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LIGHTING STANDARDS SPECIAL CONSIDERATIONS

The most recent version of this document can be found at:

http://www.colliergov.net/your-government/divisions-a-e/county-manager-s-office/standards

ISSUED BY: COUNTY-WIDE LIGHTING TEAM

TABLE OF CONTENTS

Airports 2
Automated Teller Machines (ATMs) 2
Beaches and Boat Launch Sites 2
Campuses 2
Cemeteries 3
Control Rooms 3
Correctional Facilities 3
Fueling Stations 4
Fitness/Wellness Centers 4
High Security Sites 4
Libraries 5
Living Quarters 6
Museums 6
Parks, Sporting Arenas, and Sports Fields 6
Parking Garages 8
Parking Lots and Loading/Unloading Areas 8
Pools 8
Preserves 9
Roadways 10
Surveillance Cameras & Other Security Detection Systems 11
Temporary Uses (e.g. Events) 11
Trails and Nature Pathways 12
Water Parks 12
Utility Sites – Landfills & Recycling Centers 12
Utility Sites – Remote 12
Utility Sites – Water & Wastewater Plants 13
APPENDIX A – COUNTY CONSTRUCTIONS STANDARDS 14
APPENDIX B – GLOSSARY OF TERMS 14
APPENDIX C – RECOMMENDED REFERENCES FOR LIGHTING DESIGN 14
CODES AND OTHER REGULATION 14
DESIGN CRITERIA 15
STANDARDS 15
GUIDEBOOKS & GUIDELINES 16

AIRPORTS

This section applies broadly to sites primarily designed for aviation purposes including airports, airparks, and helipads.

- Federally funded projects shall meet the requirements set forth by the Federal Aviation Administration:
  - **AC 150/5340-30H: Design and Installation Details for Airport Visual Aids**
  - **AC 150/5360-13: Planning and Design Guidelines for Airport Terminal Facilities**
- All other locations should incorporate the FAA guidelines where practicable.
- In areas where the FAA guidelines do not apply (e.g. general office spaces), the other applicable standards in this guidebook shall apply.

AUTOMATED TELLER MACHINES (ATMS)

This section applies specifically to locations with outdoor automated teller machines as well as the access and defined parking areas immediately surrounding the machines.

- Lighting design shall meet the requirements set forth in **F§§ 655.962** and as amended.
- Special consideration should be made to ensure that Closed Circuit Television (CCTV) cameras in the nearby area have the appropriate amount of lighting and that glare and harsh shadows are minimized.

BEACHES AND BOAT LAUNCH SITES

This section applies specifically to the areas at and around beaches, boat ramps, launch sites for non-motorized boats, marinas, and other recreation areas near large bodies of water.

- Sea turtles are protected through the Federal **Endangered Species Act of 1973**, Florida's **Marine Turtle Protection Act**, Collier County's **Land Development Code**, City of Marco Island's **Ordinance No. 04-11**, and City of Naples' **Ordinance 05-10814**. As such, there are stringent requirements and restrictions for lighting near beach areas to ensure sea turtles and their habitats are protected from negative impacts from artificial lighting. Design Professionals/Contractors shall review and abide by the applicable sea turtle protection requirements described above.
- When applicable, boat launch sites shall meet all U.S. Coast Guard regulations and requirements.
- This guidebook *does not* require lighting at non-motorized boat launch sites, such as kayak launches. However, if lighting is provided it shall be designed in accordance with the Florida Fish & Wildlife Conservation Commission "**Guidelines for Developing Non-Motorized Boat Launches in Florida**".
- Marina areas shall have lighting sufficient to safely perform the anticipated activities, but the intensity should be low and the lights shall be pointed downward and shielded to prevent interference with vessel navigation.
- Motorized boat ramps/launches and marinas shall incorporate lights to ensure boater safety.

CAMPUSES

This section applies specifically to campuses and complexes with multiple County facilities and/or occupants, including government centers.

- Exterior lighting systems should be flexible and adaptable to meet the various needs of the campus occupants and visitors.

- The appearance of exterior lighting systems should be uniform and match the architectural design of the campus whenever practicable.
    - Decorative and historically shaped lighting fixtures are permitted provided they meet the glare and skyglow reduction standards listed in the "**Standards – Outdoor**" section above.
- Lighting for campus roadways should incorporate the considerations and requirements of the "**Roadways**" section below.
    - Lighting transitions from public roadways to campus environments should not be immediately perceptible by motorists to ensure eye adaptability and prevent distractions.
- Lighting for campus parking shall also incorporate the considerations and requirements of the "**Parking Garages**" and "**Parking Lots and Loading/Unloading Areas**" sections below.
- When designing lighting systems for campuses, consideration should be made for the inclusion of emergency notification capabilities to assist in the response of emergency events (e.g. evacuations and active shooter/killer scenarios).
- Pedestrian areas should incorporate lighting systems that feel appropriate in scale, architectural character and are low in brightness.
    - Lighting systems designed for pedestrian use should incorporate sensors to allow the necessary illumination when people are present and turn off the lights when they are not.
    - Uniformity in pedestrian lighting should be provided whenever possible to minimize dark patches where people or objects are not visible.
    - Lighting systems should illuminate pedestrian paths and the areas immediately surrounding the paths to help pedestrians navigate the area more confidently, especially when the pathway is wet.
    - Fully shielded bollards, or other downlight systems of similar height and intensity, should be used whenever practicable for pedestrian areas.

