



**RESOLUTION NO. 54-FY2017**

**RELATIVE TO APPROVING CONTRACT AMENDMENT NO. 7 FOR  
PROGRAM MANAGEMENT SERVICES**

**WHEREAS**, under 12 G.C.A. § 14105, the Consolidated Commission on Utilities (“CCU”) has plenary authority over financial, contractual and policy matters relative to the Guam Waterworks Authority (“GWA”); and

**WHEREAS**, the Guam Waterworks Authority (“GWA”) is a Guam Public Corporation established and existing under the laws of Guam; and

**WHEREAS**, on December 12, 2011 GWA received approval by the CCU via Resolution No. 11-FY2012 to seek from the PUC a request for approval to execute an initial contract with the engineering consultant “Brown & Caldwell” for Program Management Services at a cost not to exceed \$3.2 million; and

**WHEREAS**, Resolution No. 11-FY2012 resolved that the General Manager is authorized an increase in obligating authority to effectuate a contract with Brown & Caldwell subject to CCU and PUC approval; and

**WHEREAS**, the PUC ORDER via GPA Docket 11-02 dated March 21, 2011 authorized GWA to execute a contract with Brown and Caldwell for Program Management Services; and

**WHEREAS**, GWA has utilized the PMO for various engineering services, financial analysis, operational training and determine the need for additional services above the original contract value and as such sought and received approval from the CCU via Resolution 53-FY2012, Resolution 34-FY2013, Resolution 07-FY2014, Resolution 37-FY2014, Resolution 39-FY2015 and Resolution 47-FY2016 to seek PUC approval to increase the contract value for the

1 PMO services by an additional One Million Two Hundred Thousand Dollars (\$1,200,000.00),  
2 Two Million One Hundred Sixty Six Thousand Ninety One Dollars (\$2,166,091.00), Three  
3 Million One Hundred Ninety Nine Thousand Four Hundred Ninety Three Dollars  
4 (\$3,199,493.00), Two Million Four Hundred Fifty Eight Thousand Three Hundred Fifteen  
5 Dollars (\$2,458,315.00), Five Million Three Hundred Three Thousand One Hundred Forty Five  
6 Dollars (\$5,303,145.00) and Four Million Fifty Nine Thousand Eight Hundred Seventy Seven  
7 Dollars (\$4,059,877.00) respectively; and  
8

9 **WHEREAS**, the PUC ORDER via GPA Docket 11-02 dated April 30, 2013, the GWA  
10 Docket 13-01 dated December 30, 2013, July 31, 2014 and December 29, 2014, the GWA  
11 Docket 15-07 dated September 24, 2015 and the GWA Docket 16-06 dated September 29, 2016  
12 approved GWA's request to increase the contract value for the PMO an additional One Million  
13 Two Hundred Thousand Dollars (\$1,200,000.00), Two Million One Hundred Sixty Six  
14 Thousand Ninety One Dollars (\$2,166,091.00), Three Million One Hundred Ninety Nine  
15 Thousand Four Hundred Ninety Three Dollars (\$3,199,493.00), Two Million Four Hundred  
16 Fifty Eight Thousand Three Hundred Fifteen Dollars (\$2,458,315.00), Five Million Three  
17 Hundred Three Thousand One Hundred Forty Five Dollars (\$5,303,145.00) and Four Million  
18 Fifty Nine Thousand Eight Hundred Seventy Seven Dollars (\$4,059,877.00) respectively to the  
19 PUC dockets noted above; and  
20

21 **WHEREAS**, GWA management continues to support the fact that Brown & Caldwell  
22 provides tremendous benefit to GWA through subject matter expertise for all aspects of utility  
23 services provided by GWA, including issues or projects related to the 2011 Court Order as well  
24 as projects associated with USEPA State Revolving Funds (See Exhibit A); and  
25

26 **WHEREAS**, GWA management again seeks CCU approval to amend the contract with  
27 Brown & Caldwell to increase the contract value an additional Two Million Ninety Five  
28 Thousand Nine Hundred Four Dollars (\$2,095,904.00) for additional services to GWA (See  
29 Exhibit B); and  
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31  
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1           **WHEREAS**, GWA management finds the cost associated with the PMO to be  
2 commensurate to average PMO cost to the original \$400M capital improvements program and  
3 the graph shown in Exhibit C illustrates the anticipated spending amounts for the PMO discussed  
4 with the PUC and the actual amounts approved by the PUC; and

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6           **WHEREAS**, the proposed amendment and funding amounts are generally in line with  
7 GWA Management's transition plan for the PMO, which was submitted to the PUC in December  
8 of 2016; and

9  
10           **WHEREAS**, GWA management further seeks CCU approval to petition the PUC's  
11 approval to increase the contract value of the Program Management Services a funding increase  
12 "not to exceed" Two Million Ninety Five Thousand Nine Hundred Four Dollars (\$2,095,904.00)  
13 specific to additional PMO services; and

14  
15           **WHEREAS**, the source of funding will be from the 2010, 2013 and 2015 bond series  
16 proceeds, GWA revenue funds as well as State Revolving Funds that are applicable to the  
17 PMO's work and which are eligible to be used; and

18  
19           **WHEREAS**, the GWA Chief Engineer will identify specific CIP line items that are to  
20 fund the additional contract value to the PMO; and

21  
22           **NOW BE IT THEREFORE RESOLVED**, the Consolidated Commission on Utilities  
23 does hereby approve and authorize the following:

- 24  
25           1. The recitals set forth above hereby constitute the findings of the CCU.  
26  
27           2. That GWA Management amends the contract with Brown and Caldwell for an  
28 additional, "not to exceed" Two Million Ninety Five Thousand Nine Hundred Four  
29 Dollars (\$2,095,904.00) for additional Program Management Services (Exhibit B).  
30  
31           3. GWA management seeks immediate PUC approval to increase the contract value for  
32 PMO services by Brown and Caldwell an additional "not to exceed" Two Million  
Ninety Five Thousand Nine Hundred Four Dollars (\$2,095,904.00).


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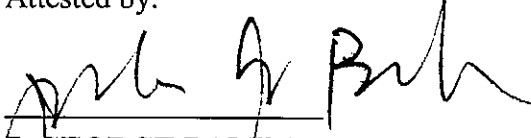
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**RESOLVED**, that the Chairman certified and the Board Secretary attests to the adoption of this Resolution.

**DULY AND REGULARLY ADOPTED**, this 26<sup>th</sup> day of September 2017.

Certified by:  
  
\_\_\_\_\_  
**JOSEPH T. DUENAS**  
Chairperson

Attested by:  
  
\_\_\_\_\_  
**J. GEORGE BAMBA**  
Secretary

I, J. George Bamba, Board Secretary of the Consolidated Commission on Utilities as evidenced by my signature above do hereby certify as follows:

The foregoing is a full, true and accurate copy of the resolution duly adopted at a regular meeting by the members of the Guam Consolidated Commission on Utilities, duly and legally held at a place properly noticed and advertised at which meeting a quorum was present and the members who were present voted as follows:

AYES:	<u>5</u>
NAYS:	<u>0</u>
ABSTENTIONS:	<u>0</u>
ABSENT:	<u>0</u>

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**GUAM WATERWORKS AUTHORITY**

**Program Management Office  
Quarterly Report to the Public Utilities Commission**

**2<sup>nd</sup> Quarter Report for 2017**

**Dated**

**06/30/2017**

## Preface

Guam Waterworks Authority (GWA) is committed to providing excellent water and wastewater products, programs and services in a safe, reliable, responsible, and cost effective manner. GWA has made meeting the deadlines stipulated in the 2011 Court Order its top priority, including the retainage of an engineering consultant to assist in the form of a Program Management Office (PMO). In addition, GWA has been subject to scrutiny by the USEPA through the NEIC Findings of Significant Deficiencies in the Water and Wastewater Systems and in the SRF Grants program. The PMO is being used to assist GWA in meeting obligations in these programs.

The estimated \$300 million 2011 Court-Ordered projects must be constructed by 2020. The 5-Year Capital Improvement Program (CIP) contains approximately \$457 million in water and wastewater projects. GWA is understaffed and requires the PMO's support to meet court-order deadlines, the NEIC Significant Findings requirements, the USEPA SRF Project implementation requests, and other work that is necessary to achieve completion of the CIP.

In recent years, GWA has emphasized employee and management training programs to increase the knowledge and skills of its workforce. The PMO is working with GWA to provide training to staff within the Engineering and Operations Divisions.

This quarterly report provides the status of projects in which the PMO is currently engaged. This information reflects a cut-off date of June 30, 2017.

### Section 1.0: Active and Completed Work Authorizations

This section includes a listing of the active work authorizations performed under GWA's PMO during the reporting quarter. Table 1-1 below indicates each active work authorization, work authorization budget, invoiced amount prior to the current quarter, the amount invoiced in the current quarter, and the respective percent complete as of the cut-off date. New work authorizations pending funding certification are excluded from this table.

Table 1-1: Active PMO Work Authorizations						
Work Authorization #	Project Title	Approved Budget	Invoiced Prior to Current Quarter	Invoiced in Current Quarter	Invoiced to Date	Percent (%) Complete
2012-14	NPDES Negotiation Support	\$246,000	\$218,488	\$ 0	\$218,488	89%
2013-02-A1	Phase II Constr Mgmt Agana WWTP Upgrades	\$326,450	\$326,445	\$ 0	\$326,445	100%*
2014-01-A2	Program Management Support	\$99,920	\$99,920	\$ 0	\$99,920	100%*
2014-02	Ugum WTP Operations Support	\$415,390	\$411,516	\$ 0	\$411,516	99%*
2014-03	NEIC Wastewater System Inspection	\$90,095	\$24,663	\$ 0	\$24,663	27%
2014-04	PUC Stipulations 2013	\$160,019	\$160,019	\$ 0	\$160,019	98%*
2014-05	Groundwater Well Rehab Plan	\$373,350	\$354,080	\$ 0	\$354,080	95%*
2014-06	Water System Hydraulic Analysis	\$370,240	\$329,276	\$1,889	\$331,165	89%
2014-07	Hydraulic Model for Sewer System	\$250,324	\$250,273	\$ 0	\$250,273	100%*
2014-09	Formal Training Program	\$247,025	\$221,457	\$ 0	\$221,457	90%

**Table 1-1: Active PMO Work Authorizations**

Work Authorization #	Project Title	Approved Budget	Invoiced Prior to Current Quarter	Invoiced in Current Quarter	Invoiced to Date	Percent (%) Complete
2014-10	Design Management New Agat WWTP	\$499,630	\$490,975	\$ 0	\$490,975	98%*
2014-11	SRF Project Management	\$544,925	\$544,924	\$ 0	\$544,924	100%*
2014-12	Umatac-Merizo WWTP Water Quality Standards	\$357,827	\$348,625	\$ 0	\$348,625	97%
2014-13	Baza Gardens Wastewater Cross-Island Design	\$299,780	\$278,332	\$ 0	\$278,332	93%
2014-11-A1	SRF Program Support Amendment No. 1	\$544,925	\$544,924	\$ 0	\$544,924	100%*
2014-11-A2	SRF Program Support Amendment No. 2	\$730,000	\$102,152	\$354,115	\$456,268	63%
2015-01	Program Management Support	\$894,882	\$894,880	\$ 0	\$894,880	100%*
2015-05	2015 Revenue Bond Financing	\$218,772	\$218,772	\$ 0	\$218,772	100%*
2015-06	Facility Planning	\$975,382	\$577,236	\$48,344	\$625,580	64%
2015-07	Water Resources Master Plan Update	\$2,623,300	\$1,699,052	\$198,360	\$1,897,412	72%
2015-08	Source Control Program	\$471,368	\$74,441	\$71,153	\$145,594	31%
2016-01	Agat to Umatac Potable Waterline Analysis	\$56,030	\$ 260	\$6,729	\$6,990	13%
2016-02	Phase I: Tumon Sewer Basin Study	\$187,990	\$ 0	\$ 0	\$ 0	0%
2016-03	Mixing Zone Study for Agat-Santa Rita WWTP Discharge to Tipalao Bay	\$447,250	\$115,132	\$322,002	\$437,134	98%
2016-04	Hydraulic Modeling Phase 3	\$148,746	\$ 0	\$ 0	\$ 0	0%
2016-05	Engineering for Groundwater Well Production Meters	\$301,539	\$ 0	\$ 0	\$ 0	0%
2016-07	Project Management for Umatac-Merizo WWTP Upgrade and D/B Preparation	\$1,250,757	\$42,276	\$309,393	\$351,669	28%
2016-08	Program Management 2016-2017	\$782,995	\$31,748	\$283,061	\$314,809	40%
2016-09	Backflow Prevention and Cross-Connection Control Program	\$154,570	\$1,269	\$17,641	\$18,909	12%
<b>Total</b>		<b>\$14,069,481</b>	<b>\$8,361,135</b>	<b>\$1,612,687**</b>	<b>\$9,973,823</b>	

\*Work Authorizations essentially complete but not formally closed.

\*\*Value is rounded.

Table 1-2 below is a listing of completed work authorizations performed under GWA's Program Management Office.

**Table 1-2. Completed PMO Work Authorizations**

Work Authorization #	Work Authorization Title	Approved Budget	Final Amount Invoiced
2012-01	Program Management/2013/Amend. 3	\$956,700	\$956,700
2012-02	Programmatic Overview	\$28,548	\$28,548
2012-03	Northern District Interim Improvements	\$239,760	\$239,760
2012-04	Agat/Santa Rita Interim Measures	\$42,920	\$42,920
2012-05	Baza Gardens Interim Measures	\$46,200	\$46,200
2012-06	Agana Interim Measures	\$89,885	\$89,885

**Table 1-2. Completed PMO Work Authorizations**

Work Authorization #	Work Authorization Title	Approved Budget	Final Amount Invoiced
2012-07	Hydraulic Model	\$389,024	\$389,024
2012-08	Lifeline Program	\$5,269	\$5,269
2012-09	SSES Implementation	\$80,602	\$80,602
2012-10	Chaot/ Agana Heights Tank DB Package	\$271,071	\$271,071
2012-11	PUC Stipulated Order	\$131,554	\$131,554
2012-12	Phase I Facility Eval. Umatac-Merizo WW	\$105,635	\$105,635
2012-13	Phase I Ugum Inspection and Training	\$135,986	135,986
2012-15	Well Corrosion Specialist	\$48,610	\$48,610
2012-16	Umatac-Merizo Overflow	\$25,170	\$25,170
2012-17	NEIC Water System Support	\$288,488	\$288,488
2012-01-A2	General Program Management Support	\$289,414	\$289,414
2012-01-A3	General Program Management Support	\$583,709	\$583,709
2012-12-A1	WW Eval Umatac PH 2	\$205,172	\$205,172
2012-13-A1	Update O&M Manual Ugum SWTP	\$17,412	\$17,412
2013-01	Phase I PM Agana WWTP Upgrades	\$110,158	\$110,158
2013-02	Phase I CM Agana WWTP Upgrades	\$223,867	\$223,867
2013-03	Southern Sewer Basin SSES	\$452,329	\$452,329
2013-04	Central I/I Tech Support	\$47,991	\$47,991
2013-05	WW Eval Agat-SR & Baza Gardens	\$582,765	\$582,765
2013-06	Engineer's Report Revenue Bond	\$247,810	\$247,810
2013-01-A1	Phase II PM-Agana WWTP Upgrades	\$70,860	\$70,860
2014-01	Program Management Support	\$1,286,120	\$1,286,120
2014-01-A1	Program Management Support	\$100,000	\$100,000
<b>Total</b>		<b>\$7,103,029</b>	<b>\$7,103,029</b>

## Section 2.0: Work Authorization Highlights

This section includes information pertaining to work authorizations performed during this quarterly period. The information in this section contains: program successes and problems, project successes and status, and if applicable, projects exceeding budget and projects behind schedule.

Table 2-1 shows the work authorizations that were worked on during this quarterly period. Significant highlights of these work authorizations are provided to show the progress of each work authorization. Where appropriate, a summary of successes and/or problems are provided.



