



Lighting

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LIGHTING

Improperly designed and installed outdoor lighting can have a negative impact upon a neighborhood and the community by creating excessive glare, light trespass and/or higher energy use. However, outdoor lighting, if properly designed and correctly installed, can make a significant, positive and beneficial contribution toward creating the nighttime charm, character and thematic identity of a community; while at the same time, enhancing the safety and security of its residents and preserving the nighttime visual environment.

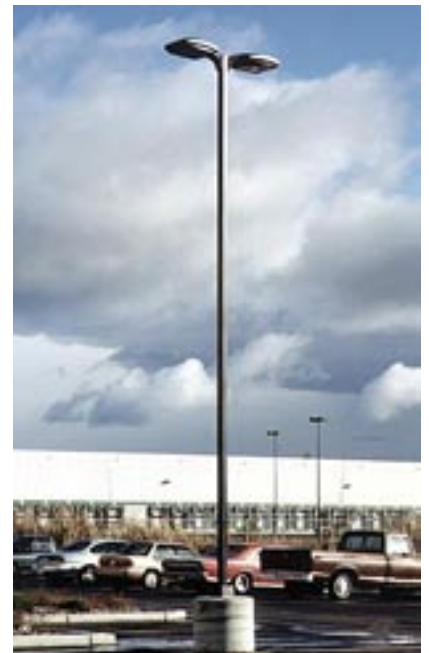
The City of Surprise's rapid increase in residential and commercial development; as well as in the addition of new streets, large parking areas, major outdoor recreation complexes and other infrastructure improvements to support the City's new growth and development, has led to increasing concern regarding light pollution and the degradation of the City's nighttime visual environment. This concern, when viewed in the context of the City's historical and existing rural/urban development pattern, warrants the need for a comprehensive outdoor lighting policy by which proposed lighting of future new development and modifications to lighting in existing development can be evaluated.

The following guidelines address key aspects of a potential comprehensive City lighting policy and subsequent lighting control ordinance. The guidelines are intended to encourage lighting practices and systems that will minimize light pollution, glare and light trespass, while providing energy efficient, public and private lighting within the City of Surprise that can ensure the continued safety and security of the community, preserve the City's nighttime visual environment and provide for the creation of a unique identity for the community. The guidelines focus upon implementing a variety of exterior lighting techniques and approaches that will:

- provide adequate lighting levels to ensure the public's nighttime safety, security and productivity, and provide for the safe movement of vehicles and pedestrians;
- avoid excessive lighting in rural and urbanized areas in order to preserve and maintain the City's nighttime visual environment; and
- enhance and reinforce the overall thematic identity, development character and design of the community, as well as the appeal of individual buildings, prominent landscaping and street thoroughfares.

General Lighting Guidelines - *The following guidelines apply to all proposed exterior lighting in new and existing development within the City of Surprise.*

- In order to address the actual physical effects of lighting, and the effect that lighting may have upon nighttime skies and surrounding neighborhoods; and to ensure that proposed lighting meets functional security of the proposed land use without adversely affecting ambient light levels of adjacent properties, each new development, or modification to exterior lighting in existing development, should submit a Master Exterior Lighting Plan during the City staff's project technical review and evaluation period that covers all proposed exterior lighting to be installed or modified.
- An exterior lighting plan for new development, or modifications to existing development, should:
 - depict the location of each proposed pole-mounted and wall or roof-mounted external lighting fixture;
 - provide detailed information regarding the thematic design, mounting height, aiming point of all lighting fixtures, light source, level of lighting, type, spacing, shielding and luminance of each proposed external lighting fixture;
 - include elevation drawings of all relevant buildings proposed for illumination. Drawings should clearly depict those portions of the building elevations to be illuminated, the levels of luminance of the elevations and the aiming point for any remote light fixture; and
 - provide landscaping information, including phometrics, that indicates the location and size of mature trees, shrubbery and other vegetation to enable an evaluation of the long-term effectiveness of lighting or screening of lighting.
- High-mounted, widely spaced pole or wall fixtures designed to illuminate large areas from a single source are not appropriate and are highly discouraged; except for lighting of specified outdoor recreational uses having unique requirements for nighttime visibility and limited hours of operation.
- The illumination of large areas should be done in a manner that minimizes any "spillover" light into the nighttime skies and onto surrounding residential areas.
- The light source in all pole lighting fixtures should be full cutoff luminaires, with the light source recessed within the fixture and shielded in a manner to prevent and/or minimize glare and upward illumination above the horizontal surface passing through the luminaire.





