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**U.S. Department of Veterans Affairs**

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Lighting

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# designmanual

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# 1. GENERAL REQUIREMENTS



## CHAPTER 1: GENERAL REQUIREMENTS

### 1.1 GENERAL

This manual is a guide for Architects, Engineers and Lighting Design Professionals (hereafter referred as A/E) for the planning and design of the lighting and lighting control systems (hereafter referred to as lighting systems, or systems) at the Department of Veterans Affairs (VA) facilities.

VA requires A/E to read, understand, and use this manual in the planning and design of the systems in all VA construction projects – minor, major and non-recurring-maintenance (NRM). A/E - who provide planning and design of the systems - shall be licensed professionals who have engaged mainly in the specialized profession of lighting system design and all related duties of lighting system design.

Lighting systems are dependent on electrical power for their function and operation. Therefore, this manual shall be used in conjunction with the VA Electrical Design Manual (EDM) to produce complete and functional systems.

VA expects that the systems planned and designed with the use of this manual shall meet their primary objectives stated in Chapter 2. In order to provide the latitude needed to incorporate new technologies and concepts, or to accommodate adverse existing conditions, technical deviations from the stipulations of this manual may be made. Deviations may be made only if a safe, reliable, functional and energy-efficient design shall result. Such deviations must be approved by VA's Project Team which consists of Contracting Officer (CO), Project Manager (PM), Contracting Officer Representative (COR), and Authority Having Jurisdiction (AHJ). Deviations are not permitted from those requirements included in shall comply with all public laws, federal regulations, executive orders, and applicable codes.

Request for deviations shall be submitted in writing by A/E to CO and AHJ through PM or COR. At the minimum, request for deviations shall contain the following elements:

- Narrative detailing reasons for the deviations.
- Narrative detailing the design and technical information relating to the deviations.
- Design drawings of the deviations (if applicable).
- Lighting and engineering calculations (if applicable).
- Estimate of cost impact caused by the deviations.
- Estimate of schedule impact caused by the deviations.
- Supporting documents such as existing site survey photographs, drawings and documents (if applicable).

Request for deviations shall be considered approved only after A/E has received a written approval with signature from CO, and AHJ.

### 1.2 RESPONSIBILITY

A/E shall provide all necessary professional services to perform planning and design of the systems for the project. A/E shall be responsible and liable for the planning and design in accordance with the contract, professional engineering and design practices, latest VA standards and applicable codes, and project-specific requirements.

### **1.3 AUTHORITY HAVING JURISDICTION (AHJ)**

Authority Having Jurisdiction (AHJ) for VHA is the Deputy Undersecretary for Operations and Management (DUSHOM), or his/her designee. Due to the nature of change in personnel and contact information in VA, AHJ and his/her contact information may not be constant. Therefore, A/E shall obtain AHJ's name and contact information from CO, PM or COR.

### **1.4 COORDINATION**

#### **1.4.1 PLANNING AND DESIGN**

A/E shall coordinate planning and design of the lighting systems with architectural, electrical, structural, civil, site utility and site work, HVAC, plumbing, fire protection/alarm systems, and sustainable designs, as applicable. A/E shall coordinate design information between construction drawings to ensure clarity, completeness and correctness in accordance with latest VA Standards and applicable codes, project-specific requirements, and pre-existing conditions (if any).

A/E shall coordinate and edit applicable VA master specifications, and standard details to ensure clarity, completeness and correctness in accordance with latest VA Standards and applicable codes, project-specific requirements, and pre-existing conditions (if any).

For renovation projects, A/E shall perform site visit(s) to investigate, and document pre-existing conditions. Findings of pre-existing conditions shall be taken into account for the planning and design of the project.

For exterior spaces, focus should be on coordination of hardscape, softscape, and landscape. Base designs for pole-mounted luminaires should be coordinated with civil and structural engineers. A/E shall reference VA base-mounting details and modify to meet specific project scope. Base-mounting details shall be shown on drawings.

For interior spaces, focus should be on coordination of luminaire type, trim and layout with ceiling type, construction, layout, plenum depths, diffusers, ceiling tracks, and all ceiling-mounted objects. Luminaire layout should be coordinated with furniture, casework, millwork, and equipment layouts. Lighting control device locations should be coordinated with interior features and furnishings to assure ready access, as well as proper sensor performance.

#### **1.4.2 INSTALLATION**

A/E is not responsible to provide (furnish, install, and connect) lighting systems. However, lighting design document shall show clear, complete and correct information regarding all aspects of lighting and electrical power designs.

During the submittal review phase, A/E shall coordinate lighting equipment submittals with ceiling system submittals to ensure complete and correct coordination between lighting and ceiling systems.



## CHAPTER 1: GENERAL REQUIREMENTS

For renovation projects, separate demolition drawings are required for all areas involved in the project. Specific information and design of interfaces between renovated and existing-to-remain conditions shall be clearly indicated on the drawings.

### 1.5 DESIGN STANDARDS AND CODES

#### 1.5.1 GENERAL

At the minimum, comply with the latest Codes and Standards of the following organizations:

- (1) American National Standards Institute (ANSI)
- (2) ASTM International (ASTM)
- (3) Building Industry Consulting Service International, Inc. (BICSI)
- (4) Illuminating Engineering Society of North America (IESNA): A/E shall pay particular attention to latest edition of the following publications:
  - Illuminating Engineering Society Handbook.
  - RP-29 Lighting for Hospitals and Health Care Facilities
  - RP-28 Lighting and the Visual Environment for Senior Living
  - RP-33 Lighting for Exterior Environments
  - RP-20 Lighting for Parking Facilities
  - RP-8 Roadway Lighting
  - DG-10 Choosing Light Sources for General Lighting
  - G-1 Guidelines on Security Lighting for People, Property and Public
  - G-2 Guidelines for Application of General Illumination - LED Technologies
- (5) Institute of Electrical and Electronic Engineers (IEEE)
- (6) National Fire Protection Association (NFPA)
- (7) National Electrical Manufacturers Association (NEMA)
- (8) Underwriters Laboratories, Inc. (UL)
- (9) ANSI / ASHRAE / IES Standard 90.1

#### 1.5.2 VA STANDARDS

Comply with latest VA standards. Pertinent standards can be found on the Office of Construction & Facilities Management's (CFM) Technical Information Library (TIL). Some of the major standards are:

- (1) Master Specifications (PG-18-1)  
<http://www.cfm.va.gov/TIL/spec.asp>
- (2) Design and Construction Procedures (PG-18-3)  
<http://www.cfm.va.gov/TIL/spec.asp>
- (3) Design Manuals (PG-18-10)  
<http://www.cfm.va.gov/til/dManual.asp>
- (4) Design Guides (PG-18-12)  
<http://www.cfm.va.gov/til/dGuide.asp>

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- (5) Design Submission Requirements (PG-18-15)  
<http://www.cfm.va.gov/til/aeDesSubReq.asp>
- (6) Architect / Engineer Review Checklist  
<http://www.cfm.va.gov/til/aeDesSubReq.asp>
- (7) Design Alerts  
<http://www.cfm.va.gov/til/alert.asp>
- (8) Quality Alerts  
<http://www.cfm.va.gov/til/alert.asp#qalert>
- (9) Physical Security Design Manual for VA Facilities  
<http://www.cfm.va.gov/til/spclRqmts.asp#PHS>
- (10) Sustainable Design and Energy Reduction Manual  
<http://www.cfm.va.gov/til/sustain.asp>
- (11) Seismic Design Requirements (H-18-8)  
<http://www.cfm.va.gov/til/seismic.asp>

### 1.5.3 OTHER STANDARDS AND CODES

A/E shall bring provisions of state and/or local building and zoning codes that are significantly different and/or more stringent than the codes and standards listed above to the attention of CO, PM and COR. A/E shall provide CO, PM and COR with specific information on how the proposed design will differ from the local requirements.

### 1.6 DAYLIGHTING

#### 1.6.1 GENERAL

A/E shall strive to employ daylighting practice in the design. When appropriate, lighting control strategies should integrate daylighting and artificial lighting.

Location of windows and skylights in a building must be designed to avoid the admittance of direct sun on task surfaces or occupants. Suitable glare control devices such as blinds or shades should be incorporated into the design.

Daylight harvesting controls must be commissioned. The system must have the lighting set points properly configured if the system is to properly respond to available daylight. The success of a daylighting design depends on commissioning and occupant education and training.

### 1.7 ABBREVIATIONS

Use only the abbreviations and symbols shown in the VA Standard Details (PG-18-4) and the Uniform Drawing System (UDS) of the U.S. National CAD Standard (NCS). A complete listing of terms and abbreviations can be found on the Construction Specification Institute (CSI) website under Standards and Formats.

## 1.8 GLOSSARY

**Ambient Lighting** – Lighting throughout an area that produces general illumination.

**Area Lighting Luminaire** – A complete lighting device consisting of a light source and ballast, where appropriate, together with its direct appurtenances such as globe, reflector, refractor, housing, and such support as is integral with the housing. The pole, post, or bracket is not considered part of the luminaire.

**Average Luminance** – Luminance is a property of a geometric ray. Luminance as measured by conventional meters is averaged with respect to two independent variables, area and solid angle; both must be defined for a complete description of a luminance measurement.

**BAS** – Building automation system.

**Baffle** – A single opaque or translucent element to shield a source from direct view at certain angles, to absorb or block unwanted light, or to reflect and redirect light.

**Ballast** – A device used with an electric-discharge lamp to obtain the necessary circuit conditions (voltage, current, and waveform) for starting and operating.

**Ballast Factor** – The fractional flux of a fluorescent lamp operated on a ballast compared to the flux when operated on the standard (reference) ballast specified for rating lamp lumens.

**Bollard** – Luminaires having the appearance of a short, thick post, used for walkway and grounds lighting. The optical components are usually top-mounted.

**Bowl** – An open-top diffusing glass or plastic enclosure used to shield a light source from direct view and to redirect or scatter the light.

**Bracket (mast arm)** – An attachment to a lamp post or pole from which a luminaire is suspended.

**Candela, cd** – The SI unit of luminous intensity, equal to one lumen per steradian (lm/sr).

**Candlepower (cp),  $I = d\phi/d\omega$**  – Luminous intensity expressed in candelas.

**Coefficient of Utilization (CU)** – The ratio of luminous flux (lumens) calculated as received on the work plane to the total luminous flux (lumens) emitted by the lamps alone. It is equal to the product of room utilization factor and luminaire efficiency.

**Color Matching** – the action of making a color appear the same as a given color.

**Color Rendering** – a general expression for the effect of a light source on the color appearance of objects in conscious or subconscious comparison with their color appearance under a reference light source.

## CHAPTER 1: GENERAL REQUIREMENTS

**Color Rendering Index (of a light source) (CRI)** – a measure of the degree of color shift objects undergo when illuminated by the light source as compared with those same objects when illuminated by a reference source of comparable color temperature.

**Color Temperature (of a light source)** – the absolute temperature of a blackbody radiator having a chromaticity equal to that of the light source. See *Correlated Color Temperature*.

**Contrast** – See Luminance Contrast.

**Correlated Color Temperature (of a light source) (CCT)** – The absolute temperature of a blackbody whose chromaticity most nearly resembles that of the light source.

**Daylight Availability** – The luminous flux from the sun plus sky at a specific location, time, date, and sky condition.

**Diffused Lighting** – Lighting provided on the work plane or on an object that is not incident predominantly from any particular direction.

**Dimmer** – A device used to control the intensity of light emitted by a luminaire by controlling the voltage or current available to it.

**Direct Glare** – Glare resulting from high luminance or insufficiently shielded light sources in the field of view. It is usually associated with bright areas, such as luminaires, ceilings, and windows that are outside the visual task or region being viewed. A direct glare source can also affect performance by distracting attention.

**Direct-Indirect Lighting** – A variant of general diffuse lighting in which the luminaires emit little or no light at angles near the horizontal.

**Direct Lighting** – Lighting involves luminaires that distribute 90% to 100% of the emitted light in the general direction of the surface to be illuminated. The term usually refers to light emitted in a downward direction.

**Directional Lighting** – Lighting provided on the work plane or on an object. Light that is predominantly from a preferred direction.

**Disability Glare** – The effect of stray light in the eye whereby visibility and visual performance are reduced. A direct glare source that produces discomfort can also produce disability glare by introducing a measurable amount of stray light in the eye.

**Discomfort Glare** – Glare that produces discomfort. It does not necessarily interfere with visual performance or visibility.

**Downlight** – A small direct lighting unit that directs the light downward and can be recessed, surface-mounted, or suspended.

## CHAPTER 1: GENERAL REQUIREMENTS

**Efficacy** – See *Luminous Efficacy of a Source of Light*.

**Efficiency** – See *Luminaire Efficiency*.

**Electroluminescence** – The emission of light from a phosphor excited by an electromagnetic field.

**Emergency Exit** – A way out of the premises that is intended to be used only during an emergency.

**Emergency Egress Lighting** – Lighting designed to supply illumination essential to the safety of life and property in the event of a failure of the normal supply. The system must be capable of providing minimum required illuminance specified in NFPA 101, Code for Safety to Life from Fire in Buildings and Structures, Section 5.9.

**Essential Electrical System (EES)** – (Refer to the NFPA 70 Article 517.2 for definition).

**Exit Sign** – A graphic device including words or symbols that indicates or identifies an escape route or the location of, or direction to, an exit or emergency exit.

**Floodlight** – A projector designed for lighting a scene or object to a luminance considerably greater than its surroundings.

**Fluorescent Lamp** – A low pressure mercury electric-discharge lamp in which a fluorescing coating (phosphor) transforms some of the UV energy generated by the discharge into light.

**Flush-mounted or Recessed Luminaire** – A luminaire that is mounted above the ceiling (or behind a wall or other surface) with the opening of the luminaire level with the surface.

**Footcandle, fc** – A unit of illumination equal to 1 lm/ft<sup>2</sup>.

**Glare** – The sensation produced by luminance within the visual field that are sufficiently greater than the luminance to which the eyes are adapted, which causes annoyance, discomfort, or loss in visual performance, and visibility.

**Globe** – A transparent or diffusing enclosure intended to protect a lamp, to diffuse and redirect its light, or to change the color of the light.

**High-Intensity Discharge (HID) Lamp** – An electric-discharge lamp in which the light-producing arc is stabilized by bulb wall temperature, and the arc tube has a bulb wall loading in excess of 3 W/cm<sup>2</sup>. HID lamps include groups of lamps known as mercury, metal halide, and high pressure sodium.

**High-Pressure Sodium (HPS) Lamp** – A high intensity discharge (HID) lamp in which light is produced by radiation from sodium vapor.

## CHAPTER 1: GENERAL REQUIREMENTS

**Illuminance (footcandle or lux) Meter** – An instrument for measuring illumination on a plane. The instrument is comprised of some form of photodetector, with or without a filter, driving a digital or analog readout through appropriate circuitry.

**Illumination** – The act of illuminating or state of being illuminated. This term has been used for density of luminous flux on a surface (illuminance) and such use is to be deprecated.

**Indirect Component** – The portion of the luminous flux from a luminaire that arrives at the work plane after being reflected by room surfaces.

**Indirect Lighting** – Lighting involving luminaires that distribute 90% to 100% of the emitted light upward.

**Instant-start Fluorescent Lamp** – A fluorescent lamp designed for starting by a high voltage without preheating of the electrodes.

**Intensity (candlepower) Distribution Curve** – A curve, often polar, that represents the variation of luminous intensity of a lamp or luminaire in the plane through the light center.

**Kelvin** – The unit of temperature used to designate the color temperature of a light source.

**Lamp** – A generic term for a source created to produce optical radiation.

**Lamp Lumen Depreciation (LLD) Factor** – The fractional loss of lamp lumens at rated operating conditions that progressively occurs during lamp operation.

**Lens** – A glass or plastic element used in luminaires to change the direction and control the distribution of light rays.

**Light** – Radiant energy that is capable of exciting the retina and producing a visual sensation.

**Light-Emitting Diode (LED)** – A solid state diode whose radiated output is a function of its physical construction, material used, and exciting current.

**Light Loss Factor (LLF)** – Formerly called maintenance factor. The ratio of illuminance (or exitance or luminance) for a given area to the value that would occur if lamps operated at their (initial) rated lumens and if no system variation or depreciation had occurred.

**Light Meter** – A common name for an illuminance meter.

**Light Source Color** – The color of the light emitted by a source.

**Louver** – A series of baffles used to shield a source from view at certain angles, to absorb or block unwanted light, or to reflect or redirect light.

## CHAPTER 1: GENERAL REQUIREMENTS

**Lumen, lm** – SI unit of luminous flux.

**Lumen Depreciation** – The decrease in lumen output that occurs as a lamp is operated, until failure.

**Lumen (or flux) Method** – A lighting design procedure used for predetermining the relation between the number and types of lamps or luminaires, the room characteristics, and the average illuminance on the work plane.

**Luminaire (light fixture)** – A complete lighting unit consisting of a lamp(s) and ballast(s) (when applicable) together with the parts designed to distribute the light, to position and protect the lamps, and to connect the lamps to the power supply.

**Luminaire Dirt Depreciation (LDD)** – The fractional loss of task illuminance due to luminaire dirt accumulation.

**Luminaire Efficiency** – The ratio of luminous flux (lumens) emitted by a luminaire to that emitted by the lamp or lamps used therein.

**Luminance Contrast** – The relationship between the luminance of an object and its immediate background.

**Luminance Ratio** – The ratio between the luminance of any two areas in the visual field.

**Luminous Efficacy of a Source of Light** – The quotient of the total luminous flux emitted to the total lamp power input. It is expressed in lumens per watt.

**Lux, lx** – A SI unit of illuminance equal to 1 lm/m<sup>2</sup>.

**Matte Surface** – A surface from which the reflection is predominantly diffused, with or without a negligible specular component.

**Means of Egress** – An unobstructed and continuous way of exit from any point in a building or structure to a public way.

**Mercury Lamp** – A high-intensity discharge (HID) lamp in which the major portion of the light is produced by radiation from mercury operating at a partial pressure in excess of 10s Pa.

**Metal Halide Lamp** – A high-intensity discharge (HID) lamp in which the major portion of the light is produced by radiation of metal halides and their products of dissociation - possibly in combination with metallic vapors such as mercury.

**Orientation** – The relation of a building with respect to compass directions.

**Overhang** – The distance between a vertical line passing through a specified point (often the photometric center) of a luminaire and the curb or edge of a roadway.

**Pendant Luminaire** – See Suspended Luminaire.

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**Peripheral Vision** – The seeing of objects displaced from the primary line of sight and outside the central visual field.

**Photometry** – The measurement of quantities associated with light.

**Photopic Vision** – Vision mediated essentially or exclusively by the cones. It is generally associated with adaptation to a luminance of at least 3.4 cd/m<sup>2</sup>.

**Point Method** – A lighting design procedure for predetermining the illuminance at various points and location in lighting installations by use of luminaire photometric data.

**Point Source** – A source of radiation, whose dimensions are sufficiently small, compared with the distance between the source and the irradiated surface that these dimensions can be neglected in calculations and measurements.

**Pole (roadway lighting)** – A standard support generally used where overhead lighting distribution circuits are employed.

**Primary Corridor, or Primary Circulation** – The main corridor or circulation route which connects the building core and common spaces, such as elevators and exit stairs.

**Programmed Rapid Start** – A fluorescent starting method where the cathode is preheated before the lamp is ignited. This softer ignition increases the number of starts over the life of the lamp.

**Quality of Lighting** – Pertains to the distribution of luminance in a visual environment. The term is used in a positive sense and implies that all luminance contributes favorably to visual performance, visual comfort, ease of seeing, safety, and aesthetics for the specific visual tasks involved.

**Rapid-Start Fluorescent Lamp** – A fluorescent lamp designed for operation with a ballast that provides a low-voltage winding for preheating the electrodes and initiating the arc without a starting switch or the application of high voltage.

**Rated Lamp Life** – The life value assigned to a particular type lamp. This is commonly a statistically determined estimate of average or of median operational life.

**Reflected Glare** – Glare resulting from reflections of high luminance in polished or glossy surfaces in the field of view.

**Reflection** – A general term for the process by which the incident flux leaves a (stationary) surface or medium from the incident side without change in frequency.

**Reflector** – A device used to redirect the flux from a source by the process of reflection.

**Secondary Corridor, or Secondary Circulation** – The corridor or circulation that includes the aisles between individual spaces, such as offices and cubicles, and support spaces.



## CHAPTER 1: GENERAL REQUIREMENTS

**Self-Ballasted Lamps** – Any arc discharge lamp of which the current limiting devices is an integral part.

**Spacing** – For roadway lighting, the distance between successive lighting units, measured along the centerline of the street.

**Spacing-to-Mounting-Height Ratio** – The ratio of the actual distance between luminaire centers to the mounting height above the work plane.

**Suspended (pendant) Luminaire** – A luminaire that is hung from a ceiling by supports.

**Task Illumination** – Provision for the minimum lighting required to carry out necessary tasks in the areas described in the latest NFPA 70 (National Electrical Code), including safe access to supplies and equipment and access to exits.

**Task Lighting** – Lighting, which is directed at a specific surface area providing task illumination for specific visual tasks.

**Torchiere** – An indirect floor lamp that sends all or nearly all of its light upward.

**Transparent** – Having the property of transmitting rays of light through its substance so that bodies situated beyond or behind can be distinctly seen.

**Troffer** – A long recessed lighting unit usually installed with the opening flush with the ceiling.

**Visibility** – The quality or state of being perceivable by the eye.

## 2. LIGHTING DESIGN REQUIREMENTS



## CHAPTER 2: LIGHTING DESIGN REQUIREMENTS

### 2.1 ENERGY CONSERVATION

Energy conservation is mandated by the Federal Government in all government buildings. A/E shall employ energy conservation strategies focusing on meeting energy mandates and to maintain required illumination to enhance patient care and safety, life/fire safety and security. The following strategies shall be evaluated for use:

- (1) Design shall include task lighting that allows occupants to achieve task illumination for specific visual tasks such as reading, writing, medical examination, and surgery procedures etc.
- (2) Design shall include daylight harvesting where practical.
- (3) Design shall use vacancy sensor instead of occupancy sensor where practical.
- (4) Design shall use occupancy sensors in public rest rooms and large multi- occupant spaces.
- (5) Design shall select luminaires with maximum efficiency.
- (6) Design shall avoid lighting above or in front of illuminated vending machines.
- (7) Design shall limit façade lighting to public entrances.
- (8) Design shall include automatic lighting control system in conjunction with bypass switches for lighting circuits in non-patient care areas and where practical.

### 2.2 LIGHTING DESIGN STRATEGIES

In order to achieve design objectives stated in this manual, A/E should employ design strategies with focus on the applications and tasks of the space/room and the occupants/ end- users. Moreover, A/E shall also employ design strategies that include complete coordination and collaboration with other design team professionals, VA contracting and project team, and local VA Medical Center's clinical and engineering staff.

### 2.3 LIGHTING DESIGN OBJECTIVES

Lighting design shall meet the following primary objectives:

#### 2.3.1 INTERIOR

- (1) Design for Safety and Security: Lighting systems shall effectively support patient care and safety, life/fire safety and security for patients, staff, and visitors.
- (2) Design for Function: Lighting systems shall provide sufficient level of lighting for patients, staff and visitors to effectively perform designated applications and tasks.
- (3) Design for Visual Comfort: Lighting systems shall contribute to the visual comfort for patients, staff, and visitors. Glare should be mitigated using practical design methods and correct specification of luminaires.
- (4) Design for Maintenance and Operation: Lighting systems shall be easily maintained and operated. Similar components of luminaires from different manufacturers should be compatible and interchangeable.

## CHAPTER 2: LIGHTING DESIGN REQUIREMENTS

### 2.3.2 EXTERIOR

- (1) Design for Safety and Security: Lighting systems shall contribute to maintain effective safety and security for patients, staff, visitors, and property.
- (2) Design for Function: Lighting systems shall provide sufficient level of lighting for patients, staff, and visitors to effectively perform applications and tasks such as driving, parking and walking, as well as wayfinding.
- (3) Design for Maintenance and Operation: Lighting systems shall be easily maintained and operated. Similar components of luminaires from different manufacturers should be compatible and interchangeable.

### 2.4 LIGHTING CONTROL DESIGN STRATEGIES AND OBJECTIVES

A/E should employ lighting control design strategies with focus on effective patient care and safety, life/fire safety and security, and energy conservation.

### 2.5 LIGHTING CONTROL DESIGN METHODOLOGIES

#### 2.5.1 INTERIOR

- (1) Lighting control requirements shall comply with the latest ASHRAE 90.1 – Chapter 9.4 Mandatory Provisions – Section 9.4.1 Lighting Control. Exceptions to each category of control requirements shall be taken into consideration for the design.
- (2) Do not use time-scheduled lighting controls such as time clocks, astronomical clocks and timers for patient care space, and utility closet/rooms/vaults.
- (3) Provide automated lighting controls only after careful consideration that safety and security is not compromised.
- (4) Maximize daylight harvesting, where applicable.
- (5) Provide override devices where automated lighting controls are installed. Local override devices shall be readily accessible and labeled.
- (6) Define automated lighting control zones. Provide a Lighting Control Zone Schedule on the drawings.
- (7) Integrate automated lighting controls with BAS controls, where possible.

#### 2.5.2 EXTERIOR

- (1) Lighting control requirements and exceptions shall comply with the latest ASHRAE 90.1 -Chapter 9.4 mandatory Provisions – Section 9.4.1 Lighting Control.
- (2) Utilize automated control.
- (3) Use photo-electric sensors to control all outdoor luminaires.
- (4) Use infrared motion sensors to reduce illumination in non-essential areas that require illumination but are not commonly occupied after operating hours.
- (5) Use programmable time clock controls or BAS time control in non-patient care areas that are unoccupied after operating hours.

## **2.6 LUMINAIRE SELECTION GUIDELINES**

### **2.6.1 INTERIOR**

- (1) Review and edit all relevant VA Division 26 master specifications and standard detail drawings to meet project's scope, specific project requirements, pre-existing conditions (if any), and latest applicable codes.
- (2) Review product installation data to assure compliance with specifications.
- (3) If LED is specified, review LED luminaires to evaluate glare control, flicker rates, and color rendering capabilities.
- (4) Confirm luminaire construction shall be able to withstand surface wipe down disinfection.
- (5) Lenses shall not deflect on contact.
- (6) Sterile environments shall utilize sealed and gasketed luminaires.
- (7) Luminaires in patient-care areas shall be provided with lens.
- (8) In a VA project, ceiling mounted surgery light – single or multiple light heads – provides task illumination for delicate surgical tasks. Surgery light is often furnished by VA, installed and connected by the contractor. However, A/E shall show surgery light on the drawings to facilitate electrical design, installation and connection of surgery light.

### **2.6.2 EXTERIOR**

- (1) Review and edit all relevant VA Division 26 specifications and standard details to meet project's scope, specific project requirements, pre-existing conditions (if any), and latest applicable codes.
- (2) Review product data to assure compliance with specifications.
- (3) Luminaires shall be UL listed for wet locations.
- (4) Recessed in-grade luminaires shall have a non-wicking conduit entrance.
- (5) Luminaires shall be rated for operation at temperatures anticipated for local area.
- (6) Pole height for site lighting shall comply with local codes or ordinances, and specific project scope and requirements.

### **2.7 LIGHT SOURCE SELECTION GUIDELINES**

Selection must be determined in conjunction with luminaire, ballast/driver, and light controls.

#### **2.7.1 FLUORESCENT**

Fluorescent luminaires have been gradually replaced by LED luminaires at VA facilities. However, fluorescent lamps still have some limited use in certain renovation projects due to various specific reasons such as cost, supply chain issues of LED luminaires or components, etc. This section provides guidance for fluorescent luminaires if used in a project:

- (1) Utilize 0.6 M (2 feet) U and 1.2 M (4 feet) T8 and T5 lamps with extended life (based on 3 hours per start), low mercury content (TCLP). Maximize lamp life by using with program rapid start ballasts.
- (2) Select appropriate quantity of lamps in each luminaire providing that design criteria for each area/room shall be met.
- (3) Quantity of luminaires shall be kept to a minimum while maintaining design criteria for each area/room.
- (4) Do not use high output lamps.
- (5) Do not use screw-in type self-ballasted compact fluorescent lamps.

#### **2.7.2 HIGH INTENSITY DISCHARGE (HID)**

- (1) Use only HID lamps listed in VA Interior Lighting specification 26 51 00.
- (2) In applications where color rendering is not important, High Pressure Sodium lamps may be considered for use.
- (3) HID sources are not recommended to provide emergency illumination. Where HID sources are fed from emergency power, luminaires must be provided with quartz restrike kits that utilize either current sensing or time-delayed restrike.
- (4) HID sources are prohibited for applications that require "instant on" operation.

### 2.7.3 LIGHT EMITTING DIODES (LED)

- (1) A/E shall use and specify LED luminaires as the primary design basis. LED luminaires may not be used only when there is a compelling reason – such as safety, existing conditions, procurement, supply chain or cost issues – that negatively affects the project.
- (2) Industry practice is to provide LED luminaire as a complete luminaire consisting of housing, reflector/lens, LED module, and driver. LED luminaires from different manufacturers which have similar housing, lumen output, input wattage, and optical system may have different photometric performance. A/E shall review all performance parameters to assure a minimum of three domestic manufacturers are producing equivalent equipment.
- (3) Utilize LED luminaires when operating at or below temperatures of 0 degrees C (32 degrees F). LED luminaires perform well in cold weather. Do not specify LED luminaires for environments that exceed 50 degrees C (122 degrees F), unless LED luminaires are certified, listed and warranted by manufacturer for such environment. Verify with manufacturer that performance and warranty are not altered.
- (4) Avoid using RGB (red, green, blue) LED light sources in applications where only white light is desired.
- (5) Tubular linear LED lamps may be used as retrofit for existing tubular linear non-LED lamps. A/E or the contractor shall comply with the following conditions:
  - Ensure that the entire replaced luminaire consisting of the replacement LED lamp and components, and existing luminaire housing shall meet the UL listing or equivalent.
  - Perform point-to-point footcandle lighting calculation for each room or area of the project to ensure compliance. The calculations shall be based on the photometric data of the retrofitted LED lamps used in the project.
  - Provide hardcopy report of the point-to-point footcandle lighting calculations to CO, PM and COR.

## 2.8 BALLAST AND LED DRIVER SELECTION GUIDELINES

Selection must be determined in conjunction with luminaire, lamp source, and controls.

