

TO: James L. App, City Manager
FROM: Doug Monn, Public Works Director
SUBJECT: Preparation of Bid Documents for Maintenance Work at Wastewater Plant
DATE: July 17, 2007

NEEDS: For the City Council to consider awarding a contract to Carollo Engineers to assist the City in preparing bid documents to perform varied maintenance related projects at the Wastewater Treatment Plant (WWTP).

FACTS:

1. The WWTP was originally constructed in 1954, with expansions in 1971 and 1989. However, many of the original facilities constructed in 1954 are still in use.
2. The facility operates with a nominal rated capacity of 4.9 million gallons per day.
3. To ensure the dependable on-going operation of the plant and to address Regional Water Quality Board suggestions regarding its operation given the age of some of the systems and equipment. Maintenance staff has developed a list of key components at the plant that require repair or replacement to ensure operation of the plant continues in the most efficient and unproblematic manner. These are:

Project #1

Replace the air piping, valves, braces, and supports from the discharge of the existing aerated grit blower to the aerated grit basins. Piping and pipe support materials will be similar to the existing piping system. Clean and recoat the aerated grit basins. As noted on the attached photos, the pipe supports are old and have deteriorated.

Project #2

Replace the aging valve control system in the existing recirculation structure. One of the valves is used to maintain a constant flow to the primary clarifiers by modulating return flow from the primary trickling filters. The second controls the recirculation flow rate over the secondary trickling filters. Both are located in a below ground vault in the existing recirculation structure. These parts were installed in 1989 and need to be updated.

Project #3

Repair spalled concrete at sidewalk, aerated grit basin, and primary clarifier flow split structure.

Project #4

Replace the existing trickling filter distribution mechanism for secondary trickling filter No. 1. Originally installed in 1954 and upgraded in 1971, this mechanism is past its useful life. Design will review alternative mechanisms (hydraulically driven, electrically driven, or pneumatically driven).

Project #5

Rehabilitate the existing trickling filter distribution mechanisms for secondary trickling filter No. 2, and primary trickling filters Nos. 1 and 2. Design will review alternative mechanisms (hydraulically driven, electrically driven, or pneumatically driven).

Project #6

Replace the existing bar screen facilities and provide direct/automated conveyance of screenings to the waste bins. Currently, solids are conveyed manually via wheelbarrows. This method is outdated.

Project #7

Replace the existing chlorine gas disinfection system with a sodium hypochlorite facility. The replacement of the existing gas chlorine system with sodium hypochlorite will

result in a less volatile system addressing concerns expressed by both Cal OSHA and Emergency Service. The conversion project includes installation of new permanent sodium hypochlorite facility immediately south of existing Secondary Clarifier No. 4. The proposed facilities will include:

- Up to three sodium hypochlorite storage tanks (sized to receive weekly delivery of sodium hypochlorite). Tanks will be double contained.
- Two (or three) sodium hypochlorite feed pumps (diaphragm or hose type - to be determined).
- Associated piping to provide sodium hypochlorite to existing disinfection distribution system.
- Demolition of existing chlorine gas facilities including overhead crane, chlorine cylinder trunnions, chlorine injectors and associated piping.
- Replacement of existing ultrasonic effluent flow meter
- Installation of new electrical and instrumentation systems based upon the following assumptions:
 - i) The existing Motor Control Center is adequate to provide electrical service for the new facilities.
 - ii) The upgraded instrumentation and control system will include local manual controls and remote monitoring.
 - iii) The controls for the new facilities will be both residual and flow paced similar to the existing facilities.

Project #8

Provide a dedicated primary scum pump (allowing the existing scum pump to serve as a redundant sludge pump).

Project #9

Install automated vacuum system for screenings and sludge removal from the chlorine contact basin (i.e. sloped floor with drains, mechanical system, etc.).

ANALYSIS &

CONCLUSION:

In 2006, staff issued a Request for Proposal (RFP) to assist staff in preparing bid documents to perform these various maintenance tasks. Carollo Engineers responded to the RFP. Attached is their detailed Scope of Work with a fee of not to exceed \$342,441.

POLICY

REFERENCE:

Capital Improvement Program

FISCAL

IMPACT:

The proposed four year CIP budget beginning FY 2007/2008 includes a budget of \$2,500,000 to upgrade the WWTP facilities (see attached).