**Table 2-4. Work Authorization Highlights for Active Work This Period**

Work Authorization #	Work Authorization Title	Significant Highlights	Successes	Problems
2012-14	NPDES Negotiation Support	<ul style="list-style-type: none"> <li>No action this period</li> </ul>		
2013-02-A1	Phase II Constr Mgmt Agana WWTP Upgrades	<ul style="list-style-type: none"> <li>No action this period</li> <li>Slated for close-out</li> </ul>	<ul style="list-style-type: none"> <li>Project is substantially complete</li> </ul>	
2014-01-A2	Program Management Support	<ul style="list-style-type: none"> <li>No action this period</li> <li>Slated for close-out</li> </ul>	<ul style="list-style-type: none"> <li>Project is substantially complete</li> </ul>	
2014-02	Ugum WTP Operations Support	<ul style="list-style-type: none"> <li>No action this period</li> <li>Slated for close-out</li> </ul>	<ul style="list-style-type: none"> <li>Project is substantially complete</li> </ul>	
2014-03	NEIC Wastewater System Support	<ul style="list-style-type: none"> <li>No action this period</li> </ul>		
2014-04	PUC Stipulations 2013	<ul style="list-style-type: none"> <li>No action this period</li> </ul>	<ul style="list-style-type: none"> <li>Project is substantially complete</li> </ul>	<ul style="list-style-type: none"> <li>Awaiting approval from GWA to issue draft report as final</li> </ul>
2014-05	Groundwater Well Rehabilitation Plan	<ul style="list-style-type: none"> <li>No action this period</li> <li>Slated for close-out</li> </ul>	<ul style="list-style-type: none"> <li>Project is substantially complete</li> </ul>	
2014-06	Water System Hydraulic Analysis	<ul style="list-style-type: none"> <li>No action this period</li> </ul>		
2014-07	Hydraulic Model for Sewer System	<ul style="list-style-type: none"> <li>No action this period</li> <li>Slated for close-out</li> </ul>	<ul style="list-style-type: none"> <li>Project is substantially complete</li> </ul>	
2014-09	Formal Training Program Assistance	<ul style="list-style-type: none"> <li>No action this period</li> </ul>		
2014-10	Design Management New Agat WWTP	<ul style="list-style-type: none"> <li>No action this period</li> <li>Slated for close-out</li> </ul>	<ul style="list-style-type: none"> <li>Project is substantially complete</li> </ul>	
2014-11	SRF Project Management	<ul style="list-style-type: none"> <li>No action this period</li> <li>Slated for close-out</li> </ul>	<ul style="list-style-type: none"> <li>Project is substantially complete</li> </ul>	
2014-11-A1	SRF Project Management	<ul style="list-style-type: none"> <li>No action this period</li> </ul>	<ul style="list-style-type: none"> <li>Project is substantially complete</li> </ul>	
2014-11-A2	SRF Project Management, Amendment 2	<ul style="list-style-type: none"> <li>CO 11 Approved Budget of additional \$365,000</li> <li>Southern SSES Rehabilitation – Phase I (Agat, Santa Rita, Umatac, Meriza) (Construction)</li> <li>Led Discussions on warranty issues regarding CIPP installation/liner issues</li> <li>Coordinated efforts on preparation and collection of final closeout documentation                             <ul style="list-style-type: none"> <li>Reviewed Contractor's revised standby claim</li> <li>Prepared record drawings, and O&amp;M Manual</li> <li>Reviewed CM Claim response letter</li> <li>Performed various follow-ups (e.g. CCTV, CM progress, etc.)</li> </ul> </li> <li>Southern SSES Rehabilitation – Phase II (Baza Gardens, Santa Rita, Talofoto) (Construction)</li> <li>Reviewed, and submitted CM Invoice no. 8, and 9, and Construction Invoice no. 7 to GWA for payment</li> </ul>	<ul style="list-style-type: none"> <li>Engineering Design underway for                             <ul style="list-style-type: none"> <li>Rt. 1 Sewer Rehab (99% Complete)</li> <li>Rt. 2 Sewer Rehab (99% Complete)</li> <li>Rt. 4 Sewer Rehab (95% Complete)</li> </ul> </li> <li>Engineering Design underway for.</li> </ul>	<ul style="list-style-type: none"> <li>A/F-series (Design) Deep Well Rehabilitation Projects are both experiencing delays. Delays are primarily due to issues with pilot hole development and locating wells with adequate</li> </ul>

**Table 2-1. Work Authorization Highlights for Active Work This Period**

Work Authorization #	Work Authorization Title	Significant Highlights	Successes	Problems
		<ul style="list-style-type: none"> <li>• Managed CM Change Order request no. 2; submitted CO no. 2 for further processing</li> <li>• Reviewed construction submittals</li> <li>• Conducted Santa Rita site visits regarding manhole leaks, CCTV work, and CIPP installation</li> <li>• Led discussions regarding CIPP work and other technical complications</li> <li>• Coordinated on-site Davis-Bacon labor inspection interviews</li> <li>• Coordinated certified payroll and project schedule submittals to GWA</li> <li>Rt. 1 Asan-Adelup-Hagatna Sewer Line Rehabilitation (Engineering Design)               <ul style="list-style-type: none"> <li>• Prepared, reviewed, and submitted final bid plans and specifications; assisted with preparation of EICDC documents for bidding and construction contract</li> <li>• Participated in Pre-bid meeting, and CM Scoping Meeting</li> <li>• Reviewed, and submitted Design Invoice no. 16, and 17 to GWA for payment</li> <li>• Participated in Route 1 bid opening                   <ul style="list-style-type: none"> <li>○ Discussed escalated cost of project</li> <li>○ Steps to move forward with bid/re-bid</li> </ul> </li> </ul> </li> <li>Rt. 1 Sewer Rehabilitation and Replacement (Asan-Adelup-Hagatna) Asan Sewer Break Repair               <ul style="list-style-type: none"> <li>• Reviewed, and submitted Construction invoice no. 1 to GWA for payment</li> <li>• Managed Construction Change Order request no. 1; led discussions on no-cost CO and means to re-allocate funding; submitted CO no. 1 for further processing</li> <li>• Corresponded on, and developed responses to RFI questions</li> <li>• Led discussions on the following: asbestos abatement, additional work upstream, challenges ongoing at current job sites, traffic control, proper shoring/trench support, etc.</li> <li>• Performed follow-ups (e.g. traffic control, archaeological monitoring, bypass set-up, removal of metal plans, and excavation schedule, etc.)</li> <li>• Coordinated on-site Davis-Bacon labor inspection interviews</li> </ul> </li> <li>Rt. 2 Agat-War-in-the-Pacific National Park (Engineering Design)               <ul style="list-style-type: none"> <li>• Developed, finalized, and submitted bid plans and specifications; assisted with preparation of EICDC documents for bidding and construction contract</li> </ul> </li> <li>Rt. 4 Relief Sewer Line Rehabilitation and Replacement (Engineering Design)               <ul style="list-style-type: none"> <li>• Participated in Pre-bid meeting; led discussions, reviewed, and submitted responses to RFIs</li> <li>• Received, reviewed, provided comments, finalized, and submitted 90% design plans and specifications to USEPA; discussed comments and costs implications</li> <li>• Received, reviewed, provided comments, and discussed 100% design plans and specifications submittal</li> <li>• Reviewed, and submitted Design Invoice no. 8, and 9 to GWA for payment</li> </ul> </li> <li>D-series Deep Well Rehabilitation (Construction)               <ul style="list-style-type: none"> <li>• Reviewed, and submitted CM invoice nos. 5, 6, and 7, and Construction invoice no. 8, and 9 to GWA for payment</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>○ A &amp; F-series Deep Well Rehab (30% Complete)</li> <li>○ Tumon Hot Spots Sewer Rehab (40% Complete)</li> <li>○ Tamuning Hot Spots Sewer Rehab (40% Complete)</li> <li>• Construction underway for:               <ul style="list-style-type: none"> <li>○ Agat-Santa Rita-Umatac-Mierzo Sewer Rehab (99% Original Scope Complete)</li> <li>○ Baza Gardens-Santa Rita-Talofso Sewer Rehab (60% Complete)</li> <li>○ D-series Deep Well Rehab (60% Complete)</li> <li>○ Route 1, Asan Sewer Break Repair (10% Complete)</li> </ul> </li> <li>• (SSES, Phase II) Executed CM Change Order no. 2 (D-series) Executed Construction Change Order no. 5 (Rt.1 Asan Sewer Break) Executed Construction Change Order no. 1 (Tamuning Hot Spots) Executed Change Order no. 1</li> </ul>	<p>capacity; additional pilot holes have been required and additional equipment was required by the drilling company to complete some of the pilot holes</p> <ul style="list-style-type: none"> <li>• SSES, Phase I, Subcontractor (CIPP) slow to respond to warranty claim</li> <li>• SSES, Phase II, Subcontractor (CIPP) delays due to mobilization from off-island</li> </ul>

**Table 2-1. Work Authorization Highlights for Active Work This Period**

Work Authorization #	Work Authorization Title	Significant Highlights	Successes	Problems
		<ul style="list-style-type: none"> <li>Managed Construction Change Order request no. 5; submitted CO no. 5 for further processing and approval</li> <li>Led discussions, participated in additional meetings with GHD, GWA, and the CM regarding issues (M-09 shut down, sound tube modifications, electrical modifications and requirements, new M-09 scope of work, isolation of D-17 and D-18 to dry tap, additional requirements for gravel, completion of D-18 and D-22 boreholes, new isolation valves, additional time needed, etc.)</li> <li>A/F-series Deep Well Rehabilitation (Engineering Design)</li> <li>Reviewed, and submitted Designer invoice no. 6, and 7 to GWA for payment</li> <li>Managed Design Change Order request no. 1; submitted CO no. 1 to GWA for further processing</li> <li>Led discussions on drilling for A-02, A-07, A-12 and D-05, status of borehole for F-03, design considerations for drilling deeper, etc.</li> <li>Received, reviewed, provided comments on Draft DAR, and discussed options and associated costs</li> <li>Tumon Hot Spots Engineering Design</li> <li>Participated in bi-weekly project progress meetings, and performed various follow-up tasks</li> <li>Received, reviewed, provided comments, and discussed Draft 30% Design and associated costs</li> <li>Reviewed, and submitted Design Invoice no. 6, to GWA for payment</li> <li>Tamuning Hot Spots Engineering Design</li> <li>Participated in meetings to discuss cleaning/CCTV work and manhole inspections of additional lines</li> <li>Led discussions on field work status updates, property/easement issues, survey work, etc.</li> <li>Assisted Engineer and GWA with several property issues in the project</li> <li>Received, reviewed, provided comments, and discussed Draft 30% Design and associated costs</li> <li>Reviewed, and submitted Design Invoice no. 5 to GWA for payment</li> <li>Managed Design Change Order request no. 1; submitted CO no. 1 to GWA for further processing</li> </ul>	<ul style="list-style-type: none"> <li>(Tumon Hot Spots) Report (DAR) to USEPA</li> <li>(Rt. 2) 100% Design Plans and Specifications submitted to GWA and Advertised for Bid</li> <li>(Rt. 1) 100% Design Plan and Specifications submitted to GWA and Advertised for Bid</li> <li>(Rt. 4) 90% Design Plans and Specifications to USEPA</li> <li>(D-series) Pump tested D-22 borehole successfully</li> </ul>	
2014-12	Umatac-Mertzo WWTP Water Quality Standards	<ul style="list-style-type: none"> <li>No action this period</li> <li>Slated for close-out</li> </ul>	<ul style="list-style-type: none"> <li>Project is substantially complete</li> </ul>	
2014-13	Baza Gardens Wastewater Cross-Island Design	<ul style="list-style-type: none"> <li>No action this period</li> <li>Slated for close-out</li> </ul>	<ul style="list-style-type: none"> <li>Project is substantially complete</li> </ul>	
2015-01	Program Management Support 2016	<ul style="list-style-type: none"> <li>No action this period</li> </ul>		
2015-05	2016 Revenue Bond Financing	<ul style="list-style-type: none"> <li>No action this period</li> <li>Slated for close-out</li> </ul>	<ul style="list-style-type: none"> <li>Project is substantially complete</li> </ul>	

**Table 2-1. Work Authorization Highlights for Active Work This Period**

Work Authorization #	Work Authorization Title	Significant Highlights	Successes	Problems
2015-06	Facility Plans for the HWWTP and NDWWTP	<ul style="list-style-type: none"> <li>• Developed, reviewed, and submitted Northern District WWTP Facility Plan Report               <ul style="list-style-type: none"> <li>○ NDWWTP Liquid Treatment Options</li> <li>○ NDWWTP Solid Treatment Options</li> <li>○ NDWWTP Recommendations</li> </ul> </li> <li>• Developed, and reviewed Request for Proposal (RFP) for the Northern District WWTP</li> <li>• Developed, reviewed, and submitted draft Hagåtña WWTP Existing Conditions and Flow Projects Technical Memorandum</li> <li>• Developed, and reviewed Hagåtña WWTP Location Alternatives Technical Memorandum               <ul style="list-style-type: none"> <li>○ Performed site visits for research and to gain information</li> <li>○ Coordinated internally on cost estimate development efforts; developed cost estimates</li> <li>○ Developed, and reviewed figures</li> </ul> </li> <li>• Conducted internal Workshop in Hagåtña WWTP Treatment Options</li> <li>• Performed clarifier/activated sludge calculations for HWWTP report incorporation</li> </ul>	<ul style="list-style-type: none"> <li>• Project is 69% complete</li> <li>• Issued Northern District WWTP Facility Plan</li> <li>• Issued draft Hagåtña WWTP Existing Conditions and Flow Projections TM</li> </ul>	
2015-07	Water Resources Master Plan Update	<ul style="list-style-type: none"> <li>• Reviewed CDM's Invoice no. 5, and 6, and coded invoices for further processing and payment</li> <li>• Developed, and executed CDM Subcontractor Amendment No. 3, providing CDM with 159 calendar days from the date of the amendment to complete scope of services</li> <li>• Developed, reviewed, and submitted Preliminary Draft Water Resources Master Plan Update, Volume 3, for GWA review and comment</li> <li>• Prepared for, and conducted Capital Improvement Project (CIP) Workshops for Water and Wastewater Systems for inclusion into the WRMPU</li> <li>• Developed CIP sections of the Volume 2 (Water System) and Volume 3 (Wastewater System) for the GWRMPU; submitted Final Draft Water Resources Master Plan Update, Volume 2</li> </ul>	<ul style="list-style-type: none"> <li>• Issued Preliminary Draft Water Resources Master Plan Update, Volume 3</li> <li>• Issued Final Draft Water Resources Master Plan Update, Volume 2</li> <li>• Executed CDM Subcontract, Amendment No. 3 for Time Completion</li> <li>• Project is 70% complete</li> </ul>	
2015-08	Source Control Program	<ul style="list-style-type: none"> <li>• CO 11 Approved Budget of additional \$227,368</li> <li>• Developed the following:               <ul style="list-style-type: none"> <li>○ GARR 28 revisions</li> <li>○ Pretreatment Program Enforcement Response Plan</li> <li>○ Fees, fines, and Implementation Plan for the Pretreatment Program</li> <li>○ FOG Control Manual</li> <li>○ ICID Control Program</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Project is 31% complete</li> <li>• Developed Interagency Memorandum of Understanding with GEPA, DPW and DPHSS on FOG program and ICID program</li> </ul>	
2016-01	Agat to Umatac Potable Waterline Analysis	<ul style="list-style-type: none"> <li>• Performed analysis and modeling of piping</li> </ul>		
2016-02	Phase I: Tumon Sewer Basin Study	<ul style="list-style-type: none"> <li>• CO 11 Approved Budget: \$187,990</li> <li>• Project set-up in anticipation of budget and funding approval</li> <li>• Performed preliminary project set-up and management tasks through approval of budget in CO 11</li> </ul>		

**Table 2-1. Work Authorization Highlights for Active Work This Period**

Work Authorization #	Work Authorization Title	Significant Highlights	Successes	Problems
2016-03	Mixing Zone Study for Agat-Santa Rita WWTP Discharge to Tipalao Bay	<ul style="list-style-type: none"> <li>Reviewed Daily Monitoring Report (DMRs) and NPDES permits for metal limits and readings</li> <li>Performed modeling update in preparation for final report submittal</li> <li>Developed, reviewed, and submitted Mixing Zone Dilution Analysis Study - Field and Model Analysis Report</li> </ul>	<ul style="list-style-type: none"> <li>Issued final Mixing Zone Dilution Analysis Study - Field and Model Analysis Report</li> </ul>	
2016-04	Hydraulic Modeling Phase 3	<ul style="list-style-type: none"> <li>CO 11 Approved Budget: \$148,746</li> <li>Project set-up in anticipation of budget and funding approval</li> <li>Performed preliminary project set-up and management tasks through approval of budget in CO 11</li> <li>Performed updates to the hydraulic water model</li> </ul>		
2016-05	Engineering for Groundwater Well Production Meters	<ul style="list-style-type: none"> <li>CO 11 Approved Budget: \$301,539</li> <li>Project set-up in anticipation of budget and funding approval</li> <li>Performed preliminary project set-up and management tasks through approval of budget in CO 11</li> </ul>		
2016-07	Project Management for Umatac-Merizo WWTP Upgrade and D/B Preparation	<ul style="list-style-type: none"> <li>CO 11 Approved Budget of additional \$665,757</li> <li>Participated in Bid Opening meeting; submitted bid submittal packages for bid analysis preparations and recommendations                             <ul style="list-style-type: none"> <li>Developed CCU Resolution and Summary</li> <li>Reviewed Bid Disqualification requirements and mobilization payment verbiage</li> <li>Reviewed winning Step 1 Proposal (CoreTech/Hawaiian Dredging)</li> </ul> </li> <li>Participated in CM/OSR scoping meeting preparations; reviewed CM fee proposal</li> <li>Performed CM Proposal Evaluation, and provided recommendation                             <ul style="list-style-type: none"> <li>Submitted CM RFP proposal submittals for analysis preparation</li> <li>Reviewed CM Proposal submittals, and complete scoresheets</li> </ul> </li> <li>Developed, reviewed, prepared, and submitted the addenda, and Step 2 RFP responses</li> <li>Participated in Water Quality Standard Meeting; performed evaluations and report development                             <ul style="list-style-type: none"> <li>Reviewed WERI Toguan River flow report</li> </ul> </li> <li>Developed wastewater treatment plant effluent discharge model and preliminary Toguan River dilution model</li> </ul>	<ul style="list-style-type: none"> <li>Successfully bid the Design/Build Contract</li> <li>The bid amount came in within engineer's estimate and under budget</li> <li>Issued Notice to Proceed (NTP) on June 29, 2017 meeting the Court Order deadline of June 30, 2017</li> <li>Successfully negotiated the CM contract for GWA with a fee which is substantially under budget</li> </ul>	
2016-08	Program Management Support 2017	<ul style="list-style-type: none"> <li>Change Order No. 11 approved, providing additional WA funding</li> <li>CO 11 Approved Budget of additional \$391,498</li> <li>Continued coordination efforts in adopting the Engineers Joint Contract Documents Committee (EJCDC) specifications in GWA's procurement</li> <li>Continued development, and review efforts for draft GWA Water Standard Details</li> <li>Provided GWA with guidance and engaged in discussion, as requested, for acquisition of well maintenance rig, as well as coordination efforts</li> <li>Prepared for, and conducted second session of Scattergraph Analysis Training</li> </ul>	<ul style="list-style-type: none"> <li>Successfully assist GWA in adopting the EJCDC front end construction contract document</li> </ul>	

**Table 2-1. Work Authorization Highlights for Active Work This Period**

Work Authorization #	Work Authorization Title	Significant Highlights	Successes	Problems
		<ul style="list-style-type: none"> <li>• Prepared, and submitted PMO Invoices for January, February, March, and April 2017, for review and payment</li> <li>• Prepared documentation of 145437 WA closures, funding de-obligations/re-obligations, and extensions per GWA request</li> <li>• Change Order No. 1.1 approved, providing additional funding for:               <ul style="list-style-type: none"> <li>○ WA 2016-02, Phase I: Tumon Sewer Basin Study</li> <li>○ WA 2016-04, Hydraulic Modeling Phase 3</li> <li>○ WA 2014-11-A2, SRF Program Amendment No. 2</li> <li>○ WA 2016-05, Engineering for Groundwater Well Production Meters</li> <li>○ WA 2016-07, Project Management for Umatac-Merizo WWTP Upgrade and D/B Preparation</li> <li>○ WA 2016-08, Program Management 2016-2017</li> <li>○ WA 2015-08, Source Control Program</li> </ul> </li> <li>• Developed, reviewed, and submitted 1<sup>st</sup> Quarter PUC Report to GWA for PUC consideration</li> <li>• Led discussions, both internally and with GWA on future training and personnel development work for GWA staff</li> </ul>		
2016-09	Backflow Prevention and Cross-Connection Control Program	<ul style="list-style-type: none"> <li>• Performed research and gathering on GWA customer service data</li> <li>• Developed a program overview</li> <li>• Reviewed CCC programs, and ID gaps within GWA data               <ul style="list-style-type: none"> <li>○ Reviewed M14</li> </ul> </li> <li>• Developed policies and procedures for cross connection control and backflow prevention</li> <li>• Developed, and reviewed 1<sup>st</sup> Draft Program TM; performed data analysis</li> </ul>		

Tables 2-2 and 2-3 show the projects that were over budget by more than 10% during this quarter and the projects that are behind schedule, respectively. As shown on Table 2-3, the PUC Stipulation 2013 Rate Study is behind schedule by six months. The draft study report is currently under GWA management's review. All work authorizations that were performed during this period are within budget.