### 2.8.1 FLUORESCENT BALLAST

- (1) Utilize program rapid-start ballasts to maximize energy savings and lamp life.
- (2) Dimming ranges for dimmable ballasts must correlate to visible light control, not power consumption. For most dimming applications a range from 10% to 100% is acceptable.

### **2.8.2 HID BALLAST**

- (1) HID ballasts fed from emergency power must be provided with either current sensing or time delayed quartz restrike.
- (2) Consider electronic ballast as the basis of design.

### **2.8.3 LED DRIVER**

- (1) Utilize 0-10V dimmable power supplies as the basis of design.
- (2) In patient-care areas, LED power supplies must be field accessible.

## **2.9 EMERGENCY POWER PACK SELECTION GUIDELINES**

- (1) Provide emergency power packs in selected luminaires located in surgical/operating rooms.
- (2) Provide emergency power packs in selected luminaires located in areas where life safety emergency power is not available, or as required by latest codes.
- (3) Specify emergency power packs with integral self-testing and self-diagnostic features.

## **2.10 LIGHTING CONTROL SELECTION GUIDELINES**

- (1) Verify lamp/ballast/LED driver compatibility with control devices prior to finalizing specifications. Confirm compatibility during the submittal review phase.
- (2) Consider utilizing central lighting control system or BAS. Use of central lighting control system or BAS offers the following advantages:
  - The ability to access status, alarm conditions, and change control sequences remotely from a computer.
  - Time clock scheduling.
  - The ability to assign/reassign any control device to any lighting control zone through program software.
  - The ability to log and record hours of operation to support group re-lamping maintenance.
  - The ability to track actual energy usage and energy savings.
  - The ability to easily swap local control devices.
- (3) Coordinate circuiting with control zones and devices.
- (4) Consider LED in dimming application.
- (5) HID sources are not suitable for frequent switching. Access to the ON/OFF control should be limited.
- (6) Wireless controls are prohibited. Consider using automatic sensors for applications where hands-free switching is desirable due to operational or infection control concerns.



## CHAPTER 2: LIGHTING DESIGN REQUIREMENTS

### 2.11 LIGHTING CALCULATIONS

- (1) Calculations shall be based on permanently mounted luminaires. Removable luminaires - such as desk lamps or portable lights (on wheels or stands) of any kind - shall not be part of calculations.
- (2) Calculations should be performed using computer software such as AGI, Elum, or Radiance. Other domestic software developed and used by domestic lighting manufacturers that is equivalent to the aforementioned software may be used.
- (3) Calculation grids should not exceed 1.5M x 1.5M (5 feet x 5 feet) at grade for exterior applications unless otherwise noted, and 0.6 M x 0.6 M at 0.76 M (2 feet x 2 feet at 2'-6") above finished floor for indoor application unless otherwise noted. Rooms that are smaller in size or have critical illumination requirements should utilize a 0.30 M x 0.30 M (1 foot x1 foot) calculation grid.
- (4) Utilize surface reflectance to reflect specified room finish. However, if specified room finish is not available, utilize standard values of 80% for ceiling, 50% for walls, and 20% for floors. Confirm the lamp lumen output listed in the photometric report of the luminaire matches the lumen output of the specified lamping.
- (5) Calculations shall use appropriate light loss factors. Light loss factors shall include lamp lumen depreciation, ballast factor, and luminaire dirt depreciation.
- (6) Calculations performed for spaces with fluorescent lamps operating outside of standard temperature ranges should include an ambient temperature adjustment factor for the lamp. Refer to lamp manufacturer's information for lamp temperature operating range and adjustment factors.
- (7) Utilize daylight rendering software to determine extent of daylight penetration and create daylight harvesting responsive control zones accordingly.
- (8) Provide a hardcopy report of lighting calculations to CO, PM and COR. Include all functional areas and list of average illumination levels, types of luminaires, quantities and type of light sources, maximum and minimum illumination, and light loss factor used.

### 2.12 LIGHTING SYSTEM COMMISSIONING

Employ total building commissioning practices tailored to the size and complexity of the building and its system components to ensure design requirements are met. This should include a designated commissioning authority, the inclusion of commissioning requirements in construction documents, a commissioning plan, verification of the installation and performance of systems to be commissioned, and a commissioning report.

### **2.13 LIGHTING MAINTENANCE CONSIDERATIONS**

- (1) Luminaire components such as lamps, ballasts, LED drivers and power supplies, must be accessible from below the ceiling.
- (2) Minimize the number of different light sources to simplify maintenance and operation.
- (3) Lighting luminaire components should be compatible and interchangeable.

# 3. EXTERIOR LIGHTING GUIDELINES



### 3.1 ROADWAYS

#### DESIGN PARAMETERS:

- (1) Average Maintained Illumination:
  - Pedestrian Conflict Area: 10-15 lx (1.0-1.5 FC)
  - No Pedestrian Conflict Area: 6-10 lx (0.6-1.0 FC)
- (2) Uniformity Ratio (avg / min):
  - Primary Roadways 4:1
  - Secondary Roadways 6:1
- (3) Color Temperature (CCT)
  - LED: 4000 degrees
  - Metal Halide: 4000 degrees
  - High Pressure Sodium: 1900 degrees
- (4) Color Rendering (CRI):
  - LED: minimum of 80
  - Metal Halide: minimum of 65
  - High Pressure Sodium: minimum of 21
- (5) Power Source:
  - Normal power

#### DESIGN APPROACH:

Lighting should enhance nighttime visibility to promote safety and security for pedestrians and vehicles. Higher pole heights will reduce glare and permit wider spacing. Provide increase illumination at signage, pedestrian crosswalks, and bus stops. Consider photometric distribution types when selecting and spacing to minimize pole locations. Luminaires should be mounted on one side unless uniformity limits are exceeded. When mounted on both sides, the poles should be staggered.

#### RECOMMENDED LUMINAIRES:

- (1) Pole-mounted full cutoff, low profile, LED, metal halide or high pressure sodium luminaire.

#### CONTROL APPROACH:

- (1) Photocontrols for all luminaires.
- (2) Refer to the ASHRAE 90.1 - Chapter 9 – Section 9.4.1.4 Exterior Lighting Control - for additional controls.

#### SPECIFIC COORDINATION ISSUES:

- (1) Luminaires shall be enclosed and sealed in weatherproof housing with UL listing for wet locations.
- (2) Comply with Dark Sky recommendations.
- (3) Roadway surface luminance impacts night-time visibility and should be considered.

## CHAPTER 3: EXTERIOR LIGHTING GUIDELINES

- (4) Coordinate pole and luminaire with exterior building and landscape color palette.
- (5) Coordinate pole locations with civil and landscape features, signage, pedestrian crosswalks, underpasses, overpasses and bus stops.
- (6) Coordinate pole base height to reduce pole damage. Consider elevated bases when located in vehicular ways.
- (7) Coordinate pole-mounted security cameras and devices, banners, and signs with structural engineer.
- (8) Provide house side shields at property lines to mitigate light trespass.

## 3.2 OPEN PARKING AREAS

### DESIGN PARAMETERS:

- (1) Average Maintained Illumination:
  - Asphalt Surfaces: 5 lx (0.5FC) minimum point
  - Concrete Surfaces: 10 lx (1 FC) minimum point
- (2) Uniformity Ratio (avg / min): 4:1
- (3) Color Temperature (CCT):
  - LED: 4000 degrees
  - Metal Halide: 4000 degrees
  - High Pressure Sodium: 1900 degrees
- (4) Color Rendering (CRI):
  - LED: minimum of 80
  - Metal Halide: minimum of 65
  - High Pressure Sodium: minimum of 21
- (5) Power Source:
  - Normal power

### DESIGN APPROACH:

Lighting should enhance nighttime visibility to promote safety and security for pedestrians and vehicles. Higher pole heights will reduce glare and permit wider spacing. Special consideration should be taken to provide increase illumination at signage, pedestrian crosswalks, and bus stops. Consider photometric distribution types when selecting and spacing to minimize pole locations. Consider multiple luminaires per pole to further reduce pole locations.

### RECOMMENDED LUMINAIRES:

- (1) Pole-mounted full cutoff, low profile, LED, metal halide or high pressure sodium luminaire.

### CONTROL APPROACH:

- (1) Photocontrols for all luminaires.
- (2) Refer to the ASHRAE 90.1 - Chapter 9 – Section 9.4.1.4 Exterior Lighting Control - for additional controls .

### SPECIFIC COORDINATION ISSUES:

- (1) Luminaires shall be enclosed and sealed in weatherproof housing with UL listing for wet locations.
- (2) Comply with Dark Sky recommendations.
- (3) Coordinate pole and luminaire with exterior building and landscape color palette.
- (4) Coordinate pole locations with civil and landscape features, signage, pedestrian crosswalks, underpasses, overpasses, and bus stops.

## CHAPTER 3: EXTERIOR LIGHTING GUIDELINES

- (5) Coordinate pole base height to reduce pole damage. Consider elevated bases when located in parking areas.
- (6) Coordinate pole-mounted security cameras and devices, banners, and signs with structural engineer.
- (7) Provide house side shields at property lines to mitigate light trespass.

### 3.3 WALKWAYS

#### DESIGN PARAMETERS:

- (1) Average Maintained Illumination:
  - Adjacent to Roadside: 10 lx (1 FC)
  - Remote from Roadway: 5 lx (0.5 FC)
- (2) Uniformity Ratio (avg / min): 4:1
- (3) Color Temperature (CCT):
  - LED: 4000 degrees
  - Metal Halide: 4000 degrees
  - Compact Fluorescent: 3500 degrees
- (4) Color Rendering (CRI):
  - LED: minimum of 80
  - Metal Halide: minimum of 65
  - Compact Fluorescent: minimum of 80
- (5) Power Source:
  - Normal power
  - Life Safety branch of the EES power for egress lighting at exit discharge.

#### DESIGN APPROACH:

Lighting should enhance nighttime visibility to promote safety and security for pedestrians. Vertical illumination should be considered. Luminaires with visible brightness will create visual interest and reinforce wayfinding and highlight intersections and cross walks. Consider pedestrian scale poles (12 foot (3.65 m) mounting height or less) and luminaires instead of bollards. Consider photometric distribution types when selecting and spacing to minimize pole locations.

#### RECOMMENDED LUMINAIRES:

- (1) LED, compact fluorescent or metal halide bollard with cutoff type optics.
- (2) Pole-mounted LED or metal halide pedestrian scale luminaire with visible brightness.

#### CONTROL APPROACH:

- (1) Photocontrols for all luminaires.
- (2) Refer to the ASHRAE 90.1 - Chapter 9 – Section 9.4.1.4 Exterior Lighting Control - for additional controls.

#### SPECIFIC COORDINATION ISSUES:

- (1) Luminaires shall be enclosed and sealed in weatherproof housing with UL listing for wet locations.
- (2) Comply with Dark Sky recommendations.
- (3) Coordinate pole and luminaire with exterior building and landscape color palette.



## CHAPTER 3: EXTERIOR LIGHTING GUIDELINES

- (4) Coordinate locations with civil and landscape features, signage, pedestrian crosswalks, and bus stops.
- (5) Coordinate pole-mounted security cameras and devices, banners and signs with structural engineer.
- (6) Coordinate location of walkway lighting to avoid light trespass in interior spaces.

### 3.4 ENTRIES

#### DESIGN PARAMETERS:

- (1) Average Maintained Illumination:
  - Emergency/Ambulance: 500 lx (50 FC)
  - Main: 50 lx (5 FC)
- (2) Uniformity Ratio (avg/min): 4:1
- (3) Color Temperature (CCT):
  - LED: 4000 degrees
  - Metal Halide: 4000 degrees
  - Compact Fluorescent: 3500 degrees
- (4) Color Rendering (CRI):
  - LED: minimum of 80
  - Metal Halide: minimum of 65
  - Compact Fluorescent: minimum of 80
- (5) Power Source:
  - Normal power
  - Life Safety branch of the EES power for egress lighting at exit discharge and emergency/ambulance entry.

#### DESIGN APPROACH:

Lighting at building entrances shall include a combination of approaches to enhance nighttime visibility and promote safety and security. Transitions should be highlighted to adjust for visual adaptation throughout the day. Vertical illumination and surface brightness should be considered to create a lit destination. Decorative wall luminaires should be considered to provide visual interest and create a visual cue to mark the building entrance from a distance at night. Color rendering and temperature are particularly important at the emergency/ambulance entrance where patient assessment can occur.

#### RECOMMENDED LUMINAIRES:

- (1) LED, compact fluorescent or metal halide bollard with visible brightness.
- (2) Pole-mounted LED or metal halide pedestrian-scale luminaire with visible brightness.
- (3) Recessed ceiling-mounted fluorescent or LED cove or perimeter light.
- (4) Recessed ceiling-mounted compact fluorescent, LED or metal halide downlight or wall washer.

#### CONTROL APPROACH:

- (1) Photocontrols for all luminaires.
- (2) Refer to the ASHRAE 90.1 - Chapter 9 – Section 9.4.1.4 Exterior Lighting Control - for additional controls.
- (3) Ambulatory entrance shall remain at full brightness throughout the night.

## CHAPTER 3: EXTERIOR LIGHTING GUIDELINES

### **SPECIFIC COORDINATION ISSUES:**

- (1) Luminaires shall be enclosed and sealed in weatherproof housing with UL listing for wet locations.
- (2) Recessed soffit/ceiling-mounted lights shall have a minimum UL listing for damp locations.
- (3) Coordinate pole and luminaire with exterior building and landscape color palette.

### 3.5 LANDSCAPE

#### DESIGN PARAMETERS:

- (1) Average Maintained Illumination:
  - Trees, Shrubbery: 30 lx (3 FC)
  - Decorative Structures: 50 lx (5 FC)
  - Focal Points: 50 lx (5 FC)
  - Water Features: 30 lx (3 FC)
- (2) Uniformity Ratio (avg / min): n / a
- (3) Color Temperature (CCT):
  - LED: 4000 degrees
  - Metal Halide: 4000 degree
- (4) Color Rendering (CRI):
  - LED: minimum of 80
  - Metal Halide: minimum of 65
- (5) Power Source:
  - Normal power

#### DESIGN APPROACH:

Landscape lighting should be limited to entries, courtyards and meditation gardens, as well as the highlighting of building or landscape features (i.e., trees, plant life, artwork, water features, and hardscape). Glare and direct light source view should be minimized by luminaire placement and aiming. Color rendering and temperature should be evaluated with the features being illuminated.

#### RECOMMENDED LUMINAIRES:

- (1) In grade LED or metal halide up-lights.
- (2) Stanchion- or base-mounted LED or metal halide accent and floodlights.
- (3) Surface-mounted in landscape feature linear LED exterior strip lights.
- (4) LED step light.
- (5) LED underwater accent light.

#### CONTROL APPROACH:

- (1) Photocontrols for all luminaires.
- (2) Refer to the ASHRAE 90.1 - Chapter 9 – Section 9.4.1.4 Exterior Lighting Control - for additional controls.

#### SPECIFIC COORDINATION ISSUES:

- (1) Luminaires shall be enclosed and sealed in weatherproof housing with UL listing for wet locations.
- (2) Coordinate fixture layout with hardscape and landscape.
- (3) Coordinate location and aiming to avoid light trespass in interior spaces.

### 3.6 BUILDING PERIMETER

#### DESIGN PARAMETERS:

- (1) Average Maintained Illumination:
  - Non-Public Building Entries: 30 lx (3 FC)
  - Walkways Adjacent to Perimeter: 10 lx (1 FC)
  - Loading Dock Platforms: 30 lx (3 FC)
- (2) Uniformity Ratio (avg/ min): 4:1
- (3) Color Temperature (CCT):
  - LED: 4000 degrees
  - Metal Halide: 4000 degrees
  - Compact Fluorescent: 3500 degrees
- (4) Color Rendering (CRI):
  - LED: minimum of 80
  - Metal Halide: minimum of 65
  - Compact Fluorescent: minimum of 80
- (5) Power Source:
  - Normal power
  - Life Safety branch of the EES power for egress lighting at exit discharge.

#### DESIGN APPROACH:

Lighting should enhance nighttime visibility to promote safety and security at building perimeter. Vertical illumination and glare should be considered.

#### RECOMMENDED LUMINAIRES:

- (1) Wall-mounted full cutoff, low profile, LED, metal halide or high pressure sodium luminaire.
- (2) Wall-mounted LED, metal halide or high pressure sodium wall pack luminaire with lens.
- (3) Wall-mounted LED, metal halide or high pressure sodium floodlights.

#### CONTROL APPROACH:

- (1) Photocontrols for all luminaires.
- (2) Refer to the ASHRAE 90.1 - Chapter 9 – Section 9.4.1.4 Exterior Lighting Control - for additional controls.

#### SPECIFIC COORDINATION ISSUES:

- (1) Luminaires shall be enclosed and sealed in weatherproof housing with UL listing for wet locations.
- (2) Comply with Dark Sky recommendations.
- (3) Coordinate luminaire with exterior building color palette.
- (4) Coordinate luminaire layout with building elevations.

### 3.7 FLAGPOLES

#### DESIGN PARAMETERS:

- (1) Average Maintained Illumination:
  - Flag: 100 lx (10 FC)
- (2) Uniformity Ratio (avg / min): n / a
- (3) Color Temperature (CCT):
  - LED: 4000 degrees
  - Metal Halide: 4000 degrees
- (4) Color Rendering (CRI):
  - LED: minimum of 80
  - Metal Halide: minimum of 65
- (5) Power Source:
  - Normal power

#### DESIGN APPROACH:

Lighting should highlight flag uniformly. Consider horizontal and vertical illumination. Glare and direct light source view should be minimized by luminaire placement and aiming. Color rendering and temperature should be evaluated with the flags being illuminated.

#### RECOMMENDED LUMINAIRES:

- (1) In grade LED or metal halide up light.
- (2) Stanchion- or base-mounted LED or metal halide spot light.
- (3) Pole-mounted LED or metal halide accent and flood lights.

#### CONTROL APPROACH:

- (1) Photocontrols for all luminaires.

#### SPECIFIC COORDINATION ISSUES:

- (1) Comply with Federal laws governing nighttime illumination of the flag of the United States.
- (2) Coordinate mounting requirements for luminaires mounted to flagpole.
- (3) Luminaires shall be enclosed and sealed in weatherproof housing with UL listing for wet locations.

### 3.8 PARKING STRUCTURES

#### DESIGN PARAMETERS:

- (1) Average Maintained Illumination:
  - Basic: 50 lx (5 FC) with a minimum point of 10 lx (1 FC)
  - Ramps Day: 100 lx (10 FC) with a minimum point of 20 lx (2 FC)
  - Ramps Night: 50 lx (5 FC) with a minimum point of 10 lx (1 FC)
  - Entrance Areas Day: 2500 lx (250 FC) with a minimum point of 500 lx (50 FC)
  - Entrance Areas Night: 50 lx (5 FC) with a minimum point of 10 lx (1 FC)
  - Stairways: 20 lx (2 FC)
  - Top Level Open to Sky: 25 lx (2.5 FC) with a minimum point of 5 lx (0.5 FC)
- (2) Uniformity Ratio (avg / min): 10:1
- (3) Color Temperature (CCT):
  - LED: 4000 degrees
  - Metal Halide: 4000 degrees
  - Compact Fluorescent: 3500 degrees
  - Fluorescent: 3500 degrees
- (4) Color Rendering (CRI):
  - LED: minimum of 80
  - Metal Halide: minimum of 65
  - Compact Fluorescent: minimum of 80
  - Fluorescent: minimum of 80
- (5) Power Source:
  - Normal power
  - Life Safety branch of the EES power for egress and exit discharge lighting.

#### DESIGN APPROACH:

Lighting should enhance interior parking structure visibility to promote safety and security. Consider horizontal and vertical illumination. Provide brightness at ceiling to improve contrast between deck and side wall openings. Glare and direct light source view should be minimized by luminaire selection and placement. Transitions should be highlighted to adjust for visual adaptation throughout the day. Signage, pedestrian walkways, and elevator lobbies should be illuminated to create lit destinations. The top deck should be treated as an exterior parking area using pole-mounted luminaires mounted on the perimeter and ramps.

## CHAPTER 3: EXTERIOR LIGHTING GUIDELINES

### **RECOMMENDED LUMINAIRES:**

- (1) Surface-mount to ceiling low profile LED, HID, fluorescent or compact fluorescent parking garage luminaire with up-light component.
- (2) Pole-mounted full cutoff, low profile, LED or metal halide luminaire.
- (3) Recessed ceiling-mounted compact fluorescent or LED downlight at lobbies.

### **CONTROL APPROACH:**

- (1) Photocontrols for all luminaires.
- (2) Refer to the latest ASHRAE 90.1 - Chapter 9 – Section 9.4.1.2 Parking Garage Lighting Control - for additional controls.

### **SPECIFIC COORDINATION ISSUES:**

- (1) Luminaires shall be enclosed and sealed in weatherproof housing with UL listing for wet locations.
- (2) Coordinate pole base height to reduce pole damage. Consider elevated bases when located in parking areas of roof deck.
- (3) Coordinate interior parking area luminaire layout with structural grid and ceiling clearances.
- (4) Consider luminaire options to discourage nesting by birds.



### 3.9 HELICOPTER PADS

#### DESIGN PARAMETERS:

- (1) Average Maintained Illumination:
  - Apron: 40 lx (4 FC)
- (2) Uniformity Ratio (avg / min): n /a  
(Comply with FAA helipad lighting regulations.)
- (3) Color Temperature (CCT):
  - LED: 4000 degrees
  - Metal Halide: 4000 degrees
- (4) Color Rendering (CRI):
  - LED: minimum of 80
  - Metal Halide: minimum of 65
- (5) Power Source:
  - Normal power

#### DESIGN APPROACH:

Helipad lighting shall comply with FAA helipad lighting regulations which include but are not limited to:

- (1) Windsock shall be internally or externally illuminated.
- (2) Touchdown and Lift Off Area (TLOF) shall be illuminated by a minimum of three (3) flush or elevated green perimeter lights per side with one (1) fixture mounted at each corner if TLOF is square or rectangular; maximum spacing of 7.6 M (25 feet) between fixtures whether TLOF is square, rectangular, or round.
  - Flush fixtures shall be located within 0.3 M (1 foot) inside or outside of TLOF perimeter.
  - Elevated fixtures shall be located within 0.3 M (1 foot) outside of TLOF perimeter.
- (3) Final Approach and Take Off Area (FATO) shall be illuminated by a minimum of three (3) flush or elevated green perimeter lights per side with one (1) fixture mounted at each corner if FATO is square or rectangular; maximum spacing of 7.6 M (25 feet) between fixtures whether FATO is square, rectangular, or round.
  - Flush fixtures shall be located within 0.3 M (1 foot) inside or outside of FATO perimeter.
  - Elevated fixtures shall be located 3 M (10 feet) outside of FATO perimeter.
- (4) Optional floodlights may be utilized to illuminate the TLOF or FATO but must not interfere with the area and should be capable of being turned OFF during takeoffs and landings.

## CHAPTER 3: EXTERIOR LIGHTING GUIDELINES

- (5) Optional landing direction lights shall be utilized only when necessary and consist of five (5) yellow omni-directional lights on the centerline of the preferred approach/departure path spaced at 4.57 M (15 feet) intervals.
- (6) Optional heliport identification beacons shall be utilized only when necessary and flash white/green/yellow at the rate of 30-45 flashes per minute.
- (7) Obstructions (i.e., unmarked wires, antennas, poles, cell towers, etc.) within the approach/departure space shall be adequately illuminated to FAA standards.

### **RECOMMENDED LUMINAIRES:**

- (1) LED or HID lighted wind cone.
- (2) Flush or elevated omni-directional green LED perimeter lights.
- (3) Optional flush or elevated omni-directional yellow LED landing lights.
- (4) Wall- or building-mounted LED or HID floodlight.

### **CONTROL APPROACH:**

- (1) Local manual switch for flood lights.
- (2) Photocontrols for perimeter and landing lights.

### **SPECIFIC COORDINATION ISSUES:**

- (1) Comply with appropriate regulatory agency documents.
- (2) Determine size and shape (rectangular, square, circular) of TLOF and FATO.
- (3) Determine location of helipad (roof or ground).
- (4) Determine if TLOF will be elevated above FATO and coordinate lighting with safety net if TLOF is elevated.
- (5) Determine any obstructions to the TLOF and FATO.
- (6) Determine if landing direction lights will be needed.
- (7) Determine if heliport identification beacons will be needed.
- (8) Determine if taxiway and taxi routes will be located on site.
- (9) Luminaires shall be enclosed and sealed in weatherproof housing with UL listing for wet locations.
- (10) Critical Safety branch of the EES is required if helicopter pad is used for medical purposes.

### 3.10 WATER TANKS

#### DESIGN PARAMETERS:

- (1) Average Maintained Illumination:
  - Horizontal: 100 lx (10 FC)
  - Vertical: 30 lx (3 FC)
- (2) Contrast Ratio (avg / min): n / a
- (3) Color Temperature (CCT):
  - LED: 4000 degrees
  - Metal Halide: 4000 degrees
  - High Pressure Sodium: 1900 degrees
- (4) Color Rendering (CRI):
  - LED: minimum of 80
  - Metal Halide: minimum of 65
  - High Pressure Sodium: minimum of 21
- (5) Power Source:
  - Normal power

#### DESIGN APPROACH:

Proper vertical and horizontal illumination and uniformity should be provided for the water tank storage area. Glare and direct light source view should be minimized by luminaire placement and aiming.

#### RECOMMENDED LUMINAIRES:

- (1) Pole-, base- or building-mounted LED, metal halide or high pressure sodium floodlight.

#### CONTROL APPROACH:

- 1) Automatic full OFF with local manual control devices for all lighting.

#### SPECIFIC COORDINATION ISSUES:

- 1) Luminaires shall be enclosed and sealed in weatherproof housing with UL listing for wet locations.

### 3.11 ROOF MOUNTED ANTENNA-OBSTRUCTION LIGHTS

#### DESIGN PARAMETERS:

- (1) Average Maintained Illumination: n / a
- (2) Uniformity Ratio (avg / min): n / a
- (3) Color Temperature (CCT): n / a
- (4) Color Rendering (CRI): n / a
- (5) Power Source:
  - Critical Emergency branch of the EES

#### DESIGN APPROACH:

Obstruction lighting shall comply with FAA regulations which include but are not limited to:

- (1) Flashing or steady burning aviation red obstruction light beacons used during nighttime.
- (2) Flashing medium intensity white obstruction lights used during daylight and twilight that automatically reduce intensity during nighttime. Other methods may be omitted if structure is less than or equal to 152 M (500 feet). This system is not recommended for structures less than or equal to 60.9 M (200 feet).
- (3) Flashing high intensity white obstruction lights used during daytime with automatically selected reduced intensities for twilight and nighttime operations. Other methods may be omitted if this is used. This system is not recommended for structures less than or equal to 152 M (500 feet).
- (4) Flashing or steady burning aviation red obstruction light beacons used during nighttime and high or medium intensity white lights for daytime and twilight. Other methods may be omitted if medium intensity is used and structure is less than or equal to 152 M (500 feet) or if high intensity is used and structure is any height.
- (5) If structure is located in the midst of numerous structures with white lights, red obstruction lights should be used.
- (6) Temporary obstruction lights must be provided during building construction.

#### RECOMMENDED LUMINAIRES:

- (1) Red flashing or steady obstruction light beacons.
- (2) Medium intensity flashing white obstruction light beacons.
- (3) High intensity flashing white obstruction light beacons.

#### CONTROL APPROACH:

- (1) None. Lights shall remain ON at all times.

## CHAPTER 3: EXTERIOR LIGHTING GUIDELINES

### **SPECIFIC COORDINATION ISSUES:**

- (1) Coordinate location of lights with structure.
- (2) Coordinate type of obstruction lights on other buildings with new structure.
- (3) Continually coordinate type of obstruction lights needed as construction of new structure progresses.
- (4) Luminaires shall be enclosed and sealed in weatherproof housing with UL listing for wet locations.

# 4.1 PATIENT AREAS LIGHTING GUIDELINES MATRIX



## CHAPTER 4: PATIENT AREAS LIGHTING GUIDELINES

The consultant shall select the correct lighting guidance section in this design manual for each room based on its application and task. In most cases, room names may describe the rooms' applications and tasks. In other cases, this may not be the case. If unclear of the application and task of a specific room based on its room name, the consultant shall confirm its application and task with CO, PM and COR. The following matrix provides lighting guidelines for selected patient areas/rooms. Room names for these patient areas/room are extracted from VA Design Guides (PG-18-12). For patient areas and rooms not listed on this matrix, A/E may refer to Appendix A for the lighting guideline references, or illumination levels. In case A/E is unable to locate lighting guideline for any patient area/room of the project, A/E can follow lighting guidance shown in the matrix or Appendix A with closest applications and tasks to that of the project's area/room.

Subsequent sections of Chapter 4 show specific lighting guidelines for patient areas/rooms. These lighting guidelines are referenced in the matrix under the column "Guideline Reference".

