



## AGENDA REPORT

SAN CLEMENTE CITY COUNCIL MEETING  
Meeting Date: May 7, 2013

Agenda Item 6E  
Approvals:  
City Manager RJS  
Dept. Head WAL  
Attorney \_\_\_\_\_  
Finance J...

**Department:** Public Works / Engineering Division  
**Prepared By:** Ken Knatz, Principal Civil Engineer

**Subject:** *AWARD OF PROFESSIONAL SERVICES AGREEMENT TO PACIFIC ADVANCED CIVIL ENGINEERING FOR PROGRESSIVE CAVITY PUMP REPLACEMENT, PROJECT NO. 23202.*

**Fiscal Impact:** None. The project was budgeted for \$500,000 from the Sewer Fund Depreciation Reserve.

**Summary:** Staff recommends that the City Council approve a contract with Pacific Advanced Civil Engineering (PACE) in the amount of \$70,193. The purpose of the Agreement is to provide professional engineering services to replace progressive cavity pumps at the Water Reclamation Plant.

**Background:** The Water Reclamation Plant (WRP) is equipped with eight progressive cavity pumps that convey the solid sludge waste stream through the treatment process. The pumps are from a German manufacturer who is no longer in business and were installed in the early 1990s as part of the plant expansion. There is currently no support or availability of spare parts for the pumps. Maintaining operation of the pumps is becoming more challenging as the pumps are reaching the end of their useful life.

**Discussion:** Due to the importance of the pumps to the treatment process, it is vital that the pumps be replaced. To provide engineering services for the project, staff prepared and distributed a request for proposal to seven firms with wastewater treatment plant design experience. Proposals were received from two firms: PACE and URS. The professional services fees for design engineering and engineering construction support ranged from \$70,193 to \$143,680. Engineering and Utilities Division staff evaluated the proposals and recommend that Pacific Advanced Civil Engineering be selected to perform the work. Although PACE's proposal in the amount of \$70,193 is significantly less costly, the scope of work includes additional services that were not offered by URS. The services include system automation and process performance improvements that will improve plant efficiency and yield power savings through fine tuning of controls programming. Also, PACE will process an SDG&E rebate for a one-time incentive based on the power consumption reduction between the existing and selected pumps at final installation through field testing by SDG&E.

**Recommended**

**Action:** STAFF RECOMMENDS THAT the City Council approve and authorize the Mayor to execute a Professional Services Agreement with Pacific Advanced Civil Engineering in the amount of \$70,193 for the Progressive Cavity Pump Replacement, Project No. 23202

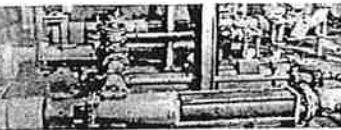
**Attachments:** 1. Location Map  
2. Scope of Work

**Notification:** None.

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## SECTION II – METHODOLOGY

In order to meet the objectives of this project, PACE will provide a cohesive team of engineers and operators with extensive experience in the evaluation and upgrade of existing sludge pumping and control systems, including local, hands-on knowledge of the latest pump technology and its application to the City's current issues. We will meet the challenges head-on by involving the City's Operation and Maintenance staff early-on and often to not only make sure the major components of the project are improved, but also the "ancillary" items that just plain "nag" at the daily operations of the facility.

### STRATEGY 1

*Involve City Operation and Maintenance staff early and often in the development of the Final Design Plans and Specifications.*

Our team will approach the project using our previous experience in the design, construction and operation of sludge pumping, handling and processing to assist the City in determining the best equipment for the job. We will start by meeting with the City's Operation and Engineering Staff to solidify the project goals and develop target criteria to determine a successful project from the City's point of view. We will study the existing conditions, including the existing pump performance, as-built drawings, construction submittal data, and O&M manuals as well as spend time with the O&M staff to better understand the current challenges and identify ancillary issues which may also be incorporated into the project.

### STRATEGY 2

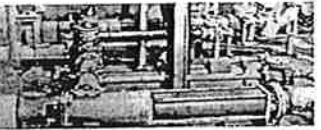
*The design and selection of pumping and drive equipment will be based on maximum durability and reliability through the specification of quality equipment and process specific materials of construction which provide the longest service life under the expected aggressive conditions.*

Based on the knowledge gained from studying the current conditions, we will prepare a Preliminary Design Report which clearly define the direction of the design and will provide a road-map to achieving the City's goals and objectives for the project. The Preliminary Design Report will include detailed analysis of the proposed replacement pumps, VFD controls and potential retrofits to the ancillary piping and instrumentation which reduces maintenance costs while improving process efficiency.

