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Funding Source(s):

Cost to Pima County General Fund: \$0.00

Contract is fully or partially funded with Federal Funds? ☐ Yes ☒ No ☐ Not Applicable to Grant Awards
Were insurance or indemnity clauses modified? ☐ Yes ☒ No ☐ Not Applicable to Grant Awards
Vendor is using a Social Security Number? ☐ Yes ☒ No ☐ Not Applicable to Grant Awards

If Yes, attach the required form per Administrative Procedure 22-73.

Amendment Information

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Amendment No.: AMS Version No.:
Effective Date: New Termination Date:
☐ Expense ☐ Revenue ☐ Increase ☐ Decrease Amount This Amendment: \$
Funding Source(s):

Cost to Pima County General Fund:

Contact: Robert Padilla

Department: Natural Resources, Parks and Recreation Telephone: 724-5235

Department Director Signature/Date: *Christy C. Carr* 6/8/16

Deputy County Administrator Signature/Date: *John M. Smith* 6/8/16

County Administrator Signature/Date: *C. D. Schellberg* 6/9/16
(Required for Board Agenda/Addendum Items)

**INTERGOVERNMENTAL AGREEMENT
FOR WATER QUALITY MONITORING
BETWEEN PIMA COUNTY AND PIMA COUNTY REGIONAL FLOOD CONTROL
DISTRICT AND ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY**

THIS INTERGOVERNMENTAL AGREEMENT (Agreement), is made and entered into by and between Pima County, a political subdivision of the State of Arizona ("County"), Pima County Regional Flood Control District ("District") and Arizona Department of Environmental Quality ("ADEQ") pursuant to A.R.S. §11-952 et seq.

WHEREAS County, District, and ADEQ may contract for services and enter into agreements with one another for joint or cooperative action pursuant to A.R.S. §§11-951 through 11-954 and 41-2631 through 41-2634; and 48-3603 and 48-3624.

WHEREAS County owns Bar V Ranch, situated along Davidson Canyon south of Interstate Highway 10; and

WHEREAS District owns the Cienega Creek Natural Preserve, situated north of Interstate Highway 10 at the confluence of Davidson Canyon; and

WHEREAS District and County wish to maintain and protect the state's Outstanding Water designation for Davidson Canyon and Cienega Creek; and

WHEREAS ADEQ wishes to monitor the Outstanding Waters segments of Davidson Canyon and Cienega Creek in Bar V Ranch and Cienega Creek Natural Preserve;

WHEREAS ADEQ has agreed to provide water quality monitoring equipment ("Equipment") to collect data on County and District lands; and

WHEREAS ADEQ has facilities and resources to analyze and report the water quality monitoring data; and

WHEREAS County and District want to obtain water quality analyses and other data from ADEQ regarding conditions in the watersheds affecting County and District lands;
NOW, THEREFORE County and District and ADEQ agree as follows:

- 1. The Parties Incorporate the Recitals into this Agreement.**
- 2. Purpose.**

The purpose of this Agreement is to set forth the responsibilities of the parties and provide water quality monitoring data to County and District.

- 3. Scope:**

A. ADEQ, through its Water Quality Division, located at 1110 W. Washington

St, will provide, install and operate Equipment designed to collect water quality samples on Cienega Creek and Davidson Canyon as described in the attached Sampling Analysis Plan (Appendix A).

- B. County will make available a site located at Latitude $34^{\circ} 59' 01.5''$, Longitude $110^{\circ} 38' 46.7''$ for the installation of such Equipment.
- C. County and District will provide ADEQ right-of-entry to their lands on Cienega Creek and Davidson Canyon to allow ADEQ to collect additional surface water quality samples. ADEQ agrees not to disturb the ground or operate motor vehicles cross country or in a watercourse.
- D. ADEQ will provide maintenance of the Equipment that it installs pursuant to this agreement.
- E. ADEQ will analyze water quality samples as described in the attached Sampling Analysis Plan.
- F. ADEQ will provide the County and the District with all water quality data that ADEQ collects in the watershed of Cienega Creek and Davidson Canyon, within ninety (90) days after sample collection, and quality control and quality assurance review.
- G. ADEQ will repair all damage done to County and District property during the course of designing, installing, and operating the Equipment. ADEQ, upon termination of this Agreement for any reason, will restore County and District property to its original condition.

4. Term and Termination

- A. ADEQ will within its lawful methods of financing provide for payment of the costs and expenses of its obligations arising each year under this Agreement from current annual budgeted funds for that year.
- B. The term of the Agreement will be for a five (5) year period upon execution by all parties and is renewable for additional five (5) year terms upon mutual agreement of all parties, unless terminated pursuant to Section 4 (D) or (E) below. Any modification of this Agreement shall be by formal written amendment and executed by the parties hereto.
- C. All work will be performed by ADEQ staff. No contractors or subcontractors will be used to perform any work outlined in Appendix A
- D. Notwithstanding any other provision in this Agreement, this Agreement may be terminated if for any reason by the County Board of Supervisors or District's Board of Directors or the State of Arizona does not appropriate

sufficient monies for the purpose of maintaining any of the parties' obligations pursuant to this Agreement, or if ADEQ fails to share water quality data with the District. In the event of cancellation for failure of ADEQ to provide water quality data, County or District shall provide ADEQ notice of opportunity to cure the defects within thirty (30) days. .

- E. ADEQ, County or District may terminate this Agreement by issuing a written notice of its intention not to renew this Agreement at least ninety (90) days prior to the end of the then existing Term.
- F. Following expiration or termination of this Agreement for any reason, ADEQ will remove all Equipment at its sole cost and expense within ninety (90) days.

5. Severability

Each provision of this Agreement stands alone, and any provision of this Agreement found to be prohibited by law shall be ineffective to the extent of such prohibition without invalidating the remainder of this Agreement.

6. Indemnification

Each party (as "Indemnitor") agrees to indemnify, defend, and hold harmless the other party (as "Indemnitee") from and against any and all claims, losses, liability, costs, or expenses (including reasonable attorney's fees) (hereinafter collectively referred to as "Claims") arising out of bodily injury of any person (including death) or property damage, but only to the extent that such Claims which result in vicarious/derivative liability to the Indemnitee are caused by the act, omission, negligence, misconduct, or other fault of the Indemnitor, its officers, officials, agents, employees, or volunteers. The State of Arizona, (State Agency) is self-insured per A.R.S. 41-621.

7. Americans With Disabilities Act

ADEQ shall comply with all applicable provisions of the Americans with Disabilities Act (Public Law 101-336, 42 U.S.C. 12101-12213) and all applicable federal regulations under the Act, including 28 CFR Parts 35 and 36.

