

4-A\1.25

October 11, 2016

Mr. Brian Fairchild
Senior Principal
SWCA, Incorporated
6200 UTSA Boulevard, Suite 102
San Antonio, TX 78249

Re: Contract Renewal No. 2 and Amendments for the Water Quality Sampling and Analysis Program for Comal and San Marcos Springs Ecosystems

Dear Mr. Fairchild:

Please regard this letter as the second formal renewal and first amendment of the Contract No. 13-656-HCP ("Contract") originally dated January 1, 2014, between the Edwards Aquifer Authority ("EAA") and SWCA, Incorporated ("Contractor") for the Water Quality Sampling and Analysis Program for Comal and San Marcos Springs ecosystems project.

The original Contract term, which was January 1, 2014 through December 31, 2015, is hereby renewed and extended for an additional two-year period pursuant to the provisions of Article III, paragraph 3.2, thereunder. The new Contract expiration date shall be December 31, 2018. The total annual Contract, as now renewed and amended, is not to exceed \$431,000. Costs for 2017 will not exceed \$145,700 and for 2018 will not exceed \$285,300.

The amendments to the Contract include extending the Completion Date to December 31, 2018, combining the remaining renewals into a single two-year period, and to amend the scope of work. The underlined text below indicates language added to the Contract. The strike-through text indicates deleted language.

Amended sections are hereby amended and restated in full, as follows:

ARTICLE III, Section 3.2

Section 3.2. Commencement and Completion Date. The Contractor will commence work hereunder immediately upon receipt of written notice issued by the EAA General Manager. All work covered hereby will be completed and delivered to the EAA by the Completion Date and shall be completed in compliance with the schedules, budgets, descriptions and specifications contained herein and in the Exhibits hereto. It shall be the Contractor's responsibility to ensure that the completion times for the tasks required for this project are met. All work contracted for this Contract shall be completed by December 31, 20158 (the "Completion Date").~~, with an EAA~~

~~option to renew for three additional one year periods, which options to extend may be exercised by EAA, in writing delivered to the Contractor, at any time prior to the Completion Date, or the extended term Completion Dates. Time is of the essence in the performance of this Contract.~~

EXHIBIT A, SCOPE OF WORK

Task 1. Comal Springs Ecosystem Sampling

This task is divided into several subtasks consisting of ~~surface water sampling~~, stormwater runoff sampling, ~~well sampling~~, subsurface sediment sampling, and passive diffusion sampling.

~~Subtask 1.1 Surface Water Grab Sampling~~

~~The Contractor will collect grab samples from the five surface water sampling locations (see attached map), twice during the calendar year, approximately six months apart. Samples will be collected in March and August. Grab samples will be analyzed for the analytical parameters using the analytical methods provided in Table 1.~~

Subtask 1.2~~1~~ Surface Water Passive Sampling

The Contractor will perform six sampling events annually, using passive diffusion samplers (PDS) manufactured by Amplified Geochemical Imaging, LLC (or equivalent). A PDS will be placed in each of the sampling locations identified in the attached map for the Comal River. The PDS will be left in place for two weeks at each location. The sampling events will occur in February, April, June, August, October, and December. When conducting the PDS sampling, the Contractor will also perform six pharmaceutical and personal care product (PPCP) sampling events using a PPCP specific diffusion sampler placed only at the most downstream sample site. Purchase price of PDS from Amplified Geochemical includes analysis of a suite of organic and PPCP compounds.

All analyses, other than those provided for PDS's and provided by Amplified Geochemical Imaging, LLC. will be conducted by a National Environmental Laboratory Accreditation Program (NELAP) laboratory.

Sample sites in the Landa Lake and Comal River area are listed below: (also see attached map):

Upper Springs (near Bleiders Creek);
Upper Landa Lake - (near Spring Island);
Lower Landa Lake - (above outfalls);
Upper Old Channel - (Elizabeth Street); and,
USGS Gauge - (above San Antonio Street Bridge)

Subtask 1.3~~2~~ Storm Water Sampling

~~Two~~ The Contractor will perform one storm water sampling events each year. ~~The Contractor shall schedule these sampling events so that they are approximately six months apart and are representative of different seasons of the year (preferably winter and summer). It is understood that this sampling is dependent on rainfall events; if it becomes apparent that this criteria for a sampling schedule is unable to be met, the Contractor shall~~