### STRATEGY 3

*Each of the three pumping system designs will be developed as a 3D Model, allowing City Staff and our design team to better visualize the completed installation and quickly identify potential construction and operational conflicts.*

Based on approval of the Technical Memorandum, we will proceed with putting together the Design Plans and Specifications. The design will be developed as a 3-Dimensional Model, allowing City Staff and our design team to better visualize the completed installation and quickly identify potential construction and operational conflicts. From the model, PACE will generate traditional 2-D construction drawings for bid. The drawings will take specific care to identify the preferred sequence of construction as to minimize any impact to current operations of the



ity. This will include step-by-step installation details. Progress drawing sets will be submitted to the City based on 30%, 90% and Final complete milestones and we will meet to review progress and receive comments from Staff at each milestone.

## STRATEGY 4

*Use in-house controls and instrumentation specialists who are well-versed with the plant's control systems to ensure seamless integration of new and old systems.*

A successful project always ends with the lights turning on with the "flick of a switch," as expected. Controls and integration will be a defining component of this project. The City has indicated they have struggled with past projects where the control systems and methodologies were not well thought out or were not consistent or compatible with the existing systems. Using our extensive in-house background in the design, fabrication, programming and calibration of complex PLC and SCADA control system tethered to our direct, "real-world" operational experience of variable speed pumping equipment in clarifier and sludge handling systems, PACE will focus on providing seamless integration of new and old systems.



## SECTION III – WORK PLAN

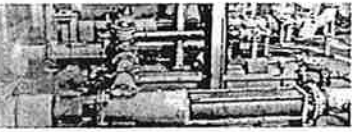
### Scope of Work

Based on the stated objectives of the project and our understanding of the work to be completed, PACE has prepared the following proposed Work Plan broken down by task. All work, with the exception of the electrical/power design, will be completed internally by PACE's staff and managed out of PACE's headquarter office in Fountain Valley. For the electrical design, we have selected to use the IDS Group as a sub-consultant to PACE.

It is our intent to involve the City's Operations and Maintenance personnel in the equipment evaluations and final design of the project. To that end, we anticipate up to four on-site meetings during the design to gather current and historical information on the operation and maintenance of three specific sludge pumping systems. Additionally, we will utilize the existing As-built plans, specifications and O&M manuals for the existing facility from the City's document library.

### Task 10 – Preliminary Design

- PACE shall review the City's three existing sludge pumping systems (Primary Clarifier Pumps, TWAS Pumps and Dewatering Feed Pumps) to determine the current, planned and potential future operational conditions (flow & pressure) required for these systems.
- PACE shall review the existing electrical, instrumentation and control systems and current operational sequences for these systems and identify upgrades which could be part of this project which would reduce operational costs and improve process efficiencies.
- PACE will review the existing mechanical piping and installation configurations of the three pumping systems to identify modifications which would improve equipment access, service and maintenance, as well as reduce energy consumption.
- Based on the operational conditions required, PACE shall identify and evaluate pump manufacturers / pump technologies which would be applicable for the Final Design of the project. The pump manufacturers shall have established service and parts facilities located in the US. Pump systems will be evaluated on applicability to process, materials of construction, durability and reliability when pumping waste sludges.
- Based on the information collected and analyzed, PACE shall prepare a Preliminary Design Report which presents the pump alternatives, proposed layouts and required changes to electrical, instrumentation, control and piping systems that would be required to implement each alternative. The report will identify the capacities and operational conditions required for each pumping system as well as the proposed materials of construction, design and serviceability of the equipment proposed. The Preliminary Design shall present a minimum of three "equal" pump manufacturers indicating how each would be integrated into the existing systems. For each of the alternatives evaluated, PACE shall develop estimated capital and operational costs. Based on the information presented, PACE shall provide a recommendation on the type, capacity, materials and ancillary modifications required to implement the new pumping systems for the three existing processes.
- The Preliminary Design Report shall be submitted to the City for their review. PACE will schedule a meeting with the City Staff to go over the Preliminary Design Report and to finalize the selection of the pumping systems.
- It is our understanding that the City may opt to pre-purchase the pumping equipment prior to awarding a construction contract. If the City chooses to do so, PACE will provide engineering support services to assist the City in procurement of the equipment on a Time & Expense basis.



