JOINT STUDY SESSION MEMORANDUM

To: Members of the Colorado Chautauqua Association and the Landmarks Board

From: Lesli Ellis, Comprehensive Planning Manager, PH&S, COB
Marcy Cameron, Historic Preservation Planner, PH&S, COB
Michael Matts, Director of Cultural Resources and Operations, CCA

Date: June 26, 2017

Subject: Joint Colorado Chautauqua Association and Landmarks Board Discussion on the Development of the Chautauqua Lighting Plan and Design Guidelines

PURPOSE
The purpose of this Joint Study Session with the Colorado Chautauqua Association (CCA) and Landmarks Board is to solicit feedback on the development of the Chautauqua Lighting Plan and Design Guidelines project. This initial study session will focus on the Draft Guiding Principles, Needs Assessment, and Master Exterior Lighting Plan (MELP) Assessment. Two additional joint study sessions will be held over the course of the project, to review the draft plan and provide feedback on the draft design guidelines. The final plan and design guidelines will be brought to CCA and the Landmarks Board for adoption in September of 2017. The City of Boulder has hired Bishop Mundus and Clanton and Associates to develop the plan and design guidelines.

JOINT BOARD DISCUSSION
1. Do the boards have feedback on the Draft Guiding Principles?

2. What aspects of the Master Exterior Lighting Plan (MELP) should be integrated into the current Lighting Plan and Design Guidelines? See Attachment B: Master Exterior Lighting Plan (MELP).

3. What does the board consider the practical need for lighting within the boundary of the Chautauqua Historic District and National Historic Landmark site (e.g. Safety, Security, Wayfinding)?

4. Where can lighting be improved at Chautauqua (e.g. Primary and secondary roads, pathways, parking, signage and lighting of public buildings)? What areas should remain dark? See Map on page 5 of the MELP (Attachment B).
BACKGROUND

The Chautauqua Lighting Plan and Design Guidelines (“Lighting Plan”) is an interdepartmental project, developed with the Colorado Chautauqua Association using the Collaborative Stewardship Framework. The purpose of this project is to aid in decision making for exterior lighting proposals within the boundaries of the Chautauqua Historic District, designated as a local historic district and as a National Historic Landmark. See Attachment A: Collaborative Stewardship Framework.

In 2014, the Community, Culture and Safety tax (Ballot Measure 2A) was approved by voters for a “Chautauqua Pedestrian Safety, Access, and Lighting Improvements Project.” In 2015 and 2016, the Landmarks Board reviewed two Landmark Alteration Certificate (LAC) applications for the installation of lighting from the King’s Gate entrance to the parking lot east of the tennis courts and at the Shelter House (Trolley Station) and the Arbor in the Chautauqua Historic District. The board did not approve the lighting applications, presented by the Public Works Department and based on the Colorado Chautauqua Association’s Master Exterior Lighting Plan (MELP).

The Landmarks Board decision not to approve the application was based upon its consideration that the proposed lighting was inappropriate and that the MELP, developed by the Colorado Chautauqua Association but not adopted by the Landmarks Board, did not provide adequate guidance to determine the appropriateness of exterior lighting within the historic district. The review process highlighted the need for a comprehensive lighting plan and design guidelines to assess whether the proposal met the standards for a Landmark Alteration Certificate.

In early 2017, an interdepartmental project team was formed, composed of representatives from Public Works, Open Space and Mountain Parks, Parks and Recreation, Planning, Housing and Sustainability, Finance, and Communications, as well as representatives for the Colorado Chautauqua Association. The project team will meet throughout the process to provide input to the consultant.

A community working group has also been formed, composed of representatives of Friends of Chautauqua, Historic Boulder, Inc., History Colorado, Chautauqua Cottagers, Friends of Boulder Open Space, and the Sierra Club – Indian Peaks Chapter, and will provide input throughout the process.

Community members will be able to provide input through public open houses and through online questionnaires. Information on the anticipated meetings and opportunities for engagement is included in the “Next Steps” below.

The project timeline anticipates completion of the Lighting Plan in September 2017, to allow for the review of a Landmark Alteration Certificate application and installation of lighting by Public Works at the beginning of 2018.
PROCESS
The Lighting Plan project has five phases:

1. **Historic Context and Existing Conditions; Development of Project Goals and Draft Lighting Principles (May-June 2017).**
   The initial phase will focus on evaluating existing conditions, researching the history of lighting at Chautauqua, assessing the appropriateness and need for lighting, developing project goals and draft lighting principles.

2. **Options Development (July-August).** The second phase will include the development of lighting options, shaped by the historic context, lighting principles, and feedback from the working groups, boards and community members.

3. **Recommendations (August).** In this phase, the consultant will develop draft recommendations for the plan.

4. **Draft Design Guidelines (September).** Following the development of the plan recommendations, the consultant will create specific design guidelines to aid in future decision-making related to exterior lighting within the boundaries of the historic district.

5. **Finalize Plan and Design Guidelines (September 2017).**
   The last phase will involve finalizing recommendations and design guidelines based on the consultant work, community, board and working group feedback. The plan will be brought to the Colorado Chautauqua Association Board or Directors and the Landmarks Board for adoption.

Following the development and adoption of the plan, Public Works staff will submit a Landmark Alteration Certificate application for the lighting component of the Community, Culture and Safety tax for review, using the developed design guidelines as a basis for the proposal. The application will be reviewed by the Landmarks Board and the Colorado Chautauqua Buildings and Grounds Committee.

