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# Comparative Energy Analysis Report

*Prepared for*

**City of Oxnard**

*Prepared by*

**The Energy Network**

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**April 16, 2014**

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## 1. Overview

This report is intended to provide a framework for City of Oxnard to identify inefficient facilities and prioritize further investigation and energy efficiency retrofit work. This analysis uses only total floor area and energy billing data provided by the City of Oxnard to provide an overview of energy use in City facilities and to help identify individual locations with the potential for energy efficiency improvements. Many factors affect the energy use in different facilities, including age, type of heating, ventilation, air conditioning, and lighting equipment, facility occupancy and hours, plug loads, and climate. Once individual facilities with the greatest potential for energy savings are identified, a more detailed screening of those facilities can be performed to identify the specific sources of the inefficiencies. Further analysis can identify inefficient equipment, malfunctioning equipment, equipment not operating as designed, or suboptimal operational procedures.

## 2. City of Oxnard Facilities Summary

As identified in **Table 1**, this report presents an analysis of energy consumption data for 24 facilities or other asset types over the period September 1, 2012 to September 1, 2013. Within this portfolio of the City's properties, electricity data is available for 24 facilities and gas data is available for 15 facilities. Together these facilities account for 85% of the electricity usage data and 94% of the gas usage data available for the analysis period. The approximate annual energy cost for all accounts included in this analysis is \$3,660,000 per year. Based on the available utility data, the average electricity cost is \$0.16/kWh and the average gas cost is \$0.82/therm.

The facilities in City of Oxnard's portfolio contain about 530,000 square feet of floor space. The facility sizes range from 11,000 to 80,000 square feet. In the figures presented in the section "Annual Energy Costs and Usage", annual energy consumption and costs are normalized for square footage in buildings where floor area data are available. Annual energy usage or cost values that have been normalized for floor area are called "intensity" values. Since the facilities included in the City of Oxnard's portfolio represent a variety of building types and space uses, it may not be feasible or desirable to equalize the energy usage or cost intensity across all facilities. **Figure 1** shows the highest, lowest, and median energy cost intensities for the City's portfolio.

Additional details on methodology are presented in the section "Notes on Methodology."

**Table 1 – Comparative Energy Analysis Report Total Energy Cost Summary – City of Oxnard– September 1, 2012-September 1, 2013 (Sorted by Annual Energy Cost)**

<b>Facility Name</b>	<b>Annual Electricity Use (kWh/yr)</b>	<b>Annual Electricity Cost (\$/yr)</b>	<b>Average Electricity Rate (\$/kWh)</b>	<b>Annual Gas Use (therm/yr)</b>	<b>Annual Gas Cost (\$/yr)</b>	<b>Average Gas Rate (\$/therm)</b>	<b>Total Annual Energy Cost (\$/yr)</b>	<b>Annual Energy Cost (\$/sqft/yr)</b>
Streetlights LS1	4,738,811	\$1,450,327	\$0.31				\$1,450,327	
Wastewater Treatment Plant	10,350,374	\$976,906	\$0.09	1,758	\$1,783	\$1.01	\$978,689	
Public Safety Building	894,492	\$106,002	\$0.12	1,311	\$1,380	\$1.05	\$107,383	\$3.37
Oxnard Public Library	564,412	\$101,248	\$0.18	6,945	\$5,667	\$0.82	\$106,915	\$1.48
Del Norte RRTS	631,622	\$103,025	\$0.16	3,450	\$3,090	\$0.90	\$106,115	\$1.33
Traffic Control	602,845	\$102,393	\$0.17				\$102,393	
Performing Arts Center	448,061	\$86,698	\$0.19	2,197	\$2,001	\$0.91	\$88,699	\$2.86
Annex 1	529,354	\$69,969	\$0.13	11,058	\$8,533	\$0.77	\$78,502	\$2.07
Service Center Fire Admin	469,601	\$67,394	\$0.14	10,519	\$8,100	\$0.77	\$75,494	\$2.04
Civic Center City Hall	462,031	\$64,017	\$0.14	6,270	\$5,162	\$0.82	\$69,179	\$2.09
Water Yard	431,956	\$61,910	\$0.14	2,806	\$2,602	\$0.93	\$64,512	\$4.08
Corporate Yard	371,693	\$53,951	\$0.15	11,024	\$8,210	\$0.74	\$62,161	\$1.05
Streetlights LS2	650,791	\$57,091	\$0.09				\$57,091	
South Oxnard Library	330,386	\$50,985	\$0.15	964	\$1,033	\$1.07	\$52,018	\$1.93
Community Center West	176,916	\$48,647	\$0.27	452	\$598	\$1.32	\$49,245	\$2.46
Oxnard Transportation Center	349,285	\$45,314	\$0.13	4,143	\$3,255	\$0.79	\$48,569	\$3.69
Pump and Irrigation	176,963	\$40,955	\$0.23				\$40,955	
OPD Sturgis Annex	292,163	\$38,964	\$0.13				\$38,964	\$0.65
Carnegie Art Museum	161,637	\$23,037	\$0.14				\$23,037	\$2.09
Colonia Multi-Service Center	67,529	\$22,245	\$0.33				\$22,245	
Oxnard Union HSD	80,782	\$14,220	\$0.18	4,335	\$3,485	\$0.80	\$17,705	
Fire Station 1	73,901	\$12,145	\$0.16	271	\$429	\$1.58	\$12,574	
Area Lights	54,931	\$5,528	\$0.10				\$5,528	
Streetlights LS3	31,171	\$3,503	\$0.11				\$3,503	
<b>Total</b>	22,941,574	\$3,606,476		67,503	\$55,327		\$3,661,803	
<b>% of Total</b>		<b>99% of Total Energy Costs</b>			<b>1% of Total Energy Costs</b>		<b>100% of Total Energy Costs</b>	

**Figure 1 - Annual Energy Costs and Cost Intensities for City of Oxnard City Facilities\***

\$/sq.ft.	\$4.08	<b>City of Oxnard Highest Cost Intensity</b> (Water Yard)	\$64,512	\$/facility
	\$2.09	<b>City of Oxnard Median</b> (Civic Center City Hall)	\$69,179	
	\$1.05	<b>City of Oxnard Lowest Cost Intensity</b> (Corporate Yard)	\$62,161	

\*Excluding facilities smaller than 1,000 square feet and with abnormally high and low cost intensities

### 3. Annual Energy Costs and Usage in City of Oxnard Facilities

**Figures 2 – 3** provide graphical comparisons of the energy cost, cost intensity, energy use, and energy use intensity of the facilities in this analysis. Figures 2.1 and 2.2 show the facilities with the highest energy costs and cost intensities including both gas and electricity data. Figures 3.1 – 3.8 show the facilities with the highest electricity costs; highest gas costs; highest electricity cost intensities; highest gas cost intensities; highest electricity usage; highest gas usage; highest electricity usage intensities; and highest gas usage intensities, respectively. Table of Figures on p. ii above provides a list of all figures in this report. Figures 4.1 – 4.2 show the energy costs and energy use of distributed assets, such as streetlights.

