/Chemical Methods (SW-846)*. Washington, D.C.

- . 1999. *Guidance Manual for the Monitoring and Reporting Requirements of the NPDES Storm Water Multi-Sector General Permit*. Washington, D.C.
- . 1999. *Storm Water Management Fact Sheet: Non-storm Water Discharges to Storm Sewers (EPA 832-F-99-022)*. Office of Water, Washington, D.C.
- . 2000. *Table II – Required Containers, Preservation Techniques, and Holding Times. U.S. Code of Federal Regulations, Title 40, Chapter 1, §136.3*. Office of Water, Washington, D.C.

## 11.0 GLOSSARY

**303(d) List** – The 303(d) list is a list of waterbodies that have a beneficial use that is impaired by one or more pollutants. The 303(d) list is required by Section 303(d) of the federal Clean Water Act (CWA). Waterbodies included on this list are referred to as “impaired waters.” The state must take appropriate action to improve impaired waterbodies by establishing TMDLs and reducing/eliminating pollutant discharges.

**A.A.C.** – Arizona Administrative Code

**ADEQ** – Arizona Department of Environmental Quality

**ADOT** – Arizona Department of Transportation: the permittee, owner/operator, and project managers of all its contractors and sub-contractors.

**AL** – Assessment Level; a numeric value, expressed as a concentration or a physical or chemical property of a pollutant, that when exceeded may indicate a potential defect in the SWPPP or BMPs. Monitoring results that exceed ALs are not permit violations but require the permittee to re-evaluate the SWPPP or BMP effectiveness and assess the potential for improvements to reduce pollutants.

**AMR** – Analytical Monitoring Report

**AZPDES** – Arizona Pollutant Discharge Elimination System

**Base flow** – Normal day-to-day flow that is usually present in a drainage feature.

**BMPs** – Best management practices; schedules of activities, prohibitions of practices, operation and maintenance procedures, and other management practices used to prevent or reduce pollution to waters of the U.S. BMPs also include treatment requirements, operating procedures, and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

**CFR** – Code of Federal Regulations

**CWA** – Clean Water Act; the federal water pollution control act amendments of 1972 (Public Law [P.L.] 92-500;86Stat.816;33 United States Code [U.S.C.] Section 1251 through 1376), as amended (Arizona Revised Statutes [A.R.S.] §49-201[6]).

**Discharge** – Any addition of any pollutant to waters of the U.S. from any point source.

**DMR** – Discharge Monitoring Report

**Effluent** – Stormwater originating from a facility outfall.

**Grab Sample** – An individual sample collected from a single location or over a period of time not exceeding 15 minutes. Analysis of a grab sample characterizes the quality of a discharge at a given time of the discharge.

**Holding time** – The maximum amount of time of time a sample may be stored before analysis; this includes time transporting a sample to the laboratory for analysis plus the time for the laboratory to begin sample evaluation.

**Impaired Water** – A surface water that has been assessed by ADEQ or USEPA under Section 303(d) of the CWA as not attaining a water quality standard for at least one designated use and is listed in Arizona’s 303(d) and Other Impaired Waters List.

**L** – Liter; equal to 1,000 milliliters.

**mg** – Milligram; equal to 0.001 gram.

**mg/L** – Milligram per liter; roughly equivalent to one part per million.

**mL** – Milliliter; equal to 0.001 liter.

**Monitoring** – Refers to a variety of activities and processes through which ADOT will obtain information relevant to its implementation of the stormwater quality management program so that the need for and/or opportunities for revising or refining its program and/or operations can be identified.

**MS4** – Municipal Separate Storm Sewer System; a conveyance of system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, and storm drains):

1. Owned or operated by a state, city, town, county, district, association, or other public body (created by or pursuant to state law) having jurisdiction over disposal of sewage, industrial wastes, stormwater, or other wastes, including special districts under state law such as a sewer district, flood control district or drainage district, or similar entity, or a designated and approved management agency under Section 208 of the CWA (22 U.S.C. 1288), that discharges to a water of the U.S.;
2. Designated or used for collecting or conveying stormwater;
3. That is not a combined sewer; and
4. That is not part of a publicly owned treatment work (A.A.C. R18-9-A901[22]).