Table 2-2. Projects Over Budget			
Work Authorization #	Project Title	% Over Budget	Remarks
N/A	N/A	N/A	N/A

Table 2-3. Projects Behind Schedule			
Work Authorization #	Project Title	Time Behind (Mo.)	Corrective Actions
2014-04	PUC Stipulation 2013	6	Draft Report Currently under GWA Management's Review

Table 2-4 summarizes the staff trainings that were conducted during the quarterly period. Staff trainings include operational instruction and guidance not formally documented as a training session or module.

Table 2-4. Summary of Staff Training				
Date	Course Description	Instructor(s)	# of Attendees	Duration (Hrs.)
5/5/2017	EJCDC Front End Documentation	Bill Chang/Bill Gilman Brown and Caldwell	2	8
6/30/2017	Supplemental Flow Meter Calibration, Reliability, and Field Validation Training (In-class)	Mark Poppe Brown and Caldwell	4	1.0
6/30/2017	Manhole Hydraulic Analysis to Determine Flow Meter Installation Suitability (Field Exercise)	Mark Poppe Brown and Caldwell	2	1.5

In addition, GWA's in-house training efforts for the past quarter have included the following:

- In an effort to measure GWA's Human Resource needs, a Training Needs Assessment (TNA) was conducted on March 23, 2017. The focus group for the TNA included Managers, Supervisors, and Leaders. Participants were given time to complete the TNA up to April 7, 2017. The results of the TNA are currently being analyzed to develop specific courses/workshops for implementation in the near future.
- As GWA continues to improve its Network Systems, GWA participated in the Certified Information Systems Security Professional (CISSP) Training Camp. The Training Camp is one of the leading, most informative, and most comprehensive Information Systems training. With threats to our network systems on the rise, GWA took measures to mitigate threats to our network and provided CISSP Certification to 2 employees in the Information Technology Division, the Network Systems Administrator and the Systems Programmer Administrator.
- GWA is actively training on Cyber Security Awareness – provided to 217 employees.

- Operations staff were trained on the following CBT Materials:
  - Water Supply Operations: Filtration – provided to 4 employees
  - Water Distribution Operator’s Training: Valves - provided to 5 employees
  - Water Distribution Operator’s Training: Service and Meters – provided to 5 employees
  - Water Distribution Operator’s Training: Pumps and Motors – provided to 5 employees
  - Water Supply Operations: Pumps – provided to 6 employees
  - Water Distribution Operator Training: Hydrants – provided to 5 employees
  - Turbidity Measurement and Particle Counting – provided to 6 employees
  - Water Distribution Operator Training: Water Mains – provided to 6 employees
  - Membrane Technology: provided to 3 employees
- Chlorination Leak Response Training – provided to 5 employees; This 4-hr training was facilitated by Island Equipment.
- Sulzer Pump & Motor Training – provided to 48 employees; The Pump and Motor training was a 2-day training consisting of both Classroom and Hands-on Training. Course overview:
  - a. Submersible Pump/Motor Overview
  - b. General Pump Theory
  - c. Submersible Pump and Motor Application, Installation, and Maintenance
  - d. VFD Theory
  - e. MCU 33, DI Sensors & Thermal Sensors
  - f. Pump Maintenance & Troubleshooting
- AWWA-HIWPS Training Workshop “Complying with Regulations” – provided to 32 employees
- NASSCO Pipeline Assessment Certification Program (PACP)/Manhole & Lateral Assessment Certification Program (MACP/LACP) – provided to 9 employees; This certification program was necessary to comply with the standardized reporting requirements used by USEPA and GWA Consultants.
- 2017 Safety Conference – provided to 18 employees
- SHRM Guam Chapter “Labor Relations Training” – provided to 2 employees
- SHRM Guam Chapter “Employment Law Update” – provided to 2 employees
- Customer Service Training (Job-site specific duties) – provided to 10 employees
- 8HR HazWOPER Refresher – provided to 2 employees
- 8HR DOT HazMat Safe Transportation – provided to 5 employees
- First Aid/CPR AED Certification is on-going and has provided training thus far to 23 employees, to date.
- Government Procurement Training: - provided to 3 employees



### Section 3.0: Summary of Hours and Fees Received by Local Contractors and PMO

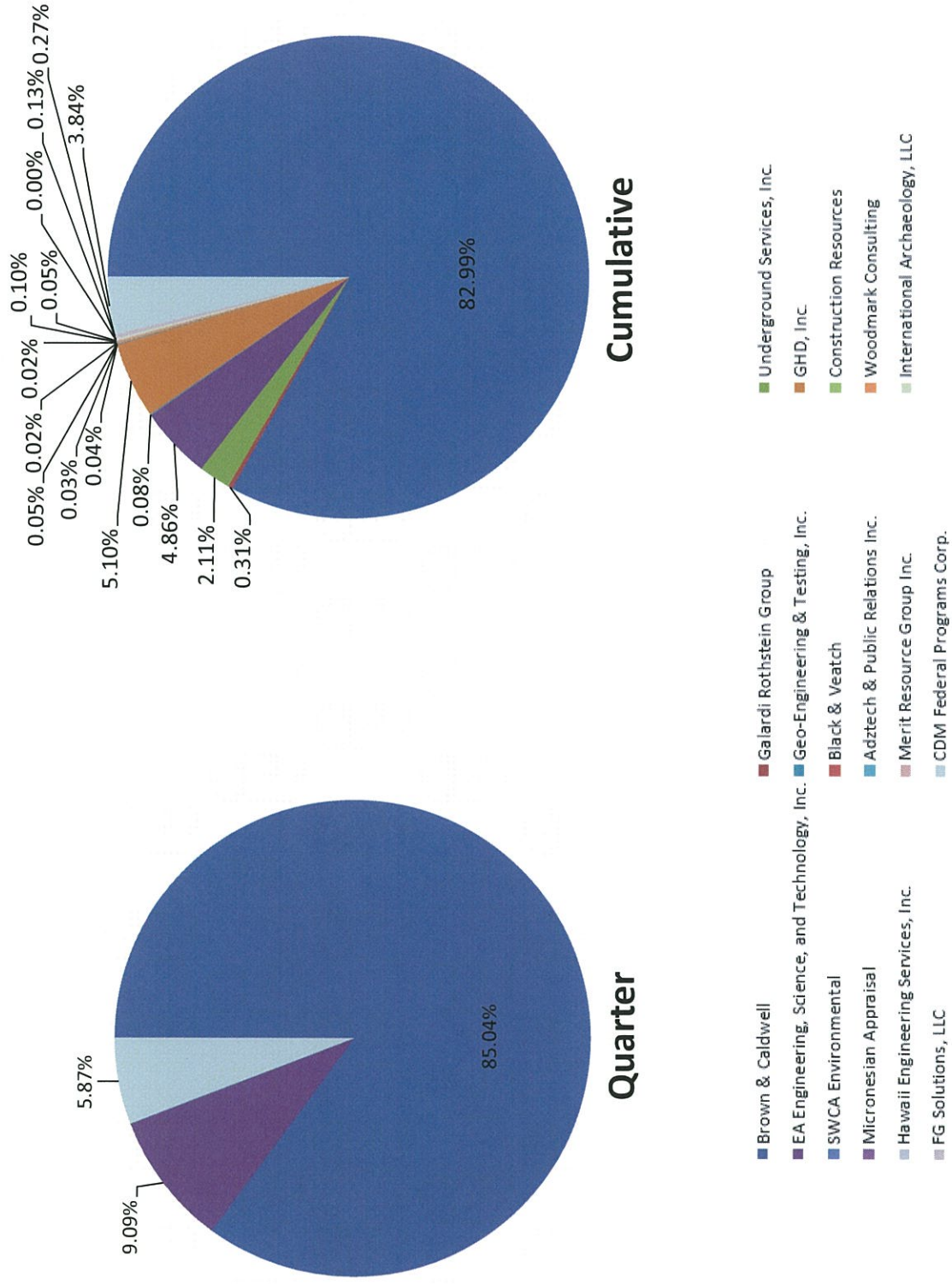
This section provides a summary of the fees invoiced by the PMO, local contractors, and subconsultants during the quarter. Table 3-1, Summary of Hours and Fees, and Figure 3-1, Percentage of Work by Firm, provides a summary of the total invoiced amount for work performed during the quarter compared to the cumulative invoiced amounts over the duration of the Program. Percentages of work performed by each subconsultant during the quarter and cumulative over program duration are also shown. GRT taxes are also depicted and represent a significant cost. Significant activities by subconsultants are anticipated in the upcoming work authorizations later in 2016.

<b>Table 3-1. Summary of Hours and Fees</b>					
Company	Total Billed in Quarter	Hours Worked	% of Total Billed for Quarter (Less Taxes)	Cumulative Billed	Cumulative %
Brown and Caldwell (PMO)*	\$1,316,618.72	5991.25	85.04%	\$13,605,624.90	82.99%
Galardi Rothstein Group	\$ 0.00	N/a	0.00%	\$50,579.83	0.31%
Underground Services, Inc.	\$ 0.00	N/a	0.00%	\$345,331.25	2.11%
EA Engineering, Science, and Technology, Inc., PBC*	\$140,733.00	785.50	9.09%	\$797,290.17	4.86%
Geo-Engineering & Testing, Inc.*	\$ 0.00	N/a	0.00%	\$12,917.08	0.08%
GHD, Inc. *	\$ 0.00	N/a	0.00%	\$836,356.37	5.10%
SWCA Environmental*	\$ 0.00	N/a	0.00%	\$6,062.28	0.04%
Black & Veatch	\$ 0.00	N/a	0.00%	\$4,598.00	0.03%
Construction Resources*	\$ 0.00	N/a	0.00%	\$8,107.50	0.05%
Micronesia Appraisal*	\$ 0.00	N/a	0.00%	\$2,800.00	0.02%
Adztech & Public Relations, Inc.*	\$ 0.00	N/a	0.00%	\$2,625.00	0.02%
Woodmark Consulting	\$ 0.00	N/a	0.00%	\$17,002.43	0.10%
Hawaii Engineering Services, Inc.	\$ 0.00	N/a	0.00%	\$9,000.00	0.05%
Merit Resource Group, Inc.	\$ 0.00	N/a	0.00%	\$ 743.60	0.00%
International Archaeology, LLC	\$ 0.00	N/a	0.00%	\$20,642.75	0.13%
FG Solutions, LLC	\$ 0.00	N/a	0.00%	\$44,237.13	0.27%
CDM Federal Programs Corporation	\$90,824.10	693.20	5.87%	\$629,808.43	3.84%
Taxes (GRT)	\$64,512.49			\$683,126.59	
<b>Total</b>	<b>\$1,612,688.31</b>	<b>7469.95</b>	<b>100%</b>	<b>\$17,076,853.31</b>	<b>100%</b>
<b>Cumulative Paid to Date**</b>				<b>\$16,045,461.11</b>	<b>94%</b>

\* Local Guam Firm

\*\* Cumulative Paid to Date only reflects the periods on the invoices submitted within the quarter (i.e. only reflects payments received until June 30, 2017).

Figure 3-1. Percentage of Work by Firm



#### **Section 4.0: Summary of Progress of Major Project Categories and Status**

This section provides a summary of the progress of the major project categories and the progress status of the projects.

Figure 4-1, PMO Progress by Major Project Categories describes the major project categories – General Program & Small Project Support, Water System Support, Wastewater System Support, Planning Support, and Other Support for each quarter through the 1<sup>st</sup> Quarter of Year 6.

Figure 4-2, PMO Progress Status illustrates the PUC approved budgets to date, the actual spending to date along with an assessment of the Program percentage completed to date, and the PMO approved budget by year.

Figure 4-1. PMO Progress by Major Project Categories

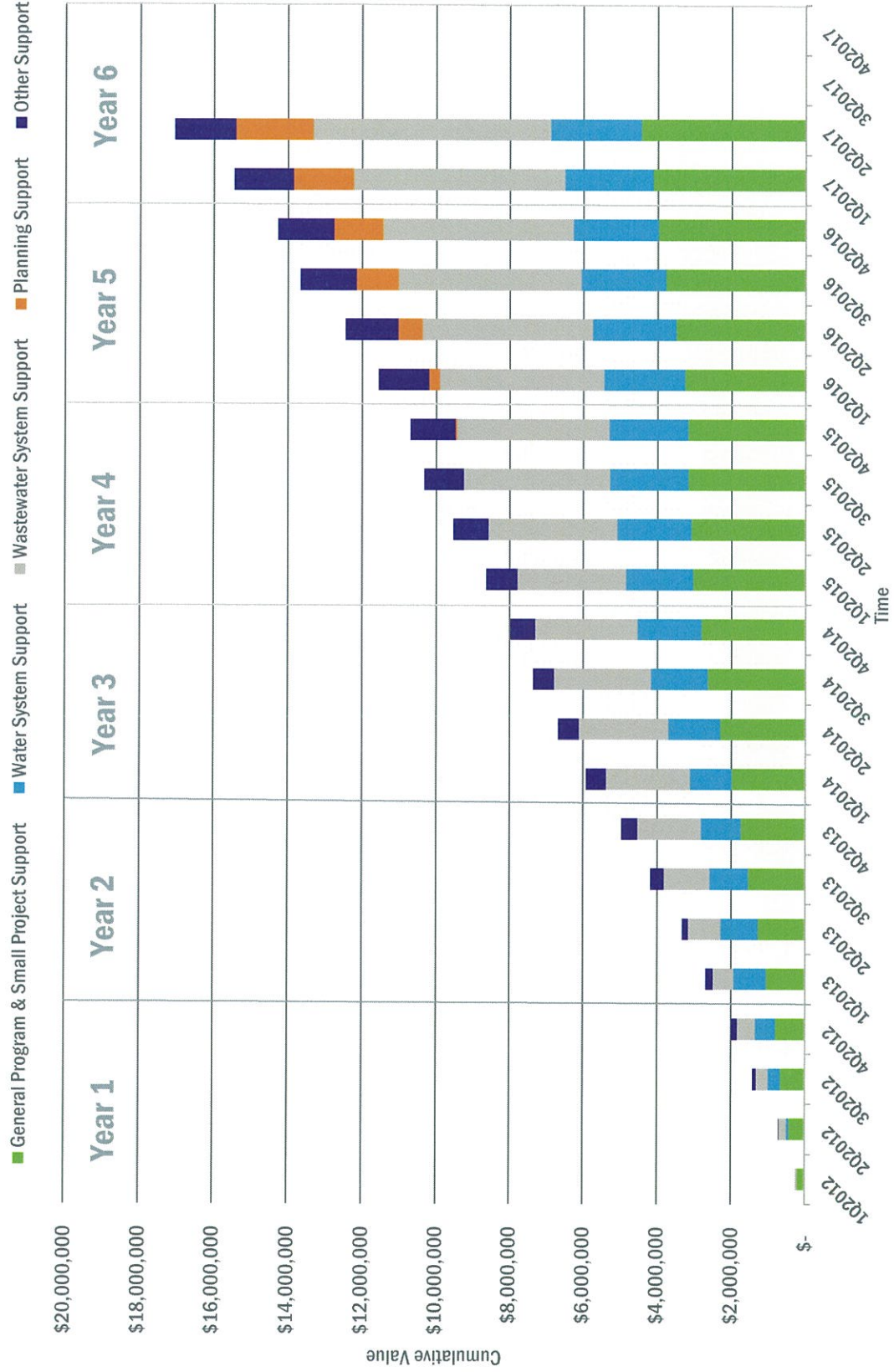
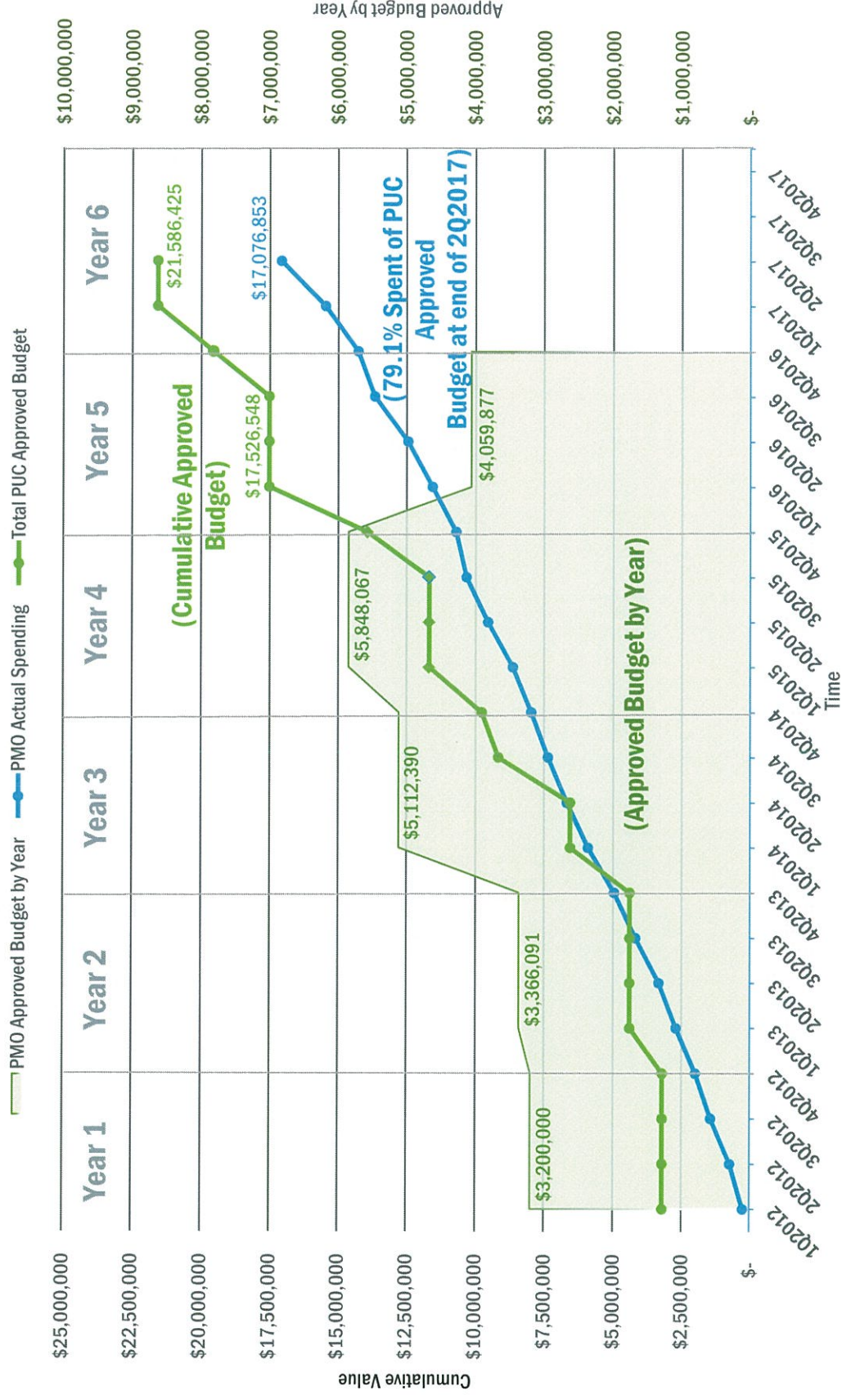