Figure 2.1 – Facilities with Highest Annual Energy Cost (\$)

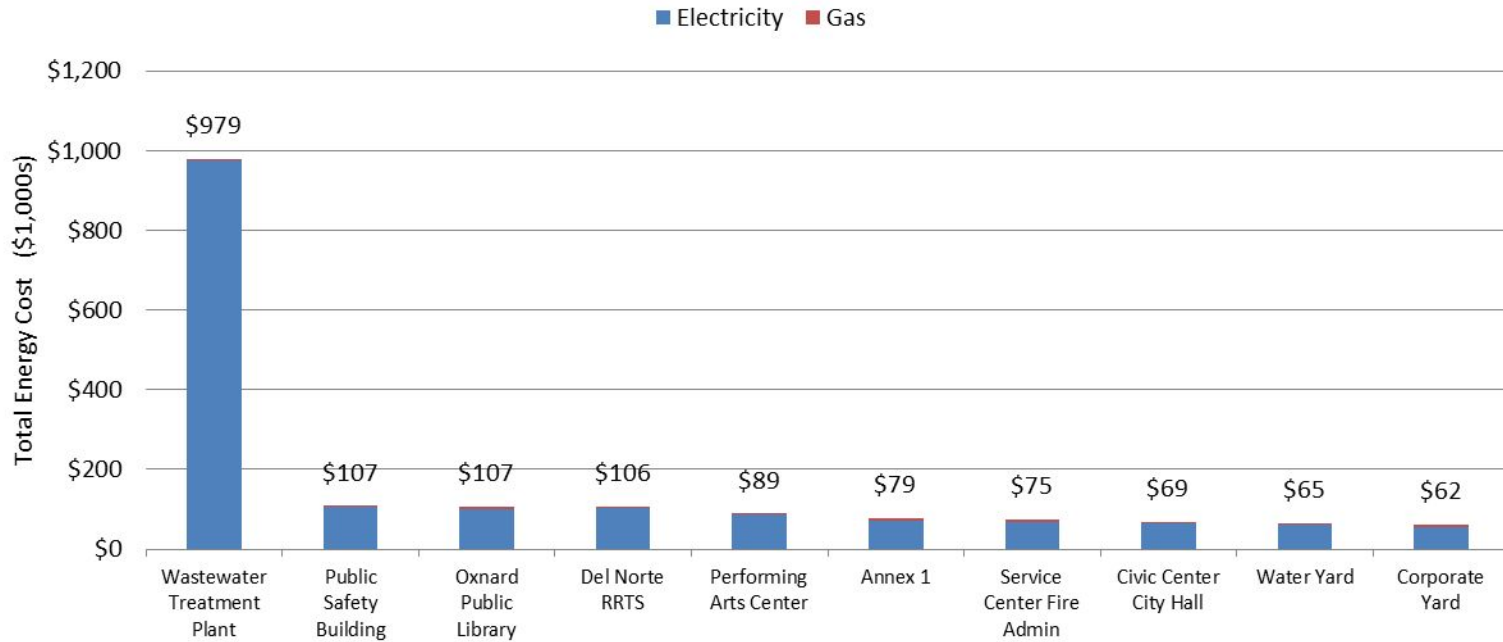
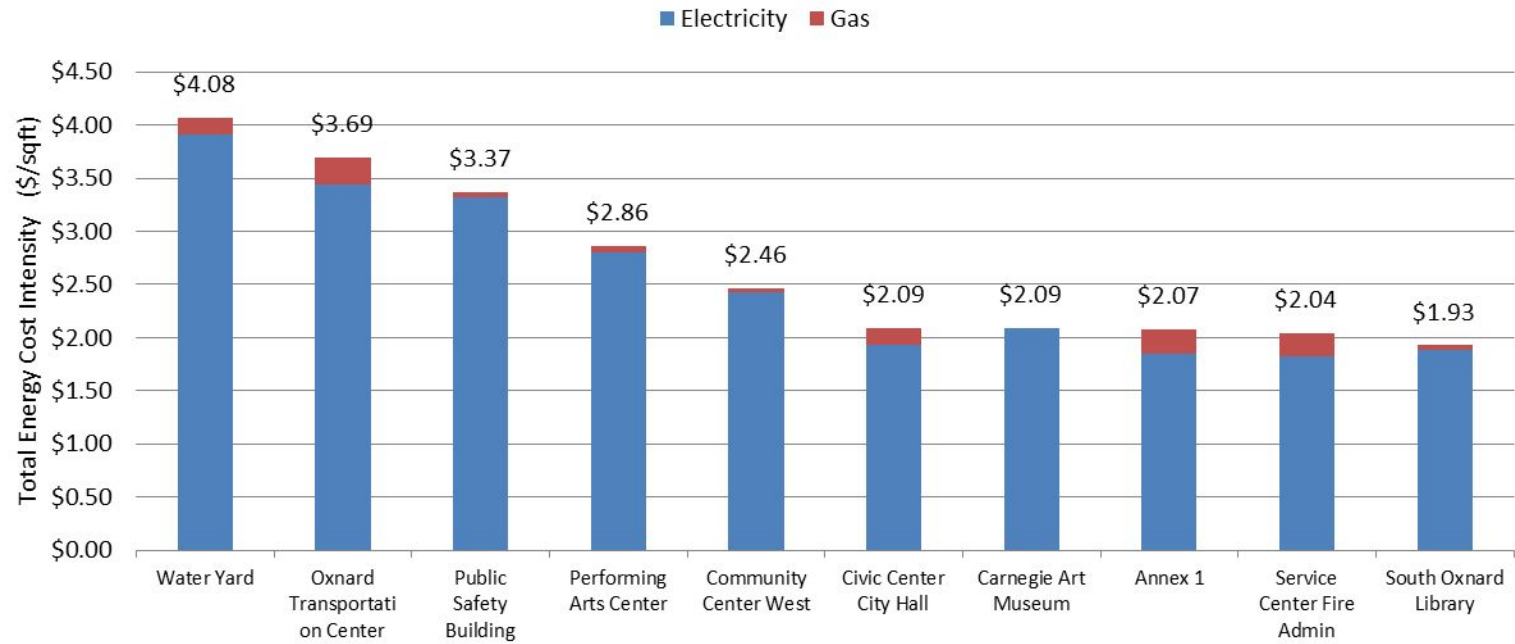
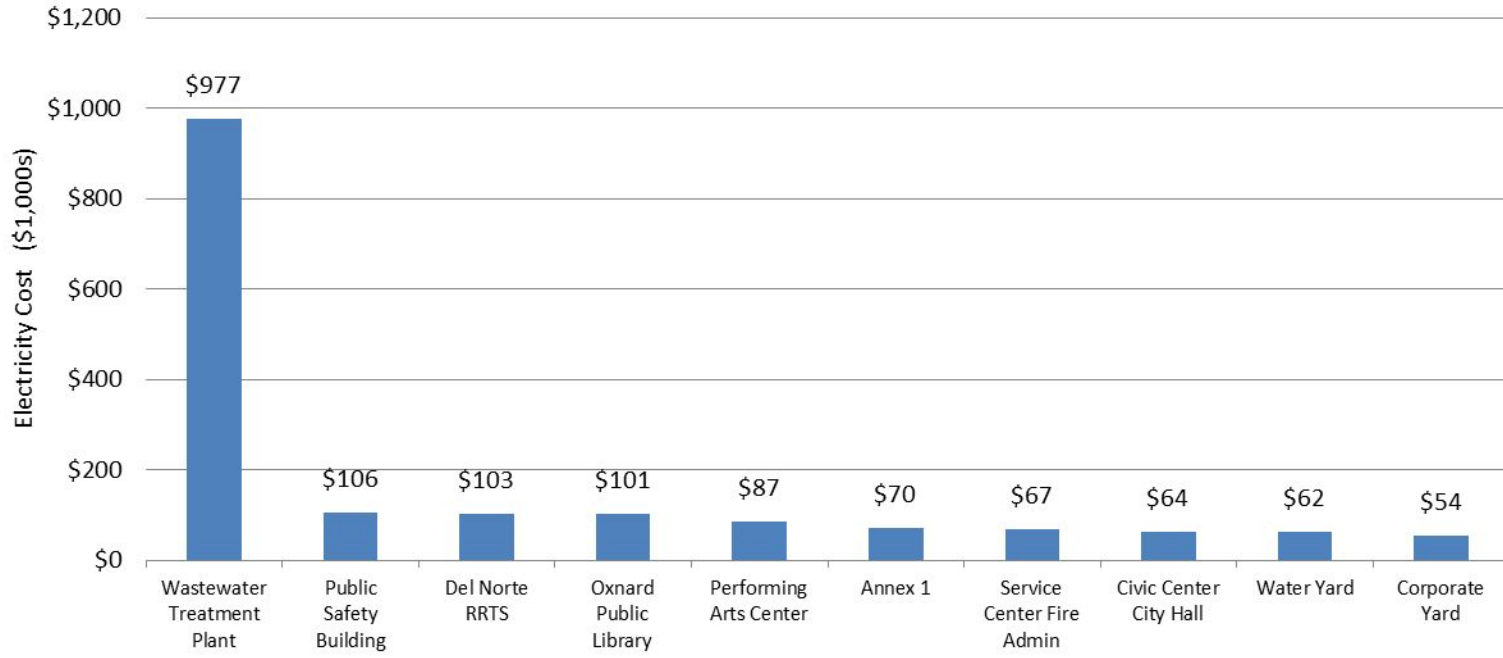




