TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

June 10, 2025

Kristin DeBone
Project Manager
TCEQ Nonpoint Source Program
12100 Park 35 Circle, Building F
Austin, TX 78753

Subject: Approval: City of San Angelo (COSA) Green Infrastructure Project Development Quality Assurance Project Plan (QAPP) Revision 0

Federal Grant #99614625

Dear Ms. DeBone:

The above-referenced Quality Assurance Project Plan (QAPP) was approved today, June 10, 2025.

Please ensure the QAPP is distributed in a timely manner to the appropriate entities listed in Section A7 of the QAPP. Distribution documentation must be available for review during an audit.

Should you have questions, feel free to contact me at james.babcock@tceq.texas.gov.

Sincerely,

James Babcock

James Babcock
Lead NPS Quality Assurance Specialist

Enclosure

Cc: Tina Treviño, TCEQ Quality Assurance Team Lead
D. Jody Koehler, TCEQ Quality Assurance Manager
Faith Hambleton, TCEQ NPS Program Manager
Kristin DeBone, TCEQ NPS Quality Assurance Coordinator

A1 TITLE PAGE

City of San Angelo (COSA) Green Infrastructure Project Development Quality Assurance Project Plan (QAPP) Revision 0

Funding Source: Nonpoint Source (NPS) Program Clean Water Act (CWA) §319(h)

Prepared in cooperation with
the Texas Commission on Environmental Quality (TCEQ)
and the U.S. Environmental Protection Agency (EPA)
Federal ID #99614625
QTRAK #

Effective Period: Three years from date of final approval

Questions concerning this QAPP should be directed to:

Scott McWilliams
General Manager
Upper Colorado River Authority
512 Orient Street
San Angelo, Texas 76903
(325) 655-0565
scottm@ucratx.org

A2 APPROVAL PAGE

By signing this document, signatories acknowledge their respective organizations' awareness of and adherence to requirements contained in this QAPP in accordance with roles and responsibilities as described in Section A8 Project Organization and throughout.

Texas Commission on Environmental Quality

Air Monitoring Division
Laboratory and Quality Assurance (QA) Section

D. Jody Koehler 06/10/2025
D. Jody Koehler, TCEQ QA Manager Date

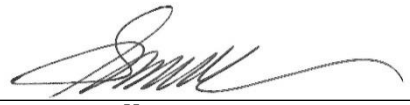
James Babcock 06/10/2025
James Babcock, Lead NPS QA Specialist Date

Water Quality Planning Division
NPS Program

Faith Hambleton 6/10/2025
Faith Hambleton, Team Leader Date

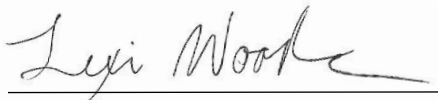
6/9/2025
Kristin DeBone,
NPS QA Coordinator & Project Manager Date

UCRA



6/9/25

Scott McWilliams, Date
Project Manager and Quality Assurance Officer (QAO)



6/9/25

Lexi Woods, Data Manager Date

A3 TABLE OF CONTENTS

Table A3.1 List of Acronyms List of Acronyms

Acronym	Definition
CAP	Corrective Action Plan
BMP	Best Management Practice
CAC	NPS Contribution Abundance Class
COSA	City of San Angelo
CWA	Clean Water Act
DO	Dissolved Oxygen
DMRG	Data Management Reference Guide
EPA	United States Environmental Protection Agency
GIS	Geographic Information System
GPS	Global Positioning System
NPS	Nonpoint Source Program
NWS	National Weather Service
QA	Quality Assurance
QAO	Quality Assurance Officer
QAPP	Quality Assurance Project Plan
QMP	Quality Management Plan
RMSE	Root Mean Square Error
SOP	Standard Operating Procedure
TCEQ	Texas Commission on Environmental Quality
UCRA	Upper Colorado River Authority
USGS	United States Geological Survey

A4 PROJECT PURPOSE, PROBLEM DEFINITION, AND BACKGROUND

The Concho River (Segment 1421) was first listed in 2008 as impaired for depressed dissolved oxygen (DO) in water (Category 5c) in the *2008 Texas Water Quality Inventory and 303(d) List*. The Upper Colorado River Authority (UCRA) has approached this impairment with multiple projects since its first listing in 2008. These projects included constructing various stormwater pollution prevention structures, developing a Water Education Center, and other best management practices (BMPs). The efforts of the UCRA have increased watershed stewardship within the community, resolved annual fish kills, and continued improvement of water quality in the Concho River in San Angelo. However, the river remains impaired and undergoes routine monitoring through the UCRA and TCEQ Clean Rivers Program.

This project will develop a plan to implement green infrastructure within the Downtown area of San Angelo. Using ArcGIS mapping software, the aim is to create a map of downtown San Angelo that highlights highly trafficked/recreated areas with little to no greenery (impervious surface). The 2014 EPA BMP siting tool will be adapted to identify the most applicable green infrastructure remediation strategies within the project area.

This green infrastructure project's target area is approximately 1 mi^2 of surveyable area located between the North Concho River and the West Houston Harte Expressway (see Appendix A for map of project area). Along with the creation of maps, the UCRA will also perform community and business owner surveys to identify areas with potential NPS concerns (flooding, litter, dumping, etc.). Evaluation of current NPS contributions in the Downtown San Angelo area is imperative and warranted to collate feasible BMP implementation plans for the North Concho River.

Once completed, this plan will serve as a guide to which BMPs are of highest priority. This will allow the UCRA to maximize water quality remediation in the Downtown area while limiting anthropogenic impact to the North Concho River. This new project aligns with the original proposal in that identifying and prioritizing BMPs will provide environmental benefits such as long-term improvements in DO concentrations and therefore, aquatic life habitat. According to the United States Internal Revenue Service (2022), the project area lies within a median household income of $35,854, which is nearly half the median household income of San Angelo, $57,625 ± $7,920 and is considered economically disadvantaged. Thus, this project will also contribute to environmental justice, providing equitable access to a healthy, sustainable, and resilient environment to communities in Downtown San Angelo.

Using ArcGIS mapping software, UCRA will create a map of downtown San Angelo that identifies areas with little to no greenery in comparison to impervious surface. The EPA BMP siting tool will be adapted to identify and rank applicable remediation strategies for those areas. The identification and ranking will be biased toward green infrastructure as a

key component. This will allow UCRA and other water resource management entities to address water quality concerns such as elevated bacteria and nutrients as well as depressed DO with green infrastructure BMPs in future projects.

The purpose of this QAPP is for the acquisition of established COSA mapping software files for ArcGIS Pro (v. 3.2.2).

This QAPP is reviewed and approved by TCEQ to help ensure that the outputs and data generated for the purposes described within are of known and documented quality and deemed acceptable for their intended use. This process will facilitate the use of project outputs and data by the NPS Program and other programs deemed appropriate by the TCEQ.

A5 PROJECT/TASK DESCRIPTION AND SCHEDULE

The purpose of this QAPP is to document how UCRA will acquire, review and compile data and meet quality objectives related to the following project efforts:

BMP Design and Construction
In partnership with COSA, UCRA will install no less than one small-scale NPS BMP in downtown San Angelo and along the North Concho River corridor, i.e., pet waste stations.

Education and Outreach
UCRA will create and disseminate educational materials and informational signage following approval by TCEQ project management. Said materials will target multiple generations to distribute messaging as widely as possible. UCRA staff will also present project information and general NPS education to local civic groups.

Green Infrastructure Plan
UCRA personnel will generate several shapefiles using results from desk, field, and community-based surveys. These files will be evaluated on ArcGIS Pro (v. 3.2.2) for the following parameters including (but not limited to): impervious surface to permeable surface ratio, slope, greenery type, total area, runoff volume estimates, and community complaint abundance. The resulting data will be classified into potential NPS contribution abundance classes (CAC) 1 to 5 (1 being lowest and 5 being highest). An adaptation of the EPA BMP Siting Tool (2014) will be employed to identify which green infrastructure BMPs would be most applicable to each NPS CAC within the project area. The UCRA data manager will organize project results into a document detailing prioritized green infrastructure project ideas for each CAC. This document will be submitted along with the Final Report as described in Task 7 and Task 8.