**NO<sub>2</sub> + NO<sub>3</sub>** – Nitrite plus nitrate

**NPDES** – National Pollutant Discharge Elimination System; the point source discharge permit program established by §402 of the CWA (A.A.C. R18-11-101[32]).

**Outfall** – A point source as defined by 40 CFR 122.2 at the point where an MS4 discharges to waters of the U.S. and does not include open conveyances connecting two municipal separate

storm sewers or pipes, tunnels, or other conveyances which conduct segments of the same stream or other waters of the U.S. and are sued to convey waters of the U.S. (40 CFR 122.26[b][9]). Outfalls do not include crossdrain structures or culverts installed under a road that function only to maintain the natural flow of surface waters and drainage. However, a structure that collects or diverts drainage that has contacted the road surface for discharge into a waterbody is considered an outfall under the ADOT Permit.

**Parameter** – A variable, measurable property whose value is a determinant of the characteristics of a system; for example, temperature, pH, and turbidity are parameters of water.

**pH** – Analytical measurement of the acidic, neutral, or basic properties of a water sample that is determined by the amount of hydrogen ion activity present.

**Pollutant** – Fluids, contaminants, toxic wastes, toxic pollutants, dredged spoil, solid waste, substances and chemicals, pesticides, herbicides, fertilizers and other agricultural chemicals, incinerator residue, sewage, garbage, sewage sludge, munitions, petroleum products, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt and mining, industrial, municipal and agricultural wastes or any other liquid, solid, gaseous or hazardous substances (A.R.S. 49-201[29]).

**Process generated waste water** – Any waste water used in the slurry transport of mined material, air emissions control, or processing exclusive of mining. The term shall also include any other water that becomes commingled with such waste water in a pit, pond, lagoon, mine or other facility used for treatment of such waste water. The term does not include waste water used for the suction dredging of deposits in a body of water and returned directly to the body of waste without being used for other purposes or combined with other waste water.

**QAM** – Quality Assurance Manual

**QA/QC** – Quality Assurance and Quality Control; a system of procedures, checks, audits, and corrective actions to ensure that all environmental monitoring and sampling, and other technical and reporting activities, are of the highest achievable quality.

**Quality control** – Individual procedures, checks, audits, and corrective actions taken to ensure that all environmental monitoring and sampling, and other technical and reporting activities, are of the highest achievable quality.

**Representative Storm** – A storm event of greater than 0.1 inch of rainfall and at least 72 hours after the previously measurable (greater than 0.1 inch rainfall) storm event.

**Sample** – A small amount of water collected from a larger portion intended to show the nature and quality of the rest.

**Sampling** – The act of collecting samples.

**Sediment** – Organic or inorganic material that is carried by or is suspended in water and that settles out to form deposits in the storm drain system or receiving waters.

**SSWMP – Statewide Stormwater Management Program;** A comprehensive program to manage the quality of stormwater discharged from the storm sewer system in all areas within Arizona, except for Indian Country. The term Statewide Stormwater Management Program is also used to refer to the written document that describes the SSWMP.

**Stormwater**– Includes stormwater runoff, snow melt runoff, and surface runoff and drainage (A.A.C. R18-9-A901[36]).

**Surface receiving water** – A surface water that has a stormwater discharge flowing into it.

**Surface water** – A water of the U.S. that includes the following:

- A water that is currently used, was used in the past, or may be susceptible to use in interstate or foreign commerce;
- An interstate water, including an interstate wetland;
- All other waters, such as in intrastate lake, reservoir, natural pond, river, stream (including an intermittent or ephemeral stream), creek, wash, draw, mudflat, sandflat, wetland, slough, backwater, prairie pothole, wet meadow, or playa lake, the use, degradation, or destruction of which would affect or could affect interstate or foreign commerce including any such water:
  1. That is or could be used by interstate or foreign travelers for recreational or other purposes;
  2. From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or
  3. That is used or could be used for industrial purposes by industries in interstate or foreign commerce;
- An impoundment of a surface water as defined by this definition;
- A tributary of a surface water identified in subsections (1) through (4) of this definition; and
- A wetland adjacent to a surface water identified in subsections (1) through (5) of this definition (A.A.C. R18-11-101[43]).