SERVICES	ROOM NAME	GUIDELINE REFERENCE
AMBULATORY CARE (HOSPITAL)	CLEAN SUPPLY ROOM	7.1
AMBULATORY CARE (HOSPITAL BASED)	HOUSEKEEPING AIDS CLOSET	7.2
AMBULATORY CARE (HOSPITAL BASED)	JANITOR'S CLOSET	7.2
AMBULATORY CARE (HOSPITAL BASED)	MEDICATION ROOM	4.3.3
AMBULATORY CARE (HOSPITAL BASED)	OFFICES	6.1
AMBULATORY CARE (HOSPITAL BASED)	RECEPTION	5.8
AMBULATORY CARE (HOSPITAL BASED)	SOILED UTILITY ROOM	7.3
AMBULATORY CARE (HOSPITAL BASED)	TOILET, WHEELCHAIR ACCESSIBLE	4.3.8
AMBULATORY CARE (HOSPITAL BASED)	TOILET/SHOWER, WHEELCHAIR	4.3.8
AMBULATORY CARE (HOSPITAL BASED)	ER/UC: CLEAN UTILITY ROOM	7.4

CHAPTER 4: PATIENT AREAS LIGHTING GUIDELINES

AMBULATORY CARE (HOSPITAL BASED)	ER/UC: EXAM ROOM, ISOLATION	4.2.1
AMBULATORY CARE (HOSPITAL BASED)	ER/UC: EXAM ROOM, SECURITY	4.4.7
AMBULATORY CARE (HOSPITAL BASED)	ER/UC: LIFE SUPPORT UNIT	4.2.1
AMBULATORY CARE (HOSPITAL BASED)	ER/UC: NURSE STATION / COMMUNICATION CENTER	4.3.1
AMBULATORY CARE (HOSPITAL BASED)	ER/UC: OBSERVATION AND TREATMENT ROOM	4.2.1
AMBULATORY CARE (HOSPITAL BASED)	ER/UC: VITAL SIGN STATION	4.2.1
AMBULATORY CARE (HOSPITAL BASED)	ETM: AUDIOMETRIC BOOTH	4.2.12
AMBULATORY CARE (HOSPITAL BASED)	ETM: BLOOD DRAW	4.2.2
AMBULATORY CARE (HOSPITAL BASED)	ETM: EXAM ROOM	4.2.1
AMBULATORY CARE (HOSPITAL BASED)	ETM: EXAM ROOM, ISOLATION	4.2.1
AMBULATORY CARE (HOSPITAL BASED)	ETM: GYN EXAM ROOMS	4.2.1
AMBULATORY CARE (HOSPITAL BASED)	ETM: INTAKE/EXIT INTERVIEW	6.1
AMBULATORY CARE (HOSPITAL BASED)	ETM: NURSE STATION COMMUNICATION CENTER	4.3.1
AMBULATORY CARE (HOSPITAL BASED)	ETM: NURSE TRIAGE	4.2.1
AMBULATORY CARE (HOSPITAL BASED)	ETM: PROCEDURE ROOM, GENERAL PURPOSE	4.2.5
AMBULATORY CARE (HOSPITAL BASED)	ETM: AIDS CLINIC: AEROSOLIZED PENTAMIDINE PROCEDURE ROOM	4.2.5
AMBULATORY CARE (HOSPITAL BASED)	ETM: DERMATOLOGY: PHOTOTHERAPY TREATMENT ROOM & SHOWER ROOM	4.2.1, 4.3.8



CHAPTER 4: PATIENT AREAS LIGHTING GUIDELINES

SERVICES	ROOM NAME	GUIDELINE REFERENCE
AMBULATORY CARE (HOSPITAL BASED)	ETM: DERMATOLOGY: PROCEDURE/TREATMENT ROOM	4.2.1
AMBULATORY CARE (HOSPITAL BASED)	ETM: GI CLINIC: GASTRIC (ESOPHAGEAL) MOTILITY PROCEDURE ROOM	4.2.5
AMBULATORY CARE (HOSPITAL BASED)	ETM: GI CLINIC: SCOPE CLEANING/CLEAN STORAGE	4.7.1 4.7.6
AMBULATORY CARE (HOSPITAL BASED)	ETM: GI CLINIC: SCREENING PROCTOSCOPY/SIGMOIDOSCOPY ROOM	4.2.5
AMBULATORY CARE (HOSPITAL BASED)	ETM: MOHS CLINIC PROCEDURE / TREATMENT ROOM	4.2.5
AMBULATORY CARE (HOSPITAL BASED)	ONCOLOGY: CHEMOTHERAPY AGENT PREPARATION AREA	4.2.8
AMBULATORY CARE (HOSPITAL BASED)	ONCOLOGY: CHEMOTHERAPY TREATMENT ROOM	4.2.8
AMBULATORY CARE (HOSPITAL BASED)	ORTHOPEDIC CLINIC: CAST ROOM	4.2.3
AMBULATORY CARE (HOSPITAL BASED)	DISPOSITION: AGENT CASHIER	6.1
CARDIOVASCULAR LABORATORY	EKG TESTING ROOM	4.2.7
CARDIOVASCULAR LABORATORY	HOLTER MONITOR ROOM	4.2.7
CARDIOVASCULAR LABORATORY	ECHOCARDIOGRAPH ROOM	4.2.7
CARDIOVASCULAR LABORATORY	STRESS ECHOCARDIOGRAPH ROOM	4.2.7
CARDIOVASCULAR LABORATORY	STRESS TESTING TREADMILL ROOM	4.2.7

CHAPTER 4: PATIENT AREAS LIGHTING GUIDELINES

SERVICES	ROOM NAME	GUIDELINE REFERENCE
CARDIOVASCULAR LABORATORY	TILT TABLE TESTING ROOM	4.2.7
CARDIOVASCULAR LABORATORY	EVENT/HOLTER MONITOR WORK ROOM	4.2.7
CARDIOVASCULAR LABORATORY	CARDIAC CATHETERIZATION LABORATORY	4.2.5
CARDIOVASCULAR LABORATORY	CONTROL ROOM, CARDIAC CATHETERIZATION	4.2.5
CARDIOVASCULAR LABORATORY	TRANSESOPHAGEAL ECHOCARDIOGRAPH ROOM	4.2.5
CARDIOVASCULAR LABORATORY	SYSTEM COMPONENT ROOM	4.2.5
CARDIOVASCULAR LABORATORY	RECOVERY ROOM, PATIENT PREP	4.2.15
DENTAL	X-RAY PANORAMIC/ CEPHALOMETRIC	4.2.6
DENTAL	CONE BEAM COMPUTERIZED TOMOGRAPHY	4.2.6
DENTAL	DENTAL TREATMENT ROOM, MULTIFUNCTIONAL	4.2.16
DENTAL	DENTAL TREATMENT ROOM: SPECIAL NEEDS PATIENT	4.2.16
DENTAL	ORAL SURGERY, MINOR PROCEDURE ROOM	4.2.17
DENTAL	STORAGE, STERILE INSTRUMENTS	7.1
DENTAL	DENTAL EQUIPMENT MECHANICAL ROOM	7.9
DENTAL	LABORATORY, GENERAL PURPOSE	4.2.4
DENTAL	LABORATORY, PORCELAIN/ CERAMICS	4.2.4

CHAPTER 4: PATIENT AREAS LIGHTING GUIDELINES

SERVICES	ROOM NAME	GUIDELINE REFERENCE
DIGESTIVE DISEASES - ENDOSCOPY	PROCEDURE ROOM, ENDOSCOPY	4.2.5
DIGESTIVE DISEASES - ENDOSCOPY	PROCEDURE ROOM, ERCP / ENDOSCOPIC ULTRASOUND	4.2.5
DIGESTIVE DISEASES - ENDOSCOPY	RECOVERY ROOM, PATIENT PREP	4.2.15
DIGESTIVE DISEASES - ENDOSCOPY	REPROCESSING ROOM, SCOPE	4.7.6
ELECTROENCEPHALOGRAPHY LABORATORY	EXAM ROOM, EEG	4.2.1
ELECTROENCEPHALOGRAPHY LABORATORY	EXAM ROOM, EMG	4.2.1
MEDICAL/SURGICAL INPATIENT UNITS & INTENSIVE CARE NURSING UNITS	PATIENT ROOM	4.3.4
MEDICAL/SURGICAL INPATIENT UNITS & INTENSIVE CARE NURSING UNITS	PATIENT ROOM, ISOLATION	4.3.5
MEDICAL/SURGICAL INPATIENT UNITS & INTENSIVE CARE NURSING UNITS	PATIENT ROOM, INTENSIVE CARE	4.3.6
MEDICAL/SURGICAL INPATIENT UNITS & INTENSIVE CARE NURSING UNITS	NURSE STATION	4.3.1
MEDICAL/SURGICAL INPATIENT UNITS & INTENSIVE CARE NURSING UNITS	MEDICATION ROOM	4.3.3

CHAPTER 4: PATIENT AREAS LIGHTING GUIDELINES

SERVICES	ROOM NAME	GUIDELINE REFERENCE
MEDICAL/SURGICAL INPATIENT UNITS & INTENSIVE CARE NURSING UNITS	NOURISHMENT STATION	4.3.10
MEDICAL/SURGICAL INPATIENT UNITS & INTENSIVE CARE NURSING UNITS	TEAM WORK ROOM	6.1
MAGNETIC RESONANCE IMAGING (MRI)	MRI SCANNING ROOM	4.2.6
MAGNETIC RESONANCE IMAGING (MRI)	MRI CONTROL ROOM	4.2.6
MAGNETIC RESONANCE IMAGING (MRI)	MRI SYSTEMS COMPONENT ROOM	4.2.6
MENTAL HEALTH FACILITIES	BCU: PATIENT ROOM AND TOILET, ONE BED	4.4.1 4.4.2
MENTAL HEALTH FACILITIES	BCU: PATIENT ROOM AND TOILET, TWO BED	4.4.1 4.4.2
MENTAL HEALTH FACILITIES	BCU: ISOLATION, RESTRAINT	4.4.1 4.4.2
MENTAL HEALTH FACILITIES	BCU: NURSE STATION	4.4.6
MENTAL HEALTH FACILITIES	BCU: NURSE WORKROOM	6.1
MENTAL HEALTH FACILITIES	BCU: MEDICATION ROOM	4.3.3
MENTAL HEALTH FACILITIES	BCU: TEAM ROOM	6.3
MENTAL HEALTH FACILITIES	BCU: DINING ROOM	4.4.3
MENTAL HEALTH FACILITIES	BCU: SERVING/PANTRY	4.4.3

CHAPTER 4: PATIENT AREAS LIGHTING GUIDELINES

SERVICES	ROOM NAME	GUIDELINE REFERENCE
MENTAL HEALTH FACILITIES	BCU: DAY ROOM	4.4.4
MENTAL HEALTH FACILITIES	BCU: GROUP ROOM	4.4.5
MENTAL HEALTH FACILITIES	RRTP: BEDROOM, ONE BED	4.4.8 4.4.9
MENTAL HEALTH FACILITIES	RRTP: BEDROOM, TWO BED	4.4.8 4.4.9
MENTAL HEALTH FACILITIES	RRTP: LIVING AREA, DINING AREA, AND KITCHENETTE	4.4.10
MENTAL HEALTH FACILITIES	RRTP: LOUNGE	4.3.11
MENTAL HEALTH FACILITIES	RRTP: MULTI-PURPOSE ROOM / KITCHENETTE	4.3.12
MENTAL HEALTH FACILITIES	RRTP: EDUCATION / CONFERENCE / GROUP ROOM	6.2
MENTAL HEALTH FACILITIES	RRTP: DINING ROOM	5.6
MENTAL HEALTH FACILITIES	RRTP: SERVING LINE / TRAINING KITCHEN	5.6
MENTAL HEALTH FACILITIES	RRTP: RECREATION THERAPY ROOM	4.2.11
MENTAL HEALTH FACILITIES	OUTPATIENT SERVICES: EXAM ROOM	4.2.1
MENTAL HEALTH FACILITIES	OUTPATIENT SERVICES: TREATMENT ROOM	4.2.1
MENTAL HEALTH FACILITIES	OUTPATIENT SERVICES: GROUP THERAPY ROOM	4.4.11
MENTAL HEALTH FACILITIES	OUTPATIENT SERVICES: GROUP TESTING ROOM	6.1
MENTAL HEALTH FACILITIES	OUTPATIENT SERVICES: BIOFEEDBACK LABORATORY TREATMENT ROOM	4.2.7

CHAPTER 4: PATIENT AREAS LIGHTING GUIDELINES

SERVICES	ROOM NAME	GUIDELINE REFERENCE
MENTAL HEALTH FACILITIES	OUTPATIENT SERVICES: BIOFEEDBACK LABORATORY CONTROL ROOM	6.1
MENTAL HEALTH FACILITIES	OUTPATIENT SERVICES: OFFICE, COUNSELOR	6.1
MENTAL HEALTH FACILITIES	OUTPATIENT SERVICES: SOCIAL ACTIVITIES, DINING, MULTI-PURPOSE	4.3.12
MENTAL HEALTH FACILITIES	OUTPATIENT SERVICES: CLASSROOM / GROUP ROOM	4.4.11
MENTAL HEALTH FACILITIES	OUTPATIENT SERVICES: OCCUPATIONAL THERAPY	4.2.11
NUCLEAR MEDICINE	NUCLEAR MEDICINE SCANNING ROOM	4.2.6
NUCLEAR MEDICINE	BONE DENSITOMETRY ROOM	4.2.6
NUCLEAR MEDICINE	PATIENT DOSE ADMINISTRATION	4.2.6
NUCLEAR MEDICINE	PET/CT SCAN ROOM	4.2.6
NUCLEAR MEDICINE	PET/CT SCAN CONTROL ROOM	4.2.6
NUCLEAR MEDICINE	PET/CT SYSTEM COMPONENT ROOM	4.2.6
NUCLEAR MEDICINE	RADIOPHARMACY	4.2.18
OUTPATIENT CLINIC (SOC/CBOC)	BLOOD DRAW	4.2.2
OUTPATIENT CLINIC (SOC/CBOC)	CLEAN UTILITY ROOM	7.4
OUTPATIENT CLINIC (SOC/CBOC)	DRESSING ROOM	4.3.13
OUTPATIENT CLINIC (SOC/CBOC)	EXAM ROOM	4.2.1

CHAPTER 4: PATIENT AREAS LIGHTING GUIDELINES

SERVICES	ROOM NAME	GUIDELINE REFERENCE
OUTPATIENT CLINIC (SOC/CBOC)	HOUSEKEEPING AIDS CLOSET	7.2
OUTPATIENT CLINIC (SOC/CBOC)	MEDICATION ROOM	4.3.3
OUTPATIENT CLINIC (SOC/CBOC)	NURSE STATION	4.3.1
OUTPATIENT CLINIC (SOC/CBOC)	NURSE / COMMUNICATION STATION	4.3.1
OUTPATIENT CLINIC (SOC/CBOC)	OFFICE	6.1
OUTPATIENT CLINIC (SOC/CBOC)	PACS VIEWING ROOM	4.2.6
OUTPATIENT CLINIC (SOC/CBOC)	RECEPTION	5.8
OUTPATIENT CLINIC (SOC/CBOC)	SOILED UTILITY ROOM	7.3
OUTPATIENT CLINIC (SOC/CBOC)	TOILET/SHOWER, WHEELCHAIR	4.3.8
OUTPATIENT CLINIC (SOC/CBOC)	TOILET, WHEELCHAIR ACCESSIBLE	4.3.8
OUTPATIENT CLINIC (SOC/CBOC)	AMBULATORY CARE: AGENT CASHIER	6.1
OUTPATIENT CLINIC (SOC/CBOC)	AMBULATORY CARE: DERMATOLOGY PHOTOTHERAPY TREATMENT ROOM	4.2.1
OUTPATIENT CLINIC (SOC/CBOC)	AMBULATORY CARE: DERMATOLOGY PROCEDURE/TREATMENT ROOM	4.2.1
OUTPATIENT CLINIC (SOC/CBOC)	AMBULATORY CARE: ETM NURSE TRIAGE	4.2.1

CHAPTER 4: PATIENT AREAS LIGHTING GUIDELINES

SERVICES	ROOM NAME	GUIDELINE REFERENCE
OUTPATIENT CLINIC (SOC/CBOC)	AMBULATORY CARE: ETM PROCEDURE ROOM	4.2.5
OUTPATIENT CLINIC (SOC/CBOC)	AMBULATORY CARE: ETM VITAL SIGN STATION	4.2.1
OUTPATIENT CLINIC (SOC/CBOC)	AMBULATORY CARE: GI SCREENING PROCTOSCOPY/SIGMOIDOSCOPY ROOM	4.2.5
OUTPATIENT CLINIC (SOC/CBOC)	AMBULATORY CARE: GYN EXAM ROOM	4.2.1
OUTPATIENT CLINIC (SOC/CBOC)	AMBULATORY CARE: ONCOLOGY CHEMOTHERAPY TREATMENT ROOM	4.2.8
OUTPATIENT CLINIC (SOC/CBOC)	AMBULATORY CARE: ORTHOPEDIC CLINIC CAST ROOM	4.2.3
OUTPATIENT CLINIC (SOC/CBOC)	AMBULATORY CARE: UC INFECTIOUS ISOLATION ROOM	4.2.1
OUTPATIENT CLINIC (SOC/CBOC)	AMBULATORY CARE: UC MONITORED BEDS	4.2.15
OUTPATIENT CLINIC (SOC/CBOC)	AMBULATORY CARE: UC OBSERVATION AND TREATMENT ROOM	4.2.1
OUTPATIENT CLINIC (SOC/CBOC)	AUDIOLOGY: INSTRUMENT CALIBRATION AND STORAGE ROOM	7.1 7.6
OUTPATIENT CLINIC (SOC/CBOC)	AUDIOLOGY: OFFICE/THERAPY ROOM	6.1
OUTPATIENT CLINIC (SOC/CBOC)	DENTAL: GENERAL TREATMENT OPERATORY	4.2.16
OUTPATIENT CLINIC (SOC/CBOC)	DENTAL: ORAL SURGERY RECOVERY ROOM	4.2.17
OUTPATIENT CLINIC (SOC/CBOC)	DENTAL: ORAL SURGERY ROOM	4.2.17
OUTPATIENT CLINIC (SOC/CBOC)	DDP-ENDOSCOPY: EGD PROCEDURE ROOM	4.2.5
OUTPATIENT CLINIC (SOC/CBOC)	ENDOSCOPY: SCOPE CLEANING/CLEAN STORAGE	7.1 7.6



## CHAPTER 4: PATIENT AREAS LIGHTING GUIDELINES

SERVICES	ROOM NAME	GUIDELINE REFERENCE
OUTPATIENT CLINIC (SOC/CBOC)	ENGINEERING: BIOMEDICAL ENGINEERING REPAIR SHOP	7.5
OUTPATIENT CLINIC (SOC/CBOC)	EYE CLINIC: EYE EXAMINATION/TREATMENT ROOM	4.2.1
OUTPATIENT CLINIC (SOC/CBOC)	EYE CLINIC: FITTING AND DISPENSING ROOM	4.2.7
OUTPATIENT CLINIC (SOC/CBOC)	EYE CLINIC: VISUAL FIELDS ROOM AND PHOTOGRAPHY ROOM	4.2.7
OUTPATIENT CLINIC (SOC/CBOC)	LABORATORY: CLINICAL CHEMISTRY	4.2.4
OUTPATIENT CLINIC (SOC/CBOC)	LABORATORY: MICROBIOLOGY	4.2.4
OUTPATIENT CLINIC (SOC/CBOC)	MENTAL HEALTH: OFFICE/EXAM ROOM	4.4.7
OUTPATIENT CLINIC (SOC/CBOC)	PHARMACY: BASIC SERVICE	4.2.18
OUTPATIENT CLINIC (SOC/CBOC)	PHARMACY: ONCOLOGY DRUGS PREPARATION AREA	4.2.8
OUTPATIENT CLINIC (SOC/CBOC)	PULMONARY: EXERCISE OFFICE	6.1
OUTPATIENT CLINIC (SOC/CBOC)	PULMONARY: SPECIAL PROCEDURES/ BRONCHOSCOPY ROOM	4.2.5
OUTPATIENT CLINIC (SOC/CBOC)	PULMONARY: VENTILATORY TEST ROOM/SPIROMETRY	4.2.7
OUTPATIENT CLINIC (SOC/CBOC)	RADIOLOGY: CHEST ROOM, DEDICATED	4.2.7
OUTPATIENT CLINIC (SOC/CBOC)	RADIOLOGY: CT SCANNING ROOM	4.2.6
OUTPATIENT CLINIC (SOC/CBOC)	RADIOLOGY: CT COMPUTER POWER AND EQUIPMENT ROOM	4.2.6
OUTPATIENT CLINIC (SOC/CBOC)	RADIOLOGY: FILM LIBRARY	7.1

## CHAPTER 4: PATIENT AREAS LIGHTING GUIDELINES

SERVICES	ROOM NAME	GUIDELINE REFERENCE
OUTPATIENT CLINIC (SOC/CBOC)	RADIOLOGY: GENERAL PURPOSE ROOM	4.2.6
OUTPATIENT CLINIC (SOC/CBOC)	RADIOLOGY: MAMAGROPHY ROOM	4.2.6
OUTPATIENT CLINIC (SOC/CBOC)	RADIOLOGY: RADIOGRAPHIC/FLUOROSCOPIC ROOM	4.2.6
OUTPATIENT CLINIC (SOC/CBOC)	RADIOLOGY: ULTRASOUND ROOM	4.2.6
OUTPATIENT CLINIC (SOC/CBOC)	SPD: BASIC SERVICE	7.1
OUTPATIENT CLINIC (SOC/CBOC)	SPD: MANUAL EQUIPMENT WASH AREA	7.6
OUTPATIENT CLINIC (SOC/CBOC)	SURGERY: AMBULATORY SURGERY CYSTOSCOPY ROOM	4.2.5
OUTPATIENT CLINIC (SOC/CBOC)	SURGERY: MINOR PROCEDURE OPERATING ROOM	4.2.13
OUTPATIENT CLINIC (SOC/CBOC)	SURGERY: SUB-STERILE ROOM	7.6
PHARMACY SERVICE	UNIT DOSE AND WARD STOCK	4.2.18
PHARMACY SERVICE	MEDICATION ASSIGNMENT AND STAT COUNTER	4.2.18
PHARMACY SERVICE	CONTROL SUBSTANCE VAULT AND SECURED DISPENSING AREA	4.2.18
PHARMACY SERVICE	RECEIVING AREA	4.2.18
PHARMACY SERVICE	EXTEMPORANEOUS REPACKAGING AND EXTEMPORANEOUS COMPOUNDING	4.2.18
PHARMACY SERVICE	INTRAVENOUS ADMIXTURE AND ASEPTIC TRANSFER	4.2.18
PHARMACY SERVICE	ONCOLOGY DRUGS	4.2.8

CHAPTER 4: PATIENT AREAS LIGHTING GUIDELINES

SERVICES	ROOM NAME	GUIDELINE REFERENCE
POLYTRAUMA REHABILITATION: INPATIENT REHAB CENTER	PATIENT ROOM	4.3.4
POLYTRAUMA REHABILITATION: INPATIENT REHAB CENTER	NURSE STATION	4.3.1
POLYTRAUMA REHABILITATION: INPATIENT REHAB CENTER	RECREATION THERAPY ROOM, GROUP	4.2.11
POLYTRAUMA REHABILITATION: INPATIENT REHAB CENTER	DINING ROOM	5.6
POLYTRAUMA REHABILITATION: INPATIENT REHAB CENTER	QUIET TREATMENT ROOM	4.2.11
POLYTRAUMA REHABILITATION: INPATIENT REHAB CENTER	FAMILY MULTIPURPOSE ROOM	4.3.12
POLYTRAUMA REHABILITATION: INPATIENT REHAB CENTER	FAMILY LIVING	4.3.11
POLYTRAUMA REHABILITATION: INPATIENT REHAB CENTER	REHABILITATION GYM	4.2.11
POLYTRAUMA REHABILITATION: INPATIENT REHAB CENTER	COGNATIVE THERAPY EXAM/TREATMENT ROOM	4.2.1
POLYTRAUMA REHABILITATION: INPATIENT REHAB CENTER	COMPUTER ACTIVITIES ROOM	4.3.11

CHAPTER 4: PATIENT AREAS LIGHTING GUIDELINES

SERVICES	ROOM NAME	GUIDELINE REFERENCE
POLYTRAUMA REHABILITATION: INPATIENT REHAB CENTER	COGNATIVE THERAPY MULTIPURPOSE ROOM	4.3.12
POLYTRAUMA REHABILITATION: TRANSITIONAL REHAB CENTER	TRANSITIONAL REHAB RESIDENT BEDROOM	4.3.7 4.3.9
POLYTRAUMA REHABILITATION: TRANSITIONAL REHAB CENTER	DOUBLE APARTMENT UNITS	4.3.7 4.3.9
POLYTRAUMA REHABILITATION: TRANSITIONAL REHAB CENTER	NURSE STATION/CHECK IN STATION	4.3.1
POLYTRAUMA REHABILITATION: TRANSITIONAL REHAB CENTER	DINING AREA	5.6
POLYTRAUMA REHABILITATION: TRANSITIONAL REHAB CENTER	RECREATION ACTIVITY ROOM, GROUP	4.2.11
POLYTRAUMA REHABILITATION: TRANSITIONAL REHAB CENTER	LOUNGE SPACE	4.3.11
POLYTRAUMA REHABILITATION: TRANSITIONAL REHAB CENTER	PHYSICAL/OCCUPATIONAL THERAPY	4.2.11
POLYTRAUMA REHABILITATION: TRANSITIONAL REHAB CENTER	RECREATION THERAPY ROOM, GROUP	4.2.11
POLYTRAUMA REHABILITATION: TRANSITIONAL REHAB CENTER	GAIT AND BALANCE LAB	4.2.11

CHAPTER 4: PATIENT AREAS LIGHTING GUIDELINES

SERVICES	ROOM NAME	GUIDELINE REFERENCE
POLYTRAUMA REHABILITATION: TRANSITIONAL REHAB CENTER	EXAM ROOM	4.2.1
PULMONARY MEDICINE SERVICE	PULMONARY FUNCTION TESTING LAB	4.2.7
PULMONARY MEDICINE SERVICE	EXTENDED PULMONARY FUNCTION TESTING LAB	4.2.7
PULMONARY MEDICINE SERVICE	PULMONARY EXERCISE PHYSIOLOGY LAB	4.2.7
PULMONARY MEDICINE SERVICE	RESPIRATORY THERAPY ROOM	4.2.7
PULMONARY MEDICINE SERVICE	BRONCHOSCOPY PROCEDURE ROOM	4.2.5
PULMONARY MEDICINE SERVICE	SLEEP STUDY ROOM	4.3.7
PULMONARY MEDICINE SERVICE	SLEEP STUDY MONITORING ROOM	4.2.6
PULMONARY MEDICINE SERVICE	RECOVERY ROOM, PATIENT PREP	4.2.15
RADIATION THERAPY SERVICE	LINEAR ACCELERATOR ROOM & CONTROL AREA	4.2.6
RADIATION THERAPY SERVICE	CT SIMULATOR UNIT ROOM AND CONTROL ROOM	4.2.6
RADIATION THERAPY SERVICE	ULTRASOUND PLANNING UNIT ROOM	4.2.6 4.3.8
RADIATION THERAPY SERVICE	TREATMENT PLANNING COMPUTER ROOM / DOSIOMETRY ROOM	4.2.6
RADIOLOGY SERVICE	GENERAL PURPOSE RADIOLOGY ROOM	4.2.6
RADIOLOGY SERVICE	CHEST ROOM	4.2.6
RADIOLOGY SERVICE	RADIOGRAPHIC/ FLUOROSCOPIC ROOM	4.2.6 4.3.8

CHAPTER 4: PATIENT AREAS LIGHTING GUIDELINES

SERVICES	ROOM NAME	GUIDELINE REFERENCE
RADIOLOGY SERVICE	MAMMOGRAPHY ROOM	4.2.6
RADIOLOGY SERVICE	ULTRASOUND ROOM	4.2.6 4.3.8
RADIOLOGY SERVICE	IR SPECIAL PROCEDURE ROOM	4.2.6
RADIOLOGY SERVICE	IR SPECIAL PROCEDURE CONTROL ROOM	4.2.6
RADIOLOGY SERVICE	IR SPECIAL PROCEDURE SYSTEM COMPONENT ROOM	4.2.6
RADIOLOGY SERVICE	CT SCANNING ROOM	4.2.6
RADIOLOGY SERVICE	CT CONTROL ROOM	4.2.6
SPINAL CORD INJURY/DISORDERS	ACUTE CARE ONE BEDROOM	4.3.4
SPINAL CORD INJURY/DISORDERS	ACUTE CARE ISOLATION, ANTE ROOM	4.3.5
SPINAL CORD INJURY/DISORDERS	ACUTE CARE TWO BEDROOM	4.3.4
SPINAL CORD INJURY/DISORDERS	PATIENT BATHROOM	4.3.8
SPINAL CORD INJURY/DISORDERS	ACUTE RESPIRATORY ONE BEDROOM	4.3.4
SPINAL CORD INJURY/DISORDERS	NURSE STATION	4.3.1
SPINAL CORD INJURY/DISORDERS	NOURISHMENT KITCHEN	4.3.10
SPINAL CORD INJURY/DISORDERS	HYDROTHERAPY/ TUBROOM	4.2.11
SPINAL CORD INJURY/DISORDERS	LITTER STORAGE	7.1

## CHAPTER 4: PATIENT AREAS LIGHTING GUIDELINES

SERVICES	ROOM NAME	GUIDELINE REFERENCE
SPINAL CORD INJURY/DISORDERS	TRANSFER EQUIPMENT STORAGE	7.1
SPINAL CORD INJURY/DISORDERS	DAY ROOM/LOUNGE	4.3.11
SPINAL CORD INJURY/DISORDERS	RESIDENT DINING/SERVING	5.6
SPINAL CORD INJURY/DISORDERS	MULTI-PURPOSE ROOM	4.3.12
SPINAL CORD INJURY/DISORDERS	INTERNET CAFÉ	4.3.11
SPINAL CORD INJURY/DISORDERS	ACTIVITIES OF DAILY LIVING	4.2.11
SPINAL CORD INJURY/DISORDERS	THERAPEUTIC POOL	4.2.11
SPINAL CORD INJURY/DISORDERS	DRESSING ROOM	4.3.13
SPINAL CORD INJURY/DISORDERS	TYPICAL CORRIDOR	4.3.2
SPINAL CORD INJURY/DISORDERS	SCI ELEVATOR	5.2
SPINAL CORD INJURY/DISORDERS	MAIN ENTRANCE CANOPY	3.5
SPINAL CORD INJURY/DISORDERS	URODYNAMICS: EXAM/TREATMENT ROOM	4.2.1
SPINAL CORD INJURY/DISORDERS	URODYNAMICS: CYSTOSCOPY/LITHOTRIPSY	4.2.5
SPINAL CORD INJURY/DISORDERS	URODYNAMICS: STORAGE AND INSTRUMENT CLEANING ROOM	7.1 7.6
SPINAL CORD INJURY/DISORDERS	URODYNAMICS: RECOVERY ROOM	4.2.15
SPINAL CORD INJURY/DISORDERS	URODYNAMICS: DRESSING ROOM	4.3.13

