



CITY OF SANTA BARBARA

COUNCIL AGENDA REPORT

AGENDA DATE: March 15, 2011

TO: Mayor and Councilmembers

FROM: Engineering Division, Public Works Department

SUBJECT: Increase In Design Services For Influent Pump Replacement Project

RECOMMENDATION:

That Council authorize an increase in the extra services amount with Brown & Caldwell for extra design work for the Influent Pump Replacement Project (Project) at El Estero Wastewater Treatment Plant (EEWWTP), Contract No. 23,247, in the amount of \$60,253, for a total project expenditure authority of \$339,872.

BACKGROUND:

The EEWWTP Influent Pumps move an average of eight million gallons per day of wastewater. The pumps are capable of handling wet weather flows in excess of thirty million gallons per day. Three of the existing pumps were installed in the 1970s, and a fourth pump was installed in 2006.

On December 8, 2009, Council authorized a Professional Services Contract with Brown and Caldwell in the amount of \$254,119 for design services and up to \$25,500 for extra services. The authorized design services are for pump replacement plans and specifications, ventilation improvements to the wet well and headworks area, and bid support.

DISCUSSION:

The proposed \$60,253 added work is necessary for gathering additional information on the flow into the plant and making design modifications as necessary, fan and duct replacement design, and an electrical assessment of an existing 900 kilowatt emergency backup generator. Staff recommends maintaining the original extra services amount of \$25,500 to address any issues that may arise in the original design work.

Staff recommends the current contract be increased to cover the out-of-scope work, and any remaining funds in the extra services at the end of the Project design be returned to the fund to cover construction.

BUDGET/FINANCIAL INFORMATION:

FUNDING

There are sufficient funds in the Wastewater Bond Fund for replacement and upgrades of the influent pumps and supporting equipment.

The following summarizes the expenditures recommended in this report:

PROJECT DESIGN SERVICES CONTRACT FUNDING SUMMARY

	Base Contract	Extra Services	Total
Initial Contract Amount	\$254,119	\$25,500	\$279,619
Proposed Increase	\$0	\$60,253	\$60,253
Total	\$254,119	\$85,753	\$339,872

The following summarizes all Project design costs, construction contract funding, and other Project costs.

ESTIMATED TOTAL PROJECT COST

**Cents have been rounded to the nearest dollar in this table.*

Design		
Design (by Contract) (including this increase)		\$339,872
Design Management (by City Staff)		\$90,000
	Subtotal	\$429,872
Construction	Subtotal	\$2,504,000
	Project Total	\$2,933,872

If the recommendation is approved, the total design services contract expenditure authority will be increased to \$339,870.

There are sufficient appropriated funds in the Wastewater Capital Program to cover design.

ATTACHMENT): Brown and Caldwell Fee Estimate

PREPARED BY: Joshua Haggmark, Principal Civil Engineer/JW/sk

SUBMITTED BY: Christine F. Andersen, Public Works Director

APPROVED BY: City Administrator's Office

18200, Von Karman Ave, Suite 400
Irvine, California 92612
Tel: 714-730-7600
Fax: 714-734-0940
www.brownandcaldwell.com

February 15, 2011

Brown AND
Caldwell

Mr. James Winslow, P.E.
Supervising Civil Engineer
City of Santa Barbara
Public Works Department, Water Resources Division
Post Office Box 1990
Santa Barbara, California 93102

1012/071391.015

Subject: Fee Proposal for Miscellaneous Engineering Services at El Estero Wastewater Treatment Plant Influent Pump Station

Dear Mr. Winslow:

Per the City's request, we are pleased to submit our fee proposal for additional engineering services at the El Estero Wastewater Treatment Plant (EEWWTP) Influent Pump Station (IPS). The scope of services to be performed is presented below.

Scope of Work

Task 230 – Fan and Duct Replacement

The scope of this task is two-folds: to produce a separate bid package for HVAC fan replacement, and to replace all existing duct work in the IPS.

The HVAC fan replacement work package will include specs and rough cost estimate for the replacement of four HVAC fans in the IPS. The intention is for the City to replace the fans in an expedited fashion and separately from the IPS replacement project in order to bring the IPS to compliance.

The replacement of all duct work in the IPS will be included in the design package for the IPS rehabilitation design. Drawings will be a combination of photos and simplified plans and section views. Since the as-built drawings of the existing ductwork are not in CAD format, they will be of limited usefulness in creating new drawings. It is assumed that a site visit is not needed for this task. Pictures can be taken during other site visits either during the flow testing (see below) or under the Aeration Basin project.