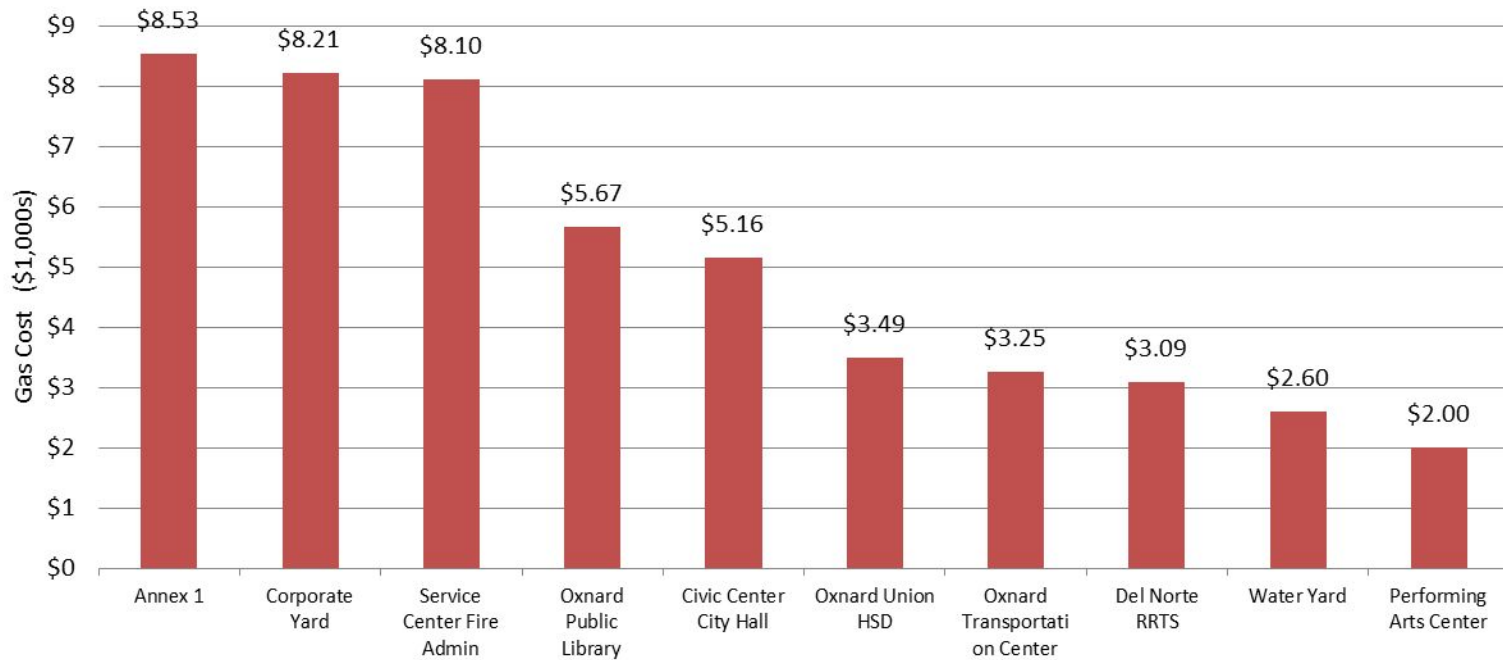
Figure 2.2 – Facilities with Highest Annual Energy Cost Intensity (\$/sq.ft.)



