

**Funding Agreement for the
Evaluation of Wastewater Disposal in the Recharge and Contributing Zones of the
Edwards Aquifer Using a Coupled Surface-Water/Groundwater Model
under the
Proposition 1 Edwards Aquifer Protection Projects within Urbanized Areas of
Bexar County's Recharge and Contributing Zones Program**

This Proposition 1 Edwards Aquifer Protection Projects within Urbanized Areas of Bexar County's Recharge and Contributing Zones Funding Agreement (Funding Agreement) is between the City of San Antonio (City), the San Antonio River Authority (River Authority), and the Southwest Research Institute (Funding Recipient), collectively the "Parties." The Parties understand and agree that this Funding Agreement documents the roles and responsibilities of each of the Parties in the City's Proposition 1 Edwards Aquifer Protection Projects within Urbanized Areas of Bexar County's Recharge and Contributing Zones Program (Program). The Parties agree to comply with the terms of this Funding Agreement (Agreement).

Background

Proposition 1, the Edwards Aquifer Protection Venue Project, authorizes the City to continue the voter-approved watershed and preservation project initiated in 2000 and continued in 2005, 2010, and 2015. A 1/8 cent sales tax is projected to collect \$100 million for this project. Of the \$100 million projected to be collected pursuant to the 2015 authorization, \$90 million will continue to be used toward the purchase of conservation easements and acquisition of real estate interests over the sensitive recharge and contributing zones of the aquifer. The remaining \$10 million is dedicated for Program-funded projects that will protect and improve Edwards Aquifer water quality. The Funding Recipient's Evaluation of Wastewater Disposal in the Recharge and Contributing Zones of the Edwards Aquifer Using a Coupled Surface-Water/Groundwater Model (Project) has received both Conservation Advisory Committee (CAB) and City of San Antonio City Council (Council) funding approval and is the subject of this Agreement. The primary project goal is to develop a coupled surface-water/groundwater model that accurately simulates solute transport from on-site sewage facilities (OSSF) and Texas Land Application Permit (TLAP) wastewater disposal in the Helotes Creek Watershed of the Edwards Aquifer Contributing Zone and that quantifies the impact of solute transport on recharge to the Edwards Aquifer, including the impact of residential land-use development on surface-water and groundwater quality.

Funding

The City has authorized and will contribute \$530,398 for the Project. The funding amount is documented by the detailed information in Exhibit A. All Parties acknowledge and agree that \$530,398 is the full amount authorized by this Funding Agreement, and no additional funds will be claimed by the Funding Recipient, unless this amount is modified through an amendment executed by all of the Parties.

Agreement Term

This Agreement shall be effective as of March 1, 2018 (the “Effective Date”) through and including April 30, 2020 (the “Term”). The Parties may extend this Agreement for a mutually agreeable period.

City of San Antonio Acknowledges and Agrees

1. Funding Recipient will be responsible for the work to be conducted under the Program.
2. River Authority will serve as project manager and administrator of the Program.
3. Funding Recipient will submit invoices for payment directly to City, with a copy sent concurrently to River Authority, to the following addresses:

City of San Antonio Phillip Covington Special Projects Manager Edwards Aquifer Protection Program Parks and Recreation Department PO Box 839966 San Antonio, TX 78283 (210) 207-3003 phillip.covington@sanantonio.gov	San Antonio River Authority Karen Bishop Senior Supervisor Environmental Sciences Department PO Box 839980 San Antonio, Texas 78283 (210) 302-3642 kbishop@sara-tx.org
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4. Funding shall be paid directly to the Funding Recipient after River Authority verification of satisfactory performance of work in accordance with the payment schedule attached as Exhibit B and the completion of Funding Recipient’s project milestones and deliverable dates, attached as Exhibit C.

River Authority Acknowledges and Agrees

1. River Authority will serve as project manager and administrator of the Program.
2. River Authority is responsible to the City to ensure quality and timely implementation of Project components and future monitoring of aquifer protection and improvement projects funded through the Program.
3. River Authority will coordinate payment to the Funding Recipient in a timely manner per Exhibits A and B.