8. Cancellation For Conflict Of Interest

This Agreement is subject to cancellation for conflict of interest pursuant to ARS § 38-511, the pertinent provisions of which are incorporated into this Agreement by reference.

9. No Joint Venture

It is not intended by this Agreement to, and nothing contained in this Agreement shall be construed to, create any partnership, joint venture or employment relationship between the parties or create any employer-employee relationship between County or District and any of ADEQ's employees, or between ADEQ and any County or District employees. None of the parties shall be liable for any debts, accounts, obligations or other liabilities whatsoever of the other party, including (without limitation) ADEQ's, District's and County's obligation to withhold Social Security and income taxes for itself or any of its employees.

10. Compliance With Laws

The parties shall comply with all federal, state, and local laws, rules, regulations, standards and Executive Orders, without limitation. The laws and regulations of the State of Arizona shall govern the rights, performance and disputes of and between the parties. Any action relating to this Agreement shall be brought in a court of the State of Arizona in Pima County.

Any changes in the governing laws, rules, and regulations during an agreement shall apply, but do not require an amendment or revisions.

11. Non-Discrimination

ADEQ agrees to comply with all provisions and requirements of Arizona Executive Order 2009-09 which is hereby incorporated into this agreement as if set forth in full herein_including flow down of all provisions and requirements to any subcontractors. During the performance of this agreement, ADEQ shall not discriminate against any employee, client or any other individual in any way because of that person's age, race, creed, color, religion, sex, disability or national origin.

12. No Third Party Beneficiaries

Nothing in the provisions of this Agreement is intended to create duties or obligations to or rights in third parties not parties to this Agreement or to affect the legal liability of either party to the Agreement by imposing any standard of care with respect to the maintenance of public facilities different from the standard of care imposed by law.

13. Workers' Compensation

ADEQ shall comply with the notice of A.R.S. §23-1022 (E). For purposes of A.R.S. §23-1022, ADEQ shall be considered the primary employer of all personnel currently or hereafter employed by those parties, irrespective of the operations of protocol in place, and said party shall have the sole responsibility for the payment of Workers' Compensation benefits or other fringe benefits of said employees.

14. Notice

Any notice required or permitted to be given under this Agreement shall be in writing and shall be served by personal delivery or by certified mail upon the other party as follows:

COUNTY:

Chris Cawein, Director
Pima County NRPR
3500 W. River rd.
Tucson, Arizona, 85741
(520) 724-5256
Chris.Cawein@pima.gov

ADEQ:

Jason Sutter
Water Quality Surface Water Section
Arizona Department of Environmental Quality
1110 West Washington Street
Phoenix, Arizona, 85007
(602) 771-4468
Sutter.jason@azdeq.gov

15. Records Retention

Pursuant to A.R.S. §§ 35-214 and 35-215, the parties shall retain all records relating to this Agreement for a period of five years after completion of the Agreement. All records shall be subject to inspection and audit by the State of Arizona at reasonable times. Upon request, the parties shall produce the original of any or all such records at the offices of ADEQ.

16. Arbitration

The parties to this Agreement agree to resolve all disputes arising out of or relating to this Agreement through arbitration, after exhausting applicable administrative review, to the extent required by A.R.S. § 12-1518 except as may be required by other applicable statutes.

17. Entire Agreement

This document constitutes the entire agreement between the parties pertaining to the subject matter hereof, and all prior or contemporaneous agreements and understandings, oral or written, are hereby superseded and merged herein. This Agreement may be modified, amended, altered or extended only by a written amendment signed by the parties.

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IN WITNESS THEREOF, the parties have affixed their signatures to this Agreement on the date written below.

PIMA COUNTY

**ARIZONA DEPT. OF
ENVIRONMENTAL QUALITY**

Sharon Bronson, Chair, Board of Supervisors

Trevor Baggione, WQD Director,
Arizona Department of Environmental
Quality

Date

Date

ATTEST

Robin Brigode, Clerk of Board

Date

APPROVED AS TO CONTENT:

Christopher Cawein, Director, Pima County Natural Resources, Parks and Recreation

Date

PIMA COUNTY REGIONAL FLOOD CONTROL DISTRICT

Sharon Bronson, Chair, Board of Directors

Date

ATTEST

Robin Brigode, Clerk of Board

Date

APPROVED AS TO CONTENT:



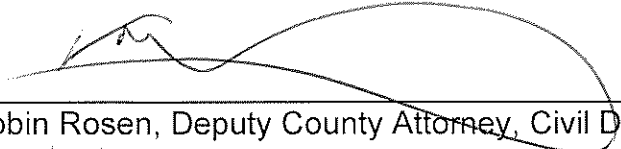
Suzanne Shields, Chief Engineer, Pima County Regional Flood Control District

Date

INTERGOVERNMENTAL AGREEMENT DETERMINATION

The foregoing Intergovernmental Agreement between Pima County, the Pima County Regional Flood Control District and the Arizona Department of Environmental Quality has been reviewed pursuant to A.R.S. § 11-952 et seq. by the undersigned, who have determined that it is in proper form and is within the powers and authority granted under the laws of the State of Arizona to those Parties to the Intergovernmental Agreement represented by the undersigned.

PIMA COUNTY:

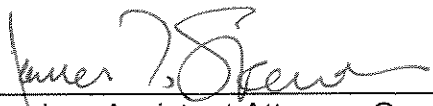


Tobin Rosen, Deputy County Attorney, Civil Division

3/31/16

Date

ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY




Jay Skardon, Assistant Attorney General, Environmental Enforcement Section

3/21/16

Date

PIMA COUNTY REGIONAL FLOOD CONTROL DISTRICT:



Tobin Rosen, Deputy County Attorney, Civil Division

3/31/16

Date

EXHIBIT A: SAMPLING ANALYSIS PLAN



Davidson Canyon and Lower Cienega Creek Sample and Analysis Plan

Santa Cruz Watershed
Pima County, Arizona

December 2015

1.0 INTRODUCTION

Lower Davidson Canyon (Spring located at 31°59'00"/110°38'46" to Cienega Creek, excluding the ephemeral reach) and Cienega Creek (Gardener Canyon to Pantano Wash) are designated as Outstanding Arizona Waters (OAW) per *Arizona Administrative Code* (A.A.C.) Title 18, Chapter 11, Section 112(G). As such, both stream segments are given Tier 3 antidegradation protection per A.A.C. 18-11-107.01(C) which prohibits a new or expanded discharge directly to an OAW or a discharge that is tributary or upstream from degrading the water quality in a downstream OAW.

Although low or baseflow data have been collected from lower Davidson Canyon and Cienega Creek by the Arizona Department of Environmental Quality (ADEQ) and Pima County no stormwater data have been collected. In contrast, no baseflow data exists in the upper watershed due to its ephemeral nature; however Rosemont Copper began collecting stormwater samples from Barrel Canyon and upper Davidson Canyon in 2010 as part of their voluntary monitoring program. In order to determine current water quality conditions ADEQ will initiate a low flow and stormwater sampling program.