## Task 20 – Final Design

- Based on the City selected pump alternative and ancillary additional system modifications, PACE shall prepare and submit 60%, 90% and 100% complete Final Design Plans and Specifications for public bid. This work shall include all Civil, Mechanical, Structural, Electrical and Control and Instrumentation design required for the project. The plans and specifications shall be submitted for review by the City at each milestone, with all comments and corrections integrated into the next milestone submittal. PACE shall be available to meet with the City to receive and review comments after each milestone submittal.

The plans shall include the following general sheet arrangement:

- Title Sheet and General Notes
- Demolition and Removal Plan and Details
- Mechanical Plans and Sections for each pumping system
- Mechanical Installation Details
- Structural Modifications and Details
- Electrical Modifications and Details
- Process and Instrumentation Diagrams

The Specifications shall be submitted at the 60%, 90% and 100% milestones and shall incorporate comments and corrections provided by the City review at each milestone. The City shall provide their standard front-end contractual documents, bid forms and preferred construction sequencing which will be incorporated by PACE in the 90% submittal.

- At each of the milestone submittals, PACE shall prepare and submit to the City an Engineer's Estimate of Probable Construction Cost.

## Task 30 – Construction Period Design Support Services

- Pre-Bid and Bid Services**
  - PACE shall attend the City's Pre-Bid meeting and site-walk
  - PACE shall, at the request of the City, assist the City with answering questions and providing clarifications to the Bid Documents during the bid period.
- Contractor Submittal and RFI Review Services**
  - PACE shall provide the services of its engineering staff for the purpose of technical review of Contractor Submittals for conformance with the Final Plans and Specifications. PACE shall also provide engineering staff to respond to Project RFIs and provide, as needed, Supplemental Information and Design during construction. The fee for these services is based on an estimated six submittal packages and 10 RFI requests.
- Construction Progress Meetings and On-Site Services**
  - PACE shall provide the services of its engineering staff for the purpose of attending on-site Construction Progress meetings in support of the City project management team. We anticipate that construction of the proposed improvements will require a total of two months for submittals and on-site installation. Therefore, PACE's involvement will be proposed to be bi-monthly (two per month) meetings for a total of four meetings.
- Final Inspection and Start-up Assistance**
  - PACE shall provide the services of its engineering staff for the purpose of conducting a Substantial Completion Inspection. PACE shall conduct said inspection and provide the City with punch-list of items to be included in the Final Punch-list provided to the contractor.



- b. After Substantial Completion but prior to Final Completion, PACE shall provide start-up assistance to the City and the City's contractor to conduct performance tests, control checks and general guidance with the commissioning of new equipment and controls.
  - c. Upon completion of the Punch-list, PACE shall conduct a Final Inspection and provide a Letter of Final Completion to the City.
- **Preparation of Project O&M and SOP Manual**
    - a. PACE shall review and approve the Contractor provided O&M manuals for all new equipment supplied as part of the project.
    - b. PACE shall coordinate Contractor provided O&M manuals and integrate them into the facilities existing Master O&M Documents.
    - c. PACE shall develop and provide to the City both written and video-based Standard Operating Procedures (SOPs) for the three pumping systems and associated controls and instrumentation. The City shall define the video format required. The SOP manual shall include routine startup, shutdown, inspection and safety procedures as well as emergency operational procedures.

#### Task 40 – Optional Additional Services

- **Process Control Programming / PLC Modifications**
  - a. If so requested, PACE shall provide services as the "City's Integrations Contractor" to provide the services of its Controls and Instrumentation Specialist for the purpose of integration, networking and programming of the new pump controls and instrumentation systems as identified and designed in the Final Plans and Specifications prepared in Task 30. Programming services shall also include re-programming of the existing or new PLC and HMI for operational control sequences to maximize energy efficiency and improve pump performance. These services shall be provided during construction / installation of the new pumping equipment. No PLC, instrumentation or PC hardware or software are included with this task item. PACE has assumed 2 man-days per pumping system to complete the work.
- **SCADA Programming and Visualization**
  - a. If so requested, PACE shall provide services as the "City's Integrations Contractor" to provide the services of its Controls and Instrumentation Specialist for the purpose of programming updates to the City's existing SCADA system to incorporate modifications made to the sludge pumping control systems as identified and designed in the Final Plans and Specifications prepared in Task 30. These services shall be provided during construction / installation of the new pumping equipment. No SCADA, PC or Networking hardware or software are included with this task item. PACE has assumed 2 man-days per pumping system to complete the work.
- **SDG&E Incentive Application Assistance**
  - a. It is anticipated that the project will produce significant improvements in electrical efficiency due to increases in hydraulic efficiency of the pumping equipment and the addition of controls and instrumentation. If so requested, PACE shall provide the City with assistance and engineering analysis required to prepare and submit an application for energy incentives which are available through the State's Public Purpose Program (PPP). These incentives can be used by the City to pay for the pumps, instruments and electrical equipment as well as installation services on the project.