STUDY AREA AND SURROUNDINGS
The Lighting Plan and Design Guidelines will aid in future decision-making for exterior lighting proposals within the boundary of the local historic district and the Chautauqua National Historic Landmark. The plan will acknowledge a Context Area, recognizing the surrounding area that influences or may be influenced by lighting within the Study Area.
**DRAFT GUIDING PRINCIPLES**
The following draft principles were developed through feedback from the interdepartmental staff team and community working group. The Guiding Principles will guide the recommendations and lighting design guidelines.

1. Preserve the special character of Chautauqua Historic District.
2. Sensitively integrate lighting into Chautauqua's camp-like aesthetic.
3. Meet or exceed the City of Boulder’s Dark Sky Ordinance, addressing lighting levels, trespass, pollution and glare.
4. Ensure energy efficiency and sustainability are considered.
5. Only light areas where the need is clearly defined (i.e. safety, security, wayfinding, wildlife conflicts, etc.)
6. Ensure Open Space and Mountain Parks lands are dark for evening programs and wildlife protection.
7. Ensure Chautauqua remains open and accessible to all members of the community.
8. In areas where lighting is appropriate, create a balance and consistency of light where it is needed, using light color, light levels and placement of fixtures.

**MASTER EXTERIOR LIGHTING PLAN (MELP)**
The Colorado Chautauqua Association hired Clanton and Associates to develop the *Colorado Chautauqua National Historic Landmark Master Exterior Lighting Plan (MELP)* in 2012. The document sets out a design philosophy and prescriptive designs and strategies for exterior lighting. The following excerpt from the MELP summarizes its design philosophy. The MELP is included as *Attachment B: Master Exterior Lighting Plan*.

**Design Philosophy**
The exterior lighting masterplan for Chautauqua will provide light for safety and comfort while preserving the natural resources and atmosphere that make the park so unique. The lighting program throughout will help retain a low level of natural ambient light suitable for the City of Boulder open space and mountain parks, save energy, and reduce waste to support Chautauqua green building goals. Low glare, well-placed lighting will provide a safe and comfortable nighttime environment. This masterplan (MELP) recommends lighting strategies for areas where Chautauqua deems that safety and security is a concern, but does not propose lighting throughout the entire park. Specific control measures will ensure that lighting is not used when it is not needed. The following design principles address the philosophy of site lighting throughout the Chautauqua National Historic Landmark:

- Image & Identity
- Environmentally Sensitive Lighting
- Historic Preservation
- Nighttime Visibility
- Safety and Security
- Nighttime Aesthetics

**Prescriptive Designs and Strategies**
The MELP identifies different areas within Chautauqua (primary and secondary roads, parking, pedestrian paths, structures, and signs) and illustrates typical existing conditions, lighting equipment specifications, rules of thumb for location, spacing, and mounting heights, and appropriate sketches for mounting details. The MELP makes recommendations on the style of fixtures and also provides control strategies for automatic control.

**MELP ASSESSMENT**
The Landmark Alteration Certificate applications submitted by Public Works in 2015 were based on the MELP. However, the MELP was not adopted by the Landmarks Board and in their review, the Landmarks Board found that it did not provide adequate context, analysis or guidance to determine the appropriateness of exterior lighting within the historic district. This project, the Chautauqua Lighting Plan and Design Guidelines, will be developed collaboratively by the City of Boulder and the Colorado Chautauqua Association. The project will use the MELP as a resource in the development of the new lighting plan and design guidelines.

**NEXT STEPS**
The second and third open houses and joint LB/CCA study sessions are anticipated to be held in August and September. The dates have not been confirmed and will be available on the city’s website. In addition to the open houses, community members may also provide input through our project webpage: [https://bouldercolorado.gov/historic-preservation/chautauqualightingplan](https://bouldercolorado.gov/historic-preservation/chautauqualightingplan).

Contact Marcy Cameron, Historic Preservation Planner, with questions or comments on the process. cameronm@bouldercolorado.gov or (303) 441-3209.

**ATTACHMENTS**
A: Collaborative Stewardship Framework
B: Colorado Chautauqua National Historic Landmark Master Exterior Lighting Plan, 2012
Collaborative Stewardship of the Colorado Chautauqua

GUIDING PRINCIPLES FOR PLACE MANAGEMENT AND FISCAL SUSTAINABILITY *

Purpose of the Guiding Principles
These guiding principles represent a shared statement about the nature of the Colorado Chautauqua and the manner in which its primary stewards (the City of Boulder and the Colorado Chautauqua Association) intend to collaborate in the planning and management of its future.

1 A Public Place
Chautauqua is a shared community resource and a public place. It is essential that it remain a place that is accessible, safe and welcoming to the general public.

2 A Historic Landmark
The Colorado Chautauqua is a recognized national and local historic landmark. Preservation of its historic character is of the utmost importance when making decisions about its future.

3 A Historic Mission
Chautauqua supports cultural, educational, social and recreational experiences that are integral to its historic character and function. Preservation and perpetuation of its historic mission and supporting operations are paramount to sustaining the spirit of Chautauqua.

4 A Balanced Approach
Chautauqua encompasses multiple ownerships and missions; the needs and interests of many must be balanced in a manner that protects the site and spirit of Chautauqua, in keeping with principles 1, 2 and 3. Management decisions about surrounding uses should be made with sensitivity to potential impacts on Chautauqua. At the same time, Chautauqua should be managed and preserved in a manner consistent with the community’s sustainability goals and with sensitivity to impacts on surrounding residential neighborhoods.

