Form 9-1366
(May 2018)

U.S. DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

JOINT FUNDING AGREEMENT

Customer #:	6000000816
Agreement #:	15WSCA600081610_A5
Project #:	ZG00FUV
TIN #:	96-6002833
Fixed Cost Agreement	NO

FOR

WATER RESOURCES INVESTIGATIONS

THIS AGREEMENT is entered into as of the, 29th day of May, 2018 by the U.S. GEOLOGICAL SURVEY, UNITED STATES DEPARTMENT OF THE INTERIOR, party of the first part, and the SANTA BARBARA COUNTY WATER AGENCY (SBCWA), party of the second part.

1. The parties hereto agree that subject to availability of appropriations and in accordance with their respective authorities there shall be maintained in cooperation Geohydrology and Water Availability of San Antonio Creek Valley, California herein called the program. The USGS legal authority is 43 USC 36C; 43 USC 50; and 43 USC 50b.

2. The following amounts shall be contributed to cover all of the cost of the necessary field and analytical work directly related to this program. 2(b) includes In-Kind Services in the amount of $0.00 .

   (a) by the party of the first part during the period

Amount	Date	to	Date
$1,385.00	November 1, 2014		October 31, 2020

   (b) by the party of the second part during the period

Amount	Date	to	Date
$13,854.00	November 1, 2014		October 31, 2020

   USGS DUNs is 1761-38857. Total USGS fundiing for this agreement, including this amendment is $352,627. Total SBCWA funding for this agreement, including this amendment is $1647,810. Total cost of this agreement is $2,000,437.00

   (c) Contributions are provided by the party of the first part through other USGS regional or national programs, in the amount of: $0.00

   Description of the USGS regional/national program:
   No additional funding

   (d) Additional or reduced amounts by each party during the above period or succeeding periods as may be determined by mutual agreement and set forth in an exchange of letters between the parties.

   (e) The performance period may be changed by mutual agreement and set forth in an exchange of letters between the parties.

3. The costs of this program may be paid by either party in conformity with the laws and regulations respectively governing each party.

4. The field and analytical work pertaining to this program shall be under the direction of or subject to periodic review by an authorized representative of the party of the first part.

5. The areas to be included in the program shall be determined by mutual agreement between the parties hereto or their authorized representatives. The methods employed in the field and office shall be those adopted by the party of the first part to insure the required standards of accuracy subject to modification by mutual agreement.

6. During the course of this program, all field and analytical work of either party pertaining to this program shall be open to the inspection of the other party, and if the work is not being carried on in a mutually satisfactory manner, either party may terminate this agreement upon 60 days written notice to the other party.

9-1366 (Continuation) Customer #: 6000000816 Agreement #: 15WSCA600081610 A5

7. The original records resulting from this program will be deposited in the office of origin of those records. Upon request, copies of the original records will be provided to the office of the other party.

8. The maps, records or reports resulting from this program shall be made available to the public as promptly as possible. The maps, records or reports normally will be published by the party of the first part. However, the party of the second part reserves the right to publish the results of this program, and if already published by the party of the first part shall, upon request, be furnished by the party of the first part, at cost, impressions suitable for purposes of reproduction similar to that for which the original copy was prepared. The maps, records or reports published by either party shall contain a statement of the cooperative relations between the parties.
The Parties acknowledge that scientific information and data developed as a result of the Scope of Work (SOW) are subject to applicable USGS review, approval, and release requirements, which are available on the USGS Fundamental Science Practices website (https://www2.usgs.gov/fsp/).

9. Billing for this agreement will be rendered.
QUARTERLY
Invoices not paid within 60 days from the billing date will bear Interest, Penalties, and Administrative cost at the annual rate pursuant the Debt Collection Act of 1982, (codified at 31 U.S.C. § 3717) established by the U.S. Treasury.

