

**COUNTY OF VENTURA
2014 Water-Energy Grant Proposal**

Santa Paula Hospital Water and Energy Modernization Project

Work Plan

Description of the Project

Santa Paula Hospital, constructed in 1961, is a 49-bed general community hospital that provides comprehensive acute care services, including emergency services, intensive care, obstetrics, medical and surgical care, pediatric, infection control, social, and other services. Figure 1 depicts the system map for the project. The “system” for the purposes of this grant application is the physical campus of Santa Paula Hospital; all analyses and calculations used in this grant application relate to water and energy consumed by activities at the Santa Paula Hospital campus.

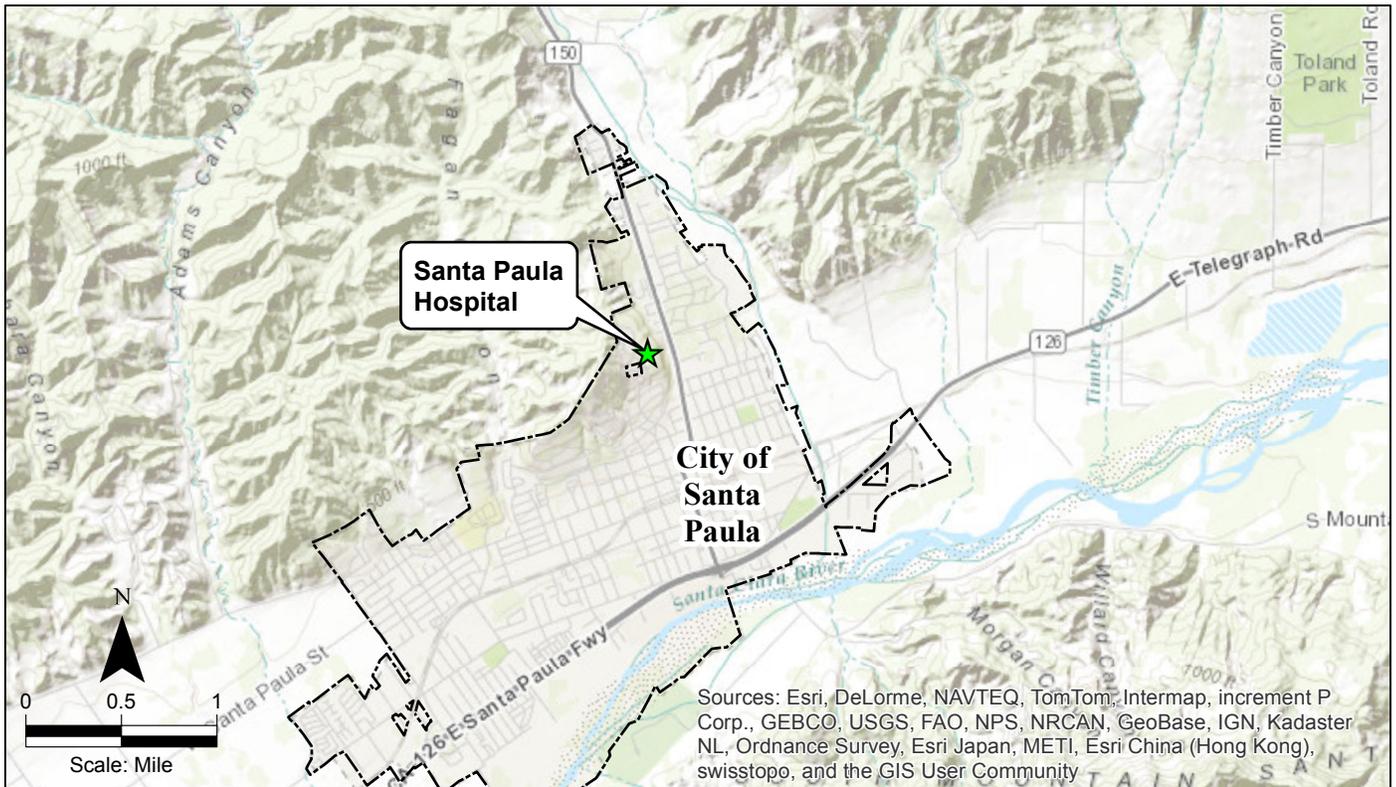
Santa Paula Hospital is the only emergency room between the city of Ventura and the city of Santa Clarita and generally serves residents in the communities of Santa Paula, Fillmore, Piru, and Saticoy (a populace of approximately 48,000). Santa Paula Hospital serves residents that would otherwise have limited or no access to healthcare. In 2013 more than 67 percent of patients served at the Hospital were uninsured or Medi-Cal recipients; more than 20 percent of patients served were Medicare recipients (based on patient days by financial class).