The contract that this QAPP is associated with was executed in November 2020 and is estimated to be completed in April 2026. All task and deliverable dates are estimates. Work covered under this QAPP will not begin until the QAPP is executed.

See Appendix A for a project location map.

See Appendix B for the contract tasks referenced in this QAPP.

Amendments

Amendments to the QAPP must be approved to reflect changes in project organization, tasks, schedules, objectives, and methods; address deficiencies and nonconformances; improve operational efficiency; and accommodate unique or unanticipated circumstances. Requests for amendments are submitted by the UCRA Project Manager to the TCEQ NPS Project Manager in writing using the NPS QAPP Amendment Shell. The changes are effective immediately upon approval by the TCEQ QA Manager, TCEQ NPS Project Manager, and TCEQ Lead QA Specialist, or their designees.

Amendments to the QAPP and the reasons for the changes will be documented, and full copies of the amendments will be forwarded to all persons on the QAPP distribution list by the UCRA QAO. Amendments shall be reviewed, approved, and incorporated into a revised QAPP during the annual certification process or within 120 days of the initial approval in cases of significant changes.

Annual QAPP Reviews, Certifications, and Revisions

This QAPP shall be reviewed in its entirety and certified annually by the UCRA Project Manager and the TCEQ NPS Project Manager. A letter certifying this annual review must be submitted to the TCEQ NPS Project Manager no later than 90 days prior to the QAPP anniversary date. Amendments approved since QAPP approval or the previous annual certification should be included as an attachment along with the letter. Only nonsubstantive changes not affecting the project design or quality or quantity of work to be performed can be included in the annual certification letter. This includes organizational changes or schedule changes based on a contract amendment that do not impact data deliverables. If changes beyond these are necessary, a QAPP amendment must be submitted and approved before the annual review may be certified. The TCEQ NPS Project Manager is required to review the QAPP and provide certification of annual reviews to the TCEQ QA Manager and EPA Region 6 Project Officer no later than 30 days before QAPP anniversary dates. If the QAPP expires, work described within this document must be halted.

If the project will extend beyond the third QAPP anniversary date, a full QAPP revision is required. If the QAPP expires, work described within this document must be halted.

A6 INFORMATION/DATA QUALITY OBJECTIVES AND PERFORMANCE/ACCEPTANCE CRITERIA

Positional data collected for this project will be acquired following the guidelines specified in TCEQ Operating Policies and Procedures (OPP) 8.11, Geographic Information Systems – Positional Data. All positional data collected shall maintain a 152.4(cm) RMSE horizontal positional accuracy class to meet the American Society for Photogrammetry and Remote Sensing Positional Accuracy Standards for Digital Geospatial Data, *Edition 2 (2023), United States Geological Survey (USGS)*. This level of accuracy is acceptable because access to private property can be restricted during community survey ventures.

Aerial and satellite photo interpolation are additional tools that will be used to identify and verify study parameters. Additionally, all locations mapped with aerial photography are assumed to be accurate within 5.879 meters according to root mean square error estimates for Digital Aerial Photo Interpolation (EPA Geospatial Metadata Technical Specification Version 1.0.)

UCRA will review all input data (GIS and non-GIS) before use, to determine reasonableness/accuracy. For community survey location, criteria include availability of a physical address or legal description, definition of an address as physical address and not mailing address, validation Global Positioning System (GPS) reading format (Decimal Degrees, Degrees Decimal Minutes, or Degrees Minutes Seconds), and consistency between GPS coordinates and physical address. For CAC boundaries, criteria will include validation from COSA GIS directory within existing zoning layers. CAC boundaries that do not have validation will still be used, but the GIS layer will include attributes on the method and the level of confidence used. All other input data (land survey measurements and UCRA visual inspections) will be used to assist in the location of CAC areas; when the information appears unreasonable or inaccurate, the information will not be used.

UCRA will document locations surveyed during the project and other analysis in the green infrastructure plan. The mapping outputs will include appropriate information and metadata compliant with FGDC Standards. Before delivery, the UCRA Data Manager will verify all GIS output data, with particular attention to errors in transcription, calculations, and data input. Transcription refers to the information copied from the received datasets to final output layers (i.e., zoning information, flow gauge measurements). Calculation refers to the measurement of each study parameter collected to produce statistics for each CAC (e.g., areas within impervious to permeable surface ratio, constructed surface slope, and runoff volume estimates). Data input refers to the data obtained from the sources (see table B2.1) and will be used to estimate location and characteristics of CAC boundaries.

For community survey questionnaires, no quantitative quality objectives or criteria are required. Program participants are asked to complete these questionnaires to the best of their ability. If a member does not wish to participate, that location will not be included in the final data output. Participant surveys will be verbally solicited by UCRA personnel using the Community Survey form following approval by the TCEQ Project Manager.

Acceptance Criteria for Existing Data

Precision

Precision is the degree to which a set of observations or measurements of the same property, obtained under similar conditions, conform to themselves. It is a measure of agreement among repeated measurements of the same property under identical, or substantially similar conditions, and is an indication of random error.

Accuracy (Bias)

Accuracy, or bias, is a measure of the overall agreement of a measurement to a known value. A measurement is considered unbiased when the value reported does not differ

from the true value.

Representativeness

Representativeness is defined as the measure of the degree to which data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition.

Completeness

Completeness is a measure of the amount of valid data obtained from a measurement system, expressed as a percentage of the number of valid measurements that should have been collected (i.e., measurements that were planned to be collected). Ideally, 100 percent of the data should be obtained. However, the possibility of data loss due to accidents, insufficient sample volume, broken or lost samples, etc. is to be expected. Therefore, it will be a general goal of the project(s) that 90 percent data completion is achieved.

Comparability

Comparability is the qualitative term that expresses the measure of confidence that two or more data sets can contribute to a common analysis. Comparability is also guaranteed by reporting data in standard units, by using accepted rules for significant figures, and by reporting data in a standard format as specified in Section B7.

Sensitivity

Sensitivity is the capability of a method or instrument to discriminate between measurement responses representing different levels of the variable of interest.

A7 DISTRIBUTION LIST

The Lead NPS QA Specialist will provide approved versions of this QAPP and any amendments or revisions of this plan to the TCEQ NPS Project Manager. The TCEQ NPS Project Manager will provide approved copies to the UCRA Project Manager and EPA Project Officer within two weeks of approval. The TCEQ NPS Project Manager will document transmittal of the plan to EPA and maintain this documentation as part of the project's quality assurance records. This documentation will be available for review in the event of an audit.

D. Jody Koehler
TCEQ QA Manager
jody.koehler@tceq.texas.gov
(512) 239-1990

Melissa Benfer, Project Officer
benfer.melissa@epa.gov
EPA Region 6
(214) 665-8423

The UCRA will provide copies of this project plan and any amendments or revisions of this plan to each project participant defined in the list below. The UCRA will document

receipt of the plan by each participant and maintain this documentation as part of the project's quality assurance records. This documentation will be available for review in the event of an audit.

Upper Colorado River Authority
512 Orient Street
San Angelo, TX 76903

Scott McWilliams, Project Manager and QAO
scottm@ucratx.org
(325) 655-0565

Lexi Woods, Data Manager
lexiw@ucratx.org
(325) 655-0565

A8 PROJECT ORGANIZATION

TCEQ

Air Monitoring Division

D. Jody Koehler
TCEQ QA Manager
Responsible for coordination, development, and implementation of TCEQ's QA program. Provides QA oversight and guidance for TCEQ's programs and is responsible for the development and maintenance of the TCEQ QMP. TCEQ's QA Manager, or designated QA staff in the Laboratory and Quality Assurance Section of the Monitoring Division, is responsible for review and approval of program/project QAPPs to ensure QAPPs conform to applicable requirements as detailed in TCEQ's QMP.

James Babcock
Lead NPS QA Specialist
Assists the TCEQ NPS Project Manager in QA related issues. Participates in the planning, development, approval, implementation, and maintenance of the QAPP. Determines conformance with program quality system requirements. Coordinates or performs audits as necessary, using a wide variety of assessment guidelines and tools. Concurs with proposed corrective actions and verifications. Provides technical expertise and/or consultation on quality services. Recommends to TCEQ management that work be stopped in order to safeguard project and programmatic objectives, worker safety, public health, or environmental protection.