- Except for arterial streets, outdoor performance areas, sport and recreation facilities, playfields, and those structures and facilities where lighting must be used to illuminate potential obstructions and/or hazards to air navigation, all pole-mounted light fixtures should not exceed sixteen (16') feet in height, measured from the finished grade to the top of the light fixture. The height of any pedestals upon which pole fixtures are placed should be included in the overall height measurement.
- The use of metal halide and high pressure sodium light sources should be considered as appropriate energy efficient light sources that have the ability to produce accurate color renditions.
- The style of light standards and fixtures should be consistent with the style and character of architecture proposed for the development site; and be compatible with the overall quality and character of lighting in the City of Surprise.

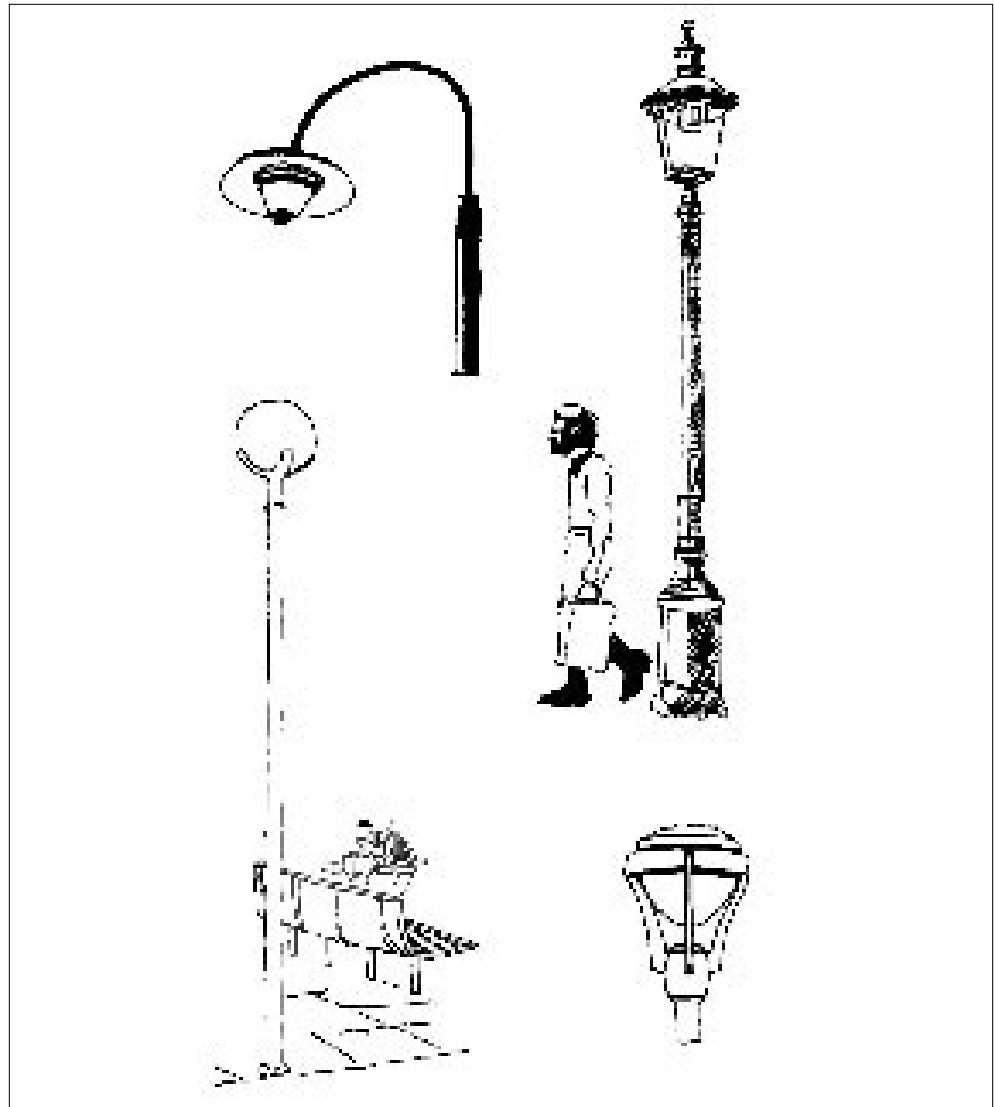


figure 7.1: Light Standards Reflect Design Character

RESIDENTIAL LIGHTING - *The following lighting guidelines provide direction in utilizing lighting techniques to provide safety and security for residents, as well as create thematic design for, and enhance aesthetics of single, rural and multi-family residential development.*

SINGLE FAMILY AND RURAL NEIGHBORHOODS

- Exterior lighting in single family planned residential neighborhoods, starting at the entrance of the development and extending throughout, should be architecturally integrated with the thematic design aspects of the development as well as the building styles, materials and colors used in the development.
- Street lighting fixtures and levels of lighting in single family residential neighborhoods should reflect the vehicular function and character of the street; with shorter light fixtures and lower lighting levels on local streets, and taller light fixtures and higher light levels for more heavily traveled arterial streets.
- Street lighting fixtures in single family neighborhoods should be no taller than sixteen (16) feet, measured from finished grade to the top of the fixture; and should be spaced in an alternating manner on either side of the street to provide an adequate distribution of lighting along the street.
- Street lighting fixtures for local neighborhood streets having curb-separated sidewalks should always be placed within the landscaped area between the back of curb and sidewalk.
- Pole lighting for safety and security of neighborhood open space, trails, bicycle paths and pedestrian ways should not exceed twelve (12) feet in height; and should be supplemented with lower light levels using “bollard” or “foot”- type lighting systems.