5 Collaborative Place Management
To achieve the balanced approach described in principle 4, the Chautauqua area (including the CCA leasehold and adjacent parks and open space) must be collaboratively managed. In particular, the following components of collaborative place management must be clearly defined and agreed to by the city and the CCA:

5a Roles and Responsibilities. The city and the CCA have the joint responsibility of preserving, perpetuating and improving the spirit and historic character of Chautauqua through collaborative stewardship and place management as well as the responsibility of managing specific public and private assets:

- The Colorado Chautauqua Association has the role of perpetuating the spirit and mission of the historic Chautauqua through production of cultural, educational, social and recreational experiences to benefit the Boulder community and visitors to the area. The CCA also has the responsibility, under its lease with the city, of managing and programming certain public assets and CCA’s owned cottages, lodges and other facilities in a manner consistent with its historic mission and these guiding principles.
**The City of Boulder** has multiple roles, including: 1) **owner** of the underlying land throughout Chautauqua, three key historic buildings and an historic structure in the leasehold, serving in this role as landlord to the CCA; 2) **manager** of the public infrastructure throughout Chautauqua and of the public assets and lands outside the leasehold, including a public park and open space; and 3) **regulator** in terms of city laws. The city has the responsibility of representing the interests and priorities of the community at-large; maintaining safe and efficient access to and within the site; and coordinating policy and action in a manner consistent with these guiding principles.

5b **Thresholds for Collaborative Processes.** Effective collaboration among the multiple core entities responsible for the Chautauqua area’s management is critical. In general, the collaborative processes between CCA, the city and the public should proportionately increase as the scope of the proposed change increases as illustrated in the following graph:

The following is illustrative of “thresholds for collaboration” that will be refined, clarified and agreed to by the city and the CCA to guide future agreements and decision-making processes. It may or may not be the final recommendation to have three thresholds; that will be determined in the next steps.

**Threshold 1: Minor Modifications.** These encompass site or facility changes that do not involve significant changes to the site or public building exteriors; are led and financed primarily by a single party; and are consistent with these guiding principles. Coordination and collaboration between the CCA and the city is essential, but successful precedents exist that can be clearly defined and followed to ensure transparency, mutual understanding and continued success. Examples of this type of change include recent enhancements to site way finding and interpretive signage and
current work to improve the bus pull-out and site circulation for improved pedestrian safety.

- **Threshold 2: Significant Modifications Led by a Single Party.** These are changes to the site or facilities that significantly alter a city-owned building’s exterior, involve new construction or demolition, significantly alter historic site patterns or designs, and/or represent a significant change in use. This level of change may be proposed by a single party but will require a higher degree of coordination and collaboration early in the process to address the concerns or needs of other parties and ensure consistency with these guiding principles. The resulting process may or may not lead to shared financial responsibility, but should ensure transparency, opportunities for public input and clarity and timeliness of decision making for the concerned party(ies). *Examples of this type of change include the potential addition of ADA-accessible bathrooms for the Chautauqua Auditorium and the concept of a new free-standing building.*

- **Threshold 3: Significant Modifications Requiring Multi-Party Investment.** These are changes similar in scope or impact to those in Threshold 2, but which would clearly benefit from joint investment in their design and implementation. Due to the shared investment, these may require an even higher degree of collaboration early and throughout the process. *An example of this type of change is the potential undergrounding of utilities around and through the National Historic Landmark area.*

5c **Guiding Policy Documents.** To support a collaborative approach to management of the Chautauqua area, key policy documents should be jointly developed and adopted by the core parties. These include, but are not limited to, the Chautauqua Collaborative Stewardship Framework (which should be revised and finalized consistent with these guiding principles) and the Chautauqua Design Guidelines.

5d **Public Information and Input.** Because the management of Chautauqua is a shared responsibility across multiple entities, it can be difficult for the public to find complete and accurate information regarding planning and management-related issues for the area. A shared approach to providing public information and opportunities for public input shall be developed and implemented to support these principles’ goals for collaborative stewardship in the public interest.

6 **A Cautious Approach to Change**
While it is recognized that changes within and around Chautauqua will occur over time, decisions over these matters must be thoughtfully and cautiously considered, and collaboratively managed in accordance with these guiding principles to ensure the preservation of Chautauqua’s historic character and unique sense of place.

7 **Shared Financial Responsibility**
Because the Chautauqua area is a shared resource with community-wide as well as interest-specific benefit, investments in its care and upkeep should be shared in accordance with the benefit provided to each interest or user group as well as the community at-large. This does not remove the possibility of significant changes being funded by a single party; however, when there are clear benefits to multiple entities, joint funding should be considered.
Definitions

**Enhancement**: to make greater, as in value, beauty, or effectiveness; augment; provide with improved, advanced, or sophisticated features. In the context of historic preservation, “enhancement” is usually used to refer to the repair, rehabilitation, restoration and, in some cases, the re-creation of historically documented features.

**Historic character**: those aspects of an historic property or historic district that accurately convey a sense of its past. The National Register defines seven aspects of integrity that are important components of historic character: location, design, setting, materials, workmanship, feeling, and association. National Historic Landmarks typically possess all of these aspects of historic character/integrity.

**Historic preservation**: an endeavor that seeks to preserve, conserve and protect buildings, objects, landscapes or other artifacts of historic, architectural or environmental significance.

**Leasehold**: the property managed by the Colorado Chautauqua Association under a lease agreement with the City of Boulder as shown in Figure 1. The city-owned property leased by the CCA includes all the land and three buildings including the Auditorium, Dining Hall, and Academic Hall.

**Manage**: to have oversight and responsibility for the on-going affairs and/or the upkeep of a site, property, organization or business.