Funding Recipient Acknowledges and Agrees

1. Work to be conducted by Funding Recipient will be under the direct supervision of Principal Investigator, Ronald T. Green, an employee of the Funding Recipient.
2. The Project shall produce the following deliverables:
 - a. Literature review on the Helotes Creek watershed
 - b. Data assembly (hydraulic, water quality, flow, etc.)
 - c. Models
 - i. Hydrostratigraphic framework model
 - ii. Coupled surface-water/groundwater model
 - iii. Surface-water flow model
 - d. Simulation of solute transport using models
 - e. Compilation and reporting of results (monthly status reports, draft final and final report)
3. The Project shall answer the following questions:
 - a. What method of wastewater disposal imposes the greatest impact on water recharging the Edwards Aquifer: wastewater disposal using individual on-site sewage facilities (OSSF) versus wastewater disposal by Texas Land Application Permit (TLAP)?
 - b. Does a package sewage treatment plant (i.e., TLAP) have more/less impact on the quality of water recharged to the Edwards Aquifer compared with individual on-site sewage facilities (OSSF)?
 - c. What areas within the Contributing and Recharge zones are most vulnerable to degradation from development?
 - d. What, if any, areas located in the upland regions of watersheds within the Contributing Zone should be targeted by the EAPP as candidates for conservation easements or purchase to protect water quality and quantity that recharges the Edwards?
 - e. What are the specific threats, including the impact of development that occurs too close to rivers, either in the Recharge or Contributing zone, and development that occurs in the Contributing Zone too close to the Recharge Zone?
 - f. What are the minimum distances from rivers and from the Recharge Zone that development (i.e., additional OSSF or TLAP) facilities would be deemed to not pose a threat to the quality and quantity of Edwards recharge?
 - g. Secondary questions to be addressed include:
 - i. How does OSSF density impact aquifer recharge?
 - ii. How does TLAP impact aquifer recharge when it is applied in upland areas versus riverbeds?
 - iii. How does quantity of TLAP discharge scale in terms of impact on recharge to the Edwards Aquifer?
 - iv. How does the distance of the wastewater discharge from the Recharge Zone (when discharged in the Contributing Zone) impact the quality of recharge when it enters the Edwards Aquifer? and

- v. How does the distance of the wastewater discharge from the river channels (when discharged in either the Recharge and Contributing zones) impact the quality of recharge when it enters the Edwards Aquifer?
4. The Project's major milestones include:
- a. Final project area delineation within the Helotes Creek Watershed
 - b. Development of an integrated surface-water/groundwater model capable of simulating solute transport and surface-water/groundwater flow between the Trinity and Edwards aquifers in the Edwards Aquifer Recharge and Contributing zones
 - c. Completion of coupled surface-water/groundwater model runs
 - d. Analysis of coupled surface-water/groundwater model runs
 - e. Once a surface-water/groundwater flow model has been developed and is fully operational, the SwRI team will extend the flow model to accommodate solute transport. The source of solute will be obtained from the OSSF and TLAP facilities. The impact of these facilities on land use and the soil layer will be then be incorporated into the model.
 - f. Working with the Edwards Aquifer Authority (EAA) and the City of Austin Watershed Protection Department, Environmental Resource Management Division in a consulting capacity within their responsibilities at their respective agencies. The collaboration with the EAA and its programs, the project will be integrated with the multi-year Interformational Flow Program (IFFP) underway at the EAA. The project will also benefit from insights on watershed protection developed by the City of Austin Watershed Protection Department.
 - g. Monthly status reports will be provided to San Antonio River Authority documenting project activities including costs
 - h. Draft Report delivered one month prior to project end date
 - i. Final Report delivered on the project end date
 - j. The SwRI project team will make a formal presentation of the projects results to San Antonio River Authority staff at which the public will be invited.
 - k. The coupled surface-water/groundwater model developed, including sample input and output files, will be made available for consideration and use by the general public. These models will be maintained by San Antonio River Authority or an agent designated by San Antonio River Authority. All data generated by the project, including model input and output files, will be submitted to San Antonio River Authority at the conclusion of the project.
5. The Project's major tasks are as follows:
- a. Task 1. Literature search for documents on the Helotes Creek watershed, coupled surfacewater/groundwater models, impact of OSSF and TLAP on subsurface, and related subject material.
 - b. Task 2. Delineation of the study and model domain.