OPTIONS:

- a. Authorize the City Manager to award a contract with Carollo Engineers to assist the City in preparing bid documents to perform various maintenance work at the WWTP for a not-to-exceed fee of \$342,441.
- b. Amend, modify, or reject the above option.

Prepared by: Ditas Esperanza, P.E., Capital Projects Engineer

Attachments (3)

- 1) Photos of facilities
- 2) Scope of Work and Fee Proposal
- 3) CIP Budget

EXHIBIT A

City of El Paso de Robles General Improvements Project SCOPE OF SERVICES

BACKGROUND

The City of El Paso Robles de Robles (OWNER) operates a WWTP with a nominal rated design capacity of 4.9 mgd. Current facilities include a headworks facility (pumping/screening/grit removal), primary clarification, four trickling filters (two primary trickling filters and two secondary trickling filters), four secondary clarifiers, disinfection (chlorine gas), solids handling (anaerobic digestion/dewatering), holding ponds, and an effluent stream discharge to the Salinas River. The last major plant expansion, completed in 1989, included the addition of primary clarifiers, trickling filters, secondary clarifiers, a new disinfection system, a chlorine contact basin, and a new anaerobic digester. In 2006, the City also completed construction of a new anaerobic digester and mechanical sludge dewatering facility. Some of the existing facilities still in use at the WWTP were originally constructed in 1954 and upgraded by Carollo Engineers (ENGINEER) during a 1971 plant expansion.

The OWNER has developed a General Improvements Project to repair or replace some of the key components at the WWTP. A description of each the associated design tasks follows.

PROJECT DESIGN ELEMENTS

The primary goal of the project is to prepare design documents based upon a conventional design bid build delivery system to complete the projects identified as part of the General Improvements Project.

The anticipated key project elements include:

1. Replace the air piping, valves, braces, and supports from the discharge of the existing aerated grit blower to the aerated grit basins. Pipe and pipe support materials will be similar to the existing piping system. Clean and recoat the aerated grit basins.
2. Replace the valve control system in the existing structure. One of the valves is used to maintain a constant flow to the primary clarifiers by modulating return flow from the primary trickling filters. The second controls the recirculation flow rate over the secondary trickling filters. Both are located in a belowground vault in the existing recirculation structure.
3. Repair spalled concrete at sidewalk, aerated grit basin, and primary clarifier flow split structure.
4. Replace the existing trickling filter distribution mechanism for secondary trickling filter No. 1. Originally installed in 1954 and upgraded in 1971, this mechanism is past its

useful life. Design will review alternative mechanisms (hydraulically driven, electrically driven, or pneumatically driven).

5. Rehabilitate the existing trickling filter distribution mechanisms for secondary trickling filter No. 2, and primary trickling filters Nos. 1 and 2. Design will review alternative mechanisms (hydraulically driven, electrically driven, or pneumatically driven).
6. Replace the existing bar screen facilities and provide direct/automated conveyance of screenings to the waste bins.
7. Replace the existing chlorine gas disinfection system with a sodium hypochlorite facility. Based upon an initial scoping meeting the project design concepts of this project includes the following elements:

Installation of new permanent sodium hypochlorite facilities immediately south of existing Secondary Clarifier No. 4. These facilities will include:

- Two sodium hypochlorite storage tanks (sized to receive weekly delivery of sodium hypochlorite). Tanks will be double contained.
 - Two (or three) sodium hypochlorite feed pumps (diaphragm or hose type - to be determined).
 - Associated piping to provide sodium hypochlorite to existing disinfection distribution system.
 - Demolition of existing chlorine gas facilities including overhead crane, chlorine cylinder trunnions, chlorine injectors and associated piping.
 - Installation of new electrical and instrumentation systems based upon the following assumptions:
 - a. The existing Motor Control Center is adequate to provide electrical service for the new facilities
 - b. The upgraded instrumentation and control system will include local manual controls and remote monitoring
 - c. The controls for the new facilities will be both residual and flow paced similar to the existing facilities
 - Installation of a new flow monitoring system at the existing Parshall flume
8. Provide a dedicated primary scum pump (allowing the existing scum pump to serve as a redundant sludge pump)
 9. Install automated vacuum system for screenings and sludge removal from the chlorine contact basin (i.e. sloped floor with drains, mechanical system, etc.)