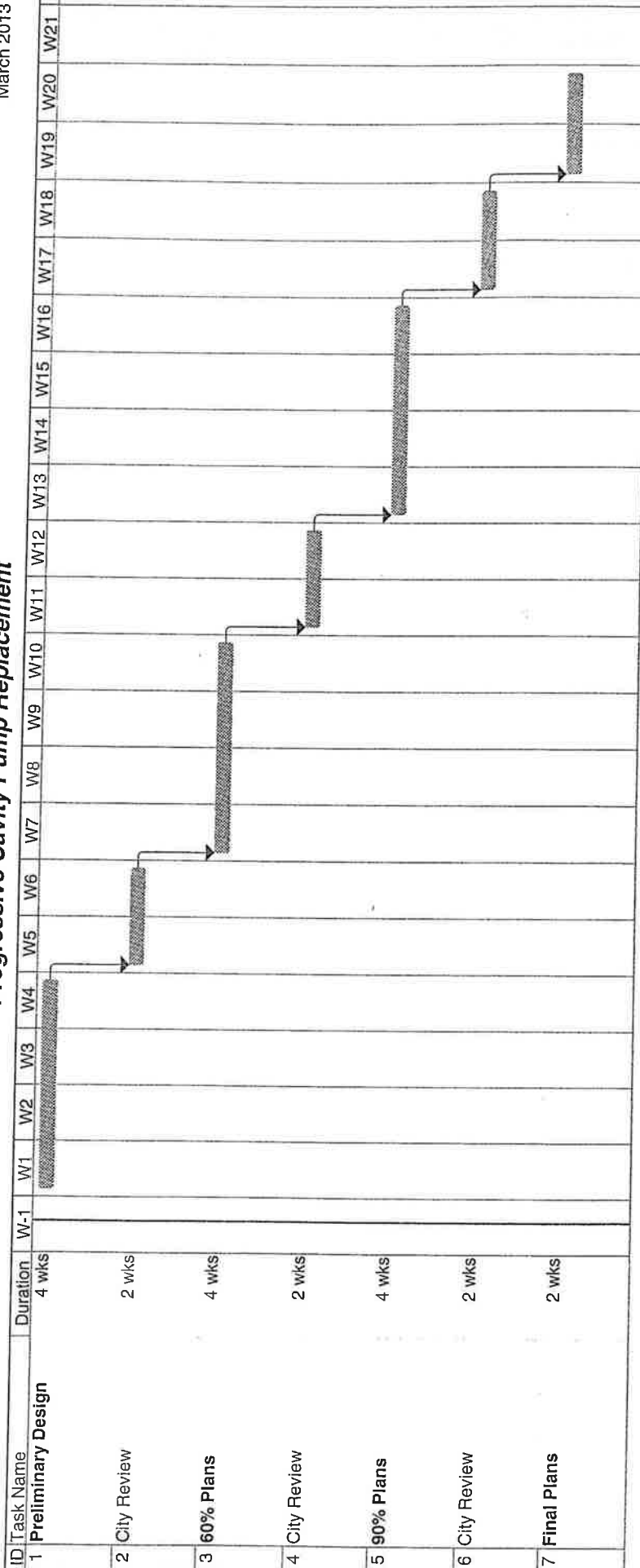
**Contract Deliverables:**

PACE shall include (3) three hard copies and an electronic PDF and Word format files of the following design documents:

- Preliminary Design Report
- Final Design, Plans & Specifications (for each submittal milestone)
- Engineer's Estimate of Probable construction cost (for each submittal milestone)
- Video SOP Manual