figure 7.2: Pedestrian Area Utilizing Overhead and Bollard Lights





- Outdoor lighting of community centers and recreation areas located in a residential neighborhood should be of an architectural style that is compatible with the neighborhood; and should be located in a manner that prevents light “spillover” onto adjoining residential lots.
- Lighting for neighborhood playfields, tennis courts and other outdoor recreation activities that require intensive lighting should be located and shielded in a manner so as not to increase the overall ambient light level of adjoining residential lots.
- Single family residential development should be shielded from any lighting and/or glare emanating from adjacent or nearby lighted signs, spotlights, floodlights or any other type of lighting associated with neighborhood commercial or other non-residential uses.
- Lighting of individual residential lots should be of an architectural style compatible with the style of neighborhood lighting fixtures; and should maintain the ambient light levels of the neighborhood.
- Outdoor lighting requirements in predominantly rural areas differ greatly from the lighting needs of the urbanized community. Specialized purposes or functions of lighting in rural areas, and the desire to minimize outdoor lighting so that the nighttime skies can be enjoyed, negates the need for pole-mounted lighting fixtures to illuminate rural roads; except at the primary entrance to a rural subdivision where the entry road intersects the principal rural road serving the area.
- In those rural areas where pole-mounted fixtures are required, the exterior pole-mounted light fixture should not exceed sixteen (16) feet in height, measured from the finished grade to the top of the light fixture.
- In order to preserve the dark sky environment of rural areas, only low-mounted lighting fixtures that emit low level, non-glare lighting should be used. Low-mounted lighting fixtures should be located at the entry drive of each rural residence, and in a manner that fully illuminates the resident address for easy identification by emergency response vehicles.



MULTI-FAMILY RESIDENTIAL DEVELOPMENT

- Exterior lighting of multi-family and other higher density residential development should always reflect and enhance the architectural style and character of the development.
- Lighting levels within multi-family residential developments should be sufficiently balanced to ensure the safe and secure movement of vehicles and pedestrians, while at the same time contribute to the overall aesthetic character and quality of the development.