	U.S. Geological Survey **United States** **Department of the Interior**		Santa Barbara County Water Agency
	USGS Point of Contact		**Customer Point of Contact**
Name:	Irene A. Rios, Budget Analyst	Name:	Thomas Fayram
Address:	4165 Spruance Rd., Ste 200 San Diego, CA 92101	Address:	130 East Victoria Street, Ste 200 Santa Barbara, CA 93101
Telephone:	619-225-6156	Telephone:	805-568-6436
Email:	iarios@usgs.gov	Email:	tfayram@cosbpw.net

Signatures and Date

Signature:	Date:	Signature:	Date:
Eric G. Reichard 5-30-19		See page 3	
Name: Eric G. Reichard		Name:	
Title: Director, USGS, CA Water Science Center		Title:	

Joint Funding Agreement No.
15WSCA600081610_A5
Signature Page Continued – Page 3

SANTA BARBARA COUNTY WATER AGENCY

BY:_____
Steve Lavagnino, Chair, Board of Directors

Date: 7-9-19

APPROVE AS TO FORM:
RAY AROMATORIO, ARM, AIC
RISK MANAGER

BY:_____
Risk Manager

ATTEST:

APPROVED AS TO FORM:
MONA MIYASATO
County Executive Officer
Ex Officio Clerk of the Board
of Directors of the Santa Barbara
County Water Agency

BY:_____
Deputy Clerk

APPROVE AS TO FORM:
MICHAEL C. GHIZZONI
COUNTY COUNSEL

BY:_____
Deputy

RECOMMENDED FOR APPROVAL:
Santa Barbara County Water Agency

BY:_____
Scott D. McGolpin,
Public Works Director

APPROVE AS TO ACCOUNTING FORM:
BETSY M. SCHAFFER, CPA
AUDITOR-CONTROLLER

BY:_____
Deputy

United States Department of the Interior

U.S. GEOLOGICAL SURVEY
California Water Science Center
6000 J Street, Placer Hall
Sacramento, CA 95819
Phone: (916) 278-3026 Fax: 916) 278-3045
http://water.wr.usgs.gov

May 29, 2019

Mr. Thomas D. Fayram
Deputy Director of Public Works, Water Resources
Santa Barbara County Water Agency
130 East Victoria Street, Suite 200
Santa Barbara, CA. 93101

Attention: Mr. Matthew Scrudato

Dear Mr. Fayram:

This letter confirms discussions between our respective staffs, concerning the continuation of the cooperative water resources program between the Santa Barbara County Water Agency (SBCWA) and the U.S. Geological Survey (USGS), during the period October 1, 2014 to October 31, 2020.

The purpose of this amendment is to detail funding covering the next phase of the study.

As described in *Geohydrology and Water Availability of the San Antonio Creek Valley* (study), the study is a cooperative study between the County of Santa Barbara, Vandenberg Air Force Base (VAFB), and the U.S. Geological Survey (USGS). The objectives of the study are to:

1) refine the geohydrologic framework of the San Antonio Creek Valley;
2) quantify the hydrologic budget of the valley; and
3) develop hydrologic modeling tools to evaluate and aid in managing the groundwater resource.

The study will provide hydrologic information needed by Santa Barbara County Water Agency and VAFB to better understand the potential impacts of increasing groundwater use on groundwater levels, stream-aquifer interaction, and water quality, and help develop a management and monitoring plan to evaluate the potential hydrologic effects of future groundwater development on different parts of the valley.

The study is currently planned as a 6-year project starting October 1, 2014 through September 30, 2020. The study includes five main tasks: (1) data compilation, (2) new data acquisition, including an assessment of water quality, (3) model development, (4) analysis of water availability, and (5) report preparation. Work has commenced, on all tasks; work started to date includes the following:

1) Existing climate, land-use, geologic, water-quality, and geodetic data have been compiled and assembled into a Geographic Information System (GIS) (Task 1).

2) Existing water-quality data have been compiled (Task 1).

3) A previously operated, but discontinued, stream gage at San Antonio Creek near Casmalia (11136100) was reinstalled and was monitored as part of this project into December 2018 (Task 2).

4) A new stream gage on Harris Creek was installed and was monitored into December, 2018 (Task 2).

5) Multiple-well site 008N034W16C001-4 has been instrumented with pressure transducers and is transmitting water-level data in real time (Task 2).

6) Eight shallow monitoring wells and two deep multiple-well monitoring sites have been installed.

7) Continuous water-level measurements are being recorded in 18 monitoring wells.

8) Twenty-six stream-bed electrical resistance sensors and three temperature sensor rods were deployed and were monitored into March 2019 (Task 2).