## CHAPTER 4: PATIENT AREAS LIGHTING GUIDELINES

SERVICES	ROOM NAME	GUIDELINE REFERENCE
SPINAL CORD INJURY/DISORDERS	URODYNAMICS: NURSE STATION	4.3.1
SPINAL CORD INJURY/DISORDERS	OUTPATIENT URODYNAMICS: CLEAN UTILITY ROOM	4.7.4
SPINAL CORD INJURY/DISORDERS	HOME ENVIRONMENT LEARNING	4.2.11
SPINAL CORD INJURY/DISORDERS	PHYSICAL THERAPY	4.2.11
SPINAL CORD INJURY/DISORDERS	OCCUPATIONAL THERAPY	4.2.11
SPINAL CORD INJURY/DISORDERS	UROLOGIST OFFICE	6.1
STERILE PRECESSING AND LOGISTICS	HOUSEKEEPING AIDES CLOSET	7.2
STERILE PRECESSING AND LOGISTICS	STAFF-CONFERENCE ROOM	6.2
STERILE PRECESSING AND LOGISTICS	ADMINISTRATION, FIRST CLERK	6.1
STERILE PRECESSING AND LOGISTICS	ADMINISTRATION, CHIEF OF SPD	6.1
STERILE PRECESSING AND LOGISTICS	ADMINISTRATION, ASSISTANT CHIEF OF SPD	6.1
STERILE PRECESSING AND LOGISTICS	LOCKER ROOMS	6.4
STERILE PRECESSING AND LOGISTICS	TOILET AND SHOWER ROOMS	6.4



CHAPTER 4: PATIENT AREAS LIGHTING GUIDELINES

SERVICES	ROOM NAME	GUIDELINE REFERENCE
STERILE PREPROCESSING AND LOGISTICS	AUTOMATIC CART WASH	7.6
STERILE PREPROCESSING AND LOGISTICS	DETERGENT & WATER TREATMENT	7.8
STERILE PREPROCESSING AND LOGISTICS	SOILED RECEIVING AND DECONTAMINATION	7.3
STERILE PREPROCESSING AND LOGISTICS	MANUAL EQUIPMENT WASH	7.6
STERILE PREPROCESSING AND LOGISTICS	ENDOSCOPE DISINFECTION	7.6
STERILE PREPROCESSING AND LOGISTICS	SCOPE STORAGE	7.6
SURGICAL SERVICE	GENERAL OPERATING ROOM	4.2.13
SURGICAL SERVICE	PRE-OPERATIVE HOLDING / PHASE II RECOVERY PATIENT ROOM	4.2.15
SURGICAL SERVICE	ORTHOPEDIC OPERATING ROOM	4.2.13
SURGICAL SERVICE	UROLOGY / CYSTOSCOPY OPERATING ROOM	4.2.13
SURGICAL SERVICE	CARDIOTHORACIC OPERATING ROOM	4.2.13
SURGICAL SERVICE	CARDIOTHORACIC PUMP ROOM OR HYBRID OR CONTROL ROOM	7.10
SURGICAL SERVICE	NEUROSURGICAL OPERATING ROOM	4.2.13
SURGICAL SERVICE	ROBOTICS OPERATING ROOM	4.2.13
SURGICAL SERVICE	TRANSPLANT OPERATING ROOM	4.2.13

## CHAPTER 4: PATIENT AREAS LIGHTING GUIDELINES

SERVICES	ROOM NAME	GUIDELINE REFERENCE
SURGICAL SERVICE	MONOPLANE HYBRID OPERATING ROOM	4.2.13
SURGICAL SERVICE	BIPLANE HYBRID OPERATING ROOM	4.2.13
SURGICAL SERVICE	IMMEDIATE USE STERILIZATION ROOM	7.6
SURGICAL SERVICE	ANESTHESIA CLEAN WORK ROOM	4.2.1
SURGICAL SERVICE	DECONTAMINATION / CLEAN UP AREA	4.2.14
SURGICAL SERVICE	SOILED SURGICAL UTILITY ROOM	7.3
SURGICAL SERVICE	CARDIAC CATHETERIZATION LABORATORY	4.2.13
SURGICAL SERVICE	ELECTROPHYSIOLOGY PROCEDURE ROOM	4.2.5
SURGICAL SERVICE	TRANSESOPHAGEAL ECHOCARDIOGRAPH ROOM	4.2.5
SURGICAL SERVICE	ISOLATION PACU / PHASE I RECOVERY	4.2.15
SURGICAL SERVICE	IPACU / PHASE I RECOVERY PATIENT	4.2.15
SURGICAL SERVICE	FROZEN SECTION LABORATORY	4.2.4

## 4.2 SPECIALTY, DIAGNOSTIC, AND TREATMENT AREAS



### 4.2.1 EXAMINATION AND TREATMENT ROOM

#### DESIGN PARAMETERS:

- (1) Average Maintained Illumination - Ambient: 500 lx (50FC)
- (2) Average Maintained Illumination - Task:
  - Exam: 1000 lx (100 FC) on exam table
  - Charting: 300 lx (30 FC) on desk
- (3) Uniformity Ratio (avg / min):
  - Ambient 3:1
- (4) Color Temperature (CCT):
  - Fluorescent: 3500 degrees
  - LED: 3500 degrees
- (5) Color Rendering (CRI):
  - Fluorescent: minimum of 80
  - LED: minimum of 80
- (6) Power Source:
  - Normal
  - Critical branch of the EES.

#### DESIGN APPROACH:

A combination of ambient, and task illumination should be provided to reach desired illumination levels. Both horizontal and vertical illumination is important for caregiver performance and patient comfort. Luminaires should be visually comfortable with appropriate optics to minimize glare during examinations when the patient is in a reclining position. Color rendering and temperature are particularly important.

#### RECOMMENDED LUMINAIRES:

- (1) Recessed ceiling-mounted fluorescent or LED lensed luminaire.
- (2) Surface-mounted fluorescent or LED under cabinet task light (if not provided with pre-fabricated furniture system).

#### CONTROL APPROACH:

- (1) Multi-level switching local controls for fluorescent luminaires, or dimming controls for LED luminaires.
- (2) Refer to the ASHRAE 90.1 – Chapter 9 - Section 9.4.1.1 Interior Lighting Controls – for additional controls.
- (3) Automatic daylight response by photocontrols for ambient lighting.
- (4) Under-cabinet task lights shall be controlled with integral switch.
- (5) Provide separate controls for areas enclosed by curtains.

## CHAPTER 4: PATIENT AREAS LIGHTING GUIDELINES

### **SPECIFIC COORDINATION ISSUES:**

- (1) Rooms may require supplemental medical procedure lights. Coordinate placement with casework and equipment layouts. Ensure that room luminaires match the CCT and CRI of supplemental medical lights.
- (2) Isolation and infection control examination and treatment rooms shall be specified with enclosed and sealed luminaires, UL listed for wet locations and have the ability to be wiped down with corrosive cleaners.
- (3) Consider luminaire placement and optical control to mitigate glare and veiling reflections.

### 4.2.2 BLOOD DRAW STATION

#### DESIGN PARAMETERS:

- (1) Average Maintained Illumination - Ambient: 500 lx (50 FC)
- (2) Average Maintained Illumination - Task:
  - Blood Draw: 1000 lx (100 FC) at task area
- (3) Uniformity Ratio (avg / min):
  - Ambient: 5:1
- (4) Color Temperature (CCT):
  - Fluorescent: 3500 degrees
  - LED: 3500 degrees
- (5) Color Rendering (CRI):
  - Fluorescent: minimum of 80
  - LED: minimum of 80
- (6) Power Source:
  - Normal
  - Critical branch of the EES.

#### DESIGN APPROACH:

A combination of ambient and task illumination should be provided to reach desired illumination levels. Both horizontal and vertical illumination is important for blood draw rooms, specifically at blood draw chair. Color rendering and temperature are particularly important.

#### RECOMMENDED LUMINAIRES:

- (1) Recessed ceiling-mounted fluorescent or LED lensed luminaire.
- (2) Surface-mounted fluorescent or LED under cabinet task light(if not provided with pre-fab furniture system).

#### CONTROL APPROACH:

- (1) Multi-level switching local controls for fluorescent luminaires, or dimming controls for LED luminaires.
- (2) Refer to the ASHRAE 90.1 – Chapter 9 - Section 9.4.1.1 Interior Lighting Controls – for additional controls.
- (3) Under-cabinet task lights shall be controlled with integral switch.
- (4) Provide separate controls for areas enclosed by curtains.

#### SPECIFIC COORDINATION ISSUES:

- (1) Consider luminaire placement and optical control to mitigate glare and veiling reflections.

### 4.2.3 ORTHOTIC AND CASTING ROOM

#### DESIGN PARAMETERS:

- (1) Average Maintained Illumination - Ambient: 300 lx (30 FC)
- (2) Average Maintained Illumination - Task:
  - Bench Top: 500 lx (50 FC) at 3'-0" AFF
  - Fine Detail: 1000 lx (100 FC) at 3'-0" AFF
- (3) Uniformity Ratio (avg / min):
  - Ambient: 3:1
- (4) Color Temperature (CCT):
  - Fluorescent: 3500 degrees
  - LED: 3500 degrees
- (5) Color Rendering (CRI):
  - Fluorescent: minimum of 80
  - LED: minimum of 80
- (6) Power Source:
  - Normal
  - Critical branch of the EES

#### DESIGN APPROACH:

A combination of ambient and task illumination should be provided to reach desired illumination levels. Both horizontal and vertical illumination should be considered to provide adequate illumination on the cast and splint area. Luminaires should be visually comfortable with appropriate optics to minimize glare when the patient is in a reclining position.

#### RECOMMENDED LUMINAIRES:

- (1) Recessed ceiling-mounted fluorescent or LED lensed luminaire.
- (2) Surface-mounted fluorescent or LED under-cabinet task light (if not provided with pre-fabricated furniture system).

#### CONTROL APPROACH:

- (1) Multi-level switching local controls for fluorescent luminaires, or dimming controls for LED luminaires.
- (2) Refer to the ASHRAE 90.1 – Chapter 9 - Section 9.4.1.1 Interior Lighting Controls – for additional controls.
- (3) Under-cabinet task lights shall be controlled with integral switch.

## CHAPTER 4: PATIENT AREAS LIGHTING GUIDELINES

### **SPECIFIC COORDINATION ISSUES:**

- (1) Rooms may require supplemental medical procedure lights. Coordinate placement with casework and equipment layouts. Ensure that room luminaires match the CCT and CRI of supplemental medical lights.
- (2) Consider luminaire placement and optics to mitigate glare and veiling reflections.



#### 4.2.4 LABORATORY

##### DESIGN PARAMETERS:

- (1) Average Maintained Illumination - Ambient: 500 lx (50 FC)
- (2) Average Maintained Illumination – Task:
  - Bench Top: 800 lx (80 FC) on work surface
  - Dental Prosthetics: 2000 lx (200 FC) on work surface
- (3) Uniformity Ratio (avg / min):
  - Ambient: 3:1
- (4) Color Temperature (CCT):
  - Fluorescent: 3500 degrees
  - LED: 3500 degrees
- (5) Color Rendering (CRI):
  - Fluorescent: minimum of 80
  - LED: minimum of 80
- (6) Power Source:
  - Normal
  - Life Safety branch of the EES
  - Critical branch of the EES

##### DESIGN APPROACH:

A combination of ambient and task illumination should be provided to reach desired illumination levels. Vertical illumination should be considered at shelving. Color rendering and temperature are particularly important. In cell and tissue labs, provide UV-free or UV-filtered light luminaires.

##### RECOMMENDED LUMINAIRES:

- (1) Recessed ceiling-mounted fluorescent or LED lensed luminaires.
- (2) Surface-mounted fluorescent or LED under cabinet task-light (if not provided with pre-fabricated furniture system).

##### CONTROL APPROACH:

- (1) Multi-level switching local controls for fluorescent luminaires, or dimming controls for LED luminaires.
- (2) Refer to the ASHRAE 90.1 – Chapter 9 - Section 9.4.1.1 Interior Lighting Controls – for additional controls.
- (3) Under-cabinet task lights shall be controlled with integral switch.
- (4) If sensors are used, motion detectors shall be placed in every aisle to ensure complete coverage.
- (5) Lighting in laboratories that use photographic or optical diagnostic techniques, or use electron microscopes, shall be controlled with dimmers.

## CHAPTER 4: PATIENT AREAS LIGHTING GUIDELINES

### **SPECIFIC COORDINATION ISSUES:**

- (1) Consider light sources with higher CRI and CCT for critical color rendering tasks.
- (2) Consider luminaire placement and optics to mitigate glare and veiling reflections.

### 4.2.5 PROCEDURE ROOM

#### DESIGN PARAMETERS:

- (1) Average Maintained Illumination - Ambient: 500 lx (50 FC)
- (2) Average Maintained Illumination - Task:
  - Medical Task: 10000 lx (1000 FC), surgical task lighting
  - Control Room: 300 lx (30 FC) at finished floor
  - System Component: 100 lx (10 FC) at finished floor
- (3) Uniformity Ratio (avg / min):
  - Ambient: 3:1
- (4) Color Temperature (CCT):
  - Fluorescent: 3500 degrees
  - LED: 3500 degrees
  - Compact Fluorescent: 3500 degrees
- (5) Color Rendering (CRI):
  - Fluorescent: minimum of 80
  - LED: minimum of 80
  - Compact Fluorescent: minimum of 80
- (6) Power Source:
  - Normal
  - Critical branch of the EES

#### DESIGN APPROACH:

A combination of ambient and task illumination should be provided to reach desired illumination levels. Both horizontal and vertical illumination should be considered for procedure rooms. Luminaires should be visually comfortable with appropriate optics to minimize glare during procedures when the patient is in a reclining position.

#### RECOMMENDED LUMINAIRES:

- (1) Recessed ceiling-mounted fluorescent or LED lensed luminaire.
- (2) Recessed ceiling-mounted compact fluorescent or LED downlight.
- (3) Surface-mounted fluorescent or LED under-cabinet task light (if not provided with pre-fab furniture system).

#### CONTROL APPROACH:

- (1) Multi-level switching local controls for fluorescent luminaires, or dimming controls for LED luminaires.
- (2) Refer to the ASHRAE 90.1 – Chapter 9 - Section 9.4.1.1 Interior Lighting Controls – for additional controls.
- (3) Under-cabinet task lights shall be controlled with integral switches.

## CHAPTER 4: PATIENT AREAS LIGHTING GUIDELINES

### **SPECIFIC COORDINATION ISSUES:**

- (1) Rooms may require supplemental medical procedure lights. Coordinate placement with casework and equipment layouts. Ensure that room luminaires match the CCT and CRI of supplemental medical lights.
- (2) Isolation and infection control examination and treatment rooms shall be specified with enclosed and sealed luminaires, UL listed for wet locations and have the ability to be wiped down with corrosive cleaners.
- (3) Consider luminaire placement and optics to mitigate glare and veiling reflections.
- (4) Consider light sources with higher CRI and CCT for critical color rendering tasks.

### 4.2.6 DIAGNOSTIC IMAGING ROOM

#### DESIGN PARAMETERS:

- (1) Average Maintained Illumination - Ambient: 500 lx (50 FC) at 3'-0" AFF
- (2) Average Maintained Illumination - Task:
  - Control Station: 300 lx (30 FC) at finished floor
  - System Component: 200 lx (20 FC) at finished floor
  - Imaging Room: 400 lx (40 FC) at finished floor
- (3) Uniformity Ratio (avg / min):
  - Ambient: 3:1 in Control Station and Imaging Room
- (4) Color Temperature (CCT):
  - Fluorescent: 3500 degrees
  - LED: 3500 degrees
  - Compact Fluorescent: 3500 degrees
- (5) Color Rendering (CRI):
  - Fluorescent: minimum of 80
  - LED: minimum of 80
  - Compact Fluorescent: minimum of 80
- (6) Power Source:
  - Normal
  - Critical branch of the EES

#### DESIGN APPROACH:

A combination of ambient and task illumination should be provided to reach desired illumination levels. Both horizontal and vertical illumination is important for caregiver performance and patient comfort. Luminaires should be visually comfortable with appropriate optics to minimize glare when the patient is in a reclining position. Graphic and decorative luminaires are recommended in imaging rooms for visual interest during testing.

#### RECOMMENDED LUMINAIRES:

- (1) Recessed ceiling-mounted fluorescent or LED lensed luminaires.
- (2) Recessed ceiling-mounted compact fluorescent or LED downlight or wall washer.
- (3) Surface-mounted fluorescent or LED under-cabinet task light (if not provided with pre-fabricated furniture system).
- (4) Recessed ceiling-mounted fluorescent or LED cove or perimeter light.

## CHAPTER 4: PATIENT AREAS LIGHTING GUIDELINES

### **CONTROL APPROACH:**

- (1) Imaging and control rooms shall be fully dimmable.
- (2) Refer to the ASHRAE 90.1 – Chapter 9 - Section 9.4.1.1 Interior Lighting Controls – for additional controls.
- (3) Under-cabinet task lights shall be controlled with integral switches.

### **SPECIFIC COORDINATION ISSUES:**

- (1) In imaging rooms with electromagnetic (EMI) and radio frequency (RFI) fields, light must be constructed of non-ferrous materials. Ballasts and drivers should be located outside of the magnetic resonance field, typically in the system component room or control room and provided with electrical noise filters.
- (2) Coordinate luminaire placement with scanning equipment locations. Do not place luminaires over large scanning equipment.
- (3) Consider luminaire placement and optics to mitigate glare and veiling reflections.

#### 4.2.7 DIAGNOSTIC TESTING ROOM

##### DESIGN PARAMETERS:

- (1) Average Maintained Illumination - Ambient: 500 lx (50 FC) at 3'-0" AFF
- (2) Average Maintained Illumination – Task: 500 lx (50 FC) at testing station
- (3) Uniformity Ratio (avg / min):
  - Ambient: 3:1
- (4) Color Temperature (CCT):
  - Fluorescent: 3500 degrees
  - LED: 3500 degrees
  - Compact Fluorescent: 3500 degrees
- (5) Color Rendering (CRI):
  - Fluorescent: minimum of 80
  - LED: minimum of 80
  - Compact Fluorescent: minimum of 80
- (6) Power Source:
  - Normal
  - Critical branch of the EES

##### DESIGN APPROACH:

A combination of ambient and task illumination should be provided to reach desired illumination levels. Luminaires should be visually comfortable with appropriate optics to minimize glare during examinations when the patient is in a reclining position. In ophthalmology testing rooms, providing dimming controls is especially important, as patients' eyes may be medically dilated and much of the equipment requires low lighting levels.

##### RECOMMENDED LUMINAIRES:

- (1) Recessed ceiling-mounted fluorescent or LED lensed luminaires.
- (2) Surface-mounted fluorescent or LED under-cabinet task light (if not provided with pre-fabricated furniture system).
- (3) Recessed ceiling-mounted fluorescent or LED cove or perimeter light.

##### CONTROL APPROACH:

- (1) Lights must be fully dimmable for patient comfort and relaxation during testing.
- (2) Refer to the ASHRAE 90.1 – Chapter 9 - Section 9.4.1.1 Interior Lighting Controls – for additional controls.
- (3) Automatic daylight response by photocontrols for ambient lighting -cabinet task lights shall be controlled with integral switches.

##### SPECIFIC COORDINATION ISSUES:

- (1) Consider luminaire placement and optics to mitigate glare and veiling reflections.

### 4.2.8 CHEMOTHERAPY TREATMENT ROOM

#### DESIGN PARAMETERS:

- (1) Average Maintained Illumination - Ambient: 200 lx (20 FC) at 3'-0" AFF
- (2) Average Maintained Illumination - Task:
  - Injections: 500 lx (50 FC) at 3'-0" AFF
  - Agent Preparation: 1000 lx (100 FC) at 3'-0" AFF
- (3) Uniformity Ratio (avg / min):
  - Ambient: 3:1
- (4) Color Temperature (CCT):
  - Fluorescent: 3500 degrees
  - LED: 3500 degrees
  - Compact Fluorescent: 3500 degrees
- (5) Color Rendering (CRI):
  - Fluorescent: minimum of 80
  - LED: minimum of 80
  - Compact Fluorescent: minimum of 80
- (6) Power Source:
  - Normal
  - Critical branch of the EES

#### DESIGN APPROACH:

A combination of ambient and task illumination should be provided to reach desired illumination levels. Both horizontal and vertical illumination should be considered for chemotherapy treatment rooms. Luminaires should be visually comfortable with appropriate optics to minimize glare during procedures when the patient is in a reclining position. Color rendering and temperature are particularly important.

#### RECOMMENDED LUMINAIRES:

- (1) Recessed ceiling-mounted fluorescent or LED lensed luminaire.
- (2) Recessed ceiling-mounted compact fluorescent or LED downlight.
- (3) Surface-mounted fluorescent or LED under-cabinet task light (if not provided with pre-fabricated furniture system).

#### CONTROL APPROACH:

- (1) Provide patient bed/chair control for lighting in treatment rooms or cubicles. Dimming controls are preferable for patient comfort.
- (2) Refer to the ASHRAE 90.1 – Chapter 9 - Section 9.4.1.1 Interior Lighting Controls – for additional controls.
- (3) Under-cabinet task lights shall be controlled with integral switches.



## CHAPTER 4: PATIENT AREAS LIGHTING GUIDELINES

### **SPECIFIC COORDINATION ISSUES:**

- (1) Mitigate light spill from common areas into patient areas.
- (2) Coordinate if pillow switch lighting control is provided for patient use.
- (3) Lighting in chemotherapy agent preparation areas shall be specified with enclosed and sealed luminaires, UL listed for wet locations and have the ability to be wiped down with corrosive cleaners, and comply with USP 797 standards.
- (4) Consider luminaire placement and optics to mitigate glare and veiling reflections.

#### 4.2.9 RADIATION THERAPY ROOM

##### DESIGN PARAMETERS:

- (1) Average Maintained Illumination - Ambient: 500 lx (50 FC) (task?)
- (2) Uniformity Ratio (avg / min):
  - Ambient: 3:1
- (3) Color Temperature (CCT):
  - Fluorescent: 3500 degrees
  - LED: 3500 degrees
  - Compact Fluorescent: 3500 degrees
- (4) Color Rendering (CRI):
  - Fluorescent: minimum of 80
  - LED: minimum of 80
  - Compact Fluorescent: minimum of 80
- (5) Power Source:
  - Normal
  - Critical branch of the EES

##### DESIGN APPROACH:

A combination of ambient and task illumination should be provided to reach desired illumination levels. Luminaires should be visually comfortable with appropriate optics to minimize glare during examinations when the patient is in a reclining position. Light luminaires with graphics, color changing covers, or video screens may be used in these spaces to provide visual interest to patients during their procedure.

##### RECOMMENDED LUMINAIRES:

- (1) Recessed ceiling-mounted fluorescent or LED lensed luminaires.
- (2) Recessed ceiling-mounted compact fluorescent or LED downlight or wall washer.
- (3) Surface-mounted fluorescent or LED under-cabinet task light (if not provided with pre-fabricated furniture system).
- (4) Recessed ceiling-mounted fluorescent or LED cove or perimeter light.

##### CONTROL APPROACH:

- (1) Provide patient bed/chair control for lighting in treatment rooms or cubicles. Dimming controls are preferable for patient comfort
- (2) Refer to the ASHRAE 90.1 – Chapter 9 - Section 9.4.1.1 Interior Lighting Controls – for additional controls.
- (3) Under-cabinet task lights shall be controlled with integral switches.

## CHAPTER 4: PATIENT AREAS LIGHTING GUIDELINES

### **SPECIFIC COORDINATION ISSUES:**

- (1) Coordinate if pillow switch lighting control is provided for patient use.
- (2) Consider luminaire placement and optics to mitigate glare and veiling reflections.

### 4.2.10 DIALYSIS TREATMENT ROOM

#### DESIGN PARAMETERS:

- (1) Average Maintained Illumination - Ambient: 500 lx (50 FC) at 3'-0" AFF
- (2) Average Maintained Illumination - Task:
  - Needle Insertion: 2000 lx (200 FC) at area of task
  - System Component: 100 lx (10 FC) at finished floor
- (3) Uniformity Ratio (avg / min):
  - Ambient: 3:1
- (4) Color Temperature (CCT):
  - Fluorescent: 3500 degrees
  - LED: 3500 degrees
  - Compact Fluorescent: 3500 degrees
- (5) Color Rendering (CRI):
  - Fluorescent: minimum of 80
  - LED: minimum of 80
  - Compact Fluorescent: minimum of 80
- (6) Power Source:
  - Normal
  - Critical branch of the EES

#### DESIGN APPROACH:

A combination of ambient and task illumination should be provided to reach desired illumination levels. Both horizontal and vertical illumination should be considered for dialysis treatment rooms. Luminaires should be visually comfortable with appropriate optics to minimize glare during procedures when the patient is in a reclining position. Color rendering and temperature are particularly important.

#### RECOMMENDED LUMINAIRES:

- (1) Recessed ceiling-mounted fluorescent or LED lensed luminaires.
- (2) Recessed ceiling-mounted compact fluorescent or LED downlight or wall washer.
- (3) Surface-mounted fluorescent or LED under-cabinet task light (if not provided with pre-fabricated furniture system).
- (4) Wall-mounted linear fluorescent or LED indirect/direct luminaire.
- (5) Recessed ceiling-mounted fluorescent or LED cove or perimeter light.

## CHAPTER 4: PATIENT AREAS LIGHTING GUIDELINES

### **CONTROL APPROACH:**

- (1) Provide patient bed/chair control for lighting in treatment rooms or cubicles. Dimming controls are preferable for patient comfort
- (2) Refer to the ASHRAE 90.1 – Chapter 9 - Section 9.4.1.1 Interior Lighting Controls – for additional controls.
- (3) Under-cabinet lights shall be controlled with integral occupancy sensors or switches.

### **SPECIFIC COORDINATION ISSUES:**

- (1) Mitigate light spill from common areas into patient areas.
- (2) Coordinate if pillow switch lighting control is provided for patient use.
- (3) Consider luminaire placement and optics to mitigate glare and veiling reflections.

#### 4.2.11 PHYSICAL/OCCUPATIONAL THERAPY

##### DESIGN PARAMETERS:

- (1) Average Maintained Illumination - Ambient: 100 lx (10 FC) at finished floor
- (2) Average Maintained Illumination - Task:
  - Clinics: 500 lx (50 FC) at 3'-0" AFF
  - Whirlpools: 300 lx (30 FC) at 2' AFF
  - Hubbard Tanks: 300 lx (30 FC) at 2' AFF
  - Hydrotherapy: 300 lx (30 FC) at 2' AFF
  - Special Treatment: 750 lx (75 FC) at 3'-0" AFF
  - Tables and Exercise: 300 lx (30 FC) at 3'-0" AFF
  - Food Preparation: 500 lx (50 FC) at 3'-0" AFF
- (3) Uniformity Ratio (avg / min):
  - Ambient: 3:1
- (4) Color Temperature (CCT):
  - Fluorescent: 3500 degrees
  - LED: 3500 degrees
  - Compact Fluorescent: 3500 degrees
- (5) Color Rendering (CRI):
  - Fluorescent: minimum of 80
  - LED: minimum of 80
  - Compact Fluorescent: minimum of 80
- (6) Power Source:
  - Normal
  - Critical branch of the EES

##### DESIGN APPROACH:

A combination of ambient and task illumination should be provided to reach desired illumination levels. Lighting in the room should appear pleasant and comfortable. Specify luminaires with lenses or wire guards in recreational therapy areas. Luminaires should be visually comfortable with appropriate optics to minimize glare in spaces where the patient is in a reclining position.

##### RECOMMENDED LUMINAIRES:

- (1) Recessed ceiling-mounted fluorescent or LED lensed luminaires.
- (2) Recessed ceiling-mounted compact fluorescent or LED downlight or wall washer.
- (3) Recessed ceiling-mounted fluorescent or LED cove or perimeter light.
- (4) Suspended linear fluorescent or LED indirect/direct luminaire.
- (5) Surface-mounted fluorescent or LED under-cabinet task light (if not provided with pre-fabricated furniture system).

## CHAPTER 4: PATIENT AREAS LIGHTING GUIDELINES

### **CONTROL APPROACH:**

- (1) Multi-level switching local controls for fluorescent luminaires, or dimming controls for LED luminaires.
- (2) Refer to the ASHRAE 90.1 – Chapter 9 - Section 9.4.1.1 Interior Lighting Controls – for additional controls.
- (3) Under-cabinet lights shall be controlled with integral switches.

### **SPECIFIC COORDINATION ISSUES:**

- (1) Consider luminaire placement and optics to mitigate glare and veiling reflections especially in areas with pools.
- (2) Luminaires in rooms with whirlpools, Hubbard tanks, and pools shall be enclosed and sealed and UL listed for wet locations.

#### 4.2.12 AUDIOLOGY TESTING ROOM

##### **DESIGN PARAMETERS:**

- (1) Average Maintained Illumination - Ambient: 500 lx (50 FC)
- (2) Average Maintained Illumination - Task:
  - Control Booth: 300 lx (30 FC)
- (3) Uniformity Ratio (avg / min):
  - Ambient: 3:1
- (4) Color Temperature (CCT):
  - Fluorescent: 3500 degrees
  - LED: 3500 degrees
  - Compact Fluorescent: 3500 degrees
- (5) Color Rendering (CRI):
  - Fluorescent: minimum of 80
  - LED: minimum of 80
  - Compact Fluorescent: minimum of 80
- (6) Power Source:
  - Normal

##### **DESIGN APPROACH:**

Lights and light controls in audiometric booths are typically provided in a pre-fab audiology booth system.

##### **CONTROL STRATEGY:**

- (1) Lighting should be controlled with switches or dimmers provided by audiology booth manufacturer.

##### **SPECIFIC COORDINATION ISSUES:**

- (1) When possible, have the manufacturer provide light sources that comply with the facility standards for maintenance.



#### 4.2.13 SURGERY/OPERATING ROOM

##### DESIGN PARAMETERS:

- (1) Average Maintained Illumination - Ambient: 2000 lx (200 FC) at 3'-0" AFF
- (2) Average Maintained Illumination - Task:
  - Surgical Table: 3000 lx (300 FC) on surface of the table
  - Control Room: 500 lx (50FC) at 2'-6" AFF
  - Surgical Field: 15000 lx (1500 FC), (see Specific Coordination Issue #4)
- (3) Uniformity Ratio (avg / min):
  - Ambient: 2:1
- (4) Color Temperature (CCT):
  - Fluorescent: 4100 degrees, or matching the surgical light CCT
  - LED: 4000 degrees, or matching the surgical light CCT
- (5) Color Rendering (CRI):
  - Fluorescent: minimum of 80 and minimum R9 of 90
  - LED: minimum of 80 and minimum R9 of 90
- (6) Power Source:
  - Normal
  - Critical branch of the EES
  - Each luminaire above the surgery table shall be designed with 50% integral emergency power battery packs

##### DESIGN APPROACH:

A combination of ambient, surgery, and task illumination should be provided to reach desired illumination levels. The use of fully dimmable lighting luminaires provides medical staff with the flexibility required for procedures. Color rendering and temperature are particularly important.