~~propose a new sampling schedule to EAA staff to be approved by EAA.~~ A storm water sampling event will be triggered when the flow rate at the U.S. Geological Survey (USGS) Comal Springs gauging station (#08169000) increases by 5% or there is a 20% change in three of the five water quality parameters measured in the downstream real time water quality monitoring probe. ~~Samples will be collected from each stormwater sampling location during the sampling event.~~ During even numbered years stormwater samples will be collected from five stormwater sampling locations during a stormwater sampling event. During odd numbered years samples will be collected at Upper Springs (near Blieders Creek) and Upper Old Channel (at Elizabeth Bridge). Five stormwater samples will be collected at each location during odd numbered years. During even numbered years, five samples will be collected at Upper Springs (near Blieders Creek) and New Channel (below confluence with Dry Comal Creek) with the remaining sites sample three times. Sampling times will be spaced to reflect changes in the stream hydrograph (one to three during initial rise or first flush, one at peak flow and one during the recession limb).

~~Stormwater samples will be analyzed for the analytical parameters using the analytical methods provided in Table 1.~~ using the methods found in Table 3. In even numbered years, the stormwater samples will only be analyzed for the parameters found in Table 1. In odd numbered years, the stormwater samples will only be analyzed for chemicals listed in the City of New Braunfels/Landa Park Golf Course Integrated Pest Management Plan (LP-IPMP, attached), plus atrazine.

The following locations will be sampled for stormwater (see attached map):

- Upper Springs (near Blieders Creek);
- New Channel - (below confluence with Dry Comal Creek);
- Upper Old Channel - (at Elizabeth Street);
- Lower Old Channel - (above Hinman Island); and,
- Comal River - (above confluence with Guadalupe River)

~~Subtask 1.4 Groundwater Sample Collection for Extreme Low Flow Scenarios Comal Springs~~

~~In the event total springflow at Comal Springs (as measured by USGS Comal Springs gauging station (#08169000)) drops below 30 cubic feet per second (cfs), the Contractor will conduct weekly monitoring of three wells in the vicinity of the spring complex for dissolved oxygen (DO), conductivity, pH, and temperature. Should springflow drop below 20 cfs, additional weekly sampling analyses will include nutrients, total dissolved solids (TDS), and total organic compounds (TOC). EAA staff will assist the Contractor in selecting three wells that will be used for sampling. Groundwater samples will be analyzed for the analytical parameters using the analytical methods provided in Table 2.~~

~~Based on conditions during the drought of record (circa 1950s), sampling for a lower flow could last for up to 21 weeks.~~

Subtask 1.53 Sediment Sampling

~~The Contractor will conduct one~~ subsurface sediment sampling event ~~each June in even numbered years~~ at each of the ~~surface water~~ PDS sampling locations. Three samples will be collected at each sample site and composited into one sample for analysis. Sediment samples will be analyzed for the ~~analytical~~ parameters ~~using the analytical methods provided shown~~ in Table 2.

The Contractor shall provide prior notification to EAA no later than 5 business days of intent to conduct a ~~surface or~~ sediment sampling event. The Contractor shall provide 24 hour prior notification to the EAA of the intent to mobilize for a potential stormwater sampling.

After each sampling event, the Contractor shall provide the data within one week of receipt from the Laboratory and indicate which parameters 1) have exceeded TCEQ surface water standards for contact recreation and ecological health for storm, ~~well, and~~ PDS ~~and surface water~~ samples and 2) have exceeded Probable Effect of Concentration to Benthic Organisms (PEC) for sediment samples.

The Contractor shall ensure collection of sufficient number of samples and sample volume per laboratory requirements for water and sediment samples.

Task 2. San Marcos Springs

This task is divided into of several subtasks consisting of ~~surface sampling~~, stormwater runoff sampling, ~~groundwater sampling~~, subsurface sediment sampling, and passive diffusion sampling.

~~Subtask 2.1 Surface Water Sampling Locations~~

~~The Contractor will collect grab samples from the seven surface water sampling locations (see attached map), twice during the calendar year, approximately six months apart. Samples will be collected in March and August. Grab samples will be analyzed for the analytical parameters using the analytical methods provided in Table 1.~~

Subtask 2.21 Surface Water Passive Sampling

The Contractor will perform six sampling events using passive diffusion samplers (PDS) manufactured by Amplified Geochemical Imaging, LLC (or equivalent). One PDS will be placed in each of the sampling locations identified in the attached map for the San Marcos River. The PDS will be left in place for two weeks at each location. The sampling events will occur in February, April, June, August, October, and December. When conducting the PDS sampling, the Contractor will also perform six PPCP sampling events using a PPCP specific diffusion sampler placed at the most downstream sample site. Purchase price of PDS from Amplified Geochemical includes analysis of a suite of organic and PPCP compounds.