9) Quarterly measurements of wells (about 25) that are part of the existing USGS groundwater-level monitoring network continued (Task 2).

10) Additional wells (about 12) have been canvased and added to the quarterly groundwater-level monitoring network (Task 2).

11) Groundwater geochemistry samples from 27 wells have been collected and analyzed (Task 2).

12) Construction of the preliminary 3-dimensional (3D) geohydrologic framework for the groundwater model has been completed (Task 3).

13) The project website has been built and is accessible at: https://ca.water.usgs.gov/projects/san-antonio-creek/index.html.

14) Infiltrometer tests have been collected and processed at 12 locations (Task 2).

15) Aquifer/slug tests have been collected on all monitoring wells (16 wells) installed as part of this study (Task 2).

16) Differential GPS measurements were taken to establish vertical geodetic control at all accessible wells in the monitoring network (Task 2).

17) Preliminary watershed recharge model has been completed (Task 3).

18) Preliminary groundwater flow model and integrated hydrologic model development and calibration is underway (Task 3).

19) Report preparation is underway for infiltrometer analysis, 3D geohydrologic framework model, and hydrologic-system evaluation (Task 5)

Total costs for the proposed amendment with SBCWA for CFY 2020 is $15,239. Of this total SBCWA will contribute $13,854 and subject to the availability of cooperative matching funds (CMF), the USGS will contribute $1,385. The proposed program cost associated with this amendment are presented in Table 1. Total agreement cost through this amendment is $2,000,437, total SBCWA including this amendment, is $1,647,810, total contribution by USGS is $352,627 The updated project timeline is presented in Table 2. The planned funding through the end of the study is presented in Table 3.

Mr. Thomas D. Fayram, Deputy Director, Santa Barbara County Water Agency

Enclosed are two originals of Joint Funding Agreement (JFA) 15WSCA600081610 Amendment 5 for your approval. Work performed with funds from this agreement will be conducted on a reimbursable basis. If you are in agreement with this proposed amendment, please return one copy of the JFA with original signatures to our office for further processing. The second copy of the JFA is for your files.

If you have any questions concerning this program, please contact Geoff Cromwell, in our Santa Maria Field Office, at (805) 928-9539 x11. If you have any administrative questions, please contact Irene Rios, in our San Diego Office, at (619) 225-6156.

Sincerely,

Eric G. Reichard
Director, USGS California Water Science Center

Enclosures
cc: Claudia Faunt, USGS CA WSC
Geoff Cromwell, USGS CA WSC

Table 1. Geohydrology and Water Availability of the San Antonio Creek Valley, California

2020 Funding Summary

Task #	Task Description	Year* / Organization:	2019 SB Co	2019 USGS**	2019 *Total*
1	**Data Compilation (total)**		**$0**	**$0**	***$0***
	Originally budgeted costs		$0	$0	*$0*
	Information requests, communications, and analysis		$0	$0	*$0*
2	**New Data Acquisition**		**$0**	**$0**	***$0***
A	Drilling & well installation				
i	Two multiple well monitoring sites		$0	$0	*$0*
ii	Auger drilling of shallow wells		$0	$0	*$0*
B	Groundwater levels				
i	Well canvassing		$0	$0	*$0*
ii	Expanded GW level monitoring		$0	$0	*$0*
iii	GW level recorders		$0	$0	*$0*
iv	Measuring point elevations-GPS		$0	$0	*$0*
C	Streamflow gaging		$0	$0	*$0*
D	Groundwater/surface-water interaction				
i	Temperature monitoring - GW/SW fluxes		$0	$0	*$0*
ii	Streamflow duration & location		$0	$0	*$0*
iii	Streambed infiltration tests		$0	$0	*$0*
E	Water-Quality sampling		$0	$0	*$0*
F	Hydraulic properties & profiles data				
i	Collect new slug & aquifer tests		$0	$0	*$0*
ii	EM & temperature logging		$0	$0	*$0*
3	**Model Development**		$0	$0	*$0*
4	**Water Availability Analysis**		$0	$0	*$0*
5	**Reporting**		**$13,854**	**$1,385**	***$15,239***
i	Project Website		$2,575	$258	*$2,833*
ii	~~Water quality article~~		$0	$0	*$0*
iii	Hydrogeologic Setting JA / Infiltrometer JA		$3,554	$355	*$3,909*
iv	Hydrologic modeling SIR / Water Availability SIR / Fact sheet		$7,725	$773	*$8,498*
TOTAL			**$13,854**	**$1,385**	***$15,239***

*Yearly costs are by county fiscal year (CFY) for Santa Barbara County (SB Co).