**SWPPP** – Stormwater Pollution Prevention Plan

**SWQS** – Arizona Surface Water Quality Standards as provided in A.A.C. Title 18, Chapter 11, Article 1.

**Total recoverable** – The concentration of metals determined on an unfiltered sample after vigorous digestion, or the sum of the concentrations of metals in both dissolved and suspended fractions.

**TDS** – Total dissolved solids

**TPH** – Total Petroleum Hydrocarbons

**TSS** – Total suspended solids

**Unique Water** – A surface water that is classified as an outstanding state resource water by ADEQ under A.A.C. R18-11-112 (A.A.C. R18-11-101[47]). *Note: ADEQ anticipates that the term ‘unique water’ will be replaced with ‘outstanding Arizona water’ within the permit term.*

**Upstream** – Toward the source or upper part of a stream; against the current.

**USEPA** – U.S. Environmental Protection Agency

**VMR** – Visual Monitoring Report

**Water column** – The area of a water sample that lies between the bottom of the jar and the water surface.

# **Appendix A**

## **ARIZONA'S 2004 303(D) AND OTHER IMPAIRED WATERS LIST**

Surface Water Stream Reach or Lake Number		Pollutants or Parameters of Concern	
		303(d) List TMDL required	TMDL completed or not required 4a = TMDLs complete but water quality remains impaired 4b = no TMDL required, water is impaired but expected to attain standards by next list
<b>Bill Williams Watershed</b>			
Alamo Lake AZL15030204-0040		Mercury in fish tissue, pH (high), ammonia	
Coors Lake AZL15030204-5000		Mercury in fish tissue	
Boulder Creek unnamed tributary - Wilder Creek AZ15030202-006B		Mercury	
Boulder Creek Wilder Creek – Copper Creek AZ15030202-005A	Wilder Creek – Butte Creek	Mercury	4a Arsenic, copper, zinc
	Butte Creek – Copper Creek		4a Arsenic
Burro Creek Boulder Creek - Black Canyon AZ15030202-004		Mercury	
<b>Colorado – Grand Canyon Watershed</b>			
Colorado River Parashant Canyon - Diamond Creek AZ15010002-003		Selenium, suspended sediment concentration	
Paria River Utah border - Colorado River AZ14070007-123		Suspended sediment concentration	
Virgin River Beaver Dam Wash - Big Bend Wash AZ15010010-003		Selenium, suspended sediment concentration	
<b>Colorado – Lower Gila Watershed</b>			
Colorado River Hoover Dam - Lake Mohave AZ15030101-015		Selenium	
Gila River Coyote Wash - Fortuna Wash AZ15070201-003		Boron, selenium	
Painted Rock Borrow Pit Lake AZL15070201-1010		DDT metabolites, toxaphene and chlordane in fish tissue, dissolved oxygen	
<b>Little Colorado – San Juan Watershed</b>			
Bear Canyon Lake AZL15020008-0130		pH	
Lake Mary (lower) AZL15020015-0890		Mercury in fish tissue	
Lake Mary (upper) AZL15020015-0900		Mercury in fish tissue	