Task 240– 900 kW Generator Review

The City is considering replacing the existing 900 kW generator which serves to provide back-up power to the EEWWTP IPS. The objective of this task is to determine all electric loads (including future loads related to the IPS project) the new generator would need to supply. The fee estimate assumes that a site visit is needed in order to accurately determine all loads supplied by the Emergency Generator. During the site visit, a City representative shall be available to accompany BC personnel. The deliverable will be a generator sizing and load summary calculation along with a brief report summarizing BC's recommendations. The scope/fee does not include any condition assessment related to the existing Emergency Generator and transfer System, nor does it include any design effort related to the Emergency Generator and transfer System.

Task 250 – Flow Testing (Co-locate Flow Meters)

The goal of this study is to collect reliable direct flow measurements by using clamp-on transit-time flow meters for comparison with the confluent meter. The clamp-on meters will be installed near the top of the influent pump discharge risers before entering the discharge manifold. These locations are presumably more hydraulically suitable for accurate flow measurements than on the manifold itself. Three flow meters will be used to allow recording of total flow from the first three pumps simultaneously so that the same total flow passing through the confluent meter can be measured at the same time. The tests will be performed over a wide range of flows with one to three pumps operating. Data-logging devices will be used with the clamp-on flow meters and the output signal from the confluent meter to better average high frequency measurements and synchronize readings. Testing will also include direct comparison of readings of the same flow with all three clamp-on meters, plus tests for transducer positioning configuration on the flow readings. The testing will be performed over a two-day period with two people, plus preparation, equipment rental, data processing and report preparation.

- **Subtask 001** – Coordination/Study Plan
- **Subtask 002** – Pre-field Preparation/Mobilization
- **Subtask 003** – Confluent Flow Meter Testing
- **Subtask 004** – Data Process
- **Subtask 005** – Report

Task 250 – (NOT USED)

Task 270 – Redesign after Flow Testing

The results of the flow testing will affect work previously done as part of the IPS pre-design and design work. This task includes the following work:

- **Subtask 001** – Amendment to PDR. The objective of this task is to update the pre-design report (PDR) based on the results of the flow testing. Design values will be updated to reflect newly calibrated flow values. New pump and system curves will be developed. We will work with pump vendors to determine new pump selections to fit the new operating conditions. This work will be summarized in a letter to the City to be added as an attachment to the PDR.
- **Subtask 002** – The expected outcome of the flow testing will result in the minimum flow being lower which will likely require specifying four new pumps with different operating conditions. The original design intent was to reuse two of the existing motors for the two low flow pumps. This will have to be verified with smaller low flow pumps. Project specification sections 11040 and 11305 will likely be updated. Depending on the size of the new pumps, P&ID and mechanical drawings may need to be updated to reflect the newly selected pumps and possible pipe size changes.

While an estimate of labor hours has been included in this fee proposal for the redesign work resulting from the flow testing, our estimate could be somewhat inaccurate depending on the results of the flow testing. We propose that the scope and fee for this change-order work be evaluated after the flow testing. This change in scope can be performed as an Extra Service, which has an allowance of \$25,500.

Flow Testing Discussion

Clamp-on flow meters can be very tricky to get to operate properly. They are heavily dependent upon proper installation from a hydraulic and physical placement consideration. The two considerations can mask issues with the other. We feel that we have identified an appropriate location to address the hydraulic placement consideration. Other main factors in the physical installation concern the condition of the pipe materials themselves. Clamp-on meters require specific geometric placement of the sensors on the exterior of the pipe. They also require that the sensors fully contact the exterior pipe wall which may require some prep work such as limited grinding in order to provide smoothed contact surfaces. For most clamp-on meters to work properly one must know the exact specs on the pipe the meter is installed on. Additionally, the internal structural condition of the pipe must be known or otherwise estimated. The pipe materials are usually assumed to be in like-new condition, clean, and free of material buildup or accumulation. These conditions can potentially impact the clamp-on meters ability to obtain accurate data rather than random number generation that is not representative of the flow. However, when performed with care, the results from clamp-on testing would be potentially accurate within a few percent.

Fee Estimate

Brown and Caldwell's proposed fee for conducting the work described above is summarized in the following table. The detailed fee estimated is included in Exhibit A.

