



The lighting designer has no greater opportunity to effect mood and make a statement than when he or she is participating in the design of an exterior environment. Hopefully, today's presentation will present you with a few new ideas to help make your projects more safe, secure, and dynamic.



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Before beginning the presentation I need to tell you that the RC Lurie Company is a registered provider with the American Institute of Architect's Continuing Education Systems. This presentation qualifies for AIA/CEU as well as LEU units for Engineering and LC re-certification.

## Learning Objectives

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- Creating the Visual Environment:

- Identify goals and key considerations for the use of light at night
  - Evaluate techniques and tools used to achieve desired effects
  - Demonstrate the successful application of light
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Learning Objectives...

## Exterior Lighting – Community Responsive Design

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### Community Responsive Design

1. list priorities of lighting goals- safety, aesthetics, security, identity, light pollution and trespass, energy effectiveness and cost.
  2. determine the theme, one that relates to the character and style of the community.
  3. develop a family of luminaires, poles mounting heights that match various applications.
  4. consider how luminance ratios impact visibility. 20:1 from primary focal point and general surround, lower ratios can be used for adjacent areas.
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Lighting an exterior almost always must be integrated into the fabric of the surrounding community at large. This requires the designer to start the design process with a much broader three dimensional view than is typical for most interior design programs. Most exterior lighting designs will encompass general, safety, and security lighting, with more or less emphasis on each element depending on the design goals of a specific project . The design should be unified in terms of lighting performance as well as structural esthetics.

## Exterior Lighting – Community Responsive Design

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### Community Responsive Design

5. determine how luminaire luminances affect perceptions of the environment. High luminances can be distracting, uncomfortable and even disabling.
  6. provide design guidelines, establish the process for planning public and private lighting.
  7. educate developers of lighting ordinances. Or more carefully stated, integrate lighting ordinances and their intent in the recommended design.
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The designer must establish a set of design and esthetic guidelines that will guide the design process from the conceptual stage through the completion of construction.

## Exterior Lighting – Concepts and Techniques

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- Purposes/Goals of Lighting Task
- Key Considerations
- Techniques and Tools



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To start the process it is vital to understand that exterior lighting is the creation of the visual environment at night. The goals of design are similar in most applications. The designer must strive to make appropriate use of the project's lighting, whether it is a retail, office, medical, educational, residential, or any other use during its evening operation.

## Purpose/Goal of Lighting Task

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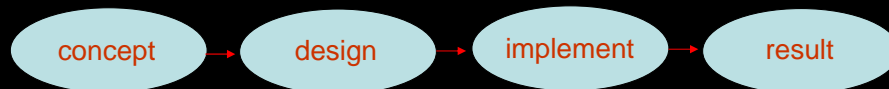
- Establish a clear goal for the lighting effect & appearance
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It is critical to first establish a clear goal for the lighting design...what should the final result look like? What should the created visual environment accomplish?

## Purpose/Goal of Lighting Task

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- Establish a clear goal for the lighting effect & appearance



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Be sure to be consistent, or true, to the goal throughout all stages of design. Establishing these goals at the concept and design stages will insure proper thought to the design, and overall compatibility of the lighting design to the other elements of the project.

## Purpose/Goal of Lighting Task

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- Lighting of architecture & space
- Exterior architecture evolves during design process
  - Typically concerned with daytime appearance
  - Daytime light
  - Color neutral
  - Bright, uniform light



Let's first evaluate light's role in the architectural design process. For the majority of projects, lights' role is thought of in terms of the structure's daytime appearance. The architecture evolves through the design, always considering how the textures, colors, shadows, etc work during the day. Daylight doesn't penalize or favor any color scheme, it's bright, typically in the range of 5,000-20,000 foot candles and can be very uniform.