**National Historic Landmark**: a nationally significant historic place designated by the Secretary of the Interior because it possesses exceptional value or quality in illustrating or interpreting the heritage of the United States.

**Place management**: the process of preserving or enhancing an area in a manner that maintains its integrity as a “place” with a unique character and function. This is practiced through programs to enhance a location or to maintain an already attained desired standard of operation. Place management can be undertaken by private, public or voluntary organizations or a mixture of each. Despite the wide variety of place management initiatives, the underlying common factor is usually to best meet the needs of multiple users and interests (e.g., residents, visitors, and owners) in a manner consistent with the nature of the place.
Protect and preserve: broadly speaking, protecting and preserving is the process of determining and implementing appropriate actions to minimize change to identified historic properties or districts that would adversely affect their historic character.

Stewardship: the ethical overseeing and protection of something considered worth caring for and preserving.

*The Guiding Principles for Collaborative Place Management and Fiscal Sustainability of the Colorado Chautauqua (“the Chautauqua Guiding Principles”) adopted by the Boulder City Council and the Colorado Chautauqua Association Board of Directors in late 2012 following a thoughtful public process represent a shared statement about the nature of the Colorado Chautauqua and the manner in which is primary stewards (the City of Boulder and the Association) intend to collaborate in the planning and management of its future.
Colorado Chautauqua National Historic Landmark
Master Exterior Lighting Plan

Clanton and Associates
For the Colorado Chautauqua Association
Approved by Colorado Chautauqua Board of Directors
January 23, 2012
Table of Contents

Introduction .................................................................................................................................................... 1
Design Philosophy ......................................................................................................................................... 1
  Image and Identity ................................................................................................................................... 1
  Environmental Issues and Goals ............................................................................................................... 2
  Historic Preservation ............................................................................................................................... 2
  Nighttime Visibility .................................................................................................................................. 3
  Safety and Security ................................................................................................................................. 4
  Nighttime Aesthetics ............................................................................................................................... 4
  City of Boulder Lighting Ordinance ........................................................................................................... 4
Prescriptive Designs and Strategies .............................................................................................................. 5
  Primary Roadways (Public) .................................................................................................................... 6
  Secondary Roadways (Residential) .......................................................................................................... 7
  Parking (Public) ..................................................................................................................................... 8
  Pedestrian Paths ................................................................................................................................... 9
  Parks and Public Spaces .......................................................................................................................... 10
  Building Facades ................................................................................................................................ 11
  Monuments/Structures ............................................................................................................................ 16
  Residential Exterior ............................................................................................................................... 17
  Historic Globe Lighting ........................................................................................................................... 18
Control Strategies ....................................................................................................................................... 19
Maps and Drawings .................................................................................................................................... 20
Appendix A .................................................................................................................................................. 25
Appendix B .................................................................................................................................................. 26
Introduction

On the Chautauqua campus, the exterior lighting helps to organize and define the nighttime visual environment. The placement, style, and performance of the lighting equipment determine much of the visual character of the environment after dark as well as the overall visibility for visitors. Changes in light levels should signify changes in public (more light) versus private (less light) zones of the park. During the day, the decorative elements of the lighting equipment will support the historic nature of the architecture and site and provide a unifying aesthetic element on the property. In addition to identifying where to provide light, the masterplan also designates areas that should remain dark. Every effort should be made to minimize light trespass and light pollution for the residences and adjacent open space.

The site lighting system should provide for driver and pedestrian visibility and way finding. Traveled pathways are lighted to provide guidance and good visibility while parking lots are lighted to provide security for both pedestrians and motorists. All of these design issues should be addressed with minimal energy use and effective maintenance in mind.

Design Philosophy

The exterior lighting masterplan for Chautauqua will provide light for safety and comfort while preserving the natural resources and atmosphere that make the park so unique.

The lighting program throughout will help retain a low level of natural ambient light suitable for the City of Boulder open space and mountain parks, save energy, and reduce waste to support Chautauqua green building goals. Low glare, well-placed lighting will provide a safe and comfortable nighttime environment. This masterplan recommends lighting strategies for areas where Chautauqua deems that safety and security is a concern, but does not propose lighting throughout the entire park. Specific control measures will ensure that lighting is not used when it is not needed.

The following design principles address the philosophy of site lighting throughout the Chautauqua National Historic Landmark:

- Image & Identity
- Environmentally Sensitive Lighting
- Historic Preservation
- Nighttime Visibility
- Safety and Security
- Nighttime Aesthetics

Image and Identity

The most important issue related to Chautauqua image and identity is not so much the selection of luminaire style, but rather the consistent application of styles, mounting heights, and light levels throughout the entire historic site. This masterplan establishes a clear hierarchy of lighting equipment and strategies to support the architecture and infrastructure of the park.

The luminaire styles should be influenced by the architectural styles of the park structures. However, many traditional lighting fixtures create as much glare as they do useful light and are not designed to minimize light trespass and light pollution. With some modifications, many traditional styles can be made to better control the light and still stay true to the traditional forms.
Light enhances architectural form and will support massing, hierarchy, and details of the architecture. Surfaces will be revealed with light, but views of the light fixtures will be minimized. Light fixtures should be integrated into the architecture where possible by mounting in eaves, under canopies, recesses, or within low walls. Light fixtures shall be inconspicuous unless there is an intentional decorative purpose. In general, the pedestrian level of the architectural form shall be the emphasis for appropriate exterior lighting. Only a few select facades should have light above the pedestrian level as a way to identify Chautauqua’s very prominent and public features.