- c. Task 3. Development of a hydrostratigraphic framework model of the study domain. This framework model will be predicated on the larger-scale framework model developed by Fratesi et al. (2015).
 - d. Task 4. Data assembly, including hydraulic, water chemistry, water elevation, stream flow, and physical property data. In addition, surface-water flow data and soil data assembled during the Devils River watershed model project (Green et al., 2014; Toll et al., 2017) will be used as the basis for this task. Baseflow separations on stream data will be performed to assist in the early calibration process. Field activities such as geophysical imaging of the subsurface may be required to substantiate the conceptual model (Green et al., 2014).
 - e. Task 5. Development of a conceptual model for the coupled surface-water/groundwater model. These development will be predicated on the larger-scale model developed by Fratesi et al. (2015) and a watershed-basin scale model developed by Toll et al. (2017).
 - f. Task 6. Development and preliminary calibration of a surface-water flow model of Helotes Creek watershed. Preliminary calibration will be based on the surface-water portions of stream discharge.
 - g. Task 7. Development and preliminary calibration of a groundwater flow model of Helotes Creek watershed. This will happen concurrently with Task 5. Preliminary calibration will be based on baseflow portions of stream discharge and available aquifer water-level data.
 - h. Task 8. Determination of recharge for the coupled surface-water/groundwater flow model. Recharge will be directly calculated using NEXRAD precipitation data. The methodology to determine recharge from precipitation is documented in Toll et al. (2017).
 - i. Task 9. Final calibration of the coupled surface-water/groundwater flow model. Final calibration will be based on total streamflows and available aquifer water-level data.
 - j. Task 10. Simulation of solute transport in Helotes Creek watershed using the coupled surface-water/groundwater flow model. Solute will be introduced by both OSSF and TLAP wastewater disposal facilities.
 - k. Task 11. Compilation of solute transport in terms of quality or water recharged to the Edwards Aquifer. Results will be compared with a baseline case in which no solute is introduced into the Helotes Creek watershed.
 - l. Task 12. Project Management and Reporting. Monthly status report submission and final report preparation and submission. Communication and correspondence with San Antonio River Authority project manager.
6. The City may rescind the funding in whole or in part if milestones are missed without providing City with appropriate notice and justification, and alternative plans and timeline or the project falls significantly behind schedule, subject to force majeure.
 7. Funding Recipient may request an extension in writing up to fifteen business days before the original project end date.
 8. Any decisions regarding the extension to the project end date shall be made by the River Authority in coordination with the City.