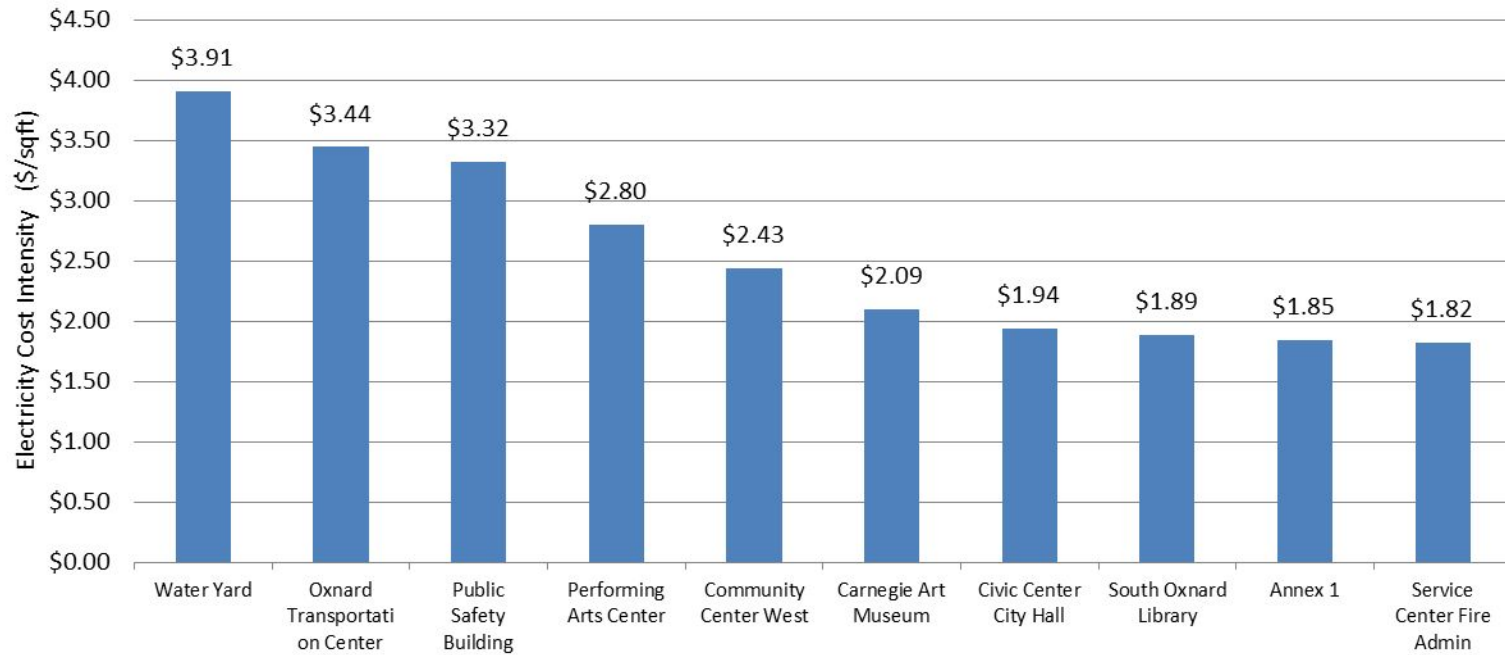
**Figure 3.1 – Facilities with Highest Annual Electricity Cost (\$)**



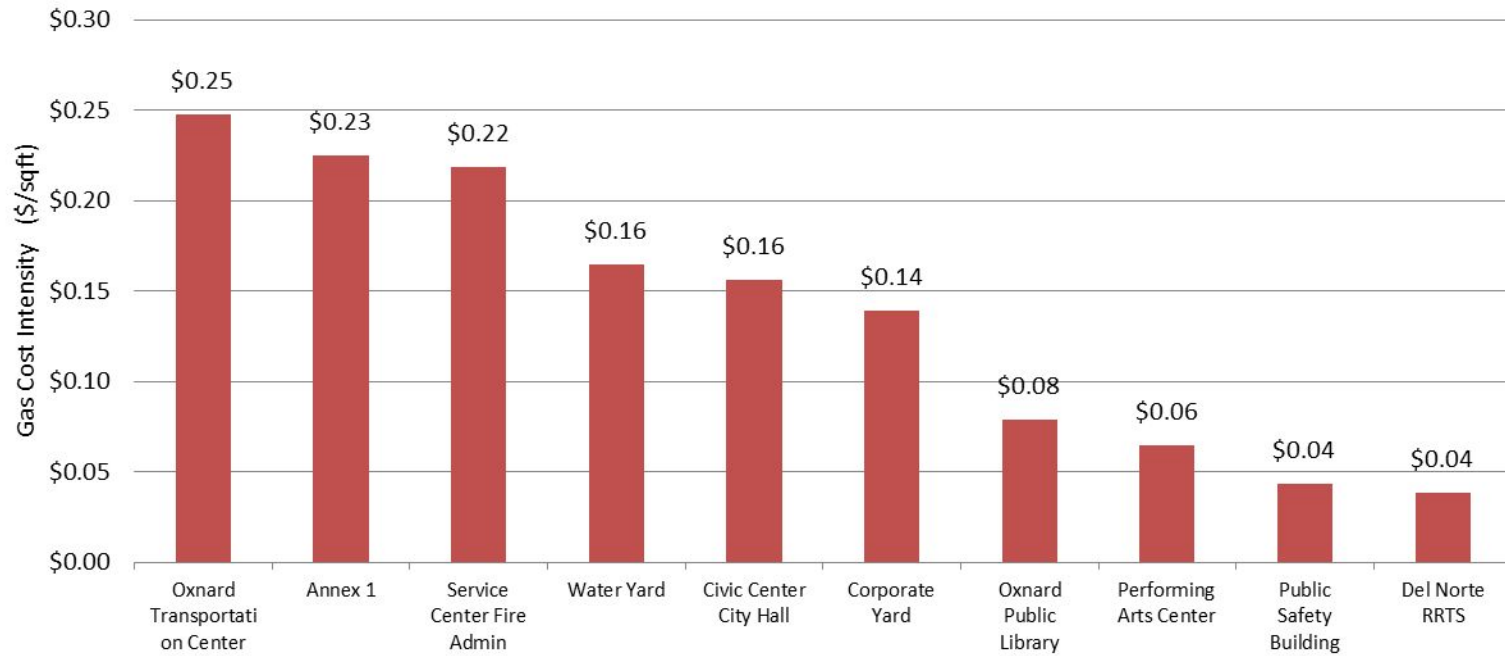
**Figure 3.2 – Facilities with Highest Annual Gas Cost (\$)**



