COLORADO
Colorado Water Conservation Board
Department of Natural Resources

1313 Sherman Street, Room 721
Denver, CO 80203

November 5, 2014

El Paso County
Attn: Elaine Kleckner
200 S. Cascade Ave., # 30
Colorado Springs, Co 80903

RE: Notice to Proceed - WSRA Grant – El Paso County Groundwater Quality Study Phase 2 Aquifer

Dear Elaine,

This letter is to inform you that the purchase order to assist in the above WSRA grant project was approved on November 5, 2014. The email copy serves as your original purchase order.

With the purchase order, you are now able to proceed with the project and invoice the State of Colorado for costs incurred through October 31, 2015. Upon receipt of your invoice(s), the State of Colorado will provide payment no later than 45 days. I wish you much success in your project.

If you have any questions or concerns regarding the project, please contact Andy Moore, Project Manager at 303-866-3441 ext. 3229 or at andy.moore@state.co.us and forward your invoices directly to me and I will obtain the approvals for disbursement.

Sincerely,

//s//

Dori Vigil
Program Assistant II
Water Supply Planning Section
O 303.866.3441 x3250 |
1313 Sherman Street, Suite 723, Denver, CO 80203
dori.vigil@state.co.us
www.cwcb.state.co.us

cc: Andy Moore, Project Manager

STATE OF COLORADO
Department of Natural Resources

ORDER
Number: POGG1 PDAA 20150000000000000181
Date: 11/05/14
Description:
WSRA 2500 El Paso GW Quality Study Phase 2 Aquifer

BUYER
Buyer:
Email:

VENDOR
EL PASO COUNTY
200 S CASCADE AVE
STE 30
COLORADO SPRINGS, CO 80903-2202

Contact: .
Phone: .

**** IMPORTANT ****
The order number and line number must appear on all invoices, packing slips, cartons and correspondence

BILL TO
COLORADO WATER BOARD CONSERVATION
1313 SHERMAN STREET, ROOM 718
DENVER, CO 80203

SHIP TO
COLORADO WATER BOARD CONSERVATION
1313 SHERMAN STREET, ROOM 718
DENVER, CO 80203

SHIPPING INSTRUCTIONS
Delivery/Install Date:
F.O.B:
VENDOR INSTRUCTIONS:

Line Item	Commodity/Item Code	UOM	QTY	Unit Cost	Total Cost	MSDS Req.
1	G1000		0	0.00	$10,000.00	☐
Description: WSRA 2500 El Paso GW Quality Study Phase 2 Aquifer						
Start Date: 10/31/14		End Date: 10/31/15				

Line Item	Commodity/Item Code	UOM	QTY	Unit Cost	Total Cost	MSDS Req.
2	G1000		0	0.00	$41,932.50	☐
Description: WSRA 2500 El Paso GW Quality Study Phase 2 Aquifer						
Start Date: 10/31/14		End Date: 10/31/15				

TERMS AND CONDITIONS
https://www.colorado.gov/osc/purchase-order-terms-conditions

DOCUMENT TOTAL = $51,932.50

El Paso County Groundwater Quality Study - Phase 2 (2012 – 2015)

USGS Study of Upper Black Squirrel Creek Designated Basin Alluvial Aquifer Storage Water Quality in Cooperation with El Paso County Stakeholders

Statement of Work

Water Activity Name: **El Paso County Groundwater Quality Study – Phase 2 Aquifer Vulnerability Assessment and Modeling – Task 5**

Grant Recipient: El Paso County Board of County Commissioners and their Groundwater Quality Study

Funding Source Requested: $51,932.50

($10,000 from Arkansas Basin Funds and $41,932.50 from Statewide Funds)

Introduction and Background:

From the late 1990's through the mid-2000's there has been prolific development of rural residential property and suburban development overlying the Upper Black Squirrel Creek groundwater aquifer located in eastern El Paso County. In 2006 the aquifer was subject of a Colorado Geological Survey study that quantified the alluvial storage potential, capacity, and areas of geological suitability for future storage projects. The Basin's alluvial groundwater and storage opportunities were identified in Colorado SB.06-193 and again thereafter in 2013 before the Interim Water Resources Review

Committee as a likely candidate for a future large scale alluvial storage pilot project. In 2008 concerns from a diverse group of stakeholders over water quality and escalation of nitrate concentrations basin wide led to a limited scope Phase 1 literature review study, also by Colorado Geological Survey. Therein, Mr. Topper of CGS identified significant data gaps and areas of critical interest for establishing monitoring wells and additional data for the protection of the water supply and aquifer storage capacity. The Phase 1 literature review concluded that more data, mapping and tools were needed and made recommendations for a phase 2 sampling, analysis and mapping study.