CEMETERIES

This section applies specifically to burial grounds.

- The considerations and requirements discussed in the "**Preserves**" section should be incorporated when not in conflict with other requirements or standards.
- **Prohibition of Temporary Light Installations**
    - No vigil or solar lights shall be placed in cemeteries due to their fragile nature as well as their susceptibility to accidents and weather conditions.
- When needed, cemetery lighting should be designed and installed in a way that is not distracting to the bereaved or disrespectful to the deceased.

CONTROL ROOMS

This section applies specifically to control rooms and operations centers used as a central space for monitoring one or more facilities or systems.

- Control rooms should be designed in a way that allows for complete control over ambient light levels. Full dimming capability with user controls shall be provided for all lighting systems. Since control rooms typically employ lower lighting levels than regular office environments, particular focus should be paid to preventing eye strain and glare while also ensuring sufficient task lighting.

CORRECTIONAL FACILITIES

This section applies specifically to jails, detention centers, and other corrections-related facilities.

- Given the many challenges of performing maintenance in a correctional environment, special consideration should be made to ensure the lighting equipment is rated and warranted to operate for the longest lifespan with the least amount of required maintenance that the project funding will allow. Similarly, fixtures and enclosures should be designed to handle the higher than normal level of wear, tear, and abuse that equipment faces in these sort of areas. In addition, fixtures and enclosures may require security features to properly address the unique threats posted by the inmate populations.
- Lighting controls and illumination levels in jail locations shall meet the requirements of the "**Florida Model Jail Standards**".

FUELING STATIONS

This section applies specifically to areas related to fueling vehicles.

- Lighting systems for County fueling stations shall meet the standards as set forth in the Collier County Land Development Code "Facilities with Fuel Pumps" section.
- Special care should be taken in the design and installation to minimize glare, light trespass, and skyglow as much as practicable.
- Below are examples of *improper* (left) and proper (right) fueling station lighting:

Photos courtesy of Flagstaff Dark Skies Coalition

FITNESS/WELLNESS CENTERS

This section applies specifically to areas primarily designed for physical exercise.

- These areas should incorporate daylighting wherever possible.
- Dimming capabilities shall be provided to allow the lighting levels to be adjusted to suit the intended activities (e.g. yoga vs cycling).
- Areas with high intensity activities or those with high levels of movement should allow lighting levels that are brighter than typical office environments.
- To ensure safe movement and egress, running lights should be provided on the floor to illuminate the walkway and exits in areas where lighting may be dimmed to low levels.

HIGH SECURITY SITES

This section applies to specifically to high security / high risk sites as identified by the United States Department of Homeland Security as well as the County through risk and threat assessments.

- The lighting design of high security sites should be based around the specific requirements identified through risk and threat assessments as well as the overall security plan for the site.

- When determining if security lighting is an appropriate part of a facility's security posture and what type of lighting to choose, the Design Professional/Contractor and County Division(s) should consider interoperability with and support for monitoring and detection systems.
- Security lighting should be provided throughout the site, with special emphasis on building and perimeter illumination.
    - The purpose of perimeter lighting is to provide a well-illuminated strip around a protected area to keep potential intruders vulnerable to observation.
        - Ideally, the outside of the fence should be adequately illuminated while the inside face of the fence is not illuminated to allow personnel inside of the fence line to have clear vision through the fabric of the fence.
- Attention should also be paid to the design of lighting systems at entry control points to ensure adequate lighting for pedestrians, islands, and guards in approach and exit zones.
    - Control zones that incorporate identification checks include lighting sufficient for the task requirements.
    - Lighting intensity should increase as the control point is approached.
- Areas outside the perimeter that may be considered defensible space, including public sidewalks and streets, waterways, and adjacent nonpublic properties should be considered during the design of lighting systems.
    - Special care should be made to prevent light trespass in areas outside of the perimeter.
- The "glare" method of strongly illuminating the perimeter with the intent of inducing the adverse effects of glare for people viewing a high security site shall not be employed.
- Lighting should be located a minimum of twenty (20) feet from the site perimeter.
    - Lighting levels shall be uniform across the entire perimeter.
- Careful consideration should be made to assist with night-adaptation when security personnel are moving between areas of differing illumination levels.
    - Outdoor lighting should not be a disadvantage to security personnel engaging in patrols.