## Purpose/Goal of Lighting Task

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- Lighting of architecture
- Exterior architecture evolves during design process
  - Typically concerned with daytime appearance
  - Daytime light
  - Color neutral
  - Bright, uniform light
  - From overhead
    - Dynamic
    - Location, time of day
    - Weather



Daylight comes from above, or overhead, and is dynamic in nature, varying with location, time of day and weather. Think of how much the appearance of a building can change between cloudy and sunny days.

## Purpose/Goal of Lighting Task

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- Nighttime
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Light at night is different. It is a design opportunity in addition to the daylight version of the project. It is a complete re-creation of the visual environment, and if not thoughtfully designed will reduce the quality of the project.

## Purpose/Goal of Lighting Task

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- Nighttime

- Typically lighting from below
- Contrasting with dark sky/surrounds
- Lower levels of light



The lighting of architecture is typically done from below, and the lighted objects contrast with the dark sky and surrounds. Light levels in the range of .2-5 footcandles are sufficient to produce a desired effect in most cases.

## Purpose/Goal of Lighting Task

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- Nighttime
  - Typically lighting from below
  - Contrasting with dark sky/surrounds
  - Lower levels of light
- Lighting for use



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If the goal involves lighting for use, functional lighting,

## Purpose/Goal of Lighting Task

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- Nighttime

- Typically lighting from below
- Contrasting with dark sky/surrounds
- Lower levels of light

- Lighting for use

- Security
- Navigation
- Identification of visual task/focus
  - Vertical illumination
  - Uniformity



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whether it be general security type lighting, or lighting for navigation or identification, vertical illumination and uniformity should be the main visual focus. Remember, although horizontal illumination is easy to calculate and therefore is most often referenced in the evaluation of a lighting design, it is lighted vertical surfaces and an object's illumination that humans react to, which gives form and focus to the lighted environment.

## Purpose/Goal of Lighting Task

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- Nighttime
  - Typically lighting from below
  - Contrasting with dark sky/surrounds
  - Lower levels of light
- Lighting for use
  - Security
  - Navigation
  - Identification of visual task/focus
    - Vertical illumination
    - Uniformity
  - Utilitarian



Even a 'utilitarian' lighting task can be accomplished tastefully.

## Purpose/Goal of Lighting Task

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- Elements of Lighting Design, ambient or general lighting

### IES Recommended Lighting Levels

.2 footcandles, minimum footcandle value

.5 footcandles, minimum increased security level

### Uniformity Levels

4:1 Uniformity average to  
minimum

10:1 Uniformity maximum to  
minimum

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The first step in the creation of the visual environment is the application of the appropriate quantity and quality of general lighting. Security lighting for buildings without normal evening hours of active occupancy may only need low levels of lighting, while active 'use' lighting for projects with evening operating hours will require higher levels of light, and many projects will have a combination of the two.

## Purpose/Goal of Lighting Task

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- Elements of Lighting Design, ambient or general lighting  
Fixture selection, form and function



- Geometric shapes offer a neutral design element and lowest cost
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The first layer of light, the ambient or general lighting of the space, is usually the place to start. Plain geometric forms are usually the most neutral and least costly options for the introduction of general lighting. This layer of light is typically established with the paved traffic areas, whether vehicular or pedestrian.

## Purpose/Goal of Lighting Task

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- Elements of Lighting Design, ambient or general lighting  
Fixture selection, form and function



- Specialty shapes offer a accent to the design
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The addition of specialty shapes allow the designer an additional element of design. It can be incorporated into the entire lighting system, or as an additional lighting element at core areas, pathways, or entry points to the site.

# Purpose/Goal of Lighting Task

- Elements of Lighting Design, ambient or general lighting  
Fixture selection, form and function

## PERFORMANCE

The Esometric Series provides a comprehensive solution for an array of applications. Select lamp orientation, optical distribution and reflector construction enable this series to deliver superior optical solutions that suit a variety of performance and budget requirements.