- Pole-mounted lighting fixtures along roadways within multi-family developments should not exceed sixteen (16) feet in height, measured from finished grade to the top of the lighting fixture.
- Lighting at entry monuments and gates should be an integral part of the total landscape and building architecture of the development.
- Open space and pedestrian ways in a multi-family complex should be lighted by a combination of pole-mounted fixtures not to exceed twelve (12) feet in height, and bollard-type lighting fixtures not to exceed four (4) feet in height.
- The use of building- or roof-mounted lighting to illuminate areas within a multi-family residential development should be prohibited.

NON-RESIDENTIAL LIGHTING - *The design and installation of proposed lighting in new and existing commercial, office, industrial and business park development should adhere to the following guidelines to ensure compatibility with the community's character and identity, preservation of the City's nighttime visual environment and creation of a festive atmosphere for those pedestrian-oriented commercial areas of the City designed to encourage nighttime use.*

- All non-residential developments, including commercial retail, office, industrial, and business parks, should provide an exterior lighting plan during the City's technical review of the project. The lighting plan should clearly depict the type, size, height, location, aiming point and design characteristics for each light standard proposed for buildings, parking areas and pedestrian ways.
- Architectural and landscape lighting in non-residential development should be encouraged if:
 - the lighting will illuminate an architectural feature or landscape feature that is unique to the particular project due to the use of materials, colors or design characteristics;
 - the lighting will enhance the design of the project and is not to be used solely as an attraction getting device;
 - the lighting will enhance the overall quality and character of lighting in the City; and
 - lighting fixtures are located and designed so as not to impact vehicular and pedestrian traffic due to glare.





- When utilizing wall wash lighting techniques to illuminate building elevations, multiple luminaire, rather than a single high intensity light, should be used.
- Lighting fixtures on non-residential property should be located in a manner, and consist of optically controlled fixtures and/or fixture cutoffs in order to minimize light spillover and glare beyond the boundary of the property.
- The design of lighting fixtures and their structural support should be of a scale and architectural design that is compatible with on-site buildings.
- Large non-residential developments having multiple, separate building sites should have a consistent, thematic, lighting fixture and structural support design and scale throughout the development.



figure 7.3: Themed Lighting in Commercial Areas.



- Lighting for parking areas in non-residential development should be as unobtrusive as possible to meet the functional and safe vehicular and pedestrian circulation on the site; and should comply with guidelines related to lighting of parking facilities as set forth in the Planning and Design Guidelines Manual.
- Landscape lighting should be an integral part of the total design of the project and should be placed in a manner to prevent glare and maintain the ambient light levels of the total site.
- Flickering, flashing, pulsating, and rotating lights, or any other site or building lighting that could be confused with warning, emergency or traffic signals should not be permitted in non-residential development.

- Non-residential development requiring nighttime lighting for loading/unloading docks should locate such lighting in a manner to prevent light trespass and glare onto adjoining property.
- Illumination of signage for non-residential developments should utilize halo-lit or backlit letters to provide legibility with moderate ambient lighting conditions; and to convey a subtle and attractive appearance.
- External spot or flood lighting of signs in non-residential developments should be placed so the light source is screened from direct view of passersby; and so that the light when directed against the sign does not reflect or shine into adjacent areas or impede the motorist's and pedestrian's vision.
- All outdoor lighting installations should be served by underground electrical service, and include timers, dimmers and/or sensors in order to reduce overall energy consumption and eliminate unnecessary lighting.
- Service station canopy lighting should be provided by luminaires that are recessed or flush with the bottom surface of the canopy; or fully shielded by the fixture. Service station lighting, including both canopy lighting and lighting around service pump islands, should not exceed the ambient light level of the area in which it is located, especially in or adjoining residential neighborhoods.