LIBRARIES

This section applies specifically to buildings or spaces that contain collections of books, periodicals, films, and/or music for people to read, borrow, or refer to.

- Library lighting should be designed to make patrons and staff feel comfortable in their surroundings. In addition, the aesthetic characteristics of the fixtures should be in keeping with the architectural design of the space.
- Book stacks and reading areas shall be lighted adequately so patrons can find books and staff can spend long hours shelving books without visual discomfort.
    - Evenness of illumination across the stack face is more important than achieving a high lighting level at any single point.
- Table lamps, where provided, should be of very durable construction and should be designed to spread light evenly across the work surface.
    - In public areas, they should be securely mounted to furniture and should not obstruct the librarian's view across the room.
- Lighting at service desks shall be adequate for paper-based tasks and must not cause reflected glare in computer screens.
- When practicable, the lighting systems should incorporate controls or automation for the Correlated Color Temperature of the light to allow the color temperature to be adjusted to optimal reading levels depending on the time of day.

LIVING QUARTERS

This section applies specifically to areas where staff and/or visitors are provided with accommodations typically included in a residential setting such as dorm rooms, living areas, and kitchens. EMS stations, Fire stations, Temporary shelters, and Emergency Services Centers are all examples of locations that provide living quarters.

- Living quarters should provide full dimming controls for lighting systems.
- Where possible, there should also be user controls for the Correlated Color Temperature to allow the user(s) to choose color temperatures to match their desired sleep patterns.

MUSEUMS

This section applies specifically to buildings or spaces where objects of historical, artistic, scientific, or cultural interest are stored and exhibited.

- Museum lighting should incorporate the standards, guidelines, and best practices of appropriate museum authorities (such as the American Alliance for Museums or National Park Service) whenever practicable and not in conflict with the "**Standards – Outdoor**" section of this guidebook or specific project requirements.
- Lighting should be designed to make patrons and staff feel comfortable in their surroundings. In addition, the aesthetic characteristics of the fixtures should be in keeping with the architectural design of the space.
- The lighting systems used should highlight the texture, color, and shape of exhibits.
- The highest practicable Color Rendering Index (CRI) value lighting systems should be used to provide color rendition for the exhibited objects.
- Lighting systems should be designed to provide a wide range of flexibility in exhibit spaces to allow the lighting to be adjusted to the needs of whatever is exhibited at a particular time.
- Care should be taken to limit reflections on showcases that contain glass surfaces.
- Precautions should be taken to limit the potential for lighting damage, both by daylight and artificial lighting, on exhibits.
- Research and service areas should incorporate the considerations and requirements listed in the aforementioned "**Libraries**" section whenever practicable.

PARKS, SPORTING ARENAS, AND SPORTS FIELDS

This section applies specifically outdoor parks as well as arenas and fields primarily designed for use in sports and other recreational activities.

- Lighting systems shall be designed to be safe and protect the welfare of participants and spectators while minimizing the negative impacts of lighting on the community and environment.
- Lighting fixtures shall incorporate shielding and glare control devices whenever practicable to reduce the possibility for glare, light trespass, and sky glow.
    - Lighting fixtures must be aimed so that their beams are directed and fall within the primary playing or performance area.
- All public and tournament level courts should be lighted for night-time use, but all lights should be extinguished no later than the times specified below.
- All outdoor sporting and recreational events shall be scheduled to be completed by 10:00pm.
    - No event shall be permitted to start after 9:00pm.

- Lights shall turn off no later than one (1) hour after the events are concluded and all attendees have exited the premises unless in unusual circumstances where events started prior to 9:00pm have not concluded.

- Lighting the fields or performance areas during periods of vacancy shall be prohibited.
- Whenever practicable, vegetation buffering or other similar methods shall be employed to assist in protecting adjacent properties and roadways from glare and light trespass.
- Lighting shall employ a set back of a minimum of one foot for every foot in pole height from any residential property line, property line where residences are located, or any right-of-way.
- Sports fields are exempt from any restrictions on maximum light pole height unless otherwise specified in the Land Development Code.
- Recreation field perimeters shall be lit in accordance with the criteria listed below.
  - **Baseball and Softball Fields**
    - Lighting shall extend thirty (30) feet perpendicular to the foul lines and away from the field.
  - **Rectangular Fields** (E.g. Soccer and Football)
    - Lighting shall extend twenty (20) feet from the side lines and thirty (30) feet from the end lines.
  - **All other Recreational/Sports Fields**
    - Lighting shall extend ten (10) feet from the playing field boundaries.
  - Lighting Perimeter Illumination Examples:

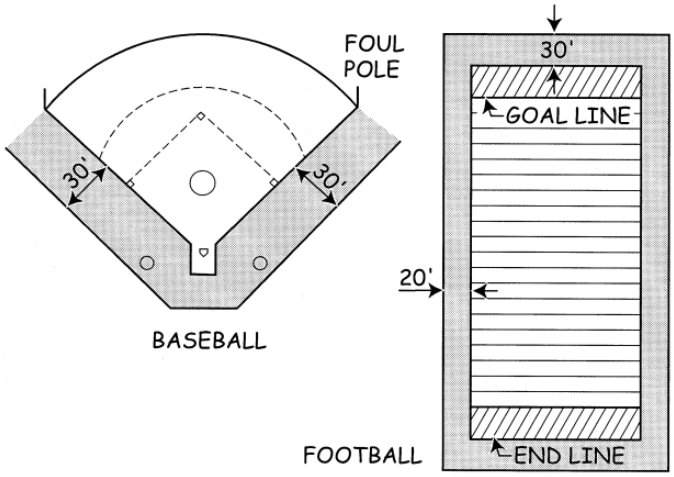

Diagram courtesy of Fairfax County, VA

  - Below are examples of *improper* (left) and proper (right) sports field lighting:

Photos courtesy of Flagstaff Dark Skies Coalition

- Neighborhood and Community Park restrooms should be designed to be naturally lighted during the daytime, artificially lighted no later than dusk, and turned off no later than one after the site is closed/secured.

PARKING GARAGES

This section applies specifically to structures that provide parking spaces.

- Parking garages that are occupied should provide a uniform illumination level, regardless of the time of day or night.
  - A low level is recommended for basic parking areas.
  - A higher level is recommended for ramps.
  - Entrance areas are recommended to have the highest levels to provide a gradual transition between ambient outdoor lighting and the lower lighting level of the parking garage interior to allow the eyes of motorists and pedestrians to adjust to the changing illumination levels.
- Parking garage lighting systems should provide lighting uniformity on the pavement surface and interior walls.
- Controls and/or sensors based on occupancy should be employed for parking garages, but consideration should be taken to prevent dimming or turning off lights in a way that could reduce uniformity and/or increase shadow contrast.
- Whenever practicable and not in conflict with other requirements or standards, parking garage lighting systems should incorporate the "**Daylighting**" considerations and requirements contained in the "**Standards – Indoor**" section above.
- **Top-Level Roof Areas**
  - These areas are considered exterior hardscapes and shall follow the same standards outlined in the "**Parking Lots**" section below in addition to the subsequent requirements listed in this section.
  - Fully shielded bollards and embedded fixtures, or other downlight systems of similar height and intensity, should be used whenever practicable for top-level roof areas.
  - Garage parking space utilization should be assessed annually, at a minimum, to determine if usage of the top level is still necessary to meet capacity requirements.
    - If utilization does not justify the use of the top level, the following shall apply:
      - This space shall be physically blocked-off from vehicle and pedestrian use.
      - All lights with the purpose of illuminating this area shall remain off at all times.

PARKING LOTS AND LOADING/UNLOADING AREAS

This section applies specifically to parking lots, loading and unloading docks, and the top-level roof areas of parking garages.

- Parking lot lighting shall be located at vehicle entrances and exits, loading and unloading areas, parking spaces, and drive aisles.

POOLS

This section applies generally to all types of pools designed for swimming and water recreation activities.

- Artificial lighting shall be provided for all swimming pools intended to be used at night.
- Artificial lighting shall also be provided when the natural lighting is not sufficient to make all portions of the pool, including the bottom, visible and without glare.

- Lighting systems shall meet the standards as set forth in **ANSI/APSP/ICC-1 2014 Public Swimming Pools**.
- To assist the abilities of lifeguards and ensure safety for swimmers, reflection and glare on the pool's surface should be kept to a minimum.
- Underwater lights shall be designed and located in a way that makes the illumination as uniform as practicable.
    - Underwater lights are not required in areas where the water depth is not adequate for lighting (e.g. wading pools or zero depth entry areas).
    - Underwater lights shall incorporate controls or sensors to allow the lights to be dimmed or turned off completely after:
        - The pool is no longer occupied for a predefined period of time
        - The pool has closed for the evening
    - Care should be taken when designing underwater lighting systems in environmentally sensitive areas to ensure only the minimum necessary amount of illumination.

PRESERVES

This section applies specifically to areas that are managed to preserve the flora, fauna, and other environmental features.