# City of San Clemente Progressive Cavity Pump Replacement

PACE Job # A288  
March 2013



<b>Task</b>		Inactive Task	
<b>Split</b>		Inactive Task	
<b>Milestone</b>		Inactive Milestone	
<b>Summary</b>		Inactive Summary	
<b>Project Summary</b>		Manual Task	
<b>External Tasks</b>		Duration-only	
<b>External Milestone</b>		Manual Summary Rollup	

<b>Manual Summary</b>	
<b>Start-only</b>	
<b>Finish-only</b>	
<b>Progress</b>	
<b>Deadline</b>	

Project: San Clemente - Pump Replac  
Date: Thu 3/21/13

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**ENGINEERING FEE ESTIMATE  
PROJECT WORKSHEET**

**Project Data**  
 Project Name: Progressive Cavity Pump  
 Client: City of San Clemente  
 PACE Job Number: A288  
 Estimate Date: March 21, 2013

2013 PACE Hourly Rate Schedule	
Description	Hourly Rate
Principal	\$225
Sr. Proj. Mgr./Sr. Consulting Engr.	\$187
Project Manager/Consulting Engr.	\$177
Sr. Proj. Engr./Sr. Design Engr.	\$156
Proj. Engr./Design Engineer II	\$136
Design Engineer	\$115
Sr. CAD Designer/Sr. GIS Analyst	\$117
CAD Designer/GIS Analyst	\$91
Graphic Designer	\$92
Proj. Coordinator/Admin. Support	\$70
Assistant Designer	\$70
G.P.S. Survey Unit (w/Operator)	\$241
Expert Witness/Legal Consultation	\$350 + Exp.

2013 IDS Hourly Rate Schedule	
Description	Hourly Rate
Principal Electrical Engine	\$175
Sr. Electrical Engineer	\$150

Total Fee Amount: \$51,167

Item No.	Work Item Description	Estimated Manhours											Man-Power Subtotal	Reimburs. Expenses @ 5% of Estm Fee	Total Task Costs	
		Principal Engr.	Sr. Project Manager/Sr. Consulting Engr.	Project Mgr./Consulting Engr.	Sr. Project Engineer/Sr. Design Engr.	Project Engineer / Design Engr. II	Design Engineer	Sr. CAD Designer / Sr. GIS Analyst	CAD Designer / GIS Analyst	Graphic Designer	Proj. Coord / Admin Support	Principal Electrical Engineer				Sr. Electrical Engineer
10	Preliminary Design	\$225	\$187	\$177	\$156	\$136	\$115	\$117	\$91	\$92	\$70	\$75	\$150	\$12,360	\$618	\$12,978
	Preliminary Design Meetings		4			4								\$1,292		
	Review Existing Pump Systems		2			4								\$918		
	Review Existing Electrical, Control & Instrumentation		2		4							2	4	\$1,948		
	Identify Pump Manufacturers & Technologies		2			4								\$918		
	Prepare & Submit Preliminary Design Report	2	2		4	12		16		2	4	2	4	\$6,366		
20	Final Design													\$26,084	\$1,305	\$27,389
	Final Design Meetings		6			6								\$1,838		
	60% Design Plans & Specifications / Eng Estimate	2	4		8	16		24			8	2	8	\$9,540		
	90% Design Plans & Specifications / Eng Estimate	2	4		8	16		24			8	2	8	\$9,540		
	100% Final Design Plans & Specifications / Eng Estimate	2	4		4	8		8			4	2	4	\$5,076		
30	Construction Period Design Support Services													\$10,276	\$514	\$10,790
	Pre-bid and Bid Services		2			4								\$918		
	Contractor Submittal and RFI Review Services		4			12					4	2	4	\$3,610		
	Construction Progress Meetings & On-site Services		2		8	8								\$1,088		
	Final Inspection & Start-up Assistance		2		8	8					2		2	\$1,902		
	Preparation of Project O&M and SOP Manual		2			8				8				\$2,758		
	<b>TOTALS</b>	8	42	0	28	114	0	72	0	10	38	12	34	\$48,730	\$2,437	\$51,167
40	Additional Services (Not Included in Proposal)													\$18,120	\$906	\$19,026
	Process Control Programming / PLC Modifications		4											\$8,236		
	SCADA Programming and Visualization		4											\$8,236		
	SDG&E Incentive Application Assistance					8					8			\$1,648		
	<b>TOTALS</b>	8	50	0	124	122	0	72	0	10	46	12	34	\$66,850	\$3,343	\$70,193

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