1.1 Purpose of Project

This Sample and Analysis (SAP) will provide a plan for the collection of water quality data that will determine baseline stormwater and low flow conditions and inform future water quality assessments. Based upon Rosemont's stormwater data, primary constituents of concern include arsenic, copper, lead and selenium however; additional parameters will be collected to meet 305(b) water quality assessment requirements. Low flow data from the OAWs have not resulted in any water quality exceedances being reported in recent 305(b) water quality assessments.

1.2 SAP Objectives

The primary objective of the SAP is to provide for the collection of a representative body of water quality and stream flow data to characterize current water quality conditions within the Davidson Canyon and lower Cienega Creek watersheds prior to the construction of the Rosemont Copper mine. The data must be credible and scientifically defensible as described in the A.A.C., Title 18, Chapter 11, Article 6.

2.0 BACKGROUND

Davidson Canyon and Cienega Creek are located in Pima County, southeast of Tucson. Prolonged drought conditions, increased groundwater pumping and the proposed Rosemont Copper project all have the potential to impact surface water quality. Lower Davidson Canyon and lower Cienega Creek are OAWs and afforded a higher level of protection under A.A.C. 18-11-107.01(C). Although water quality data have been collected since the 1980s, it has been temporally and spatially limited.

Therefore, a robust dataset is required to understand current conditions and establish a baseline against which future data can be compared to ensure that water quality is being protected.

Figure 1 shows the sample sites and Table 1 contains the length and designated uses for stream reaches that the sample sites are located within.

Table 1. Sample Site Reach Information and Designated Uses

Reach	Length (mi.)	Designated Uses
Davidson Canyon (15050302-153A)- Headwaters to OAW	13.6	A&We, AgL, PBC
Davidson Canyon OAW (15050302-153B) - Spring located at 31°59'00"/110°38'46" to Cienega Creek, excluding the ephemeral reach	0.4	A&Ww, AgL, FC, FBC
Cienega Creek (15050302-006B)- Gardener Canyon to Pantano Wash	28.8	A&Ww, AgL, FC, FBC

A&Ww- Aquatic and Wildlife, warmwater
A&We- Aquatic and Wildlife, ephemeral
AgL- Agricultural Livestock Watering

PBC- Partial Body Contact
FC- Fish Consumption
FBC- Full Body Contact

Sample Sites Davidson Canyon and Cienega Creek

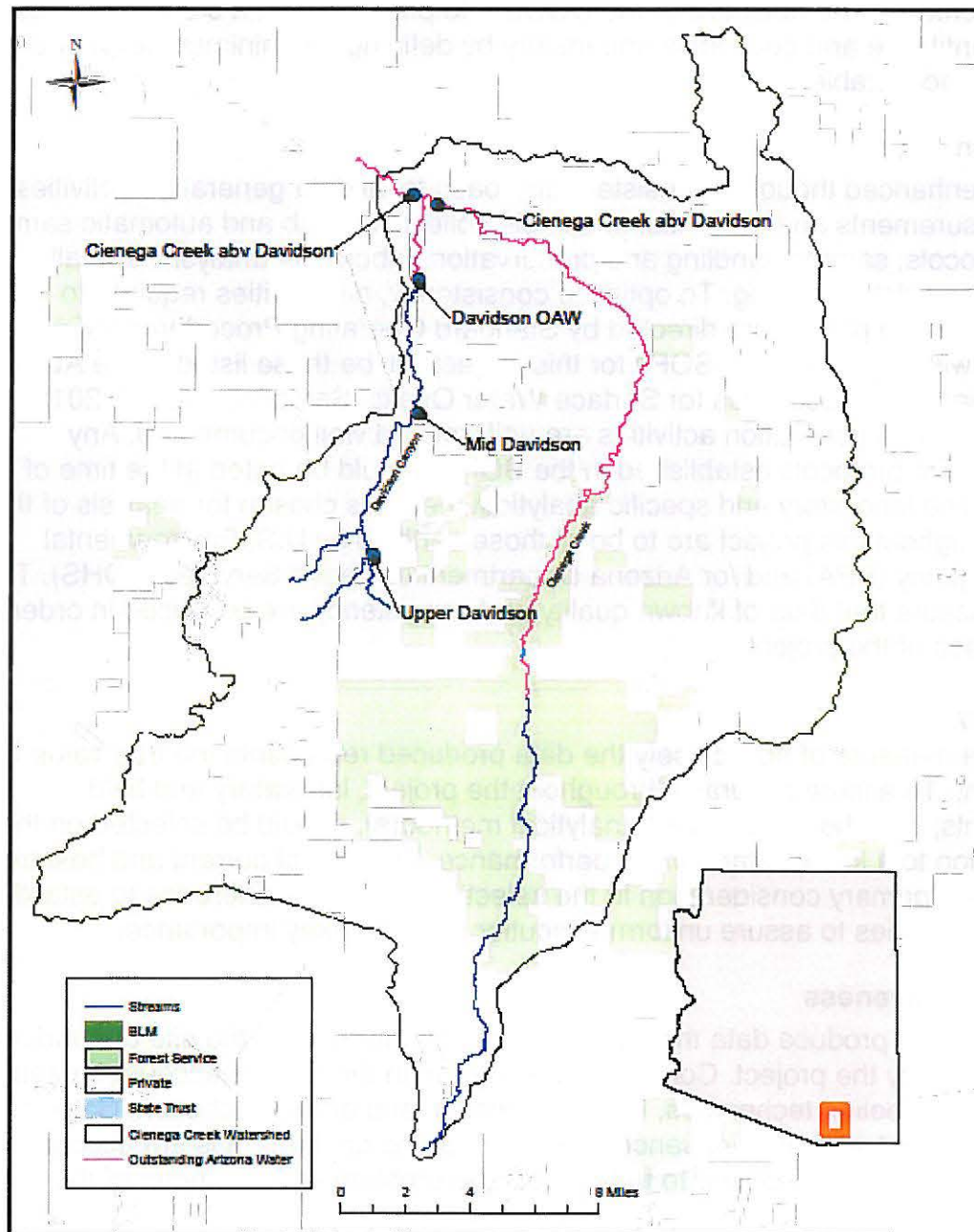


Figure 1. Sample Sites

3.0 DATA QUALITY OBJECTIVES

The Impaired Waters Identification Rule (IWIR) (A.A.C. R18-11-6) states that data collected must be credible and scientifically defensible. In order to meet those requirements, data quality objectives (DQOs) are set. The DQOs include precision, accuracy, representativeness, comparability, and completeness, commonly referred to as the PARCC criteria. The objective of the DQOs is to produce a data set with well-defined levels of quantitative and qualitative uncertainty by defining the minimum level of data quality that is acceptable.