### HORIZONTAL vs. VERTICAL LAMP ORIENTATION

#### HORIZONTAL LAMPS

- Allow lower housing profiles, reducing wind load and allowing use of smaller poles
- Provide an elongated distribution often preferred for roadway lighting
- Deliver higher luminous efficiency

#### VERTICAL LAMPS

- Provide a wide and uniform distribution of light
- Allow for increased lamp life, reducing maintenance costs
- Ideal for post top mounting

All vertical and horizontal lamped luminaires are available in multiple symmetric and asymmetric distributions. House-side shield options are available in both lamp orientations to limit light trespass.

## OPTICAL CONSTRUCTION

Optical system design and reflector finish determine the distribution and efficiency of a luminaire. Lithonia Lighting employs many manufacturing techniques to optimize the Esometric Series. These efficient luminaires are well suited for basic illumination or high performance applications where exacting control is required. Several families feature field-replaceable/in interchangeable optics, providing ease of maintenance and application flexibility.

#### HYDROFORMED

- Durable single-piece construction
- Anodized finish to enhance performance and provide corrosion resistance
- Cost-effective, efficient optical solution for all budgets

#### SPFR

- Excellent choice for round, symmetric and asymmetric distributions
- Optimized for vertical lamp orientations
- Anodized finish to enhance performance and provide corrosion resistance

#### SEGMENTED

- Specular Mirror® finish provides the highest level of optical performance
- Multi-faceted panels provide optical precision and control
- Engineered to maximize performance in horizontal lamp orientations

- Appropriate optical systems provide proper spacing, shielding, quantity and quality of illumination

The performance of this element in your design creates the base layer of lighting appropriate to the overall design . . .

## Purpose/Goal of Lighting Task

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Elements of Lighting Design, ambient or general lighting

- IES Recommended Lighting Levels
- 2 footcandles, minimum footcandle value
- 5 footcandles, minimum increased security level

Uniformity Levels

- 4:1 Uniformity average to minimum
  - 10:1 Uniformity maximum to minimum
- 

It establishes the minimum lighting levels and therefore the quantity of light required for accent lighting. It is very important to remember that the uniformity of the lighted environment is as important as the quantity of illumination provided.

## Purpose/Goal of Lighting Task

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- Elements of Design, Focal Glow

Generally, the destination point or for the foreground signage or an attention point

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The next layer of lighting, or element in your design is focal glow . . .

## Purpose/Goal of Lighting Task

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- Elements of Design, Focal Glow

Generally, the destination point or for the foreground signage or an attention point



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That layer of lighting generally creates a destination point or attention point within the overall design . . .

## Purpose/Goal of Lighting Task

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- Elements of Design, Focal Glow

Landscape lighting is an effective tool for this design element.



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and can also be accomplished with landscape lighting. In our photo the landscape lighting creates not only a vertical plane of illumination, or a visual 'stopping point' but also offers a reflection view of this plane in the pond on the project.

## Purpose/Goal of Lighting Task

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- Elements of Design, Focal Glow



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A new class of fixtures, interior and exterior have developed; luminous, and/or color changing floor tiles and linear strips. Even luminous 3 dimensional forms can be created.

## Purpose/Goal of Lighting Task

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- Elements of Design, Sparkle



The attention getting lighting element of sparkle can be obtained with landscape lighting, as well as luminous forms on the vertical surfaces of buildings . . .

## Purpose/Goal of Lighting Task

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- Elements of Design, Sparkle



even the addition of color, or the use of contrasting colors, can make a dynamic statement in the exterior environment.

## Techniques and Tools



Now that we have explored potential goals for our lighting design, as well as reviewed several key considerations and challenges encountered, let's discuss a few common exterior techniques and how you can achieve them.

## Techniques and Tools

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- Techniques

- Grazing

- Create interest
    - Accentuate texture



A commonly used lighting technique is grazing. Light is spread across the task at a very shallow angle. Any variation in the surface texture is accentuated, creating interest . . .

## Techniques and Tools

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- Techniques

- Grazing

- Create interest
    - Accentuate texture
    - Long shadows
    - Typically clear lamps and lenses



Long shadows result from the use of point source type lamps, typically using clear glass lamps as well as clear lenses.

