

DATE ISSUED: June 14, 200

REPORT NO. 01-128

ATTENTION: Public Safety & Neighborhood Services Committee  
Agenda of June 20, 2001

SUBJECT: Street Lighting

REFERENCE: Manager's Report No. 83-511 dated 12/9/83  
Manager's Report No. 94-310 dated 1/9/95  
Manager's Report No. 95-114 dated 5/30/95  
Manager's Report No. 99-204 dated 1/10/00

### SUMMARY

THIS IS AN INFORMATION ITEM ONLY. NO ACTION IS REQUIRED ON THE PART OF THE COMMITTEE OR THE CITY COUNCIL.

### BACKGROUND

At the request of the Committee Chair, the following report has been prepared to respond to questions about street lights. The issues addressed in this report are: cost of switching from LPS street lights to HPS street lights City-wide, over time; how to reduce the time needed to install street lights; cost comparison between cobra-head street lights and acorn lights; the lighting standards that the City uses; and a lighting level comparison among cobra-head street lights, double-globe acorn lights, and single-globe acorn lights; impacts of changing City standards on Maintenance Assessment Districts; and the potential for using solar power for street lights.

#### **Types of Street Lights:**

Generally north of Interstate 8, all City street lights are low pressure sodium vapor (LPS). These lights are distinguished by their strong yellow color. This type of light emits a monochromatic color, which is easily filtered out from the telescopes at Mount Palomar and Mount Laguna observatories.

South of Interstate 8, lights may be either LPS or high pressure sodium vapor (HPS). HPS lights do not provide more illumination than LPS, but they do emit a broad spectrum which gives much better color rendition. HPS are approved for use in high-crime census tracts, major and collector streets. Existing LPS lights in these areas will be converted to HPS at their time of regularly scheduled maintenance.

In 1982, the City Council voted for LPS over HPS to be the City-wide standard. This was primarily based on the lower energy costs of LPS, and was supported by the Director of the Palomar Observatory. In 1993, the Council amended this policy to allow for HPS for all high-

crime areas south of Interstate 8 plus Centre City; Golden Hill Revitalization Area; Skyline Drive (from 58<sup>th</sup> Street to East Skyline Drive) and Imperial Avenue (from Euclid Avenue to 69<sup>th</sup> Street). In 1994, it was further amended to allow HPS south of Interstate 8 on all 2-lane collectors and higher classifications which are at least 40' wide and have a minimum of 5,000 vehicles per day (ie. ADT).

## **DISCUSSION**

### **Intersection Standards**

The City’s Street Design Manual identifies the number of lights and wattage per intersection that is based on the street’s width and classification. The resulting level of illumination at most City intersections conforms to CalTrans standards.

Section 9-10.3 in the CalTrans Traffic Manual states the following:

“Where highway safety lighting is to be installed at intersections on conventional highways, . . . the minimum maintained horizontal illuminance should be as follows:

“In urban areas and expressways, 1.6 horizontal lux [0.15 horizontal footcandles] on the area normally bounded by the crosswalks, and 6.5 horizontal lux [0.60 horizontal footcandles] at the intersection of centerlines of the entering streets.

The Street Design Manual is currently being revised and full-conformance to Caltrans lighting standards will be addressed. When these standards are satisfied, it is acceptable to install additional ornamental acorn lights for aesthetics, such as on Market Street at 20th Street and 21st Street where there are two cobra heads and two acorn lights per intersection.

### **Mid-block Standards**

Illumination is determined by many factors—type of light, wattage, spacing, height of pole, roadway width, etc. There are no current illumination standards for mid-block street lights, although the 150' spacing standard adopted in 2000 was partially based on the American National Standard Practice for Roadway Lighting, that is commonly referred to as “ANSI RP-8.”

In the last twenty (20) years, Council has voted on various spacing standards for mid-block lighting. The table below summarizes the changing standards:

<b>Date of Change</b>	<b>Mid-Block Spacing</b>	
	<b>From</b>	<b>To</b>
1981	850'	600'
1995	600'	300'
2000	300'	150'*

- \* Mid-Block street lighting shall be placed such that spacing of street lights between intersection is no greater than 300 feet; except that mid-block street lighting shall be spaced no greater than 150 feet within one-quarter mile of all transit stops (bus and trolley), as well as in residential and commercial areas in high crime census tracts.

We are currently using the new mid-block standard adopted by the City Council in January, 2000. Full implementation would cost about \$172 million plus an additional \$12 million for energy and maintenance.

### Comparing the Illumination of Cobra-head vs. Acorn

In the table below, we have compared the illumination levels produced by three example street lights: a 150 Watt HPS Cobra-head street light, a 150 Watt HPS double-globe acorn-type post-top street light, and a 150 Watt HPS single-globe acorn-type street light. The points of evaluation are at the face of curb nearest the street light (near side), at the centerline of a 40-foot-wide street directly in front of the street light, and the face of curb directly across from the street light (far side). Additional evaluation points were taken down the street a distance of 75 feet. These two columns evaluate the illumination levels from one street light and from two street lights halfway between the two lights. The second street light is assumed to be located on the opposite side of the street from the first street light (staggered) and 150 feet away.