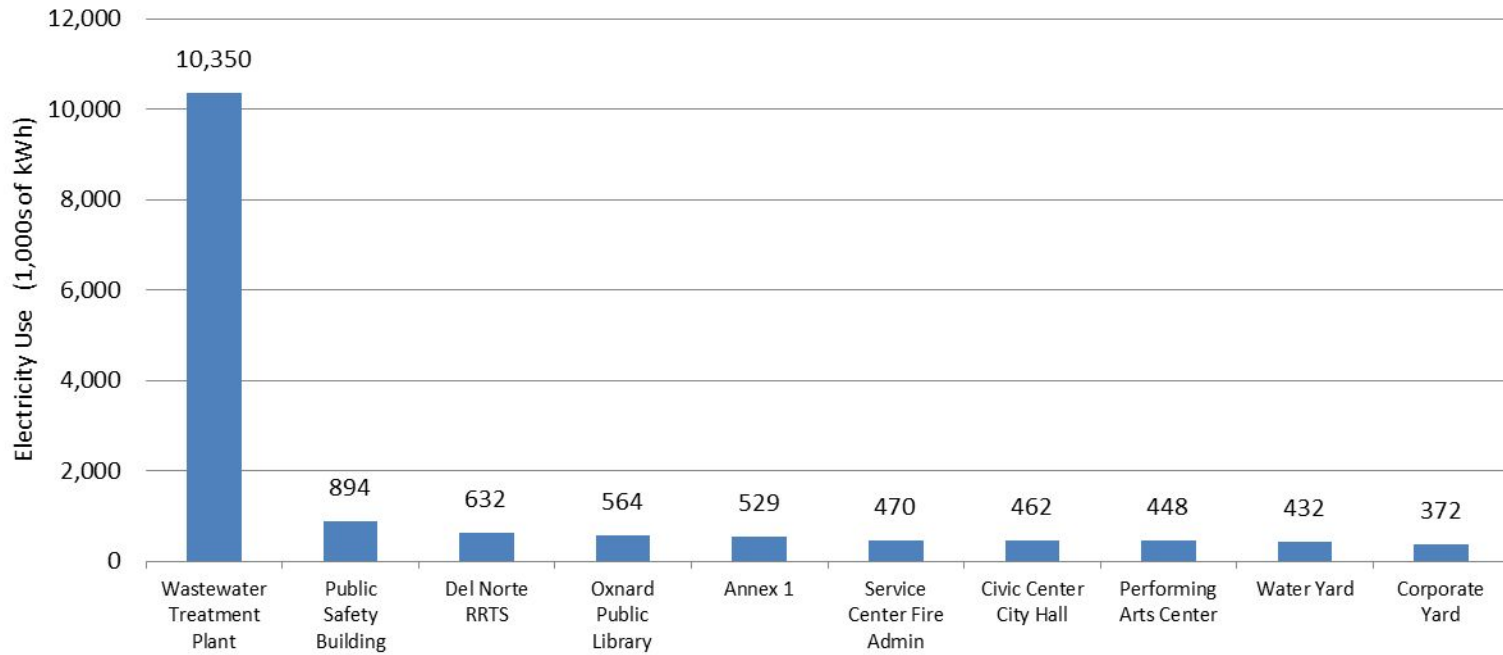
**Figure 3.3 – Facilities with Highest Annual Electricity Cost Intensity (\$/sq.ft.)**