- Preserves are some of the most environmentally sensitive areas in the County and immense care shall be taken to minimize potential environmental impacts when incorporating any sort of lighting systems at preserves. The amount of light suitable for a suburban or urban applications is far too much for the intentional natural darkness of preserves, so the use of lighting at preserves requires different guiding principles than other County sites. The following principles shall be used when considering and designing lighting systems for these areas:
    1. Establish if lighting is actually needed.
        - It should not be assumed that lighting is always required.
        - The need for outdoor lighting should emphasize applications where accessibility, security and/or safety are principal concerns.
            - Appropriate lighting shall be provided for accessible locations in developed areas, where people with disabilities should have a reasonable expectation of night access without portable lighting.
    2. Provide only the minimum amount of light that is needed at each location.
        - Lighting systems should employ adaptive lighting techniques that are capable of changing the amount and color of light over the course of the night.
    3. Prevent stray light (glare, skyglow, and light trespass).
        - All lighting systems shall be fully shielded (or located under overhangs/canopies) and installed with particular attention paid to limiting stray light.
    4. Indoor lighting should be designed for lower levels of illumination and warmer color temperatures at night to assist with the transition from interior to exterior environments.
    5. Ornamental outdoor lighting systems should be avoided except when absolutely required as part of the architectural design.
        - Ornamental lighting shall prevent stray light as outlined above and be of low intensity.
    6. Lighting systems shall be designed to provide long life, high energy efficiency, and low maintenance requirements.
    7. Lighting systems shall be designed and installed to withstand weather and physical abuse, while minimizing the potential for unsafe conditions for staff and visitors.

- As an example, fixtures near pathways should be designed in a way that will not pose a significant risk of injury for pedestrians and bicyclists.

ROADWAYS

This section applies generally to public roadways owned and/or maintained by the County.

1. **Purpose**
   - The principal purpose of roadway lighting is to produce quick, accurate, and comfortable visibility at night. As a supplement to vehicular headlight illumination, fixed lighting can enable the motorist to see details more distinctly, locate them with greater certainty, and react safely to roadway and traffic conditions present on or near the roadway facility. Experience has demonstrated that under many circumstances it is possible to light urban and suburban streets and highways, so as to reduce the loss of lives and injuries attributable to inadequate visibility. Furthermore, the IESNA Roadway Lighting Committee has argued that the lighting of streets and highways generally is economically practical. These preventive measures can cost a community less than the accidents caused by inadequate visibility.
2. **Applicability:**
   - The design of a roadway lighting system involves consideration of visibility, economics, aesthetics, safety, and environmental conditions, as well as appropriate material and equipment.
   - The lighting system of a specific road section should accommodate the visual needs of night traffic (vehicular and pedestrian) and be expressed in terms clearly understandable by lighting designers, traffic engineers, and highway administrators.
3. **Objectives:**
   - When roadway lighting principles and techniques are properly applied, the visibility provided on these public ways can provide economic and social benefits to the public that include:
     - Reduction in nighttime accidents
     - Aid to police protection and enhanced sense of personal security
     - Facilitation of traffic flow
     - Promotion of business and industry during nighttime hours
     - Inspiration for community spirit and growth
4. **Warranting Conditions and Location Criteria:**
   - It is not practical to establish specific warrants for the installation of roadway lighting that satisfy all conditions. In general, lighting may be considered for those locations where the relevant governmental agencies agree that lighting would contribute substantially to the safety, efficiency, and comfort of vehicular and/or pedestrian traffic. Lighting may be provided for all major arterials in urbanized areas and for locations or sections of streets and highways where the ratio of night to day crash rates is higher than the statewide average for similar locations and a study indicates that lighting would significantly reduce the nighttime crash rate. The following locations should be considered as a basis for warranting roadway lighting:
     - Criteria Based Upon Crash History
     - Criteria Based Upon Analysis and Investigation
     - General Criteria
5. **Level of Illumination:**
   - Use the Illuminance method for all lighting design. The design values for light levels given by the " **AASHTO Roadway Lighting Design Guide**" are maintained values.
   - These levels are for the purpose of highway safety and do not apply to lighting levels required for crime deterrence and prevention.

6. **Uniformity of Illumination**
   - In order to avoid vision problems due to varying illumination, it is important to maintain illumination uniformity over the roadway. It is recommended the ratio of the average to the minimum initial illumination on the roadway be between 3:1 to 4:1 at or for:
     - Underpasses
     - Roadway Lighting
     - Pedestrian Facilities

In general, roadway lighting should be considered as warranted when it is necessary, at night, to provide the mutual sight distance capabilities described in the "**Manual of Uniform Minimum Standards for Design, Construction, and Maintenance for Streets and Highways**" (commonly known as the "Florida Greenbook", Chapter 3 - Geometric Design.

SURVEILLANCE CAMERAS & OTHER SECURITY DETECTION SYSTEMS

This section applies specifically to areas where surveillance cameras (CCTV) or other light-dependent security detection systems are employed.