10. Modify the Sludge Holding Tank mixing piping

The level of effort is based upon a conventional design-bid-build approach for all project elements listed.

PROJECT APPROACH

The project will include several separate deliverables.

The **first deliverable** will be letter reports associated with Project Elements: 6. Bar Screen Replacement and 9. Chlorine Contact Basin Modifications.

The **second deliverable** will be plans and specifications sufficient to allow competitive bidding for Project Elements: 1. Aerated Grit Basin Air Piping, 2. Recirculation Valve Replacement, 3. Spalled concrete repair, 8. Primary Scum Pump, 9. Chlorine Contact Basin Modifications and 10. Sludge Holding Tank Modifications.

The **third deliverable** will be plans and specifications sufficient to allow competitive bidding for Project Elements: 3. Secondary Trickling Filter Mechanism No. 1 Replacement, 5. Primary Trickling Filters Nos. 1 and 2 and Secondary Trickling Filter No. 2 Rehabilitation, 6. Bar Screen Replacement and 7. Chlorine Gas System Replacement.

Task 1.0 - Preliminary Design

Key project elements will require preliminary design to ensure consensus with the City on the direction for the final design. Preliminary design will include analysis of alternative technologies, process hydraulics, and equipment sizing for the following project elements:

- Project Element No 6: Bar Screen replacement
- Project Element No 9: Automated Vacuum Cleaning System installation

Deliverables

The deliverable product for preliminary design will be a technical memorandum/letter report addressing each of the project elements listed providing a recommended approach.

Task 2.0 - Final Design

2.1: Plans and Specifications

ENGINEER will prepare plans using the standard title block prepared for the Solids Handling Project. All drawings shall be prepared using AutoCAD. ENGINEER will prepare the General Conditions and Special Conditions using the documents similar to those prepared for the Solids Handling Project. Technical specifications will be prepared

using ENGINEERs standard detailed specifications. Contract Documents will be reviewed by the OWNER's legal counsel and by the Public Works Department. Construction drawings shall include general, architectural, mechanical, structural, civil, electrical, and instrumentation drawings. Final design will also include process schematics, hydraulic profile, and design criteria.

For bidding purposes the drawings will be provided as 1/2 size drawings only.

Deliverables

The ENGINEER's team shall submit plans and specifications to the OWNER for review and comment at the 30 percent, 90 percent, and 100 percent design points. The ENGINEER shall provide 5 half-size sets of plans and specifications for each submittal. The 30 percent submittal shall include the following:

- ▶ P&IDs
- ▶ Facility layouts
- ▶ Equipment configurations
- ▶ Major process piping
- ▶ Location/dimensions of major structures
- ▶ Electrical single line diagrams
- ▶ Preliminary specification list

The 90 percent submittal shall include complete drawings ready for checking and final review by the OWNER, as well as the following:

- ▶ Complete P&IDs
- ▶ Complete structural drawings
- ▶ Complete mechanical drawings
- ▶ Complete yard piping drawings
- ▶ Complete process control descriptions
- ▶ Complete technical specifications

The 100 percent submittal shall include all applicable changes following the 90 percent submittal review.

2.2: Project Cost Estimates

Construction cost estimates shall be prepared as part of the 30 percent and 100 percent submittals. Estimates shall be based upon quantity take-offs and manufacturer's quotes. All estimates shall be projected to the midpoint of construction.

2.3: Project Meetings

The ENGINEER's team (including a company partner or project manager responsible for the project) will meet with the OWNER's staff within two weeks of the 30 percent and 90 percent submittals to keep the City informed. ENGINEER will prepare and submit meeting notes to the OWNER.

Task 3.0 - Bidding Services

During bidding, ENGINEER will:

- ▶ Provide written responses to bidder's inquiries (i.e. similar to the bidding process for the previous projects).
- ▶ Assist the OWNER in the preparation of addenda.
- ▶ Attend the pre-bid conference.
- ▶ Assist the OWNER in analyzing bid results, and provide recommendations on the award of the construction contract.

OWNER will print documents for project bidding.

Task 4.0 Services During Construction (Optional)

The primary goal of this effort is to provide services during construction of the General Improvements Project. These services are based upon the design as currently understood and may be modified following completion of design. The scope is also similar to that of the Solids Handling Project.