## Techniques and Tools

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- Techniques
  - Flood/wash



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By contrast, flood lighting . . .

## Techniques and Tools

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- Techniques

- Flood/wash

- Smoothing
    - Flattening
    - Good 'base layer'
    - Could use either clear or coated lamps/lenses



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Has a smoothing or flattening affect. It is the technique of choice in laying down a smooth, uniform base-layer of illumination. Depending on the geometry of the application, clear or coated lamps and refractive lenses might be utilized. "Layering" is a process by which many designers 'apply' light to their task.

## Techniques and Tools

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- Techniques

- Spot/highlight
  - Create focus
  - 'Highlighting layer'
  - Attention
  - Typically clear lamps/lenses



The use of spot lighting creates focus and allows for the highlighting of essential details. This 'highlighting layer' can either accentuate or diminish architectural details as compared to their appearance during the day.

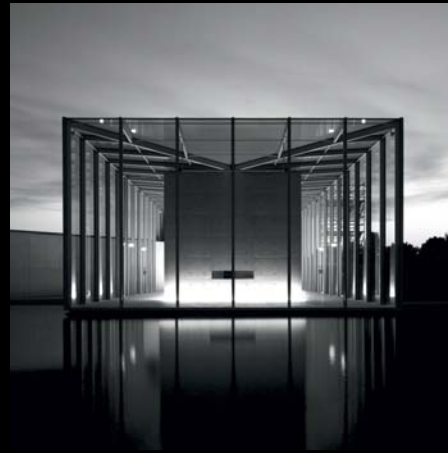
## Techniques and Tools

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- Techniques

- Silhouetting

- Negative contrast
    - Interest
    - Depth
    - Security



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Silhouetting is an interesting technique that provides an interesting solution. Through negative contrast certain physical features of structures, etc will be highlighted. There can be a kinetic component associated with silhouetting...it helps to show people moving around the building, creating interesting movements or simply can be used as another form of security lighting.

## Techniques and Tools

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- Techniques
    - Outline
- 

The outline technique can be as simple as a border of linear light,

## Techniques and Tools

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- Techniques
  - Outline
    - Visual edges



This edge is being accented by a secondary source possibly Neon or LED.

## Techniques and Tools

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- Techniques

- Outline

- Visual edges
    - Area Differentiation



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Frequently, you don't have to light the entire structure...often in exterior lighting, less is more! These dark triangles are formed by a lack of light!

## Techniques and Tools

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- Techniques
  - Shadow/modeling



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Lighting is more about contrast than anything else.

## Techniques and Tools

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- Techniques
  - Shadow/modeling
    - 3D Effect
    - Depth through contrast



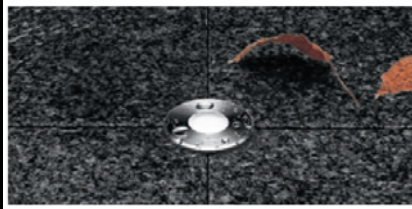
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So areas of dark can be just as effective in defining detail and depth as areas of light.

## Techniques and Tools

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- New Technologies



### Light Emitting Diodes – LED Luminaires

These luminaires with integral LEDs require no maintenance other than occasional external cleaning. White LEDs feature exceptionally long life, low power consumption, excellent color stability, and low surface temperature. Applications include use as directional or indicator lights or suitable for lighting of walkways, uplighting of landscape, and surface washing effects.

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LED lighting sources are becoming more popular in exterior lighting applications, due to their longevity and low energy use.

## Techniques and Tools

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- New Technologies



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The first series of high performance LED products has been introduced into the market. The initial cost is roughly four times that of conventional metal halide fixtures. While there are savings in energy use, the most significant savings is in maintenance costs due to the lamp life being up to 100,000 hours.

## Purpose/Goal of Lighting Task

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- Aesthetic affect
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Let's next ask ourselves what the desired aesthetic affect of the lighting solution should be.