3.1 Precision

Precision is enhanced through a consistent approach to all data generation activities, such as field measurements and calibrations, sample collection (grab and automatic sampler), custody protocols, sample handling and preservation, laboratory analysis, and all calculations and data handling. To optimize consistency, all activities required to generate data throughout the project are directed by Standard Operating Procedures (SOPs). Unless otherwise specified, the SOPs for this project will be those listed in the ADEQ Standard Operating Procedures for Surface Water Quality Sampling (ADEQ, 2012). SOPs help ensure all data generation activities are uniform and well documented. Any exceptions to the protocols established in the SOPs, should be noted at the time of the occurrence. The laboratory and specific analytical methods chosen for analysis of the samples throughout this project are to be of those certified by U.S. Environmental Protection Agency (EPA) and /or Arizona Department of Health Services (ADHS). This is required to ensure that data of known quality and consistency are produced in order to meet the needs of the project.

3.2 Accuracy

Accuracy is a measure of how closely the data produced represents the true value for a measurement. To assure accuracy throughout the project, laboratory and field measurements, with their associated analytical method(s), should be selected on the basis of accreditation to a known standard of performance. The use of current and best available technology is a primary consideration in the selection process. Adherence to established SOPs for all activities to assure uniform execution is also of key importance.

3.3 Representativeness

The objective is to produce data that truly reflects the character of the site or condition being examined by the project. Consideration is given in the SAP to account for sample site selection, collection techniques, type of samples, and analytes chosen. Care is taken that samples reflect seasonal influences and that natural backgrounds are accounted for. Choices are guided by the desire to truly reflect the problem and character of the water body.

3.4 Comparability

The purpose is the production of reproducible data throughout the project, for which it is valid; to compare or contrast project sample results, spatially and temporally. This goal is pursued through use of uniform collection, handling, analytical, and measurement

methods as directed by the appropriate SOPs. Production of reproducible data is aided by efforts to assure that conditions of data generation throughout the project do not differ in any way (e.g. collection, analytically, spatially, or temporally). If all data generation activities are uniform and documented, with any exceptions noted, then data sets can be compared or contrasted with defined confidence.

3.5 Completeness

The objective is that the number of samples to be taken is sufficient to characterize the nature of the problem and site, with consideration given to possible spatial and temporal impacts, natural backgrounds, and all foreseeable potential impacts affecting the presence of the targeted pollutants within the reach. In addition to satisfying the IWIR requirements, the samples collected must meet the needs of the evaluation and allow for the needs of models chosen for the project. Sampling throughout all phases of mine remediation is necessary to identify and quantify improvements. Additional samples are planned to be collected to satisfy "core parameter" data requirements for water quality assessment purposes.

3.6 Data Handling and Analysis

In order to fulfill the objectives set forth in the DQOs, data must be reviewed upon returning from the field and receipt from the laboratory. Data will be handled using the following guidelines:

1. Evaluate data against chain of custody (COC) and past or expected results;
2. Reconcile problems with results;
3. Enter data and have data Quality Assurance (QA)/Quality Control (QC) checked within one month of receipt; and
4. Adjust SAP as data warrants.

Statistical analysis methods, as outlined in Statistical Methods in Water Resources (Helsel and Hirsh, 2002), will be used. Comparison of results to water quality standards will determine the degree of attainment.

The SAP, using the DQOs as guidance, is intended to collect a body of data that is both comprehensive and scientifically sound. The body of data will be considered sufficient for 305(b) Assessment purposes once seasonality and spatial variations in water quality have been addressed. A full evaluation of the data collected will occur after the 2015 monsoon season and again following baseflow sampling anticipated to be completed in early 2016.

4.0 SAMPLING PLAN

Three Davidson Canyon and two Cienega Creek sites will be sampled (Table 2 and Figure 1). Historic water quality data are available from sites 109222, 100263 and 100598. The mid and upper Davidson Canyon sites are newly established sites. These sites will serve as the baseline for comparison to data collected under this SAP in addition to data collected under Rosemont's Phase 1 voluntary and 401 Surface Water Mitigation monitoring plans. Given the flashy nature of flows in the watershed and distance from Phoenix, ADEQ will install an automated sampler in the OAW and mid-reach Davidson Canyon sites. ADEQ will install a passive stormwater sampler at the upper Davidson

Canyon site. Grab samples will be the primary collection method at the Cienega Creek sites but will also be collected at the Davidson Canyon sites as conditions allow.

Table 2. Sample Site Descriptions and Unique Identifiers

Description (Reach)	Site ID	ADEQ #
Davidson Canyon at OAW Spring Source 34° 59' 01.5", 110° 38' 46.7"	SCDVC002.50*	109222
Cienega Creek at Marsh Station Road 32° 01' 09", 110° 38' 44"	SCCIE002.89	100263
Cienega Creek above Davidson Canyon 32° 01' 9.2", 110° 38' 27.8"	SCCIE003.26	100598
Mid Davidson Canyon 31° 55' 11.2", 110° 38' 59.6"	TBD*	TBD
Upper Davidson Canyon 31° 51' 23", 110° 40' 19.4"	TBD	TBD

* Automated sampling sites

4.1 Sample Sites

As mentioned above five sites will be sampled to determine current water quality conditions in Davidson Canyon and lower Cienega Creek. The rationale for sampling each site follows.

4.1.1 Davidson Canyon at OAW Spring Source (SCDVC002.50)

The site is located within the upper Davidson Canyon OAW reach below the southern spring located within the Cienega Creek Natural Preserve (Preserve). Data from this site will establish baseline water quality entering the Preserve from upper Davidson Canyon under high flows and confirm water quality during low flow conditions based on two ADEQ sampling events from 2012.

Stormwater data collected from within the OAW is key to establishing the baseline against which future data, post mine construction, will be compared. Therefore, ADEQ will install automated sampling equipment to capture samples under variable flow conditions. In addition to an autosampler and level logger, this site will also be equipped with a data recorder, which will transmit stream stage and weather data to an ADEQ webserver every 15 minutes. The telemetry data is then posted on ADEQ's website- <http://www.azdeq.gov/environ/water/monitors/>

4.1.2 Cienega Creek at Marsh Station Road (SCCIE002.89)

This site will measure the combined water quality from Davidson Canyon and upper Cienega Creek. ADEQ has a long period of data collection, extending from 1987 to 2013; however the majority of this data is low flow data. This site is located within the OAW reach of Cienega Creek and the Preserve.