**Environmental Issues and Goals**

Environmentally sensitive lighting minimizes light pollution and light trespass, and applies only the right amount of light where and when it is needed. To limit light trespass and light pollution, the Lighting Masterplan complies with the City of Boulder Outdoor Lighting Standards, Section 9-9-16. All exterior area lighting will be shielded or fully shielded, aimed downward, and will utilize white light sources. Lighting levels will be minimized and lighting controls will ensure that lighting is turned off in some areas when it is not needed.

- **Dark Skies – Minimizing Light Pollution**
  
  Light pollution is uncontrolled light that travels into the atmosphere. This light represents wasted energy and creates “sky glow” that reduces visibility of stars in the night sky. Unshielded luminaires and excessively high light levels cause more light pollution than properly controlled light fixtures. The lighting within Chautauqua will be well shielded and designed to limit light levels to help maintain dark skies.

- **Friendly Neighbor – Limiting Light Trespass**

  Light trespass is often felt as “the light shining in my window”. Usual culprits are unshielded floodlights, high wattage lamps, and other unshielded luminaires that are improperly located and poorly aimed. Light trespass will be avoided throughout Chautauqua. Light trespass can be minimized with careful equipment selection, proper location, and proper aiming and shielding.

- **Lighting only WHAT is necessary.**

  The determination of what to light is just as important as how to light. Some areas may be specifically designated as dark preserves. When an area does require lighting, the design should contain the light to that area as much as possible. For instance, light from parking areas should be adequately shielded to limit stray light onto adjacent areas or buildings. This same principle applies to street and trail lighting locations to minimize stray light onto adjacent cabins. By lighting only what is necessary, the light that is used will be more effective as compared to a design that lights all areas equally.

- **Lighting only WHEN it is necessary.**

  Energy use and light pollution can be reduced by turning off lights when they are not needed. Time control and motion sensors can be used to automatically turn lights off in areas that are used less at night yet still provide light when needed for late night use.

**Historic Preservation**

The Chautauqua Design Guidelines note that the development of the park spanned several decades. While lighting equipment such as street poles may have some historic character, the guidelines state that simplicity should be the most important consideration. This masterplan illustrates various period styles that could be used on the site. While the style may reflect a lantern-like aesthetic, the lighting technology will still address glare and uplight from the luminaire.
The lighting of building facades and structures at Chautauqua will focus on highlighting elements and features of the existing architecture. The designs should take care to hide the lighting equipment and not use any stylized fixtures that become an additional decorative element on the façade.

**Nighttime Visibility**

- **Lighting Quality, not Quantity.**
  
  Often, architectural exterior lighting is used principally for floodlighting instead of lighting quality, resulting in over-lit facades that create reflected light pollution or trespass. High quality accent lighting creates a composition of light and darkness on the architecture, using less light for greater effect. Streets and parking lots are also often over-lit when light level is used as the main lighting criteria without concern for the many other factors that affect visibility.

  Lighting quality involves many issues such as contrast, brightness adaptation, minimal glare and light source color. Good visibility is achieved by balancing brightness, lighting vertical surfaces, providing clear visual cues, and controlling glare. These strategies create a high quality visual environment using low light levels and minimal energy.

- **Brightness Adaptation.**
  
  Our eyes adjust to the brightest object in our field of view. This adjustment of our eyes is referred to as brightness adaptation. If an object is very bright, such as uncontrolled light from a floodlight, everything else in the immediate surrounding area appears relatively dark, making it harder to detect object details.

- **Reducing Glare.**
  
  Glare is usually caused by uncontrolled light emitted from unshielded luminaires. An example of this is unshielded wall pack fixtures or floodlights located on a building façade. These situations can be easily avoided with proper equipment selection, location, aiming, and shielding.

- **Better Visibility with White Light.**
  
  Light source color is another key to low light level visibility. Reaction time and color recognition under low light levels is superior with white light sources like metal halide, fluorescent, LED, and induction lamps. Using a warm colored light source (3000 K) will give a warm residential aesthetic while taking advantage of the white light visibility benefit.

- **Lighting Vertical Surfaces.**
  
  Illuminated surfaces improve the sense of brightness, safety, and security in an exterior environment. These surfaces allow pedestrians to see other people and objects in silhouette as well as accenting the character of the architecture and features.

- **Wayfinding.**
  
  Sign lighting provides an obvious complement to wayfinding features. However, lighting may also augment wayfinding in the form of indicators. For example bollards may alert motorists to the presence of pedestrians. Additionally, changes in brightness provide visual cues and orientation for pedestrians. Continuously lighted streets may identify a primary vehicle route while lower lighting levels suggest private or residential areas.
**Safety and Security**

Lighting to improve safety involves lighting hazards so that they can be seen with sufficient reaction time. Hazards may include vehicle intersections, crosswalks, stairs and ramps, and other site features that may be perceived as unsafe if not well identified at normal night time lighted conditions. The lighting system, along with other site design elements, must provide visual information to assist users in avoiding such things as a collision or loss of bearings.

Security can be described as the perception of safety. Lighting to improve security involves lighting potentially hazardous locations and situations. For example, an increase in reaction time can improve the ability to find refuge, or call for help. Lighting can also act as a deterrent by increasing the visibility in an area of concern. However, it should be noted that an increase in the number of people in an area will be a more effective deterrent against crime than an increase in light level.

**Nighttime Aesthetics**

The lighting system at night should reveal a hierarchy of brightness levels and provide subtle surface brightness throughout the public spaces. The style of lighting equipment will be less noticeable at night but an organized sequence of lighted areas and surfaces will provide wayfinding and a sense of security. For example, a street that provides access to cottages may have a relatively low light level when the surrounding cottage porches have lights. Similarly, the lighted façade of the Auditorium at the end of Morning Glory Drive provides a visible destination at the end of a public street.