Surface Water Stream Reach or Lake Number	Pollutants or Parameters of Concern	
	303(d) List TMDL required	TMDL completed or not required 4a = TMDLs complete but water quality remains impaired 4b = no TMDL required, water is impaired but expected to attain standards by next list
Little Colorado River West Fork of the Little Colorado River - Water Canyon Creek AZ15020001-011		4a Turbidity/suspended sediment concentration
Little Colorado River Water Canyon Creek - Nutrioso Creek AZ15020001-010		4a Turbidity/suspended sediment concentration
Little Colorado River Nutrioso Creek - Carnero Wash AZ15020001-009		4a Turbidity/suspended sediment concentration
Little Colorado River unnamed reach (15020001-021) to Lyman Lake AZ15020001-005		4a Turbidity/suspended sediment concentration
Little Colorado River Silver Creek - Carr Wash AZ15020002-004	<i>Escherichia coli, sediment</i>	
Little Colorado River Porter Tank Draw - McDonalds Wash AZ15020008-017	Copper, silver, suspended sediment concentration	
Long Lake AZL15020008-0820	Mercury in fish tissue	
Lyman Lake AZL15020001-0850	Mercury in fish tissue	
Nutrioso Creek headwaters - Picnic Creek AZ15020001-017		4a Turbidity/suspended sediment concentration
Nutrioso Creek Picnic Creek - Little Colorado River AZ15020001-015		4a Turbidity/suspended sediment concentration
Rainbow Lake AZL15020005-1170		4a Nutrients and pH
Soldiers Lake AZL15020008-1440	Mercury in fish tissue	
Soldiers Annex Lake AZL15020008-1430	Mercury in fish tissue	
<b>Middle Gila Watershed</b>		
Alvord Park Lake AZL15060106B-0050	Ammonia	
Cash Mine Creek headwaters - Hassayampa River AZ15070103-349		4a Copper, zinc
Cash Mine Creek (unnamed tributary to) headwaters - Cash Mine Creek AZ15070103-415		4a Cadmium, copper, zinc
Chaparral Lake AZL15060106B-0300	Dissolved oxygen, Escherichia coli	
Cortez Park Lake AZL15060106B-0410	Dissolved oxygen, pH (high)	

Surface Water Stream Reach or Lake Number	Pollutants or Parameters of Concern	
	303(d) List TMDL required	TMDL completed or not required 4a = TMDLs complete but water quality remains impaired 4b = no TMDL required, water is impaired but expected to attain standards by next list
French Gulch headwaters - Hassayampa River AZ15070103-239	Copper, zinc, cadmium	
Gila River Salt River - Agua Fria River AZ15070101-015	DDT metabolites, toxaphene and chlordane in fish tissue	
Gila River Agua Fria River - Waterman Wash AZ15070101-014	DDT metabolites, toxaphene and chlordane in fish tissue	
Gila River Waterman Wash - Hassayampa River AZ15070101-010	DDT metabolites, toxaphene and chlordane in fish tissue	
Gila River Hassayampa River - Centennial Wash AZ15070101-009	DDT metabolites, toxaphene and chlordane in fish tissue	
Gila River Centennial Wash - Gillespie Dam AZ15070101-008	DDT metabolites, toxaphene, and chlordane in fish tissue, boron, selenium	
Gila River Gillespie Dam - Rainbow Wash AZ15070101-007	DDT metabolites, toxaphene and chlordane in fish tissue	
Gila River Rainbow Wash - Sand Tank AZ15070101-005	DDT metabolites, toxaphene and chlordane in fish tissue	
Gila River Sand Tank - Painted Rocks Reservoir AZ15070101-001	DDT metabolites, toxaphene and chlordane in fish tissue	
Hassayampa River headwaters - Copper Creek AZ15070103-007A		4a Cadmium, copper, zinc, and pH
Hassayampa River Buckeye Canal - Gila River AZ15070103-001B	DDT metabolites, toxaphene and chlordane in fish tissue	
Mineral Creek Devils Canyon - Gila River AZ15050100-012B	Copper, selenium	
Painted Rocks Reservoir AZL15070101-1020A	DDT metabolites, toxaphene and chlordane in fish tissue	
Queen Creek headwaters - Superior Mine WWTP AZ15050100-014A	Copper	
Queen Creek Superior Mine WWTP - Potts Canyon AZ15050100-014B	Copper	
Salt River 23rd Ave WWTP -Gila River AZ15060106B-001D	DDT metabolites, toxaphene and chlordane in fish tissue	
Turkey Creek unnamed tributary at 34°19'28" / 112°21'28" – Poland Creek AZ15070102-036B	Cadmium, copper, lead, zinc	
<b>Salt River Watershed</b>		
Canyon Lake AZL15060106A-0250	Dissolved oxygen	
Christopher Creek headwaters - Tonto Creek AZ15060105-353		4a Escherichia coli