4.1.3 Cienega Creek above Davidson Canyon (SCCIE003.26)

Data from this site will serve as baseline data for upper Cienega Creek prior to its confluence with Davidson Canyon. ADEQ has only sampled this site once under

low flow conditions in 1998. This site is located within the OAW reach of Cienega Creek and the Preserve.

4.1.4 Mid Davidson Canyon (TBD)

The sample site is located downstream of South Sonoita Highway on State Trust Land. The site is approximately 2.2 miles downstream of Rosemont Copper's DC-3 sample site and 5.2 miles above the Davidson Canyon OAW. Data from this site will fill a data gap that currently exists between DC-3 and the Davidson Canyon OAW.

ADEQ will install automated sampling equipment (autosampler and level logger) to collect samples under variable flow conditions and collect stream level information.

4.1.5 Upper Davidson Canyon (TBD)

Although Rosemont Copper has a proposed sample site located on Davidson Canyon above Barrel Canyon no water quality data has been collected due to their inability to obtain access. ADEQ will establish a sample site below the confluence of Davidson Canyon and East Fork Davidson Canyon. This site will be used to determine background water quality in relatively undeveloped areas of the watershed.

Since the site is located in the headwaters area of the watershed, any flows will likely be short in duration. Therefore, ADEQ will use passive stormwater samplers to collect water quality samples. A tipping bucket rain gauge will also be installed near the site to collection precipitation data form the upper watershed. The site is located on State Trust Land.

4.2 Sampling Frequency

Sampling will primarily target stormwater runoff since this is the critical condition when water quality exceedances have previously been observed. Unattended sampling equipment (autosamplers, level loggers and stormwater samplers) will be installed in order to sample events when they occur. The equipment will be serviced as soon as accessible after storm events and served once a month depending on precipitation patterns. Manual grab samples, field water quality parameters, and discharge will be collected during field visits as conditions permit. Stormwater sampling efforts will primarily focus on the two rainy seasons (January-March and July-September) with a minimum of two sampling events targeted per season. Low flow sampling will occur in the cooler months when baseflow is expected to occur, with a minimum of two sampling events.

4.3 Target Analytes and Analytical Methods

The suite of analytes for this project will include ADEQ's Ambient Monitoring program's five bottle suite, see Appendix A. Table 3 lists the analytes, analytical methods and method reporting limits (MRLs) for the identified constituents of concern based upon historic water quality data. As mentioned in Section 1.1 and above, additional parameters will be included in the sample suite to fulfill 305(b) Assessment needs.

In order to develop a more robust dataset, analytical results that fall between the MRL and method detection limit will be reported as an estimated value by the laboratory rather than as a non-detect.

In order to develop a more robust dataset, analytical results that fall between the MRL and method detection limit will be reported as an estimated value by the laboratory rather than as a non-detect.

Table 3. Analytes of Concern, Analytical Methods and Reporting Limits

Analyte	Method	Reporting Limit
Copper (total and dissolved)	EPA 200.7	10 µg/L
Lead (total)	EPA 200.8	1 µg/L
Arsenic (total)	EPA 200.7	3 µg/L
Selenium (total)	EPA 200.7	1 mg/L

5.0 FIELD METHODS

Samples and field data will be collected using ADEQ-collection techniques (detailed in ADEQ, 2012) with as few deviations from protocol as possible. Samples will be analyzed by a state license laboratory using ADHS or EPA approved analytical methods with as few deviations from protocol as possible. Deviations will be noted in the project field notebook.

5.1 Health and Safety

Personal safety always has priority over samples and sample collection. Refer to the Health and Safety Plan in Appendix B. An emergency contact sheet will be completed prior to leaving Phoenix for field activities. Copies are distributed to the Watershed Protection Unit Supervisor or Surface Water Section Manager and the emergency contacts will be listed for each team member. Refer to the sample form in Appendix C.

5.2 Field Activity Documentation

All sites will be photographed during every visit. Notes to be made during each visit include specific field parameter measurements and general observations related to: accessibility, hydrologic features (stream bed material, flow conditions, obstructions, etc.), vegetation (presence/absence compared to upstream/downstream), water clarity, odor, color, bottom and bank material, and overall suitability as a sampling site. Changes will be noted at each subsequent visit in either a field notebook or on the field data sheet (Appendix D).

5.3 Sample Collection

Most water samples will be collected by autosamplers and, when available, manual grab samples following the ADEQ Standard Operating Procedures for Surface Water Quality Sampling (ADEQ, 2012). All samples will be placed in a cooler with ice immediately after collection and kept on ice and/or refrigerated during transport until delivery to the laboratory. Samples collected by the autosamplers will be chilled as soon as they are retrieved. A Chain of Custody will be maintained on all samples at all times until delivered to the analytical laboratory.

5.4 Field Measurements and Equipment

Site conditions will be described during each site visit. These descriptions will be recorded in a bound field notebook and/or on the Field Data Sheet (Appendix D) and will include the following information:

- Type of work being completed (i.e. reason for visit)
- Location of work
- Weather conditions
- Estimated recent precipitation amounts
- Temperature
- Ongoing activities that may influence or disrupt sampling efforts
- Accessibility to the sampling locations (e.g. rough terrain, fallen trees, flooding, etc.)
- Maintenance completed on autosamplers
- Condition of autosamplers

General field-measured water quality data will be obtained with a HydroLab Mini Sonde and Surveyor or comparable instrument. These measurements will include:

- Water temperature (°C)
- Dissolved oxygen (mg/L and % saturation)
- Specific conductance (µS/cm)
- pH (SU)
- ORP (mV)
- Total Dissolved Solids (TDS; mg/L)

Other general field-measurements include:

- Air temperature (°C)
- Turbidity
- Discharge (cfs)
- Barometric pressure (mm Hg)
- Depth of water at level logger transducer (feet), if one is installed at the site

5.5 Sample Bottle Labels

Each sample bottle will be labeled similar to the following example:

Site ID: SCXXX000.00

Date: MM/DD/YY

Time: HR:MM (24-hour clock)

Samplers Initials

Parameters and Analysis Requested:

Preservation (if necessary)

Sample bottles will be labeled with an indelible pen. Where necessary, the label will be protected from water and solvents with clear tape. Additional notes should be made regarding filtering, and special methods should also be listed on the bottle. If preservation acid is used, the appropriate sticker will also be added to the bottle and clear tape will be placed over the top of the sticker.

5.6 Sample Custody

Sample custody is a part of a quality field or laboratory operation. Custody of a sample is defined as:

- Having physical possession
- Being in view, after being in possession
- Having possession, then being stored in a secure area
- Being maintained in a secure area by the person who last had possession

These custody practices will be observed while ADEQ has possession of the samples. Prior to leaving for the field a tracking number will be obtained and noted in the project field book and the laboratory COC. Proper documentation of field samples includes entering information into the field book, field forms and the COC for each sample collected.

