

SANTA PAULA HOSPITAL

Energy Management and  
Modernization Plan

Scoping Study – DRAFT Report

Prepared By

Ellner Consulting

December 31, 2012

**COUNTY OF VENTURA  
SANTA PAULA HOSPITAL  
ENERGY MANAGEMENT AND MODERNIZATION  
PLAN (EMMP) – DRAFT  
December 31, 2012**

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**I. EXECUTIVE SUMMARY**

- A. Ellner Consulting (EC) has completed and is presenting herein the results of an Energy Management and Modernization Program (EMMP) Scoping Study for the Santa Paula Hospital, Ventura, California.
- B. The resulting EMMP Plan includes the following Objectives.
1. Obtain Stakeholder endorsement to implement the EMMP.
  2. Implement a long term energy management program for steam, chilled water, hot water, electricity and conditioned air.
  3. Modernize HVAC systems in compliance with existing needs and program objectives.
  4. Replace energy management and environmental control systems to actively control, monitor and optimize energy program benefits.
  5. Train operating engineers to operate, maintain and manage the SPH energy program.
- C. The proposed strategy for achieving EMMP objectives summarized above include implementation of Energy Efficiency Measures (EEM's) summarized in Table 1 below.

**TABLE 1: EMMP PROJECT SUMMARY – SPH**

<b>EEM TAG</b>	<b>REF. SECT.</b>	<b>DESCRIPTION</b>	<b>COST ESTIMATE</b>	<b>ANNUAL ENERGY SAVINGS</b>	<b>AVOIDED EMISSIONS (TONS CO2)</b>
EEM-1	III.B	Replace 2 existing CHW systems in Mechanical Rooms 2 and 3 with expanded and upgraded CHW system in Mechanical Room 1. Distribute piping and connect to serve all mechanical systems.	\$630,000	\$18,739	120
EEM-2	III.C	Refurbish and reconfigure existing HVAC systems and equipment.	\$748,800	\$11,758	75
EEM-3	III.D	Furnish a new Johnson Metasys control system for modernized HVAC, chilled and hot water systems.	\$345,600	\$12,209	76
EEM-4	III.E	Perform deferred Maintenance on steam and hot water systems.	\$42,000	\$6,716	40
<b>TOTALS</b>			<b>\$1,766,400</b>	<b>\$49,422</b>	<b>311</b>

- D. The poor condition of existing mechanical equipment and resulting “need” to upgrade systems supersedes the energy efficiency benefits resulting from the

proposed EMMP. Santa Paula Hospital will have to upgrade equipment in the near future to avoid catastrophic failure of some systems. This EMMP provides the roadmap for these required upgrades, with appropriate enhancements to substantially improve energy efficiency.

- E. The following additional information is contained in this Scoping Study Report.
1. **Sections II:** A summary of existing conditions and opportunities.
  2. **Section III:** A more detailed description of Energy Efficiency Measures included in the proposed EMMP.
  3. **Section IV:** Summary of utility and energy benchmarking. Energy and cost avoidance calculation summaries, construction cost estimates and simple economic performance summaries.
  4. **Section V:** Presentation of an “Inventory Reference Package”, a long term operations and maintenance tool developed as part of this work.
  5. **Appendices 1 – 3:** Supporting material, including drawings, calculations, inventory reference package and other information.

## II. EXISTING CONDITIONS AND EMMP OVERVIEW

- A. SPH was first constructed in the 1930’s and provides comprehensive, acute care hospital services, including emergency services, ICU, OBGYN, Medical and surgical care services, pediatric, infection control, social and other services.
- B. SPH has gone through the following expansion projects since the initial Main Hospital construction.
1. Intensive Care Unit Wing constructed in mid 1960’s.
  2. Emergency Services Wing constructed in mid 1970’s.
  3. Administration Wing constructed in mid 2000’s.
- C. Each of the expansion projects included the construction of separate and independent chilled, hot water and air handling systems. Additionally, other remodel projects to existing spaces, included updates and expansion to mechanical and electrical systems have also occurred over the years. Appendix-3 contains a comprehensive reference to existing mechanical equipment and systems, including locations of equipment, areas served and other information.
- D. As a result, mechanical systems at SPH include multiple generations of aging, stand alone chilled, steam/hot water, package air conditioning and air distribution systems serving occupied spaces. Equipment has deteriorated over the years, most has reached or exceeded rated lifetimes. Although operating engineers have done a fine job keeping equipment running, this condition cannot realistically

continue indefinitely into the future as equipment begins to experience more significant and frequent failures.

- E. The Energy Management and Modernization Program (EMMP) summarized herein, includes Energy Efficiency Measures described in Section III below, providing a “roadmap” modernize, unify and improve the reliability and energy efficiency of mechanical systems and occupant comfort.