Water Quality Planning Division

Faith Hambleton
NPS Program Team Leader
Responsible for management and oversight of the TCEQ NPS Program. Oversees the development of QA guidance for the NPS program to be sure it is within pertinent frameworks of the TCEQ. Monitors the effectiveness of the program quality system.

Reviews and approves all NPS projects, internal QA audits, program corrective actions, work plans, and contracts. Enforces program corrective action, as required. Ensures NPS personnel are fully trained and adequately staffed.

Kristin DeBone
TCEQ NPS Project Manager
Maintains a thorough knowledge of work activities, commitments, deliverables, and time frames associated with projects. Develops lines of communication and working relationships between the UCRA, the TCEQ, and the EPA. Tracks deliverables to ensure that tasks are completed as specified in the contract. Responsible for ensuring that the project deliverables are submitted on time and are of acceptable quality and quantity to achieve project objectives. Serves on planning team for NPS projects. Participates in the development, approval, implementation, and maintenance of the QAPP. Conducts independent technical review of the QAPP to ensure compliance with project needs and requirements. Responsible for verifying that the approved QAPP is implemented by the UCRA. Notifies the TCEQ Lead NPS QA Specialist of circumstances which adversely affect the quality of data derived from the collection and analysis of samples. Monitors and enforces corrective action.

NPS QA Coordinator
Assists Lead QA Specialist with NPS QA management. Serves as liaison between NPS management and TCEQ QA management. Responsible for NPS guidance development related to program QA. Assists with development and maintenance of data management-related standard operating procedures (SOP) for NPS data management. Participates in the development, approval, implementation, and maintenance of the QAPP. Provides input and oversight regarding corrective actions. Maintains record of corrective actions.

UCRA

Scott McWilliams
UCRA Project Manager
Responsible for ensuring tasks and other requirements in the contract are executed on time and are of acceptable quality. Monitors and assesses the quality of work. Coordinates attendance at conference calls, training, meetings, and related project activities with the TCEQ. Responsible for verifying the QAPP is followed, and the project is producing data of known and acceptable quality. Ensures adequate training and supervision of all monitoring and data collection activities. Complies with corrective action requirements.

UCRA QAO
Responsible for coordinating development and implementation of the QA program. Responsible for ensuring the most recent version of the NPS QAPP shell document is used for writing and maintaining an official approved copy of the QAPP. Responsible for maintaining records of QAPP distribution, including appendices and amendments. Responsible for maintaining written records of sub-tier commitment to requirements specified in this QAPP. Responsible for identifying, receiving, and maintaining project QA records. Responsible for coordinating with the TCEQ NPS Project Manager to resolve QA-related issues. Notifies the UCRA Project Manager and TCEQ NPS Project

Manager of circumstances which may adversely affect the quality of data. Responsible for validation and verification of all data collected and acquired. Coordinates the research and review of technical QA material and data related to water quality monitoring system design and analytical techniques. Facilitates, conducts, and documents any technical systems audits.

Lexi Woods
UCRA Data Manager
The Project Data Manager is responsible for acquisition and verification of data, documentation of data sources, and ensuring the accuracy of data. Responsible for maintaining project data quality assurance records. Oversees data management for the study. Performs data quality assurances prior to transfer of analysis output to the TCEQ. Responsible for transferring analysis output to the TCEQ in an acceptable format. Ensures analysis output is submitted according to work plan specifications.

U.S. EPA Region 6

Melissa Benfer, EPA Project Officer
Responsible for managing the CWA Section 319(h) funded grant on behalf of EPA. Assists the TCEQ in approving projects that are consistent with the management goals designated under the State's NPS management plan and meet federal guidance. Coordinates the review of project workplans, draft deliverables, and works with the State in making these items approvable. Meets with the State at least annually to evaluate the progress of each project and when conditions permit, participates in a site visit on the project. Fosters communication within EPA by updating management and others, both verbally and in writing, on the progress of the State's program and on other issues as they arise. Assists in grant close-out procedures ensuring all deliverables have been satisfied prior to closing a grant.

A9 PROJECT QA MANAGER INDEPENDENCE

TCEQ uses a semi-decentralized QA program, which is organizationally independent of operational programs and activities within the agency. TCEQ’s QA program has sufficient access and authority to coordinate the development and implementation of the agency’s quality system.

The TCEQ QA Manager and designated TCEQ QA staff are independent of activities performed by NPS. No NPS staff have authority to sign QAPPs or amendments on behalf of TCEQ’s QA Manager or the Lead NPS QA Specialist. Similarly, TCEQ’s QA Manager and the Lead NPS QA Specialist cannot sign QAPPs or amendments on behalf of NPS staff.

Roles of project QA staff are described in Section A8. An illustration of QA independence and lines of communication and supervision for this project are detailed in the project organization chart in Section A10.

A10 PROJECT ORGANIZATION CHART AND COMMUNICATIONS

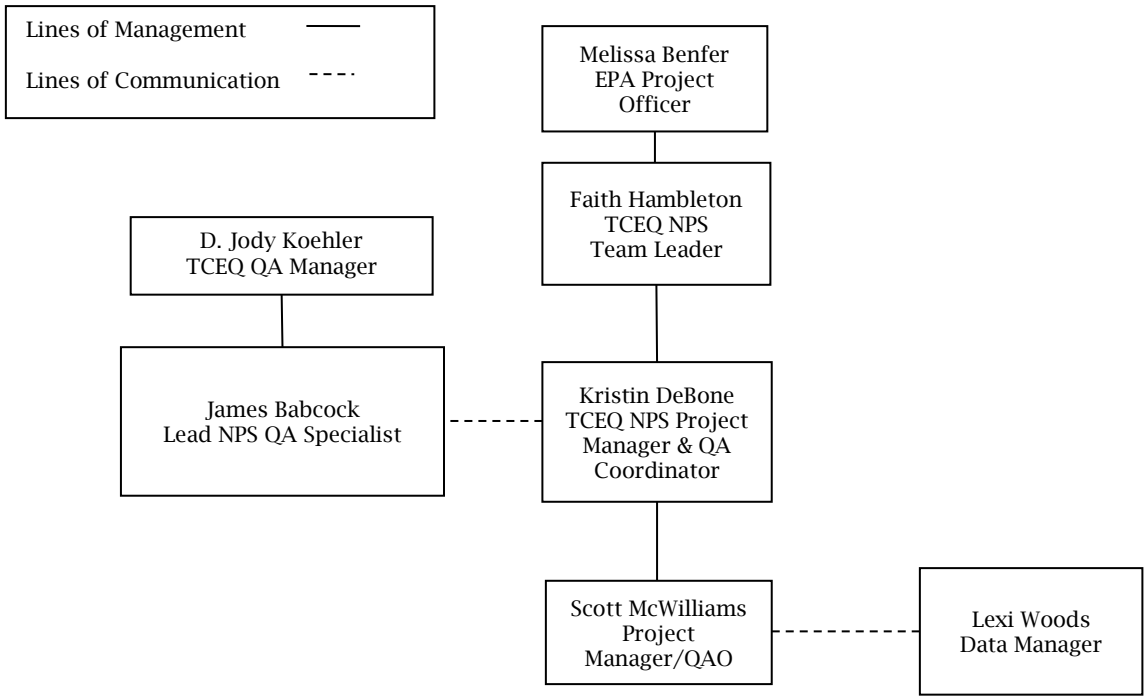


Figure A10.1. Organization Chart

A11 PERSONNEL TRAINING/CERTIFICATION

In accordance with EPA directive FEM 2012-02 *Rev. 1*, work conducted for this project is covered under a documented quality management system. Personnel conducting work associated with this project are deemed qualified to perform their work through educational credentials, specific job/task training, required demonstrations of competency, and internal and external assessments. Records of educational credentials, training, demonstrations of competency, assessments, and corrective actions are retained by project management in employee personnel files and are available for review.

A12 DOCUMENTS AND RECORDS

Project personnel will be given the most current approved version of the QAPP. Maps and community survey results will be submitted to TCEQ as subtask deliverables. These files are also available at TCEQ's request.