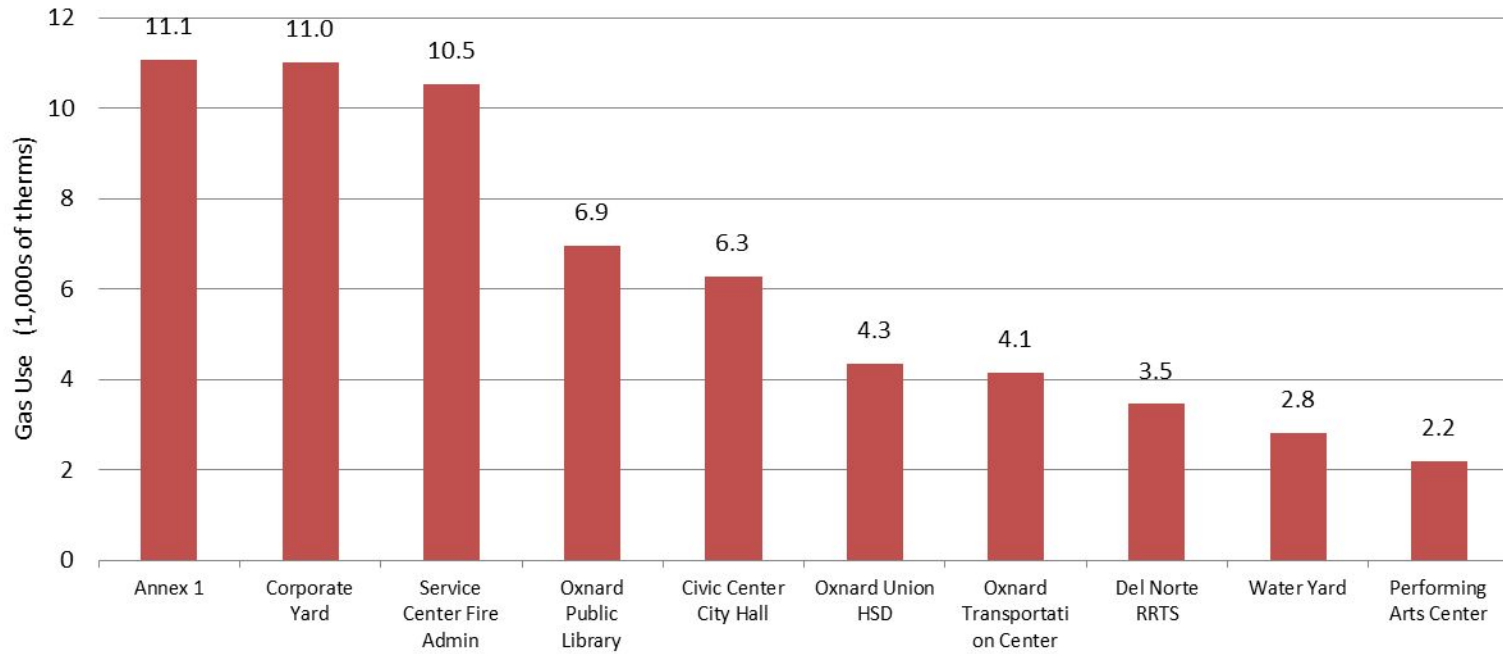
**Figure 3.4 – Facilities with Highest Annual Gas Cost Intensity (\$/sq.ft.)**



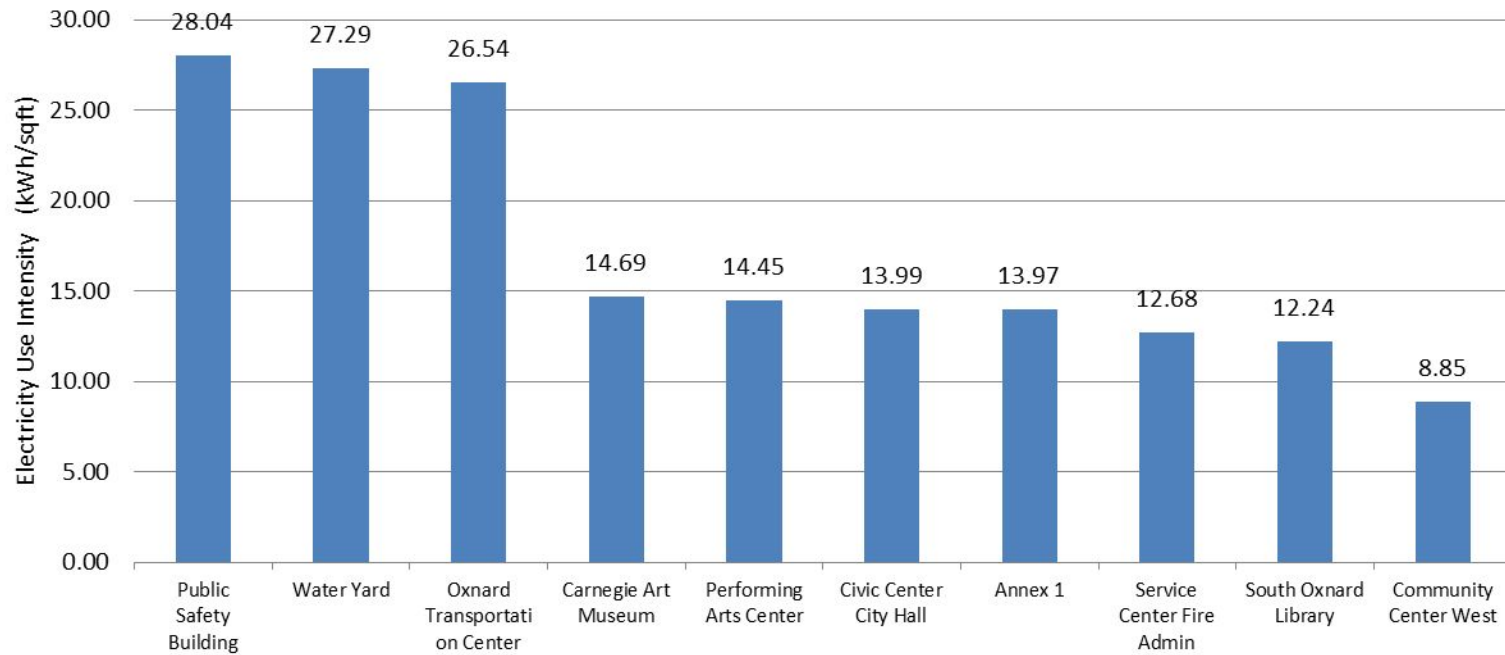
**Figure 3.5 – Facilities with Highest Annual Electricity Use (kWh)**