### **III. ENERGY EFFICIENCY MEASURES**

- A. The Energy Efficiency Measures summarized in Section I above and described below:

- 1. Are conceptual. Additional technical due-diligence, planning and design is required prior to implementation.
- 2. Are interdependent in several ways and although presented independent of each other, should be viewed as a package. In spite of this, EEM’s can be prioritized and phased over several years as required.

#### **B. EEM-1: Chilled Water System Upgrades**

- 1. Consolidate three (3), older and less efficient chilled water systems into a single, high efficiency chilled water generation and distribution system to serve existing and new air handling units, fan coil and other equipment.
- 2. Remove existing CHW systems located in Mechanical Rooms 2 and 3, including distribution piping, serving air handling and fan coil units.
- 3. Replace existing chiller in Mechanical Room 1, with a new, high efficiency, water cooled chiller. Replace existing cooling towers, piping, pumps and associated controls.
- 4. Add chilled water piping, pumps and other accessories to distribute chilled water from the retrofitted chilled water system to existing and proposed air handling and fan coil units serving SPH.

#### **C. EEM-2: HVAC System Re-furbish and Re-configure.**

- 1. Modernize or replace existing air handling systems (single and multi-zone), fan coil units, exhaust fans and other equipment to properly condition spaces and reliably maintain comfort.
- 2. Includes refurbish, repair and/or replace fans, motors, heating/cooling coils, drain pans, valves, dampers and actuators as applicable. Convert applicable systems to variable air volume.
- 3. **Steam/Hot Water Generators:** See EEM-4 below.

**D. EEM-3: Replace Control System**

1. As noted above, existing controls are old, outdated, stand-alone, pneumatic and electro-mechanical devices, which, although generally maintaining occupant comfort, are marginally effective and provide limited energy management features.
2. Replace existing, stand-alone controls to the latest line of Johnson Metasys or Andover Control Systems, with configuration and performance features compatible with County Standards.
3. New controls will be designed and constructed to control and monitor mechanical systems included in all EEM's.
4. New controls will be networked with existing controls in other sites for central operator interface, reporting and energy systems management.

**E. EEM-4: Steam and Hot Water System Deferred Maintenance**

1. Steam traps, steam and hot water pipe and accessory insulation is deteriorating at steam-to-hot water systems and along existing pipe runs. Conditions are worse around valves, pumps and other non-pipe appliances. Significant energy loss, increased temperatures and unsafe conditions result.
2. EEM-4 includes correcting this condition as follows:
  - a. Perform a detailed survey of existing steam distribution system. Make note of existing steam leaks and deteriorated insulation.
  - b. Prioritize repairs according to criticality, safety and energy loss.
  - c. Repair steam leaks, particularly at traps, flanges, joints, valves and heat exchangers. Repair/replace insulation as applicable.
  - d. Inspect, repair and replace steam traps annually as applicable. Steam traps, which manage the proper removal of condensate and prevent loss of steam have mechanical moving parts and are exposed to harsh, corrosive environments. As a result, they tend to fail over time. A regular steam trap testing, repair and maintenance program will reduce steam trap failures and save energy.

**IV. UTILITY AND ENERGY ANALYSIS**

**A. Delivered Utility Summaries**

1. Electricity: Electricity is delivered to SPH by Southern California Edison from a single, metered, service.
2. Natural Gas and Steam: Natural gas is centrally metered at SPH. Natural gas is primarily consumed by boilers, which generate and distribute steam to buildings for space heating and domestic hot water. Steam-to-hot water conversion systems and equipment information can be referenced in Appendix 3.
3. The following tables summarize annual site-wide consumption and costs for electricity and natural gas delivered to SPH.

**TABLE 2: ELECTRICAL USE SUMMARIES**

<b>Item</b>	<b>2010</b>	<b>2011</b>	<b>Average</b>
<b>kWh / yr</b>	1,312,237	1,457,750	1,384,994
<b>Peak kW</b>	279	286	283
<b>Total Elect. Cost</b>	\$154,359	\$163,527	158,943
<b>Unit Cost (\$/kWh)</b>	\$0.12	\$0.11	\$0.11
<b>Winter</b>	\$0.10	\$0.10	\$0.10
<b>Summer</b>	\$0.15	\$0.14	\$0.14
<b>Elect. Cost per square foot</b>	<b>\$3.43</b>	<b>\$3.63</b>	<b>\$3.53</b>

**TABLE 3: NATURAL GAS USE SUMMARIES**

<b>Item</b>	<b>Estimate</b>
<b>Est. Therm / yr</b>	79,008
<b>Ave. Therm/Month</b>	6,584
<b>Estimated Total Gas Cost</b>	\$67,157
<b>Estimated Unit Cost (\$/Therm)</b>	\$0.85
<b>Gas Cost per square foot</b>	\$1.49

**B. Utility Allocations To End Uses**

1. A utility baseline analysis was prepared. Analysis resulted in allocations of annual electricity and natural gas consumption to end uses.
2. The baseline analysis prepared for this Scoping Study includes allocation of energy by end uses. If the proposed EMMP is implemented, energy

information will increase exponentially over the next several years. The baseline energy allocation strategy derived for this EMMP and presented herein is intended to serve as the starting point for long term sub-metering, data processing, energy analysis, trend tracking, verification of program effectiveness and other items.