## Purpose/Goal of Lighting Task

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- Aesthetic affect
  - Light on surfaces and objects



How does light enhance or change the colors and textures of the lighted surfaces. The perforated panels in this application, for example appear semi-transparent.

## Purpose/Goal of Lighting Task

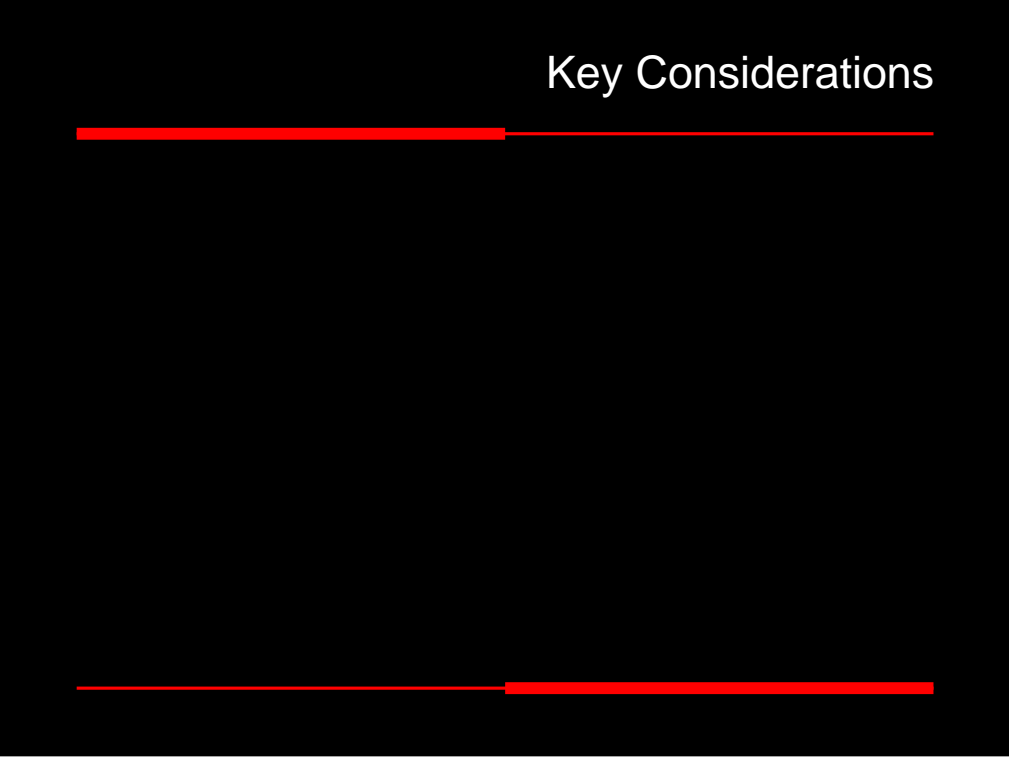
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- Aesthetic affect
  - Light on surfaces and objects
  - Appearance of lighting product
    - Integrate shape and scale to compliment the architecture and environment



How does the lighting product's daytime appearance, or 'dayform' integrate in shape and scale with the architecture and environment? Does it make a statement, or sit quietly within the design vignette.

## Key Considerations



There are some key considerations, or issues, that all lighting solutions need to incorporate into the nightscape.

## Key Considerations

- Lighting for people



Lighting for people - How can the lighting affect the viewer or participant? What is the scale of the lighting used?

## Key Considerations

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- Lighting for people
- Comfort



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Does the lighting allow for a comfortable visual experience? Indirect lighting outdoors is a great way to produce a high quality, uniform vertical illumination result without glare.

## Key Considerations

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- Lighting for people
  - Comfort
  - Contrast/interest



Humans enjoy contrasting levels of light within certain limits. Varying light levels create interest.

## Key Considerations

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- Lighting for people
  - Comfort
  - Contrast/interest
  - Order



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Lighting products, both at night and during the day, can provide a sense of boundary and limits. As this photo indicates, there is an intended separation between the vehicular and pedestrian areas of this corporate entrance.