PARKS/RECREATION LIGHTING - *Outdoor lighting of parks, open space and recreation areas must provide for both safety and security of the public, as well as a variety of ambient light levels conducive to enjoyment of facilities during the nighttime hours. Lighting guidelines for outdoor lighting of parks, active open space areas and sports and recreation fields strive to meet the balance between public safety and enjoyment of outdoor passive and active recreation areas during the nighttime hours.*

- Pedestrian and bicycle pathway lighting should consist of a combination of free-standing pole, bollard, in-place step or building mounted lighting fixtures that are aimed or directed in a manner that any changes in the elevation or turn of the pathway are illuminated so that such pathway features are clearly discernible.
- Pole-mounted lighting fixtures for pedestrian and bicycle pathways throughout a park or developed open space area should not exceed twelve (12) feet in height, measured from the finished grade to the top of the fixture, and should be spaced in a manner to provide continuous illumination of the pathway.



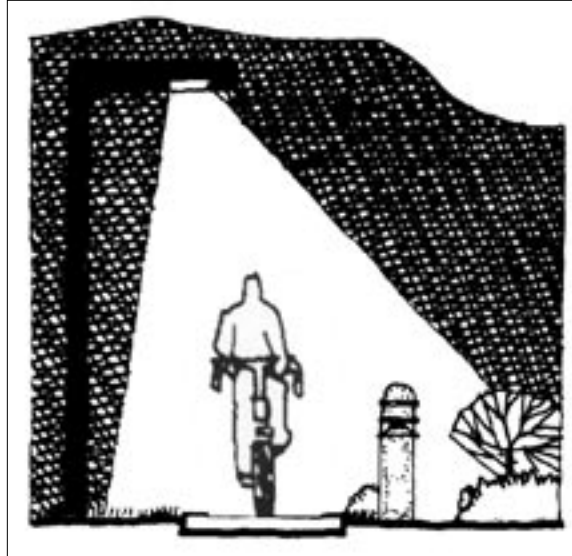


figure 7.2: Pedestrian Area Utilizing Overhead and Bollard Lights

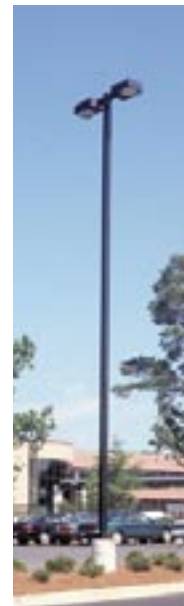
- Supplemental lighting of park areas and pedestrian/bicycle pathways should consist of non-glare bollard-type fixtures that do not exceed four (4) feet in height as measured from finish grade to top of the fixture. Bollard lighting should consist of low ambient lighting, and should be located to emphasize and highlight unique features of a landscape treatment and to directional movement along the pathways.



- The maximum height of outdoor lighting for recreational facilities such as basketball, volleyball, handball, horseshoes, lawn bowling; shuffleboard and bocce ball courts should not exceed twenty-five (25) feet, measured from the finish grade to the top of the lighting fixture. Athletic fields for baseball, football, soccer and nighttime practice golf ranges should not exceed eighty (80) feet in height, measured from the finish grade to the top of the fixture.
- Lighting of outdoor recreational facilities should be designed to ensure continuous and evening lighting of the total field of play.
- The lighting source for all outdoor recreation facilities should be limited to metal halide in order to ensure better and more accurate lighting. In the event new fixture technology becomes available, consideration should be given to the use of such technology, provided it meets overall ambient lighting level requirements set by the City.
- All outdoor recreational lighting should be located and designed in a manner so as to direct lighting to remain within the property line of the facility and to minimize glare and light trespass in adjoining areas. All lighting fixtures should have fixture cutoffs and optically controlled luminaires at the boundaries of the property.
- Outdoor recreational lighting should have automatic shutoff mechanisms set to turn lights on and off.