3. The following table summarizes results of the electricity allocation analysis by end use. Detailed calculation results and assumptions are in Appendix 1.

**TABLE 4: ELECTRICITY USAGE SUMMARY BY END USE**

Description	kWH/Yr	Electrical Cost (\$/Yr)	% of Total
Receptacle/plug/computers	157,248	\$17,297	11%
Interior Lights	178,870	\$19,676	13%
Exterior Lights	9,828	\$1,081	1%
Process Equipment	157,248	\$17,297	11%
Chilled Water System	505,454	\$55,600	36%
Hot Water System	29,315	\$3,225	2%
Air Distribution System	200,102	\$22,011	14%
Package Units / Split DX	146,765	\$16,144	11%
<b>TOTAL</b>	<b>1,384,829</b>	<b>\$152,331</b>	<b>100%</b>

**C. Energy Analysis**

1. An energy analysis was prepared to estimate energy and cost avoidance targets for recommended energy efficiency and modernization measures.
2. The energy analysis expanded on the derivation of energy allocation to end uses described above and detailed in Appendix 1.
3. Energy savings target estimates, including avoided electricity and natural gas consumption and costs were derived for applicable energy efficiency measures summarized in Section III above using baseline energy summaries previously described. The following table - summarizes total energy and cost avoidance targets if all measures are implemented. Appendix 2 includes supporting calculations.

**TABLE 5: EEM ENERGY AND COST AVOIDANCE TARGETS**

EEM	NAME	ELECTRICITY			NATURAL GAS			TOTAL	
		Kwh/Yr.	\$\$	CO2 Tons	Therms/Yr.	\$\$	CO2 Tons	\$\$	CO2 Tons
1	CHW Upgrade	170,352	\$18,739	120	0	\$0	0	\$18,739	120
2	Air Dist. Upgrade	106,894	\$11,758	75	0	\$0	0	\$11,758	75
3	Controls	60,439	\$6,648	43	6,542	\$5,560	33	\$12,209	76
4	Steam/HW	0	\$0	0	7,901	\$6,716	40	\$6,716	40
<b>TOTAL</b>		<b>337,685</b>	<b>\$37,145</b>	<b>238</b>	<b>14,442</b>	<b>\$12,276</b>	<b>73</b>	<b>\$49,421</b>	<b>311</b>

D. Construction budgets, utilizing conceptual budget estimating techniques were prepared and are included in the following table for Energy Efficiency Measures.

**V. EQUIPMENT AND SYSTEMS INVENTORIES**

A. Mechanical systems and equipment have been continuously maintained, repaired, modified and/or replaced over the years. There are few complete mechanical, electrical and/or control system drawings or other historical records.

B. Mechanical systems and equipment include a variety of old single and multi-zone air handling units, package AC units, and exhaust fans.

C. There is no modern energy management and environmental control system serving mechanical equipment and systems. With few exceptions, existing controls are generally outdated, stand alone, local electro-mechanical devices, with no monitoring feedback or energy management features, functions or capabilities. There does not appear to be any pro-active control system deferred maintenance program. Controls are repaired, replaced and generally upgraded when existing controls fail. Additionally, please note:

1. Most unitary (packaged dx) AC systems operate on standard, programmable thermostats, with 7 day schedules, which generally (and properly) schedules equipment off during un-occupied hours.
2. Most air handling units are constant volume, with fixed position or 100% outside air dampers, with stand-alone controllers, utilizing pneumatic (compressed) air to power actuators and perform control loop functions.
3. Steam-to-hot water generation and distribution systems are also controlled with stand-alone electro-pneumatic controllers and actuators.
4. Exhaust fans generally operate 24/7.

**D. Inventory Reference Package**

1. The on-site surveys, data collection and processing of existing floor plans, equipment and zoning locations resulted in preparation of an Inventory Reference Package (IRP). The IRP is intended for use by SPH operations and maintenance persons and future consulting engineers tasked with modernizing equipment and systems. See Appendix 3. We believe the IRP will be an effective tool, helping to more efficiently support the County's long term operations and maintenance effort.
2. The IRP generally categorizes equipment and systems as follows.
  - a. Air handling and unitary refrigeration systems, including condensing units, exhaust fans and other equipment.
  - b. Chilled water generation and distribution systems.
  - c. Hot water generation and distribution systems.
3. The IRP includes the following elements
  - a. Color coded floor plans, with each color representing a unique zone served by specific mechanical equipment.
  - b. Equipment identification, location and reference callouts on color coded floor plans. The existing County asset numbering system is used identify equipment.
  - c. Two (2) reference tables, including "Equipment References" and "Area References". Equipment and Area reference tables complete the relationships between specific mechanical equipment and areas served by mechanical equipment.
4. The IRP can be used for the following on-going activities.
  - a. Day-to-day reference for equipment operation and maintenance.
  - b. Maintenance personnel training, making it easier for staff persons to more effectively service equipment and systems.
  - c. As a guide for future consulting engineers to reference, when they consider major equipment upgrades and/or replacement.