- When surveillance cameras or other security detection systems are used at a site, the lighting Design Professional/Contractor shall coordinate with the camera system designer and installers to ensure that the lighting design supports the needs of the security systems. Specifically:
  - Adequate lighting shall be provided for cameras that require light in the visible light spectrum.
    - General site lighting is not required to support cameras in areas where the cameras provide integrated lighting systems (e.g. infrared illuminators) or that do not require light in the visible spectrum (e.g. thermal).
  - At a minimum, all interior camera views shall have even illumination that is sufficient for clear viewing/recording during the facility's hours of operation.
  - High security and exterior areas camera views shall have even illumination that is sufficient for viewing/recording on an around-the-clock basis.
  - Whenever possible, lighting sources should not be visible in the camera's field of view.
  - Supplemental illuminators outside of the visible light spectrum (e.g. infrared) may be used if the light provided covers at least 70% of the camera's field of view (FoV).
    - Scenes look different when infrared light is used instead of visible light sources due to differences in the way the light sources are absorbed and reflected from the illuminated surfaces, so Design Professionals/Contractors should consider the light absorption and reflectance differences in a scene when including infrared lighting sources.

TEMPORARY USES (E.G. EVENTS)

This section applies specifically to events that do not occur on a regular basis, such as "Snowfest".

- Temporary lighting systems shall be shielded and directed way from sensitive areas.
- Special care shall be made in ensuring that attendees and pedestrians/motorists in the surrounding areas are protected from glare caused by the temporary light systems.
- All special events shall be scheduled to be completed by no later than 12:00pm.
  - No event shall be permitted to start after 10:00pm.
  - Lights shall turn off after no later than three (3) hours after the event is concluded.

TRAILS AND NATURE PATHWAYS

This section applies specifically to pathways designed to draw attention to the natural features of the surrounding area.

- The considerations and requirements discussed in the aforementioned "**Preserves**" section should be incorporated when not in conflict with other requirements or standards.
- The Collier County Lighting Standards do not require lighting for trails and nature pathways. However, if lighting is provided it shall be low intensity and provide only enough illumination to ensure safety. Whenever practicable, pathway lighting shall be controlled by motion sensors.
- If lights are provided at comfort stations, the external sidewalks and ground surfaces around the stations should be illuminated.

WATER PARKS

This section applies generally to water parks, including leisure rivers and interactive play attractions.

- Lighting systems shall meet the standards as set forth in the latest revision of the "**ANSI/APSP–9 2005 Aquatic Recreation Facilities**".

UTILITY SITES – LANDFILLS & RECYCLING CENTERS

This section applies specifically to Public Utilities sites designed for the purpose of collecting, disposing, or recycling of solid and hazardous waste.

- The lighting recommendations made by the Department of Homeland Security in the "**Reference Manual to Mitigate Potential Terrorist Attacks Against Buildings**" should be incorporated when not in conflict with other requirements or standards.
- The considerations and requirements discussed in the "**High Security Sites**" and "**Surveillance Cameras & Other Security Detection Systems**" sections should be incorporated when not in conflict with other requirements or standards.

UTILITY SITES – REMOTE

This section applies specifically to remote Public Utilities sites including wellfields and utility stations.

- The lighting recommendations made by the Department of Homeland Security in the "**Reference Manual to Mitigate Potential Terrorist Attacks Against Buildings**" should be incorporated when not in conflict with other requirements or standards.
- The considerations and requirements discussed in the "**High Security Sites**" and "**Surveillance Cameras & Other Security Detection Systems**" sections should be incorporated when not in conflict with other requirements or standards.
- The design of remote utility site lighting shall ensure that only enough light is provided to safely and efficiently perform necessary tasks and meet security requirements.
- Lighting systems shall employ full cut-off or directionally shielded fixtures that are aimed and controlled so the directed light stays within the confines of the site to prevent light trespass on neighboring properties and restrict skyglow.
- The use of sensors or automation devices shall be employed for exterior lighting at remote utility sites to meet or exceed the light reduction requirements outlined in the "**Dark Sky Lighting Zone and Outdoor Lighting Restriction**" section of this guidebook.
- Pole lights shall be no taller than twenty feet (20') above finished grade.

UTILITY SITES – WATER & WASTEWATER PLANTS

This section applies specifically to Public Utilities water and wastewater plant sites.

- The lighting recommendations established by the Department of Homeland Security in the "**Reference Manual to Mitigate Potential Terrorist Attacks Against Buildings**" should be incorporated when not in conflict with other requirements or standards.
- The considerations and requirements discussed in the "**Campus**", "**High Security Sites**"**,** and "**Surveillance Cameras & Other Security Detection Systems**" sections should be incorporated when not in conflict with other requirements or standards.