Santa Paula Hospital has gone through several expansion projects since the initial main Hospital construction. The intensive care unit (ICU) wing was constructed in the mid-1960s, the emergency services (ER) wing was constructed in the mid-1970s, and the administration wing was constructed in the mid-2000s. Each of these expansion projects included the construction of separate and independent chilled, hot water, and air handling systems. As a result, mechanical systems at Santa Paula Hospital include multiple generations of older, stand-alone chilled, steam/hot water, package air-conditioning and air distribution systems. Equipment has deteriorated over the years and most has reached or exceeded rated lifetimes. As shown in Figures 2 through 4, equipment is severely corroded and water leaks are evident. Temperature and humidity is monitored and recorded daily using a log or electronic documentation of the heating, ventilation, and air conditioning (HVAC) system. These are standard operating procedures required by regulatory agencies such as ANSI/ASHRAE/ASHE Standard 170-2008 and the Joint Commission.

Since 2010, there have been 10 outages of the chiller equipment, making it necessary to rent temporary cooling equipment to maintain Hospital services. Since 2010, there have been seven significant leak repairs performed on the chilled water system. In the last few years, service calls to repair the chilling and heating equipment have dramatically increased. In 2011 there were 9 service calls and in 2014 there were 25 service calls. This condition cannot realistically continue if Santa Paula Hospital is going to continue its mission to provide high-quality medical care to the residents of Ventura County.

The Santa Paula Hospital Water and Energy Modernization Project has several goals:

- Replace equipment so that the Ventura County Health Care Agency can continue to provide residents, particularly disadvantaged residents, timely and local access to health care;
- Improve water efficiency of the Hospital; and
- Improve energy efficiency of the Hospital.



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Kennedy/Jenks Consultants

County of Ventura
Santa Paula, CA

System Map

K/J 1444235*00
December 2014

Figure 1



General Conditions in Mechanical Room 1



Connection Point for Emergency/Portable Chilling Equipment



Significant Scale in Air Chiller System

Figure 2. Condition in Mechanical Room 1, Santa Paula Hospital



Old Air Handling Unit Piping



Corrosion of Air Handling Units



Repair and Patching on ICU Air Handling Unit

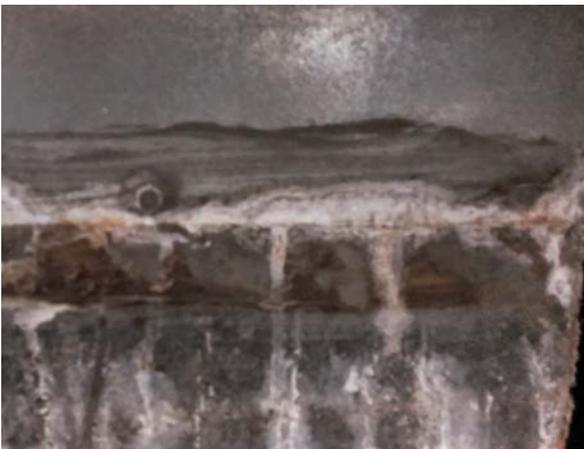
Figure 3. Conditions of Air Handling Units, Santa Paula Hospital



Air Cooling Tower



Scale in Air Cooling Tower



Patch of leak in Air Cooling Tower



Recent Leak in Air Cooling Tower Motorized Ball Valve

Figure 4. Conditions of Air Cooling Tower, Santa Paula Hospital

The specific project is to:

1. Replace the three chillers serving the main Hospital, the intensive care unit, and emergency room.

Existing Chiller #1 (CH-1) is approximately 22 years old and serves the main Hospital. The existing chiller is a water-cooled reciprocating Carrier, model number 30HR080-13400, with a nominal capacity of 80 tons. This chiller, the associated 300 gallon per minute (gpm) chilled water pump, and 260 gpm condenser water pump, and associated cooling tower will be replaced. As detailed in Attachment 2, the new cooling tower will have significantly less drift¹ and will operate at higher cycles of concentration, which will reduce blowdown and water consumption². The new chiller will have a higher operating efficiency, which will reduce energy consumption.