Figure 4-2. PMO Progress Status



**Section 5.0: GWA Project Bidding Process Utilizing the PMO**

Based on PUC Docket 13-01, dated July 31, 2014, Ordering Provision Number 7, an indication is required of whether certain projects managed by the PMO could be separately pursued under the competitive bidding process for all projects that are not typical management and supervisory assistance. The PMO is used primarily for technical review and subject matter knowledge, training support, and design/project/construction management support. The PMO continues to reinforce GWA's capabilities and limited manpower by identifying project needs and establishing clear scopes of work so that the design work can be openly procured from the consulting engineering community. The PMO encourages the local engineering community to participate in solving GWA's needs by acting in a supervisory project management and technical resource capacity, allowing the engineering community to do detailed design and construction management.

Projects initiated by the PMO and currently being performed by the Guam consulting engineering community as a result of open procurement are shown in Table 5-1 below.

<b>Table 5-1. Work Distributed to the Consulting Engineering Community</b>	
<b>Project</b>	<b>Consulting Engineer</b>
Agat-Santa Rita WWTP	GHD, Inc.
Umatac-Merizo WWTP – Toguan River Monitoring	Water and Environmental Research Institute of the Western Pacific EA Engineering, Science, and Technology, Inc.
Baza Cross-Island Wastewater Conveyance	Dueñas, Camacho & Associates, Inc.
Route 1 Sewer Line Rehabilitation	HDR, Inc.
Route 1 Asan Sewer Break Repair	HDR, Inc.
Route 2 Sewer Line Rehabilitation	SSFM, Inc.
Route 4 Sewer Line Rehabilitation	AECOM
Tumon Hot Spots Sewer Line Rehabilitation	TG Engineers, Inc.
Tamuning Hot Spots Sewer Line Rehabilitation	TG Engineers, Inc.
Agat-Santa Rita Sewer Line Rehabilitation	TG Engineers, Inc.
Baza Gardens-Talafofo Sewer Line Rehabilitation	EMPSCO Engineering Consultants
Umatac-Merizo Sewer Line Rehabilitation	TG Engineers, Inc.
D-Series Wells	EA Engineering, Science, and Technology, Inc., PBC
A-Series Wells	AECOM
Water Resources Master Plan Update	CDM Smith
Mixing Zone Study for Agat-Santa Rita WWTP	EA Engineering, Science, and Technology, Inc., PBC
Source Control Program	EA Engineering, Science, and Technology, Inc., PBC

Table 5-2 provides a summary of PMO involvement with GWA's Capital Improvement Program (CIP) projects. While GWA has many active projects in the CIP, only 38% of the projects in the CIP have any participation by the PMO. The PMO provides technical review (TR), design management (DM), construction management (CM), and project management (PM) for 38%, 6%, 4.5%, and 3% of the total CIP projects, respectively, and several PMO services are offered on the same CIP project. The PMO's involvement on a CIP project is primarily to prepare the project for open procurement for the Engineering community on Guam.

**Table 5-2. Plan Summary of PMO Involvement with GWA CIP**

CIP #	Project Description	PMO Involvement		Remarks*
		No	Yes	
PW 05-01	Ground Water Disinfection	●		
PW 05-03	Santa Rita Springs Booster Pump Rehab Phase II	●		
PW 05-05	"A" Series Well Transmission Line	●		
PW 05-06	Water Booster Pump Station	●		
PW 05-07	Meter Replacement Program	●		
PW 05-08	Barrigada Tank Repair/Replacement	●		
PW 05-09	Leak Detection	●		
PW 05-10	Potable Water System Planning		●	TR, TRNG
PW 05-11	Implement Ground Water Rule	●		
PW 05-12	Brigade II (Ugum List) BPS Upgrade	●		
PW 05-13	Deep Well Rehabilitation		●	TR
PW 05-14	New Deep Wells at Down Hard	●		
PW 05-15	Rehabilitation of Asan Springs		●	TR
PW 05-16	Master Meters		●	TR
PW 09-01	Ugum Water Treatment Plant Intake		●	TR, TRNG, CM
PW 09-02	Water Wells		●	TR, TRNG
PW 09-03	Water Distribution System Pipe Replacement and Upgrades		●	TR
PW 09-04	Pressure Zone Realignment/Development 2005 Improvements		●	TR
PW 09-06	Central Water Distribution System 2005 Improvements	●		
PW 09-08	Mechanical/Electrical Equipment	●		
PW 09-09	Water Reservoir Internal/External	●		
PW 09-10	Water Reservoir Internal/External	●		
PW 09-11	Water System Reservoirs 2005 Improvements		●	TR
PW 11-01	Distribution System Upgrade	●		
PW 11-02	Ugum Water Treatment Plant Reservoir		●	TR
PW 12-01	Water Audit Program & Water Loss Control Plan	●		
PW 12-02	Production Plan/Reduce Navy Purchases	●		
PW 12-03	Hydraulic Assessment of Tanks	●		
PW 12-04	Agana Heights & Chaot Tanks		●	TR, DM
PW 12-05	Tank Major Repair Yigo #1, Mangilao #2, Astumbo #1	●		
PW 12-06	Tank Replacement Piti & Hyundai	●		

**Table 5-2. Plan Summary of PMO Involvement with GWA CIP**

CIP #	Project Description	PMO Involvement		Remarks*
		No	Yes	
PW 12-07	Assessment/Replacement of Malojloj Elevated & Yigo Elevated	●		
PW 12-08	Public Water System Asset Inventory/Condition Assessment	●		
PW 12-09	Public Water System GIS & Mapping	●		
PW 14-01	Fire Hydrant Replacement Program	●		
WW 05-04	Wastewater System Planning		●	TR, DM
WW 09-01	Lift Station Upgrades	●		
WW 09-02	Moratorium		●	TR
WW 09-06	Wastewater Collection System Repl/ Rehabilitation		●	TR
WW 09-08	Facilities Plan/Design/Interim for Baza Gardens STP Impr.		●	TR
WW 09-10	Facilities Plan/Design/Interim for Agat-Santa Rita STP Impr.		●	TR
WW 09-11	WTP Priority 1 Upgrades	●		
WW 11-03	Baza Gardens STP Replacement		●	TR
WW 11-04	Facilities Plan/Design/Interim for Umatac-Merizo STP Impr.		●	TR
WW 11-08	Agat/Santa Rita STP Replacement		●	TR, DM
WW 12-01	Northern District WWTP Primary Treatment Upgrades		●	TR, CM
WW 12-02	Bio Solids Management Plan	●		
WW 12-03	Agana WWTP Interim Measures		●	TR, DM, PM, CM
WW 12-04	I&I SSES Southern		●	TR, TRNG, PM
WW 12-05	I&I SSES Central	●		
WW 12-06	I&I SSES Northern	●		
WW 12-07	Umatac Merizo STP Replacement		●	TR
WW 12-09	Wastewater Facility Back Up Power	●		
EE 05-02	SCADA Pilot Project	●		
EE 09-01	Wastewater Pumping Station Electrical Upgrade	●		
EE 09-02	Electrical Upgrade - Water Wells	●		
EE 09-03	Electrical Upgrade - Water Booster	●		
EE 09-04	Electrical Upgrade - Water Booster	●		
EE 09-05	Electrical Upgrade - Other Water	●		
EE 09-07	SCADA Improvements - Phase 2	●		
EE 09-08	SCADA Improvements - Phase 3	●		
EE 09-09	SCADA Improvements - Phase 4		●	TR
MC 05-01	Laboratory Modernization		●	TR
MC 05-02	Land Survey	●		
MC 09-01	General Plant Improvements/Water	●		
MC 15-01	Information Technology Integration Improvements	●		

\*Remarks: TR – Technical Review  
 TRNG – Training  
 DM – Design Management  
 PM – Project Management  
 CM – Construction Management



## **Section 6.0: Training Anticipated for Next Quarter**

The PMO will continue to provide training to GWA staff through organized classroom training and facilitate knowledge transfer through collaboration with GWA staff on Work Authorization assignments.

For the next quarter, the PMO plans to conduct the following training for GWA:

1. Backflow Prevention and Cross Connection Control. The program will assist GWA in providing reasonable protection for its potable public water supply and system. Such protection will help prevent contamination resulting from backflow through uncontrolled plumbing connections and cross connections. GWA is increasing the staff assigned to compliance duties for these programs, and intends to provide training to the staff in the coming months.
2. Groundwater Operation, including:
  - a. Groundwater Disinfection, Principle, Regulations and Calculation.
  - b. Disinfection Monitoring.
  - c. Chlorination/Chlorine Cylinders Management.
  - d. Chlorination Equipment Operation and Maintenance.
  - e. Water Well Production Rates/Monitoring.
  - f. Well and Well Pump Service.
  - g. Water Well Site Management.
  - h. Water Well Rehabilitation.

In addition, GWA plans to implement the following training activities in-house through its Personnel Services Division:

- Employee Safety Orientation
- Cross Connection/Back Flow Prevention Awareness Training
- Computer Training
- Supervisory Training (i.e. Effective Communications, Adverse Action Procedures, etc.)
- Crane Operator Certification
- Well-Driller's Licensure
- Physical Security Training
- Customer Service Training
- Hazardous Communication
- Confined Space 8hr refresher
- Excavation
- Slips trips and falls CBT
- Safety Awareness OSHA 10hr.
- Forklift Safety
- MUTCD Temporary Traffic Control
- Office Safety
- Lockout/Tagout

## **Section 7.0: Make-up of the PMO Team**

The Program Management Team consists of Brown and Caldwell (BC) as the prime engineer supported by seventeen (17) consultants as shown in Table 3-1. The number of local residents hired by BC since 2011 –

- 3 Engineering Interns, part-time
- 4 Full-time Engineers
- 1 Part-time Administrative Coordinator
- 1 Full-time Administrative Coordinator

The number of BC Employees who reside locally and worked on Guam projects during the quarter -

- 4 Full-time Engineers
- 1 Full-time Administrative Coordinator

**Section 8.0: Use of Local Firms**

The Ordering Provisions of the PUC, GWA Docket 13-01, dated 12/24/2014, OP #8, requires the PMO to indicate its use of local firms. Per Guam Procurement Law, 5 GCA Chapter 5, Section 5008(d), Policy in Favor of Local Procurement,

*"All procurement of supplies and services shall be made from among businesses licensed to do business on Guam and that maintain an office or other facility on Guam, whenever a business that is willing to be a contractor is:*

*(d) A service business actually in business, doing a substantial portion of its business on Guam, and hiring at least 95% U. S. Citizens, lawfully admitted permanent residents or nationals of the United States, or persons who are lawfully admitted to the United States to work, based on their citizenship in any of the nations previously comprising the Trust Territory of the Pacific Islands."*

The Brown and Caldwell Guam office is a service business, actually in business, doing business on Guam, and hiring 100% U.S. Citizens. In addition, Brown and Caldwell has maintained a Certificate of Authority (File# F-1236) to do business on Guam since January 25, 1990. Brown and Caldwell is considered a local business.

# EXHIBIT "B" (1 of 1)

	Work Authorizations for Amendment No. 7	Fees	Recommended Reduction	Amount reduced	Adjusted Amounts	Comments
WA 2017-01	PMO Support 2017-18	\$862,012	15%	\$131,457	\$730,555	Covers until Oct. 1, 2017 to September 2018. I am ok with this.
WA 2014-11-A3	SRF Grant Funded Project Support Amendment No. 3	\$914,571	10%	\$94,201	\$820,370	Covers until December 2018. I am ok with this because some of the SRF projects may be completed prior to the PMO ending so if there are anything moving past engineering can take up.
WA 2017-03	Consulting Engineer's Report for 2018 Revenue Bond Financing	\$243,387	14%	\$33,344	\$210,043	Needed for 2018 Bond
WA 2017-04	Project Management for New Wells AG10, AG12 and Y8	\$221,131	50%	\$111,118	\$110,013	I was the one who asked for this but I think we can limit their involvement to only provide technical input when necessary. GWA CIP Water would take the lead and the PMO support.
WA 2017-05	Hydraulic Modeling and Training for Wastewater Collection System	\$333,714	33%	\$108,791	\$224,923	We have started using the wastewater hydraulic modeling but not to the level as water. The training is necessary but I think we can reduce the effort.
WA 2017-06	Southern Guam Water Supply Study	\$468,251	100%	\$468,251	\$0	I don't think this is necessary at this time.
	<b>Total</b>	<b>3,043,066</b>			<b>\$2,095,904</b>	

Guam Waterworks Authority  
Program Management Support 2017-2018

**TO:** Brown and Caldwell  
414 W. Soledad Ave.  
Suite 602  
Hagatna, Guam 96910

**WORK AUTHORIZATION NO.:** 2017-01

**SUBMITTAL DATE:** August 21, 2017

**FROM:** Miguel C. Bordallo, P.E.  
GENERAL MANAGER  
GUAM WATERWORKS AUTHORITY

You are hereby authorized to perform the services described below in accordance with the Contract for Technical and Professional Services executed February 6, 2012 between Brown and Caldwell (BC) and Guam Waterworks Authority (GWA) for Program Management Services, GPA-RFP-11-005.

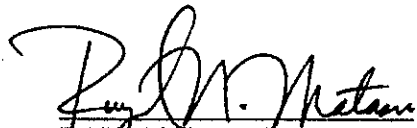
**DESCRIPTION OF WORK AND FEE ESTIMATES**

**DESCRIPTION:** Program Management Support 2017-2018

Defined cost, scope, and schedule on a time and materials basis are provided below and consist of providing general program management support for GWA from Oct 1, 2017 to September 30, 2018. General program management support consists of managing and consulting oversight of GWA's capital improvements program and engineering advice on projects and programs that have critical and urgent deadlines, a brief scope and limited budget. Additionally, updates to the Program Strategy, Master Program Schedule, and Program Benefits Delivery are included.

NOT TO EXCEED amount: **\$ 862,012**

Signed:



RAYMOND N. MATASCI  
SR. VICE PRESIDENT/PROGRAM MANAGER  
BROWN AND CALDWELL

Date August 31, 2017

GWA Reviewer:

\_\_\_\_\_  
THOMAS F. CRUZ, P.E.  
CHIEF ENGINEER

Date \_\_\_\_\_

Signed:

\_\_\_\_\_  
MIGUEL C. BORDALLO, P.E.  
GENERAL MANAGER  
GUAM WATERWORKS AUTHORITY

Date \_\_\_\_\_

Guam Waterworks Authority  
Program Management Support 2017-2018

**WORK AUTHORIZATION NO: 2017-01**

**DESCRIPTION:** Program Management Support

**GWA PROJECT MANAGER: Thomas F. Cruz, P.E.**

**PROJECT BACKGROUND AND OBJECTIVE**

The purpose of this task order is to provide general program management support as part of GWA's Program Management Office (PMO) for GWA's Capital Improvements Program and engineering advice on critical issues facing GWA.