## Key Considerations

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- Lighting for people
  - Comfort
  - Contrast/interest
  - Order
  - Orientation



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Lighting products can provide orientation. Consider the nighttime and daytime use of lighting products to lead or direct a visitor.

## Key Considerations

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- Lighting for people
  - Comfort
  - Contrast/interest
  - Order
  - Orientation
  - Urban character



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Finally, lighting effects and aesthetics can supplement, or create, a community's image or 'feel'. In this case, a campus lighting standard is part of the public identification of campus grounds.

## Key Considerations

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- Sustainability
- 

Certainly, sustainability has become a topic of discussion, and it's application to exterior lighting is both obvious and well founded.

## Key Considerations

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- Sustainability

- Energy usage minimized

IBC 2006, includes IECC the International Energy Conservation Code and restricts watts per square foot for exterior lighting; it also restricts the use of 'inefficient' fixtures, those with lumens per watt less than 60 unless lamp wattage is 100 or less



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The use of energy efficient sources and technologies aid in designs featuring reduced energy consumption.

## Key Considerations

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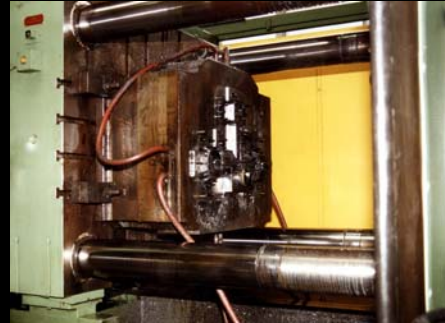
- Sustainability
    - Energy usage minimized
    - Long life cycle products
- 

The luminaires themselves either address long life cycle concerns, or they do not. There is very little middle ground for exterior luminaires. The exterior environment can be a cruel place to put a light fixture.

## Key Considerations

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- Sustainability
  - Energy usage minimized
  - Luminaire manufacture/materials
    - Metals and technique



For cast products, a choice of die casting over sand casting provides tighter tolerances for more consistent compression of sealing gaskets. The aluminum is introduced at high pressure into the hard steel mold resulting in a high density, corrosion resistant part. This process also uses less raw material.

## Key Considerations

- Sustainability

- Energy usage minimized
- Luminaire manufacture/materials
  - Metals and technique
  - Glass vs. plastics



Lens materials either last forever, in the case of glass, or will need replacement. Polycarbonates, for example, lose their strength advantages over glass after only a few years in exterior applications. An owner who demands polycarbonate lenses for vandal resistance needs to review the wattage and heat associated with the fixture, and review the quality of the materials used in the manufacturing process. Specifications should include warranties for lexan type products.

## Key Considerations

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- Sustainability
  - Energy usage minimized
  - Luminaire manufacture/materials
    - Metals and technique
    - Glass vs. plastics



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Not only is a glass lens sustainable from a long life point of view, but the production of glass uses far more environmentally friendly materials and manufacturing processes compared to plastics.

## Key Considerations

- Sustainability

- Energy usage minimized
- Luminaire manufacture/materials
  - Metals and technique
  - Glass vs. plastics
  - Protective finishes



Of course even the highest purity aluminum alloys will degrade with contact with air and pollutants, so a quality paint finish is required. Marine grade polyester powder coat paints are the preferred choice for aluminum exterior lighting products. But even the best paint won't stick to aluminum without a 'liaison' material, therefore proper preparation of the metal before painting is the more critical element in a quality exterior finish. Consider also the environmental issues involved in production paint lines...there are far more stringent environmental controls on, for example, a California based manufacturer, compared to zero environmental oversight on an Asian lighting manufacturer. Paint facilities are notorious polluters of VOC (volatile organic chemicals) and the reduction of their use and disposal entails significant oversight. So if sustainability is a key consideration for your office and for your clients, think about that for a moment as you specify products.