The purpose of the project is to build on Phase 1 and work completed in 2011 and further water quality parameter sampling under phase 2, task 4 work completed in 2013 & 2014, to continue and complete phase 2c (task 5) of the El Paso County Groundwater Quality Study.

The U.S. Geological Survey (USGS) was a technical advisor for Phase 1 and is the consultant for Phase 2. The USGS worked closely with the El Paso County Groundwater Quality Study Committee, reviewing the Groundwater Quality, Age, and Probability of Contamination, Eagle River Watershed Valley-Fill Aquifer, North-Central Colorado 2006-2007 in their development of the Phase 2 scope of work and sampling plans (the comprehensive Scope of Work is attached hereto).

Objectives:

1) To refine the distribution, geometry, and hydrology of the alluvial and shallow bedrock aquifers in the northwestern portion of the Upper Black Squirrel Creek basin; and

2) To establish a groundwater monitoring network to detect and quantify impacts to water quality resulting from existing and proposed land uses that may degrade water supplies; and

3) To develop statistical modeling and associated mapping tools that are expected to be used to inform land use planning and determine if changes to policies and regulations are warranted based upon contamination probabilities.

4) To protect the alluvial storage resource from further degradation of water quality, which might render it unsuitable for aquifer storage and recover at a future date. Establishing a water-quality baseline for the alluvial aquifer will be needed before

conjunctive use/aquifer storage and recovery can occur to meet the water supply gap that has been identified by El Paso County.

5) To provide entities such as special districts and UBSCGWMD with better information, tools and data to make well informed decisions regarding infrastructure planning, collaboration, supply development, recharge and source water protection.

- The Phase 2 scope of work includes the sampling and analysis of Nitrate, Major ions (including fluoride), Chlorofluorocarbons (Freon, CFCs, GW age), Tritium (G.W. age), Also sampling for fuel compounds (BTEX) and dissolved gasses (methane, N2, Ar, CO2, O2) at each well to help establish baseline for oil/gas concerns.
- Upper Black Squirrel Basin; a Groundwater Management Act Designated Basin, is a major source of agricultural, municipal, and rural residential communities, and a known alluvial water supply storage resource as identified in SB06-193. The broad baseline data set, pollution impact vulnerability mapping and dynamic impact modeling will be essential tools for protecting this aquifer resource for future storage opportunities and ensuring that existing vested water rights don't need to acquire replacement supplies, presumably from surface supplies outside the Upper Black Squirrel Creek Basin.
- The modeling and vulnerability mapping deliverables from this Phase 2 Study will be used to identify areas or zones within the basin where impacts from land use to water quality are so highly correlated that further land use protections are needed. The County's land use rule making process needs quality scientific data for initiating changes to land use policy; and the modeling from this phase 2 work products will be a valuable science based tools.
- The Study's Task 2 and 3 have established a basin wide groundwater monitoring network and a strong passionate citizen/stakeholder advisory committee that anticipates an ongoing sampling phase 3 program scope work in cooperation with the El Paso County Health Department and Upper Black Squirrel Creek Groundwater Management District.

Groundwater Quality Study Phase 2 – USGS Study Tasks:

Task 1: Records Collection and Planning

Description of Task: Compilation of GIS Data, Researching DWR records for wells completed in the alluvial aquifer that could be sampled for the Phase 2 Study, development of 50 random polygons with equal alluvial material for location of random alluvial wells to be sampled, and the outreach communication and setting site visit appointments with well owners to establish sampling and access consent.

Method / Procedure: Data requests, telephone and web based research, computer aided random definition of 50 alluvial aquifer polygons to define study area and telephone and email connection with well owners to set appointments.

Deliverable: Sampling area map and randomly selected polygon mapping.