Surface Water Stream Reach or Lake Number	Pollutants or Parameters of Concern	
	303(d) List TMDL required	TMDL completed or not required 4a = TMDLs complete but water quality remains impaired 4b = no TMDL required, water is impaired but expected to attain standards by next list
Crescent Lake AZL15060101-0420	pH (high)	
Gibson Mine tributary headwaters - Pinto Creek AZ15060103-887		4a Copper
Pinto Creek headwaters – tributary at 33°19'27" / 110°54'56" AZ15060103-018A		4a Copper
Pinto Creek tributary at 33°19'27" / 110°54'56" – Ripper Spring AZ15060103-018B		4a Copper
Pinto Creek  Ripper Spring - Roosevelt Lake AZ15060103-018C	Selenium, copper	
Salt River  Stewart Mountain Dam - Verde River AZ15060106A-003	Dissolved oxygen, copper	
Tonto Creek  headwaters - unnamed tributary at 34°18'10" / 111°04'14"  AZ15060105-013A	Dissolved oxygen, nitrogen	4a Escherichia coli
Tonto Creek unnamed tributary at 34°18'10" / 111°04'14" – Haigler Creek	Nitrogen	4a Escherichia coli
<b>San Pedro – Willcox Playa – Rio Yaqui Watershed</b>		
Brewery Gulch headwaters - Mule Gulch AZ15080301-337	Copper	
Mule Gulch  headwaters - above Lavender Pit AZ15080301-090A	Copper	
Mule Gulch  above Lavender Pit - Bisbee WWTP AZ15080301-090B	Copper, pH (low)	
Mule Gulch  Bisbee WWTP - Highway 80 Bridge AZ15080301-090C	Copper, zinc, pH (low), cadmium	
San Pedro River  Mexico border - Charleston AZ15050202-008	Copper	
San Pedro River  Babocomari Creek - Dragoon Wash AZ15050202-003	<i>Escherichia coli</i>	
San Pedro River  Dragoon Wash - Tres Alamos Wash AZ15050202-002	Nitrate	