Table A12.1 Project Documents and Records

Document/Record	Location	Retention*[a]	Form*[b]
QAPPs, amendments, and appendices	UCRA	5 years	Electronic
QAPP distribution documentation	UCRA	5 years	Electronic
SOPs	UCRA	5 years	Paper/Electronic
Assessment reports for acquired data	UCRA	5 years	Electronic
GIS Files	UCRA	5 years	Electronic
Raw data files	UCRA	5 years	Electronic
Community survey documents	UCRA	5 years	Paper/Electronic
Statistical Computation Documentation	UCRA	5 years	Electronic
Logbooks	UCRA	5 years	Paper/Electronic
Progress report/CAP/final report/data	UCRA	3 years	Paper/Electronic

*a – After the close of the project
*b – Electronic files should be ASCII (DOS) pipe delimited text files or MS Word/Excel; model input and output files can be archived in the format used by the modeling software, provided the capability of conversion to ASCII (DOS) pipe delimited text files or MS Word/Excel (TCEQ compatible version) is maintained over the time of retention.

The TCEQ may request records at any time and/or elect to take possession of records at the conclusion of the specified retention period.

B1 IDENTIFICATION OF PROJECT ENVIRONMENTAL INFORMATION OPERATIONS

Does not apply to this QAPP. No new environmental information will be collected under this project.

B2 METHODS FOR ENVIRONMENTAL INFORMATION ACQUISITION

For this project, UCRA will generate new data in terms of estimated CAC boundaries by compiling existing environmental data from multiple sources. To do this, aerial imagery is used as a basemap, and CAC boundaries are digitized by creating a new feature class (polygon) per surveyed area atop the basemap. Imagery used for the basemap is Esri World Imagery 2020 (or more recent if available), in resolution that ranges from 1m to 0.03m. Although various imagery could be available in different areas of the project, all layer projections will be finalized in UCRA's preferred project spatial reference, North American Datum (NAD) 1983.

Acquired imagery and feature class layer files will be downloaded directly from COSA's GIS department and/or the COSA website. The files will be uploaded into ArcGIS software and if not already, will be assigned to the NAD83 projection prior to data analysis. Any new features will also be created and assigned a NAD83 spatial reference.

Analytical Methods

Analytical methods are described in A4, A5, B2, and D1.

Existing Information

Data not collected under this QAPP, but that were collected by TCEQ and Texas Clean Rivers Program partners that meet the data quality objectives of this QAPP, may be

useful in satisfying the data and informational needs for this project. The collection of data under these programs is covered under approved QAPPs, such as the TCEQ SWQM Program QAPP, Texas Clean Rivers Program Partner QAPPs, and other approved QAPPs from TCEQ Programs. All data used will be clearly identified in the final project report and Table B2.1.

Table B2.1 Data Sources Used for Analysis*

Geospatial Data or Data Type	Source	Date(s)	Analysis and/or Processing*	QA Information	Data Use(s)
Construction data (slope, total area, runoff estimates, etc.)	City of San Angelo	For the period of record collected within the project area.	COSA	COSA	EPA BMP Siting Tool, Summary statistics, trend analysis
Monitoring Data (Field measurements: Temperature, dissolved oxygen, pH, etc.)	TCEQ SWQM Program	Most recent water chemistry data will be downloaded from the SWQMIS database.	TCEQ	TCEQ SWQM QAPP; SWQMIS database	Summary statistics, trend analysis
Flow Data	USGS flow data	For the period of record collected by the USGS at stations in or near the project area.	USGS	USGS QAPP; USGS database	Summary statistics, trend analysis
Precipitation Data	National Weather Service (NWS)	Most up-to-date precipitation data will be downloaded from the NWS website following storm events.	NWS	NWS Website	EPA BMP Siting Tool, Summary statistics, illustrative purposes
Income Data	US Census Bureau	Most up-to-date income statistics will be downloaded from the US Census Bureau website.	US Census Bureau	US Census Bureau	Income and Earning Statistics for qualitative purposes.

*Metadata that contains the Federal Geographic Data Committee (FGDC) minimum documentation requirements will be created for any acquired spatial data manipulated through data analysis and/or processing.

Existing geospatial data available from various local, regional, state, and federal organizations may be used for project cartographic and illustrative purposes. These types may include land use, precipitation, soil type, ecoregion, TCEQ monitoring location, TCEQ permitted outfall, gage location, city/county/state boundary, stream hydrology, reservoir, drought, road, watershed, municipal separate storm sewer system, urbanized area, basin, railroad, recreational area, area landmark, aerial photography, and park information. The above data come from the following reliable sources: USGS, COSA, TCEQ, and US Census Bureau. Geospatial data from these sources are accepted for use in project maps based on the reputability of these data sources and the fact that there are no known comparable sources for these data. Geospatial data will be cited in reports.

As the project progresses, additional data sources and/or data types may be identified as necessary to complete project tasks. Once identified, the UCRA Project Manager will notify the TCEQ NPS Project Manager and request approval prior to use. If data will be analyzed or used for any purposes beyond cartographic or illustrative purposes, the QAPP must be amended and approved prior to use. All approved data sources will be clearly documented where such data sources are reported (e.g., technical documents, technical reports, and final reports).

B3 SAMPLE HANDLING AND CUSTODY

Does not apply to this QAPP. No further sampling will be performed under this project.

B4 QUALITY CONTROL

Quality control measures are described in A5 and A6 Before delivery, the UCRA Data Manager will verify all GIS output data, with particular attention to errors in transcription, calculations, and data input.

B5 INSTRUMENT/EQUIPMENT TESTING, INSPECTION, AND MAINTENANCE

Does not apply to this QAPP. No instrument or equipment is to be used to collect new environmental information.

B6 INSPECTION/ACCEPTANCE OF SUPPLIES AND SERVICES

Does not apply to this QAPP. No new supplies or services are required under this QAPP.

B7 ENVITONMENTAL INFORMATION MANAGEMENT

Data Management

Survey results will be collected and manually entered into Microsoft Excel upon return to the UCRA office. Pre-approved data entry forms will be used to ensure data accuracy and consistency throughout the project area. UCRA will collect and analyze data used to inform the green infrastructure task, which will be submitted to TCEQ. The accuracy of the data will be verified by the UCRA Data Manager and QAO.

Data management procedures include the following: receiving data from sources in any available format (input data); categorizing received data to determine relevance and usability in the project, including conversion to electronic format when possible; selecting and processing data; and generating final CAC data (output data). Output data includes metadata with attribute description and data dictionary, and layer files with proposed symbology. Finaly, organizing all final outputs into a prioritized green infrastructure plan document, detailing CAC results and applicable BMPs with respect to green infrastructure. This will also be detailed in the project final report and included in the project deliverables. All data will be submitted in the format approved by the TCEQ NPS Project Manager.

Data Migration, Transfer, and Conversion

Existing environmental data will be received either via email or direct download from respective databases. The data will then be saved to a standard Windows folder and either input into Microsoft Excel to be adapted into a workable comma separated values file (.csv) or directly into ArcGIS depending on its type.

<u>GIS database files</u>

These files will be saved in the appropriate project folder on Windows and uploaded into the GIS framework in ArcGIS Pro.

<u>Community survey files</u>

These files will be manually recorded at the time of survey and converted into a workable comma separated values file (.csv) to be imported into ArcGIS Pro as a new feature class layer.

Land survey files
Any additional measurements required for data analysis and creation of CACs not available in existing files will be manually recorded at time of survey and converted into a workable comma separated values file (.csv) to be imported into ArcGIS Pro as a new feature class layer.

Personnel performing surveys are responsible for the accuracy of original data collection and subsequent data entry will be the responsibility of the UCRA data manager.

Information Dissemination
Project updates will be provided to the TCEQ NPS Project Manager in progress reports and the information will be made available at stakeholder meetings. Input data and outputs resulting from the project described in this QAPP will be accessible to the general public and the TCEQ.

Hardware and Software Configuration
The project will use desktop and laptop computers for reporting and data entry. The computers are property of UCRA, operate on Windows 11, and can efficiently run Microsoft 365 and ArcGIS Pro 3.4.3 or latest version in a networked environment.

Archives/Data Retention
Complete original data sets are archived on permanent media internal drives and retained on-site by the UCRA for a retention period specified in Table A12.1 Project Documents and Records.