# **APPENDIX 1:**

## **Energy Allocation Calculations by Building and End Use**

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SYSTEM ID	LOCATION	SERVES	CAPACITY	NOTES
CHILLED WATER SYSTEMS				
#20002	Santa Paula - Mech. Room 1	SP Main Building	80 tons	
#20012	Santa Paula - Mech. Room 2	SP Emergency	20 tons	
#20016	Santa Paula - Mech. Room 3	SP ICU	30 tons	
HOT WATER SYSTEMS				
20017	Santa Paula - Mech Rm 3	SP ICU	280 MBTUH	
25025	Santa Paula - Boiler Rm	SP Main Building and Emergency	1,680 MBTUH	
25019	Santa Paula - Boiler Rm	SP Main Building and Emergency	301 MBTUH	
25024	Santa Paula - Boiler Rm	SP Main Building and Emergency	1,680 MBTUH	
25018	Santa Paula - Boiler Rm	SP Main Building and Emergency	301 MBTUH	
HX	Santa Paula - Boiler Rm	SP Main Building	396 MBTUH	
HX	Santa Paula - Mech. Room 2	SP Emergency	280 MBTUH	

**Electrical Usage Summary**

Item	2010	2011	Average
kWh / yr	1,312,237	1,457,750	1,384,994
Peak kW	279	286	283
Total Elect. Cost	\$154,359	\$163,527	158,943
Unit Cost (\$/kWh)	\$0.12	\$0.11	\$0.11
Winter	\$0.10	\$0.10	\$0.10
Summer	\$0.15	\$0.14	\$0.14
Elect. Cost per SF	\$3.43	\$3.63	\$3.53

Item	Estimate
Est. Therm / yr	79,008
Ave. Therm/Month	6,584
Estimated Total Gas Cost	\$67,157
Estimated Unit Cost (\$/Therm)	\$0.85
Gas Cost per SF	\$1.49

\$226,100

0.0829

0.0520

0.0540

0.0297

**Elect. Usage Summary**

Building	kWh/Yr	Cost/Yr
Santa Paula	1,384,829	\$152,331

**Gas Usage Summary**

Building	Therm/Yr	Cost/Yr
Santa Paula	79,008	\$67,157

**EEMP PROJECT SUMMARY**

EEM TAG	ENERGY SAVINGS (kWh)	ELECTRICAL COST SAVINGS (\$)	SAVINGS (THERMS)	NATURAL GAS COST SAVINGS (\$)	TOTAL SAVINGS (\$)
EEM-1	170,352	\$18,739	0	\$0	\$18,739
EEM-2	106,894	\$11,758	0	\$0	\$11,758
EEM-3	60,439	\$6,648	6,542	\$5,560	\$12,209
EEM-4	0	\$0	7,901	\$6,716	\$6,716
EEM-7	0	\$0	0	\$0	\$0
	337,685	\$37,145	14,442	\$12,276	\$49,421

**ELECTRICITY USAGE SUMMARY BY END USE**

**OLDER BUILDINGS**

Description	kWh/Yr	Electrical Cost (\$/Yr)	% of Total
Receptacle/plug/computers	157,248	\$17,297	11%
Interior Lights	178,870	\$19,676	13%
Exterior Lights	9,828	\$1,081	1%
Process Equipment	157,248	\$17,297	11%
Chilled Water System	505,454	\$55,600	36%
Hot Water System	29,315	\$3,225	2%
Air Distribution System	200,102	\$22,011	14%
Package Units / Split DX	146,765	\$16,144	11%
Misc. HVAC	0	\$0	0%
<b>TOTAL</b>	<b>1,384,829</b>	<b>\$152,331</b>	<b>100%</b>

# BASE CASE ENERGY USAGE AND COST CALCULATIONS

Ventura County Medical Center Energy Assessment - Base Case

Santa Paula				
Description	Load		% of Total	Electrical Cost (\$/Yr)
	Peak KW	Factor KWH/Yr		
Receptacle/plug/computers	45	0.4 157,248	11%	\$17,297
Interior Lights	59	0.35 178,870	13%	\$19,676
Exterior Lights	11	0.1 9,828	1%	\$1,081
Process Equipment	45	0.4 157,248	11%	\$17,297
Chilled Water System	193	0.3 505,454	36%	\$55,600
Hot Water System	7	0.5 29,315	2%	\$3,225
Air Distribution System	46	0.5 200,102	14%	\$22,011
Package Units / Split DX	42	0.4 146,765	11%	\$16,144
Misc. HVAC	-	0.5 -	0%	\$0
<b>TOTAL</b>	<b>447</b>	<b>1,384,829</b>	<b>100%</b>	<b>\$152,331</b>