- ▶ Assist in resolving construction conflicts.
- ▶ Prepare design-related change orders.
- ▶ Prepare contract record drawings in an electronic format produced from the Auto-CAD file, updated with as-built information. The Auto-CAD file shall be delivered.
- ▶ Perform final inspection, and submit the final report and recommendations on the completed project.

Task 5.0 Startup Services (Optional)

The ENGINEER's team will assist OWNER's staff and construction management during startup of the new facilities.

Task 6.0 O&M Manual (Optional)

ENGINEER will prepare an O&M manual for all new facilities.

**Exhibit C
Estimated Costs
Final Design - Summary**

**General Improvements Project
El Paso de Robles WWTP
City of El Paso de Robles**

Direct Labor and Indirect Costs and Profit

<u>Item</u>	<u>Labor Classification</u>						<u>Total</u>
	<u>PIC</u>	<u>PM</u>	<u>Lead Engineers</u>	<u>Staff Engineers</u>	<u>Techs</u>	<u>Support Staff</u>	
Hours	21	88	139	1,261	1,211	63	2,783
Average Rate	\$222.00	\$187.00	\$157.00	\$122.00	\$95.00	\$85.00	
Fee	\$4,662	\$16,456	\$21,823	\$153,842	\$115,045	\$5,355	\$ 317,183

Other Direct Costs (ODC)

PECE Charges	\$ 23,656
Travel & Subsistence	\$ 1,602
Reproduction for Review Only (Bid Sets by District)]
Surveying	\$ -
Geotechnical	\$ -
Environmental	\$ -
Other Subconsultants	\$ -

Sub-total of Other Direct Costs	<u>\$ 25,258</u>
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<u>Total Estimated Base Costs Without Contingency</u>	<u>\$ 342,441</u>
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Contingency @ 0%	\$ -
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Total Estimated Costs With 0 Percent Contingency	<u>\$ 342,441</u>
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PROPOSED
Capital Improvement Projects Budget
FY 2007-2008 to 2010-2011

	ORIGINAL APPROPRIATION	REMAINING APPROPRIATION 3/31/07	REQUEST TYPE	FY 2007-08	FY 2008-09	FY 2009-10	FY 2010-11	TOTAL REQUEST
SEWER IMPROVEMENTS								
1 Complete N.River Rd Interceptor Upgrade		495/4	SUP	\$ 1,000,000	\$ 5,000,000			\$ 6,000,000
2 Install Sewer Line to Serve Airport Area		95	NP		200,000			3,200,000
3 Extend Sewer Line to Barney Schwartz Park			NP			500,000		1,500,000
4 Install Gravity Sewer Line in Palm Court		575	SUP	500,000				500,000
5 Rehab/upgrade various lift stations (3,4,8,11 & 12)			NP	900,000	150,000	200,000		1,250,000
6 Rehab various existing sewer mains			NP	300,000	500,000	300,000		1,600,000
7 Upgrade various existing sewer pipelines			NP	200,000	500,000			1,000,000
8 Rehab/replace old manholes			NP	200,000	200,000			600,000
9 Upgrade Clarifier, Headworks, Primary Sludge & Replace Chlorinator		573/5	SUP	2,500,000				2,500,000
10 SCADA Telemetry System Upgrade		79						
11 WWTP Improvements for Recycled Water		578	CO	397,700				397,700
Total New Appropriations				\$ 5,797,700	\$ 6,550,000	\$ 1,000,000	\$ 4,697,000	\$ 23,744,700
FUNDING USES:								
Sewer Development Impact Fees				2,500,000	2,190,000	500,000		4,350,000
Sewer Operations Fund				3,297,700	4,360,000	500,000		6,047,000
Total Uses				\$ 5,797,700	\$ 6,550,000	\$ 1,000,000	\$ 10,397,000	\$ 23,744,700

*Final amount subject to final year end results

- 1 40% Impact Fees - will require long term financing (user fee increase)
- 2 95% Impact Fees
- 3 100% Impact Fees
- 4 70% Impact Fees
- 5 Sewer Operations
- 6 Sewer Operations
- 7 Sewer Operations
- 8 Sewer Operations
- 9 70% Impact Fees
- 10 Sewer Operations
- 11 Sewer Operations - will require long term financing (user fee increase)