**City of Boulder Lighting Ordinance**

The City of Boulder adopted a lighting ordinance in 2003. Its objective is to ensure safety and security, establish the use of white light sources (compact fluorescent, LED, and induction), prevent overlighting, and minimize light pollution. The ordinance sets limits on the following lighting characteristics:

| Maximum allowable light levels (illuminance in footcandles) | Building Entries: 5  
Parking Lots: 5  
Pedestrian Walkways: 3 |
<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum uniformity ratio</td>
</tr>
<tr>
<td>Maximum lumen rating for full cutoff luminaires</td>
</tr>
<tr>
<td>Maximum lumen rating for cutoff and semi cutoff luminaires</td>
</tr>
<tr>
<td>Maximum lumen rating for unshielded luminaires</td>
</tr>
<tr>
<td>Lighting controls</td>
</tr>
</tbody>
</table>
| Maximum pole height                                            | 20’ adjacent to residential  
25’ otherwise |
| Flagpole lighting                                              | (1) Uplight not to exceed 3,500 lumens |

Additional and special use requirements can be found in the City of Boulder Land Use Code, Chapter 9-9, under Section 9-9-16, Lighting, Outdoor.
Prescriptive Designs and Strategies

The previously described concepts are applied to the typical components found throughout the Chautauqua park: roads, pedestrian spaces, structures, and residences. Roadways are made up of primary (public) routes that are frequently used by park visitors who are not necessarily staying there (open space parking, auditorium drop-off). Secondary (residential) routes serve all of the cottages but most likely are not frequented by the visiting public. Pedestrian spaces include both paths and open areas. Structures may be small focal points such as the arbor and signage or large, public facades such as the auditorium. Finally, the residential component includes all of the rented and privately owned cottages.

The map below color codes these components.

The following sections illustrate prescriptive designs and strategies for each of the components described on the map. Each section documents typical existing conditions, lighting equipment specifications, rules of thumb for location, spacing, and mounting heights, and appropriate sketches for mounting details.
Primary Roadways (Public)

EXISTING CONDITIONS:

Currently, cobrahead luminaires with high pressure sodium lamps are mounted on wood poles for the majority of the street lighting. The poles are not consistently located at intersections or on the same side of the road.

PROPOSED LIGHTING CONCEPT:

A traditional style, pole-mounted luminaire will provide lighting along the primary roads at intersections. Along stretches of primary roadway without intersections, luminaires should be spaced uniformly at curves or other decision points.

EXAMPLES

LUMINAIRE SPECIFICATIONS

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Horizontal Distribution</strong></td>
<td>Type IV or V</td>
</tr>
<tr>
<td><strong>Lamp Type</strong></td>
<td>Induction</td>
</tr>
<tr>
<td><strong>Lumen Output</strong></td>
<td>6000 lumens (85 watt)</td>
</tr>
<tr>
<td><strong>Color Temperature</strong></td>
<td>3000 K</td>
</tr>
<tr>
<td><strong>Color Rendering Index</strong></td>
<td>80+</td>
</tr>
<tr>
<td><strong>Pole Height</strong></td>
<td>18'</td>
</tr>
<tr>
<td><strong>Pole Layout</strong></td>
<td>Locate at intersections and mid-block</td>
</tr>
<tr>
<td><strong>Controls:</strong></td>
<td>Photocell ON, dim to 50% after curfew.</td>
</tr>
</tbody>
</table>
Secondary Roadways (Residential)

EXISTING CONDITIONS:
Currently, cobrahead luminaires with high pressure sodium lamps are mounted on wood poles for the majority of the secondary street lighting. Pole locations are not consistent. The remainder of the street lighting in residential streets comes from the porch lighting on the cabins.

PROPOSED LIGHTING CONCEPT:
Smaller scale poles and luminaires should light the secondary streets. The cabin porch lanterns provide background brightness while the streetlights illuminate the roadway. Backlight from the luminaires should be controlled to prevent light trespass onto the cabin property.

EXAMPLES

LUMINAIRE SPECIFICATIONS

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Horizontal Distribution</strong></td>
<td>Type IV or V</td>
</tr>
<tr>
<td><strong>Lamp Type</strong></td>
<td>Induction</td>
</tr>
<tr>
<td><strong>Lumen Output</strong></td>
<td>3500 lumens (55 watt induction)</td>
</tr>
<tr>
<td><strong>Color Temperature</strong></td>
<td>3000 K</td>
</tr>
<tr>
<td><strong>Color Rendering Index</strong></td>
<td>80+</td>
</tr>
<tr>
<td><strong>Pole Height</strong></td>
<td>12’ – 14’</td>
</tr>
<tr>
<td><strong>Pole Layout</strong></td>
<td>Locate at intersections.</td>
</tr>
<tr>
<td><strong>Controls</strong></td>
<td>Photocell ON, dim to 50% after curfew.</td>
</tr>
</tbody>
</table>
Parking (Public)

EXISTING CONDITIONS:

Currently, cobrahead luminaires with high pressure sodium lamps provide the lighting for parking lots. No specific lighting is provided for public parking in areas such as along the Chautauqua Green.

PROPOSED LIGHTING CONCEPT

A traditional style, pole-mounted luminaire should provide lighting for the parking areas. The luminaire and pole configuration should match that of the adjacent roadway (primary or secondary).