##### RECOMMENDED LUMINAIRES:

- (1) Recessed sealed ceiling-mounted fluorescent or LED lensed luminaires.
- (2) Recessed sealed ceiling-mounted LED downlight.
- (3) Surface-mounted sealed fluorescent or LED under-cabinet task light (if not provided with pre-fabricated furniture system).

## CHAPTER 4: PATIENT AREAS LIGHTING GUIDELINES

### **CONTROL APPROACH:**

- (1) All lighting shall be fully dimmable to provide flexibility during preparation, procedures, and clean-up.
- (2) Coordinate location of room and medical equipment light control stations and provide station at door.
- (3) Refer to the ASHRAE 90.1 – Chapter 9 - Section 9.4.1.1 Interior Lighting Controls – for additional controls.

### **SPECIFIC COORDINATION ISSUES:**

- (1) Operating rooms require surgical lights. Coordinate placement with casework and equipment layouts. Ensure room light luminaires match the CCT and CRI of surgical lights.
- (2) Luminaires shall be enclosed and sealed, UL listed for wet locations and have the ability to be wiped down with corrosive cleaners.
- (3) Luminaires shall meet the requirements for Electromagnetic Interference/Compatibility (EMI), and Radio Frequency Interface (RFI).
- (4) Surgical light (single or multiple light heads mounted on swivel arms) provides task illumination for complex and delicate surgical tasks within the surgical field. In construction projects, surgical lights are normally specified and furnished by VA, installed and connected by the contractor. Task illumination of surgical field is shown for reference only. A/E shall not include surgical lights in lighting calculations for ambient and other task illuminations.

#### 4.2.14 SURGICAL CORRIDOR AND SCRUB AREA

##### DESIGN PARAMETERS:

- (1) Average Maintained Illumination - Ambient: 500 lx (50 FC) at finished floor
- (2) Average Maintained Illumination - Task:
  - Scrub Sink: 1000 lx (100 FC) at 3'-0" AFF
- (3) Uniformity Ratio (avg / min):
  - Ambient: 5:1
- (4) Color Temperature (CCT):
  - Fluorescent: 3500 degrees
  - LED: 3500 degrees
  - Compact Fluorescent: 3500 degrees
- (5) Color Rendering (CRI):
  - Fluorescent: minimum of 80
  - LED: minimum of 80
  - Compact Fluorescent: minimum of 80
- (6) Power Source:
  - Normal
  - Life Safety branch of the EES
  - Critical branch of the EES

##### DESIGN APPROACH:

Luminaires should be visually comfortable with appropriate optics to minimize glare when the patient is transported in a reclined position.

##### RECOMMENDED LUMINAIRES:

- (1) Recessed sealed ceiling-mounted fluorescent or LED lensed luminaire.
- (2) Recessed sealed ceiling-mounted compact fluorescent or LED downlight (if not provided with pre-fabricated furniture system).
- (3) Recessed sealed ceiling-mounted fluorescent or LED perimeter cove light.

##### CONTROL APPROACH:

- (1) Multi-level switching local controls for fluorescent luminaires, or dimming controls for LED luminaires.
- (2) Refer to the ASHRAE 90.1 – Chapter 9 - Section 9.4.1.1 Interior Lighting Controls – for additional controls.

##### SPECIFIC COORDINATION ISSUES:

- (1) Luminaires shall be enclosed and sealed, UL listed for wet locations and have the ability to be wiped down with corrosive cleaners.

#### 4.2.15 PRE-OPERATIVE AND POST-ANESTHETIC CARE (PACU)

##### DESIGN PARAMETERS:

- (1) Average Maintained Illumination - Ambient: 100 lx (10 FC) at 3'-0" AFF
- (2) Average Maintained Illumination - Task:
  - Observation: 500 lx (50 FC) at 3'-0" AFF
  - Examination: 1000 lx (100 FC) on surface of patient bed
- (3) Uniformity Ratio (avg / min):
  - Ambient: 5:1
- (4) Color Temperature (CCT):
  - Fluorescent: 3500 degrees
  - LED: 3500 degrees
- (5) Color Rendering (CRI):
  - Fluorescent: minimum of 80
  - LED: minimum of 80
- (6) Power Source:
  - Normal
  - Critical branch of the EES.

##### DESIGN APPROACH:

A combination of ambient and task illumination should be provided to reach desired illumination levels. Both horizontal and vertical illumination is important for caregiver performance and patient comfort. Luminaires should be visually comfortable with appropriate optics to minimize glare during examinations when the patient is in a reclining position.

##### RECOMMENDED LUMINAIRES:

- (1) Recessed ceiling-mounted fluorescent or LED lensed luminaire.
- (2) Recessed ceiling-mounted compact fluorescent or LED downlight.
- (3) Wall-mounted linear fluorescent or LED indirect/direct luminaire.

##### CONTROL APPROACH:

- (1) General illumination for pre- and post-operative areas are grouped together and switched at the nurse station.
- (2) Observation and exam settings are controlled through switches at the patient headwall.
- (3) Multi-level switching local controls for fluorescent luminaires, or dimming controls for LED luminaires.
- (4) Refer to the ASHRAE 90.1 – Chapter 9 - Section 9.4.1.1 Interior Lighting Controls – for additional controls.

## CHAPTER 4: PATIENT AREAS LIGHTING GUIDELINES

### **SPECIFIC COORDINATION ISSUES:**

- (1) Consider luminaire placement and optics to mitigate glare and veiling reflections.

#### 4.2.16 DENTAL EXAM AND TREATMENT ROOM

##### DESIGN PARAMETERS:

- (1) Average Maintained Illumination - Ambient: 500 lx (50 FC) at 3'-0" AFF
- (2) Average Maintained Illumination - Task:
  - Examination: 1000 lx (100 FC), on surface of dental treatment chair
- (3) Uniformity Ratio (avg / min):
  - Ambient: 3:1
- (4) Color Temperature (CCT):
  - Fluorescent: 5000 degrees
  - LED: 5000 degrees
- (5) Color Rendering (CRI):
  - Fluorescent: minimum of 80
  - LED: minimum of 80
- (6) Power Source:
  - Normal
  - Critical branch of the EES

##### DESIGN APPROACH:

A combination of ambient and task illumination should be provided to reach desired illumination levels. Both horizontal and vertical illumination is important for caregiver performance and patient comfort. Luminaires should be visually comfortable with appropriate optics to minimize glare during examinations when the patient is in a reclining position.

##### RECOMMENDED LUMINAIRES:

- (1) Recessed sealed ceiling-mounted fluorescent or LED lensed luminaire.
- (2) Surface-mounted fluorescent or LED under-cabinet task light (if not provided by pre-fabricated furniture system)

##### CONTROL APPROACH:

- (1) Multi-level switching local controls for fluorescent luminaires, or dimming controls for LED luminaires.
- (2) Refer to the ASHRAE 90.1 – Chapter 9 - Section 9.4.1.1 Interior Lighting Controls – for additional controls.
- (3) Under-cabinet lights shall be controlled with integral switches.

## CHAPTER 4: PATIENT AREAS LIGHTING GUIDELINES

### **SPECIFIC COORDINATION ISSUES:**

- (1) Task illumination to perform treatment procedure is provided by supplemental arm-mounted-swivel dental procedure light. This procedure light is often specified and furnished by VA, installed and connected by the contractor. Coordinate placement with casework and equipment layouts. Ensure that room luminaires match the CCT and CRI of supplemental dental procedure light. A/E shall not include this procedure light in the lighting calculations.
- (2) Consider luminaire placement and optics to mitigate glare and veiling reflections.

#### 4.2.17 ORAL SURGERY, MINOR PROCEDURE ROOM

##### DESIGN PARAMETERS:

- (1) Average Maintained Illumination - Ambient: 2000 lx (200 FC) at 3'-0" AFF
- (2) Average Maintained Illumination - Task:
  - Surgery, Chair: 3000 lx (300 FC), on surface of dental procedure chair
  - Recovery, Chair: 750 lx (75 FC), on surface of dental procedure chair
- (3) Uniformity Ratio (avg / min):
  - Ambient: 3:1
- (4) Color Temperature (CCT):
  - Fluorescent: 5000 degrees
  - LED: 5000 degrees
- (5) Color Rendering (CRI):
  - Fluorescent: minimum of 80
  - LED: minimum of 80
- (6) Power Source:
  - Normal
  - Critical branch of the EES

##### DESIGN APPROACH:

- (1) A combination of ambient, surgery, and task illumination should be provided to reach desired illumination levels. Both horizontal and vertical illumination is important for a dentist's performance. Luminaires should be visually comfortable with appropriate optics to minimize glare during examinations when the patient is in a reclining position. Color rendering and temperature are particularly important.

##### RECOMMENDED LUMINAIRES:

- (1) Recessed sealed ceiling-mounted fluorescent or LED lensed luminaire.
- (2) Surface-mounted sealed fluorescent or LED under-cabinet task light (if not provided by pre-fabricated furniture system)

##### CONTROL STRATEGY:

- (1) All lighting shall be fully dimmable to provide flexibility during preparation, procedures, and clean-up.
- (2) Coordinate location of room and medical equipment light control stations and provide station at door.
- (3) Refer to the ASHRAE 90.1 – Chapter 9 - Section 9.4.1.1 Interior Lighting Controls – for additional controls.



## CHAPTER 4: PATIENT AREAS LIGHTING GUIDELINES

### **SPECIFIC COORDINATION ISSUES:**

- (1) Task illumination - within the dental surgical or operating field - is provided by supplemental arm-mounted-swivel dental procedure light. This procedure light is often specified and furnished by VA, installed and connected by the contractor. Coordinate placement with casework and equipment layouts. Ensure that room luminaires match the CCT and CRI of supplemental dental procedure light. A/E shall not include this procedure light in the lighting calculations.
- (2) Luminaires shall be enclosed and sealed, UL listed for wet locations and have the ability to be wiped down with corrosive cleaners.
- (3) Consider luminaire placement and optics to mitigate glare and veiling reflections.

#### 4.2.18 PHARMACY

##### DESIGN PARAMETERS:

- (1) Average Maintained Illumination - Ambient: 1000 lx (100 FC) at 3'-0" AFF
- (2) Average Maintained Illumination - Task:
  - Compounding Areas: 1000-1500 lx (100-150 FC) at 3'-0" AFF
  - Storage: 300 lx (30 FC) at finished floor
  - Storage Shelving: 500 lx (50 FC) at vertical face of shelving
  - Receiving: 500 lx (50 FC) at 3'-0" AFF
- (3) Uniformity Ratio (avg / min):
  - Ambient: 2:1
- (4) Color Temperature (CCT):
  - Fluorescent: 3500 degrees
  - LED: 3500 degrees
- (5) Color Rendering (CRI):
  - Fluorescent: minimum of 80
  - LED: minimum of 80
- (6) Power Source:
  - Normal
  - Critical branch of the EES

##### DESIGN APPROACH:

Both horizontal and vertical illumination should be considered, especially in storage areas. All luminaires should be sealed to contain lamp breakage.

##### RECOMMENDED LUMINAIRES:

- (1) Recessed sealed ceiling-mounted fluorescent or LED lensed luminaire.
- (2) Surface-mounted sealed fluorescent or LED under-cabinet task light (if not provided by pre-fabricated furniture system).

##### CONTROL APPROACH:

- (1) Multi-level switching local controls for fluorescent luminaires, or dimming controls for LED luminaires.
- (2) Refer to the ASHRAE 90.1 – Chapter 9 - Section 9.4.1.1 Interior Lighting Controls – for additional controls.
- (3) Under-cabinet lights shall be controlled with integral switches.

## CHAPTER 4: PATIENT AREAS LIGHTING GUIDELINES

### **SPECIFIC COORDINATION ISSUES:**

- (1) Luminaires shall be enclosed and sealed, UL listed for wet locations and have the ability to be wiped down with corrosive cleaners and comply with USP 797 standards.
- (2) The exterior lens surface of ceiling luminaires shall be smooth and mounted flush.
- (3) Consider luminaire placement and optics to mitigate glare and veiling reflections.

## 4.3 PATIENT CARE AREAS



### 4.3.1 NURSE STATION

#### DESIGN PARAMETERS:

- (1) Average Maintained Illumination - Ambient:
  - General: 300 lx (30 FC) at finished floor
  - ICU: 500 lx (50 FC) at finished floor
- (2) Average Maintained Illumination - Task:
  - Desk Surface: 500 lx (50 FC)
- (3) Uniformity Ratio (avg / min):
  - Ambient: 3:1
- (4) Color Temperature (CCT):
  - Fluorescent: 3500 degrees
  - LED: 3500 degrees
  - Compact Fluorescent: 3500 degrees
- (5) Color Rendering (CRI):
  - Fluorescent: minimum of 80
  - LED: minimum of 80
  - Compact Fluorescent: minimum of 80
- (6) Power Source:
  - Normal
  - Critical branch of the EES

#### DESIGN APPROACH:

The nurse station lighting will include a combination of ambient and task lighting strategies to allow for wayfinding, charting and note taking, filing, and computer work. Illumination levels should be uniform throughout the nurse station. Decorative lights such as sconces and pendants may be used for visual interest.

#### RECOMMENDED LUMINAIRES:

- (1) Recessed ceiling-mounted fluorescent or LED lensed luminaire.
- (2) Recessed ceiling-mounted compact fluorescent or LED downlight or wall washer.
- (3) Recessed ceiling-mounted fluorescent or LED cove or perimeter light.
- (4) Surface-mounted fluorescent or LED under-cabinet task light (if not provided by pre-fabricated furniture system)
- (5) Decorative compact fluorescent, fluorescent or LED wall-mounted sconce or ceiling-mounted pendant.

## CHAPTER 4: PATIENT AREAS LIGHTING GUIDELINES

### **CONTROL APPROACH:**

- (1) Multi-level switching local controls for fluorescent luminaires, or dimming controls for LED luminaires.
- (2) Refer to the ASHRAE 90.1 – Chapter 9 - Section 9.4.1.1 Interior Lighting Controls – for additional controls.
- (3) Under-cabinet task lights shall be controlled with integral switches.

### **SPECIFIC COORDINATION ISSUES:**

- (1) If using pendants, ensure complete field of view from nurse station to patient rooms for patient observation.
- (2) Wall-mounted sconces must be ADA compliant.
- (3) Coordinate style of lighting luminaires with adjacent areas.

### 4.3.2 PATIENT CORRIDOR

#### DESIGN PARAMETERS:

- (1) Average Maintained Illumination - Ambient:
  - General: 200 lx (20 FC) at finished floor
- (2) Uniformity Ratio (avg / min):
  - Ambient: 3:1
- (3) Color Temperature (CCT):
  - Fluorescent: 3500 degrees
  - LED: 3500 degrees
  - Compact Fluorescent: 3500 degrees
- (4) Color Rendering (CRI):
  - Fluorescent: minimum of 80
  - LED: minimum of 80
  - Compact Fluorescent: minimum of 80
- (5) Power Source:
  - Normal
  - Life Safety branch of the EES

#### DESIGN APPROACH:

Patient circulation lighting should be consistent throughout each facility. Lighting in corridors should be coordinated with adjacent spaces for a cohesive appearance. Vertical illumination should be considered with respect to signage and wayfinding. Consider locations of decentralized nurse stations when placing luminaires.

#### RECOMMENDED LUMINAIRES:

- (1) Recessed ceiling-mounted fluorescent or LED lensed luminaire.
- (2) Recessed ceiling-mounted compact fluorescent or LED downlight or wall washer.
- (3) Recessed ceiling-mounted fluorescent or LED cove or perimeter light.
- (4) Decorative compact fluorescent, fluorescent or LED wall-mounted sconce.

#### CONTROL APPROACH:

- (1) Refer to the ASHRAE 90.1 – Chapter 9 - Section 9.4.1.1 Interior Lighting Controls – for controls.

## CHAPTER 4: PATIENT AREAS LIGHTING GUIDELINES

### **SPECIFIC COORDINATION ISSUES:**

- (1) Mitigate possibly glare from highly polished floors.
- (2) Luminaires should be easily serviceable from below without the need to open the ceiling plenum.
- (3) Wall-mounted sconces must be ADA compliant.



### 4.3.3 MEDICATION ROOM

#### DESIGN PARAMETERS:

- (1) Average Maintained Illumination - Ambient: 500 lx (50 FC) at 3'-0" AFF
- (2) Average Maintained Illumination - Task:
  - Desk Surface: 750 lx (75 FC)
  - Storage: 300 lx (30 FC) at vertical face of shelving
- (3) Uniformity Ratio (avg / min):
  - Ambient: 3:1
- (4) Color Temperature (CCT):
  - Fluorescent: 3500 degrees
  - LED: 3500 degrees
- (5) Color Rendering (CRI):
  - Fluorescent: minimum of 80
  - LED: minimum of 80
- (6) Power Source:
  - Normal
  - Critical branch of the EES

#### DESIGN APPROACH:

A combination of general and task lighting should be utilized for medication rooms. Consider vertical illumination on storage shelves when placing light luminaires.

#### RECOMMENDED LUMINAIRES:

- (1) Recessed ceiling-mounted fluorescent or LED lensed luminaire.
- (2) Surface-mounted fluorescent or LED under-cabinet task light fixture (if not provided with pre-fabricated furniture system).

#### CONTROL APPROACH:

- (1) Multi-level switching local controls for fluorescent luminaires, or dimming controls for LED luminaires.
- (2) Refer to the ASHRAE 90.1 – Chapter 9 - Section 9.4.1.1 Interior Lighting Controls – for additional controls.
- (3) Under-cabinet task lights shall be controlled with integral switches.

#### SPECIFIC COORDINATION ISSUES:

- (1) Coordinate luminaire placement with overhead cabinets and shelving. Do not install luminaires directly above.

### 4.3.4 PATIENT ROOM, GENERAL

#### DESIGN PARAMETERS:

- (1) Average Maintained Illumination - Ambient: 100 lx (10 FC) at finished floor
- (2) Average Maintained Illumination - Task:
  - Reading: 400 lx (40 FC) at head of bed
  - Hand Washing Sink: 500 lx (50 FC) at 3'-0" AFF
  - Examination: 1000 lx (100 FC) at patient bed
  - Night Observation: 100 lx (10 FC) at patient bed
  - Night Light: 2 lx (0.2 FC) at finished floor, to toilet and corridor
- (3) Uniformity Ratio (avg / min):
  - Ambient: 3:1
- (4) Color Temperature (CCT):
  - Fluorescent: 3500 degrees
  - LED: 3500 degrees
  - Compact Fluorescent: 3500 degrees
- (5) Color Rendering (CRI):
  - Fluorescent: minimum of 80
  - LED: minimum of 80
  - Compact Fluorescent: minimum of 80
- (6) Power Source:
  - Normal
  - Critical branch of the EES

#### DESIGN APPROACH:

A combination of general, task, and exam lighting should be provided to reach desired illumination levels. Luminaires should be provided with sufficient shielding to minimize glare during examinations and when the patient bed is reclined. Locations of patient bed, charting area, and hand washing sink should be considered when placing luminaires.

#### RECOMMENDED LUMINAIRES:

- (1) Recessed ceiling-mounted fluorescent or LED lensed patient room luminaire (single or tandem).
- (2) Recessed ceiling-mounted fluorescent or LED exam light.
- (3) Recessed ceiling-mounted compact fluorescent or LED downlight.
- (4) Recessed wall-mounted amber LED night light.
- (5) Decorative compact fluorescent, fluorescent or LED wall-mounted sconce.

## CHAPTER 4: PATIENT AREAS LIGHTING GUIDELINES

### **CONTROL APPROACH:**

- (1) Multi-level switching shall be used for tasks including general, reading, night observation, and exam lights.
- (2) General and reading lights shall be controlled with the patient pillow switch.
- (3) Exam light shall be controlled with a red switch at the patient headwall.
- (4) Light at hand washing sink shall be controlled with a switch at the proximity above the sink.
- (5) Refer to the ASHRAE 90.1 – Chapter 9 - Section 9.4.1.1 Interior Lighting Controls – for additional controls.
- (6) Automatic daylight response by photocontrols for night lighting.

### **SPECIFIC COORDINATION ISSUES:**

- (1) Luminaires must contain lamp breakage within luminaire.
- (2) Avoid using luminaires with surfaces that collect dust and debris.
- (3) In multi-patient rooms, night lights to toilet and corridor should not be blocked by curtains. Control devices must be accessible when curtains are closed.

### 4.3.5 PATIENT ROOM, ISOLATION

#### DESIGN PARAMETERS:

- (1) Average Maintained Illumination - Ambient: Ambient: 50 lx (5 FC) at finished floor
- (2) Average Maintained Illumination - Task:
  - Reading: 400 lx (40 FC) at head of bed
  - Hand Washing Sink: 500 lx (50 FC) at 3'-0" AFF
  - Examination: 500 lx (50 FC) at patient bed
  - Night Observation: 30 lx (3 FC) at patient bed
  - Night Light: 2 lx (0.2 FC) at finished floor, to toilet and corridor
  - Cleaning: 300 lx (30 FC) at finished floor
  - Ante Room: 200 lx (20 FC) at finished floor
- (3) Uniformity Ratio (avg / min):
  - Ambient: 3:1
- (4) Color Temperature (CCT):
  - Fluorescent: 3500 degrees
  - LED: 3500 degrees
  - Compact Fluorescent: 3500 degrees
- (5) Color Rendering (CRI):
  - Fluorescent: minimum of 80
  - LED: minimum of 80
  - Compact Fluorescent: minimum of 80
- (6) Power Source:
  - Normal
  - Critical branch of the EES

#### DESIGN APPROACH:

A combination of general, task, and exam lighting should be provided to reach desired illumination levels. Luminaires should be provided with sufficient shielding to minimize glare during examinations and when the patient bed is reclined. Locations of patient bed, charting area, and hand washing sink should be considered when placing luminaires.

#### RECOMMENDED LUMINAIRES:

- (1) Recessed ceiling-mounted fluorescent or LED sealed lensed patient room luminaire (single or tandem).
- (2) Recessed ceiling-mounted fluorescent or LED sealed exam light.
- (3) Recessed ceiling-mounted compact fluorescent or LED sealed downlight.
- (4) Recessed wall-mounted amber LED night light.

## CHAPTER 4: PATIENT AREAS LIGHTING GUIDELINES

### **CONTROL APPROACH:**

- (1) Multi-level switching or dimming shall be used for general, reading, night observation, and exam lights.
- (2) General and reading lights shall be controlled with the patient pillow switch.
- (3) Exam light shall be controlled with a red switch at the patient headwall.
- (4) Light at hand washing sink shall be controlled with a switch at the proximity above the sink.
- (5) Refer to the ASHRAE 90.1 – Chapter 9 - Section 9.4.1.1 Interior Lighting Controls – for additional controls.
- (6) Automatic daylight response by photocontrols for night lighting.

### **SPECIFIC COORDINATION ISSUES:**

- (1) Luminaires must contain lamp breakage within luminaire.
- (2) Avoid using luminaires with surfaces that collect dust and debris.
- (3) In isolation rooms luminaires shall be specified as enclosed and sealed, UL listed for wet locations and have the ability to be wiped down with corrosive cleaners.

#### 4.3.6 PATIENT ROOM, INTENSIVE CARE

##### DESIGN PARAMETERS:

- (1) Average Maintained Illumination - Ambient: 100 lx (10 FC) at finished floor
- (2) Average Maintained Illumination - Task:
  - Hand Washing Sink: 500 lx (50 FC) at 2'-6" AFF
  - Examination: 1000 lx (100 FC) at surface of patient bed
  - Night Observation: 100 lx (10 FC) at surface of patient bed
  - Night Light: 2 lx (0.2 FC) at finished floor, to toilet and corridor
- (3) Uniformity Ratio (avg / min):
  - Ambient: 3:1
- (4) Color Temperature (CCT):
  - Fluorescent: 3500 degrees
  - LED: 3500 degrees
  - Compact Fluorescent: 3500 degrees
- (5) Color Rendering (CRI):
  - Fluorescent: minimum of 80
  - LED: minimum of 80
  - Compact Fluorescent: minimum of 80
- (6) Power Source:
  - Normal
  - Critical branch of the EES.

##### DESIGN APPROACH:

A combination of general, task, and exam lighting should be provided to reach desired illumination levels. Luminaires should be provided with sufficient shielding to minimize glare during examinations and when the patient bed is reclined. Locations of patient bed, charting area, and hand washing sink should be considered when placing luminaires.

##### RECOMMENDED LUMINAIRES:

- (1) Recessed ceiling-mounted fluorescent or LED lensed patient room luminaire (single or tandem).
- (2) Recessed ceiling-mounted fluorescent or LED exam light.
- (3) Recessed ceiling-mounted compact fluorescent or LED downlight.
- (4) Recessed wall-mounted amber LED night light.

## CHAPTER 4: PATIENT AREAS LIGHTING GUIDELINES

### **CONTROL APPROACH:**

- (1) Multi-level switching or dimming shall be utilized for general and exam lighting.
- (2) Exam light shall be controlled with a red switch at the patient headwall.
- (3) Refer to the ASHRAE 90.1 – Chapter 9 - Section 9.4.1.1 Interior Lighting Controls – for additional controls.
- (4) Automatic daylight response by photocontrols for night lighting.

### **SPECIFIC COORDINATION ISSUES:**

- (1) Luminaires must contain lamp breakage within luminaire.
- (2) Avoid using luminaires with surfaces that collect dust and debris.

#### 4.3.7 PATIENT ROOM, RESIDENTIAL

##### DESIGN PARAMETERS:

- (1) Average Maintained Illumination - Ambient: 50 lx (5 FC) at finished floor
- (2) Average Maintained Illumination - Task:
  - Reading: 400 lx (40 FC) at head of bed
  - Night Light: 2 lx (0.2 FC) at finished floor
  - Cleaning: 300 lx (30 FC) at finished floor
- (3) Uniformity Ratio (avg / min):
  - Ambient: 3:1
- (4) Color Temperature (CCT):
  - Fluorescent: 3500 degrees
  - LED: 3500 degrees
  - Compact Fluorescent: 3500 degrees
- (5) Color Rendering (CRI):
  - Fluorescent: minimum of 80
  - LED: minimum of 80
  - Compact Fluorescent: minimum of 80
- (6) Power Source:
  - Normal
  - Critical branch of the EES

##### DESIGN APPROACH:

A combination of general and task lighting should be provided to reach desired illumination levels. Luminaires should be provided with sufficient shielding to minimize glare during examinations and when the patient bed is reclined. Light luminaires should have a residential feeling, and the use of table and floor lamps is recommended.

##### RECOMMENDED LUMINAIRES:

- (1) Recessed ceiling-mounted compact fluorescent or LED downlight or wall washer.
- (2) Decorative compact fluorescent, fluorescent or LED wall-mounted sconce.
- (3) Stand-mounted compact fluorescent or LED table or floor lamp.

##### CONTROL APPROACH:

- (1) Multi-level switching local controls for fluorescent luminaires, or dimming controls for LED luminaires.
- (2) Table and floor lights shall be controlled with integral switches.
- (3) Refer to the ASHRAE 90.1 – Chapter 9 - Section 9.4.1.1 Interior Lighting Controls – for additional controls.
- (4) Automatic daylight response by photocontrols for night lighting.



## CHAPTER 4: PATIENT AREAS LIGHTING GUIDELINES

### **SPECIFIC COORDINATION ISSUES:**

- (1) Luminaires must contain lamp breakage within luminaire.
- (2) Wall-mounted sconces must be ADA compliant.

#### 4.3.8 PATIENT TOILET/SHOWER

##### DESIGN PARAMETERS:

- (1) Average Maintained Illumination - Ambient: 300 lx (30 FC) at 2'-6" AFF
- (2) Average Maintained Illumination - Task:
  - Shower: 200 lx (20 FC) at finished floor
  - Night Light: 10 lx (1 FC) at finished floor
- (3) Uniformity Ratio (avg / min):
  - 2:1
- (4) Color Temperature (CCT):
  - Fluorescent: 3500 degrees
  - LED: 3500 degrees
  - Compact Fluorescent: 3500 degrees
- (5) Color Rendering (CRI):
  - Fluorescent: minimum of 80
  - LED: minimum of 80
  - Compact Fluorescent: minimum of 80
- (6) Power Source:
  - Normal
  - Critical branch of the EES

##### DESIGN APPROACH:

Provide adequate vertical illumination at the vanity.

##### RECOMMENDED LUMINAIRES:

- (1) Recessed ceiling-mounted compact fluorescent or LED downlight.
- (2) Wall-mounted compact fluorescent, fluorescent or LED mirror or vanity luminaire.
- (3) Recessed wall-mounted amber LED night light.

##### CONTROL APPROACH:

- (1) Multi-level switching local controls for fluorescent luminaires, or dimming controls for LED luminaires.
- (2) Refer to the ASHRAE 90.1 – Chapter 9 - Section 9.4.1.1 Interior Lighting Controls – for additional controls.
- (3) Automatic daylight response by photocontrols for night lighting.

##### SPECIFIC COORDINATION ISSUES:

- (1) Bariatric care rooms must coordinate luminaire placement with ceiling track and ceiling track supports.
- (2) Lighting in the toilet rooms should be located to coordinate with plumbing fixtures, vanities, and wall-mounted equipment.

#### 4.3.9 PATIENT TOILET/SHOWER - RESIDENTIAL

##### DESIGN PARAMETERS:

- (1) Average Maintained Illumination - Ambient: 300 lx (30 FC) at 2'-6" AFF
- (2) Average Maintained Illumination - Task:
  - Shower: 200 lx (20 FC) at finished floor
  - Night Light: 10 lx (1 FC) at finished floor
- (3) Uniformity Ratio (avg / min):
  - n/a
- (4) Color Temperature (CCT):
  - Fluorescent: 3500 degrees
  - LED: 3500 degrees
  - Compact Fluorescent: 3500 degrees
- (5) Color Rendering (CRI):
  - Fluorescent: minimum of 80
  - LED: minimum of 80
  - Compact Fluorescent: minimum of 80
- (6) Power Source:
  - Normal
  - Critical branch of the EES

##### DESIGN APPROACH:

Provide adequate vertical illumination at the vanity.

##### RECOMMENDED LUMINAIRES:

- (1) Recessed ceiling-mounted compact fluorescent or LED downlight.
- (2) Wall-mounted compact fluorescent, fluorescent or LED mirror or vanity luminaire.
- (3) Recessed wall-mounted amber LED night light.