Surface Water Stream Reach or Lake Number	Pollutants or Parameters of Concern	
	303(d) List TMDL required	TMDL completed or not required 4a = TMDLs complete but water quality remains impaired 4b = no TMDL required, water is impaired but expected to attain standards by next list
San Pedro River Aravaipa Creek - Gila River AZ15050203-001	<i>Escherichia coli, selenium</i>	
<b>Santa Cruz – Rio Magdalena – Rio Sonoyta Watershed</b>		
Alum Gulch headwaters - 31°28'20" / 110°43'51" AZ15050301-561A		4a Cadmium, copper, pH (low), zinc
Alum Gulch 31°28'20" / 110°43'51" - 31°29'17" / 110°44'25"		4a Cadmium, copper, pH (low), zinc
Arivaca Lake AZL15050304-0080		4a Mercury in fish tissue
Cox Gulch headwaters - 3R Canyon AZ15050301-560		4a Cadmium, copper, zinc, and pH (low)
Cox Gulch, (unnamed tributary of) headwaters - Cox Gulch AZ15050301-877		4a Cadmium, copper, zinc, and pH (low)
Harshaw Creek headwaters - Sonoita Creek AZ15050301-025		4a Copper and pH (low)
Harshaw Creek, (unnamed tributary of) (Endless Chain Mine tributary) headwaters - Harshaw Creek AZ15050301-888		4a Copper and pH (low)
Humbolt Canyon headwaters - Alum Gulch AZ15050301-340		4a Cadmium, copper, zinc, and pH (low)
Lakeside Lake AZL15050302-0760	Dissolved oxygen, ammonia, nitrogen, phosphorus, chlorophyll	
Nogales and East Nogales washes Mexico border - Potrero Creek AZ15050301-011	Chlorine, <i>Escherichia coli</i> , ammonia, copper	
Parker Canyon Lake AZL15050301-1040	Mercury in fish tissue	
Pena Blanca Lake AZL15050301-1070		4a Mercury in fish tissue
Rose Canyon Lake AZL15050302-1260	pH	
Santa Cruz River Mexico border - Nogales WWTP AZ15050301-010	<i>Escherichia coli</i>	
Sonoita Creek 750 feet below WWTP - Santa Cruz River AZ15050301-013C	Zinc	4b Dissolved oxygen
Three R Canyon headwaters - 31°28'35" / 110°46'19" AZ15050301-558A		4a Cadmium, copper, pH (low), zinc
Three R Canyon 31°28'35" / 110°46'19" - 31°28'27" / 110°47'12" AZ15050301-558B		4a Cadmium, copper, pH (low), zinc
Three R Canyon 31°28'27" / 110°47'12" – Sonoita Creek AZ15050301-558C		4a Copper and pH (low)
Three R Canyon, (unnamed tributary of) headwaters - Three R Canyon AZ15050301-889		4a Cadmium, copper, zinc, and pH (low)

Surface Water Stream Reach or Lake Number	Pollutants or Parameters of Concern	
	303(d) List TMDL required	TMDL completed or not required 4a = TMDLs complete but water quality remains impaired 4b = no TMDL required, water is impaired but expected to attain standards by next list
<b>Upper Gila Watershed</b>		
Cave Creek headwaters - South Fork of Cave Creek AZ15040006-852A	Selenium	
Gila River Skully Creek - San Francisco River AZ15040002-001	Selenium	
Gila River Bonita Creek - Yuma Wash AZ15040005-022	<i>Escherichia coli, sediment</i>	
Luna Lake AZL15040004-0840		4a Dissolved oxygen, pH (high), and a fish kill in 1999 (addressed through nutrient TMDL)
San Francisco River headwaters - New Mexico border AZ15040004-023	Sediment	
<b>Verde River Watershed</b>		
East Verde River Ellison Creek - American Gulch AZ15060203-022B	Selenium	
Grande Wash headwaters - Ashbrook Wash AZ15060203-991		4b <i>Escherichia coli</i>
Granite Creek headwaters - Willow Creek AZ15060202-059A	Dissolved oxygen	
Oak Creek At Slide Rock State Park AZ15060202-018B		4a <i>Escherichia coli</i>
Pecks Lake AZL15060202-1060		4a Dissolved oxygen (addressed through nutrient TMDL)
Stoneman Lake AZL15060202-1490		4a pH (high) (addressed through nutrient TMDL)
Verde River Oak Creek - Beaver Creek AZ15060202-015		4a Turbidity/suspended sediment concentration
Verde River Beaver Creek - HUC boundary 15060203 AZ15060202-001		4a Turbidity/suspended sediment concentration
Verde River West Clear Creek - Fossil Creek AZ15060203-025		4a Turbidity/suspended sediment concentration

Surface Water Stream Reach or Lake Number	Pollutants or Parameters of Concern	
	303(d) List TMDL required	TMDL completed or not required 4a = TMDLs complete but water quality remains impaired 4b = no TMDL required, water is impaired but expected to attain standards by next list
Verde River Bartlett Dam - Camp Creek AZ15060203-004	Selenium, copper	
Watson Lake AZL15060202-1590	Nitrogen, dissolved oxygen, pH	
Whitehorse Lake AZL15060202-1630	Dissolved oxygen	