Task 2: Subject Well Identification, Inspection and Consent; and Database

Description of Task: Alluvial well site visits, inspections, consent and creation of inventory of wells and owners, and the creation of a well info database.

Method / Procedure: Well site inspections, securing consent to access and sample paperwork, database formatting and data entry.

Deliverable: Consent and access documents for approximately 40 existing alluvial wells, GIS mapping of well sites with cross referenced ID to well data, and well data database.

Task 3:

Description of Task: Identification of new monitoring well locations, permitting, monitoring well contracting, and installation of monitoring wells at approximately 8 new locations, most within the range recommended from the Phase 1 report.

Method / Procedure: Cross referencing Phase 1 recommendations with USGS random polygons that were without an alluvial well to sample, with County, State, and stakeholder land ownership to identify parcels of property in key areas that we could likely get access and consent to drill a monitoring well. Compilation of well design and construction standards, bid collection and contracting through Cherokee Metro District for the construction and development of up to 10 monitoring wells.

Deliverable: Monitoring well locations IDs, access agreements, permitting and constructed monitoring wells

Task 4:

Description of Task: USGS team sampling of wells for USGS Laboratory analysis of sampling, QAQC, and review of data internally and with Groundwater Study Committee.

Method / Procedure: Systematic sampling of the 48 alluvial study wells for Temperature, pH, Nitrate, conductivity and Major ions (including fluoride), Chlorofluorocarbons (Freon, CFCs, GW age), Tritium (G.W. age), and sampling for fuel compounds (BTEX) and

dissolved gasses (methane, N2, Ar, CO2, O2), Laboratory analysis, Quality Assurance and Control on sample results to ensure data was reliable and review of the data results and preliminary mapping of data.

Deliverable: Water Quality Data Sets, preliminary mapping, QAQC verification and study committee update briefing.

Task 5: ***Analyze water quality, groundwater age dating, soil porosity data and land use and precipitation data review, statistical modeling, committee communication and report drafting, peer review, publication and communication of final report to stakeholders, Arkansas Basin Roundtable and CWCB, along with ongoing basin water quality monitoring recommendations:***

Description of Task: **Compilation of groundwater quality data, development and testing of statistical correlation modeling with GIS data such as depth to groundwater, land use, soil porosity and precipitation.**

Development of GIS mapping showing precipitation patterns, groundwater age, land use, soil compositions, depth to groundwater and probability of groundwater contamination. Developing of Statistical modeling that is predictive of the probability of contamination of the alluvial groundwater aquifer.

Method / Procedure: **Development of Statistical Regression Models based upon water quality sampling, groundwater age dating analysis, precipitation, soils, land use, among other factors to determine what variable where most highly correlated to infiltration rates and probability of possible contamination. Development of GIS mapping tools to represent the statistical modeling, which can be updated or manipulated to reflect changes in variable conditions. Report writing, charting, graphing and data base refinement in preparation for publication. Formatting to USGS standards of publication and the review of outcomes to formulate recommendations for ongoing sampling sites of critical importance and updates to the modeling.**

Deliverable: **Final groundwater age dating data analysis, pollution probability statistical modeling, final GIS mapping, committee report out, draft final report for committee and internal review, final USGS SIR report publication, GIS mapping publication as USGS Open File reports and recommendations for future monitoring.**

GROUNDWATER QUALITY STUDY, PHASE 2 - BUDGET ALLOCATION PER YEAR (BASED ON USGS WORK PLAN)

Task	Scope of Tasks	NON-WSRA Funds	WSRA Funds-Previous	WSRA Funds-New Award	Total Funds
1 and 2	(1). Compile GIS Data; Identify Wells (2). Site visits and inventory wells; Enter well information into database	$47,700.00	$0.00	$0.00	$47,700.00
3 and 4	(3). Install new monitoring wells (4). Sample wells; Enter field data into database; Receive data from labs and review data	$95,650.00	$35,000.00	$0.00	$130,650.00
5	(5). Analyze data; Draft report preperation; Develop monitoring plan. USGS report review process; Final report preperation; Final report and GIS map publication	$102,950.00	$0.00	$51,932.50	$154,882.50
TOTAL ($)		**$246,300.00**	**$35,000.00**	**$51,932.50**	**$333,232.50**

***Note: Refer to Exhibit for more detailed scope of Tasks (1-5).**