##### CONTROL APPROACH:

- (1) Multi-level switching local controls for fluorescent luminaires, or dimming controls for LED luminaires.
- (2) Refer to the ASHRAE 90.1 – Chapter 9 - Section 9.4.1.1 Interior Lighting Controls – for additional controls.
- (3) Automatic daylight response by photocontrols for night lighting.

##### SPECIFIC COORDINATION ISSUES:

- (1) Lighting in the toilet rooms should be located to coordinate with plumbing fixtures, vanities, and wall-mounted equipment.

#### 4.3.10 NOURISHMENT STATION

##### DESIGN PARAMETERS:

- (1) Average Maintained Illumination - Ambient: 200 lx (20 FC) at finished floor
- (2) Average Maintained Illumination - Task:
  - Food Preparation: 500 lx (50FC) on surface of counter
- (3) Uniformity Ratio (avg / min):
  - Ambient: 3:1
- (4) Color Temperature (CCT):
  - Fluorescent: 3500 degrees
  - LED: 3500 degrees
  - Compact Fluorescent: 3500 degrees
- (5) Color Rendering (CRI):
  - Fluorescent: minimum of 80
  - LED: minimum of 80
  - Compact Fluorescent: minimum of 80
- (6) Power Source:
  - Normal

##### DESIGN APPROACH:

A combination of ambient and task lighting should be used at the nourishment station.

##### RECOMMENDED LUMINAIRES:

- (1) Recessed ceiling-mounted fluorescent or LED lensed light luminaire.
- (2) Recessed ceiling-mounted compact fluorescent or LED downlight.
- (3) Surface-mounted fluorescent or LED under-cabinet task light luminaire.

##### CONTROL APPROACH:

- (1) Multi-level switching local controls for fluorescent luminaires, or dimming controls for LED luminaires.
- (2) Refer to the ASHRAE 90.1 – Chapter 9 - Section 9.4.1.1 Interior Lighting Controls – for additional controls.
- (3) Under-cabinet task lights shall be controlled with integral switches.
- (4) If nourishment station is open, overhead lighting shall be controlled with adjacent area.

##### SPECIFIC COORDINATION ISSUES:

- (1) If nourishment station is open, coordinate style of lighting luminaires with adjacent areas.

#### 4.3.11 DAY ROOM

##### DESIGN PARAMETERS:

- (1) Average Maintained Illumination - Ambient: 50 lx (5 FC) at finished floor
- (2) Average Maintained Illumination - Task:
  - Reading: 500 lx (50 FC) at 2'-6" AFF
- (3) Uniformity Ratio (avg / min):
  - Ambient: 3:1
- (4) Color Temperature (CCT):
  - Fluorescent: 3500 degrees
  - LED: 3500 degrees
  - Compact Fluorescent: 3500 degrees
- (5) Color Rendering (CRI):
  - Fluorescent: minimum of 80
  - LED: minimum of 80
  - Compact Fluorescent: minimum of 80
- (6) Power Source:
  - Normal

##### DESIGN APPROACH:

The day rooms should include a combination of lighting strategies to perform a variety of tasks. Consider both horizontal and vertical illumination for day rooms.

##### RECOMMENDED LUMINAIRES:

- (1) Recessed ceiling-mounted fluorescent or LED lensed luminaire.
- (2) Recessed ceiling-mounted compact fluorescent or LED downlight or wall washer.
- (3) Decorative compact fluorescent, fluorescent or LED wall-mounted sconce.
- (4) Recessed ceiling-mounted fluorescent or LED cove or perimeter light.
- (5) Stand-mounted compact fluorescent or LED table or floor lamp.

##### CONTROL APPROACH:

- (1) Multi-level switching local controls for fluorescent luminaires, or dimming controls for LED luminaires.
- (2) Table and floor lights shall be controlled with integral switches.
- (3) Refer to the ASHRAE 90.1 – Chapter 9 - Section 9.4.1.1 Interior Lighting Controls – for additional controls.

## CHAPTER 4: PATIENT AREAS LIGHTING GUIDELINES

### **SPECIFIC COORDINATION ISSUES:**

- (1) If day room is adjoining with adjacent areas without doors, coordinate style of lighting luminaires with adjacent areas.
- (2) Wall-mounted sconces must be ADA compliant.

#### 4.3.12 MULTI-PURPOSE ACTIVITY ROOM

##### DESIGN PARAMETERS:

- (1) Average Maintained Illumination - Ambient: 50 lx (5 FC) at finished floor
- (2) Average Maintained Illumination - Task:
  - Games: 200 lx (20 FC) at 2'-6" AFF
  - Crafts: 500 lx (50 FC) at 2'-6" AFF
  - Kitchenette: 500 lx (50 FC) on surface of counter
- (3) Uniformity Ratio (avg / min):
  - Ambient: 3:1
- (4) Color Temperature (CCT):
  - Fluorescent: 3500 degrees
  - LED: 3500 degrees
  - Compact Fluorescent: 3500 degrees
- (5) Color Rendering (CRI):
  - Fluorescent: minimum of 80
  - LED: minimum of 80
  - Compact Fluorescent: minimum of 80
- (6) Power Source:
  - Normal

##### DESIGN APPROACH:

The multi-purpose activity rooms should include a combination of lighting strategies to perform a variety of tasks. Consider both horizontal and vertical illumination for multi-purpose rooms.

##### RECOMMENDED LUMINAIRES:

- (1) Recessed ceiling-mounted fluorescent or LED lensed luminaire.
- (2) Recessed ceiling-mounted compact fluorescent or LED downlight or wall washer.
- (3) Recessed ceiling-mounted fluorescent or LED cove or perimeter light.

##### CONTROL APPROACH:

- (1) Multi-level switching local controls for fluorescent luminaires, or dimming controls for LED luminaires.
- (2) Refer to the ASHRAE 90.1 – Chapter 9 - Section 9.4.1.1 Interior Lighting Controls – for additional controls.

##### SPECIFIC COORDINATION ISSUES:

- (1) None.

### 4.3.13 DRESSING ROOM

#### DESIGN PARAMETERS:

- (1) Average Maintained Illumination - Ambient: 300 lx (30 FC) at 2'-6" AFF
- (2) Uniformity Ratio (avg / min):
  - Ambient: 3:1
- (3) Color Temperature (CCT):
  - Fluorescent: 3500 degrees
  - LED: 3500 degrees
  - Compact Fluorescent: 3500 degrees
- (4) Color Rendering (CRI):
  - Fluorescent: minimum of 80
  - LED: minimum of 80
  - Compact Fluorescent: minimum of 80
- (5) Power Source:
  - Normal

#### DESIGN APPROACH:

Consider both horizontal and vertical illumination for dressing rooms.

#### RECOMMENDED LUMINAIRES:

- (1) Recessed ceiling-mounted fluorescent or LED lensed luminaire.
- (2) Recessed ceiling-mounted compact fluorescent or LED downlight or wall washer.
- (3) Recessed ceiling-mounted fluorescent or LED cove or perimeter light.

#### CONTROL APPROACH:

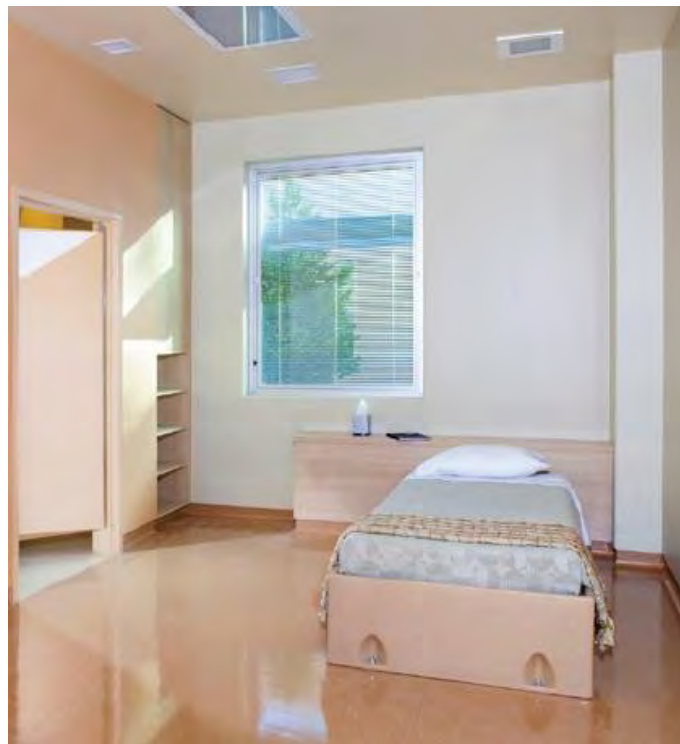
- (1) Multi-level switching local controls for fluorescent luminaires, or dimming controls for LED luminaires.
- (2) Refer to the ASHRAE 90.1 – Chapter 9 - Section 9.4.1.1 Interior Lighting Controls – for additional controls.

#### SPECIFIC COORDINATION ISSUES:

- (1) Mitigate reflections mirrors by considering luminaire position.



## 4.4 MENTAL HEALTH (MH)



### 4.4.1 PATIENT ROOM

#### DESIGN PARAMETERS:

- (1) Average Maintained Illumination - Ambient: 100 lx (10 FC) at finished floor
- (2) Average Maintained Illumination - Task:
  - Reading: 400 lx (40 FC) at head of bed
  - Hand Washing Sink: 500 lx (50 FC) at 2'-6' AFF
  - Examination: 1000 lx (100 FC) on surface of patient bed
  - Night Observation: 100 lx (10 FC) on surface of patient bed
  - Night Light: 2 lx (0.2 FC) at finished floor
- (3) Uniformity Ratio (avg / min):
  - Ambient: 3:1
- (4) Color Temperature (CCT):
  - Fluorescent: 3500 degrees
  - LED: 3500 degrees
  - Compact Fluorescent: 3500 degrees
- (5) Color Rendering (CRI):
  - Fluorescent: minimum of 80
  - LED: minimum of 80
  - Compact Fluorescent: minimum of 80
- (6) Power Source:
  - Normal
  - Critical branch of the EES

#### DESIGN APPROACH:

A combination of general, task, and exam lighting should be provided to reach desired illumination levels. Luminaires should be provided with sufficient shielding to minimize glare during examinations and when the patient bed is reclined. Locations of patient bed, charting area, and hand washing sink should be considered when placing luminaires.

#### RECOMMENDED LUMINAIRES:

- (1) Recessed ceiling-mounted fluorescent or LED lensed patient room luminaire (single or tandem).
- (2) Recessed ceiling-mounted fluorescent or LED exam light.
- (3) Recessed ceiling-mounted compact fluorescent or LED downlight.
- (4) Recessed wall-mounted amber LED night light.

## CHAPTER 4: PATIENT AREAS LIGHTING GUIDELINES

### **CONTROL APPROACH:**

- (1) Multi-level switching or dimming shall be used for general, reading, night observation, and exam lights.
- (2) Lighting controls should be located in the corridor next to the observation window.
- (3) Automatic daylight response by photocontrols for general and night lighting.
- (4) Refer to the ASHRAE 90.1 – Chapter 9 - Section 9.4.1.1 Interior Lighting Controls – for additional controls.

### **SPECIFIC COORDINATION ISSUES:**

- (1) Luminaires must contain lamp breakage within luminaire.
- (2) Avoid using luminaires with surfaces that collect dust and debris.
- (3) In multi-patient rooms, night lights to toilet and corridor should not be blocked by curtains. Control devices must be accessible when curtains are closed.
- (4) Vandal-resistant luminaires shall be used in MH.

#### 4.4.2 PATIENT TOILET

##### DESIGN PARAMETERS:

- (1) Average Maintained Illumination - Ambient: 300 lx (30 FC) at 2'-6" AFF
- (2) Average Maintained Illumination - Task:
  - Shower: 200 lx (20 FC) at finished floor
  - Night Light: 10 lx (1 FC) at finished floor
- (3) Uniformity Ratio (avg / min):
  - n/a
- (4) Color Temperature (CCT):
  - Fluorescent: 3500 degrees
  - LED: 3500 degrees
  - Compact Fluorescent: 3500 degrees
- (5) Color Rendering (CRI):
  - Fluorescent: minimum of 80
  - LED: minimum of 80
  - Compact Fluorescent: minimum of 80
- (6) Power Source:
  - Normal
  - Critical branch of the EES

##### DESIGN APPROACH:

Lighting in the toilet rooms should be located to coordinate with plumbing fixtures, vanities, and wall-mounted equipment. Provide adequate vertical illumination at the vanity.

##### RECOMMENDED LUMINAIRES:

- (1) Recessed ceiling-mounted compact fluorescent or LED downlight.
- (2) Recessed ceiling-mounted compact fluorescent, fluorescent or LED mirror or vanity luminaire.
- (3) Recessed wall-mounted amber LED night light.

##### CONTROL APPROACH:

- (1) Multi-level switching local controls for fluorescent luminaires, or dimming controls for LED luminaires.
- (2) Refer to the ASHRAE 90.1 – Chapter 9 - Section 9.4.1.1 Interior Lighting Controls – for additional controls.
- (3) Automatic daylight response by photocontrols for night lighting.

##### SPECIFIC COORDINATION ISSUES:

- (1) Bariatric care rooms must coordinate luminaire placement with ceiling track and ceiling track supports.
- (2) Vandal-resistant luminaires should be used in MH.

### 4.4.3 CANTEEN

#### DESIGN PARAMETERS:

- (1) Average Maintained Illumination - Ambient:
  - Dining: 200 lx (20 FC) at 3'-0' AFF
  - Kitchen: 200 lx (20 FC) at 2'-6" AFF
- (2) Average Maintained Illumination - Task:
  - Serving Line: 500 lx (50 FC) at food handling surface
  - Food Preparation: 500 lx (50 FC) at food-handling surface
  - Food Storage: 100 lx (10 FC) at 2'-6" AFF
  - Equipment Storage: 200 lx (20 FC) at 2'-6" AFF
- (3) Uniformity Ratio (max / min):
  - Ambient: 3:1 in dining areas
  - Task / Focus: 2:1 at food displays
- (4) Color Temperature (CCT):
  - Fluorescent: 3500 degrees
  - LED: 3500 degrees
  - Compact Fluorescent: 3500 degrees
- (5) Color Rendering (CRI):
  - Fluorescent: minimum of 80
  - LED: minimum of 80
  - Compact Fluorescent: minimum of 80
- (6) Power Source:
  - Normal
  - Life Safety branch of the EES

#### DESIGN APPROACH:

Horizontal and vertical illumination should be considered when illuminating food displays.

#### RECOMMENDED LUMINAIRES:

- (1) Recessed ceiling-mounted fluorescent or LED lensed luminaire.
- (2) Recessed ceiling-mounted compact fluorescent or LED downlight or wall washer.
- (3) Recessed ceiling-mounted fluorescent or LED cove or perimeter light.

## CHAPTER 4: PATIENT AREAS LIGHTING GUIDELINES

### **CONTROL APPROACH:**

- (1) Multi-level switching local controls for fluorescent luminaires, or dimming controls for LED luminaires.
- (2) Refer to the ASHRAE 90.1 – Chapter 9 - Section 9.4.1.1 Interior Lighting Controls – for additional controls.

### **SPECIFIC COORDINATION ISSUES:**

- (1) Vandal-resistant luminaires shall be used in MH.

### 4.4.4 DAY ROOM

#### DESIGN PARAMETERS:

- (1) Average Maintained Illumination - Ambient: 50 lx (5 FC) at finished floor
- (2) Average Maintained Illumination - Task:
  - Games: 200 lx (20 FC) at 2'-6" AFF
  - Crafts: 500 lx (50 FC) at 2'-6" AFF
- (3) Uniformity Ratio (max / min):
  - Ambient: 3:1
- (4) Color Temperature (CCT):
  - Fluorescent: 3500 degrees
  - LED: 3500 degrees
  - Compact Fluorescent: 3500 degrees
- (5) Color Rendering (CRI):
  - Fluorescent: minimum of 80
  - LED: minimum of 80
  - Compact Fluorescent: minimum of 80
- (6) Power Source:
  - Normal

#### DESIGN APPROACH:

The day rooms should include a combination of lighting strategies to perform a variety of tasks. Consider both horizontal and vertical illumination for day rooms.

#### RECOMMENDED LUMINAIRES:

- (1) Recessed ceiling-mounted fluorescent or LED lensed luminaire.
- (2) Recessed ceiling-mounted compact fluorescent or LED downlight or wall washer.
- (3) Recessed ceiling-mounted fluorescent or LED cove or perimeter light.

#### CONTROL APPROACH:

- (1) Multi-level switching local controls for fluorescent luminaires, or dimming controls for LED luminaires.
- (2) Refer to the ASHRAE 90.1 – Chapter 9 - Section 9.4.1.1 Interior Lighting Controls – for additional controls.

#### SPECIFIC COORDINATION ISSUES:

- (1) Vandal-resistant luminaires should be used in MH.

#### 4.4.5 GROUP THERAPY ROOM

##### DESIGN PARAMETERS:

- (1) Average Maintained Illumination - Ambient: 300 lx (30 FC) at 2'-6" AFF
- (2) Uniformity Ratio (avg / min):
  - Ambient: 3:1
- (3) Color Temperature (CCT):
  - Fluorescent: 3500 degrees
  - LED: 3500 degrees
  - Compact Fluorescent: 3500 degrees
- (4) Color Rendering (CRI):
  - Fluorescent: minimum of 80
  - LED: minimum of 80
  - Compact Fluorescent: minimum of 80
- (5) Power Source:
  - Normal

##### DESIGN APPROACH:

Consider both horizontal and vertical illumination for group rooms.

##### RECOMMENDED LUMINAIRES:

- (1) Recessed ceiling-mounted fluorescent or LED lensed luminaire.
- (2) Recessed ceiling-mounted compact fluorescent or LED downlight or wall washer.

##### CONTROL APPROACH:

- (1) Multi-level switching local controls for fluorescent luminaires, or dimming controls for LED luminaires.
- (2) Refer to the ASHRAE 90.1 – Chapter 9 - Section 9.4.1.1 Interior Lighting Controls – for additional controls.

##### SPECIFIC COORDINATION ISSUES:

- (1) Vandal-resistant luminaires should be used in MH.



### 4.4.6 NURSE STATION

#### DESIGN PARAMETERS:

- (1) Average Maintained Illumination - Ambient:
  - General: 300 lx (30 FC) at finished floor
- (2) Average Maintained Illumination - Task:
  - Desk Surface: 500 lx (50 FC)
- (3) Uniformity Ratio (avg / min):
  - Ambient: 3:1
- (4) Color Temperature (CCT):
  - Fluorescent: 3500 degrees
  - LED: 3500 degrees
  - Compact Fluorescent: 3500 degrees
- (5) Color Rendering (CRI):
  - Fluorescent: minimum of 80
  - LED: minimum of 80
  - Compact Fluorescent: minimum of 80
- (6) Power Source:
  - Normal
  - Critical branch of the EES

#### DESIGN APPROACH:

The nurse station lighting will include a combination of ambient and task lighting strategies to allow for wayfinding, charting and note taking, filing, and computer work. Illumination levels should be uniform throughout the nurse station.

#### RECOMMENDED LUMINAIRES:

- (1) Recessed ceiling-mounted fluorescent or LED lensed luminaire.
- (2) Recessed ceiling-mounted compact fluorescent or LED downlight or wall washer.
- (3) Recessed ceiling-mounted fluorescent or LED cove or perimeter light.
- (4) Surface-mounted fluorescent or LED under cabinet task light (if not provided with pre-fabricated furniture system).

## CHAPTER 4: PATIENT AREAS LIGHTING GUIDELINES

### **CONTROL APPROACH:**

- (1) Multi-level switching local controls for fluorescent luminaires, or dimming controls for LED luminaires.
- (2) Refer to the ASHRAE 90.1 – Chapter 9 - Section 9.4.1.1 Interior Lighting Controls – for additional controls.
- (3) Under-cabinet task lights shall be controlled with integral switches.

### **SPECIFIC COORDINATION ISSUES:**

- (1) None.

#### 4.4.7 EXAMINATION AND TREATMENT ROOM

##### DESIGN PARAMETERS:

- (1) Average Maintained Illumination - Ambient: 500lx (50FC) at 2'-6" AFF
- (2) Average Maintained Illumination - Task:
  - Exam: 1000 lx (100 FC) on surface of exam table
  - Charting: 500 lx (50 FC) on surface of desk
- (3) Uniformity Ratio (avg / min):
  - Ambient: 3:1
- (4) Color Temperature (CCT):
  - Fluorescent: 3500 degrees
  - LED: 3500 degrees
- (5) Color Rendering (CRI):
  - Fluorescent: minimum of 80
  - LED: minimum of 80
- (6) Power Source:
  - Normal
  - Critical branch of the EES

##### DESIGN APPROACH:

A combination of ambient, exam, and task illumination should be provided to reach desired illumination levels. Both horizontal and vertical illumination is important for caregiver performance and patient comfort. Luminaires should be visually comfortable with appropriate shielding to minimize glare during examinations when the patient is in a reclining position. Color rendering and temperature are particularly important. Lighting should have dimming capabilities so light levels can be lowered to calm patients who may be agitated.

##### RECOMMENDED LUMINAIRES:

- (1) Recessed ceiling-mounted fluorescent or LED lensed luminaire.
- (2) Surface-mounted fluorescent or LED under-cabinet task light luminaire (if not provided with pre-fabricated furniture system).

##### CONTROL APPROACH:

- (1) Multi-level switching local controls for fluorescent luminaires, or dimming controls for LED luminaires.
- (2) Refer to the ASHRAE 90.1 – Chapter 9 - Section 9.4.1.1 Interior Lighting Controls – for additional controls.
- (3) Under-cabinet task lights shall be controlled with integral switches.
- (4) Provide separate controls for areas enclosed by curtains.

## CHAPTER 4: PATIENT AREAS LIGHTING GUIDELINES

### **SPECIFIC COORDINATION ISSUES:**

- (1) Rooms may require supplemental medical procedure lights. Coordinate placement with casework and equipment layouts. Ensure room luminaires match the CCT and CRI of supplemental medical lights.
- (2) Isolation and infection control examination and treatment rooms' luminaires shall be specified as enclosed and sealed, UL listed for wet locations and have the ability to be wiped down with corrosive cleaners.
- (3) Consider luminaire placement and shielding to mitigate glare and veiling reflections.

#### 4.4.8 RESIDENTIAL REHABILITATION TREATMENT PROGRAM - PATIENT ROOM

##### DESIGN PARAMETERS:

- (1) Average Maintained Illumination - Ambient: 50 lx (5 FC) at finished floor
- (2) Average Maintained Illumination - Task:
  - Reading: 400 lx (40 FC) at 2'-6" AFF
  - Night Light: 2 lx (0.2 FC) at finished floor
- (3) Uniformity Ratio (avg / min):
  - Ambient: 3:1
- (4) Color Temperature (CCT):
  - Fluorescent: 3500 degrees
  - LED: 3500 degrees
  - Compact Fluorescent: 3500 degrees
- (5) Color Rendering (CRI):
  - Fluorescent: minimum of 80
  - LED: minimum of 80
  - Compact Fluorescent: minimum of 80
- (6) Power Source:
  - Normal
  - Critical branch of the EES

##### DESIGN APPROACH:

A combination of general and task lighting should be provided to reach desired illumination levels. Luminaires should be provided with sufficient shielding to minimize glare during examinations and when the patient bed is reclined. Locations of patient bed and furniture should be considered when placing luminaires. Table and floor lamps are recommended to enhance the residential feeling of the room.

##### RECOMMENDED LUMINAIRES:

- (1) Recessed ceiling-mounted compact fluorescent or LED downlight.
- (2) Stand-mounted compact fluorescent or LED table or floor lamp.
- (3) Amber LED night light.

##### CONTROL APPROACH:

- (1) Multi-level switching local controls for fluorescent luminaires, or dimming controls for LED luminaires
- (2) Refer to the ASHRAE 90.1 – Chapter 9 - Section 9.4.1.1 Interior Lighting Controls – for additional controls.
- (3) Table and floor lights shall be controlled with integral switches.
- (4) Automatic daylight response by photocontrols for night lighting.

##### SPECIFIC COORDINATION ISSUES:

- (1) Luminaires must contain lamp breakage within luminaire.

#### **4.4.9 RESIDENTIAL REHABILITATION TREATMENT PROGRAM - TOILET/SHOWER**

##### **DESIGN PARAMETERS:**

- (1) Average Maintained Illumination - Ambient: 300 lx (30 FC) at 2'-6" AFF
- (2) Average Maintained Illumination - Task:
  - Shower: 200 lx (20 FC) at finished floor
  - Night Light: 10 lx (1 FC) at finished floor
- (3) Uniformity Ratio (avg / min):
  - n/a
- (4) Color Temperature (CCT):
  - Fluorescent: 3500 degrees
  - LED: 3500 degrees
  - Compact Fluorescent: 3500 degrees
- (5) Color Rendering (CRI):
  - Fluorescent: minimum of 80
  - LED: minimum of 80
  - Compact Fluorescent: minimum of 80
- (6) Power Source:
  - Normal
  - Critical branch of the EES

##### **DESIGN APPROACH:**

Provide adequate vertical illumination at the vanity.

##### **RECOMMENDED LUMINAIRES:**

- (1) Recessed ceiling-mounted compact fluorescent or LED downlight.
- (2) Wall-mounted compact fluorescent, fluorescent or LED mirror or vanity luminaire.
- (3) Recessed wall-mounted amber LED night light.

##### **CONTROL APPROACH:**

- (1) Multi-level switching local controls for fluorescent luminaires, or dimming controls for LED luminaires.
- (2) Refer to the ASHRAE 90.1 – Chapter 9 - Section 9.4.1.1 Interior Lighting Controls – for additional controls.
- (3) Automatic daylight response by photocontrols for night lighting.

##### **SPECIFIC COORDINATION ISSUES:**

- (1) Luminaires mounted over a shower or vanity should have a rating of IP44 or greater.
- (2) Lighting in the toilet rooms should be located to coordinate with plumbing fixtures, vanities, and wall-mounted equipment.

**4.4.10 RESIDENTIAL REHABILITATION TREATMENT PROGRAM - LIVING AREA, DINING AREA, AND KITCHENETTE**

**DESIGN PARAMETERS:**

- (1) Average Maintained Illumination - Ambient: 50 lx (5 FC) at finished floor
- (2) Average Maintained Illumination - Task:
  - Food Prep: 500 lx (50 FC) on surface of counter
  - Eating: 200 lx (20 FC) at 2'-6' AFF
  - General Activity: 400 lx (40 FC) at 2'-6" AFF
- (3) Uniformity Ratio (avg / min):
  - Ambient: 3:1
- (4) Color Temperature (CCT):
  - Fluorescent: 3500 degrees
  - LED: 3500 degrees
  - Compact Fluorescent: 3500 degrees
- (5) Color Rendering (CRI):
  - Fluorescent: minimum of 80
  - LED: minimum of 80
  - Compact Fluorescent: minimum of 80
- (6) Power Source:
  - Normal

**DESIGN APPROACH:**

A combination of general and task lighting should be provided to reach desired illumination levels. Lighting should have a residential appearance.

**RECOMMENDED LUMINAIRES:**

- (1) Recessed ceiling-mounted compact fluorescent or LED downlight.
- (2) Surface-mounted fluorescent or LED under-cabinet task light (if not provided with pre-fabricated furniture system)

**CONTROL APPROACH:**

- (1) Multi-level switching local controls for fluorescent luminaires, or dimming controls for LED luminaires.
- (2) Refer to the ASHRAE 90.1 – Chapter 9 - Section 9.4.1.1 Interior Lighting Controls – for additional controls.
- (3) Under-cabinet task lights shall be controlled with integral switches.

**SPECIFIC COORDINATION ISSUES:**

- (1) Locations of furniture should be considered when placing luminaires.

#### 4.4.11 RESIDENTIAL REHABILITATION TREATMENT PROGRAM - GROUP THERAPY ROOM

##### DESIGN PARAMETERS:

- (1) Average Maintained Illumination - Ambient: 300 lx (30 FC) at 2'-6" AFF
- (2) Average Maintained Illumination - Task:
  - A/V Presentation: 30 lx (3 FC) at 2'-6" AFF
  - General Activity: 500 lx (50 FC) at 2'-6" AFF
- (3) Uniformity Ratio (avg / min):
  - Ambient: 3:1
- (4) Color Temperature (CCT):
  - Fluorescent: 3500 degrees
  - LED: 3500 degrees
  - Compact Fluorescent: 3500 degrees
- (5) Color Rendering (CRI):
  - Fluorescent: minimum of 80
  - LED: minimum of 80
  - Compact Fluorescent: minimum of 80
- (6) Power Source:
  - Normal
  - Life Safety branch of the EES

##### DESIGN APPROACH:

Consider both horizontal and vertical illumination for group rooms. Lighting should be flexible for a variety of tasks including group therapy sessions, educational classes, and A/V presentations.

##### RECOMMENDED LUMINAIRES:

- (1) Recessed ceiling-mounted fluorescent or LED lensed luminaire.
- (2) Recessed ceiling-mounted compact fluorescent or LED downlight or wall washer.
- (3) Surface-mounted fluorescent or LED under-cabinet task light luminaire.

##### CONTROL APPROACH:

- (1) Multi-level switching local controls for fluorescent luminaires, or dimming controls for LED luminaires.
- (2) Refer to the ASHRAE 90.1 – Chapter 9 - Section 9.4.1.1 Interior Lighting Controls – for additional controls.
- (3) Under-cabinet task lights shall be controlled with integral switches.



## CHAPTER 4: PATIENT AREAS LIGHTING GUIDELINES

### **SPECIFIC COORDINATION ISSUES:**

- (1) Consider luminaire placement and shielding to mitigate glare and veiling reflections especially at presentation screen.

## 5. PUBLIC AREAS



### 5.1 MAIN LOBBY

#### DESIGN PARAMETERS:

- (1) Average Maintained Illumination - Ambient:
  - General: 400 lx (40 FC) at finished floor
- (2) Uniformity Ratio (avg / min):
  - Ambient: 4:1
- (3) Color Temperature (CCT):
  - Fluorescent: 3500 degrees
  - LED: 3500 degrees
  - Compact Fluorescent: 3500 degrees
- (4) Color Rendering (CRI):
  - Fluorescent: minimum of 80
  - LED: minimum of 80
  - Compact Fluorescent: minimum of 80
- (5) Power Source:
  - Normal
  - Life Safety branch of the EES

#### DESIGN APPROACH:

Lighting in the main lobby should be aesthetically pleasing, and enhance the architectural features of the space. Lighting should reinforce wayfinding for patients and visitors through the use of brightness and contrast, with emphasis placed on signage and reception desk. Decorative luminaires, such as pendants and sconces, may be utilized for visual interest.