**Figure 3.6 – Facilities with Highest Annual Gas Use (therms)**

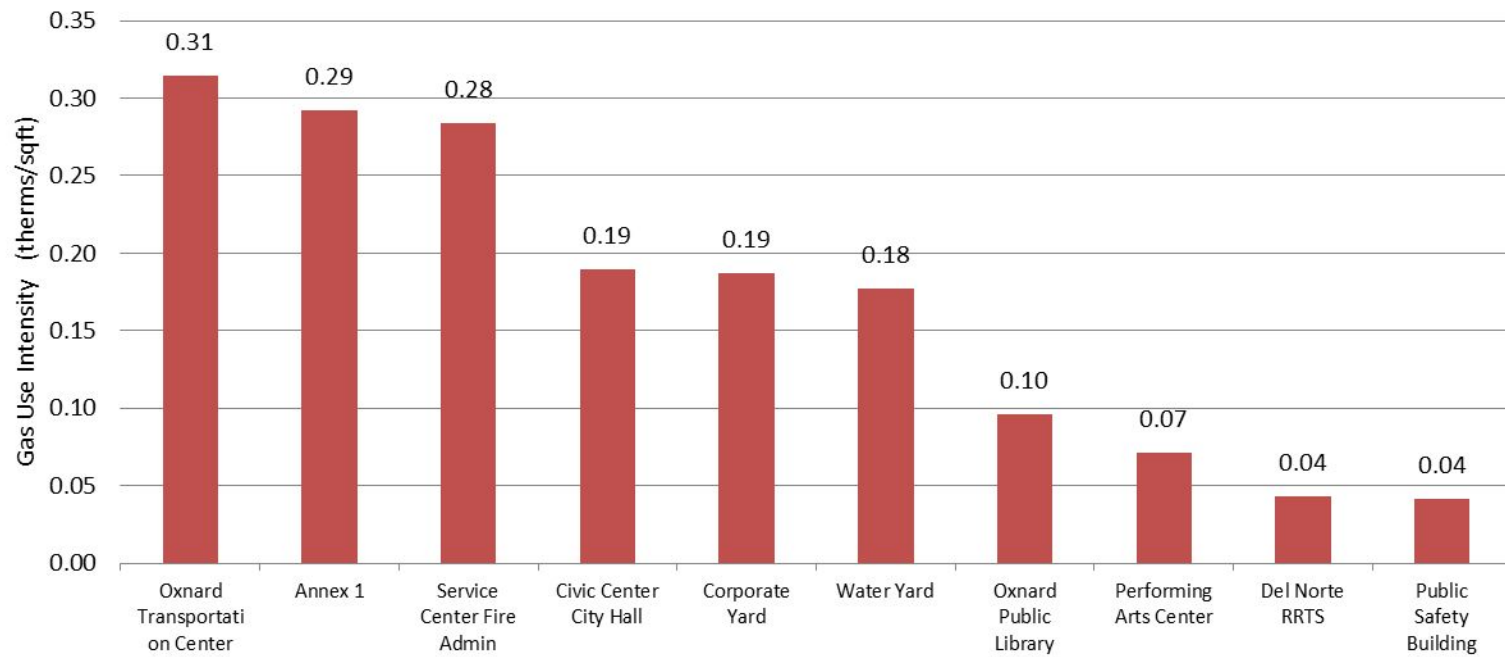


**Figure 3.7 – Facilities with Highest Annual Electricity Use Intensity (kWh/sq.ft.)**

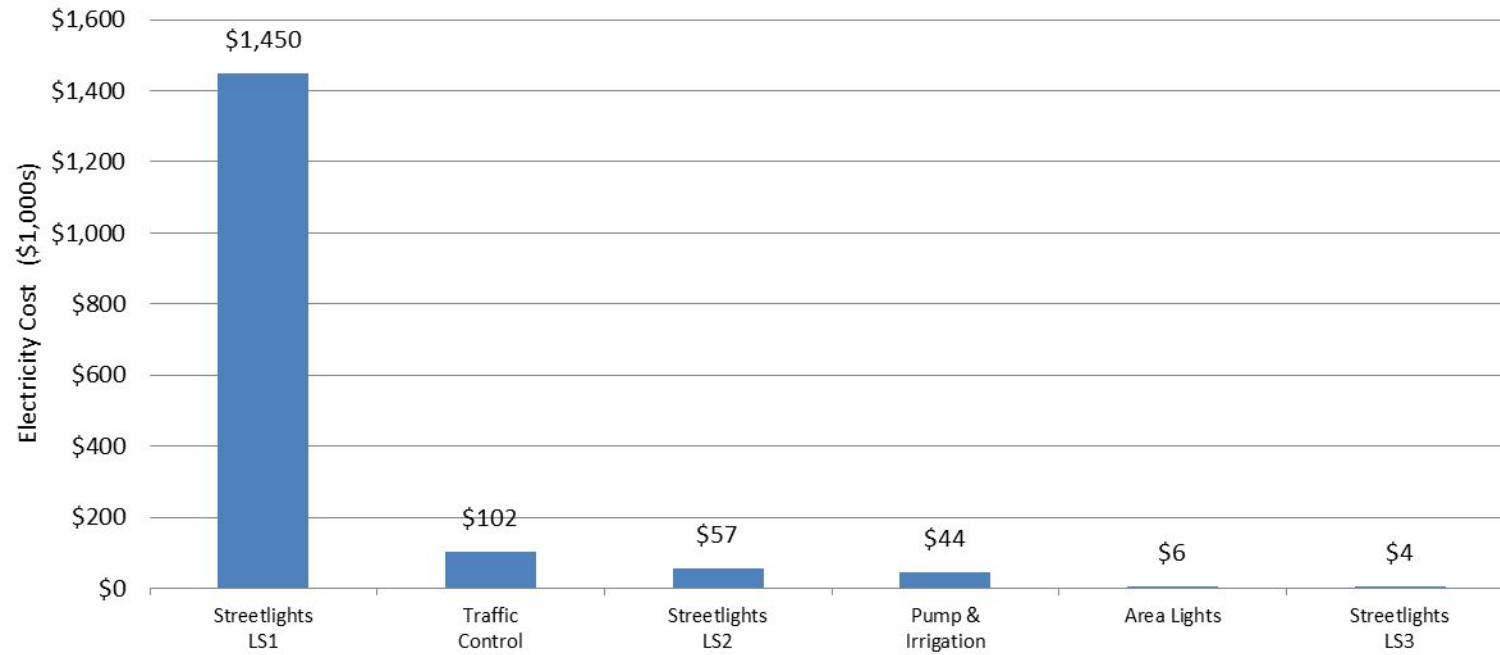




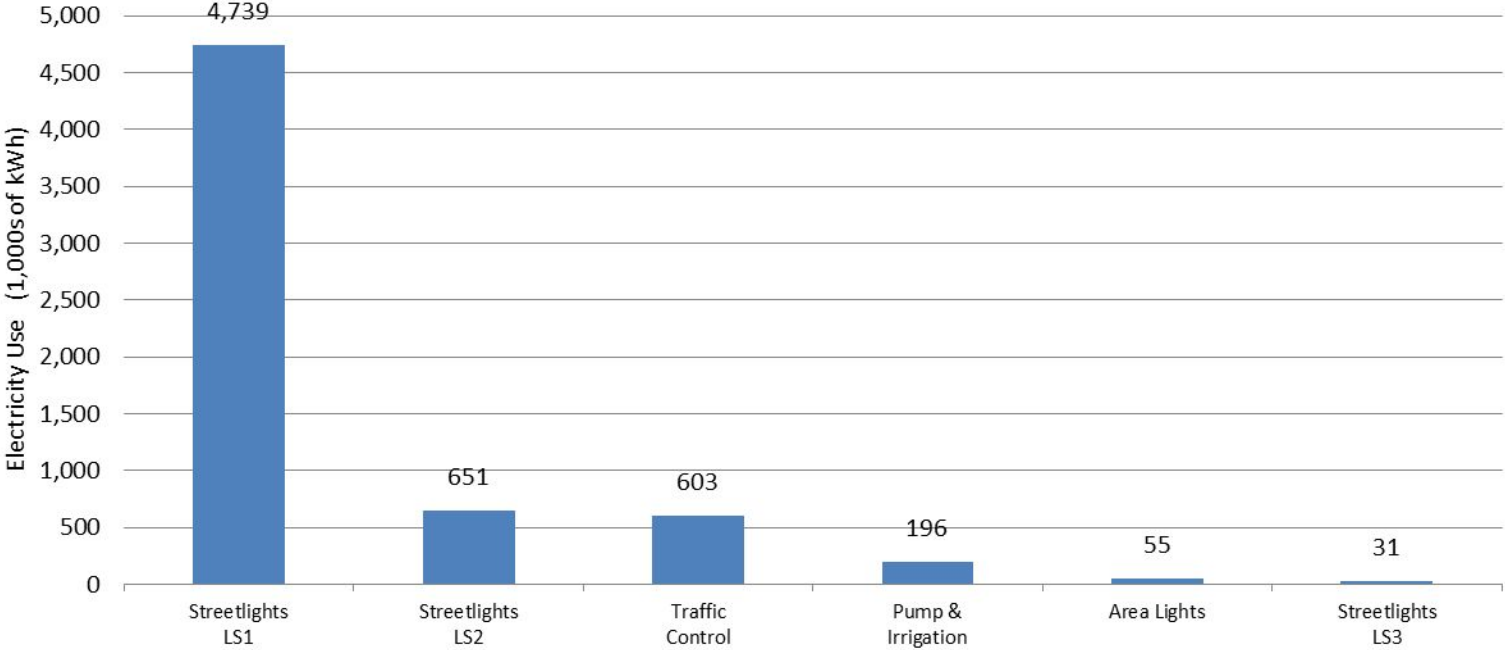
**Figure 3.8 – Facilities with Highest Annual Gas Use Intensity (therms/sq.ft.)**



**Figure 4.1 – Distributed Assets – Annual Electricity Cost (\$)**



**Figure 4.2 – Distributed Assets – Annual Energy Use (kWh)**





#### 4. Notes on Methodology

- All electricity and gas results were based on usage during period September 1, 2012 – September 1, 2013.
- Energy usage and cost data used in this analysis were derived from utility billing data provided by City staff.
- Monthly usage data from individual meters were assigned to the City facilities using a combination of matching information provided by City staff and supplemental research.
- Facility names, types, and floor area information for many facilities were provided by City staff. Errors in floor area information can have a significant effect on energy intensity calculations. It is recommended that all floor area information be verified as part of any closer investigation of facilities analyzed in this report.
- In some cases, multiple meters were associated with a single facility or asset type. For such facilities, to generate estimates of facility-wide energy use and energy intensity, energy usage and cost values were aggregated by summing the average daily energy usage and cost values for each day in the analysis period.
- The electric meters matched to specific facilities included in this analysis accounted for 85.3% of electricity usage and 84.9% of electricity costs during the analysis period.