Backup/Disaster Recovery
UCRA record keeping and document control requirements are contained in this QAPP. Original field data sheets are stored in the UCRA office, accessible only to UCRA personnel in accordance with the records retention schedule in Section A12. All database files and electronic files are automatically backed up on a daily basis using the backup software Back Blaze to an off-site, secure network storage cloud. If needed, disaster recovery can be accomplished by UCRA IT staff accessing documents from the secure storage cloud.

C1 ASSESSMENTS AND RESPONSE ACTIONS

The following table presents types of assessments and response action for activities applicable to this QAPP.

Table C1.1 Assessments and Response Actions

Assessment Activity	Approximate Schedule	Responsible Party	Scope	Response Requirements
Status Monitoring Oversight, etc.	Continuous	UCRA Project Manager	Monitoring of the project status and records to ensure QAPP requirements are being fulfilled.	Report to TCEQ in Quarterly Report. Ensure project requirements are being fulfilled.
Technical Systems Audit	Dates to be determined by TCEQ	TCEQ Quality Assurance Specialist	The assessment will be tailored in accordance with objectives needed to assure compliance with the QAPP.	30 days to respond in writing to TCEQ to provide corrective actions addressing audit findings.
Reviews of GIS Data Production and Outputs	Continuous	UCRA Data Manager	Monitoring of the data management process to ensure QA is applied consistently and errors in input and output data are identified and resolved before reporting documents are delivered.	Report to TCEQ (quarterly report, conference calls, deliverables).

Internal Assessment

Survey data and project deliverables will be internally quality controlled by the UCRA Project Manager and TCEQ NPS Project Manager's in-house review. The TCEQ NPS Project Manager will maintain overall responsibility for examining the contracted work to ensure methodologies and processes are consistent with the procedures outlined in this QAPP.

Corrective Action

Deficiencies are any unauthorized deviations from the approved QAPP and procedures referenced in the QAPP. Deficiencies may invalidate resulting data. All deficiencies from the QAPP require documentation of the nonconformance and corrective action. Deficiencies must be documented in a Corrective Action Plan (See Appendix C for the form and an example) and corrected in a timely manner. Corrective action may include the need for additional model runs. Deficiencies are documented in logbooks by modeling staff. It is the responsibility of the UCRA Project Manager, in consultation with the UCRA QAO, to ensure that the actions and resolutions to the problems are documented and that records are maintained in accordance with this QAPP.

Nonconformances must be communicated to the TCEQ NPS Project Manager immediately via email. A Corrective Action Plan (CAP) Form (See Appendix C for the form and an example) must be submitted to the TCEQ NPS Project Manager within 14 days of the deficiency occurring. Once it is approved, the TCEQ NPS Project Manager will send the CAP to the QA Coordinator who will then email the CAP to the Lead NPS Quality Assurance Specialist within 30 days of the initial notice of deficiency per TCEQ Quality Management Plan and after it is reviewed by the TCEQ NPS Project Manager.

The deficiency must also be communicated to the TCEQ NPS Project Manager through the Corrective Action Status Table (see Appendix D for the table and an example) to be included with the quarterly progress report.

The UCRA Project Manager is responsible for implementing and tracking corrective actions. All Corrective Action Plans will be documented on the Corrective Action Status Table, which will be submitted to the TCEQ NPS Project Manager with the quarterly progress report for review and approval. Records of TCEQ audit findings and corrective actions are maintained by both the TCEQ and the UCRA QAO. Documentation of corrective action to address audit findings will be submitted to the TCEQ within 30 days of receipt of audit report.

If audit findings and corrective actions cannot be resolved, then the authority and responsibility for terminating work are specified in the TCEQ Quality Management Plan and in agreements in contracts between participating organizations.

Corrective Action Plans

Corrective Action Plans should:

- Identify the deficiency, problem, nonconformity, or undesirable situation.
- Identify immediate remedial actions if possible.
- Identify the root cause(s) of the problem.
- Describe the programmatic impact.
- Identify whether the problem is likely to recur or occur in other areas.
- Include a description of the need for Corrective Action.
- Include a description of cause(s), determine solution, and propose an action plan.
- Identify personnel responsible for action.
- Establish timelines and provide a schedule.
- Document the corrective action and verify its effectiveness.

C2 OVERSIGHT AND REPORTS TO MANAGEMENT

Reports to UCRA Project Management

The UCRA Project Manager and Data Manager will hold monthly meetings (more frequently if necessary) to report project status, results of surveys, and significant QA issues.

Reports to TCEQ Project Management

Progress Report – Submittal of progress reports will be at least quarterly. Format of the submitted progress report will be as specified in the contract or work orders. Reports should provide enough information so the TCEQ NPS Project Manager can evaluate the modeling effort.

GI Plan – Summarizes UCRA's results from maps generated by the adapted BMP siting tool and describes most applicable BMP implementations to reduce effects of NPS on the Concho River. This report is to be included in the Final Report, no later than two weeks prior to the end of the contract.

Project Final Report – Summarizes the UCRA's activities for the entire project period including a description and documentation of major project activities, evaluation of the project results and environmental benefits, and a conclusion. The final report will also include the completed assessment of CACs and descriptions of respective, best applicable green infrastructure BMP ideas no later than two weeks prior to the end of the contract.

Corrective Action Plan Documentation – Identifies any deficiencies and nonconformances. The cause(s) and program impacts are discussed. CAPs are submitted to the TCEQ PM within 30 days if the occurrence or its discovery. The completed corrective actions are documented in the first progress report occurring after the deficiencies and/or nonconformance was identified.

Audit Report and Response - Following any audit performed by the UCRA, a report of findings, recommendations, and responses will be sent to the TCEQ NPS Project Manager in the quarterly/monthly progress report.

Reports by TCEQ Project Management

Performing Party Evaluation - The UCRA is evaluated in a Performing Party Evaluation by the TCEQ annually for compliance with administrative and programmatic standards. Results of the evaluation are submitted to the TCEQ Financial Administration Division, Procurements and Contracts Section.

D1 ENVIRONMENTAL INFORMATION REVIEW

The processes used in this effort to acquire, analyze, and incorporate data into an existing GIS are not models for which calibration and traditional validation are used.

For the purposes of this document, verification refers to the processes taken to determine compliance of data with project requirements, including documentation and technical criteria. Validation means those processes taken independently of the data-generation processes to determine the usability of data for its intended use(s). Integrity means the processes taken to assure that no falsified data will be reported. Data validation procedures are described in A5.

Data collected by TCEQ, COSA, the USGS, NWS, and the Texas CRP partners have been reviewed, verified, and validated according to the requirements of the respective programs prior to their use in this project. Data acquired from SWQMIS will be used solely for illustrative and non-analytical purposes and will align with the DMRG intended uses.

D2 USEABILITY DETERMINATION

The potential users of the green infrastructure plan results include the following:

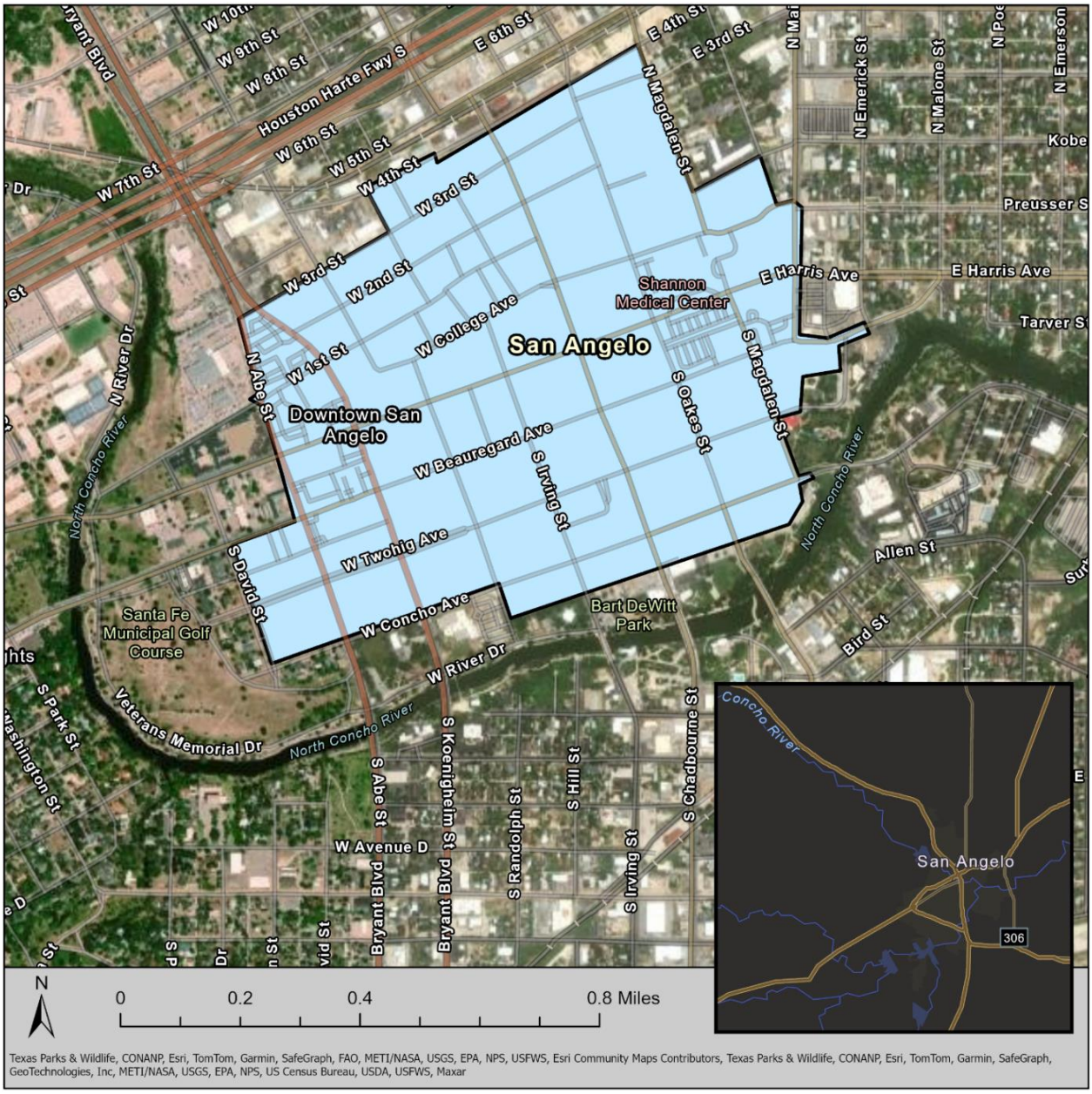
- UCRA as part of water quality and community planning projects, the development of a WPP, and education and outreach opportunities;
- The TCEQ NPS Program as WPP development, permit decisions, water quality assessments, and potential NPS abatement strategies;

- Local municipalities as a potential guidebook to remediate the effects of NPS on the North Concho River, informing community planning projects, and cooperation with agencies and utilities within the project area;
- The general public as part of education and understanding of water quality issues and green infrastructure.

Traditional model validation and calibration processes are not applicable to these activities. However, UCRA seeks to ensure that the data outputs of these activities are as accurate as possible. Data received from the project partners will be reviewed by UCRA to ensure that data contains no apparent issues that would limit its applicability to this effort (missing fields, improperly formatted information, etc.). Maps of the project area will be visually inspected by UCRA staff to ensure there are no obvious formatting or geographic projection errors, and that there are no obvious issues with the transfer of database data to a spatial format (e.g., feature layers showing up in an unexpected area). UCRA will incorporate feedback from any potential issues that arise during the use of the data, whether internal or external. Data that do not meet data quality objectives will not be used in analysis by UCRA or TCEQ.

Though this data will inform decision makers on potential green infrastructure remediation strategies, it should be understood that this is not a comprehensive view of all BMPs or assessment of economic applicability. The results of this project are meant to create a basis for potential NPS remediation strategies that implement green infrastructure and should be assessed with discretion in regards to each user's specific needs and or limitations.

APPENDIX A. AREA LOCATION MAP


San Angelo
Downtown San Angelo
Shannon Medical Center
Bart DeWitt Park
Santa Fe Municipal Golf Course
W 1st St
W College Ave
W 2nd St
W 3rd St
W 4th St
W 5th St
W 6th St
W 7th St
W 8th St
W 9th St
E 6th St
E 4th St
E 3rd St
Houston Harte Fwy S
N Magdalen St
S Magdalen St
S Oakes St
S Irving St
N Abe St
S David St
S Abe St
S Koenigheim St
S Randolph St
S Hill St
S Chadbourne St
W Beauregard Ave
W Twohig Ave
W Concho Ave
W River Dr
W Avenue D
Veterans Memorial Dr
N River Dr
S Park St
Washington St
Bryant Blvd
N Emerick St
N Malone St
N Emerson
E Harris Ave
Preusser S
Tarver S
Kobe
Allen St
Bird St
North Concho River
Concho River
306
N
0
0.2
0.4
0.8 Miles
Texas Parks & Wildlife, CONANP, Esri, TomTom, Garmin, SafeGraph, FAO, METI/NASA, USGS, EPA, NPS, USFWS, Esri Community Maps Contributors, Texas Parks & Wildlife, CONANP, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, USFWS, Maxar

APPENDIX B. CONTRACT SCOPE OF WORK AND DELIVERABLE DUE DATES

Scope of Work

Task 1: Project Administration

Objective: To effectively administer, coordinate, and monitor all work performed under this project including technical and financial supervision and preparation of status reports.

Subtask 1.1: Project Oversight — The UCRA will provide technical and fiscal oversight of the staff and/or subgrantee(s)/subcontractor(s) to ensure Tasks and Deliverables are acceptable and completed as scheduled and within budget. With the TCEQ Project Manager's authorization, the UCRA may secure the services of subgrantee(s)/subcontractor(s). The UCRA will comply with applicable requirements of 40 CFR Part 33 related to Disadvantaged Business Enterprises in connection with procurements of goods or services, as set out in the Federal Conditions and Forms section of this Contract. Project oversight status will be provided to the TCEQ Project Manager with the Quarterly Progress Reports (PRs).

Subtask 1.2: PRs — The UCRA will submit PRs to the TCEQ Project Manager by the 15th of the month following the end of the quarter. PRs will include reporting on the status of Deliverables and proposed revisions to due dates, narrative description of progress by Task, and status of nonconformances/corrective actions. The TCEQ Project Manager will provide a template for the PR to the UCRA.

Subtask 1.3: Reimbursement Forms — The UCRA will submit Reimbursement Forms in accordance with the Special Terms and Conditions.

Subtask 1.4: Contract Communication — The UCRA will maintain regular telephone and/or e-mail communication with the TCEQ Project Manager regarding the status and progress of the project and any matters that require attention between PRs. Communications will include a quarterly conference call to discuss items such as project Tasks, financial status, Quality Assurance Project Plans, corrective actions and any other matters that require attention. The TCEQ Project Manager may request additional information from the UCRA prior to the call or meeting. The UCRA will provide meeting notes, identifying action items,
for the telephone calls within five days of the call.

The first conference call held each fiscal year of the project will cover, as applicable, any staff changes, the previous year's performance, budget estimates, and overall project progress. Matters that will be communicated to the TCEQ Project Manager include, but are not limited to: Notification a minimum of 14 days before the UCRA has scheduled public meetings or events or other major Task activities.

- Notification within 48 hours following events or circumstances that may require changes to the Budget, Scope of Work, or Schedule of Deliverables.
- Requests for prior approval of activities or expenditures for which the Contract requires advance approval or that are not specifically included in the Scope of Work.

Subtask 1.5 Contractor Evaluation — The UCRA will participate in an annual Contractor Evaluation at the end of each state fiscal year by responding to the draft Evaluation.

Subtask 1.6: Coordination Call with EPA — Upon request by TCEQ and EPA, the UCRA will participate in a call with EPA to share progress on goals, measures of success, challenges, and draft documents.

Subtask 1.7: Project Article — Upon request by TCEQ, the UCRA will provide a project article. The article will state the project's purpose, describe the activities of the past fiscal year and include photographs of the project. The UCRA will address TCEQ comments on the article and provide a final article.