#### RECOMMENDED LUMINAIRES:

- (1) Recessed ceiling-mounted compact fluorescent or LED downlight or wall washer.
- (2) Recessed ceiling-mounted fluorescent or LED lensed luminaire.
- (3) Recessed ceiling-mounted fluorescent or LED cove or perimeter light.
- (4) Decorative compact fluorescent, fluorescent or LED wall-mounted sconce or ceiling-mounted pendant.

#### CONTROL APPROACH:

- (1) Multi-level switching local controls for fluorescent luminaires, or dimming controls for LED luminaires.
- (2) Refer to the ASHRAE 90.1 – Chapter 9 - Section 9.4.1.1 Interior Lighting Controls – for additional controls.

## CHAPTER 5: PUBLIC AREAS LIGHTING GUIDELINES

### **SPECIFIC COORDINATION ISSUES:**

- (1) Wall-mounted sconces must be ADA compliant.
- (2) Luminaire maintenance requirements should be considered when locating luminaires in high ceilings.
- (3) Local controls shall only be accessible to staff.

## 5.2 ELEVATOR LOBBY

### DESIGN PARAMETERS:

- (1) Average Maintained Illumination - Ambient:
  - General: 200 lx (20 FC) at finished floor
- (2) Uniformity Ratio (avg / min):
  - Ambient: 4:1
- (3) Color Temperature (CCT):
  - Fluorescent: 3500 degrees
  - LED: 3500 degrees
  - Compact Fluorescent: 3500 degrees
- (4) Color Rendering (CRI):
  - Fluorescent: minimum of 80
  - LED: minimum of 80
  - Compact Fluorescent: minimum of 80
- (5) Power Source:
  - Normal
  - Life Safety branch of the EES

### DESIGN APPROACH:

The elevator lobby should have a higher illumination level than surrounding corridors to support wayfinding for patients and visitors. Decorative luminaires may be added for visual interest.

### RECOMMENDED LUMINAIRES:

- (1) Recessed ceiling-mounted fluorescent or LED lensed luminaire.
- (2) Recessed ceiling-mounted compact fluorescent or LED downlight or wall washer.
- (3) Recessed ceiling-mounted fluorescent or LED cove or perimeter light.
- (4) Decorative compact fluorescent, fluorescent or LED wall-mounted sconce or ceiling-mounted pendant.

### CONTROL APPROACH:

- (1) Multi-level switching local controls for fluorescent luminaires, or dimming controls for LED luminaires.
- (2) Refer to the ASHRAE 90.1 – Chapter 9 - Section 9.4.1.1 Interior Lighting Controls – for additional controls.

## CHAPTER 5: PUBLIC AREAS LIGHTING GUIDELINES

### **SPECIFIC COORDINATION ISSUES:**

- (1) Coordinate luminaires in elevator lobbies with adjacent corridors.
- (2) Sconces must be ADA compliant.
- (3) Local controls shall only be accessible to staff.

### 5.3 WAITING AREA

#### DESIGN PARAMETERS:

- (1) Average Maintained Illumination - Ambient:
  - General: 200 lx (20 FC) at finished floor
- (2) Average Maintained Illumination - Task:
  - Sitting Area: 500 lx (50 FC) at 2'-6" AFF
- (3) Uniformity Ratio (avg / min):
  - Ambient: 4:1
- (4) Color Temperature (CCT):
  - Fluorescent: 3500 degrees
  - LED: 3500 degrees
  - Compact Fluorescent: 3500 degrees
- (5) Color Rendering (CRI):
  - Fluorescent: minimum of 80
  - LED: minimum of 80
  - Compact Fluorescent: minimum of 80
- (6) Power Source:
  - Normal

#### DESIGN APPROACH:

Lighting in the waiting area should have a combination of general and task lighting. Consider vertical illumination for facial recognition and conversation. Decorative luminaires such as sconces or pendants may be added for visual interest.

#### RECOMMENDED LUMINAIRES:

- (1) Recessed ceiling-mounted fluorescent or LED lensed light luminaire.
- (2) Recessed ceiling-mounted compact fluorescent or LED downlight or wall washer.
- (3) Recessed ceiling-mounted fluorescent or LED cove or perimeter light.
- (4) Decorative compact fluorescent, fluorescent or LED wall-mounted sconce or ceiling-mounted pendant.

#### CONTROL APPROACH:

- (1) Multi-level switching local controls for fluorescent luminaires, or dimming controls for LED luminaires.
- (2) Refer to the ASHRAE 90.1 – Chapter 9 - Section 9.4.1.1 Interior Lighting Controls – for additional controls.

## CHAPTER 5: PUBLIC AREAS LIGHTING GUIDELINES

### **SPECIFIC COORDINATION ISSUES:**

- (1) Coordinate luminaires in open waiting areas with adjacent spaces.
- (2) Sconces must be ADA compliant.
- (3) Local controls shall only be accessible to staff.



## 5.4 PRIMARY CORRIDORS

### DESIGN PARAMETERS:

- (1) Average Maintained Illumination - Ambient: 100-150 lx (10-15 FC) at finished floor
- (2) Uniformity Ratio (avg / min):
  - Ambient: 4:1 general
- (3) Color Temperature (CCT):
  - Fluorescent: 3500 degrees
  - LED: 3500 degrees
  - Compact Fluorescent: 3500 degrees
- (4) Color Rendering (CRI):
  - Fluorescent: minimum of 80
  - LED: minimum of 80
  - Compact Fluorescent: minimum of 80
- (5) Power Source:
  - Normal
  - Life Safety branch of the EES

### DESIGN APPROACH:

Primary circulation lighting should be consistent throughout each facility. Lighting in corridors should be coordinated with adjacent spaces for a cohesive appearance. Vertical illumination should be considered, especially with regard to signage and artwork displays. Decorative sconces may be used to add visual interest.

### RECOMMENDED LUMINAIRES:

- (1) Recessed ceiling-mounted fluorescent or LED lensed luminaire.
- (2) Recessed ceiling-mounted compact fluorescent or LED downlight or wall washer.
- (3) Recessed ceiling-mounted fluorescent or LED cove or perimeter light.
- (4) Decorative compact fluorescent, fluorescent or LED wall-mounted sconce.

### CONTROL APPROACH:

- (1) Multi-level switching local controls for fluorescent luminaires, or dimming controls for LED luminaires.
- (2) Refer to the ASHRAE 90.1 – Chapter 9 - Section 9.4.1.1 Interior Lighting Controls – for additional controls.
- (3) Refer to NFPA 101 for egress lighting control requirements.

### SPECIFIC COORDINATION ISSUES:

- (1) Sconces must be ADA compliant
- (2) Local controls shall only be accessible to staff.

## 5.5 SECONDARY CORRIDORS

### DESIGN PARAMETERS:

- (1) Average Maintained Illumination - Ambient: 50-100 lx (5-10 FC) at finished floor
- (2) Uniformity Ratio (avg / min):
  - Ambient: 4:1
- (3) Color Temperature (CCT):
  - Fluorescent: 3500 degrees
  - LED: 3500 degrees
  - Compact Fluorescent: 3500 degrees
- (4) Color Rendering (CRI):
  - Fluorescent: minimum of 80
  - LED: minimum of 80
  - Compact Fluorescent: minimum of 80
- (5) Power Source:
  - Normal
  - Life Safety branch of the EES.

### DESIGN APPROACH:

Secondary circulation lighting should be consistent throughout each facility. Lighting in corridors should be coordinated with adjacent spaces for a cohesive appearance. Vertical illumination should be considered with respect to signage and wayfinding.

### RECOMMENDED LUMINAIRES:

- (1) Recessed ceiling-mounted fluorescent or LED lensed light luminaire.
- (2) Recessed ceiling-mounted compact fluorescent or LED downlight or wall washer.
- (3) Recessed ceiling-mounted fluorescent or LED cove or perimeter light.
- (4) Decorative compact fluorescent, fluorescent or LED wall-mounted sconce.

### CONTROL APPROACH:

- (1) Multi-level switching controls for fluorescent luminaires, or dimming controls for LED luminaires.
- (2) Refer to the ASHRAE 90.1 – Chapter 9 - Section 9.4.1.1 Interior Lighting Controls – for additional controls.
- (3) Refer to NFPA 101 for egress lighting control requirements.

### SPECIFIC COORDINATION ISSUES:

- (1) Sconces must be ADA compliant
- (2) Local controls shall only be accessible to staff.

## 5.6 CANTEEN

### DESIGN PARAMETERS:

- (1) Average Maintained Illumination - Ambient:
  - Dining: 300 lx (30 FC) at 2'-6" AFF
  - Food Storage: 100 lx (10 FC) at 2'-6" AFF
  - Equipment Storage: 200 lx (20 FC) at 2'-6" AFF
- (2) Average Maintained Illumination - Task:
  - Serving Line: 500 lx (50 FC) at food handling surface
  - Kitchen: 200 lx (20 FC) at 2'-6" AFF
  - Food Preparation: 500 lx (50 FC) on surface of countertop
- (3) Uniformity Ratio (avg / min):
  - Ambient: 3:1 in dining areas
- (4) Color Temperature (CCT):
  - Fluorescent: 3500 degrees
  - LED: 3500 degrees
  - Compact Fluorescent: 3500 degrees
- (5) Color Rendering (CRI):
  - Fluorescent: minimum of 80
  - LED: minimum of 80
  - Compact Fluorescent: minimum of 80
- (6) Power Source:
  - Normal
  - Life Safety branch of the EES

### DESIGN APPROACH:

Horizontal and vertical illumination should be considered when illuminating food displays and food storage. Decorative sconces or pendants may be used to add visual interest. Heat lamps may be required to keep food warm.

### RECOMMENDED LUMINAIRES:

- (1) Recessed ceiling-mounted fluorescent or LED lensed luminaire.
- (2) Recessed ceiling-mounted compact fluorescent or LED downlight or wall washer.
- (3) Recessed ceiling-mounted fluorescent or LED cove or perimeter light.
- (4) Decorative compact fluorescent, fluorescent or LED wall-mounted sconce or ceiling-mounted pendant.
- (5) Heat lamps.

## CHAPTER 5: PUBLIC AREAS LIGHTING GUIDELINES

### **CONTROL APPROACH:**

- (1) Multi-level switching local controls for fluorescent luminaires, or dimming controls for LED luminaires.
- (2) Refer to the ASHRAE 90.1 – Chapter 9 - Section 9.4.1.1 Interior Lighting Controls – for additional controls.

### **SPECIFIC COORDINATION ISSUES:**

- (1) Coordinate heat lamps with food serving and display areas.
- (2) Sconces must be ADA compliant.
- (3) To avoid food contamination from violent lamp failure, lamps must be fully enclosed in luminaire
- (4) Local controls shall only be accessible to staff.

## 5.7 BARBER SHOP

### DESIGN PARAMETERS:

- (1) Average Maintained Illumination - Ambient: 200 lx (20 FC) at finished floor
- (2) Average Maintained Illumination - Task:
  - Barber Chair: 500 lx (50 FC) at 4'-0" AFF
- (3) Uniformity Ratio (avg / min):
  - Ambient: 3:1
- (4) Color Temperature (CCT):
  - Fluorescent: 3500 degrees
  - LED: 3500 degrees
  - Compact Fluorescent: 3500 degrees
- (5) Color Rendering (CRI):
  - Fluorescent: minimum of 80
  - LED: minimum of 80
  - Compact Fluorescent: minimum of 80
- (6) Power Source:
  - Normal

### DESIGN APPROACH:

Horizontal and vertical illumination should be considered at barber chair locations. Mirror or vanity lighting should be considered at barber stations. Luminaires should be visually comfortable with appropriate optics to minimize glare when the patient is in a reclining position at hair washing sinks.

### RECOMMENDED LUMINAIRES:

- (1) Recessed ceiling-mounted fluorescent or LED lensed luminaire.
- (2) Recessed ceiling-mounted compact fluorescent or LED downlight.
- (3) Wall-mounted compact fluorescent, fluorescent or LED mirror or vanity luminaire.

### CONTROL APPROACH:

- (1) Multi-level switching local controls for fluorescent luminaires, or dimming controls for LED luminaires.
- (2) Refer to the ASHRAE 90.1 – Chapter 9 - Section 9.4.1.1 Interior Lighting Controls – for additional controls.

### SPECIFIC COORDINATION ISSUES:

- (1) Coordinate luminaire layout with equipment and vanities.

## 5.8 RECEPTION

### DESIGN PARAMETERS:

- (1) Average Maintained Illumination - Ambient: 300 lx (30 FC) at 2'-6" AFF
- (2) Uniformity Ratio (avg / min):
  - Ambient: 4:1
- (3) Color Temperature (CCT):
  - Fluorescent: 3500 degrees
  - LED: 3500 degrees
  - Compact Fluorescent: 3500 degrees
- (4) Color Rendering (CRI):
  - Fluorescent: minimum of 80
  - LED: minimum of 80
  - Compact Fluorescent: minimum of 80
- (5) Power Source:
  - Normal

### DESIGN APPROACH:

Vertical illumination should be considered to illuminate the reception desk or wall behind the reception desk. Decorative sconces or pendants may be used to add visual interest.

### RECOMMENDED LUMINAIRES:

- (1) Recessed ceiling-mounted fluorescent or LED lensed luminaire.
- (2) Recessed ceiling-mounted compact fluorescent or LED downlight or wall washer.
- (3) Recessed ceiling-mounted fluorescent or LED cove or perimeter light.
- (4) Decorative compact fluorescent, fluorescent or LED wall-mounted sconce or ceiling-mounted pendant.

### CONTROL APPROACH:

- (1) Multi-level switching local controls for fluorescent luminaires, or dimming controls for LED luminaires.
- (2) Refer to the ASHRAE 90.1 – Chapter 9 - Section 9.4.1.1 Interior Lighting Controls – for additional controls.

## CHAPTER 5: PUBLIC AREAS LIGHTING GUIDELINES

### **SPECIFIC COORDINATION ISSUES:**

- (1) If decorative pendants are used, ensure the mounting height does not interfere with the line-of-sight for receptionist.
- (2) Coordinate light luminaires at reception with adjacent areas.
- (3) Sconces must be ADA compliant
- (4) Local controls shall only be accessible to staff.

## 5.9 PUBLIC TOILET

### DESIGN PARAMETERS:

- (1) Average Maintained Illumination - Ambient: 200 lx (20 FC) at finished floor
- (2) Average Maintained Illumination - Task:
  - Vanity: 300 lx (30 FC) at vanity surface
- (3) Uniformity Ratio (avg / min):
  - Ambient: 2:1
- (4) Color Temperature (CCT):
  - Fluorescent: 3500 degrees
  - LED: 3500 degrees
  - Compact Fluorescent: 3500 degrees
- (5) Color Rendering (CRI):
  - Fluorescent: minimum of 80
  - LED: minimum of 80
  - Compact Fluorescent: minimum of 80
- (6) Power Source:
  - Normal
  - Critical branch of the EES

### DESIGN APPROACH:

Vertical illumination should be considered at hand washing sinks and mirrors. Decorative sconces may be used at sink areas.

### RECOMMENDED LUMINAIRES:

- (1) Recessed ceiling-mounted fluorescent or LED lensed luminaire.
- (2) Recessed ceiling-mounted compact fluorescent or LED downlight or wall washer.
- (3) Recessed ceiling-mounted fluorescent or LED cove or perimeter light.
- (4) Wall-mounted compact fluorescent, fluorescent or LED mirror or vanity luminaire.
- (5) Decorative compact fluorescent, fluorescent or LED wall-mounted sconce.

### CONTROL APPROACH:

- (1) Occupancy sensors.
- (2) Refer to the ASHRAE 90.1 – Chapter 9 - Section 9.4.1.1 Interior Lighting Controls – for additional controls.



**SPECIFIC COORDINATION ISSUES:**

- (1) Coordinate lighting with toilet stall partitions, and ensure that all stalls are properly illuminated.
- (2) Sconces must be ADA compliant.

## 5.10 VETERANS CANTEEN SERVICE AND GIFT STORE

### DESIGN PARAMETERS:

- (1) Average Maintained Illumination - Ambient:
  - General: 500 lx (50 FC) at 2'-6" AFF
  - Circulation: 200 lx (20 FC) at 2'-6" AFF
  - Storage: 200 lx (20 FC) at 2'-6" AFF
- (2) Average Maintained Illumination - Task:
  - Display: 1000 lx (100 FC) at merchandise display case
  - Cashier: 500 lx (50 FC) at 2'-6" AFF
- (3) Uniformity Ratio (avg / min):
  - Ambient: 2:1
- (4) Color Temperature (CCT):
  - Fluorescent: 3500 degrees
  - LED: 3500 degrees
  - Compact Fluorescent: 3500 degrees
- (5) Color Rendering (CRI):
  - Fluorescent: minimum of 80
  - LED: minimum of 80
  - Compact Fluorescent: minimum of 80
- (6) Power Source:
  - Normal
  - Life Safety branch of the EES

### DESIGN APPROACH:

Horizontal and vertical illumination should be considered when illuminating retail displays. Decorative sconces or pendants may be used to add visual interest. Accent lighting should be used to highlight merchandise displays.

### RECOMMENDED LUMINAIRES:

- (1) Recessed ceiling-mounted fluorescent or LED lensed luminaire.
- (2) Recessed ceiling-mounted compact fluorescent or LED downlight or wall washer.
- (3) Recessed ceiling-mounted fluorescent or LED cove or perimeter light.
- (4) Track mounted LED accent or flood light.

### CONTROL APPROACH:

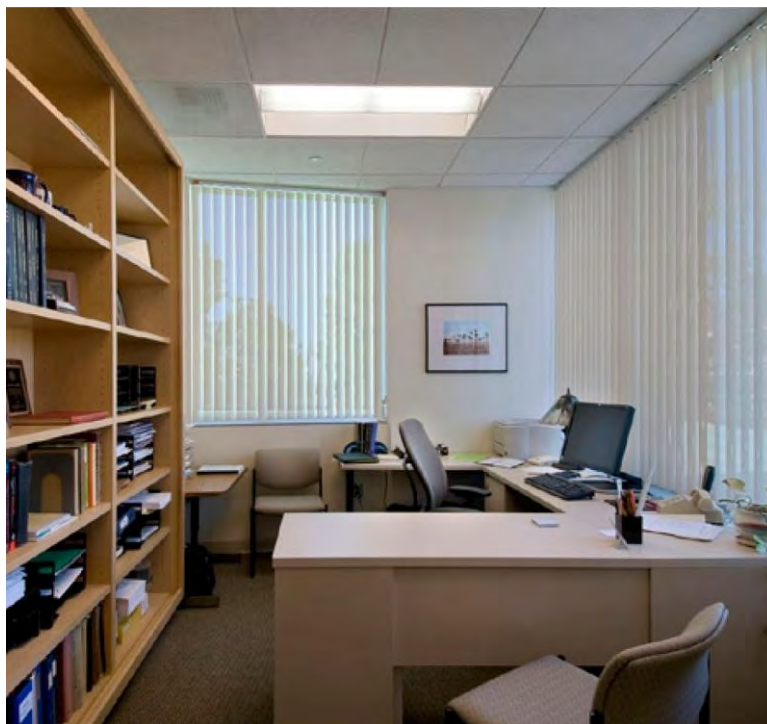
- (1) Multi-level switching local controls for fluorescent luminaires, or dimming controls for LED luminaires.
- (2) Refer to the ASHRAE 90.1 – Chapter 9 - Section 9.4.1.1 Interior Lighting Controls – for additional controls.

## CHAPTER 5: PUBLIC AREAS LIGHTING GUIDELINES

### **SPECIFIC COORDINATION ISSUES:**

- (1) Coordinate general and accent lights with merchandise displays
- (2) Local controls shall only be accessible to staff.

## 6. ADMINISTRATIVE AREAS



## CHAPTER 6: ADMINISTRATIVE AREAS LIGHTING GUIDELINES

### 6.1 OFFICE

#### DESIGN PARAMETERS:

- (1) Average Maintained Illumination - Ambient: 300 lx (30 FC) at 3'-0" AFF
- (2) Average Maintained Illumination - Task:
  - Reading: 500 lx (50 FC) at desktop or countertop
- (3) Uniformity Ratio (avg / min):
  - Ambient: 2:1
- (4) Color Temperature (CCT):
  - Fluorescent: 3500 degrees
  - LED: 3500 degrees
  - Compact Fluorescent: 3500 degrees
- (5) Color Rendering (CRI):
  - Fluorescent: minimum of 80
  - LED: minimum of 80
  - Compact Fluorescent: minimum of 80
- (6) Power Source:
  - Normal

#### DESIGN APPROACH:

Lighting in the office spaces should be a combination of indirect general lighting and direct lighting on the task surface. Task lighting should be provided at each workstation.

#### RECOMMENDED LUMINAIRES:

- (1) Recessed ceiling-mounted fluorescent or LED lensed luminaire.
- (2) Linear suspended fluorescent or LED indirect/direct luminaire.
- (3) Linear wall-mounted fluorescent or LED indirect/direct luminaire.
- (4) Surface-mounted fluorescent or LED under-cabinet task light (if not provided with pre-fabricated furniture system).

#### CONTROL APPROACH:

- (1) Multi-level switching local controls for fluorescent luminaires, dimming controls for LED luminaires, or vacancy sensors.
- (2) Under-cabinet task lights and desk lights shall be controlled with integral switches.
- (3) Refer to the ASHRAE 90.1 – Chapter 9 - Section 9.4.1.1 Interior Lighting Controls – for additional controls.

## CHAPTER 6: ADMINISTRATIVE AREAS LIGHTING GUIDELINES

### **SPECIFIC COORDINATION ISSUES:**

- (1) In open office areas, coordinate location of occupancy sensors in ceiling with space plan.
- (2) Consider luminaire placement and optics to mitigate glare and veiling reflections.

## 6.2 CONFERENCE ROOM/CLASSROOM

### DESIGN PARAMETERS:

- (1) Average Maintained Illumination - Ambient:
  - Conference Room: 300 lx (30 FC) at 2'-6" AFF
  - Classroom: 500 lx (50 FC) at 2'-6" AFF
- (2) Average Maintained Illumination - Task:
  - Reading: 500 lx (50 FC) at 2'-6" AFF
- (3) Uniformity Ratio (avg / min):
  - Ambient: 3:1
- (4) Color Temperature (CCT):
  - Fluorescent: 3500 degrees
  - LED: 3500 degrees
  - Compact Fluorescent: 3500 degrees
- (5) Color Rendering (CRI):
  - Fluorescent: minimum of 80
  - LED: minimum of 80
  - Compact Fluorescent: minimum of 80
- (6) Power Source:
  - Normal

### DESIGN APPROACH:

Conference rooms should be provided with dimmable lighting luminaires for a variety of tasks, including meetings, A/V presentations, and conferences. Consider both horizontal and vertical illumination when designing these spaces.

### RECOMMENDED LUMINAIRES:

- (1) Recessed ceiling-mounted fluorescent or LED lensed luminaire.
- (2) Recessed ceiling-mounted compact fluorescent or LED downlight or wall washer.
- (3) Suspended linear fluorescent or LED indirect/direct luminaire.
- (4) Recessed ceiling-mounted fluorescent or LED cove or perimeter light.

### CONTROL APPROACH:

- (1) Multi-level switching local controls for fluorescent luminaires, or dimming controls for LED luminaires.
- (2) Refer to the ASHRAE 90.1 – Chapter 9 - Section 9.4.1.1 Interior Lighting Controls – for additional controls.

## CHAPTER 6: ADMINISTRATIVE AREAS LIGHTING GUIDELINES

### **SPECIFIC COORDINATION ISSUES:**

- (1) Consider luminaire placement and optics to mitigate glare and veiling reflections especially at presentation screen.



### 6.3 TEAM/BREAK ROOM

#### DESIGN PARAMETERS:

- (1) Average Maintained Illumination - Ambient: 100 lx (10 FC) at 2'-6" AFF
- (2) Average Maintained Illumination - Task:
  - Food and Drinks Area: 300 lx (30 FC) at countertop
- (3) Uniformity Ratio (avg / min):
  - Ambient: 3:1
- (4) Color Temperature (CCT):
  - Fluorescent: 3500 degrees
  - LED: 3500 degrees
  - Compact Fluorescent: 3500 degrees
- (5) Color Rendering (CRI):
  - Fluorescent: minimum of 80
  - LED: minimum of 80
  - Compact Fluorescent: minimum of 80
- (6) Power Source:
  - Normal

#### DESIGN APPROACH:

The break room should be illuminated with general ambient lighting. Task lighting should be used at food preparation counters. Full dimming should be provided in On-Call Duty Rooms.

#### RECOMMENDED LUMINAIRES:

- (1) Recessed ceiling-mounted fluorescent or LED lensed luminaire.
- (2) Recessed ceiling-mounted compact fluorescent or LED downlight or wall washer.
- (3) Suspended linear fluorescent or LED indirect/direct luminaire.
- (4) Recessed ceiling-mounted fluorescent or LED cove or perimeter light.
- (5) Surface-mounted fluorescent or LED under-cabinet task light.

#### CONTROL APPROACH:

- (1) Multi-level switching local controls for fluorescent luminaires, or dimming controls for LED luminaires.
- (2) Under-cabinet task lights and desk lights shall be controlled with integral switches.
- (3) Refer to the ASHRAE 90.1 – Chapter 9 - Section 9.4.1.1 Interior Lighting Controls – for additional controls.

## CHAPTER 6: ADMINISTRATIVE AREAS LIGHTING GUIDELINES

### **SPECIFIC COORDINATION ISSUES:**

- (1) None.

## 6.4 STAFF TOILET AND LOCKERS

### DESIGN PARAMETERS:

- (1) Average Maintained Illumination - Ambient: 200 lx (20 FC) at finished floor
- (2) Average Maintained Illumination - Task:
  - Sinks: 200 lx (20 FC) at surface of sink
  - Showers: 200 lx (20 FC) at finished floor
  - Lockers: 200 lx (20 FC) at finished floor
- (3) Uniformity Ratio (avg / min):
  - Ambient: 2:1
- (4) Color Temperature (CCT):
  - Fluorescent: 3500 degrees
  - LED: 3500 degrees
  - Compact Fluorescent: 3500 degrees
- (5) Color Rendering (CRI):
  - Fluorescent: minimum of 80
  - LED: minimum of 80
  - Compact Fluorescent: minimum of 80
- (6) Power Source:
  - Normal
  - Life Safety branch of the EES.

### DESIGN APPROACH:

Vertical illumination should be considered at hand washing sinks and mirrors. Decorative sconces may be used at sink areas.

### RECOMMENDED LUMINAIRES:

- (1) Recessed ceiling-mounted fluorescent or LED lensed luminaire.
- (2) Recessed ceiling-mounted compact fluorescent or LED downlight or wall washer.
- (3) Recessed ceiling-mounted fluorescent or LED cove or perimeter light.
- (4) Wall-mounted compact fluorescent, fluorescent or LED mirror or vanity luminaire.
- (5) Decorative compact fluorescent, fluorescent or LED wall-mounted sconce.

### CONTROL APPROACH:

- (1) Occupancy sensors.
- (2) Refer to the ASHRAE 90.1 – Chapter 9 - Section 9.4.1.1 Interior Lighting Controls – for additional controls.

## CHAPTER 6: ADMINISTRATIVE AREAS LIGHTING GUIDELINES

### **SPECIFIC COORDINATION ISSUES:**

- (1) Coordinate lighting with toilet stall partitions; ensure all stalls are properly illuminated.
- (2) Sconces must be ADA compliant.
- (3) Consider emergency battery backup for 50% of luminaires.

# 7. SUPPORT AREAS



## 7.1 STORAGE

### DESIGN PARAMETERS:

- (1) Average Maintained Illumination - Ambient:
  - Bulk Storage: 100 lx (10 FC) at finished floor
  - Clean/Sterile Storage: 200 lx (20 FC) at finished floor
  - Filing: 300 lx (30 FC) at 2'-6" AFF
- (2) Uniformity Ratio (avg / min):
  - n/a
- (3) Color Temperature (CCT):
  - Fluorescent: 3500 degrees
  - LED: 3500 degrees
- (4) Color Rendering (CRI):
  - Fluorescent: minimum of 80
  - LED: minimum of 80
- (5) Power Source:
  - Normal

### DESIGN APPROACH:

Consider vertical illumination on shelving in storage rooms.

### RECOMMENDED LUMINAIRES:

- (1) Recessed or surface ceiling-mounted fluorescent or LED lensed light fixture.
- (2) Surface or suspended ceiling-mounted fluorescent or LED industrial fixture.
- (3) Wall-mounted fluorescent or LED industrial fixture.

### CONTROL APPROACH:

- (1) Multi-level switching local controls for fluorescent luminaires, or dimming controls for LED luminaires.
- (2) Refer to the ASHRAE 90.1 – Chapter 9 - Section 9.4.1.1 Interior Lighting Controls – for additional controls.

### SPECIFIC COORDINATION ISSUES:

- (1) If using industrial fixtures, provide with lamp shield or guard.
- (2) In gas cylinder storage rooms, provide luminaires with hazard rating matching room rating.

## 7.2 HOUSEKEEPING

### DESIGN PARAMETERS:

- (1) Average Maintained Illumination - Ambient: 100 lx (10 FC) at finished floor
- (2) Uniformity Ratio (avg / min):
  - n/a
- (3) Color Temperature (CCT):
  - Fluorescent: 3500 degrees
  - (LED: 3500 degrees
- (4) Color Rendering (CRI):
  - Fluorescent: minimum of 80
  - LED: minimum of 80
- (5) Power Source:
  - Normal

### DESIGN APPROACH:

Consider vertical illumination on shelves.

### RECOMMENDED LUMINAIRES:

- (1) Recessed or surface ceiling-mounted fluorescent or LED lensed light fixture.

### CONTROL APPROACH:

- (1) Multi-level switching local controls for fluorescent luminaires, or dimming controls for LED luminaires.
- (2) Refer to the ASHRAE 90.1 – Chapter 9 - Section 9.4.1.1 Interior Lighting Controls – for additional controls.

### SPECIFIC COORDINATION ISSUES:

- (1) Coordinate fixture placement with overhead cabinets and shelving. Do not install fixtures directly above.