All analyses, other than those provided for PDS's and provided by Amplified Geochemical Imaging, LLC. will be conducted by a National Environmental Laboratory Accreditation Program (NELAP) laboratory.

Sample sites in the Spring Lake and San Marcos river area are listed below (also see attached map):

Sink Creek;
Spring Lake;
Sessoms Creek;
City Park;
Rio Vista Dam;
1-35 reach; and
Capes Dam

Subtask 2.32 Storm Water Sampling

~~Two~~ The Contractor will perform one storm water sampling events each year. ~~The Contractor shall schedule these sampling events so that they are approximately six months apart and are representative of different seasons of the year (preferably winter and summer). It is understood that this sampling is dependent on rainfall events; if it becomes apparent that this criteria for a sampling schedule is unable to be met, the Contractor shall propose a new sampling schedule to EAA staff to be approved by EAA.~~ A storm water sampling event will be triggered when the flow rate at the USGS San Marcos Springs gauging station (#08170500) increases by 5% or there is a 20% change in three of the five water quality parameters measured in the downstream real time water quality monitoring probe. ~~Samples will be collected and analyzed from each stormwater sampling location during the sampling event.~~ During even numbered years, three stormwater samples will be collected from each stormwater sampling location during a stormwater sampling event with the exception of Sessoms and Sink Creeks where five samples will be collected. No stormwater sampling will occur during odd numbered years. Sampling times will be spaced to reflect changes in the stream hydrograph (one to three during initial rise or first flush, one at peak flow and one during the recession limb).

Stormwater samples will be analyzed using the methods found in Table 3. In even years, the stormwater samples will only be analyzed for the parameters found in Table 1.

The following locations will be sampled for storm water with priority given to locations at tributary outflows (see attached map):

Sink Creek;
Sessoms Creek;
Dog Beach Outflow;
Hopkins Street Outflow;
Purgatory Creek (above San Marcos River);
1-35 Reach; and
Willow Creek (above San Marcos River)

~~Subtask 2.3 Groundwater Sample Collection for Extreme Low Flow Scenarios for San Marcos Springs~~

~~In the event total springflow at San Marcos Springs (as measured by USGS San Marcos Springs gauging station (#08170500)) drops below 30 cubic feet per second (cfs), the Contractor will conduct weekly monitoring of three wells in the vicinity of the spring complex for dissolved oxygen (DO), conductivity, pH, and temperature. Should springflow drop below 20 cfs, then additional weekly sampling analyses will include nutrients, total dissolved solids (TDS), and total organic compounds (TOC). The EAA will assist the Contractor in selecting three wells that will be used for sampling. Groundwater samples will be analyzed for the analytical parameters using the analytical methods provided in Table 2.~~

~~Based on conditions during the drought of record (circa 1950s), sampling for a lower flow scenario could last for up to 21 weeks.~~

Subtask 2.5~~3~~ Sediment Sampling

The Contractor will conduct one subsurface sediment sampling event ~~each June in even numbered years~~ at each of the ~~surface water~~ PDS sampling locations. Three samples will be collected at each sample site and composited into one sample for analysis. Sediment samples will be analyzed for the ~~analytical~~ parameters ~~using the analytical methods provided shown in Appendix C Table 2.~~ Results of sediment sampling analysis will be used to formulate future sediment sampling at Spring Lake and the San Marcos River.

The Contractor shall provide prior notification to EAA no later than 5 business days of intent to conduct a ~~surface or~~ sediment sampling event. The Contractor shall provide 24 hour prior notification to the EAA of the intent to mobilize for a potential stormwater sampling.

After each sampling event, the Contractor shall provide the data within one week of receipt from the Laboratory and indicate which parameters 1) have exceeded TCEQ surface water standards for contact recreation and ecological health for storm, ~~well, and PDS and surface water~~ samples and 2) have exceeded Probable Effect of Concentration to Benthic Organisms (PEC) for sediment samples.

The Contractor shall ensure collection of sufficient number of samples and sample volume per laboratory requirements for water and sediment samples.