5.7 Instantaneous Discharge Measurements

The preferred method for measuring instantaneous stream discharge by flow meter, tape and top setting wading rod are described in the ADEQ Standard Operating Procedures (SOPs) for Surface Water Quality Sampling (ADEQ, 2012). An alternative method for measuring stream discharge is the “float” method, also described in the ADEQ SOPs. When water is flowing during a site visit, discharge measurements will be taken.

5.8 Automated Water Quality Sampling

One autosampler will be installed at the Davidson Canyon at OAW Spring (SCDVC002.50) and another at the mid Davidson Canyon (TBD) sample site. The methods for water quality monitoring by automated samplers and programmable field loggers (level loggers) are described in the ADEQ Standard Operating Procedures for Surface Water Quality Sampling (ADEQ, 2012).

5.9 Stream Stage Logger

A stream stage logger will be installed at the two automated sample sites, Davidson Canyon at OAW Spring (SCDVC002.50) and mid-Davidson Canyon (TBD). The loggers provide a record of stream stage where no USGS stream gaging station exists. The level logger data, in conjunction with several manually obtained stream discharge measurements, obtained at different stages, provide the information necessary to estimate a stage-discharge relationship. The logger data, used in conjunction with the Barrel Canyon USGS gauge and DC-3 data, will be used to determine the duration, frequency and distance the flows from Barrel Canyon persist in Davidson Canyon.

5.9 Stormwater Samplers

Passive stormwater samplers commonly referred to as first-flush samplers, will be installed at the upper Davidson Canyon (TBD) site. The advantage of using first-flush samplers over auto-samplers for collecting the first moments of the storm have largely to do with cost, portability, and relative ease of deployment.

The first-flush sampler consists of a one-liter Nalgene bottle with a specifically-designed cap. The cap is designed so that sediment-laden water falling on top of the cap is diverted

radially around an ellipsoid-shaped bulb having the same radius as the collection bottle. At the outer edge of the ellipsoid, sediment particles are shed by gravity outside the collection bottle, while the water continues to adhere to the surface of the ellipsoid and run to the center collection point below the bulb. When the collection bottle is full the bulb seals the opening preventing evaporation and contamination.

5.10 Rain Gauge

ADEQ utilizes tipping bucket rain gauges equipped with a data logger. The buckets tip in response to every 1/100 inch of precipitation, which is recorded as an event on the event data logger. Gauge data will be used to correlate the timing of flow events in the upper watershed.

5.11 Laboratory Information

Accutest Laboratories will perform all chemical analysis. The laboratory will be responsible for laboratory QA/QC. As stated in Section 4.2 there will be four storm and two low flow sampling events targeted. Each sample costs approximately \$430 for the ambient parameter suite. The OAW sites (3) will be sampled under two baseflow events.

Accutest Laboratories
1741 W University Drive
Tempe, AZ 85281
Tel: (480) 275-8931

Table 4. Laboratory Costs

Parameter	Events	Samples	Cost/each	Total
Baseflow	2	6	\$430.00	\$2580.00
Stormflow	4	60	\$430.00	\$25800.00
<i>Grand Totals</i>	<i>6</i>	<i>66</i>		<i>\$28320.00</i>

REFERENCES

ADEQ, 2012, Jones, J., ed. Standard Operating Procedures for Surface Water Quality Sampling. Arizona Department of Environmental Quality TM06-02. Phoenix, AZ.

Helsel, D.R. and Hirsh, R.M., 2002. *Statistical Methods in Water Resources*. In Techniques of Water-Resources Investigations of the United States Geological Survey, Book 4, Chapter A3, Hydrologic Analysis and Interpretation. Washington D.C., 503p.

Appendix A Analytes

Chemical	Analysis Type	Method	MRL	MRL Unit	Bottle	Holding Time
ANTIMONY	DISSOLVED	EPA 200.8	3	UG/L	Dissolved Metals	6 MONTHS
ARSENIC, INORGANIC	DISSOLVED	EPA 200.8	3	UG/L	Dissolved Metals	6 MONTHS
CADMIUM	DISSOLVED	EPA 200.8	1	UG/L	Dissolved Metals	6 MONTHS
COPPER	DISSOLVED	EPA 200.7	10	UG/L	Dissolved Metals	6 MONTHS
LEAD AND COMPOUNDS (INORGANIC)	DISSOLVED	EPA 200.8	1	UG/L	Dissolved Metals	NONE
MERCURY, ELEMENTAL	DISSOLVED	EPA 245.1	0.2	UG/L	Dissolved Metals	90 DAYS
ZINC	DISSOLVED	EPA 200.7	0.05	MG/L	Dissolved Metals	6 MONTHS
ALKALINITY, PHENOLPHTHALEIN	TOTAL	SM 2320B	6	MG/L	Inorganics	14 DAYS
CALCIUM	TOTAL	EPA 200.7	5	MG/L	Inorganics	NONE
CALCIUM CARBONATE	TOTAL	SM 2320B	6	MG/L	Inorganics	14 DAYS
CARBONATE	TOTAL	SM 2320B	6	MG/L	Inorganics	14 DAYS
CHLORIDE	TOTAL	EPA 300.0	2	MG/L	Inorganics	NONE
FLUORIDE	TOTAL	EPA 300.0	0.4	MG/L	Inorganics	28 DAYS
HARDNESS (CACO ₃ + MGCO ₃)	CALCULATED	SM 2340B	13	MG/L	Inorganics	6 MONTHS
HYDROGEN CARBONATE	TOTAL	SM 2320B	6	MG/L	Inorganics	14 DAYS
PH	TOTAL	SM 4500-H+	1.68	SU	Inorganics	15 MINUTES
POTASSIUM	TOTAL	EPA 200.8	2	MG/L	Inorganics	NONE
SODIUM	TOTAL	EPA 200.8	2	MG/L	Inorganics	NONE
SPECIFIC CONDUCTIVITY	STANDARD	SM 2510B	2	UMHOS/CM	Inorganics	FIELD
SULFATE	TOTAL	EPA 300.0	2	MG/L	Inorganics	28 DAYS
TOTAL DISSOLVED SOLIDS	DISSOLVED	SM 2540C	20	MG/L	Inorganics	7 DAYS
AMMONIA AS NITROGEN	TOTAL	SM 4500NH ₃ D	1	MG/L	Nutrients	28 DAYS
KJELDAHL NITROGEN	TOTAL	SM 4500-NORG,C	1	MG/L	Nutrients	28 DAYS
NITRATE + NITRITE	TOTAL	EPA 353.2	0.1	MG/L	Nutrients	28 DAYS
PHOSPHORUS	TOTAL	SM 4500-P BE	0.1	MG/L	Nutrients	28 DAYS
SUSPENDED SEDIMENT CONCENTRATION	SUSPENDED	ASTM D3977C	1	MG/L	SSC	NONE
ANTIMONY	TOTAL	EPA 200.8	3	UG/L	Total Metals	6 MONTHS
ARSENIC, INORGANIC	TOTAL	EPA 200.8	3	UG/L	Total Metals	6 MONTHS
BERYLLIUM AND COMPOUNDS	TOTAL	EPA 200.8	1	UG/L	Total Metals	6 MONTHS
BORON (BORON AND BORATES ONLY)	TOTAL	EPA 200.7	0.2	MG/L	Total Metals	6 MONTHS
CADMIUM	TOTAL	EPA 200.8	1	UG/L	Total Metals	6 MONTHS
CHROMIUM	TOTAL	EPA 200.7	10	UG/L	Total Metals	6 MONTHS
COPPER	TOTAL	EPA 200.7	10	UG/L	Total Metals	6 MONTHS
LEAD AND COMPOUNDS (INORGANIC)	TOTAL	EPA 200.8	1	UG/L	Total Metals	6 MONTHS