**SCOPE OF WORK**

**Task 1: Program Planning, Implementation, and Management**

**Approach:** The Program has completed its fifth year and many accomplishments and objectives have been achieved. A review of the program with respect to strategy, benefits realization, and execution will be performed to assure alignment with GWA's goals and objectives. Working together with GWA, program needs and direction will be developed with GWA staff and validated by the PMO. Improvements and changes will be documented in the updated program management plan. The following proposed subtasks will assist GWA in improving efficiency and internal capabilities.

The PMO will assist GWA with identifying component-project needs, planning the work, and coordinating with other Government of Guam agencies as required. The PMO will assist GWA in developing scopes of work and work plans for CIP projects, PUC Stipulated Order projects, and Court Order projects as required including preparation of work authorizations. PMO staff will collect information via document review and GWA staff interviews to develop work authorizations including scopes, schedules, budgets, and staffing plans for tasks that GWA delegates to the PMO. The PMO will effectively manage the project team members and perform administrative tasks for the projects to produce a quality product within budget and schedule.

The PMO will:

- be responsible for updating and implementing the program management plan;
- use a progress monitoring system to track team expenditures and product completion, providing the basis for PMO actions;
- use a monthly review process that estimates level of effort to complete and determines value earned, providing the basis for work plan modifications to meet budget and schedule;
- manage staff resources and sub-consultants to assure timely product generation and response; and
- conduct periodic quality control review of the work before final submittal to GWA.

The program will provide for housing subsistence, utilities, and leased cars for two full-time employees dedicated to the contract. In addition, airfare and per diem to bring subject knowledge technical experts as needed to Guam is limited to a total of seven (7) personnel, each for one week duration.

**PMO Team Responsibilities:** PMO staff will provide updates to the program management plan and implement the plans and protocols listed in the program management plan. The PMO will develop work authorizations, scopes, schedules, budgets, and staffing plans.

**GWA Responsibilities:** GWA staff will review and provide comments on the plans, schedules, recommendations, and deliverables. GWA staff will participate in reviews and analyses, and abide by the protocols set forth in the plans. GWA staff will participate in subject matter technical discussions.

**Products:** Program management plan updates, scopes of work, meetings.

### **Task 2: Meeting and Reporting**

**Approach:** PMO staff will be working closely with GWA staff to successfully deliver the program and will meet with GWA's Chief Engineer and Asst. General Manager of Compliance and Safety regularly. It is expected that PMO staff will meet with GWA staff weekly and provide weekly action items' reports along with monthly progress reports. Monthly reports will address project highlights and percent resources (man-hours and expenses) expended to date, decision tracking reports (issues and their resolutions), schedule for design and construction activities, and program changes (initiated by GWA, design-related, and/or other forces).

The PMO will prepare quarterly reports to the PUC on the status and performance of the PMO team. Reports will be comprised of a narrative, numerical, and graphical formats that track project performance and progress. The PMO will prepare periodic reports on training provided to GWA. The PMO will attend PUC and CCU meetings and work sessions, as necessary.

**PMO Team Responsibilities:** BC staff will coordinate and attend weekly status meetings, develop weekly and monthly progress reports and invoices, and develop quarterly and periodic reports.

**GWA Responsibilities:** GWA staff will be required to attend meetings and review progress reports.

**Products:** Weekly, monthly, and quarterly progress reports, monthly invoices, and training reports.

### **Task 3: Program and Technical Support**

**Approach:** On an as-needed basis, the PMO will provide a highly qualified, specialized technical support team that covers engineering, management, business, and organizational processes, technical and analytical presentations, inspection, claims management, and scientific disciplines necessary to respond to issues that may require specialized support during the contract period. This team shall be available for resolution of critical issues, claims, special design reviews and reports, inspections, and other specialized technical assistance during planning, design, construction and close-out phases of the component-projects and the program.

Guam Waterworks Authority  
Program Management Support 2017-2018

During the course of the program it is expected that GWA will require the PMO to conduct short-duration and immediate tasks such as independent research, document review, technical opinions and evaluations. These tasks will often have critical and urgent deadlines, a brief scope, and limited budget. It may be inefficient for such tasks to require the development of a stand-alone work authorization. Program support will be used for the PMO to respond to GWA's immediate needs required to support the overall program and GWA's operations. Tasks will be assigned to the PMO on an as-needed basis. Examples of such tasks as directed by GWA are, but not limited to:

- Support for ONE-GUAM water initiative requiring hydraulic analysis, mapping, studies and technical memoranda.
- Provide technical support for construction-related and startup issues on water and wastewater treatment plant and pumping station facilities.
- Review and edit specifications for GWA's specific equipment purchase.
- Identify appropriate curriculum for GWA to conduct internal training for "Utility Performance" improvement.
- Work with GWA in promoting knowledge transfer between members of the PMO and GWA staff through mentoring and training.
- Assist GWA in staff training programs for Engineering and Operations staff which include but are not limited to project management, risk management, and design-build project delivery.
- Provide on-call consultation services to GWA on its organizational rules and policies.
- Assist GWA in addressing emergency operational problems and regulatory compliance issues such as problems associated with the Ugum Surface Water Treatment Plant and the PFOS issues.
- Continue to support GWA in improving its construction contract front-end documents using the Engineers Joint Contract Documents Committee (EJCDC) format for design, technical, and construction contracts.
- Continue to support GWA in establishing Guam Water Standards and Water Standard Details.
- Strategic/CIP planning and scheduling.
- Review/evaluate/support current GWA contractor and consultant contracts, procurement, change orders, project close-out, invoice processing and other administrative practices to support GWA's on-going efforts to become more efficient and cost effective in the management of resources.
- Provide engineering services to report on and support environmental compliance with US EPA and Guam EPA. This includes supporting GWA on current court-order requirements as well as potential new enforcement actions.
- Provide technical support for Environmental Attorney in regards to USEPA actions.



Guam Waterworks Authority  
Program Management Support 2017-2018

- Conduct business case evaluations on technical proposals presented to GWA including present worth analyses, cost-benefit ratios, economic and non-economic analyses and preparation of technical memoranda.
- Participate in and provide technical support during project meetings.
- Provide peer review, comments, and recommendations on engineering studies, reports, and designs conducted by others.
- Provide support for procurement of GWA projects and evaluate bids, technical engineering capabilities, contractor qualifications and review of contract bidding documents.
- Work with GWA to develop a basic information system to support Project Management by providing project information on budget, cost, schedule, scope, status, and location.

**PMO Team Responsibilities:** The PMO will provide the technical support team as needed. The PMO will conduct short-duration and immediate tasks as directed by GWA.

**GWA Responsibilities:** GWA staff will be required to attend meetings and provide available information to the PMO on upcoming tasks. GWA staff will be required to document the effort needed via e-mail or letter to the PMO.

**Products:** General services such as research and document review, reports, opinions, white papers, studies, meeting minutes, and memoranda.

**Task 4: Program Contract Assistance**

**Approach:** At GWA's discretion, the PMO team will prepare and review requests for proposals and scopes of work to procure engineering and construction contracting services from the local community. The program manager will also be available to participate in the negotiation of contracts with selected consultants and contractors for individual projects. Services are intended to include planning, design, design/build, construction, plant information and asset management systems, instrumentation contracts, and other tasks as may be requested by GWA.

**PMO Team Responsibilities:** The PMO will provide contract assistance, as needed.

**GWA Responsibilities:** GWA staff will review contract documentation and provide guidance to the PMO on services requested for individual projects.

**Products:** Contract documents.

**SCHEDULE**

The effort described in this work authorization will be conducted from October 1, 2017 through September 30, 2018.

Guam Waterworks Authority  
Program Management Support 2017-2018

**BUDGET SUMMARY**

Labor (Labor Hours – 3,221)	\$712,334
ODC	\$115,195
GRT	\$34,483
<hr/>	
Total	\$862,012

Guam Waterworks Authority  
 Program Management Support 2017-2018

**BUDGET DETAILS**

This work order will be performed on a time and materials basis, and will not exceed \$862,012 without written consent from GWA.

<b>Labor</b>				
<b>Name</b>	<b>Labor Code</b>	<b>Labor Rate</b>	<b>Hours</b>	<b>Amount</b>
Chang	L	\$270	639	\$172,530
Bilz	K	\$260	501	\$130,260
Riegel	K	\$260	251	\$65,260
Matasci	N	\$270	341	\$92,070
Watson	G	\$160	181	\$30,046
Marble	G	\$160	88	\$14,608
Honda	I	\$210	120	\$26,160
Tamai	G	\$166	344	\$57,104
Sr. Advisor	M	\$260	324	\$87,480
Bourke	E	\$130	60	\$7,800
Admin	B	\$78	372	\$29,016
Labor Subtotal			3,221	\$712,334
<b>Other Direct Costs</b>				
<b>Description</b>				<b>Amount</b>
Airfare \$2000 (x4) from HNL				\$8,000
Airfare \$3000 (x3) from Mainland				\$9,000
Rental Car \$75/day (35 days)				\$2,625
Per Diem \$250/day (35 days)				\$8,750
Mileage				\$420
Overseas Housing Allowance \$2250/month (x2)				\$54,000
Utility/Recurring Maintenance \$600/month (x2)				\$14,400
Lease Car \$750/month (x2)				\$18,000
ODC Subtotal				\$115,195
<b>Total Work Authorization Estimate</b>				
Labor Subtotal				\$712,334
ODC Subtotal				\$115,195
GRT (4.167%)				\$34,483
Total				\$862,012

Guam Waterworks Authority  
State Revolving Fund (SRF) Grant Project Support Amendment No. 3

**TO:** Brown and Caldwell  
414 W. Soledad Ave.  
Suite 602  
Hagatna, Guam 96910

**WORK AUTHORIZATION NO.:** 2014-11-A3

**SUBMITTAL DATE:** August 21, 2017

**FROM:** Miguel C. Bordallo, P.E.  
GENERAL MANAGER  
GUAM WATERWORKS AUTHORITY

You are hereby authorized to perform the services described below in accordance with the Contract for Technical and Professional Services executed February 6, 2012 between Brown and Caldwell (BC) and Guam Waterworks Authority (GWA) for Program Management Services, GPA-RFP-11-005.

**DESCRIPTION OF WORK AND FEE ESTIMATES**

**DESCRIPTION:** State Revolving Fund (SRF) Grant Program Support Amendment No. 3

Defined cost, scope, and schedule on a time and materials basis are provided below and consist of providing project management, scheduling, reporting and tracking of SRF Grant and other related GWA projects for implementation in accordance with GWA's Programmatic Project Management Plan (PPMP).

NOT TO EXCEED amount: **\$ 914,571**

Signed

  
RAYMOND N. MATASCI

SR. VICE PRESIDENT/PROGRAM MANAGER  
BROWN AND CALDWELL

Date August 31, 2017

GWA Reviewer:

\_\_\_\_\_  
THOMAS F. CRUZ, P.E.  
CHIEF ENGINEER

Date \_\_\_\_\_

Signed

\_\_\_\_\_  
MIGUEL C. BORDALLO, P.E.  
GENERAL MANAGER  
GUAM WATERWORKS AUTHORITY

Date \_\_\_\_\_

**WORK AUTHORIZATION NO: 2014-11-A3**

**DESCRIPTION:** State Revolving Fund (SRF) Grant Project Support Amendment No. 3

**GWA PROJECT MANAGER: Thomas F. Cruz, P.E.**

**PROJECT BACKGROUND AND OBJECTIVE**

In February, 2015, Brown and Caldwell (PMO) was authorized by GWA under Work Authorization No. 2014-11 to support GWA in the planning, development, review, prioritization, project management, scheduling, and tracking of State Revolving Fund (SRF) Grant projects for implementation in accordance with GWA's Programmatic Project Management Plan (PPMP). Over the past two and a half years, the PMO has managed ten (10) sewer rehabilitation and groundwater well reconstruction projects with total estimated construction costs over \$30 million. The table below summarizes the status of each of the ten (10) projects.

Project Description		Estimated Completion Dates		
		Design	Bidding	Construction
1	Southern SSES Rehabilitation (Agat-Santa Rita-Umatac-Merizo)	Complete	Complete	9/30/2017
2	Route 1 Asan-Adelup-Hagatna	Complete	10/30/2017	2/28/2019
3	Asan Sewer Break Repair	Complete	Complete	12/31/17
4	Route 2 Agat War-in-the-Pacific	Complete	07/31/2017	7/31/2018
5	F and A Series Wells Rehab	9/30/2017	1/8/2018	5/22/2019
6	Tumon Sewer Hot Spots	9/4/2017	11/30/2017	11/30/2018
7	Route 4 Hagatna	Complete	10/30/2017	1/31/2019
8	D-Series Wells Rehabilitation	Complete	Complete	11/3/2017
9	Baza Gardens-Talafofo SSES	Complete	Complete	Delayed
10	Tamuning Sewer Hot Spots	9/4/2017	11/30/2017	11/17/2018

To make sure the projects are completed and SRF funding deadlines are met, and continuity is maintained through the remainder of the projects, the PMO requests an extension of PMO support through December 31 2018. Further extensions for PMO support will be reviewed by GWA on an annual basis.

**SCOPE OF WORK**

This work authorization will be performed by Brown and Caldwell listed herein as the PMO Team. This scope outlines the overall PMO Team scope, schedule, and budget.

**Task 1: Task Management**

**Approach:** Brown and Caldwell's PMO staff will manage the scope, schedule, and budget associated with the work described in this Work Authorization to ensure that this work is managed in a manner that meets the intent of the GWA PMO Program Management Plan. This includes, but is not limited to, management of documents, change, risk, and quality assurance and control. This task shall include regular progress meetings and conference calls (at least every

two weeks) between PMO and GWA personnel to review project progress, issues to be resolved, project reports and contractor procurement and payment procedures.

**PMO Team Responsibilities:** PMO staff will manage the scope, schedule and budget in accordance with the protocols set forth in the GWA PMO Program Management Plan.

**GWA Responsibilities:** GWA staff will attend meetings, review progress reports, and adhere to the protocols set forth in the GWA PMO Program Management Plan.

## **Task 2: Project Management**

**Approach:** The PMO Team will manage assigned projects from initiation phase, through pre-design, design, bidding, construction and closeout. The PMO Team assumes a continuation of management services for the ten (10) individual SRF projects as listed in the table above.

In accordance with Grant Conditions P3, P7, P8:

The PMO will work with the GWA Engineering staff and manage projects as directed by GWA. The PMO will provide project management oversight and technical subject matter expertise for the individual projects assigned to the PMO. The PMO will handle consultant and contractor payment requests and substantiate documentation for pay requests. The PMO will assist GWA in submitting project updates, change order requests and payment requests to USEPA, and address USEPA comments. The PMO will oversee preparation of QA/QC Plans by consultants for data collection, attend bid openings, collect bid tabs and submit to USEPA through GWA, provide written statements when and if the lowest bidder was not selected and documentation of the reasons, and provide recommendations of award.

The PMO will:

- provide bi-weekly progress reporting via teleconference with GWA and USEPA;
- control costs and manage budget;
- facilitate project team cooperation and input;
- maintain project files;
- track and report on cash flow projections;
- receive, review, distribute, and return comments on meeting minutes and reports issued by construction managers;
- facilitate resolution of construction problems;
- review invoices and recommend payment;
- obtain input and consensus from operations and maintenance divisions;
- arrange for and coordinate easement and right-of-way procurement activities;
- coordinate building permits from Dept. of Public Works;
- coordinate necessary stream buffers or 404 permits; and
- coordinate USEPA review and approval as needed.

In accordance with Grant Conditions P9:

The PMO will assist GWA in Federal and Territory Agency notification, SHPO notification, development of procedures for protection or salvage during construction, and obtaining SHPO concurrence. The PMO will assist GWA in selecting consultants to prepare an Archaeological

Guam Waterworks Authority  
State Revolving Fund (SRF) Grant Project Support Amendment No. 3

monitoring, discovery and data recovery Plan, and provide project notification to the Guam Historic Preservation Officer, as necessary. Archeological and cultural resources work will be performed by others under separate contract with GWA.

In accordance with Grant Conditions P11, P19:

The PMO will verify that procurement follows Federal Regulations as defined in the Grant conditions and maintain necessary documentation, validate contractor performance, payment and other bonds, and validate that purchase orders and contracts include appropriate clauses required by Federal statutes, regulations and Executive Orders as defined in the Grant conditions.

**PMO Team Responsibilities:** Manage projects as directed by GWA in accordance with the Grant conditions.

**GWA Responsibilities** Participate in reviews and project management of SRF-funded projects.

**Products:** Project documentation.

**Task 3: Contract and Construction Management**

**Approach:** The PMO Team will manage assigned projects from initiation phase, through pre-design, design, bidding, construction and closeout. The PMO Team assumes that the ten (10) individual projects currently assigned to the PMO will continue to require the following project management services during construction:

In accordance with Grant Conditions P14, P16, P17, P18, P20, P22, P23, P24:

As directed by GWA, the PMO will perform contract management, monitor contractor work plans, review cost breakdowns and schedules of values, notify USEPA of construction start, attend meetings with USEPA during construction, verify as-built drawings are being prepared by others, and submit final copies of work products to USEPA through GWA. The PMO will perform Change Order management and provide advance notification of changed conditions and budget category transfer requests to the USEPA and seek USEPA approvals.

For each infrastructure project funded by the Grant, the PMO will work with the contractor to obtain a Plan of Operation including O&M Manual, emergency operation plan, site safety plan, and personnel training plan as required.

In accordance with Grant Conditions P26, P29, P30, P34:

The PMO will assist GWA in issuing a letter at the close of the project certifying that the project meets or does not meet project performance standards. Corrective action reports and cost estimates for corrective action will be prepared, along with a schedule for corrective action. The PMO will assist GWA in meeting Federal cross-cutting requirements and conformance compliance with Federal regulations. The PMO will assist GWA with Davis-Bacon compliance efforts by accompanying GWA's grant specialist in wage rate interviews as requested by GWA. The PMO will assist GWA in notification of Public Media Events and publicity for accomplishments.

