

## Five Peaks Rancho Mirage car dealership expansion project

### Comments from Palomar Observatory

Dan McKenna 11/26/2017

I have reviewed the documents received from Joshua Altopp on 11/17/2017 regarding the new construction of a car dealership lot referred to the Five Peaks Lot (FPL) in the documentation supplied to me.

In general, it is recommend that new installations use only enough light to meet the project goals, light only when needed, and use high efficiency lights and optics with the lowest acceptable color temperature needed for color rendering.

With the introduction of Light Emitting Diode (LED) based night lighting, it is possible to meet all of these goals simultaneously.

My comments are based on conversations with members of the city of Rancho Mirage who expressed that the main goal of this instillation is for safety, and not mainly for display.

Night lighting surveys demonstrate that car dealerships can produce illumination levels of approximately 100 times that of a residential area. Typically the night lighting of car lots is designed to have the highest color temperature possible to enhance the sparkle effect attributed to a bluer light content.

The FPL attempts to light as large an area possible using the smallest number of light poles. As a result the surface light levels range from about 10 foot candles to less than one.

Two kinds of lighting fixtures are used in the proposed FPL project, PRV-A40-D-UNIV-T4-BZ-HSS, designated as P1, and PRV-A40-D-UNV-T5-BZ, designated as P2

Of interest is the so called BUG rating which stands for Backlight, Up light, and Glare. P1 has a BUG rating of B2-U0-G4 for the A40 light engine and P2 has a BUG rating of B4-U0-G4

The Bug rating addresses the numerical rating, for example B2, in terms of the lighting designated zone (LZ) the fixture is allowed to work in. 0 is used for areas of wilderness protection and 5 for the heaviest industrial areas where safety and security considerations are called for.

Thus the proposed lighting systems use devices that are recommended for very bright lighting situations due to the G4 classification for both P1 and P2.

The area to be lit is undeveloped land directly across from the Rancho Mirage Public Library. Areas that interface with undeveloped land, and its particular nocturnal ecology, usually are considered buffer zones where lighting zones transition starting at a LZ of 0 or 1 to higher designations as needed as one gets further from L0.

Rancho Mirage and other cities along Ca 111, are often in a situation where development is required to proceed right up to the practical limit as a result of the nearby steep terrain.

Thus an area with undeveloped land will be right next to commercial activity. LED lighting has an advantage over previously available lighting technology in that the combination of the small physical lamp size and closely coupled optics allows for tight control of the illumination pattern.

The P1, P2 fixtures are in particular not well suited for applications requiring no light in low angles near the horizon. The lower part of the illumination pattern is mostly responsible for the glare rating. Note that P2 and P2 have a glare rating of G4.

Not only is the propagation of light from a high glare rated fixture detrimental to the nocturnal environment, but also reduces visibility and contrast that diminishes detection of objects in the glare field. We note that glare from this lot will be next to the Highway and potentially a source of glare that may reduce driver performance.

Given that the FPL project will be across from the Library Observatory, it is reasonable to consider that the FPL will cause an increase in sky brightness and a reduction of object contrast against the night sky.

We also note that the FPL uses 4000K color temperature LEDs against the recommendations of 3000K, or lower, by the International Dark Sky association. If the intent of this lighting project is not for daylight color rendition, we see no reason to use fixtures supporting lower color temperatures.

One area where a major impact on the reduction of night sky brightness, and glare can be accomplished with moderate cost, is by using the Prevail LED luminaire control. The lighting vendor, Prevail, has a range of options that allow controlled dimming, programmability, and the use of photoelectric control and occupancy sensing.

It is not unusual for users of dimmable lighting systems to find that a 50% reduction of light level is sufficient for their needs. It should be also noted that such lighting systems when dimmed can be programmed to full brightness when occupancy is detected and even

strobed to discourage intruders. Such technology could alert local law enforcement to possible criminal activity.

Rancho Mirage is an area that experiences very warm temperatures in the summer months. Operating the lighting system below its 100% rating has the benefit of potentially increasing the lifetime of the LED lights and electronic drivers, not to mention a direct reduction in electric bills.

Rancho Mirage and the surrounding communities have the potential to reclaim the beauty of the desert night sky. We recognize the need to accommodate and balance the needs of the public with business, and hope that as lighting technology changes, such consideration for using the emerging lighting technology is used wisely.