APPENDIX A – COUNTY CONSTRUCTIONS STANDARDS

- **LIGHTING**
  - http://www.colliergov.net/your-government/divisions-a-e/county-manager-s-office/standards
- **Facilities**
  - http://www.colliergov.net/your-government/divisions-f-r/facilities-management/vertical-construction-standards
- **Information Technology**
  - http://www.colliergov.net/your-government/divisions-f-r/facilities-management/vertical-construction-standards
- **Right-of-Way**
  - http://www.colliergov.net/home/showdocument?id=46480
- **Roadway**
  - http://www.colliergov.net/your-government/divisions-s-z/traffic-operations/traffic-technical-special-provisions
- **Utilities**
  - http://www.colliergov.net/your-government/divisions-f-r/public-utilities-planning-and-project-management/utilities-standards-manual

APPENDIX B – GLOSSARY OF TERMS

- **Lighting Standards Glossary** – Collier County BCC Lighting Team
  - http://www.colliergov.net/your-government/divisions-a-e/county-manager-s-office/standards

APPENDIX C – RECOMMENDED REFERENCES FOR LIGHTING DESIGN

CODES AND OTHER REGULATION

- **Americans with Disabilities Act Standards for Accessible Design** – U.S. Department of Justice
  - https://www.ada.gov/2010ADAstandards_index.htm
- **Endangered Species Act of 1973** – United States Congress
  - http://www.epw.senate.gov/esa73.pdf
- **Florida Building Code** – International Code Council
  - ISBN: 978-1-60983-557-6
- **Florida Building Code: Energy Conservation** – International Code Council
  - ISBN: 978-1-60983-565-1
- **Florida Marine Turtle Protection Act** – Florida Statutes
  - http://www.leg.state.fl.us/statutes/index.cfm?mode=View%20Statutes&SubMenu=1&App_mode=Display_Statute&Search_String=Marine+Turtle+Protection+Act&URL=0300-0399/0379/Sections/0379.2431.html
- **Land Development Code** – Collier County BCC
  - http://www.colliergov.net/your-government/divisions-a-e/development-review/land-development-code-and-amendments
- **Ordinance 04-11** – City of Marco Island
- **Ordinance 05-10814** – City of Naples

- **NFPA 70: National Electrical Code (NEC)** – National Fire Protection Association
  - ISBN: 978-1455906727
- **NFPA 72: National Fire Alarm and Signaling Code** – National Fire Protection Association
  - ISBN: 978-1455906727
- **NFPA 101: Life Safety Code** – National Fire Protection Association
  - ISBN: 978-1455908240
- **U.S.C. Title 4 Flag and Seal, Seat of Government, and the States: Chapter 1 – The Flag** – U.S.
  - https://www.gpo.gov/fdsys/pkg/USCODE-2011-title4/html/USCODE-2011-title4-chap1.htm

DESIGN CRITERIA

- **AC 150/5340-30H: Design and Installation Details for Airport Visual Aids** – Federal Aviation Administration
  - http://www.faa.gov/airports/resources/advisory_circulars/index.cfm/go/document.current/documentNumber/150_5340-30
- **AC 150/5360-13: Planning and Design Guidelines for Airport Terminal Facilities** – Federal Aviation Administration
  - http://www.faa.gov/airports/resources/advisory_circulars/index.cfm/go/document.current/documentNumber/150_5360-13
- **ADA Standards for Accessible Design** – United States Department of Justice
  - https://www.ada.gov/regs2010/2010ADAStandards/2010ADAstandards.htm#titleII
- **Fixture Seal of Approval** – International Dark-Sky Association
  - http://darksky.org/fsa/
- **Manual of Uniform Minimum Standards for Design, Construction and Maintenance for Streets and Highways** [a.k.a. Florida Greenbook] – Florida Department of Transportation
  - http://www.dot.state.fl.us/rddesign/FloridaGreenbook/FGB.shtm

STANDARDS

- **Aquatic Recreation Facilities** – ANSI/APSP
  - Standard: ANSI/APSP–9 2005
- **Design of High-Performance Green Buildings** - ANSI/ASHRAE/IES
  - Standard: ASH-ST189.1-14
- **Energy Efficiency in Existing Buildings** - ANSI/ASHRAE/IES
  - Standard: ASH-ST100-15
- **Energy Standard for Buildings Except Low-Rise Residential Building (ASNI Approved)** – ANSI/ASHRAE/IES
  - Standard: ASH-ST90.1-13
- **Environmental Design of Control Centres** - International Organization for Standardization
  - Standard: ISO 11064-6:2005
- **Facilities Standards for the Public Buildings Service P100** – U.S. General Services Administration
  - http://www.gsa.gov/portal/content/104821
- **FDOT Design Standards** – Florida Department of Transportation
  - http://www.dot.state.fl.us/rddesign/DS/17/STDs.shtm
- **FDOT Standard Specifications for Road and Bridge Construction** – Florida Department of Transportation

    - http://www.dot.state.fl.us/programmanagement/Implemented/SpecBooks/July2016/Files/716eBook.pdf
- **Florida Model Jail Standards Manual** – Florida Sheriffs Association
    - https://www.flsheriffs.org/our_program/florida-model-jail-standards/fmjs-manual/
- **Lighting of Work Places** – International Organization for Standardization
    - Standard: ISO 8995-1:2002
- **Public Swimming Pools** – ANSI/APSP/International Code Council
    - Standard: ANSI/APSP/ICC-1 2014