9. The final report will be approved in writing by the River Authority and Funding Recipient prior to final payment.
10. Funding Recipient is aware that presentations may be requested by the River Authority, the City, the CAB, San Antonio City Council, or other governing or advisory bodies associated with the Program.
11. Funding Recipient agrees to be available for presentations to the best of its ability.
12. Funding Recipient shall acknowledge the City in any signage placed at project site, or in any news releases or other publications relating to the work performed under this Funding Agreement. News releases or other publications must be sent to the River Authority for review before they are sent to any outside party. Failure to send any news or publication release to the River Authority for review shall not result in a breach of this Funding Agreement.
13. Funding Recipient is aware that media interviews may be requested and/or coordinated by the City or the River Authority as a result of this project.
14. Funding Recipient agrees to be available for interviews to the best of its ability.
15. Funding Recipient grants the City and the River Authority, their representatives and employees the right to take photographs, videos, and other forms of media of the awarded Project.
16. Funding Recipient authorizes the City and the River Authority, their assigns and transferees to copyright, use and publish photographs, videos, and other forms of media in print and/or electronically.
17. Funding shall be paid by the City to the Funding Recipient by the City after the River Authority verification of satisfactory performance of work in accordance with the payment schedule attached as Exhibit B and the completion of the Funding Recipient's project milestones and deliverable dates, attached as Exhibit C.
18. Funding Recipient warrants and represents that it will comply with all Federal, State and Local laws and regulations applicable to Funding Recipient's use of City Funds for this project. To the extent applicable, Funding Recipient agrees to abide by the following laws in its expenditures of City Funds:
 - a. Chapter 252 of the Texas Local Government Code, or other competitive contracting processes allowed for as express exceptions to Chapter 252.
 - b. Government Code chapter 2258 and Ordinance No. 71312 regarding Prevailing Wage Rate regulations required for certain contracts, including ensuring that its construction contractor shall collect and monitor weekly certified payrolls and perform site visits to ensure the prevailing wage is being paid to all workmen. City has the right to audit certified payroll records as necessary in accordance with this Agreement. Upon audit of the records and certified payrolls under this section, should the City or its auditors find any violations, Funding Recipient shall cause its contractor to forfeit as a penalty to the City \$60.00 for each laborer, workman, or mechanic employed, for each calendar day, or portion thereof, that such laborer, workman or mechanic is paid less than the said stipulated rates for any work done under said contract, by the contractor or any subcontractor. The establishment of prevailing wage rates in accordance with Chapter 2258, Texas Government Code

shall not be construed to relieve Funding Recipient from its obligation under any federal or state law regarding the wages to be paid to or hours worked by laborers, workmen or mechanics insofar as applicable to the work to be performed under this Agreement.

19. At any time during normal business hours and as often as City may deem necessary, upon three-days written notice, Funding Recipient shall make all of its records pertaining to this Agreement available to City or any of its authorized representatives, and shall permit City or any of its authorized representatives to audit, examine, and make excerpts and/or copies of same.
20. Funding Recipient agrees and represents that it will cooperate with City and River Authority, at no charge to the City or River Authority, to satisfy, to the extent required by law, any and all requests for information received by City or River Authority under the Texas Public Information Act or related laws pertaining to this Agreement.
21. Funding Recipient shall not transfer, pledge or otherwise assign this Agreement, any interest in and to same, or any claim arising thereunder, without first procuring the written approval of City. Any attempt at transfer, pledge or other assignment shall be void ab initio and shall confer no rights upon any third person.
22. Beginning the month after the project's commencement, Funding Recipient shall provide status reports to the City through the River Authority on the first Friday monthly. Said status report shall include project activity toward milestones in the prior month and shall note any changes to the schedule of deliverables, if any.

No Third Party Rights

- A. This Agreement is not intended, nor shall it be construed, to create any third party beneficiary rights in any person who is not a party hereto, unless otherwise expressly herein provided.
- B. Nothing in this Agreement shall be deemed or construed by the Parties hereto, or any third party, to create the relationship of principal and agent, partners, joint venturers or any other similar such relationship between the parties hereto. It is understood and agreed that no provision contained herein, nor any acts of the Parties hereto, creates a relationship other than the relationship of independent contracting entities.

Publication and Academic Rights

Funding Recipient's Principal Investigator has the right to publish or otherwise publicly disclose information gained in the course of the project under this Agreement. Funding Recipient will, however, submit any prepublication material to City for review and comment at least sixty (60) days prior to planned submission for publication. City will notify Funding Recipient of any objections within thirty (30) days of receipt. Funding Recipient shall have final authority to determine the scope and content of any publications, subject to any objections for the protection of confidential information. Funding Recipient shall acknowledge the City's contribution and describe in any publications, the scope and nature of City's contribution accurately and appropriately.