# **Appendix B**

## **Visual Monitoring Report Form**



# Quarterly Visual Monitoring Report

(Complete a separate form for each monitoring point)

Facility Name:		Monitoring Point:	
Quarter and Year:		Date & Time Collected:	Date & Time Examined:
Time Rainfall Began:		Duration of Rainfall Event:	Rainfall Amount (inches):
Runoff Source: Rainfall or Snowmelt		Time Elapsed Since Last 0.1 inch Rainfall Event:	Qualifying Rainfall Event: YES or NO
Monitoring Personnel Name(s):			
PARAMETER	PARAMETER DESCRIPTION	PARAMETER CHARACTERISTICS	
1. Color	Does the sample appear to be colored? YES NO	Describe:	
2. Odor	Does the sample have an odor? YES NO	Describe:	
3. Clarity	Is the sample clear or transparent, meaning you can see through it? YES NO	Which of the following best describes the clarity? <b>Clear Milky Opaque</b> Other (describe):	
4. Floating Solids	Is there something floating on the surface of the sample? YES NO	Describe:	
5. Settled Solids	Is there something settled at the bottom of the sample? YES NO	Describe:	
6. Suspended Solids	Is there something suspended in the water column of the sample? YES NO	Describe:	
7. Foam	Is there foam or material forming on the top of the sample? YES NO	Describe:	
8. Oily Sheen	Can you see a rainbow effect or sheen on the water surface? YES NO	Which of the following best describes the sheen? <b>Oily Silver Iridescent</b> Other (describe):	
Detail any concerns, corrective actions taken, and any other obvious indicators of pollution present in the sample:			
Signature of Monitoring Personnel:			

# **Appendix C**

## **Analytical Monitoring Report Form**



# Analytical Monitoring Report

(Complete a separate form for each monitoring point)

<b>Facility Name:</b>		<b>Monitoring Point:</b>	
<b>Year:</b>	<b>Date Collected:</b>	<b>Monitoring Personnel Name(s):</b>	
<b>Time Rainfall Began:</b>	<b>Duration of Rainfall Event:</b>	<b>Rainfall Amount (inches):</b>	
<b>Runoff Source:</b> Rainfall or Snowmelt	<b>Time Elapsed Since Last 0.1 inch Rainfall Event:</b>	<b>Qualifying Rainfall Event:</b> YES or NO	
<b>Estimated Total Volume of Discharge (Include units; gal, ft<sup>3</sup>, etc.):</b>			
PARAMETER	SAMPLE TIME	HOW WAS SAMPLE COLLECTED?	QC SAMPLES
1.			Duplicate Split
2.			Duplicate Split
3.			Duplicate Split
4.			Duplicate Split
5.			Duplicate Split
Remarks, calculations, mine dewatering information, unusual circumstances that may affect sample results, additional information:			
<b>Signature of Monitoring Personnel:</b>			

# **Appendix D**

## **Discharge Monitoring Report Form**



# AZS000018

## DISCHARGE MONITORING REPORT (DMR)

(Complete a separate form for each monitoring point)

<b>Facility Name:</b>		<b>Monitoring Point (Outfall):</b>		
<b>Facility Address:</b>		<b>Year:</b>		
<b>Monitoring Personnel Name(s):</b>		<b>Date/Time Collected:</b>		
<b>Time Rainfall Began:</b>	<b>Duration of Rainfall Event:</b>		<b>Rainfall Amount (inches):</b>	
<b>Runoff Source:</b> Rainfall or Snowmelt	<b>Time Elapsed Since Last 0.1 inch Rainfall Event:</b>		<b>Qualifying Rainfall Event:</b> YES or NO	
<b>Estimated Total Volume of Discharge (Include units; gal, ft<sup>3</sup>, etc.):</b>			<b>NO DISCHARGE</b>	

Parameter	Quantity or Loading			Quality or Concentration			No Ex	Frequency of Analysis	Sample Type
	Average	Maximum	Units	Minimum	Average	Units			