Subtask 1.8: Contract Budget Updates — The UCRA will discuss annual fiscal year budgets with the TCEQ Project Manager on a quarterly basis at a minimum. Starting in the second year of the project, the UCRA will provide an Annual Budget Update that details state fiscal year spending projections associated with planned project activities. These updates will be revised when fiscal year spending projections change by 10% or more, or upon request by the TCEQ Project Manager. The update in the final year of the project will include a budget for all remaining project activities. The TCEQ Project Manager will provide a template for the Annual Budget Update.

Deliverables:

1.2 PRs (due by the 15th of the month following the end of each state fiscal quarter).
1.3 Reimbursement forms (due in accordance with Contract Special Terms and Conditions).
1.4 Conference calls with meeting notes and action items (calls within 30 days of the end of each quarter; notes due within seven (7) days of meeting).
1.5 Contractor Evaluation Response (due seven (7) days after receipt).
1.6 Coordination call with EPA (due upon request).
1.7 Project Article and pictures (due upon request).
1.8 Annual Budget Updates (quarters 5, 9, 13 and 17, within two weeks following request).

Task 2: Quality Assurance

Objective: To refine, document, and implement data quality objectives (DQOs) and quality assurance/quality control (QA/QC) activities that ensure data of known and acceptable quality are generated by this project.

Subtask 2.1: QAPP Planning Meetings — The UCRA will schedule a QAPP planning meeting with the TCEQ Project Manager, QA staff, technical staff, and contractors within 30 days of Contract execution, to implement a systematic planning process based on the elements in the applicable QAPP shell. A QAPP shell/examples will be provided by the TCEQ Project Manager. The information developed during this meeting

will be incorporated into a QAPP by the UCRA. The UCRA may conduct additional meetings to determine whether changes to an existing QAPP are needed.

Subtask 2.2: Quality Assurance Project Plan (QAPP) — The UCRA will develop and submit to TCEQ a QAPP with project specific DQOs and other components consistent with the following documents:

- TCEQ QAPP Shell(s)/example(s)
- EPA Requirements for QAPPs (QA/R5)
- EPA QAPP Requirements for Secondary Data Research Projects
- TCEQ Surface Water Quality Monitoring (SWQM) Procedures

The UCRA will develop the QAPP in consultation with the TCEQ Project Manager, QA staff, and contractors. The UCRA will address comments and submit a Final QAPP for review. The QAPP must be signed/fully approved by TCEQ and, if necessary, EPA, before any environmental data operations begin.

Subtask 2.3: QAPP Annual Reviews, Revisions, and Updates — The UCRA will submit documentation certifying its annual review of the QAPP at least 90 days prior to the QAPP anniversary date. Amendments approved since the initial QAPP approval or a subsequent certified annual review (if applicable) must be submitted along with the certification. If extensive changes to a QAPP are necessary, a full revision/update is required. Once TCEQ certifies the annual review or approves the full revision/update, the QAPP effective period is extended an additional year. No work described in a QAPP will be conducted outside the effective period for the QAPP.

Subtask 2.4: QAPP Amendments — The UCRA will submit Draft QAPP Amendments for TCEQ review when changes to the QAPP are necessary. Draft QAPP Amendments should be submitted at least 90 days prior to the scheduled initiation of changes and must be accompanied by a justification, summary of changes, and detail of changes. The UCRA will submit Final QAPP Amendments within 30 days of receipt of any comments provided by TCEQ. Final QAPP Amendments will be submitted to TCEQ with the UCRA's signatures and responses to comments and circulated for appropriate TCEQ signatures. The QAPP Amendments must be signed/fully approved by TCEQ and, if necessary, EPA, before any changes conveyed within Amendments are implemented.

Subtask 2.5: Corrective Action Reports (CARs) — The UCRA will provide CARs, as needed, to document deviations from sampling method requirements or sample design, failures associated with chain-of-custody procedures or in field and laboratory measurement systems. The UCRA will submit CARs with PRs.

Deliverables:

2.1 QAPP Planning Meeting notes (due within 30 days of Contract execution).
2.2 Draft QAPP (due at least 120 days prior to the scheduled initiation of environmental data operations).
2.2 Final QAPP (due 30 days prior to the scheduled initiation of environmental data operations).

2.3 QAPP Annual Reviews and Revisions (due at least 90 days prior to the QAPP approval anniversary).
2.4 Draft and Final QAPP Amendments. (Draft Amendment due at least 90 days prior to the scheduled initiation of changes or additions to activities listed in the current QAPP. Final QAPP Amendment due within 30 days of TCEQ comments.)
2.5 CARs (due as needed with PRs).

Task 3: Education and Outreach

Objective: To increase awareness within the community by providing San Angelo residents and other interested parties with project information.

Subtask 3.1: Public Educational Materials — The UCRA will create and disseminate educational materials to youth and adults in the community. TCEQ must approve all project-related content in any educational materials and publications at least two weeks prior to distribution.

Subtask 3.2: Presentations and Local Media — The UCRA will utilize television and radio media to disseminate educational information and will develop presentations for delivery to local civic groups. TCEQ must approve all project-related content in any educational materials and publications at least two weeks prior to distribution. Comments from drafts will be addressed in the final versions.

Subtask 3.3: Webpage Maintenance — The UCRA will update its existing webpage with new educational information on a quarterly basis and maintain all aspects of the webpage.

Subtask 3.4: Informative Signage — The UCRA will generate a project informational signage (i.e. billboards, staked signs) that lists the Clean Water Act § 319(h) source of funding, participation and partnership of EPA, TCEQ, other project partners. The UCRA will produce a Draft and Final sign and install the signage at areas to be determined. Draft signage will be submitted to TCEQ for review and approval and comments will be addressed prior to installation. The UCRA must comply with the Contract's Special Term and Condition regarding requirements for the signage and EPA and TCEQ logos.

Deliverables:
3.1 Outreach and presentation materials (to be submitted for review and approval at least two weeks prior to dissemination). Final material with PRs.
3.2 Pre-approval of content for television and radio (to be submitted for review and approval at least two weeks prior to dissemination).
3.3 Public webpage updates (to be submitted for review and approval at least two weeks prior to dissemination).
3.4 Draft signage design (to be submitted for review and approval prior to installation; quarter 13, month 2).
3.4 Final signage design and documentation of installation (due quarter 13, month 3).

Task 4: Best Management Practice (BMP) Design and Small-Scale BMP Installation

Objective: To design and oversee construction of the structural BMP. This task will be performed by a subcontractor(s) under the supervision of the UCRA or the Performing Party. The new project objective is to install small-scale NPS BMPs in downtown San Angelo and along the North Concho River corridor.

Subtask 4.1: BMP Identification — The UCRA, with assistance from the project partners, will submit a list of proposed BMPs to the TCEQ Project Manager for review and approval.

Subtask 4.2: BMP Installation — The UCRA, with assistance from the project partners, will install at least one pet waste station and other BMPs in the project area.

Subtask 4.3: BMP Coordinates and Picture — The UCRA will provide the location and a picture of each final BMP to the TCEQ Project Manager once each is constructed. The coordinates must be in decimal form with a minimum of six digits after the decimal point and the geodetic datum must be NAD83.

Deliverables:
4.1 BMP identification list (due four weeks prior to installation).
4.2 Documentation of BMP installations (by the end of FY25, quarter 3).
4.3 Photo and map coordinates of each BMP (due 30 days after each BMP is installed).

Task 5: Load Reduction Estimates

Objective: To estimate load reductions resulting from project activities.

Subtask 5.1: Load Reduction Methodology — The UCRA will submit its preferred load reduction estimate methodology and input sources to TCEQ. Load reduction estimates will be calculated for sediment, nitrogen, phosphorus, and bacteria. The Nonpoint Source Program Load Reduction Methodology Standard Operating Procedure will be provided to the UCRA with suggested load reduction methods if applicable. TCEQ must approve the methodology used to estimate load reductions.

Subtask 5.2: Load Reduction Estimates — The UCRA will calculate load reductions using the approved methodology.

Deliverables:
5.1 Load reductions methodology and inputs (due quarter 3).
5.2 Load reduction estimate calculations (due in Final Report).