Ownership of Materials and Documents

Any and all drawings, documents or information in whatsoever form and character produced by Funding Recipient pursuant to the provisions of this Agreement is the joint property of Funding Recipient and City and either Party shall be allowed to make use of such material without requiring the approval of the other Party. Funding Recipient understands and acknowledges that as the joint owner of any and all writings, documents and information, City has the right to use all such writings, documents and information as the City desires, without restriction.

Equipment

Funding Recipient shall retain title to all equipment and structures purchased and/or fabricated by it with funds provided under this Agreement.

Liability

As government entities, River Authority and City hereby expressly acknowledge that they are governed by the Texas Tort Claims Act, which is located in Chapter 101 of the Texas Civil Practice and Remedies Code, and nothing in this Agreement shall be construed as a waiver by either of the Parties of any of the immunities and protections from liability included therein.

Insurance

Funding Recipient, at its own expense, shall provide and maintain, during the term of this Agreement, either insurance, with or without retention, or a self-insurance program. This insurance or self-insurance shall cover liability for property damage and personal injury associated with Funding Recipient’s performance of work under this Agreement.

Notices

Any notice required by this Agreement shall be given by prepaid, first class, certified mail, return receipt requested, or by a recognized overnight courier, address as follows:

<p><u>In the case of City:</u> Phillip Covington Special Project Manager Edwards Aquifer Protection Program Parks and Recreation Department PO Box 839966 San Antonio, Texas 78283 (210) 207-3003 phillip.covington@sanantonio.gov</p>	<p><u>In the case of River Authority:</u> Karen Bishop Senior Supervisor Environmental Sciences Department PO Box 839980 San Antonio, Texas 78283 (210) 302-3642 kbishop@sara-tx.org</p>	<p><u>In the case of Funding Recipient:</u> Ronald T. Green, Ph.D., P.G. Institute Scientist Earth Science Section Space Science and Engineering Division Southwest Research Institute® 6220 Culebra Road San Antonio, Texas 78238 (210) 522-5305 rgreen@swri.edu</p>
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**COMPLIANCE WITH SMALL, MINORITY AND WOMAN-OWNED BUSINESS
ENTERPRISES POLICY, NON-DISCRIMINATION AND EQUAL EMPLOYMENT
OPPORTUNITY POLICY**

Funding Recipient is hereby advised that it is the policy of the City of San Antonio that Small, Minority or Woman-owned Business Enterprises (SMWBE) shall have the maximum practical opportunity to participate in the performance of public contracts. In all events, Funding Recipient shall comply with the CITY's Small Business Economic Development Advocacy Program, contained in San Antonio Ordinance No. 2007-04-12-0396, and the amendments thereto in connection with the award of the construction contract(s). Said ordinances are incorporated herein for all purposes, as if fully set forth herein. Funding Recipient further agrees that Funding Recipient will abide by all applicable terms and provisions of CITY's Non-Discrimination Policy, CITY's Small, Business Economic Development Advocacy (SBEDA) Policy and CITY's Equal Opportunity Affirmative Action Policy, these policies being available in CITY's Department of Economic Development, Division of Internal Review and the City Clerk's Office.

The CITY has applied the following contract-specific Affirmative Procurement Initiative to this contract: None (Waiver approved 11/20/2017).

Termination

The Parties, with or without cause, may elect to terminate this Agreement by providing sixty (60) days written notice to the other Parties. Termination of this Agreement shall not affect the rights and obligations of the Parties accrued prior to the termination. Upon termination, City shall pay Funding Recipient for all reasonable expenses incurred or committed to be expended as of the effective termination date. Any provisions of this Agreement which by their nature extend beyond termination shall survive such termination; such provisions include but may not be limited to subsections 5, 25 and 35 of the section entitled "**Funding Recipient Acknowledges and Agrees**" herein.

Amendment

This Funding Agreement supersedes all prior agreements and understandings between the Parties regarding the Program and may only be changed by written amendment signed by all three of the Parties.

This Agreement shall be governed by, construed and enforced in accordance with the internal laws of the State of Texas.