Building Square Footage: 45,000

## Ventura County Medical Center Energy Assessment - Parameters

Building Parameters	Hours of Operation
Square Footage	45,000 SF
Plug Load	1 W/SF
Interior Lighting	1.3 W/SF
Exterior Lighting	0.25 W/SF
Process	1 W/SF
Hours of Operation	8736 hr/yr
Bill Estimated Energy Usage	1,384,994 kWh/yr
Spreadsheet Estimated Usage	1,384,829 kWh/yr
Calibration (% Difference)	100% = Calibrated

# **APPENDIX 2:**

## **ENERGY SAVINGS CALCULATIONS AND CONSTRUCTION BUDGETS**

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Santa Paula Energy Efficiency Measures

11/29/2012

EEM-#	Energy Conservation Measure	Qty of Equipment	Total Capacity (Tons or kW)	Average Existing Efficiency (kW/Ton or %)	Average Retrofit Efficiency (kW/Ton or %)	Electricity Savings (kW)	Operating Hours per year	Load Factor	Electricity Savings (kWh)	Cost Savings (\$)
1	Central Plant Consolidation									
1	Consolidate Evaporative Cooled Chillers	3	130	1.3	0.8	65	8736	0.3	170,352	\$18,739

EEM-#	Energy Conservation Measure	Qty of Equipment	Total Capacity (Tons or kW)	Average Existing Efficiency (kW/Ton or %)	Average Retrofit Efficiency (kW/Ton or %)	Electricity Savings (kW)	Operating Hours per year	Load Factor	Electricity Savings (kWh)	Cost Savings (\$)
2	HVAC System Refurbishing and Reconfiguration									
2	Replace Package Units/Split Systems	7	28	1.5	1	14	8736	0.4	48,922	\$5,381
2	Refurbishing Patient Room Fan Coils	26	4.85	70%	90%	0.97	8736	0.5	8,474	\$932
2	Refurbishing AHU	13	28.33	70%	90%	5.67	8736	0.5	49,498	\$5,445
<b>Total</b>										
									106,894	\$11,758

EEM-#	Energy Conservation Measure	Energy Usage (kWh) Before EEM-1&2	Energy Usage (kWh) After EEM-1&2	Expected % Saving	Energy Savings (kWh)	Elec. Cost Savings (\$)	Energy Savings (Therm)	Gas Cost Savings (\$)	Total Cost Savings (\$)
3	Controls Replacement								
3	Chilled Water System	505,454	335,102	10%	33,510	\$3,686	N/A	N/A	\$3,686
3	Hot Water System	29,315	29,315	10%	2,931	\$322	N/A	N/A	\$322
3	Air Distribution System	200,102	142,130	10%	14,213	\$1,563	6,542	\$5,560	\$7,124
3	Package Units	146,765	97,843	10%	9,784	\$1,076	N/A	N/A	\$1,076
<b>Total</b>									
					60,439	\$6,648	6,542	\$5,560	\$12,209

EEM-#	Energy Conservation Measure	Energy Usage (Therm) Before EEM-1&2	Energy Usage (Therm) After EEM-1&2	Expected % Saving	Energy Savings (Therm)	Cost Savings (\$)
3	Air Distribution System (for heating)	32,708		20%	6,542	\$5,560

EEM-#	Energy Conservation Measure	Energy Usage (kWh) Before EEM-1&2	Energy Usage (kWh) After EEM-1&2	Expected % Saving	Energy Savings (kWh or Therm)	Cost Savings (\$)
4	Steam and Hot Water Deferred Maintenance	79,008	N/A	10%	7,901	\$6,716

EEM-#	Energy Conservation Measure	Energy Usage (kWh) Before EEM-1&2	Energy Usage (kWh) After EEM-1&2	Expected % Saving	Energy Savings (kWh or Therm)	Cost Savings (\$)
7	Electricity and Steam Metering	881,635	604,390	0%	0	\$0
7	Electricity Metering	32,708	N/A	0%	0	\$0
<b>Total</b>						
						\$0

**CONSTRUCTION COST ESTIMATE WORKSHEET  
SANTA PAULA HOSPITAL  
ENERGY MANAGEMENT AND MODERNIZATION PROJECT  
SCOPING STUDY**

<b>EEM - 1: CONSOLIDATE CHILLED WATER SYSTEMS</b>				
<b>OPTION 1: Expand and Replace Existing Chilled Water System</b>				
<b>TONS</b>	<b>\$/TON</b>	<b>TOTAL COST</b>		
150	\$ 3,000	\$ 450,000	Chilled Water System	
1,500	\$ 50	\$ 75,000	Distributino Piping/Connect	
		\$ 525,000		