EXAMPLES

LUMINAIRE SPECIFICATIONS

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Horizontal Distribution</td>
<td>Type IV or V</td>
</tr>
<tr>
<td>Lamp Type</td>
<td>Induction or CFL</td>
</tr>
<tr>
<td>Lumen Output</td>
<td>3500 lumens (55 watt induction)</td>
</tr>
<tr>
<td>Color Temperature</td>
<td>3000 K</td>
</tr>
<tr>
<td>Color Rendering Index</td>
<td>80+</td>
</tr>
<tr>
<td>Pole Height</td>
<td>12’ – 14’</td>
</tr>
<tr>
<td>Pole Layout</td>
<td>Space at 4-6 times pole ht.</td>
</tr>
<tr>
<td>Controls:</td>
<td>Photocell ON, dim to 50% after curfew.</td>
</tr>
</tbody>
</table>
Pedestrian Paths

EXISTING CONDITIONS:

Currently, pedestrian scale lighting exists along some paths and in the Centennial Garden. However, it is typically provided by adjacent street lighting (cobrahead luminaires).

PROPOSED LIGHTING CONCEPT

For pedestrian paths that are frequently traveled at night and are not near lighted roadways, smaller scale lighting should be used. Matching existing acorn style lighting is recommended.

EXAMPLES

LUMINAIRE SPECIFICATIONS

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Horizontal Distribution</td>
<td>Type IV or V</td>
</tr>
<tr>
<td>Lamp Type</td>
<td>CFL</td>
</tr>
<tr>
<td>Lumen Output</td>
<td>1200 lumens (18 watt)</td>
</tr>
<tr>
<td>Color Temperature</td>
<td>3000 K</td>
</tr>
<tr>
<td>Color Rendering Index</td>
<td>80+</td>
</tr>
<tr>
<td>Mounting Height</td>
<td>12’</td>
</tr>
<tr>
<td>Pole Layout</td>
<td>Locate poles at path intersections and traffic / pedestrian conflict areas.</td>
</tr>
<tr>
<td>Controls</td>
<td>Photocell ON, dim to 50% after curfew.</td>
</tr>
</tbody>
</table>
**Parks and Public Spaces**

**EXISTING CONDITIONS:**

Centennial Garden, currently lit by acorn style lights, is an example of an illuminated public space. The park serves as a pedestrian corridor at night as well.

**PROPOSED LIGHTING CONCEPT**

These areas will use the pedestrian luminaire to match the existing acorn style lighting.

**EXAMPLE PRODUCTS**

**LUMINAIRE SPECIFICATIONS**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Horizontal Distribution</td>
<td>Type IV or V</td>
</tr>
<tr>
<td>Lamp Type</td>
<td>Induction or CFL</td>
</tr>
<tr>
<td>Lumen Output</td>
<td>1200 lumens (18 watt CFL)</td>
</tr>
<tr>
<td>Color Temperature</td>
<td>3000 K</td>
</tr>
<tr>
<td>Color Rendering Index</td>
<td>80+</td>
</tr>
<tr>
<td>Pole Height</td>
<td>12’</td>
</tr>
<tr>
<td>Pole Layout</td>
<td>Locate at path intersections.</td>
</tr>
<tr>
<td>Controls:</td>
<td>Photocell ON, dim to 50% after curfew.</td>
</tr>
</tbody>
</table>
**Building Facades**

**EXISTING CONDITIONS:**

The existing Auditorium façade has no exterior lighting. While it would not be lit every night, its prominence to drivers coming to Boulder on Highway 36 makes it a good landmark and public icon during events.

**PROPOSED LIGHTING CONCEPT:**

Like many buildings in the park, small architectural details (niches, cupolas, etc.) could be lit with minimal lighting equipment and energy use.

Lighting in niches should be mounted at the top, lighting downward. Uplighting of the cupolas must be contained within the roof overhangs to reduce light escaping into the night sky.

**EXAMPLES**

**LUMINAIRE SPECIFICATIONS**

<table>
<thead>
<tr>
<th>Distribution</th>
<th>20°-40° beam spread</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lamp Type</td>
<td>Linear LED</td>
</tr>
<tr>
<td>Lumen Output</td>
<td>400 – 900 lumens max</td>
</tr>
<tr>
<td>Color Temperature</td>
<td>3000 K</td>
</tr>
<tr>
<td>Color Rendering Index</td>
<td>80+</td>
</tr>
</tbody>
</table>

**Controls:** Provide for the changing of overall light levels by switching different luminaire types separately. Controls should provide for a minimum of two “scenes” such as open/closed, event/no event, etc.
**Monuments/Structures**

**EXISTING CONDITIONS:**

Currently, very few structures are lighted in the Park. However, structures such as the Arbor receive a significant amount of pedestrian traffic at night and warrant additional illumination.

**PROPOSED LIGHTING CONCEPT:**

Structure lighting should remain subtle, downward directed, and controllable so that it is only on during events or certain times of the evening.

In this lighting concept for the arbor, only the inside surfaces of the stone columns are illuminated. The reflected light will produce a glow inside the structure, inviting pedestrians to pass through on their way to the Auditorium or to Baseline Road.

**EXAMPLES:**

**LUMINAIRE SPECIFICATIONS:**

<table>
<thead>
<tr>
<th>Distribution</th>
<th>Flood or Narrow Flood</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lamp Type</td>
<td>LED</td>
</tr>
<tr>
<td>Lumen Output</td>
<td>100 – 400 lumens</td>
</tr>
<tr>
<td>Color Temperature</td>
<td>3000 K</td>
</tr>
<tr>
<td>Color Rendering Index</td>
<td>80+</td>
</tr>
</tbody>
</table>

**Controls:**

Provide for the changing of overall light levels by switching different luminaire types separately. Controls should provide for a minimum of two “scenes” such as open/closed, event/no event, etc.
**Residential Exterior**

**EXISTING CONDITIONS:**

Currently, exterior lighting on and around the cabins is kept to a minimum. Most cabins have a lantern style porch light beside or above the door.