## Key Considerations

- Sustainability

- Energy usage minimized
- Luminaire manufacture/materials
  - Metals and technique
  - Glass vs. plastics
  - Protective finishes
- Construction/maintenance



Insects...lots of them!

Recognize also that light fixtures need to be opened for service of the lamp and ballast, and sealed again after service. Fixtures that don't use captive hardware or hardware of a different material or alloy than the receiving component WILL eventually be subject to water and insect intrusion. Lost fasteners or fasteners that are broken during maintenance due to chemical bonding of dissimilar metals in a wet environment will subject a light fixture to this type of violation.

## Key Considerations

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- Sustainability

- Energy usage minimized
- Luminaire manufacture/materials
  - Metals and technique
  - Glass vs. plastics
  - Protective finishes
- Construction/maintenance
- IP Ratings/longevity



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The designer should be familiar with IP (ingress protection) ratings. IP ratings say much more about a fixture's ability to survive in an outdoor environment than simply indicating "UL Wet Location Listed." Many lighting manufacturers can now provide IP ratings for their products upon request.

## Key Considerations

- Sustainability

- Energy usage minimized
- Luminaire manufacture/materials
  - Metals and technique
  - Glass vs. plastics
  - Protective finishes
- Construction/maintenance
- IP Ratings, longevity
- Source (lamp) selection
  - Life
  - Mercury content/disposal
  - Maintenance
  - Efficacy (lumens per watt)



Finally, the type of lamp used in the design has some association to sustainability. Energy efficiency, disposal of used lamps, etc all should be involved in source selection.

## Challenges

Every exterior lighting design will encounter challenges...

## Challenges

- Codes and Regulations

Government issued codes and regulations must be identified, addressed and adhered to.

## Challenges

- Codes and Regulations
  - Local, municipal
  - State
  - Federal
  - Egress (NEC, UBC, NFPA)
  - Energy (ASHRAE)



These include, but are certainly not limited to, local and municipal, state, and federal codes as well as national safety and energy codes.

## Challenges

- Recommendations
  - LEED
  - Dark Sky (IDA)
  - Illumination Engineering Society (IESNA)
    - Light level recommendations
      - Average
      - Minimum
      - Uniformity – max/min, ave/min, etc.
      - Spill light



INTERNATIONAL DARK-SKY ASSOCIATION (IDA)

Further, one should consider the recommendations, although not binding, of industry groups such as LEED and the IESNA. There are specific recommendations for exterior lighting such as foot candle levels, uniformity ratios, etc based on the project application.

## Challenges

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- Glare – reduction of visibility



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Glare is a major challenge that the design must overcome to be successful. The best lighting design solutions are purposeless if you can't see them. Briefly, there are generally three types of glare.

## Challenges

- Glare – reduction of visibility
  - Disability glare



Disability glare actually reduces your ability to “see the task” as a viewer in the space. It results from excessive light refracting within the eye and confusing the visual response. It can be subtle, or overwhelming.

## Challenges

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- Glare – reduction of visibility
  - Disability glare
  - Discomfort glare



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Exactly as it's name infers, discomfort glare causes the viewer to experience distraction or even a physical response such as squinting, turning of the head, or raising your hand to block the offensive intensity.

## Challenges

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- Glare – reduction of visibility
  - Disability glare
  - Discomfort glare
  - Nuisance glare



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The third type of glare is nuisance glare. This is the ability of a viewer, typically off of the property of the site, to directly view the luminous emitting area of a light fixture. The classic example is automobile dealerships and sports lighting applications. Some attempts at quantifying this type of glare includes discussions of cutoff shields or visors as well as light trespass ordinances.

## Challenges

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- Light Trespass



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“Light Trespass” is perhaps one of the most discussed considerations in exterior lighting. Light trespass is the light at or beyond the site’s property line, but basically refers to light that goes where it is offensive to someone beyond the intended illuminated environment.