Existing Chiller #2 (CH-2) is approximately 46 years old and serves the ICU. The existing chiller is an evaporatively-cooled Dunham-Bush, model number DDPC-20-2, with a nominal capacity of 20 tons. CH-2 and the associated 55 gpm chilled water pump will be replaced. The new chiller will be air cooled and will not require any makeup water, which will reduce water consumption. The chiller will have a higher operating efficiency, which will reduce energy consumption.

Existing Chiller #3 (CH-3) is approximately 40 years old and serves the ER. The existing chiller is an air-cooled Carrier, model number 30HJ030400, with a nominal capacity of 30 tons. CH-3 and the associated 75 gpm chilled water pump will be replaced. The chiller will have a higher operating efficiency, which will reduce energy consumption.

2. Replace four existing air handling units, including ductwork and reheat coils that serve the ICU and ER. The replacement air handling units will provide 7,000 cubic feet per minute (cfm) of supply air for the ICU and 10,600 cfm of supply air for the ER.
3. Replace the two high-pressure boilers. The two high-pressure steam boilers, B-1 and B-2 date from 1992. The existing boilers are natural gas fired Parker water-tube boilers, model number 100 GAO 1N-E2. The new high-pressure boilers will operate at higher cycles of concentration, which will reduce blowdown and water consumption². The new high-pressure boilers will have a higher operating efficiency, which will reduce energy consumption.

¹ Drift is water that is carried out of a cooling tower by the air moving through the cooling tower and is an uncontrolled loss of water. The amount of drift varies among designs but is very high in older or poorly managed towers but is typically estimated as 0.008 percent in new towers. Source: Conservation Mechanical Systems, Inc. 2014.

² As water evaporates from a cooling tower or boiler dissolved solids (such as calcium and silica) are concentrated. If the concentration gets too high, scale forms and leads to corrosion. Blowdown is the controlled removal of water and the associated dissolved solids to prevent minerals from getting too concentrated. The greater the amount of blowdown water the more makeup water has to be added to a cooling tower or boiler. Close monitoring and control of blowdown provides a significant opportunity to conserve water in cooling tower and boiler operations. Cycles of concentration is the ratio of the concentration of dissolved solids in the blowdown water compared to the make-up water. To reduce water use in a cooling tower or boiler, it is necessary to maximize cycles of concentration, which will minimize blowdown water quantity and reduce make-up water demand.

Project Proponent/Partner

A successful grant will result in the County of Ventura Health Care Agency receiving grant funding to implement the Santa Paula Hospital Water and Energy Modernization Project.

Work Plan Tasks

Task 1. Direct Project Administration and Reporting

Specific tasks related to Direct Project Administration will include Administration, Labor Compliance (to the extent applicable), and Reporting. Also included in this task is preparation and submittal of the Water-Energy Grant Application.

Administration. Ventura County will be the administrative lead and coordinate all activities of health care staff, design consultants, and vendors. Ventura County will prepare invoices for the grant. Administration began with preparation of the grant application and is approximately 5 percent complete.

Labor Compliance. The programs funded by the Greenhouse Gas Reduction Fund are subject to public works laws and prevailing wages under the State Labor Code. Ventura County will notify the California Department of Industrial Relations upon award of any public works contracts for the Santa Paula Hospital Energy and Water Modernization Project. Ventura County will require any public works contractors to file certified payroll records with the Compliance Monitoring Unit of the California Department of Industrial Relations. Labor compliance activities cannot begin until project bidding and is currently 0 percent complete.

Reporting. Ventura County will provide materials requested by DWR necessary to execute the grant agreement (i.e., audited financial statements), prepare quarterly progress reports, and prepare both a draft and final project report describing the project and its outcomes. Reporting activities will occur after grant execution and this task is approximately 0 percent complete.

Deliverables. Materials needed to execute the grant agreement, quarterly progress reports, draft project report, final project report, and invoices.

Task 2. Easement

All work will be performed with the existing structure of the Santa Paula Hospital. No land purchase or easement acquisition is required for implementation of this project.

Task 3. Planning Evaluation/Design/Engineering

For several years staff at Santa Paula Hospital have recognized the need to replace major mechanical equipment. Staff has seen this as an opportunity to also improve energy and water efficiency of the Hospital. In 2012 Ventura County undertook a scoping study to identify ways to reduce energy use at Santa Paula Hospital.