**PROPOSED LIGHTING CONCEPT**

The lamps in the porch lights should be changed to compact fluorescent or LED and controlled with an automatic timer. The location of lights and building number should be paired in such a way that the number is clearly illuminated for late night arrivals and easy address identification.

For Private cottage owners:

CCA is implementing this porch lighting plan on all CCA owned cottages and CCA may offer assistance to private cottage owners in retrofitting existing switches with timers to maintain consistency throughout the park by providing a source for the timers being used and contact information for the CCA electrician. The timers being used are completely programmable and can be set to turn porch lights on from dusk until dawn.

<table>
<thead>
<tr>
<th>Lamp Type</th>
<th>Compact Fluorescent or LED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lumen Output</td>
<td>400 – 900 lumens (max)</td>
</tr>
<tr>
<td>Color Temperature</td>
<td>3000 K</td>
</tr>
<tr>
<td>Color Rendering Index</td>
<td>80+</td>
</tr>
<tr>
<td>Mounting Height</td>
<td>Over door</td>
</tr>
<tr>
<td>Controls</td>
<td>Photocell ON / Timer OFF.</td>
</tr>
</tbody>
</table>
**Historic Globe Lighting**

EXISTING CONDITIONS:

The decorative globe fixtures located at the auditorium are dated from the early 1900’s and are a character defining feature of the district.

These luminaires have been relamped with low wattage compact fluorescent lamps. This approach keeps the historic fixture while reducing glare, energy consumption, and light pollution.

**LAMP RETROFFITS**

<table>
<thead>
<tr>
<th>Lamp Type</th>
<th>Compact Fluorescent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lumen Output</td>
<td>900 lumens (max)</td>
</tr>
<tr>
<td>Color Temperature</td>
<td>3000 K</td>
</tr>
<tr>
<td>Color Rendering Index</td>
<td>80+</td>
</tr>
<tr>
<td>Controls:</td>
<td>Provide automatic time switch.</td>
</tr>
</tbody>
</table>
Control Strategies

Exterior lighting control for the campus uses several different strategies:

- **Automatic photocontrol**: turns the light ON at sunset and OFF at dawn.
- **Automatic photocontrol with time switch**: turns light ON at sunset and OFF at a set time of night.
- **Automatic photocontrol with time switch and manual override**: turns the light ON at sunset and OFF at a set time; can be overridden to stay ON later and then reset to the regular schedule the next day.
- **Partial night photocontrol**: turns the light ON at sunset, dims the light to 50% at 10pm (or other selected time) and then OFF at dawn.

The control schedule for all of the lighting components is listed in the following table. The lighting varies by time of year (standard season and event nights) and by time of day (dusk to curfew and curfew to dawn).

<table>
<thead>
<tr>
<th>Exterior Lighting</th>
<th>Standard Seasonal Schedule</th>
<th>Event Schedule</th>
<th>Control Type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dusk to 10 PM</td>
<td>10 PM to Dawn</td>
<td>Dusk to Post Event Time</td>
</tr>
<tr>
<td>Primary Lighting</td>
<td>ON</td>
<td>ON at HALF POWER</td>
<td>ON</td>
</tr>
<tr>
<td>Secondary Lighting</td>
<td>ON</td>
<td>ON at HALF POWER</td>
<td>ON</td>
</tr>
<tr>
<td>Pedestrian Lighting</td>
<td>ON</td>
<td>ON at HALF POWER</td>
<td>ON</td>
</tr>
<tr>
<td>Architectural Lighting</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Auditorium Tower Lighting</td>
<td>OFF</td>
<td></td>
<td>ALL ON</td>
</tr>
<tr>
<td>Community House</td>
<td>ALL ON</td>
<td>OFF</td>
<td>ALL ON</td>
</tr>
<tr>
<td>Dining Hall Tower Lighting</td>
<td>OFF</td>
<td></td>
<td>ALL ON</td>
</tr>
<tr>
<td>Academic Hall Entry Lighting</td>
<td>ALL ON</td>
<td>Entry Lighting ON</td>
<td>ALL ON</td>
</tr>
<tr>
<td>Ranger Cottage</td>
<td>ALL ON</td>
<td>OFF</td>
<td>ALL ON</td>
</tr>
<tr>
<td>Structure Lighting</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kiosks</td>
<td>OFF</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>Arbor</td>
<td>ON</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>Trolley Stop</td>
<td>ON</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>Picnic Shelter</td>
<td>OFF</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>Sign Lighting</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline Entry</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
</tr>
<tr>
<td>Trolley Stop</td>
<td>ON</td>
<td>OFF</td>
<td>ON</td>
</tr>
</tbody>
</table>
Maps and Drawings
LEGEND

- EXISTING POLE MOUNTED LIGHTS
- HISTORIC GLOBE LIGHTING
- CENTENNIAL/ACORN LIGHTS

EXISTING POLE MOUNTED LIGHTING LOCATIONS (APPROX.)
Appendix B

In 1998, Clanton & Associates completed a lighting design for the Centennial Garden. At that time, other recommendations were made for the auditorium architectural lighting and pedestrian lighting north of the arbor and near the playground. This appendix contains the documentation for those recommendations. The concepts and designs shown in the masterplan continue the recommendations made at that time.