**Table 1: Analytical Parameters for Assessing Water Quality from Storm Water
and Surface Water Locations, Comal and San Marcos Springs**

Analyses
Volatile Organic Compounds (VOCs)
Semi-volatile Organic Compounds (SVOCs)
Organochlorine Pesticides
Polychlorinated Biphenyls (PCBs)
Organophosphorous Pesticides
Herbicides
Metals (Al, Sb, As, Ba, Be, Cd, Cr (total), Cu, Fe, Pb, Mn, Hg, Ni, Se, Ag, Tl, and Zn)
General Chemistry (GWQP) Total Alkalinity (as CaCO ₃), Bicarbonate Alkalinity (as CaCO ₃), Carbonate Alkalinity (as CaCO ₃), (Cl, Br, NO ₃ , SO ₄ , F, pH, TDS, TSS, Ca, Mg, Na, K, Si, Sr, CO ₃), and Total Suspended Solids (TSS).
Phosphorus (total)
Total Organic Carbon (TOC),
Dissolved Organic Carbon (DOC)
Kjeldahl Nitrogen
Bacteria Testing (<i>E coli</i>)
Caffeine

**Table 2: Analytical Parameters for Critical Period Related (Low Flow)
Sampling of Water Wells, Comal and San Marcos Springs**

Analyses
General Chemistry (GWQP) Total Alkalinity (as CaCO₃), Bicarbonate Alkalinity (as CaCO₃), Carbonate Alkalinity (as CaCO₃), (Cl, Br, NO₃, SO₄, F, pH, TDS, TSS, Ca, Mg, Na, K, Si, Sr, CO₃),
Total Organic Carbon (TOC)
Total Dissolved Solids (TDS)

**Table 32: Analytical Parameters for Assessing Water Quality from
Sediment Sample Locations, Comal and San Marcos Springs**

Analyses
Volatile Organic Compounds (VOCs)
Semi-volatile Organic Compounds (SVOCs)
Organochlorine Pesticides
Polychlorinated Biphenyls (PCBs)
Organophosphorous Pesticides
Herbicides

Metals (Al, Sb, As, Ba, Be, Cd, Cr (total), Cu, Fe, Pb, Mn, Hg, Ni, Se, Ag, Tl, and Zn)
General Chemistry Total Alkalinity (as CaCO ₃), Bicarbonate Alkalinity (as CaCO ₃), Carbonate
Phosphorus (total)
Total Organic Carbon (TOC),
Dissolved Organic Carbon (DOC)

Table 4-3: Method Descriptions

Method	Method Description	Protocol ¹
8260B	Volatile Organic Compounds	(GC/MS) SW846
8270C	Semivolatile Organic Compounds	(GC/MS) SW846
8081B	Organochlorine Pesticides	(GC) SW846
8082A	Polychlorinated Biphenyls (PCBs)	(GC) SW846
8141A	Organophosphorous Pesticides	(GC) SW846
8151A	Herbicides	(GC) SW846
6010B	Metals	(ICP) SW846
6020	Metals	(ICP/MS) SW846
7470A	Mercury	(CVAA) SW846
300.0	Anions,	Ion Chromatography
340.2	Fluoride	MCAWW
365.4	Phosphorus,	Colorimetry
9040C	pH	SW846
9060	Organic Carbon,	Total (TOC) SW846
SM 2320B	Alkalinity	SM
SM 2540C	Solids,	Total Dissolved (TDS) SM
SM 2540D	Solids, Total Suspended (TSS)	SM
351.2	Nitrogen, Total Kjeldahl	MCAWW
E1694	Caffeine	(HPLC/MS/MS) EPA

¹ Protocol References:

GC = Gas Chromatography

MS = Mass Spectrometry

ICP = Ion Chromatography

CVAA = Cold Vapor Atomic Absorption

HPLC = High Performance Liquid Chromatography

EPA = US Environmental Protection Agency

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

SM = "Standard Methods For The Examination Of Water And Wastewater", APHA, AWWA, WEF

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", EPA, Third Edition, November 1986 And Its Updates.

EXHIBIT B, BUDGET ESTIMATE

TASK	ESTIMATED COST	
Task 1. Comal Springs Ecosystem Sampling	\$ 298,060 **	<u>\$173,500</u>
Task 2. San Marcos Springs	\$447,093	<u>\$153,500</u>
Task 3. Conclusions and Recommendations	\$42,416	<u>\$6,000</u>
Task 4. Draft and Final Annual Reports	\$134,594	<u>\$80,000</u>
Task 5. Meetings and Presentations	\$26,696	<u>\$18,000</u>
TOTAL COSTS	\$948,860	<u>\$431,000</u>

~~**Includes cost incurred from PDS, Storm, and Sediment samples and analysis of each.~~

Please sign below to reflect your approval and acceptance of this renewal and amendments of the Contract and return a signed original of this letter to the EAA.

Please contact the EAA immediately if you have any questions about this Contract renewal and/or amendments.

Sincerely,

Roland Ruiz
General Manager

APPROVED AND ACCEPTED:
SWCA, INCORPORATED

Brian Fairchild
Senior Principal

Date