Guam Waterworks Authority  
State Revolving Fund (SRF) Grant Project Support Amendment No. 3

Examples of such tasks are, but not limited to:

- Arrange for and coordinate bid award activities.
- Review Contractor prequalification and preparation of the qualified bidders list.
- Manage construction management contracts.
- Supervise and monitor the activities and schedules for materials testing consultant.
- Coordinate change orders.
- Coordinate, review, approve, and monitor erosion and sediment control measures.
- Attend periodic site visits.
- Monitor easement conditions.
- Track RFI's, RFP's, Work Change Directives (WCD's), change orders, shop drawings and other submittals.
- Assist Construction Manager with claims analysis and resolution.
- Coordinate, review, and approve payments to contractor and consultants; verify quantities.
- Determine substantial completion and prepare lists of incomplete or unsatisfactory items, and a schedule for their completion.
- Ensure appropriate levels of communication and public outreach.
- Submit fixed asset management reports to GWA.
- Oversee start-up training provided by others.
- Assist with O & M Manual Review.
- Deliver all project files to GWA digitally archived and in single hard copy format.
- Deliver as-built record drawings to GWA.

**PMO Team Responsibilities:** PMO staff will manage projects as directed by GWA in accordance with the Grant conditions.

**GWA Responsibilities** GWA staff will participate in reviews and project management of SRF-funded projects. Perform wage rate interview and administer Davis Bacon compliance.

**Products:** Project documentation.

### **SCHEDULE**

The PMO Team will conduct the effort described in this work authorization to support GWA in the project management, scheduling, and tracking of projects. The PMO will conduct this effort for a period from January 1, 2018, to December 31, 2018. Work beyond the December 31, 2018, will proceed upon written authorization from GWA.



Guam Waterworks Authority  
State Revolving Fund (SRF) Grant Project Support Amendment No. 3

**BUDGET SUMMARY**

Labor (4,458 hours)	\$862,080
ODC	\$15,905
GRT	\$36,586
<hr/>	
Total	\$914,571

Guam Waterworks Authority  
 State Revolving Fund (SRF) Grant Project Support Amendment No. 3

**BUDGET DETAILS**

This work order will be performed on a time and materials basis and will not exceed \$914,571 without written consent from GWA.

<b>Labor</b>				
<b>Name</b>	<b>Labor Code</b>	<b>Labor Rate</b>	<b>Hours</b>	<b>Amount</b>
Matasci	N	\$270	52	\$14,040
Chang	L	\$270	208	\$56,160
Bilz	K	\$260	676	\$175,760
Riegel	K	\$260	312	\$81,120
Marble	G	\$166	1144	\$189,904
Watson	G	\$166	1196	\$198,536
Poppe	H	\$198	320	\$63,360
Worster	K	\$250	160	\$41,600
Tamai	G	\$166	104	\$17,264
Admin	B	\$78	312	\$24,336
Labor Subtotal			4,458	\$862,080
<b>Other Direct Costs</b>				
<b>Description</b>				<b>Amount</b>
Airfare \$2000 (x1) from HNL				\$2,000
Airfare \$3000 (x2) from Mainland				\$6,000
Rental Car \$75/day (21 days)				\$1,575
Per Diem \$250/day (21 days)				\$5,250
Mileage				\$1,080
ODC Subtotal				\$15,905
<b>Total Work Authorization Estimate</b>				
Labor Subtotal				\$862,080
ODC Subtotal				\$15,905
GRT (4.167%)				\$36,586
Total				\$914,571

Guam Waterworks Authority  
Consulting Engineer's Report for 2018 Revenue Bond Financing

**TO:** Brown and Caldwell  
414 W. Soledad Ave.  
Suite 602  
Hagatna, Guam 96910

**WORK AUTHORIZATION NO.:** 2017-03

**SUBMITTAL DATE:** August 21, 2017

**FROM:** Miguel C. Bordallo, P.E.  
GENERAL MANAGER  
GUAM WATERWORKS AUTHORITY

You are hereby authorized to perform the services described below in accordance with the Contract for Technical and Professional Services executed February 6, 2012 between Brown and Caldwell (BC) and Guam Waterworks Authority (GWA) for Program Management Services, GPA-RFP-11-005.

**DESCRIPTION OF WORK AND FEE ESTIMATES**

**DESCRIPTION:** Consulting Engineer's Report for 2018 Revenue Bond Financing

Defined cost, scope and schedule on a time and materials basis are provided in the attached proposal letter.

NOT TO EXCEED amount: **\$ 243,387**

Signed

  
RAYMOND N. MATASCI

SR. VICE PRESIDENT/PROGRAM MANAGER  
BROWN AND CALDWELL

Date August 31, 2017

GWA Reviewer:

\_\_\_\_\_  
GREG CRUZ  
CHIEF FINANCIAL OFFICER

Date \_\_\_\_\_

Signed

\_\_\_\_\_  
MIGUEL C. BORDALLO, P.E.  
GENERAL MANAGER  
GUAM WATERWORKS AUTHORITY

Date \_\_\_\_\_

Guam Waterworks Authority  
Consulting Engineer's Report for 2018 Revenue Bond Financing

**WORK AUTHORIZATION NO: 2017-03**

**DESCRIPTION:** Consulting Engineer's Report for 2018 Revenue Bond Financing

**GWA PROJECT MANAGER: Greg Cruz**

**PROJECT BACKGROUND AND OBJECTIVE**

A series of bond financing was approved by the Guam Consolidated Commission on Utilities in February 2013 in the act of approving the GWA 2014 – 2018 5-Year Rate Plan. The first bond sale in a series of three bond financings occurred in December 2013. The second bond sale occurred in January 2016. The third bond sale of the series is projected in the Rate Plan to take place in the 3rd quarter of calendar year 2018.

A condition of the bond sale is the preparation of a Consulting Engineer's Report and Consulting Engineer's Certification. The Report and Certification only provide engineering advice on this project, as that term is defined in Section 15B(e)(4)(C) of the Securities and Exchange Act, with respect to the regulation of municipal advisors. Brown and Caldwell has not, and does not, express any opinion or advice as to how to structure the existing or new issuance of municipal securities, including, but not limited to, the timing and terms of debt services payments. Brown and Caldwell is not subject to the relevant regulations as to municipal advisors including, without limitation, the fiduciary duty set forth in Section 15B(c)(1) of the Securities and Exchange Act. GWA has relied on the Guam Economic Development Authority (GEDA) and others for advice with respect to municipal financial products or the issuance of municipal securities, including advice with respect to the structure, timing, terms, and other similar matters concerning such financial products or issues.

This Work Authorization proposes the following Scope of Work to prepare the Consulting Engineer's Report and Consulting Engineer's Certificate.

**SCOPE OF WORK**

This work authorization will be performed by Brown and Caldwell and Galardi Rothstein Group listed herein as the PMO Team. This scope outlines the overall PMO Team scope, schedule, and budget.

**Task 1: Task Management**

**Approach:** The Program Management Office (PMO) Team will manage the scope, schedule, and budget associated with the work described in this Work Authorization to ensure that this work is managed in a manner that meets the intent of the GWA PMO Program Management Plan. This includes, but is not limited to, management of documents, change, risk, and quality assurance and control. This task shall include regular progress conference calls (at least every two weeks) or meetings between PMO and GWA personnel to review project progress, issues to be resolved, early study results, etc. This task covers efforts associated with the internal quality control and technical review process. Specifically, the PMO will conduct internal QA/QC meetings and follow-up with technical experts as necessary during the course of the project. Internal checking or peer review of all deliverables will also be performed.

**PMO Team Responsibilities:** PMO staff will manage the scope, schedule, and budget. The PMO lead will manage tasks in this Work Authorization in accordance with the protocols set forth in the GWA PMO Program Management Plan.

**GWA Responsibilities:** GWA staff will attend meetings, review progress reports, and adhere to the protocols set forth in the GWA PMO Program Management Plan.

**Products:** Project meetings and meeting minutes.

### **Task 2: Data Gathering**

**Approach:** PMO staff will request and review available reports, plans, permits, agreements, CIP, budgets, and other pertinent documentation. PMO staff will conduct interviews with GWA management to discuss significant issues facing the agency.

The PMO Team will review available reports and publicly available information on GWA, including but not limited to the FY 2017 True Up Narrative submitted to the Guam Public Utilities Commission, GWA's most recent bond offering statements, GWA operating budget and financial statements, and GWA Master Plan capital project schedules and cost estimates. The PMO Team will also collect information and descriptions of the GWA water and wastewater systems and proposed capital projects that will be the basis for components of the financial projections.

Interviews are expected to take place during the Fall of 2017. Interview questions and a data request will be prepared in advance and provided to GWA staff so that they can prepare for the interviews and collect the necessary data. A majority of the data must be received at least one week prior to the scheduled interviews in order for the PMO team to review the data and prepare for the interviews.

**PMO Team Responsibilities:** Request and review documentation, conduct management interviews.

**GWA Responsibilities:** Provide requested information, schedule, and coordinate interviews and interview locations, and participate in management interviews.

**Products:** Summary of data.

### **Task 3: Analysis and Preparation of Consulting Engineer's Report and Consulting Engineer's Certificate**

**Approach:** PMO staff will prepare a Consulting Engineer's Report (CER) for inclusion in the Official Statement of the Revenue Bond documents. The CER will include:

1. Summary description of GWA's Organization
2. Summary description of GWA's water systems, including:
  - o General overview.

Guam Waterworks Authority  
Consulting Engineer's Report for 2018 Revenue Bond Financing

- Evaluation of sources of supply.
  - Evaluation of current and future water demands.
  - Evaluation of water treatment facilities.
  - Evaluation of water distribution and storage.
  - Review and assessment of regulatory issues as they relate to GWA operations.
3. Summary description of GWA's wastewater systems, including:
- General overview.
  - Evaluation of collection and transmission systems.
  - Evaluation of wastewater treatment plants.
  - Evaluation of residuals management.
  - Review and assessment of regulatory issues as they relate to GWA operations.
4. Capital improvement program (CIP) summary, including:
- Presentation of the CIP for the five-year period following the bond issue (2018-2023).
  - Determination if the budgeted CIP appears adequate for the identified future improvement needs.
5. Financial projections to support GWA's planned capital program and operations through 2023, including:
- Projection of revenues
  - Projection of operating and maintenance expenses
  - Projection of capital costs and funding sources for the CIP
  - Projection of financial assurance targets, including applicable debt service coverage and operating reserve requirements
  - Projection of rate impacts arising from implementation of the planned CIP.
  - Update to GWA's strategic financial planning (SFP) model initially developed to facilitate Consent Decree negotiations. In updating the SFP model, the PMO Team will append cash-flow forecasts with schedules, tables, and graphs to address issues of concern to the municipal bond market (e.g., projected debt service coverage, debt/equity ratios, operating reserves, rate comparability).

The PMO team will develop up to two draft CERs for GWA review and comment. The PMO team will coordinate with the GWA financial consultant, GEDA, and Bond Counsel during preparation of the CER.

**PMO Team Responsibilities:** Prepare CER; coordinate with GWA, GWA's financial consultant, GEDA, and Bond Counsel.

**GWA Responsibilities:** Provide information as requested by the PMO, review draft CER, provide collective GWA comments on up to two draft reports; participate in conference calls and attend meetings.

**Products:** Up to two draft CERs and final CER. Certificate of Consulting Engineer per Bond

Guam Waterworks Authority  
Consulting Engineer's Report for 2018 Revenue Bond Financing  
Resolution.

**Task 4: Preparation for Rating Agency Presentations/Meetings**

**Approach:** The PMO team will support the finance team in rating agency/bond insurer presentations via conference calls. Up to three conference calls are assumed. Attendance by BC staff at rating agency/bond insurer presentations may be performed as additional services to be requested by GWA.

The PMO team will participate in monthly teleconference calls with the finance team. Up to six (6) conference calls are assumed.

**PMO Team Responsibilities:** Contribute to the preparation of presentations by GWA's finance team. Prepare for and participate in conference calls.

**GWA Responsibilities:** Provide information as requested by the PMO, prepare final rating agency presentation.

**Products:** Contributions to rating agency presentation (by others).

**ASSUMPTIONS**

- 1) A relatively current update of the SFP model will be effected through the on-going Water Resources Master Plan development process.

**SCHEDULE**

The PMO Team will conduct the effort described in this work authorization to produce the final deliverables by June 1, 2018. This assumes notice to proceed is issued in October 2017. Draft report reviews will begin in December 2017.

Guam Waterworks Authority  
Consulting Engineer's Report for 2018 Revenue Bond Financing

**BUDGET SUMMARY**

Labor (Labor Hours – 766)	\$180,756
ODC	\$52,895
GRT	\$9,736
<hr/>	
Total	\$243,387



Guam Waterworks Authority  
 Consulting Engineer's Report for 2018 Revenue Bond Financing

**DGET DETAILS**

This work authorization will be performed on a time and materials basis and will not exceed \$243,387 without written consent from GWA.

<b>Labor</b>				
<b>Name</b>	<b>Labor Code</b>	<b>Labor Rate</b>	<b>Hours</b>	<b>Amount</b>
Gilman	M	\$270	128	\$34,560
Bilz	K	\$260	204	\$53,040
Sorensen	J	\$250	196	\$49,000
Sr. Manager	M	\$270	16	\$4,320
Matasci	N	\$270	12	\$3,240
Constantinescu	H	\$218	50	\$10,900
Kansakar	G	\$166	120	\$19,920
Tamai	G	\$166	8	\$1,328
Draheim	G	\$166	8	\$1,328
Admin	E	\$130	24	\$3,120
Labor Subtotal			766	\$180,756
<b>Other Direct Costs</b>				
<b>Description</b>				<b>Amount</b>
Supplies				\$750
Airfare \$2000 (x2) from HNL				\$4,000
Airfare \$3000 from Mainland				\$3,000
Rental Car \$75/day (15 days)				\$1,125
Per Diem \$250/day (15 days)				\$3,750
Mileage				\$270
Subconsultant				\$40,000
ODC Subtotal				\$52,895
<b>Total Work Order Estimate</b>				
Labor Subtotal				\$180,756
ODC Subtotal				\$52,895
GRT (4.167%)				\$9,736
Total				\$243,387

Guam Waterworks Authority  
Project Management for New Wells AG-10, AG-12, and Y-8

**TO:** Brown and Caldwell  
414 W. Soledad Ave.  
Suite 602  
Hagatna, Guam 96910

**WORK AUTHORIZATION NO.:** 2017-04

**SUBMITTAL DATE:** August 21, 2017

**FROM:** Miguel C. Bordallo, P.E.  
GENERAL MANAGER  
GUAM WATERWORKS AUTHORITY

You are hereby authorized to perform the services described below in accordance with the Contract for Technical and Professional Services executed February 6, 2012 between Brown and Caldwell (BC) and Guam Waterworks Authority (GWA) for Program Management Services, GPA-RFP-11-005.

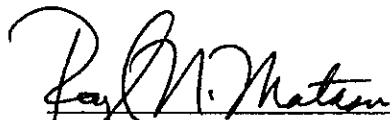
**DESCRIPTION OF WORK AND FEE ESTIMATES**

**DESCRIPTION:** Project Management for New Wells AG-10, AG-12, and Y-8

Defined cost, scope, and schedule on a time and materials basis are provided below and consist of providing project management and support for construction management, scheduling and reporting of New Wells AG-10, AG-12, and Y-8 Project.

NOT TO EXCEED amount: **\$ 221,131**

Signed:



RAYMOND N. MATASCI  
SR. VICE PRESIDENT/PROGRAM MANAGER  
BROWN AND CALDWELL

Date August 31, 2017

GWA Reviewer:

\_\_\_\_\_  
THOMAS F. CRUZ, P.E.  
CHIEF ENGINEER

Date \_\_\_\_\_

Signed:

\_\_\_\_\_  
MIGUEL C. BORDALLO, P.E.  
GENERAL MANAGER  
GUAM WATERWORKS AUTHORITY

Date \_\_\_\_\_

Guam Waterworks Authority  
Project Management for New Wells AG-10, AG-12, and Y-8

**WORK AUTHORIZATION NO: 2017-07**

**DESCRIPTION:** Project Management for New Wells AG-10, AG-12, and Y-8

**GWA PROJECT MANAGER: Thomas F. Cruz, P.E.**

**PROJECT BACKGROUND AND OBJECTIVE**

GWA is committed to enhance its water service and to provide uninterrupted water supply to its customers by increasing its groundwater production capacity. In 2011, GWA investigated 27 potential new well sites in the Northern Guam Lens and identified the top three (3) sites for further development, based on the water quality, yield potential, groundwater recharge zones, land ownership, land use plan, geological features, presence of nearby utilities, and the wellhead protection. The three new well sites identified are designated as AG-10, AG-12, and Y-8, located in Dededo and Yigo areas. In 2014, GWA completed the plans and specifications for these three new wells under Project No. PW 09-02 Island-Wide Well Site Rehabilitation and New Well Site Development. The new wells have not been constructed due to insufficient staffing to manage and complete this project. GWA is in the process of adding more staff to fill new engineering positions and to replace retiring engineers including a Senior Well Engineer. However, it would take some time for a new engineer to become familiar with the groundwater's very unique and sensitive hydrogeology.

GWA's Program Management Office (PMO) is currently managing the rehabilitation of five (5) existing wells in the Dededo area under Project No. PW05-14 Island-Wide Well Site Rehabilitation and New Well Site Development, also known as the "D-series Wells." The PMO's subject matter experts have helped resolve numerous problems encountered during construction of the D-series wells. It is anticipated that construction of the three (3) new wells could have similar issues due to their proximity in the area, similar geological formation, and similar groundwater characteristics. The plans and specifications prepared in 2014 for the three new wells need to be updated to incorporate the standardized equipment established by GWA in 2015. The electrical system would need to be revised to be SCADA ready. Other design changes required before the project goes into construction include changes for final pump capacity, motor size, and electrical requirements based on the capacity established by the pilot wells, verification of and updates to the required well casing diameter and sounding tube locations, electrical revisions to reflect the standard systems currently installed at other wells, and verification of existing site conditions to identify any additional work necessary based on the current conditions, and updates required to reflect GWA's selected RTU/HMI, etc.