[Remainder of Page Intentionally Left Blank. Signatures on Following Page.]


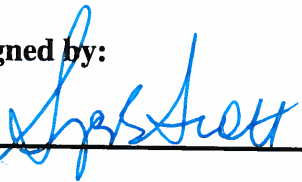
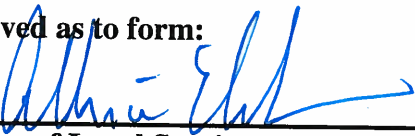
<p>Southwest Research Institute</p> <p>Date: <u>November 20, 2017</u></p> <p>Signed by:</p> 	<p>City of San Antonio</p> <p>Date: _____</p> <p>Signed by:</p>
<p><i>R</i> R.B. Kalmbach Executive Director, Contracts</p>	<p>Xavier D. Urrutia, Director Parks & Recreation Department</p> <p>Attest:</p> <p>_____ City Clerk</p> <p>Approved as to form:</p> <p>_____ City Attorney</p>
<p>San Antonio River Authority</p> <p>Date: <u>11-20-17</u></p> <p>Signed by:</p>  <p>Suzanne Scott General Manager, San Antonio River Authority</p> <p>Date: _____</p> <p>Approved as to form:</p>  <p>_____ Director of Legal Services</p>	

Exhibit A
Project Budget

The anticipated cost of the proposed project (associated with fundable components only), including, as appropriate, monitoring, long-term sustainability and maintenance, and return on investment.

The cost of a coupled surface-water/groundwater flow model of the San Geronimo watershed capable of simulating solute transport is \$530,398.

Task	Description	Cost
1	Literature search	\$5,536
2	Delineation of the study and model domain	\$9,831
3	Development of a hydrostratigraphic framework model	\$46,060
4	Data assembly	\$24,028
5	Development of a conceptual model	\$53,783
6	Preliminary calibration of a surface-water flow model	\$41,898
7	Preliminary calibration of a groundwater flow model	\$36,984
8	Determination of recharge	\$68,528
9	Final calibration of the coupled surface-water/groundwater flow model	\$61,931
10	Simulation of solute transport	\$69,536
11	Compilation of solute transport	\$62,341
12	Project Management and Reporting	\$49,941
Total		\$530,398

Exhibit B**Funding Schedule**

The City Council-approved total cost is Five Hundred Thirty Thousand Three Hundred Ninety-Eight Dollars (\$530,398) for SwRI's completion of the Project scope and deliverables as outlined in the "Funding Recipient Acknowledges and Agrees" section and in Exhibit C herein. The City of San Antonio is not obligated to reimburse SwRI in excess of such amount nor is SwRI obligated to continue the Project and incur excess charges unless the City of San Antonio agrees in writing to increase the contract amount and provide additional payment. The City of San Antonio shall make payments based upon invoices submitted at the end of each four (4) weeks after receipt of order for cost incurred for the prior four (4) weeks. All invoices submitted to City of San Antonio by SwRI shall be paid within thirty (30) days from date of invoice. SwRI is expressly authorized to declare the contract in default and to suspend or terminate work, without penalty, at any time any invoice is not paid by its due date.

The preferred method of payment is by electronic funds transfer to the account of Southwest Research Institute.

- Financial institution: Bank of America, N.A.
- Account number: 001390004879
- ACH ABA routing number: 111000025
- Wire ABA routing number: 026009593

Please reference the applicable invoice number with the payment or provide remittance information by email to remit@swri.org. If this preferred method of payment is not feasible, please send all payments issued by check and/or any other information to the address identified on the invoice.

Although Southwest Research Institute is a 501(c)(3) exempt organization, state law requires that we collect and remit sales taxes for all taxable items sold. The price quoted herein does not include Texas sales tax, which, if applicable, will be added to SwRI invoice(s) for this work unless you provide a valid exemption or resale certificate with your acceptance.

Please direct questions regarding payment by phone to (210) 522-3715 or by email to credit@swri.org.