## Challenges

- Human interface issues

Human interface issues are typically non-light related challenges in outdoor lighting solutions.

## Challenges

- Human interface issues
  - Lens temp issues (in-grade)



Certainly everyone is aware of the issues regarding lens temperature as it relates to in-grade lighting fixtures. Although there are no standards or limits in the US, designers should have 'first hand' experience and opinions as to acceptable lens temperatures for different applications.

## Challenges

- Human interface issues
  - Lens temp issues (in-grade)
  - ADA compliance



ADA compliance is another human interface challenge that must be met. These are just a few examples of issues to resolve for every exterior lighting design that really have nothing to do with the lighting effect itself.

## Techniques and Tools

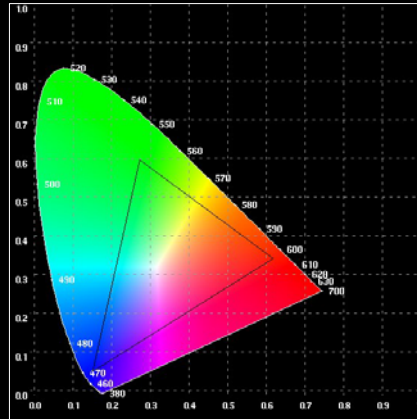
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- Color
- 

The use of color can be very effective in exterior lighting.

## Techniques and Tools

- Color
  - Source color
  - Lamp color



Depending on the type of lamp being used, there may be many choices for the color of the light emitted by the fixture.

## Techniques and Tools

- Color
  - Source color
    - Lamp color
    - Contrast



Four different lamp types were used to create this color effect. The designer often referred to this technique as “Painting with light”.

## Techniques and Tools

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- Color

- Source color
  - Lamp color
  - Contrast
  - Color filters



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Beyond the color of the light emitted from the lamp, there are other ways to introduce color, such as the use of color filters.

## Techniques and Tools

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- Color

- Source color

- Lamp color
    - Contrast
    - Color filters

- Task color

- Compliment/contrast
    - Cool vs. warm tones



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The color of the light source can compliment or contrast with the color of the task surfaces. Beware of dark surfaces, such as stainless steel panels, as they will absorb most of the light. Lots of energy produces little affect in those cases.

## Techniques and Tools

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- Glass

- From outside

- Specular reflectance, difficult to light
    - Must have texture

- From inside

- Luminous structures
    - Clear vs. frosted glass



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Glass tasks can be very difficult to illuminate as well, mainly due to their specular surfaces. A grazing application of light simply 'bounces off' the glass and the glass does not appear to be lighted. Light has to reflect back to the observer to be seen, so some texture, such as a frost or light sandblast, is desired if you are lighting glass. Lighting the internal surfaces of a glass walled structure can create an interesting affect.

## Techniques and Tools

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- Layering Concept
    - Soft vertical illumination for recognition
      - Along pedestrian way
      - Indirect lighting
    - Uniform, low level wash of vertical elements
      - Structures
      - landscape
    - Accent features to add depth/interest/focus
      - Building elements
      - Statues
      - Fountains
      - Trees
- 

The 'layering concept' can also be applied to lighting tasks. Keep in mind that the vertical surfaces are most critical. Create a base level of light throughout the area for identification and recognition of other persons, then provide a low level wash of light on the surrounding vertical surfaces to create a boundary to the area. A highlighting layer on architectural elements, statues, fountains or landscaping provides the required final layer of interest and focus.

## Techniques and Tools



This photo demonstrates many of the techniques we have discussed...layering, highlighting, contrast, interest, color, etc. Even the reflectance of light off of the water is part of the overall effectiveness of this lighting design.

We've discussed that a lighting task must have a clearly stated goal, should consider several key issues and challenges and might use one or a combination of lighting techniques and tools to accomplish the design goal. Hopefully the information presented will be an aide to your future exterior lighting designs!

This concludes the American Institute of Architects Continuing  
Education Systems Program.

Questions?



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Thank you for your time, are there any questions?