GUIDEBOOKS & GUIDELINES

General Lighting

- **Choosing Light Sources for General Lighting** - Illuminating Engineering Society
    - ISBN: 978-0-87995-254-9
- **Human Factors in Lighting** - Peter Robert Boyce
    - ISBN: 9781439874882
- **Light + Design: A Guide to Designing Quality Lighting for People and Buildings** - Illuminating Engineering Society
    - ISBN: 978-0-87995-231-0
- **Lighting Controls for Energy Management** - Illuminating Engineering Society
    - ISBN: 978-0-87995-279-2
- **Lighting for Exterior Environments** - Illuminating Engineering Society
    - ISBN: 978-0-87995-301-0
- **The Lighting Handbook** - Illuminating Engineering Society
    - ISBN: 978-0-87995-241-9
- **Recommended Practice for the Economic Analysis of Lighting** - Illuminating Engineering Society
    - ISBN: 978-0-87995-290-7
- **Sustainable Lighting: An Introduction to the Environmental Impacts of Lighting** - Illuminating Engineering Society
    - ISBN: 978-87995-258-7

Network Security

- **CIS Critical Security Controls** – Center for Internet Security
    - https://www.cisecurity.org/critical-controls.cfm
- **Cybersecurity Framework**- National Institute of Standards & Technology
    - http://www.nist.gov/cyberframework/
- **Guide to Industrial Control Systems (ICS) Security** - National Institute of Standards & Technology
    - http://nvlpubs.nist.gov/nistpubs/SpecialPublications/NIST.SP.800-82r2.pdf

Office Building Lighting

- **American National Standard Practice for Office Lighting (ANSI Approved)** - Illuminating Engineering Society
    - ISBN: 978-0-87995-262-4
- **Energy Efficiency Guide for Existing Commercial Buildings: Technical Implementation** - Illuminating Engineering Society

    - ISBN: 9781936504176
- **IES Guidelines for Upgrading Lighting Systems in Commercial and Institutional Spaces** - Illuminating Engineering Society
    - ISBN: 978-0-87995-280-8
- **Recommended Practice for Daylighting Buildings** - Illuminating Engineering Society
    - ISBN: 978-0-87995-281-5

Roadway Lighting

- **Design Guide for Residential Street Lighting** - Illuminating Engineering Society
    - ISBN: 978-0-87995-313-3
- **Guide for Selection, Installation, Operations and Maintenance of Roadway Lighting Control Systems** - Illuminating Engineering Society
    - ISBN: 978-0-87995-314-0
- **Roadway Lighting ANSI/IES** - Illuminating Engineering Society
    - ISBN: 978-0-87995-299-0
- **Roadway Lighting Design Guide** - American Association of State Highway and Transportation Officials
    - ISBN: 978-1-56051-325-4

Security & Crime Prevention Lighting

- **Crime Prevention Through Environmental Design** – Timothy Crowe & Lawrence Fennelly
    - ISBN: 978-0-87995-241-9
- **Facilities Physical Security Measures Guideline** – ASIS International
    - ISBN: 978-1-887056-95-3
- **Guideline on Security Lighting for People, Property, and Public Spaces** - Illuminating Engineering Society
    - ISBN: 978-0-87995-190-0
- **Reference Manual to Mitigate Potential Terrorist Attacks Against Buildings** – Department of Homeland Security
    - https://www.dhs.gov/xlibrary/assets/st/st-bips-06.pdf
- **Unified Facilities Criteria (UFC): Interior and Exterior Lighting Systems and Controls** – United States Department of Defense
    - https://www.wbdg.org/ccb/DOD/UFC/ufc_3_530_01.pdf

Specialty Lighting

- **Guidelines for Developing Non-Motorized Boat Launches in Florida** – Florida Fish and Wildlife Conservation Commission
    - http://myfwc.com/media/1340507/Non-motorizedBoatingAccessGuidelinesVer4.pdf
- **Lighting for Parking Facilities** - Illuminating Engineering Society
    - ISBN: 978-0-87995-300-3
- **Museum Handbook** – U.S. National Park Service
    - https://www.nps.gov/museum/publications/handbook.html
- **Museum Standards and Best Practices** – American Alliance of Museums
    - http://www.aam-us.org/resources/ethics-standards-and-best-practices/standards
- **National Cemetery Administration (NCA) Facilities Design Guide** - U.S. Department of Veterans Affairs
    - http://www.cfm.va.gov/til/nca.asp

- **Outdoor Lighting for Airport Environments** - Illuminating Engineering Society
    - ISBN: 978-0-87995-322-5
- **Recommended Practice for Library Lighting** - Illuminating Engineering Society
    - ISBN: 978-0-87995-278-5
- **Sports and Recreational Area Lighting** - Illuminating Engineering Society
    - ISBN: 978-0-87995-311-9