



**NEW MEXICO ENVIRONMENT DEPARTMENT
CONSTRUCTION PROGRAMS BUREAU**

MEMORANDUM

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Jim Chiasson, Bureau Chief



**GREEN PROJECT RESERVE
BUSINESS CASE**

City of Carlsbad Wastewater Treatment Plant
CWSRF 010 – Wastewater Treatment Facility Renovations

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The City of Carlsbad operates a regional wastewater treatment plant (WWTP) that discharges to the Pecos River and effluent storage ponds. In an order to ensure the plant continues to produce high quality effluent that meets the current requirements of the NPDES permit and in anticipation of future requirements to reduce nutrients in the effluent, the City has under taken the renovation of their WWTP.

The proposed renovations of the City of Carlsbad regional wastewater treatment plant are being funded by the Clean Water State Revolving Loan Fund - CWSRF 010, through the New Mexico Environment Department (NMED) Construction Programs Bureau (CPB). The total cost of the project is a \$13.6 million dollars. The upgrades include the repair and renovation of the entrance works, primary and secondary clarifiers, aeration basins, and digester complex. Specifically the renovations considered to be “green” modifications, are the replacement of the coarse bubble diffusers with fine bubble diffusers in the aeration basins, the replacement of four 200 HP blowers with three 150 HP blowers and replacing the chlorination and dechlorination disinfection process with ultraviolet (UV) disinfection.

A summary list of the “green” components in the contract are as follows:

Component	Description	Green Cost
Energy Efficiency (categorical):		
Aeration Basins	Furnish fine bubblers	\$300,000.00
Aeration Basins	Install fine bubblers	\$39,000.00
Blower Building	Furnish blowers	\$321,200.00
Blower Building	Install blowers	\$2,500.00
	subtotal	\$662,700.00
Gross Receipt Tax @ 5.75%	Tax	\$38,105.25
Total Energy Efficiency		\$700,805.25
Environmentally Innovative (business case)		
UV Disinfection	UV building facility complete	\$500,000.00
Gross Receipt Tax @ 5.75%	Tax	\$28,750.00
Total Environmentally Innovative		\$528,750.00
TOTAL		\$1,229,555.25

Component Aeration Basin and Blower Building - Energy Efficiency (categorical):

These components shall be located on the wastewater treatment plant site in the aeration basin and blower building. The cost of these 100% green components is \$662,700 as shown in Item No. 7.08, 7.09, 8.03 and 8.04 in the attached pay application Exhibit 1.

Approximately 55% to 60% of the power consumed in a traditional WWTP is consumed by the aeration system and specifically the blowers. In the case of the existing Carlsbad WWTP, four 200 HP motors run the centrifugal blowers for the wastewater treatment plant aeration process. These blowers were manufactured by Spencer in 1981. As noted in the attached e-mail correspondence with Spencer, the existing blowers require 851 kW each (see Exhibit 2).

The renovation project includes replacing the four 200 HP blowers with three new 150 HP high speed turbo blowers by Aerzen USA in addition to replacing the coarse bubble aeration

diffusers with fine bubble diffusers. The change from coarse diffusers to fine diffusers, and the advanced blower technology, allows the blower horse power to be reduced. The motors on the new blowers are equipped with a variable frequency drive (VFD) and are rated at 126 kW which means that the Carlsbad WWTP will see a reduction in energy usage of over 80% in the aeration process, which is categorically Energy Efficient (see Exhibit 2).

Component UV Disinfection – Environmentally Innovative (business case):

This component shall be located on the wastewater treatment plant site in the new UV building. The cost of this 100% green component is \$500,000 as shown in Item No. 11 in the attached pay application Exhibit 1.

Currently the effluent from the Carlsbad wastewater treatment plant is disinfected with chlorine gas. In order to meet the requirements of the NPDES permit, residual chlorine is removed from the effluent with the use of sulfur dioxide gas. Carlsbad currently uses 1,500 pounds of chlorine gas and 2,300 pounds of sulfur dioxide gas per month. The change to ultraviolet disinfection of the effluent from the plant will result in the elimination of approximately 18,000 pounds of chlorine gas and 27,600 pounds of sulfur dioxide gas annually. This is clearly a significant reduction of chemical use in the wastewater treatment at the Carlsbad plant as a result of this project and therefore meets the Environmentally Innovative definition. A side benefit of this reduction in chemical use is the elimination of the requirements associated with storing the chemicals on site. Currently because of the quantity of chemicals stored at the plant, Carlsbad must abide by the Process Management Safety Standard in the OSHA regulations. The OSHA regulations require yearly training of the staff and review of the facilities to ensure the facility is properly operated and maintained at a cost of \$12,000 per year. This total cost of training, chemicals, operation and maintenance is \$60,000 per year. Replacing the current chlorination/dechlorination disinfection process with UV will save the City of Carlsbad an estimated \$50,000 per year of this cost.

Chlorination/dechlorination disinfection process:

\$12,000/year for chlorine gas
\$9,200/year for sulfur dioxide gas
\$26,800/year for operation and maintenance
\$12,000/year for training
Total cost of \$60,000 per year

UV disinfection process:

\$10,000/year for operation and maintenance