Chemical	Analysis Type	Method	MRL	MRL Unit	Bottle	Holding Time
MAGNESIUM	TOTAL	EPA 200.7	5	MG/L	Total Metals	NONE
MANGANESE	TOTAL	EPA 200.8	10	UG/L	Total Metals	6 MONTHS
MERCURY, ELEMENTAL	TOTAL	EPA 245.1	0.2	UG/L	Total Metals	6 MONTHS
SELENIUM AND COMPOUNDS	TOTAL	EPA 200.7	1	UG/L	Total Metals	6 MONTHS
ZINC	TOTAL	EPA 200.7	50	UG/L	Total Metals	6 MONTHS

APPENDIX B

Health and Safety Plan

Davidson Canyon Health and Safety Plan

Location: Southeast of Tucson, Arizona

Objective: Perform field activities related to the deployment and maintenance of field equipment and to collect water samples from Davidson Canyon and Cienega Creek.

PPE Level: Level D

Chemical Protective Gloves

Rubber Hip or Chest Waders

Required Safety Training for Field Personnel:

40-hr OSHA 1910.12

Current 8-hr OSHA 19910.12

MSHA Part 48 Refresher

Known and Potential Hazards:

Hazard	PPE	Precautions
Flash Flood	N/A	Use extreme caution when crossing flooded river fords in vehicles. Beware of changing weather conditions and be prepared to seek higher ground. Observe rules of thumb; don't wade in stream over factor of 9 (i.e., depth ft x velocity ft/s > 9).
Illegal Activity (Undocumented aliens/Drug Smuggling)	N/A	Be aware of surroundings. Avoidance of migrants is the best course of action in most situations. Leave any situation or location that elicits uncertainty or fear. Report concerns and observations to law enforcement. Cooperate fully with law enforcement and Border Patrol.
Lightning	N/A	Take cover in vehicle or building.
Contact with Chemicals and Poor Quality Water	Nitrile Gloves, Safety Glasses, Hip/Chest Waders	Avoid direct contact with polluted stream water. Wash-up thoroughly before eating, drinking, etc. Some sample bottles contain sulfuric or nitric acid, use caution when handling.
Heat Stress	N/A	Drink plenty of potable water; wear a hat and light colored clothing. Take breaks as needed.
Hypothermia	Rain/Snow gear	Expect sub-freezing and wet conditions during winter months. Keep dry.

Desert wildlife- snakes, Africanized bees, and scorpions should be expected.	Snake leggings	Use caution walking to sites, and when reaching into equipment vaults. Avoid dark color clothing and eating bananas (attracts bees).
Slips, Trips, and Falls	Deep lugged boots, safety ropes, and flash lights at night	Use good footings, and ropes for assistance down steep slopes.

Nearest Hospital: Concentra Medical Center, 4600 S Park Ave #5 ; see attached map

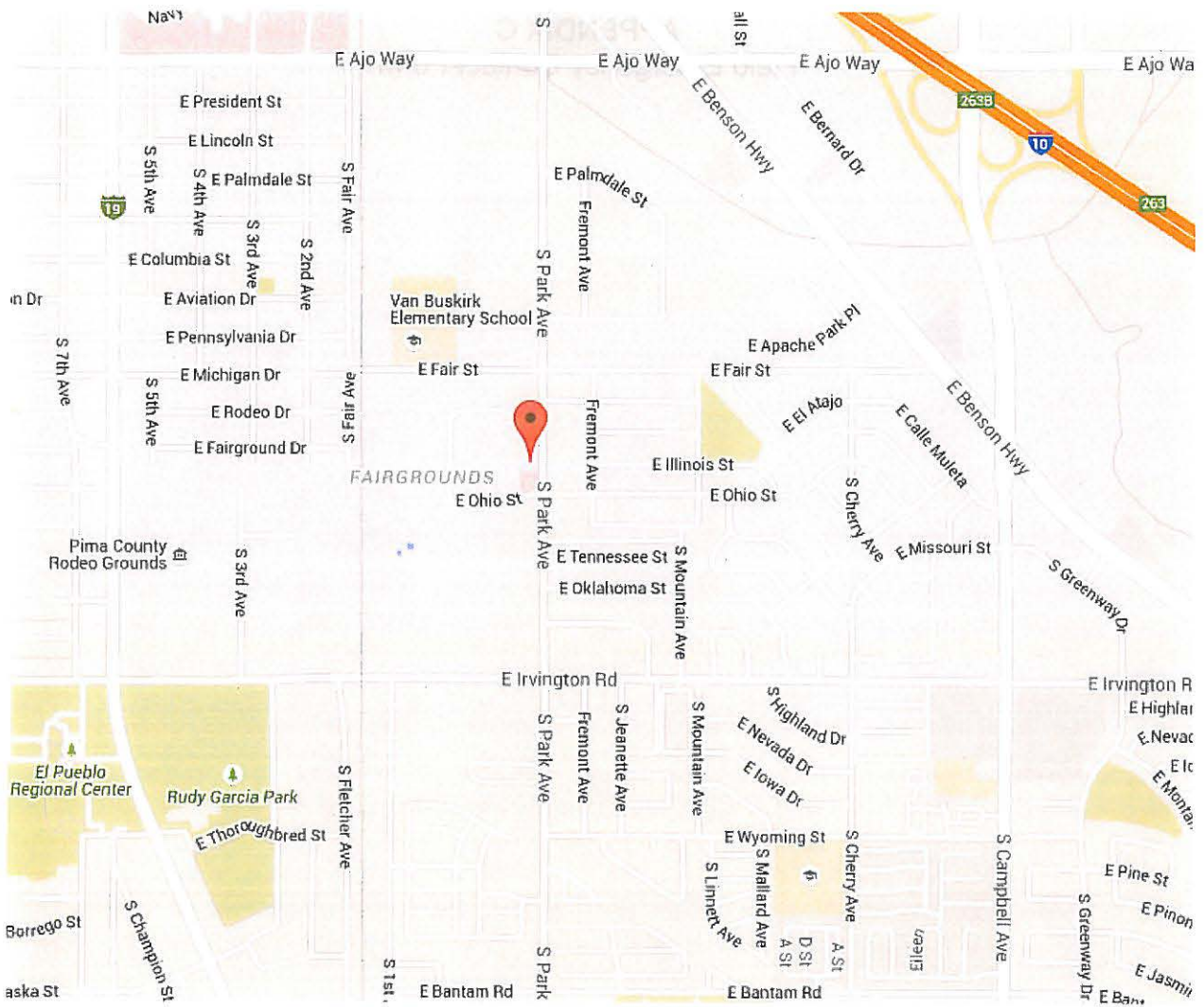
Equipment and Personal Decontamination:

Wash with non-phosphate (Liquinox) detergent and rinse with deionized water for instruments. Wash with non-phosphate (Liquinox) detergent, rinse with deionized water, rinse with nitric acid (5%), and a final rinse with D.I. water for automatic samplers, churn splitters and other equipment that will come into contact with the sample.

Antibacterial soap and water rinse will be used for personal hygiene and protection from any bacterial agents.

Emergency Contacts

Police/Fire/Ambulance	911
Concentra Medical Center 4600 S Park Ave #5 Tucson, AZ 85714	(520) 889-9574
Pima County Sheriff San Xavier District Tucson, AZ 85713	(520)351-3888
US Border Patrol Sonoita Station 3225 Highway 82 Sonoita, AZ 85637	(520) 444-5051



Concentra Medical Center
 4600 S Park Ave #5
 (520) 889-9574

APPENDIX C
Field Emergency Contact Form

FIELD EMERGENCY CONTACT FORM **Davidson Canyon**

Employees to be in the field	Phone Number	Emergency Contact	Contact Phone
John Doe	(602)123-4567	(contact name)	(602)123-4567
Jane Smith	(520)123-4567	(contact name)	(602)123-4567

Vehicle License/Description:

Contact Person	Work Phone #	Home Phone #
Jason Sutter	602-771-4468	602-361-3720

Emergency Numbers

Pima County Sheriff
San Xavier District
Tucson, AZ 85713
(520) 351-3888

Arizona Department of Public Service
Tucson- District 8
6401 S Tucson Blvd
Tucson, AZ 85706
(520) 746-4500

US Border Patrol
Sonoita Station
3225 Highway 82
Sonoita, AZ 85637
(520) 444-5051

ADEQ Main Phone
800-234-5677

Vehicle emergencies contact 1-800-352-8400 until 10:00 p.m.
Check-in with contact person unless otherwise specified.

ITINERARY

Date: Mon, M/DD/YY	Check-in time:	Lodging:
Activities:		
Date: Tues, M/DD/YY	Check-in time:	Lodging:
Activities:		
Date: Wed, M/DD/YY	Check-in time:	Lodging:
Activities:		

APPENDIX D Field Form



ADEQ Number _____

TMDL FIELD FORM

INSERT PROJECT NAME

Site Code _____ Date _____ Water Sample Time _____

Site Name _____ Field Crew _____

FIELD DATA						
Air Temp.		°C	Sp Cond.		µS/cm	Weather Conditions:
Water Temp.		°C	ORP		mVolt	
D.O.		mg/L	Turbidity	Ave= NTU	Bottle 1= NTU	DI Bottle 1= NTU
D.O. %		%	Standard		Bottle 2= NTU	DI Bottle 2= NTU
pH		SU	Calibration	Cal= NTU Read= NTU	Bottle 3= NTU	DI Bottle 3= NTU

FIELD CALIBRATIONS		
SEE LOG MULTIPROBE LOGBOOK _____ FOR CALIBRATION INFORMATION		
% D.O.	Barometric Pressure in mm Hg =	Post-cal. Reading = %

SAMPLE COLLECTION INFORMATION	
<input type="checkbox"/> Grab	<input type="checkbox"/> Submerged Bottle(s) <input type="checkbox"/> Reach pole <input type="checkbox"/> Chum Splitter
Circle where sample taken	LEW — ¼ — ½ — ¾ — REW Run <input type="checkbox"/> , Riffle <input type="checkbox"/> , Pool <input type="checkbox"/>

E. COLI			
Collection Time		Incubation Time-in	
Enumeration Time		Most Probable Number	
Number Positive Large Wells		Number of Positive Small Wells	

EQUIPMENT USED, LOT NUMBERS, SAMPLES COLLECTED, GENERAL CONDITIONS				
Parameter	Serial or Lot#	Samples Collected	Condition sampled	Pictures
Multiprobe		Inorganics <input type="checkbox"/>	Baseflow <input type="checkbox"/>	Upstream <input type="checkbox"/>
Turbidity meter		Metals <input type="checkbox"/>	Storm flow <input type="checkbox"/>	Downstream <input type="checkbox"/>
Flow meter		Nutrients <input type="checkbox"/>	Spring Runoff <input type="checkbox"/>	Left Bank <input type="checkbox"/>
Sulfuric Acid		SSC <input type="checkbox"/>		Right Bank <input type="checkbox"/>
Nitric Acid		Bacteria <input type="checkbox"/>		Other (specify) <input type="checkbox"/>
Other		Clean Metals <input type="checkbox"/>		

Form Checked by

Page 1 of 2



FLOW MEASUREMENTS				TOTAL Q=	CFS
Measurement from Run <input type="checkbox"/> , Riffle, <input type="checkbox"/> , Pool <input type="checkbox"/>					
Station	Distance (ft)	Depth (ft)	Velocity (ft/s)	Comments	
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					

IF UNSAFE TO GAGE USE FLOAT METHOD- NEED TO EST. CHANNEL WIDTH, STREAM DEPTH, AND VELOCITY (MEASURE TIME REQUIRED FOR AN OBJECT TO TRAVEL A GIVEN DISTANCE (I.E. 100FT) ONCE PLACED IN STREAM, REPEAT 5 TIMES TO DETERMINE AVERAGE VELOCITY)

FIELD NOTES

NOTE ANY DEVIATIONS FROM SOPs, CHANGE IN SAMPLE LOCATION, AND ANY OTHER USEFUL INFORMATION REGARDING DATA COLLECTED AT THIS SITE.

QUALITY CONTROL SAMPLE INFORMATION

Type of QC Sample (ie blank, dup, etc)	Your Identifying Code	Lab Tracking Number

Form Checked by

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