Minimum Maintained Horizontal Footcandles									
LOCATION	150 W HPS COBRA	150 W HPS DOUBLE ACORN	150 W HPS ACORN						
	at the pole	at 75 feet	at the pole	at 75 feet	at the pole	at 75 feet			
		one cobra	two cobras		one double acorn	two double acorns		one acorn	two acorns
Face of Curb—near side	1.35	0.08	0.23	0.10	0.09	0.12	0.10	0.04	0.06
Centerline of 40'-wide Street	1.90	0.13	0.26	1.10	0.06	0.12	1.10	0.03	0.06
Face of Curb—far side	0.75	0.15	0.23	0.25	0.03	0.12	0.25	0.02	0.06

### Schedule to Construct a Street Light

Attachment 1 shows the ten-month time line for installing street lighting utilizing overhead utilities via SDG&E and Street Division. Staff will continue to explore ways to further reduce the time to install overhead street lights.

**Conversion of all LPS to HPS**

Currently, the City’s Street Division maintains 24,882 LPS street lights and 14,717 HPS. The conversion costs includes ballast installation on 2,095 LPS lights. The total cost (excluding labor) is \$2,782,790. Assuming a conversion rate of 40 to 50 lights per day, Street Division estimates it would take from 2.5 to 3.5 years for a complete conversion, depending whether it is done by full-time or part-time staff.

If the existing LPS lights are converted to HPS lights, it is estimated that the energy cost will increase by approximately \$500,000.

**Cost Comparison of Cobra-head vs. Acorn**

The table below shows a comparison of the materials costs of a cobra-head light and an acorn light.

	COBRA-HEAD	ACORN
Pole	\$870	\$1,000 to \$3,500 (due to aesthetics)
Light Fixture	\$82	\$125
Globe	\$0	\$80 to \$300 (built-in prisms for reflection)
TOTAL	\$952	\$1,205 to \$3,925

Maintenance cost are similar for both Cobra and Acorn lights. However, some “acorn” light standards may require painting every 5 years or as needed at a cost of \$30 per pole. Additionally, pole replacement cost could be substantially higher for “acorn” lights.

The energy cost for both cobra-head and acorn lights is the same when using a typical 150-watt HPS (i.e., \$82.27 per year).

**Impacts of Changing City Standards on Maintenance Assessment Districts (MADs)**

Maintenance Assessment Districts (MADs or Districts) are also known as Landscape Maintenance Assessment Districts (LMDs) or Lighting and Landscape Maintenance Assessment Districts (LLMDs). A MAD is formed where property owners vote by ballot to pay extra on their property taxes to receive services that are above-and-beyond what the City would otherwise provide. This above-and-beyond service level is termed a “special benefit,” while the City’s standard service level is termed a “general benefit.” Proposition 218, passed by California voters in 1996, strictly governs such things as:

- a)the distinction between “special” and “general” benefit;
- b)information which must be provided to property owners at the time of balloting about the services they will pay for as a “special benefit” compared to what the City provides as a

- “general benefit;”
- c)projected costs and assessment limits; and
- d)District formation procedures.

Because of the very specific parameters in the current City street lighting policy, staff believes it is defensible to consider only those MAD street lights which meet the current policy as “general benefit,” with all other MAD street lights retaining their status as “special benefit.” Considering only the cobra-head style light, which is the current City Standard street light, this approach would result in \$75,000 in costs now cumulatively paid by 13 sub-districts in Street Lighting District #1 MAD transferring from MAD “special benefit” responsibility to City “general benefit” responsibility.

In response to the question of the whether the above-described fiscal impact would change if the City Standard street light were amended by City Council to an option of cobra-head, single-acorn or double-acorn, this would result in up to \$184,800 in costs now cumulatively paid by MADs becoming a City responsibility. This is broken down as follows: a) \$124,000 in costs now cumulatively paid by 32 sub-districts in Street Lighting District #1 MAD; and b) \$60,800 in cumulative costs paid by 2 other MADs, being transferred from MAD “special benefit” responsibility to City “general benefit” responsibility.” In response to the question of the fiscal impact if there were to be different Findings for Downtown (Core/Columbia, Marina, Little Italy, Cortez and Center C East), such that their street lighting costs were still considered a “special benefit,” then the \$60,800 figure would be reduced to \$3,800.

**Solar-powered Street Lights**

Street lights can be powered by solar energy. Additional equipment which must be provided includes solar-electric panels and battery packs. This equipment is usually mounted on the street light pole. The solar-electric panel is sized according to the latitude of the installation and is oriented on the pole to provide maximum collection of solar energy onto the panel. The solar-electric panel and the battery packs are designed together to provide sufficient power to operate the street light for several consecutive nights allowing for times when the skies will be overcast and the batteries will not be able to recharge. In addition to the regular street light maintenance, the solar-electric panels and battery packs must also be maintained.

In order to determine the total cost and projected energy savings of using solar-powered street light installations in San Diego, we recommend that a solar-electric consultant be utilized.

Respectfully submitted,           D. Cruz Gonzalez Director, Transportation Department		Approved: George I. Loveland Senior Deputy City Manager
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LOVELAND/HOLDEN

Attachment: Overhead Street Light Tasks