- The gas meters matched to specific facilities included in this analysis accounted for approximately 96.2% of gas usage and 94% of gas costs during the analysis period.
- **Table 2** indicates the data types available for each facility.

**Table 2 – Facilities Included in Analysis**

<b>Facility Name</b>	<b>Street</b>	<b>Electricity Data Interval</b>	<b>Gas Data Interval</b>	<b>Facility Type</b>	<b>Area (sq.ft.)</b>
Annex 1	300 W 3rd St	monthly	monthly	Facilities	37,888
Area Lights		monthly	unavailable	Distributed	
Carnegie Art Museum	424 S C St	monthly	unavailable	Museum	11,000
Civic Center City Hall	305 West Third Street	monthly	monthly	Office	33,030
Colonia Multi-Service Center	1500 Camino Del Sol	monthly	unavailable	Misc	
Community Center West	801 Hobson Way	monthly	monthly	Misc	20,000
Corporate Yard	1060 Pacific Ave	monthly	monthly	Misc	58,923
Del Norte RRTS	111 South Del Norte Blvd	monthly	monthly	Facilities	80,000
Fire Station 1	491 S K St	monthly	monthly	Fire	
OPD Sturgis Annex	3001 Sturgis Rd	monthly	unavailable	Misc	60,000
Oxnard Public Library	251 South A St	monthly	monthly	Library	72,000
Oxnard Transportation Center	201 East Fourth Street	monthly	monthly	Misc	13,162
Oxnard Union HSD	309 S K St	monthly	monthly	School	
Performing Arts Center	800 Hobson Way	monthly	monthly	Misc	31,000
Public Safety Building	251 S C St	monthly	monthly	Misc	31,900
Pump and Irrigation		monthly	unavailable	Distributed	
Service Center Fire Admin	214 S C St & 360 W 2nd St	monthly	monthly	Misc	37,026
South Oxnard Library	4300 Saviers Rd	monthly	monthly	Library	27,000
Streetlights LS1		monthly	unavailable	Distributed	
Streetlights LS2		monthly	unavailable	Distributed	
Streetlights LS3		monthly	unavailable	Distributed	
Traffic Control		monthly	unavailable	Distributed	
Wastewater Treatment Plant	6001 South Perkins Rd	monthly	monthly	Misc	
Water Yard	251 South Hayes Ave	monthly	monthly	Misc	15,831