Task 6: Diel Pre-Construction Monitoring

Objective: To collect dissolved oxygen (DO) data and provide an assessment of potential DO improvement.

Subtask 6.1: Water Quality Monitoring Assessment Requirements — The UCRA will satisfy the following water quality monitoring assessment requirements described in their monitoring quality assurance project plan (QAPP):

- Perform a desk readiness review with field staff of field sampling procedures and requirements as outlined in the QAPP and the TCEQ SWQM Procedures Manual. The UCRA will submit a brief report documenting topics discussed and attendance at this review.
- Submit field notes and instrument calibration sheets from first sampling event within 30 days of first event.

Subtask 6.2: DO Monitoring — The UCRA will collect DO data during 12 pre-construction 24-hour continuous monitoring events. The diel monitoring events will be conducted on a weekly basis. The total number of diel monitoring events may be reduced if dictated by safety or project period time constraints. It is understood that diel monitoring will not be conducted if unsafe conditions arise due to excessive stormwater flows. If such conditions are encountered the work will be rescheduled if project period time constraints allow. Select diel data collection site downstream of bank stabilization location. The UCRA has submitted a station location (SLOC) request and received a unique station ID.

Subtask 6.3: Water Quality Data Submission — The UCRA will maintain a master database of collected data. The UCRA will upload data into the TCEQ Surface Water Quality Monitoring Information System (SWQMIS) Test Environment and submit successful data set(s) to the TCEQ Project Manager. Data will be submitted electronically to the TCEQ Project Manager in the Event/Result file format described in the most current version of the Data Management Reference Guide (DMRG). A completed Data Review Checklist and Data Summary will be submitted to the TCEQ Project Manager with each data submittal.

Deliverables:

6.1 Documentation of field monitoring readiness review (due before first sampling event)
6.1 All field notes and instrument calibration sheets from first sampling event (due within 30 days of the event)
6.2 Station location (SLOC) requests and documentation of sampling events (due when draft QAPP is submitted)
6.3 SWQMIS data submissions (data summary and checklist, event and result files, and validator report) after successful upload into SWQMIS Test Environment (due quarterly following start of monitoring).

Task 7: Green Infrastructure Plan

Objective: To identify potential NPS contributions from various urban infrastructures and determine applicable green infrastructure (GI).

Subtask 7.1: Mapping and Surveying — The UCRA will develop a map that identifies areas of concern and applicable BMPs using ArcGIS mapping software. The UCRA will use the EPA BMP Siting Tool to identify the most applicable remediation strategies for those areas using green infrastructure as the key component. To gather data for the EPA BMP Siting Tool and ArcGIS map, the UCRA will perform field surveys and a desk review to classify levels of NPS impacts from downtown areas on the Concho River. The UCRA will also distribute written and/or virtual questionnaires to willing community members and business owners in the downtown area to discover potential NPS hotspots on the classification maps created in this project.

Subtask 7.2: Draft GI Plan — The UCRA will assess data compiled during this project and provide a summary of BMP green infrastructure projects with respect to cost estimate viability, partner support, and community involvement. This summary will target areas with the highest potential NPS contributions.

Subtask 7.3 Final GI Plan — The UCRA will submit the final draft of the GI Master Plan at least two months prior to the end of the Contract.

Deliverables:

7.1 Draft NPS questionnaire (due quarter 13, month 1).
7.1 Final NPS questionnaire (due quarter 13, month 3).
7.1 BMP Map (due at least four (4) months prior to the end of the Contract, with the draft GI Master Plan).
7.2 Draft GI Master Plan (due at least four (4) months prior to the end of the Contract).
7.3 Final GI Master Plan (due at least two (2) months prior to the end of the Contract).

Task 8: Final Report

Objective: To produce a Final Report that summarizes all completed activities and conclusions reached during the project. The Final Report will discuss the extent to which project goals and purposes have been achieved and state the amount of funds spent on the project. The Final Report should emphasize successes, failures, lessons learned and should include analyses estimating the project's water quality improvements and/or load reductions, if applicable. The Final Report will summarize all the Task Reports either in the text or as appendices.

Subtask 8.1: Draft Final Report — At least 30 days prior to submitting the Final Report, the UCRA will provide a Draft Final Report. This comprehensive report should document all Deliverables under this Scope of Work. The Draft Final Report should be structured per the following outline:

- Title and contract number
- Table of Contents
- Project background
- Study area

- Summary of all Task Reports
- Amount of project funding and amount spent
- Discussion; include deliverables not completed, lessons learned, recommendations
- Water quality results achieved and estimated load reductions
- Appendices (if needed)

Subtask 8.2: Final Report — The UCRA will revise the Draft Final Report to address comments provided by the TCEQ Project Manager. At least two weeks before the expiration of the Contract, the UCRA will submit the Final Report to the TCEQ Project Manager.

Deliverables:
8.1 Draft Final Report (due at least six (6) weeks prior to the end of the Contract).
8.2 Address TCEQ comments (due within 30 days of comments).
8.2 Final Report (due at least two (2) weeks prior to the end of the Contract).

APPENDIX C. CORRECTIVE ACTION PLAN FORM

Corrective Action Plan Form

Deficiency Report and Corrective Action Plan			
QAPP Title:			
QAPP UCRA:		Date of deficiency:	
CAP Number:		Date deficiency reported to TCEQ:	
CAP submitted by:		Date CAP submitted:	
TCEQ Project Manager:		Date CAP closed:	
Description of deficiency:			
Root cause of deficiency:			
Programmatic impact of deficiency:			
Corrective Action to address the deficiency and prevent its recurrence:			
Proposed Completion Date for Each Action:			
Individual(s) Responsible for Each Action:			
Method of Verification:			

Example Corrective Action Plan Form

Deficiency Report and Corrective Action Plan			
QAPP Title:	WPP Implementation – LID BMP Monitoring QAPP		
QAPP UCRA:	River Authority	Date of deficiency:	9/25/2023
CAP Number:	1 *(# sequentially)*	Date deficiency reported to TCEQ:	9/25/2023
CAP submitted by:	Jane Doe	Date CAP submitted:	10/9/2023
TCEQ Project Manager:	John Doe	Date CAP closed:	*Added by TCEQ PM when CAP approved.*
Description of deficiency:	The pavement monitoring station at the university is measuring a larger runoff volume than is estimated possible. Runoff measured is higher than the total precipitation volume calculated by multiplying the catchment area by the precipitation measured at the site.		
Root cause of deficiency:	(1) It is possible that the drainage area was not measured accurately, it may be larger. (2) The outfall of the monitoring station might not adequately allow runoff to flow through causing pooling around the flow-measuring point. The accumulation of non-flowing water could be confounding the flow meter since its physical principal of measurement is hydrostatic pressure caused by water depth.		
Programmatic impact of deficiency:	The illogical results of the pavement runoff measurement indicate that further calibration of the equipment is necessary. Data collected at this event are not able to be used in analysis or results.		
Corrective Action to address the deficiency and prevent its recurrence:	A survey will be conducted on the site to determine the ridge of the catchment area. A wider and deeper channel will be dug out at the monitoring point outfall to ensure all the flow drains away from the measuring point. Storm event runoff will not be measured at this site until this work has been completed.		
Proposed Completion Date for Each Action:	11/30/2023		
Individual(s) Responsible for Each Action:	Joe Schmo, River Authority Project Manager		
Method of Verification	Results of the catchment area survey will be emailed to the TCEQ Project Manager. Photos of the modified measurement site will be emailed to the TCEQ Project Manager.		

APPENDIX D. CORRECTIVE ACTION PLAN STATUS FORM

Corrective Action Status Table

The Corrective Action Status Table is included as a tab in the quarterly progress report template provided by the TCEQ NPS Project Manager.

Corrective Action #	Date Issued	Description of Deficiency	Action Taken	Date Closed

Corrective Action Status Table Example

Corrective Action #	Date Issued	Description of Deficiency	Action Taken	Date Closed
1	7/25/2021	Runoff measured at pavement was greater than total area runoff.	The area is being surveyed to ensure the catchment area size is correct. The monitoring station location is being modified to ensure runoff flows through properly.	
2	8/1/2021	Sample residual insufficient for analysis of TSS.	Data estimated but questionable, not will not be submitted to TCEQ.	8/8/2021