

3.8 Lighting Plan

The Project is located in Pima County where certain types of activities fall under building, construction and operations requirements. On August 21, 2000, Pima County, along with the Town of Marana and the City of Tucson, adopted Final Ordinance No. 2001-138: The Outdoor Lighting Code (OLC). The purpose and intent of the OLC is to preserve the unique desert environment and night sky by controlling the obtrusive aspects of excessive and careless outdoor lighting usage. All outdoor lighting and associated illuminating devices must be specified and installed in conformance with the provisions of the OLC of the authorizing jurisdiction as applicable and under the appropriate permit and inspection.

The OLC consists of a set of restrictions on the amount of outdoor artificial lighting allowed per unit area for various public and private property activities according to the use of the lighting; the type of lighting appliance; and the geographic location within Pima County. Specifically, the Rosemont Project is located in the two most restrictive lighting areas, defined by the OLC as E1a and E1b. Areas in E1a are around astronomical observatories and include all areas within 15 mi of the summit of Kitt Peak and 12.5 mi of the summit of Mount Hopkins. They also include those areas within any national park, monument, or forest boundary. In these areas, the preservation of a naturally dark environment, both in the sky and visible landscape, is of paramount concern. Lighting Area E1b is a circular area, 25 mi in radius, the center of which is the summit of Mount Hopkins in the Santa Rita Mountain range (Figure 3-9). The OLC states, however, that if a property is located in more than one lighting area, the entire property shall be subject to the more restrictive lighting area; therefore, the entire Property falls in Lighting Area E1a.

ARS 11-830 exempts mining operations of more than five ac from Pima County zoning ordinances. Therefore, compliance with the OLC is technically not required for the Project. However, Rosemont Copper has voluntarily elected to comply with the requirements of the OLC during the projected life of the Project, including the design, construction, and daily operation phases.

Specific Rosemont Project outdoor lighting design requirements and basis of design will address the following technical items as prescribed by the OLC.

3.8.1 Property Site Outdoor Light Output Limits

Table 5.1, “Maximum Total Outdoor Light Output Requirements,” of the OLC identifies the maximum total outdoor light output in units of mean lumens (lm) per net acre (a lumen is a measure of luminous flux in SI Units). A net acre is the remaining ground area within a development, parcel, or subdivision after removing all segments for proposed and existing public streets. For reference, the Pima County OLC can be found in the Appendix D of this Plan.

The OLC limits lm output based on whether the lighting uses full cutoff optics (FCO) and if it is produced by low pressure sodium (LPS)-type lamp sources and luminaires (light fixtures). For example, the maximum output allowed in Lighting Area E1a is 18,000 lm per acre for FCO LPS, plus FCO non-LPS.

There is also a limit of 3,000 lm per acre for FCO non-LPS. Unshielded lighting using any lamp type is prohibited.

The OLC provides a definition for “Full Cutoff Light Fixture:”

A luminaire where no candela (lm) occur at or above an angle of 90 degrees above the nadir (Horizontal Plane at centerline of luminaire). This applies to all lateral angles around the luminaire. Such candela information shall be as determined by a photometric test report from a nationally recognized independent testing laboratory and as certified by the manufacturer. Any structural part of the luminaire providing this cutoff angle shielding shall be permanently attached.

FCO outdoor type lighting fixtures are readily available from a number of lighting fixture manufacturers.

A typical FCO LPS streetlight casts 8,000 lm. The OLC would permit about one streetlight for every 20,000 sq ft on an isolated parking lot.

3.8.2 Lamp Type and Shielding Standards

Table 5.2 of the OLC, “Lamp Type and Shielding Standards,” describes standards for lamp types depending on the use of the light. The three classes of use are:

- Class 1 for applications requiring good color rendition, such as commercial car lots, gas stations and swap meets
- Class 2 for general illumination
- Class 3 for decorative lighting

This plan assumes the Rosemont operations would fall in Class 2 (General Illumination). Furthermore, Rosemont does not anticipate the need for outdoor lighting to achieve color rendition or decorative type lighting.

FCO LPS is required in all E1a areas for Class 2 lighting. Lighting other than LPS is prohibited unless the output is less than 3,000 lm per luminaire.

Only FCO is required in E1b areas for Class 2.

3.8.3 Miscellaneous OLC Items

Some additional requirements of the OLC are listed below:

- Mobile/portable outdoor lighting used for flood or area lighting in support of mining operations or onsite construction activities, either permanent or temporary, shall comply with the OLC.

However, temporary lighting not complying with the OLC can be used for one thirty-day period within a calendar year, with one thirty-day extension.

- Mobile equipment lights that are low voltage, incandescent lamps are exempt from compliance with the OLC. These lights include headlights found on motorized equipment, such as haul trucks, operations vehicles, and fleet and service trucks.
- The design and specification of mercury vapor lamps and associated lighting fixtures are prohibited and shall not be considered.

Rosemont Copper operations will require adequate levels of outdoor illumination for its 24/7 operations.

3.8.4 Proposed Rosemont Mine Outdoor Lighting Design Specification

The Project, although not required to do so, will make every attempt to comply with the OLC. It should be noted, however, that federal and state laws also require Rosemont operations to give utmost attention to the safety of its employees and the public.

The outdoor artificial area lighting foot-candle (fc) design will provide a maximum of 1.0 fc at all mine process and support areas and facilities. (A ft-candle is a unit of luminance in English Units, and is equal to 1.0 lm per sq ft.) The design goal is to achieve a balance between compliance with the OLC and support for safe mine operations during the course of the 24-hour per day operating schedule.

Based on the category “Commercial and Industrial, Option 1” and the location in Lighting Area E 1a, a maximum total outdoor light requirement to be applied to the entire Rosemont Property (in mean lm per net ac) can be determined. This target number is 18,000 lm per ac from both FCO LPS plus FCO non-LPS. Of the 18,000 lm per ac, only 3,000 lm per ac can be from FCO non-LPS lamp sources and light fixtures.

The Rosemont outdoor lighting design will be based on using, to the greatest extent possible, full cutoff, low pressure, sodium type lamp sources and light fixtures. The goal is to provide 18,000 lm per acre while providing a safe, adequately lit work environment.