Phase	Description	Total Labor Hours	Total Effort
230	Fan and Duct Replacement	90	\$14,305
240	900 kW Generator Review	30	\$3,991
250	Flow Testing (Co-locate Flow Meters)	124	\$26,049
260	(NOT USED)	0	\$0
270	Redesign after Flow Testing	95	\$15,908
TOTAL (with Flow Testing Option 1)			\$60,253

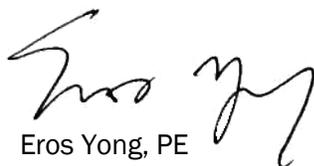
Schedule

The project schedule will be updated after this fee proposal has been accepted.

If you have any questions about our proposal, please contact me at (714) 689-4864.

Very truly yours,

Brown and Caldwell



Eros Yong, PE
Project Manager

Enclosure (1)

Exhibit A: Brown and Caldwell Fee Estimate

Santa Barbara, City of (CA) -- El Estero Pump Station Design

Phase	Phase Description	Yong, Eros Y	Fisher, Leslie D	Jones, Garr M	Anderson, M. Michael	Shadan, Farshid F	Lozano, Erick	Cilic, FN	George, Alfred H	Parr, Scott M	Ennis, Renee C	McDonald, Rhys	Wahlberg, Eric J	White, Kevin A	Hansen, Aren C	Wolstenholme, Philip	Total Labor Hours	Total Labor Effort	APC	Airfare	Lodging and Food	Other Travel	Supplies	Total ODCs	Company Vehicles	Equipment	Total Unit Pricing Effort	Total Expense Effort	Total Effort	
230	Fan and Duct Replacement	4	2	0	0	0	0	0	40	36	4	0	0	0	0	4	90	\$ 13,765	\$ 540	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 540	\$ 14,305
****	Default Task	4	2	0	0	0	0	0	40	36	4	0	0	0	0	4	90	\$ 13,765	\$ 540	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 540	\$ 14,305
240	900 kW Generator Review	0	0	0	0	2	28	0	0	0	0	0	0	0	0	0	30	\$ 3,811	\$ 180	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 180	\$ 3,991	
****	Default Task	0	0	0	0	2	28	0	0	0	0	0	0	0	0	0	30	3,811	180	0	0	0	0	0	0	0	0	\$ 180	\$ 3,991	
250	Flow Testing (Colocate Flow Meters)	14	0	0	0	0	0	0	0	0	13	89	4	4	0	0	124	\$ 20,200	\$ 744	\$ 350	\$ 525	\$ 270	\$ 1,200	\$ 2,345	\$ -	\$ 2,760	\$ 2,760	\$ 5,849	\$ 26,049	
001	Coordination/Study Plan	7	0	0	0	0	0	0	0	0	5	11	1	0	0	0	24	\$ 3,783	\$ 144	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 144	\$ 3,927
002	Pre-Field Prep/Mobilization	2	0	0	0	0	0	0	0	0	0	26	0	0	0	0	28	\$ 4,772	\$ 168	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 168	\$ 4,940	
003	Confluent Flow Meter Testing	0	0	0	0	0	0	0	0	0	0	18	0	0	0	0	18	\$ 3,077	\$ 108	\$ 350	\$ 525	\$ 270	\$ 1,200	\$ 2,345	\$ -	\$ 2,760	\$ 2,760	\$ 5,213	\$ 8,290	
004	Data Process	0	0	0	0	0	0	0	0	0	0	16	0	4	0	0	20	\$ 3,094	\$ 120	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 120	\$ 3,214	
005	Report	5	0	0	0	0	0	0	0	0	8	18	3	0	0	0	34	\$ 5,475	\$ 204	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 204	\$ 5,679	
260	NOT USED	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
270	Redesign after Flow Testing	8	0	16	16	0	0	44	8	0	3	0	0	0	0	0	95	\$ 15,338	\$ 570	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 570	\$ 15,908	
001	Amendment to PDR	4	0	8	8	0	0	24	0	0	3	0	0	0	0	0	47	\$ 7,473	\$ 282	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 282	\$ 7,755	
002	Redesign	4	0	8	8	0	0	20	8	0	0	0	0	0	0	0	48	\$ 7,865	\$ 288	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 288	\$ 8,153	
GRAND TOTAL		26	2	16	16	2	28	44	48	36	20	89	4	4	0	4	339	\$ 53,114	\$ 2,034	\$ 350	\$ 525	\$ 270	\$ 1,200	\$ 2,345	\$ -	\$ 2,760	\$ 2,760	\$ 7,139	\$ 60,253	