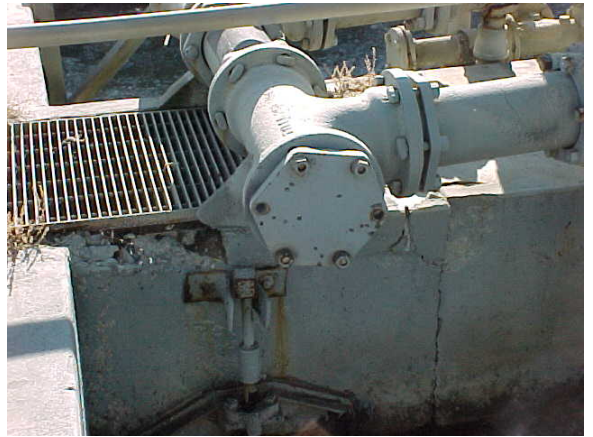
CO = Carry Over Project
NP = New project
SUP = Supplemental request to augment current estimated carry-over appropriation

AS ADOPTED BY CC - 6-5-07

PROJECT #1

AERATION CHAMBER PIPING REPLACEMENT

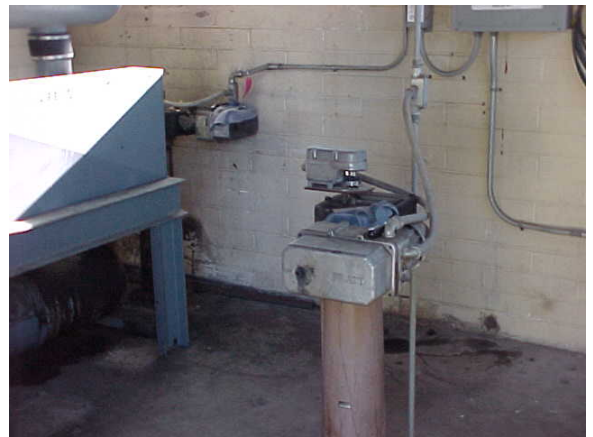
Note: pipe supports have deteriorated



PROJECT #2 – REPLACE RECIRCULATION VALVE CONTROLLERS



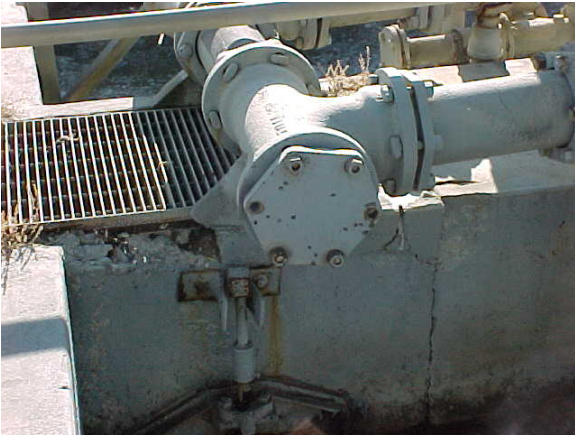
Existing controllers to be replaced



Recirculation valves are obsolete for parts. These were the valves installed in 1989 and need to be updated.

PROJECT #3 AERATION CHAMBER

SPALLING CONCRETE REPAIR



**PROJECTS #4 AND 5
REHABILITATE/REPLACE
TRICKLING FILTER DISTRIBUTION MECHANISMS**



Arms eroding, pinhole. No replacement parts available due to age of equipment.



Water pouring out of bottom of main drive. No replacement parts available due to age of equipment.

PROJECT #6
REPLACE EXISTING BAR SCREEN EQUIPMENT



Existing Screening Equipment

Note: Currently solids are hauled manually via wheelbarrows.



Holding Bin for solids

PROJECT #7 REPLACE EXISTING CHLORINE GAS SYSTEM WITH SODIUM HYPOCHLORITE

Note: The use of Chlorine Gas is outdated. In the past, the City has notice from OSHA to convert from Chlorine Gas to sodium hypochlorite.



**PROJECT #8
PROVIDE DEDICATED SCUM PUMP
FOR EACH CLARIFIER**



Note: The City has two primary clarifiers. Currently the City switches the scum pump between the two. It would be more efficient to have a scum pump for each clarifier.

**PROJECT #9
INSTALL AUTOMATED CHLORINE CONTACT BASIN VACUUM SYSTEM**



Existing manual vacuum system



Note: Use of manual system is no longer efficient to keep the contact basin clean.