Street Lighting - *The following guidelines provide additional direction regarding the design, location and characteristics of public street lighting within the City of Surprise.*

- All lighting along public and private streets should be served by underground electrical service, and consist of fully shielded luminaires to prevent any glare or light trespass onto adjoining property and adjacent areas.
- Lighting fixtures for local residential streets should be non-reflective, emit lower light levels than collector and arterial streets, and should not exceed sixteen (16) feet in height, measured from finish grade to the top of the fixture.
- For streets in rural and agricultural areas, street lighting should be provided only at:
 - major intersecting rural roads;
 - intersections where local roads of a rural subdivision intersect with a major rural road;
 - those areas identified as dangerous and hazardous to vehicular travel due to significant changes in roadway alignment, bridges, or hazardous structures such as curbs, piers, abutments or culverts;
 - locations along roads and highways where police reports indicate nighttime accident rates exceed those of daytime hours; or
 - locations of a highway or rural road where traffic turning movements to and from roadside developments threaten public safety.
- As a minimum, street lighting should be provided at all intersections of local streets in a residential neighborhood.
- In residential neighborhoods where curb-separated sidewalks exist, pole-mounted lighting fixtures on local residential streets should be placed within the landscaped areas between the curb and sidewalk, and spaced in an alternative pattern using both sides of the street; and according to the lighting levels desired and specified for the development and the traffic volume on the street.
- The distance of a pole-mounted lighting fixture from the curb should be located so that the centerline of each pole is not more than two (2) feet from the face of the curb.





- Lighting along collector streets serving residential areas should reflect the overall thematic design and characteristics of the development or area served, and should not exceed sixteen (16) feet in height.
- Major arterial streets should consist of unique street lighting that not only provides for the safe movement of vehicles and pedestrians; but also reflects the thematic character and community identity desired by the City of Surprise.



figure 7.3: Median Accent Lighting



- Light standards along the City's primary arterials should consist of a metal halide or high pressure sodium light source and not exceed thirty (30) feet in height, measured from the finish grade to the top of the light fixture.

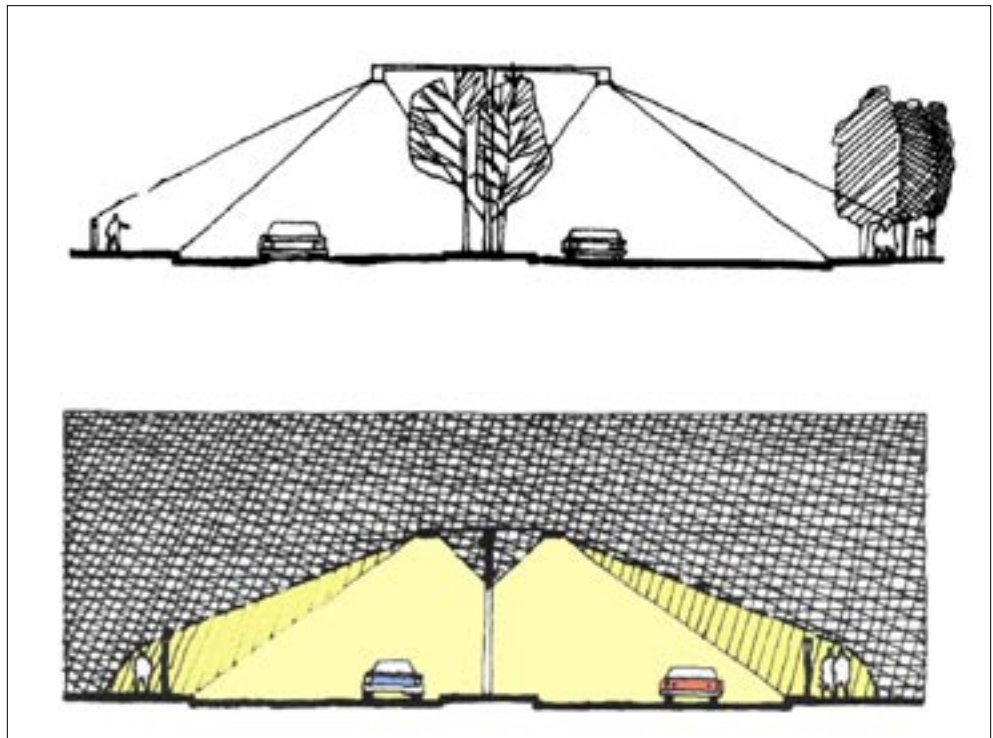


figure 7.4: Lighting Standards Reflect Community Character While Providing a Safe and Secure Environment