The objective of this work authorization is to:

1. Assist GWA in completing this project by providing project management services for the construction of the three new wells. The project management services include working with the engineer of record (EOR) to update the 2014 plans and specifications, assisting GWA in construction bidding, assisting GWA in procuring construction management (CM) services, and providing project management services during the construction.
2. Assist GWA staff in becoming familiar with and knowledgeable of the tasks performed for this Work Authorization. Allow GWA staff to shadow appropriate PMO personnel and take steps to increase the training of GWA's staff.

## **SCOPE OF WORK**

This work authorization will be performed by Brown and Caldwell listed herein as the PMO Team. This scope outlines the overall PMO Team scope, schedule, and budget.

### **Task 1: Task Management**

**Approach:** Brown and Caldwell's PMO staff will manage the scope, schedule, and budget associated with the work described in this Work Authorization to ensure this work is managed to meet the intent of the GWA PMO Program Management Plan. This includes, but is not limited to, management of documents, change, risk, and quality assurance, and control. This task shall include regular progress meetings and conference calls between PMO and GWA personnel to review project progress, issues to be resolved, project reports, and contractor procurement, and payment procedures.

**PMO Team Responsibilities:** PMO staff will manage the scope, schedule and budget in accordance with the protocols set forth in the GWA PMO Program Management Plan.

**GWA Responsibilities:** GWA staff will attend meetings, review progress reports, and adhere to the protocols set forth in the GWA PMO Program Management Plan.

**Products:** Scope of work, project meetings and meeting minutes.

### **Task 2: Project Management**

**Approach:** The PMO Team will manage the project from design, bidding, construction, and closeout. The PMO will work with the GWA Engineering group and manage the project as directed by GWA. The PMO will provide project management oversight and technical subject matter expertise for the project. The PMO will handle consultant and contractor payment requests and substantiate documentation for pay requests.

The PMO will:

- provide weekly progress reporting with GWA;
- control costs and manage budget;
- facilitate project team cooperation and input;
- maintain project files;
- provide equipment standardization, SCADA requirements and other design changes to EOR for design update;
- prepare RFP and scope of services for CM procurement;
- assist GWA in selection of consultants;
- arrange and attend meeting(s) to negotiate final scope and fees;
- update project cost estimates based on design consultant's input;
- receive, review, distribute, and return comments on technical memoranda and reports issued by EOR;
- review invoices and recommend payment;

Guam Waterworks Authority  
Project Management for New Wells AG-10, AG-12, and Y-8

- conduct review meetings with design consultant;
- obtain input and consensus from operations and maintenance divisions;
- arrange for and coordinate easement and right-of-way procurement activities;
- coordinate power supply by GPA; and
- coordinate building permits from Dept. of Public Works.

The PMO will assist GWA in Federal and Territory Agency notification, SHPO notification, development of procedures for protection or salvage during construction, and obtaining SHPO concurrence. The PMO will assist GWA in selecting consultants to prepare an Archaeological Monitoring, Discovery and Data Recovery Plan, and provide project notification to the Guam Historic Preservation Officer, as necessary. Archeological and cultural resources work will be performed by others under separate contract with GWA.

**PMO Team Responsibilities:** Manage the project as directed by GWA.

**GWA Responsibilities** Participate in reviews of submittals related to the project.

**Products:** Project documentation.

**Task 3: Contract and Construction Management**

**Approach:** As directed by GWA, the PMO will perform contract management, monitor contractor work plans, review cost breakdowns and schedules of values, notify GWA of construction start, attend meetings with CM and contractor during construction, verify as-built drawings are being prepared by others, and submit final copies of work products to GWA. The PMO will perform change order management and provide advance notification of changed conditions and budget category transfer requests to GWA and seek GWA approvals.

The PMO will work with the contractor to obtain a Plan of Operation including O&M Manual, emergency operation plan, site safety plan, and personnel training plan as required.

The PMO will assist GWA in issuing a letter at the close of the project certifying that the project meets or does not meet project performance standards. Corrective action reports and cost estimates for corrective action will be prepared, along with a schedule for corrective action.

The PMO will:

- arrange for and coordinate bid award activities;
- review contractor prequalification and preparation of the qualified bidders list;
- manage construction management contracts;
- supervise and monitor the activities and schedules for materials' testing consultant;
- coordinate change orders;
- coordinate, review, approve, and monitor erosion and sediment control measures;
- attend periodic site visits;
- monitor easement conditions;
- track RFIs, RFPs, Work Change Directives (WCDs), change orders, shop drawings, and other submittals;

Guam Waterworks Authority

Project Management for New Wells AG-10, AG-12, and Y-8

- assist CM with conducting claims analysis and claims resolution;
- coordinate, review, and approve payments to contractor and consultants, verifying quantities;
- determine substantial completion and prepare lists of incomplete or unsatisfactory items and a schedule for their completion;
- ensure appropriate level of communications and public outreach;
- submit fixed asset management reports to GWA;
- arrange dedication as required;
- oversee start up training provided by others;
- O & M Manual Review;
- deliver all project files to GWA in digitally archived and hard copy format; and
- deliver as-built record drawings to GWA.

**PMO Team Responsibilities:** Manage projects as directed by GWA.

**GWA Responsibilities** Participate in reviews of submittals related to the project.

**Products:** Project documentation.

**SCHEDULE**

The PMO Team will conduct the effort described in this work authorization to support GWA in the project management, scheduling, and tracking of projects. The PMO will conduct this effort for a period of 18 months upon notice of approval.

Guam Waterworks Authority  
Project Management for New Wells AG-10, AG-12, and Y-8

**BUDGET SUMMARY**

Labor (1,082 hours)	\$206,740
ODC	\$5,545
GRT	\$8,846
<hr/>	
Total	\$221,131

Guam Waterworks Authority  
 Project Management for New Wells AG-10, AG-12, and Y-8

**BUDGET DETAILS**

This work order will be performed on a time and materials basis and will not exceed \$221,131 without written consent from GWA.

<b>Labor</b>				
<b>Name</b>	<b>Labor Code</b>	<b>Labor Rate</b>	<b>Hours</b>	<b>Amount</b>
Matasci	N	\$270	36	\$9,720
Chang	L	\$270	36	\$9,720
Bilz	K	\$260	312	\$81,120
Riegel	K	\$260	36	\$9,360
Marble	G	\$166	312	\$51,792
Worster	K	\$260	80	\$20,800
Tamai	G	\$166	36	\$5,976
Admin	B	\$78	234	\$18,252
Labor Subtotal			1,082	\$206,740
<b>Other Direct Costs</b>				
<b>Description</b>				<b>Amount</b>
Airfare \$3000 from Mainland				\$3,000
Rental Car \$75/day (7 days)				\$525
Per Diem \$250/day (7 days)				\$1,750
Mileage				\$270
ODC Subtotal				\$5,545
<b>Total Work Authorization Estimate</b>				
Labor Subtotal				\$206,740
ODC Subtotal				\$5,545
GRT (4.167%)				\$8,846
Total				\$221,131



Guam Waterworks Authority  
Hydraulic Modeling and Training for Wastewater Collection System

**TO:** Brown and Caldwell  
414 W. Soledad Ave.  
Suite 602  
Hagatna, Guam 96910

**WORK AUTHORIZATION NO.:** 2017-05

**SUBMITTAL DATE:** August 21, 2017

**FROM:** Miguel C. Bordallo, P.E.  
GENERAL MANAGER  
GUAM WATERWORKS AUTHORITY

You are hereby authorized to perform the services described below in accordance with the Contract for Technical and Professional Services executed February 6, 2012 between Brown and Caldwell (BC) and Guam Waterworks Authority (GWA) for Program Management Services, GPA-RFP-11-005.

**DESCRIPTION OF WORK AND FEE ESTIMATES**

**DESCRIPTION:** Hydraulic Modeling and Training for Wastewater Collection System

Defined cost, scope, and schedule on a time and materials basis are provided below and consist of updating, calibrating, and analyzing the GWA wastewater collection system model and providing GWA with wastewater collection system modeling support on an on-call basis.

NOT TO EXCEED amount: **\$ 333,714**

Signed

  
RAYMOND N. MATASCI

SR. VICE PRESIDENT/PROGRAM MANAGER  
BROWN AND CALDWELL

Date August 31, 2017

GWA Reviewer:

\_\_\_\_\_  
THOMAS F. CRUZ, P.E.  
CHIEF ENGINEER

Date \_\_\_\_\_

Signed

\_\_\_\_\_  
MIGUEL C. BORDALLO, P.E.  
GENERAL MANAGER  
GUAM WATERWORKS AUTHORITY

Date \_\_\_\_\_

Guam Waterworks Authority  
Hydraulic Modeling and Training for Wastewater Collection System

**WORK AUTHORIZATION NO: 2017-05**

**DESCRIPTION:** Hydraulic Modeling and Training for Wastewater Collection System

**GWA PROJECT MANAGER: Thomas F. Cruz, P.E.**

**PROJECT BACKGROUND AND OBJECTIVE**

Flow metering data was not adequate to calibrate portions of the wastewater collection system model for the Water Resources Master Plan (WRMP) update. Therefore, portions of the system could not be fully analyzed for the WRMP update. The purpose of this Work Authorization is to collect flow metering data and then update and calibrate the wastewater collection system model. The model can then be analyzed to identify deficiencies and recommend improvement projects. On-call assistance will also be given to answer questions about the wastewater collection system using the calibrated model.

**SCOPE OF WORK**

This work authorization will be performed by the BC's Program Management Office (PMO) Team. This scope outlines the overall PMO Team scope, schedule, and budget.

**Task 1: Task Management**

**Approach:** GWA PMO staff will manage the scope, schedule, and budget associated with the work described in this Work Authorization to ensure that this work is managed in a manner that meets the intent of the GWA PMO Program Management Plan. This includes, but is not limited to, the management of documents, changes, risk, and quality assurance (QA) and quality control (QC). This task shall include periodic progress conference calls or meetings between PMO and GWA personnel to review project progress, issues to be resolved, early study results, etc. This task covers efforts associated with the internal quality control and technical review process. Specifically, the PMO will conduct internal QA/QC meetings and follow-up with technical experts as necessary during the course of the project. Internal checking or peer review of all deliverables will also be performed.

**PMO Team Responsibilities:** PMO staff will manage the scope, schedule, and budget in accordance with the protocols set forth in the GWA PMO Program Management Plan.

**GWA Responsibilities:** GWA staff will attend meetings, review progress reports, and adhere to the protocols set forth in the GWA PMO Program Management Plan.

**Task 2: Flow Metering**

**Approach:** The PMO will develop a flow metering plan. GWA will then place flow meters in the collection system. To cover the desired areas, data may be gathered in one area and then the flow meters may be moved to another area.

GWA will periodically download the data. The PMO will review the flow metering data and inform GWA if any meters require maintenance based on the data.

**PMO Team Responsibilities:** Develop a flow metering plan, and review the flow metering data.

**GWA Responsibilities:** Install, maintain, and download the flow meters.

**Products:** Flow metering plan and data collected during flow metering.

### **Task 3: Data Gathering and Fieldwork**

**Approach:** The PMO will work with GWA to collect data to update portions of the model that need to be updated. Work was done to update model piping and verify elevations during the WRMP update. However, there are additional areas that need to be verified to improve the model accuracy. Data gathering and fieldwork that will be done for this task will include the following:

1. *Interviews.* Interviews will be conducted by GWA's staff to collect information on system piping and operations. This task will include meeting with the following staff:
  - a. Operations staff. The operations staff have knowledge of piping obtained during their daily field work that is not reflected in the GIS. Staff will also be interviewed to collect information on correct piping in key areas of the system.
  - b. GIS and Engineering staff. The GIS and Engineering staff have knowledge of what is included in GIS and what remains to be added based on a backlog of field-collected data.
2. *Fieldwork.* Fieldwork will be done to visit manholes as needed to verify piping configuration.

**PMO Team Responsibilities:** Conduct interviews and fieldwork as needed.

**GWA Responsibilities:** Respond to interview requests and support the PMO team in conducting site visits and fieldwork. GWA will be responsible for supplying any tools and equipment required for fieldwork such as manhole cover hooks.

**Products:** Data gathered from interviews and collected during fieldwork.

### **Task 4: Update and Calibrate Hydraulic Model**

**Approach:** The latest GWA wastewater collection system model will be updated through the following tasks:

1. *Update Model Piping.* A major GIS update was delivered to GWA after the sewer model was built and calibrated. The model piping and manholes will be updated within GIS to reflect new calibrated sewer model. The model piping will also be updated using data collected during Task 3.
2. *Update Model Facilities.* Lift station data, including wet well dimensions and pump data, was not available for many of the lift stations when the model was built and calibrated. Data delivered after the model calibration will be incorporated into the model.
3. *Update Loads.* Water demands will be used as the initial customer loading. The latest water demand data will be loaded into the model (and then adjusted during calibration).

Guam Waterworks Authority  
Hydraulic Modeling and Training for Wastewater Collection System

4. *Calibrate Model.* The model will be calibrated by the PMO team using the flow metering data. Dry weather calibration will be performed followed by wet weather calibration. The calibration will focus on areas that are not currently well calibrated in the model.

**PMO Team Responsibilities:** Update and calibrate the model using the latest information and flow metering data.

**GWA Responsibilities:** Support the model update and calibration.

**Products:** Updated model.

**Task 5: Model Analysis and Recommendations**

**Approach:** The calibrated model will be analyzed and improvement projects will be developed similar to the approach used in the WRMP update. This task will include the following:

- *Model Analysis.* The model will be analyzed and deficiencies will be identified for gravity piping, force main piping, and lift stations using the criteria from the WRMP update.
- *Develop Improvement Projects.* Improvement projects will be developed for the pipe and pump deficiencies in a format similar to the format in the WRMP update.

**PMO Team Responsibilities:** Analyze the model, identify deficiencies, and develop recommendations.

**GWA Responsibilities:** Review the recommendations and provide feedback.

**Products:** Recommendation for improvement projects.

**Task 6: On-Call Model Assistance**

**Approach:** The PMO will assist GWA with wastewater system issues, which will include addressing specific concerns in the wastewater collection system and developing solutions using the model. Examples of typical assistance include:

- Analyze new developments and hotels.
- Assist in planning the implementation of proposed pipeline and lift station improvement projects. For example, the model was recently used to analyze the capacity of the pipeline running from Andersen AFB to the Northern District WWTP to answer pipe capacity questions from the DoD.
- Analyze wastewater collection system piping. For example, during the recent WRMP workshop, there was a discussion of using the model to analyze serving the Tiyan Donut Hole area off of Route 8.
- Analyze areas that could not be analyzed during the WRMP update. For example, as mentioned in Task 4 data was not available for many of the lift stations when the model was calibrated. Pump data that was delivered by GWA after the model was calibrated needs to be put into the model as part of Task 4. The lift stations then need to be analyzed for capacity.
- Conduct other analyses for growth, development, efficiency optimization, and maintenance.

Guam Waterworks Authority  
Hydraulic Modeling and Training for Wastewater Collection System

**PMO Team Responsibilities:** The PMO will assist GWA staff in analyzing the model and generating results for use by GWA. Prepare Technical Memoranda as outlined in Task 7 below.

**GWA Responsibilities:** Supply information as requested. Review results and recommendations prepared by the PMO and offer comments and opinions.

**Products:** Modeling results and recommendations.

#### **Task 7: Technical Memoranda**

**Approach:** The PMO will prepare technical memoranda (TM) documenting the modeling and the analyses and evaluation requested by GWA. The TMs will be submitted to GWA for review and comment. At a minimum, the TMs will include the following:

- Description of the flow metering;
- Description of the model update including the modeling methodology and assumptions;
- Description of the model analyses and findings;
- Recommended improvement projects;
- Figures, including maps and graphs, to support the findings and recommendations; and
- Other supporting documentation.

**PMO Team Responsibilities:** The PMO will develop the TMs. The PMO will also submit the updated model to GWA's designated person responsible for the model.

**GWA Responsibilities:** GWA staff will be required to review and comment on the TMs.

**Products:** Draft and final TMs.

#### **Task 8: Hydraulic Model Training**

**Approach:** The latest GWA wastewater collection system model will be used for one training class for GWA staff. Training for the class will occur on Guam or by teleconference based on GWA's needs. The model may be shared with other Engineering consultants at the request and approval of GWA. Documentation will be written and provided to authorized Engineering consultants for use of the model. Important user instructions will be discussed by teleconference with said Engineering consultants.

**PMO Team Responsibilities:** Prepare for and provide one training class for GWA.

**GWA Responsibilities:** Provide venue and necessary facilities for training as requested. Provide approvals and directions for consultants desiring to use the updated hydraulic model.

**Products:** Training class.

Guam Waterworks Authority  
Hydraulic Modeling and Training for Wastewater Collection System

**SCHEDULE**

The effort described in this task order will be completed by December 31, 2018.

**BUDGET SUMMARY**

Labor (labor hours – 1,438)	\$288,764
ODC	\$31,600
GRT	\$13,350
<hr/>	
Total	\$333,714

Guam Waterworks Authority  
 Hydraulic Modeling and Training for Wastewater Collection System

**BUDGET DETAILS**

This work order will be performed on a time and materials basis, and will not exceed \$333,714 without written consent from GWA.