Following that study, Ventura County hired an engineering consultant to determine the necessary performance standards for the new chiller equipment to serve the ER and ICU (replacement for CH-2 and CH-3). Based on the anticipated performance of the new equipment, the engineering consultant completed design of the air handling units serving the ICU and ER. These plans and specifications will be used to bid replacement of the air handling units and CH-2 and CH-3 at Santa Paula Hospital.

All equipment installed in hospitals must meet rigorous requirements for performance and seismic safety as determined by the Office of State Health Planning and Development (OSHPD). Remaining design tasks include identifying equipment that will both meet the Hospital's needs and which will meet OSHPD standards for the following:

- Replacement of the chiller serving the main Hospital (CH-1) and the air cooling tower

- Replacement of the two high-pressure boilers (B-1 and B-2).

Ventura County will prepare Requests for Proposals to acquire the services of a vendor or vendors who will furnish all labor, materials, and resources necessary to: (1) replace CH-1 and the air cooling tower and (2) replace the two high-pressure boilers.

Planning Evaluation/Design/Engineering activities are approximately 55 percent complete.

Deliverables. Plans and specifications for replacement of air handling units at ICU and ER; bid documents for replacement of air handling units; identification of OSHPD approved replacements for CH-1, the air cooling tower, B-1 and B-2; and requests for proposals.

Task 4. Environmental Documentation

The project involves the minor alteration to the Hospital physical infrastructure including the replacement of mechanical equipment and involves no expansion of use of the Hospital. The project falls under CEQA Categorical Exemption Class 1. A Notice of Exemption will be filed with the Ventura County Clerk. This task is approximately 5 percent complete.

Deliverables. Notice of Exemption.

Task 5. Permitting

Ventura County will apply for and obtain a Facilities Development Permit from OSHPD prior to starting construction. As part of permitting, Ventura County will retain the services of an independent Inspector of Record who will file construction inspection reports with OSHPD. The application for the permit consists of submittal of design documents and this task is approximately 55 percent complete.

Deliverables. Copies of Correspondence with the OSHPD.

Task 6. Proposal Monitoring Plan

This task consists of refining the Proposal Monitoring Plan provided with this grant application. The Proposal Monitoring Plan will be revised and finalized based on DWR review. The Proposal Monitoring Plan is approximately 75 percent complete.

Deliverables. Draft and Final Proposal Monitoring Plan.

Task 7. Project Construction/Implementation

Specific tasks will include Construction Contracting, Construction, and Construction Administration.

Construction Contracting. The Santa Paula Hospital Water and Energy Modernization Project will involve three contracting activities. First Ventura County will bid replacement of the air handling units and associated equipment (CH-2 and CH-3). The second activity will be to request proposals from vendors to furnish all labor, materials, and resources necessary to replace the air chillers serving the main Hospital and the air cooling tower. The last contracting activity will be to request proposals for the replacement of the two high-pressure boilers. All bids and proposals will be advertised through standard County of Ventura procedures. Ventura County will award the project to the responsible and responsive bidders with the lowest bid in accordance with the Public Contract Code. This task cannot begin until after design activities are complete and until after OSHPD permit(s) are acquired.

Construction/Implementation. Construction/Implementation consists of the following:

- Install four new air handling units, ductwork, and reheat coils to provide approximately 17,600 cfm supply air to the ICU and ER. Remove the existing two chillers (CH-2 and CH-3) and replace with two new modern chillers with a combined capacity of approximately 50 tons.

- Remove and replace the existing chiller (CH-1) and pump that serves the main Hospital with new equipment (approximately 80 tons). Remove and replace the existing cooling tower.
- Remove and replace the existing two high-pressure boilers with new central steam equipment to serve the Hospital complex.

Once construction is completed, project closeout documentation will be prepared. Project closeout documentation consists of record drawings, testing and balancing reports, and operations and maintenance manuals for the new equipment.

Construction work has not begun, and this task is 0 percent complete.

Construction Administration During construction, County of Ventura staff and/or a qualified consultant will provide construction management and administration. Specific tasks will include daily on-site observations, coordination with inspector for inspection of equipment, startup testing of equipment and documentation of construction activities. This task will be performed during construction and is therefore 0 percent complete.

Deliverables. Notice to proceed issued to the contractor(s) and vendor(s), construction photos, and project closeout documentation.