**Cooperative matching funds are subject to availability and are awared by Federal Fiscal Year.

Table 2. Geohydrology and Water Availability of the San Antonio Creek Valley, California - Workplan

Task #	Task Description	Calendar Year:	2015				2016				2017				2018				2019				2020			
			J	O	J	A	J	O	J	A	J	O	J	A	J	O	J	A	J	O	J	A	J			
			A	N	F	M	A	N	F	M	A	N	F	M	A	N	F	M	A	N	F	M	A			
			S	D	M	J	S	D	M	J	S	D	M	J	S	D	M	J	S	D	M	J	S			
		County Fiscal Years (CFY):	CFY15		CFY16				CFY17				CFY18				CFY19				CFY20				-
		Quarters:	-		Q2	Q3	Q4		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	-
		Federal Fiscal Years (FFY):	FFY15		FFY16				FFY17				FFY18				FFY19				FFY20				
		Quarters:	-		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
1	**Data compilation/analysis**				X	X	X	X																	
2	**New data collection**																								
A	Drilling and well installation																								
i	Two multiple well monitoring sites								X																
ii	Auger drilling of shallow wells				X				X																
B	Groundwater levels																								
i	Well Canvassing					X																			
ii	Expanded groundwater level monitoring							X	X	X	X	X	X	X	X	X	X	X	X	X					
iii	GW Level Recorders										X	X	X	X	X	X	X	X	X	X					
iv	Measuring point elevation-GPS										X														
C	Streamflow gaging																								
i	Installation of two new stations (Casmalia and Harris Creek)								X																
ii	Operation	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X							
D	Groundwater/surface-water interaction																								
i	Temperature monitoring for GW/SW fluxes		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X						
ii	Streamflow duration & location		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X						
iii	Streambed infiltration tests									X															
E	Water-Quality sampling																								
i	Groundwater									X	X	X													
ii	Surface water						X				X	X													
F	Hydraulic properties & profiles data																								
i	Collect new slug & aquifer test data									X															
ii	EM & temperature logging - seasonal changes in WQ & flow									X		X													
3	**Model development**																								
A	**Hydrogeologic Framework**		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X						
i	Construction of 3D hydrogeologic framework		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X							
ii	Definition of textural variations in principal aquifers					X	X	X	X	X	X	X	X	X	X	X	X	X							
iii	Aquifer hydraulic properties						X	X	X	X	X	X													
B	**Hydrologic Model**					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			
i	Recharge Model																								
	Recharge Analysis					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			
	Precipitation/Runoff - Surface Water Model							X	X	X	X	X	X	X	X	X	X	X							
ii	Hydrologic Flow Model																								
	Groundwater Model						X	X	X	X	X	X	X	X	X	X	X	X	X						
	Linked Model										X	X	X	X	X	X	X	X	X	X	X	X			
4	**Water availability analysis**												X	X	X	X	X	X							
5	**Products**																								
i	Project Website								X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
ii	Infiltrometer Analysis (JA)																								
	Preparation															X	X	X	X	X					
	Review and Publication																			X	X	X			
iii	Hydrogeologic Setting - new & existing information (JA)																								
	Preparation									X	X	X	X	X	X	X	X	X	X	X					
	Review and Publication																		X	X	X				
iv	Water Availability (SIR)																								
	Preparation															X	X	X	X	X	X				
	Review and Publication																				X	X	X		
v	Hydrologic modeling & summary (SIR and Fact sheet)																								
	Preparation									X	X	X	X	X	X	X	X	X	X	X	X	X			
	Review and Publication																				X	X	X		

X	Scheduled Task
X	Completed Task
	Orininally Scheduled Task (shifted to later date)
X	Extneded Completion Date (shifted from earlier date)