<b>Labor</b>				
<b>Name</b>	<b>Labor Code</b>	<b>Labor Rate</b>	<b>Hours</b>	<b>Amount</b>
Chang	L	\$ 270	86	\$ 23,220
Liechty	M	\$ 270	12	\$ 3,240
Poppe	J	\$ 218	100	\$ 21,800
Fugal	J	\$ 260	404	\$ 105,040
Engineer II	F	\$ 166	684	\$113,544
Bourke	E	\$ 130	92	\$ 11,960
Tamai	F	\$ 166	60	\$ 9,960
Labor Subtotal			1,438	\$288,764
<b>Other Direct Costs</b>				
<b>Description</b>				<b>Amount</b>
Airfare \$3000 (x6) from Mainland				\$18,000
Rental Car \$75/day (40 days)				\$3,000
Per Diem \$250/day (40 days)				\$10,000
Training Materials				\$600
ODC Subtotal				\$31,600
<b>Total Work Authorization Estimate</b>				
			Labor Subtotal	\$288,764
			ODC Subtotal	\$31,600
			GRT (4.167%)	\$13,350
			Total	\$333,714

Guam Waterworks Authority  
Southern Guam Water Supply Study

**TO:** Brown and Caldwell  
414 W. Soledad Ave.  
Suite 602  
Hagatna, Guam 96910

**WORK AUTHORIZATION NO.:** 2017-06

**SUBMITTAL DATE:** August 21, 2017

**FROM:** Miguel C. Bordallo, P.E.  
GENERAL MANAGER  
GUAM WATERWORKS AUTHORITY


You are hereby authorized to perform the services described below in accordance with the Contract for Technical and Professional Services executed February 6, 2012 between Brown and Caldwell (BC) and Guam Waterworks Authority (GWA) for Program Management Services, GPA-RFP-11-005.

**DESCRIPTION OF WORK AND FEE ESTIMATES**

**DESCRIPTION:** Southern Guam Water Supply Study

Defined cost, scope, and schedule on a time and materials basis are provided below and consist of providing engineering and technical support for the Southern Guam Water Supply Study.

NOT TO EXCEED amount: **\$ 468,251**

Signed  Date August 31, 2017  
RAYMOND N. MATASCI  
SR. VICE PRESIDENT/PROGRAM MANAGER  
BROWN AND CALDWELL

GWA Reviewer: \_\_\_\_\_ Date \_\_\_\_\_  
THOMAS F. CRUZ, P.E.  
CHIEF ENGINEER

Signed \_\_\_\_\_ Date \_\_\_\_\_  
MIGUEL C. BORDALLO, P.E.  
GENERAL MANAGER  
GUAM WATERWORKS AUTHORITY



**WORK AUTHORIZATION NO: 2017-06**

**DESCRIPTION:** Southern Guam Water Supply Study

**GWA PROJECT MANAGER:** Thomas F. Cruz, P.E.

**PROJECT BACKGROUND AND OBJECTIVE**

The 2016 GWA Water Master Plan Update (WRMP) identified the need for a Southern Guam Water Supply Study (SGWSS). The capability of GWA to provide reliable water to Southern Guam is limited by infrastructure condition, system capacity, inadequate redundancy, restricted access to developed sources, operational issues, excessive system losses, and lack of water-resource policy. Service interruptions are frequent and considered commonplace. At present, the southern system has inadequate transmission and distribution redundancy and does not consistently meet the 1.2 supply-to-demand contingency factor established by the 2010 GWA Potable Water Production Plan to address reliability. An analysis of billing and meter data completed as part of the 2016 WRMP estimates non-revenue water (NRW) at nearly 75% in Southern Guam.

Growing water demands can be met through either increasing system capacity or decreasing demand. Capacity can be added to the Southern Guam system through: development of new surface and/or subsurface water resources; re-development of inactive or abandoned springs, diversions and wells; access to existing private and military sources; purchasing raw or treated water from the Navy's Fena reservoir; or transporting water from the Northern Guam Lens Aquifer well network. Significant decreases in water demand can be achieved through the reduction of non-revenue water and conservation measures.

The water system in Southern Guam is also subject to deteriorating infrastructure which affects reliability of water supply. The dead end, single-line transmission configuration and sole reliance on treated water produced by the Ugum surface water treatment plant (SWTP) makes the system particularly vulnerable to service interruptions. System redundancy and reliability can be increased by alternatives such as looping the system, increasing storage and developing new sources, especially as variations in weather and climate impact raw water source supply and quality.

All options will involve capital investment, and the formalization of GWA water supply policy to justify expenditures. The SGWSS will examine options to increase the quantity and reliability of water supply to Southern Guam. Project components will include:

- Analysis of historical water sources and evaluation of the development or re-development of southern springs, ground and surface water resources.
- Impact of transporting water from central or northern Guam including the ongoing analysis for "closing the loop" from Agat to Umatac.

Guam Waterworks Authority  
Southern Guam Water Supply Study

- Impact of water loss control efforts and strategic raw/treated water storage on supply and distribution.
- Analysis of alternate sources to supply water to the Ugum SWTP with the intent of maximizing Ugum production capabilities.
- Feasibility study for the long-term utilization of Fena Reservoir to supply treated and/or raw water to GWA.
- Suggestions for contingency planning in Southern Guam, including 1.2 supply-to-demand capability for system resilience.
- Business case evaluation and planning-level cost estimates for the recommended approach(es).

The end product of this study will be a roadmap and implementable plan for the reliable provision of enough quality potable water to Southern Guam over the planning horizon in compliance with Guam Safe Drinking Water Regulations.

### **SCOPE OF WORK**

This work authorization will be performed by the Brown and Caldwell Program Management Office (PMO) Team. This scope outlines the overall PMO Team scope, schedule, and budget.

#### **Task 1: Task Management**

**Approach:** GWA PMO staff will manage the scope, schedule, and budget associated with the work described in this Work Authorization to ensure that this work is managed in a manner that meets the intent of the GWA PMO Program Management Plan. This includes, but is not limited to, management of documents, change, risk, and quality assurance and quality control.

**PMO Team Responsibilities:** PMO staff will manage the scope, schedule, and budget. The PMO will manage tasks in this Work Authorization in accordance with the protocols set forth in the GWA PMO Program Management Plan.

**GWA Responsibilities:** GWA staff will attend meetings, review progress reports, and adhere to the protocols set forth in the GWA PMO Program Management Plan.

#### **Task 2: Existing Conditions**

**Approach:** The PMO Team will review applicable studies, reports, plans, data, and recent evaluations relevant to the water supply in Southern Guam. The PMO Team Leader and key team members will conduct a kickoff meeting on Guam to develop goals for the Southern Guam Water Supply Study (SGWSS) in conjunction with GWA.

The PMO Team will review the Southern Guam service areas, island population projections,

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Southern Guam Water Supply Study

potential development plans, and the island general plan as envisioned by the Guam Visitors Bureau, Guam Economic Development Authority, Comprehensive Economic Development Strategy (CEDS) and the Department of Land Management. A planning period will be established and approved by GWA. The PMO Team will develop demand projections for the planning period, updating the development and demand information outlined in the GWA 2017 Water Resources Master Plan Update (WRMPU).

Initial interviews will be carried out with GWA staff familiar with historic and current operation of the water supply system in Southern Guam to capture institutional knowledge regarding:

- Service interruption frequency and cause.
- Operational issues.
- Challenges to supplying water to the area.
- Underlying causes for elevated non-revenue water loss levels.
- Source water quality issues.

It is anticipated that as part of this phase meetings with key stakeholders in each Southern Guam community will be held to:

- Acquire historical data and anecdotal information to supplement the desktop literature review.
- Identify and access potential and historic water source site locations.
- Capture level of service issues and impacts at the community level.
- Determine the extent of private water supply available and utilized.

Input from other territorial stakeholders such as Guam EPA, the Navy and WERI will be sought.

Issues specific to or affecting water supply in Southern Guam will be identified during this task and may include:

- Water rights.
- Impact due to variations in weather and climate.
- Economic development.
- Watershed protection.
- Water quality.
- Security of supply.
- System redundancy.
- System resilience.
- Water policy and regulations.

A strategic planning workshop will be conducted to develop and formalize GWA water policy as it relates to Southern Guam. Workshop topics may include: establishing quantifiable goals for levels of service, environmental protection, economic development, pursuit of Fena resources as part of the OneGuam initiative, system reliability, and redundancy, contingency planning, and supply-to-demand ratio, as applicable.

The work effort will be documented in a TM for review and comment by GWA.

**PMO Team Responsibilities:** Request and review information, conduct kickoff meeting and site visits, conduct GWA in-house and community stakeholder interviews. Organize strategic planning workshop. Refine 2017 WRMPU demand and development projections. Produce TM.

**GWA Responsibilities:** Provide data as required. Attend kickoff meeting and strategic planning workshop. Participate in in-house interviews. Initiate contact with community stakeholders and attend stakeholder interviews, as needed. Facilitate access to existing and potential source water supply sites. TM review and comment.

**Products:** TM summarizing work effort and results.

### **Task 3: Identify and Develop Alternatives**

#### **3.1 Raw Water Supply and Storage Alternatives**

**Approach:** The purpose of this phase is to identify and assess options to increase source water supply and raw water storage. The following project categories will be evaluated as applicable:

- Status quo – existing surface water and spring sources currently utilized by GWA.
- Enhanced status quo – options which add production or increase water quality using existing GWA sources (such as adding supply or raw water storage to the Ugum Surface Water Treatment Plant) or acquiring sources currently in use by private owners for irrigation, industrial, and potable water supply.
- Rehabilitation options – rehabilitating previously utilized sources (including Asan, Laelae, Silgin and Atlague springs, the Geus dam and Malojloj wells and others identified as part of the investigative work completed in Task 2).
- Renewal or new source options – developing new or re-developing long-abandoned wells, diversions, reservoirs, and spring sources (such as Laolao river, Fintasa falls, the abandoned Ylig treatment plant, and diversions at the Talofoto, and Tolaeyuus rivers).
- Navy water options – investigating the feasibility of the Fena Reservoir to supply raw water and/or continue to supply treated water to GWA.

The options will be ranked using a weighted matrix screening method, and GIS-based maps indicating source location and storage inundation areas, as applicable. For each potential new or rehabilitated supply source, yield will be estimated, and the impact of adding the supply to the system will be analyzed.

Preliminary water quality sampling and analysis may be required to further determine suitability of sources for treatment. The PMO Team will develop a schedule of sampling and analysis requirements as part of this task as needed. Sample collection and analysis are not included in this WA.

### 3.2 Water Treatment Options

**Approach:** The purpose of this phase is to identify the water treatment requirements for sources identified in Task 3.1.

Surface water diversions, springs, and ground water well sources will require different treatment processes based on contaminant levels, physical characteristics, and whether the groundwater source is considered Groundwater under the Direct Influence of Surface Water (GWUDI).

Available hydrogeologic and water quality data will be analyzed for up to five options from Task 3.1 to determine the likelihood of any groundwater sources (wells, springs, and infiltration galleries) being designated as GWUDI.

Any new surface water or potential GWUDI-designated groundwater sources will need to be treated to meet Guam Primary and Secondary Safe Drinking Water Regulations, up to and including Long Term 2 Enhanced Surface Water Treatment Rule, Stage 2 Disinfection Byproducts Rule, Revised Ground Water Rule, and Revised Total Coliform Rule, as applicable.

Water treatment will be investigated for the following project categories as applicable:

- Status quo - adequacy of treatment at current facilities (including Ugum, Fena and Santa Rita spring).
- Rehabilitation options – treatment upgrades necessary to bring developed GWA sources not currently producing water into the system (including Asan spring and Malojloj wells) online.
- New treatment options - treatment of new or abandoned sources to meet current Guam Primary and Secondary Safe Drinking Water Regulations.

Potential new sources may need to undergo preliminary water quality sampling and analysis to assist in the determination of treatment requirements at a planning level. In addition to characteristics such as turbidity, hardness, alkalinity, odor, pH, and conductivity, the analysis may include testing for microorganisms (including pathogens), inorganic contaminants, pesticides and herbicides, organic contaminants, and radioactive contaminants. GWA staff and laboratory facilities will be utilized as much as practicable for the water quality sampling and analyses. Should collection and testing requirements exceed the expertise or manpower of GWA resources, this work will be undertaken by a subconsultant. Sample collection and analysis are not included in this WA.

As part of this phase, the cost of power, chemicals, labor, and other operations and maintenance and capital data will be analyzed to determine the current “per gallon” cost of production from treatment facilities owned and/or operated by GWA including Ugum, Santa Rita Spring, and wells in the north. The history of water purchased from the Navy will be investigated including contractual conditions, rates, and the potential to integrate treatment facilities in accordance with the OneGuam Framework for an Integrated Water System for Guam.

Planning-level treatment options and conceptual process layouts will be presented for up to five options. GIS-based location and conceptual figures will be created to illustrate the options.

### 3.3 Water Transmission, Storage and Distribution Alternatives

**Approach:** The purpose of this phase is to identify and assess improvements to the distribution, pumping and treated water storage systems that will positively impact water supply in southern Guam. The following topics will be studied:

- System-wide cost of water transmission in terms of \$/gal-mi.
- Non-revenue water and water loss control measures.
- Impact of potential new sources on pipe and pump capacity.
- Completion of pipeline, pump station and storage upgrades, replacement and rehabilitation as outlined in the 2016 WRMP update.
- “Closing the loop” between Agat and Umatac.
- Adding treated water storage to increase system reliability, resilience, and redundancy.
- Partially looping/twinning the transmission system to increase system reliability, resilience, and redundancy.
- Transmission from the north.

### 3.4 Modelling

Scenarios will be added to the current GWA hydraulic model, at locations where sufficient calibrated data exists and where feasible, to examine overall system impact of options identified in Tasks 3.1, 3.2, and 3.3.

Projected demand over the planning period will be combined with potential system enhancements including NRW reduction, addition of new raw or treated water storage, pipeline realignment, pumping from the north, looping, and addition of new water sources. It is anticipated that this phase will be completed by the PMO Team with GWA support.

**PMO Team Responsibilities:** Prepare weighted screening ranking for Task 3.1. Produce supplementary sampling requirements. Model storage, transmission and source options. Create GIS-based location maps and conceptual level treatment process drawings. Produce TM.

**GWA Responsibilities:** Provide data as required. Provide staff and laboratory facilities for water quality collection, sampling, and analyses. Assist with modelling efforts. TM review and comment.

**Products:** TM summarizing work effort and results of Tasks 3.1, 3.2, 3.3, and 3.4.

#### **Task 4: Recommended Water Supply Strategy**

##### **4.1 Fatal Flaw Analysis**

**Approach:** The purpose of this phase is to summarize and combine as applicable the options identified in Task 3 and subject them to analysis at a fatal flaw level. This will reduce the number of viable conceptual alternatives, justifiably dismissing those that are not feasible, are clearly inferior in comparison to other alternatives, or otherwise do not satisfy the SGWSS goals. The general approach will be:

- Determine methodology and objectives for the analysis.
- Establish evaluation criteria.
- Conduct an iterative fatal flaw screening process.

##### **4.2 Business Case Evaluation**

**Approach:** The conceptual alternatives that pass the fatal flaw analysis will be brought forward to be evaluated in greater detail.

Business case evaluations (BCE) will be conducted to compare alternatives and develop the recommended approach. The recommended approach(es) will be supplemented with descriptions and conceptual drawings. As necessary, workshops will be conducted to establish BCE criteria and present recommended approach(es) in conjunction with GWA.

##### **4.3 Planning Level Cost Estimates**

**Approach:** The PMO Team will develop planning-level (ASTM E2516-11 Level 5) cost estimates for alternatives that survive the fatal flaw analysis. Capital, O&M, and lifecycle cost projections will be developed, and project implementation schedules will be generated. The estimates may include rough costs for land acquisition and permitting as applicable.

**PMO Team Responsibilities:** Develop and combine alternatives. Conduct fatal flaw analysis. Conduct BCE workshops and complete BCEs. Prepare recommended approach evaluations and recommendations. Prepare cost estimates. Produce TM.

**GWA Responsibilities:** Supply information as requested. Participate in BCE workshops. TM review and comment.

**Products:** TM summarizing work effort and results of Tasks 4.1, 4.2, 4.3.

#### **Task 5: Report**

**Approach:** The TMs developed during Task 2 through 4 work efforts will be combined and consolidated into one report.

**PMO Team Responsibilities:** Prepare draft and final Southern Guam Water Supply Study reports.

Guam Waterworks Authority  
Southern Guam Water Supply Study

**GWA Responsibilities:** Draft and final Southern Guam Water Supply Study reports review and comment.

**Products:** Draft and final Southern Guam Water Supply Study reports.

**ASSUMPTIONS:**

- Public outreach is not included in this work.
- Detailed field-level geotechnical, surveying, and hydrological investigations are not included in this work.
- It is assumed that proposed capacity and condition CIP projects relevant to the Southern Guam water supply (as outlined in the 2017 WRMPU) will be implemented.
- Sample collection and analysis are not included in this WA.

**SCHEDULE**

The PMO Team would be able to commence work immediately upon receiving a written Notice to Proceed (NTP). The scope of services described in this work authorization is expected to be completed within 12 months after NTP.

**BUDGET SUMMARY**

Labor (Labor Hours – 2,032)	\$426,520
ODC	\$23,275
GRT	\$18,747
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Total	\$468,642



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Guam Waterworks Authority  
 Southern Guam Water Supply Study

**BUDGET DETAILS**

This work order will be performed on a time and materials basis, and will not exceed \$468,642 without written consent from GWA.

<b>Labor</b>				
<b>Name</b>	<b>Labor Code</b>	<b>Labor Rate</b>	<b>Hours</b>	<b>Amount</b>
Chang	L	\$270	24	\$6,480
Matasci	N	\$270	12	\$3,240
Bilz	K	\$260	96	\$24,960
Engineer II	F	\$151	640	\$96,640
Senior Specialist	L	\$270	280	\$75,600
Worster	J	\$250	120	\$30,000
Faisst	M	\$270	120	\$32,400
Fugal	K	\$260	100	\$26,000
Sorensen	I	\$218	480	\$104,640
Tamai	G	\$166	160	\$26,560
Labor Subtotal			2032	\$426,520
<b>Other Direct Costs</b>				
<b>Description</b>				<b>Amount</b>
Airfare \$3000 (x2) from US Mainland				\$6,000
Airfare \$2000 (x3) from Hawaii				\$6,000
Rental Car \$75/day (35 days)				\$2,625
Per Diem \$250/day (35 days)				\$8,750
ODC Subtotal				\$23,375
<b>Total Work Authorization Estimate</b>				
Labor Subtotal				\$426,520
ODC Subtotal				\$23,375
GRT (4.167%)				\$18,747
Total				\$468,642

# EXHIBIT "C" (1 of 1)