<b>EEM-2: HVAC SYSTEM REFURBISHING AND RECONFIGURATION</b>				
<b>ITEM</b>	<b>QUANT.</b>	<b>CAPACITY</b>	<b>\$/UNIT</b>	<b>TOTAL COST</b>
<b>Main Hospital</b>				
Miscelaneous		20	\$ 1,000	\$ 20,000
Refurbish AHU's		13	\$ 35,000	\$ 455,000
Refurbish FCU's		26	\$ 2,500	\$ 65,000
Exhaust Fans		42	\$ 2,000	\$ 84,000
		<b>TOTAL COST</b>		<b>\$ 624,000</b>

<b>EEM-3: CONTROL SYSTEM REPLACEMENT</b>				
<b>ITEM</b>	<b>QUANT.</b>	<b>CAPACITY</b>	<b>\$/UNIT</b>	<b>TOTAL COST</b>
<b>Main Hospital</b>				
Replace Package/Splits		6	\$ 2,000	\$ 12,000
Refurbish AHU's		13	\$ 15,000	\$ 195,000
Refurbish FCU's		26	\$ 1,500	\$ 39,000
Exhaust Fans		42	\$ 1,000	\$ 42,000
		<b>TOTAL COST</b>		<b>\$ 288,000</b>

<b>EEM-4: STEAM AND HOT WATER DEFERRED MAINTENANCE</b>				
<b>ITEM</b>	<b>QUANT.</b>	<b>CAPACITY</b>	<b>\$/UNIT</b>	<b>TOTAL COST</b>
Mech Rooms 2/3		2	\$ 10,000	\$ 20,000
Mech Rooms 1		1	\$ 15,000	\$ 15,000
		<b>TOTAL COST</b>		<b>\$ 35,000</b>

**Equipment Key**

Reference	Symbol	Equip Type	Asset #	Location	Notes
17-A		Air Handling Units		SHEET-17	Patient Rooms 081-171
17-B		Air Handling Unit		SHEET-17	S-1
17-C		Air Handling Unit		SHEET-17	S-2
17-D		Air Handling Unit		SHEET-17	S-3
17-E		Air Handling Unit		SHEET-17	S-4
17-F		Air Handling Unit		SHEET-17	S-5
18-A		Exhaust Fan		SHEET-18	EF-3
18-B		Exhaust Fan		SHEET-18	EF-4
18-C		Air Handling Unit		SHEET-18	20045 AHU ICU
18-D		Exhaust Fan		SHEET-18	EF-6, 2nd & 3rd Floor Toilet Rooms
18-E		Exhaust Fan		SHEET-18	EF-5
18-F		Package Unit		SHEET-18	Purchasing
18-G		Air Handling Unit		SHEET-18	AH-5, X-Ray
18-H		Exhaust Fan		SHEET-18	No Tag
18-I		Exhaust Fan		SHEET-18	EF-8 Isolation Toilet Room
18-J		Exhaust Fan		SHEET-18	EF-7 Isolation Toilet Room
18-K		Exhaust Fan		SHEET-18	No Tag
18-L		Exhaust Fan		SHEET-18	EF-12 Corridor
18-M		Air Handling Unit		SHEET-18	20051 OB
18-N		Exhaust Fan		SHEET-18	No Tag - Patient Room
18-O		Exhaust Fan		SHEET-18	No Tag - Corridor
18-P		Exhaust Fan		SHEET-18	No Tag - Patient Room
18-Q		Exhaust Fan		SHEET-18	No Tag
18-R		Exhaust Fan		SHEET-18	Serves PACU - S-1 20010
18-S		Exhaust Fan		SHEET-18	EF-17 Eastern Patient Rooms
18-T		Exhaust Fan		SHEET-18	EF-15 Pharmacy & Locker Rooms
18-U		Exhaust Fan		SHEET-18	No Tag (E-22)?
18-V		Exhaust Fan		SHEET-18	Surgery (E-23)?
18-W		Exhaust Fan		SHEET-18	Waiting Room Restroom (E-24)?
18-X		Package Unit		SHEET-18	
18-Y		Package Unit		SHEET-18	Purchasing
18-Z		Exhaust Fan		SHEET-18	Purchasing
18-AA		Exhaust Fan		SHEET-18	
18-AB		Exhaust Fan		SHEET-18	
18-AC		Exhaust Fan		SHEET-18	Storage
18-AD		Exhaust Fan		SHEET-18	Storage
18-AE		Package Unit		SHEET-18	Purchasing
18-AF		Exhaust Fan		SHEET-18	(EF 15) Storage No Tag
18-AG		Exhaust Fan		SHEET-18	No Tag
18-AH		Exhaust Fan		SHEET-18	No Tag
18-AI		Exhaust Fan		SHEET-18	No Tag
18-AJ		Exhaust Fan		SHEET-18	Receiving - Kitchen
18-AK		Exhaust Fan		SHEET-18	Receiving - Kitchen
18-AL		Exhaust Fan		SHEET-18	Kitchen
18-AM		Exhaust Fan		SHEET-18	EF-5 Utilities
18-AN		Exhaust Fan		SHEET-18	Central Services
18-AO		Condensing Unit		SHEET-18	Kitchen
18-AP		Exhaust Fan		SHEET-18	Kitchen
18-AQ		Exhaust Fan		SHEET-18	No Tag
18-AR		Exhaust Fan		SHEET-18	EF-16
18-AS		Exhaust Fan		SHEET-18	No Tag
18-AT		Exhaust Fan		SHEET-18	EF-10 Bacteriology / Surgery Waiting
18-AU		Air Handling Unit		SHEET-18	ER

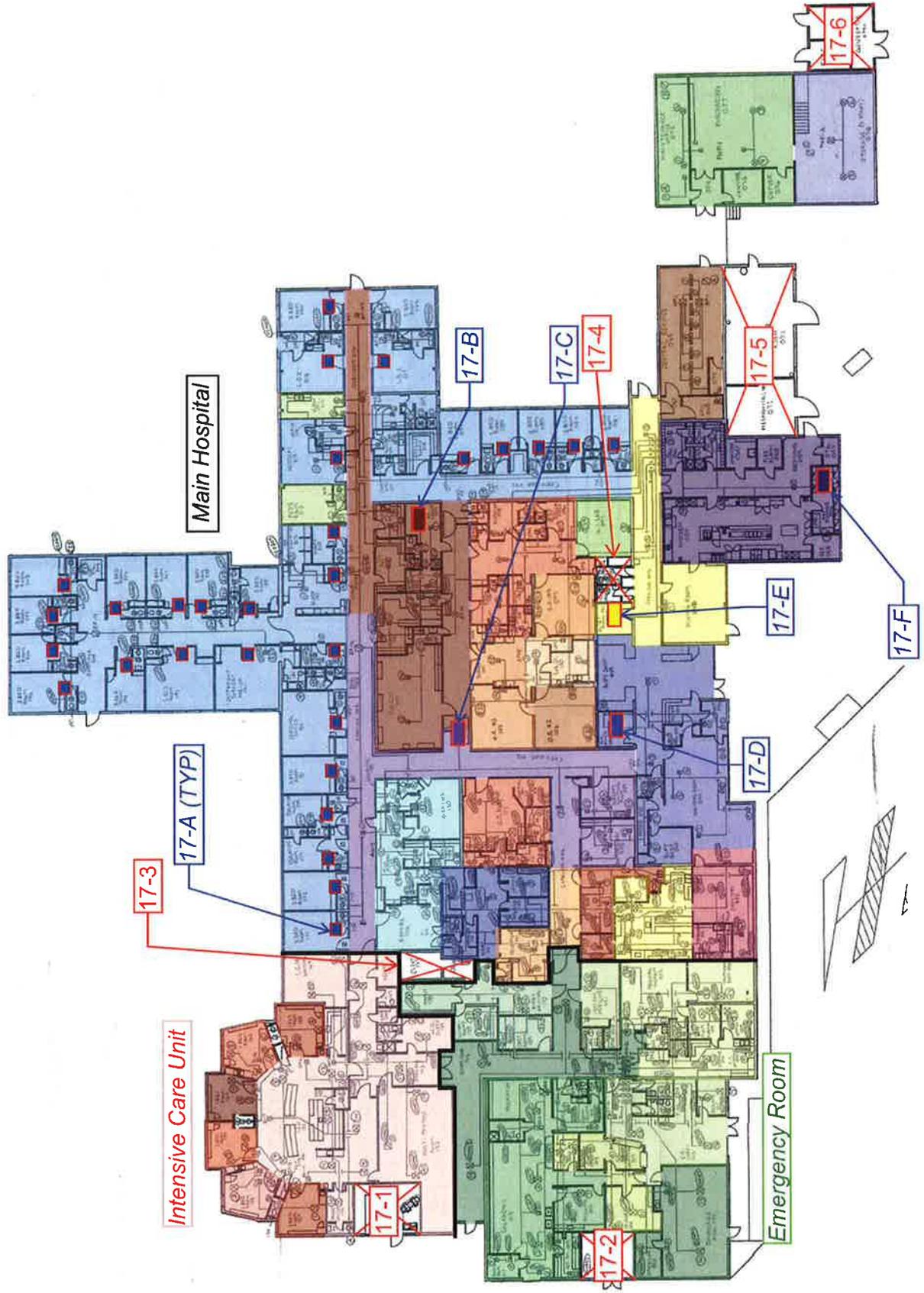
**Equipment Key**

Reference	Symbol	Equip Type	Asset #	Location	Notes
18-AV		Exhaust Fan		SHEET-18	No Tag-ER
18-AW		Condensing Unit		SHEET-18	Serves ER X-Ray Area #20048
18-AX		Package Unit		SHEET-18	CT Rooms (ER)
18-AY		Exhaust Fan		SHEET-18	Lab Hood #20033
18-AZ		Exhaust Fan		SHEET-18	Pathology #20034
18-BA		Exhaust Fan		SHEET-18	Triage ER Lobby #20035
18-BB		Exhaust Fan		SHEET-18	EF-1 #20037
18-BC		Air Handling Unit		SHEET-18	ER #20037
18-BD		Air Handling Unit		SHEET-18	ER #20038



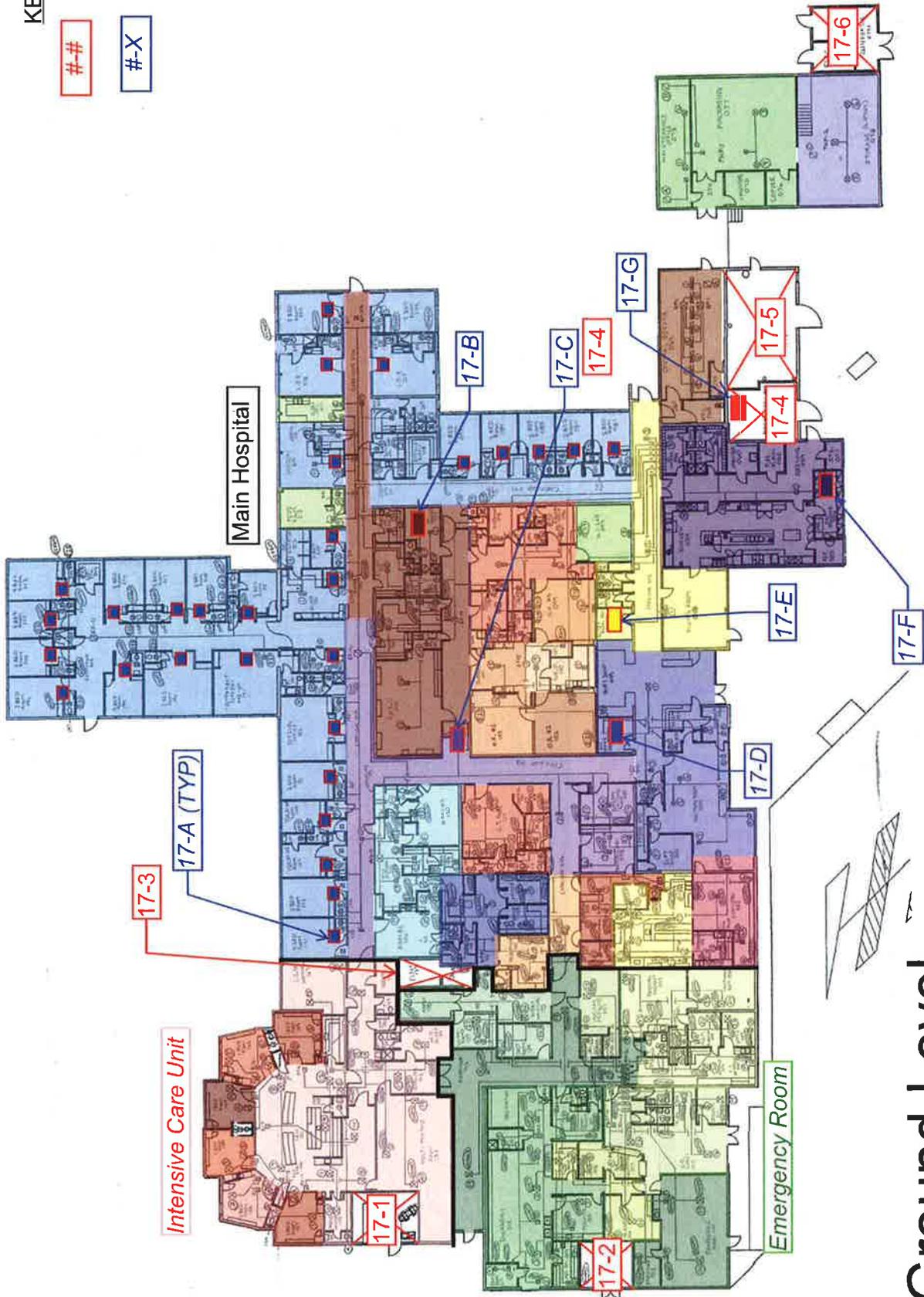
# Santa Paula Hospital

# SHEET-17



# Santa Paula Hospital

# SHEET-17



Ground Level