### 7.3 SOILED UTILITY ROOM

#### DESIGN PARAMETERS:

- (1) Average Maintained Illumination - Ambient: 200 lx (20 FC) at finished floor
- (2) Uniformity Ratio (avg / min):
  - Ambient: 3:1
- (3) Color Temperature (CCT):
  - Fluorescent: 3500 degrees
  - LED: 3500 degrees
- (4) Color Rendering (CRI):
  - Fluorescent: minimum of 80
  - LED: minimum of 80
- (5) Power Source:
  - Normal

#### DESIGN APPROACH:

Consider vertical illumination on shelves.

#### RECOMMENDED LUMINAIRES:

- (1) Recessed or surface ceiling-mounted fluorescent or LED lensed light fixture.

#### CONTROL APPROACH:

- (1) Multi-level switching local controls for fluorescent luminaires, or dimming controls for LED luminaires.
- (2) Refer to the ASHRAE 90.1 – Chapter 9 - Section 9.4.1.1 Interior Lighting Controls – for additional controls.

#### SPECIFIC COORDINATION ISSUES:

- (1) Coordinate fixture placement with overhead cabinets and shelving. Do not install fixtures directly above.



## 7.4 CLEAN UTILITY ROOM

### DESIGN PARAMETERS:

- (1) Average Maintained Illumination - Ambient: 200 lx (20 FC) at finished floor
- (2) Uniformity Ratio (avg / min):
  - Ambient: 3:1
- (3) Color Temperature (CCT):
  - Fluorescent: 3500 degrees
  - LED: 3500 degrees
- (4) Color Rendering (CRI):
  - Fluorescent: minimum of 80
  - LED: minimum of 80
- (5) Power Source:
  - Normal

### DESIGN APPROACH:

- (1) Consider vertical illumination on shelves.

### RECOMMENDED LUMINAIRES:

- (1) Recessed or surface ceiling-mounted fluorescent or LED lensed light fixture.

### CONTROL APPROACH:

- (1) Multi-level switching local controls for fluorescent luminaires, or dimming controls for LED luminaires.
- (2) Refer to the ASHRAE 90.1 – Chapter 9 - Section 9.4.1.1 Interior Lighting Controls – for additional controls.

### SPECIFIC COORDINATION ISSUES:

- (1) Coordinate fixture placement with overhead cabinets and shelving. Do not install fixtures directly above.

## 7.5 MAINTENANCE/REPAIR SHOPS

### DESIGN PARAMETERS:

- (1) Average Maintained Illumination - Ambient: 300 lx (30 FC) at 3'-0" AFF
- (2) Average Maintained Illumination - Task:
  - Repair Activities: 1000 lx (100 FC) on countertop working surface
- (3) Uniformity Ratio (avg / min):
  - Ambient: 3:1
- (4) Color Temperature (CCT):
  - Fluorescent: 3500 degrees
  - LED: 3500 degrees
- (5) Color Rendering (CRI):
  - Fluorescent: minimum of 80
  - LED: minimum of 80
- (6) Power Source:
  - Normal

### DESIGN APPROACH:

- (1) Consider vertical illumination and body shadows at machines and equipment.

### RECOMMENDED LUMINAIRES:

- (1) Recessed or surface ceiling-mounted fluorescent or LED lensed light fixture.
- (2) Surface or suspended ceiling-mounted fluorescent or LED industrial fixture.
- (3) Wall-mounted fluorescent or LED industrial fixture.
- (4) Surface-mounted fluorescent or LED under-cabinet task light fixture.

### CONTROL APPROACH:

- (1) Multi-level switching local controls for fluorescent luminaires, or dimming controls for LED luminaires.
- (2) Refer to the ASHRAE 90.1 – Chapter 9 - Section 9.4.1.1 Interior Lighting Controls – for additional controls.
- (3) Under-cabinet task lights shall be controlled with integral switch.

### SPECIFIC COORDINATION ISSUES:

- (1) Consider luminaire placement and shielding to mitigate glare and veiling reflections.
- (2) If using industrial fixtures, provide with lamp shield or guard.

## 7.6 STERILE PROCESSING AND LOGISTICS: CLEAN SIDE

### DESIGN PARAMETERS:

- (1) Average Maintained Illumination - Ambient:
  - Clean Receiving: 300 lx (30 FC) at 2'-6" AFF
  - Ante Room: 300 lx (30 FC) at finished floor
- (2) Average Maintained Illumination - Task:
  - Autoclave: 500 lx (50 FC) at 2'-6" AFF
  - Manual Equipment Wash: 500 lx (50 FC) at 2'-6" AFF
- (3) Uniformity Ratio (avg / min):
  - Ambient: 3:1
- (4) Color Temperature (CCT):
  - Fluorescent: 3500 degrees
  - LED: 3500 degrees
- (5) Color Rendering (CRI):
  - Fluorescent: minimum of 80
  - LED: minimum of 80
- (6) Power Source:
  - Normal
  - Critical branch of the EES

### DESIGN APPROACH:

- (1) Light fixtures in the SPL areas shall be sealed and gasketed to prevent steam from entering, and have a minimum rating of IP65.

### RECOMMENDED LUMINAIRES:

- (1) Recessed or surface ceiling-mounted fluorescent or LED lensed light fixture.

### CONTROL APPROACH:

- (1) Multi-level switching local controls for fluorescent luminaires, or dimming controls for LED luminaires.
- (2) Refer to the ASHRAE 90.1 – Chapter 9 - Section 9.4.1.1 Interior Lighting Controls – for additional controls.

### SPECIFIC COORDINATION ISSUES:

- (1) Coordinate fixture placement with overhead cabinets and shelving. Do not install fixtures directly above.

## 7.7 STERILE PROCESSING AND LOGISTICS: EQUIPMENT PREPARATION ASSEMBLY AND STERILIZATION

### DESIGN PARAMETERS:

- (1) Average Maintained Illumination - Ambient:
  - Preparation and Assembly: 300 lx (30 FC) at 2'-6" AFF
  - SPD Storage: 300 lx (30 FC) at finished floor
- (2) Average Maintained Illumination - Task:
  - Inspection: 500 - 800 lx (50 - 80 FC) at 2'-6" AFF
- (3) Uniformity Ratio (avg / min):
  - Ambient: 3:1
- (4) Color Temperature (CCT):
  - Fluorescent: 3500 degrees
  - LED: 3500 degrees
- (5) Color Rendering (CRI):
  - Fluorescent: minimum of 80
  - LED: minimum of 80
- (6) Power Source:
  - Normal
  - Critical branch of the EES

### DESIGN APPROACH:

- (1) Light fixtures in the SPL areas shall be sealed and gasketed to prevent steam from entering, and have a minimum rating of IP65.

### RECOMMENDED LUMINAIRES:

- (1) Recessed or surface ceiling-mounted fluorescent or LED lensed light fixture.

### CONTROL APPROACH:

- (1) Multi-level switching local controls for fluorescent luminaires, or dimming controls for LED luminaires.
- (2) Refer to the ASHRAE 90.1 – Chapter 9 - Section 9.4.1.1 Interior Lighting Controls – for additional controls.

### SPECIFIC COORDINATION ISSUES:

- (1) Coordinate fixture placement with overhead cabinets and shelving. Do not install fixtures directly above.

## **7.8 STERILE PROCESSING AND LOGISTICS: DETERGENT AND WATER TREATMENT**

### **DESIGN PARAMETERS:**

- (1) Average Maintained Illumination - Ambient: 300 lx (30 FC) at 2'-6" AFF
- (2) Uniformity Ratio (avg / min):
  - Ambient: 3:1
- (3) Color Temperature (CCT):
  - Fluorescent: 3500 degrees
  - LED: 3500 degrees
- (4) Color Rendering (CRI):
  - Fluorescent: minimum of 80
  - LED: minimum of 80
- (5) Power Source:
  - Normal

### **DESIGN APPROACH:**

- (1) Light fixtures in the SPL areas shall be sealed and gasketed to prevent steam from entering, and have a minimum rating of IP65.

### **RECOMMENDED LUMINAIRES:**

- (1) Recessed or surface ceiling-mounted fluorescent or LED lensed light fixture.

### **CONTROL APPROACH:**

- (1) Multi-level switching local controls for fluorescent luminaires, or dimming controls for LED luminaires.
- (2) Refer to the ASHRAE 90.1 – Chapter 9 - Section 9.4.1.1 Interior Lighting Controls – for additional controls.

### **SPECIFIC COORDINATION ISSUES:**

- (1) Coordinate fixture placement with overhead cabinets and shelving. Do not install fixtures directly above.

## 7.9 ELECTRICAL AND MECHANICAL ROOMS

### DESIGN PARAMETERS:

- (1) Average Maintained Illumination - Ambient:
  - Electrical: 300 lx (30 FC) at 2'-6" AFF
  - Main Switchgear/Generator: 500 lx (50 FC) at 2'-6" AFF
  - Mechanical: 300 lx (30 FC) at 2'-6" AFF
- (2) Uniformity Ratio (avg / min):
  - Ambient: 3:1
- (3) Color Temperature (CCT):
  - Fluorescent: 3500 degrees
  - LED: 3500 degrees
- (4) Color Rendering (CRI):
  - Fluorescent: minimum of 80
  - LED: minimum of 80
- (5) Power Source:
  - Normal
  - Life Safety branch of the EES for egress lighting
  - Critical branch of the EES power for 50% of luminaires
  - Battery powered emergency lighting at exit and entry of Main Switchgear and Generator rooms

### DESIGN APPROACH:

- (1) Lighting should provide vertical and horizontal illumination and illuminate below and above.

### RECOMMENDED LUMINAIRES:

- (1) Surface or suspended ceiling-mounted fluorescent or LED industrial luminaire.

### CONTROL APPROACH:

- (1) Multi-level switching local controls for fluorescent luminaires, or dimming controls for LED luminaires.

### SPECIFIC COORDINATION ISSUES:

- (1) Coordinate luminaire placement with floor-mounted MEP equipment and with ducts, pipes and conduits above.
- (2) If using exposed light source industrial luminaire, provide with lamp shield or guard.

## 7.10 EQUIPMENT ROOMS

### DESIGN PARAMETERS:

- (1) Average Maintained Illumination - Ambient: 300 lx (30 FC) at 2'-6" AFF
- (2) Uniformity Ratio (avg / min):
  - Ambient: 3:1
- (3) Color Temperature (CCT):
  - Fluorescent: 3500 degrees
  - LED: 3500 degrees
- (4) Color Rendering (CRI):
  - Fluorescent: minimum of 80
  - LED: minimum of 80
- (5) Power Source:
  - Normal

### DESIGN APPROACH:

- (1) Consider vertical illumination and body shadows at equipment.

### RECOMMENDED LUMINAIRES:

- (1) Recessed or surface ceiling-mounted fluorescent or LED lensed luminaire.

### CONTROL APPROACH:

- (1) Multi-level switching local controls for fluorescent luminaires, or dimming controls for LED luminaires.
- (2) Refer to the ASHRAE 90.1 – Chapter 9 - Section 9.4.1.1 Interior Lighting Controls – for additional controls.

### SPECIFIC COORDINATION ISSUES:

- (1) Coordinate luminaire placement with overhead cabinets and shelving. Do not install luminaire directly above.
- (2) Coordinate luminaire placement with equipment.

## 7.11 LOADING DOCKS

### DESIGN PARAMETERS:

- (1) Average Maintained Illumination - Ambient:
  - Loading Dock: 100 lx (10 FC) at finished floor
  - Staging: 200 lx (20 FC) at finished floor
- (2) Uniformity Ratio (avg / min):
  - n/a
- (3) Color Temperature (CCT):
  - Fluorescent: 3500 degrees
  - LED: 3500 degrees
- (4) Color Rendering (CRI):
  - Fluorescent: minimum of 80
  - LED: minimum of 80
- (5) Power Source:
  - Normal
  - Critical branch of the EES

### DESIGN APPROACH:

- (1) Consider vertical illumination.

### RECOMMENDED LUMINAIRES:

- (1) Recessed or surface ceiling-mounted fluorescent or LED lensed light fixture.
- (2) Surface or suspended ceiling-mounted fluorescent or LED industrial fixture.
- (3) Wall-mounted fluorescent or LED moveable dock light.

### CONTROL APPROACH:

- (1) Multi-level switching local controls for fluorescent luminaires, or dimming controls for LED luminaires.
- (2) Refer to the ASHRAE 90.1 – Chapter 9 - Section 9.4.1.1 Interior Lighting Controls – for additional controls.

### SPECIFIC COORDINATION ISSUES:

- (1) Specify wet-listed and tamper-resistant luminaires for loading dock exterior.
- (2) If using industrial luminaires in loading dock interior, specify lamp shield or guard for luminaires.
- (3) Coordinate location of dock lights with loading platform.



## 7.12 MAIL ROOMS

### DESIGN PARAMETERS:

- (1) Average Maintained Illumination - Ambient:
  - Sorting: 500 lx (50 FC) at finished floor
  - Distribution: 300 lx (30 FC) at finished floor
- (2) Uniformity Ratio (avg / min):
  - 2:1
- (3) Color Temperature (CCT):
  - Fluorescent: 3500 degrees
  - LED: 3500 degrees
- (4) Color Rendering (CRI):
  - Fluorescent: minimum of 80
  - LED: minimum of 80
- (5) Power Source:
  - Normal
  - Critical branch of the EES

### DESIGN APPROACH:

- (1) Consider vertical illumination.

### RECOMMENDED LUMINAIRES:

- (1) Recessed or surface ceiling-mounted fluorescent or LED lensed light fixture.
- (2) Surface or suspended ceiling-mounted fluorescent or LED industrial fixture.
- (3) Wall-mounted fluorescent or LED moveable dock light.

### CONTROL APPROACH:

- (1) Multi-level switching local controls for fluorescent luminaires, or dimming controls for LED luminaires.
- (2) Refer to the ASHRAE 90.1 – Chapter 9 - Section 9.4.1.1 Interior Lighting Controls – for additional controls.

### SPECIFIC COORDINATION ISSUES:

- (1) If using industrial fixtures, provide with lamp shield or guard.
- (2) Coordinate luminaire placement with overhead cabinets and shelving. Do not install luminaire directly above.
- (3) Coordinate luminaire placement with equipment.

APPENDIX A: ILLUMINATION LEVELS

**APPENDIX A: ILLUMINATION LEVELS**

AREA DESCRIPTION	ILLUMINATION LEVEL Lx (FC)*	GUIDELINE REFERENCE
ACTIVITIES ROOM AND DINING SPACE		4.4.4
AGENT CASHIER		6.1
AIRLOCK (ANTE ROOM)		5.5
AMBULATORY CARE		
AMB. SURGERY OR		4.2.13
CONSULTATION		6.1
EXAMINATION/TREATMENT		4.2.1
LIFE SUPPORT UNIT		
GENERAL		4.3.6
OVER BED		4.3.6
MULTIPURPOSE EXAMINATION		4.3.6
OBSERVATION AND TREATMENT		
GENERAL		4.3.6
OVER BED		4.3.6
OVER HEAD OF BED		4.3.6
SCREENING PROCTOSCOPY AND SIGMOIDOSCOPY		4.2.1
SECURITY EXAMINATION		4.2.1
ANESTHESIA		
ANESTHESIOLOGY PREPARATION		4.2.4
STORAGE		7.1
WORKROOM, ANESTHESIA, AND EQUIPMENT STORAGE		7.1
ANIMAL HOUSING AREA	200-600 (20-60)	Notes: a, b
APPARATUS AND EQUIPMENT STORAGE		7.1
AUDIOMETRY ROOM AND TEST ALCOVE		4.2.12
AUDITORIUM		
SOCIAL ACTIVITIES	300 (30)	Notes: a, c
ASSEMBLY	200 (20)	Notes: a, c
AURAL REHABILITATION/SPEECH PATHOLOGY THERAPY		4.2.11
AUTOPSY AND MORGUE		
AUTOPSY	1000-3000 (100-300)	Notes: a, d, e
ISOLATION/TEACHING AUTOPSY	1000-3000 (100-300)	Notes: a, d, e
MORTUARY REFRIGERATOR(COLD ROOM)	300 (30)	Notes: a
BARBER SHOP		5.7
BARIUM PREPARATION		4.2.1
BATHROOM		5.9
BEAUTY SHOP		5.7
BEDROOM		
NON-PATIENT	100-200 (10-20)	Notes: a
PATIENT (SEE PATIENT ROOMS)		
BILLIARD ROOM		4.4.4
BLOOD SPECIMEN COLLECTION		4.2.2
BOILER ROOM		
BURNER		7.9

APPENDIX A: ILLUMINATION LEVELS

AREA DESCRIPTION	ILLUMINATION LEVEL Lx (FC)*	GUIDELINE REFERENCE
PLATFORMS		7.9
CANTEEN		
FOOD SERVICE AREA (SEE FOOD SERVICE)		
KITCHEN (SEE FOOD SERVICE)		
RETAIL STORAGE AND RECEIVING		7.1
RETAIL STORE		5.10
VENDING MACHINE AREA		7.1
WARD CART STORAGE		7.1
CAN WASH AND CAN CRUSHER(SEE FOOD SERVICE)		
CARDIAC PROCEDURE/CATHETERIZATION		4.2.5
CARDIOPULMONARY REHABILITATION CENTER		4.2.1
CART STORAGE		7.1
CAST ROOM		4.2.3
CHAPEL		
ALTAR/ARK/REREDOS	500 (50)	Notes: a, c
CHANCEL (INCLUDING ALTAR & CHOIR)	200 (20)	Notes: a, c
CHOIR ROBIN	300 (30)	Notes: a
EUCCHARISTIC AND DEVOTIONAL	200 (20)	Notes: a, c
NAVE	200 (20)	Notes: a, c
SACRISTY	200 (20)	Notes: a, c
CLASSROOM		6.2
CLEAN CAGE STORAGE		7.6
CLEAN LINEN		7.4
CLEAN LINEN SORTING		7.6
CLEAN UTILITY/SUPPLIES		7.7
CLEAN UTILITY/SPD CART		7.7
CLINIC, EVALUATION		4.2.1
CLINIC SPACE, LEARNING STATIONS		6.1
CLINIC SPACE, VOC. REHABILITATION THERAPY		4.2.11
CLOSETS		
ELECTRICAL		7.9
GENERAL		7.2
HOUSEKEEPING AIDS		7.2
HOUSEKEEPING AIDS(SURGERY)		7.2
LINEN		7.4
PLASTER AND SPLINT		7.2
CLOTHING CHANGE		7.2
CONFERENCE/CLASSROOM		6.2
CONFERENCE ROOM		6.2
CONGREGATE BATH/TOILET/HOPPER	500 (50)	Notes: a
CONSULTATION		6.1
CONSULTATION/MEDICATION/CHART		4.3.3
CONSULTATION, VIEWING, AND TEACHING		6.1
CONTROLLED TEMPERATURE ROOM	200 (20)	Notes: a
CONTROL ROOMS		
CONTROL AREA (RAD. THERAPY)		4.2.6
CONTROL BOOTH/ALCOVE (X-RAY)		4.2.6

APPENDIX A: ILLUMINATION LEVELS

AREA DESCRIPTION	ILLUMINATION LEVEL Lx (FC)*	GUIDELINE REFERENCE
CONTROL CENTER (INTENSIVE CARE)		4.2.6
CONTROL STATION (SURGERY SUITE)		4.2.13
CORRIDORS		
DENTAL SUITE		5.5
GENERAL NON-NURSING		5.5
GENERAL NURSING		4.3.1
LABORATORIES		5.5
QUARTERS		5.5
SURGICAL SUITE		4.2.14
COUNSELING/TREATMENT		4.4.7
CRAWL SPACE	50 (5)	Notes: a
CREDIT UNION	500 (50)	Notes: a
CYSTOSCOPIC ROOM (NON-SURGERY)		
GENERAL		4.2.5
DARKROOM: DEVELOPING, PRINTING, AND ENLARGING	300 (30)	Notes: a, c
DAY ROOM		4.3.11
DECONTAMINATION		7.6
DENTAL SUITE		
DARKROOM	300 (30)	Notes: a, c
DENTAL OFFICE		6.1
DENTAL RESIDENTS AND TRAINEES STUDY/CONFERENCE ROOM		6.2
EXAMINATION, HYGIENE, AND GENERAL TREATMENT OPERATORIES		4.2.16
INSTRUMENT PREPARATION AND STERILIZATION		7.7
ORAL SURGERY		4.2.17
PATIENT INTERVIEW		6.1
PREVENTIVE DENTISTRY		4.2.16
PROSTHETIC LABORATORY		4.2.4
RECOVERY		4.2.16
RESEARCH LABORATORY		4.2.4
SOILED SPD CART HOLDING		7.3
SUPPLY ROOM		7.6
X-RAY AREA		4.2.16
DIALYSIS CENTER		
BEDROOM (MULTI-BED)		4.2.10
LOCAL OVER BED		4.2.10
LOCAL OVER ARM		4.2.10
OVER HEAD OF BED		4.2.10
DIALYSATE PREPARATION		4.2.10
DIALYSIS TRAINING (SEE BEDROOM ABOVE)		
EQUIPMENT SERVICE AREA SOILED/CLEAN		4.2.10
EQUIPMENT SERVICE AREA STORAGE		4.2.10
FINAL WATER TREATMENT		4.2.10
DISPENSING (SEE PHARMACY)		
DRESSING/RECOVERY		4.3.13
DRESSING ROOM		4.3.13

APPENDIX A: ILLUMINATION LEVELS

AREA DESCRIPTION	ILLUMINATION LEVEL Lx (FC)*	GUIDELINE REFERENCE
DRESSING/TOILET		4.3.8
EAR, NOSE AND THROAT CLINIC (ENT)		
AUDIOMETRY ROOM AND TEST ALCOVE		4.2.1
EXAMINATION AND TREATMENT		4.2.1
STERILIZATION, PREPARATIONS, AND STORAGE		7.6
ELECTROCARDIOGRAPHIC (ECG)		
GENERAL		4.2.7
MACHINE		4.2.7
ELECTROENCEPHALOGRAPHIC (EEG)		
EEG INSTRUMENT AND WORKROOM		4.2.7
EXAMINATION		4.2.7
PHYSICIANS READING		4.2.7
PREPARATION		4.2.7
ELECTROMYOGRAPHIC (EMG)		4.2.7
ELECTRON MICROSCOPE SUITE		
CUTTING ROOM	2000 (200)	(Notes: a, d)
PREPARATION	1000 (100)	(Notes: a, d)
SCOPE ROOM	300 (30)	(Notes: a, c)
ELEVATORS	200 (20)	(Notes: a)
EMERGENCY GENERATOR		7.9
ENDOSCOPY		
UPPER AND LOWER GI		4.2.5
WORKROOM		4.2.5
ENGINEERING CONTROL CENTER		6.1
ENTRANCE (SEE LOBBY)		
ENTRANCE (EXTERIOR)		3.4
EQUIPMENT STORAGE		7.1
EQUIPMENT STORAGE AND TESTING		7.10
ESCORT SERVICE	200 (20)	(Notes: a)
EXAMINATION AND TREATMENT		4.2.1
EXAMINATION/CONSULTATION		4.2.1
EXERCISE ROOM		4.3.12
EXITS (AT FLOOR LEVEL)	50 (5)	(Notes: a)
EYE CLINIC		
EXAMINATION AND TREATMENT		4.2.1
REFRACTION AREA		4.2.1
SURGERY		4.2.13
VISUAL FIELD/DARKROOM ADAPTATION	500 (50)	(Notes: a, c)
FILM PROCESSING	300 (30)	(Notes: a, c)
FLAMMABLE OR TOXIC STORAGE		7.1
FOOD SERVICE		
BULK FOOD CARTS		5.6
CART WASH CENTER		5.6
CLEAN DISH STORAGE		5.6
COLD FOOD AND DESSERT PREPARATION		5.6
DIETITIANS		6.1
DIETETICS-SERVING UNIT		5.6

APPENDIX A: ILLUMINATION LEVELS

AREA DESCRIPTION	ILLUMINATION LEVEL Lx (FC)*	GUIDELINE REFERENCE
DINING ROOM/AREA/SPACE		5.6
DINING ROOM/RECREATION AREA		5.6
DISHWASHING AREA/UNIT		5.6
FIXED SERVING LINE		5.6
FOOD PROCESS AND PREPARATION		5.6
FOOD STORAGE		5.6
INGREDIENT CONTROL AREA		5.6
KITCHENETTE		5.6
MAIN KITCHEN		5.6
KITCHEN SERVING		5.6
LUNCH AREA WITH KITCHEN UNIT		4.3.11
LUNCH ROOM		4.3.11
MEAT AND VEGETABLE UNIT		5.6
MOBILE SERVING LINE		5.6
NUTRITION CLINIC		5.6
POT WASHING CENTER		5.6
REFRIGERATED AND FROZEN STORAGE		5.6
REFRIGERATED GARBAGE AND TRASH STORAGE		5.6
SANITATION SUPPLY STORAGE		5.6
SERVING LINE		5.6
SERVING UNIT WORK AREA		5.6
SOILED DISH COLLECTION		5.6
SPECIAL NOURISHMENT PREPARATION		5.6
GAME AND ACTIVITY ROOM		4.3.11
GAS STORAGE		7.1
GROSS SPECIMEN STORAGE		7.1
GI SCREENING PROCTOSCOPY/SIGMOIDOSCOPY ROOM		4.2.5
GU CARE ROOM		4.2.5
GU EXAMINATION/TREATMENT		4.2.1
HEALTH RECORDS STORAGE		7.1
HOSPITAL PLANS AND DRAFTING		6.1
INACTIVE RECORDS STORAGE		7.1
INFORMATION COUNTER		5.8
INFORMATION TECHNOLOGY		
DEMARCO ROOM		7.10
ANTENNA HEADEND EQUIPMENT ROOM		7.10
MAIN COMPUTER ROOM, BACKUP COMPUTER ROOM		7.9
NETWORK OPERATIONS ROOM		7.9
TELECOMMUNICATIONS ROOMS		7.9
TELEPHONE OPERATORS ROOM		7.9
WORKROOM, EQUIPMENT CONFIGURATION / REPAIR		7.5
INSTRUMENT CALIBRATION AND STORAGE		7.5
INTENSIVE CARE (SEE PATIENT ROOMS)		
INTERVIEW/CONSULTATION		6.1
INTERVIEW-EXAMINATION		4.2.1

APPENDIX A: ILLUMINATION LEVELS

AREA DESCRIPTION	ILLUMINATION LEVEL Lx (FC)*	GUIDELINE REFERENCE
ISOLATION BEDROOM (RECOVERY/ICU)		4.3.5
KITCHENETTE/MULTIPURPOSE		4.3.12
LABORATORIES; GENERAL		4.2.4
BENCH AND TABLE TOP LIGHTING		4.2.4
BIOCHEMISTRY		4.2.4
BIOSAFETY		4.2.4
CARDIAC BLOOD GAS ANALYSIS		4.2.4
CHEMISTRY		4.2.4
CLINICAL CHEMISTRY/MICROBIOLOGY		4.2.4
COAGULATION		4.2.4
CYTOLOGY		4.2.4
DERMATOLOGY		4.2.4
DIAGNOSTIC		4.2.4
ENVIRONMENTAL		4.2.4
FROZEN/AND GROSS SECTION		4.2.4
HIGH/LOW LEVEL IN-VITRO COUNTING		4.2.4
HISTOLOGY		4.2.4
IMMEDIATE RESPONSE (STAT)		4.2.4
IMMUNOPATHOLOGY		4.2.4
MICROBIOLOGY		4.2.4
MYCOBACTERIOLOGY (TB)		4.2.4
MYCOLOGY		4.2.4
ORTHOTICS		4.2.4
PHARMACEUTICAL EXPERIMENTATION		4.2.4
PHYSICS		4.2.4
PROCEDURAL		4.2.4
PULMONARY BLOOD GAS		4.2.4
RADIOIMMUNOASSAY (RIA)		4.2.4
ROUTINE (HEMATOLOGY)		4.2.4
SPECIAL CHEMISTRY		4.2.4
SPECIMEN ACCESSIONING, PROCESS / DISTRIBUTION		4.2.4
STUDENT LABORATORY - CLASSROOM		4.2.4
URINE (URINALYSIS) AND FECES		4.2.4
URODYNAMICS		4.2.4
LAUNDRY		
CART WASHER AREA		7.6
CENTRAL LIQUID SUPPLY SYSTEM		7.8
CLEAN LINEN HOLDING (FLOW RACK) AND ASSEMBLY AREA		7.6
CLEAN LINEN PROCESSING AREA		7.6
DISTRIBUTION AREA (CART STORAGE, DISPATCH, AND DOCK)		7.1
GENERAL ADMINISTRATIVE AREA		6.1
LINEN COLLECTION		7.3
LINEN PACK PREPARATION		7.6
LINEN REPAIR AREA		7.7
LINEN STORAGE		7.7

APPENDIX A: ILLUMINATION LEVELS

AREA DESCRIPTION	ILLUMINATION LEVEL Lx (FC)*	GUIDELINE REFERENCE
LUNCH ROOM/TRAINING ROOM		6.3
PRODUCTION AND SUPPORT AREA		7.7
RECEIVING AREA		7.7
SORTING AND WASHING AREA		7.7
UNIFORM EXCHANGE (AUTOMATED)		7.4
<b>LIBRARY</b>		
AUDIOVISUAL ROOM	300 (30)	(Notes: a, c)
CIRCULATION/REFERENCE DESK	300 (30)	(Notes: a)
LIBRARIAN	500 (50)	(Notes: a)
MICROFORM AREAS	300 (30)	(Notes: a)
PHOTOCOPY AREA	300 (30)	(Notes: a)
SEATING SPACE (READER STATIONS)	300 (30)	(Notes: a)
SHELVING/STACK AREAS	300 (30)	(Notes: a)
WORKROOM/TECHNICAL SERVICES	500 (50)	(Notes: a)
<b>LINEN</b>		
CLOSET		7.2
LINEN ROOM AND CLEAN SPD CART		7.7
LINEN SERVICE		7.7
SEAMSTRESS SPACE		7.5
SOILED COLLECTION		7.3
SOILED COLLECTION AND CENTRAL SORTING		7.3
SOILED LINEN HOLDING AREA		7.3
SOILED LINEN ROOM		7.3
LOADING DOCK		7.11
LOBBY/FOYER		5.1, 5.2
LOCKER ROOMS		6.4
<b>LOUNGES</b>		
READING		5.3
PATIENT'S LOUNGE AND TV ROOM		5.3
MAIL ROOM AND DISTRIBUTION CENTER		7.12
MAIL ROOM/UNIT		7.12
MAINTENANCE/SHOPS (SEE SHOPS)		
MEDICAL AND GENERAL STORAGE (SEE STOREROOM)		
MEDICATION AND TREATMENT		4.3.3
<b>MEDICAL MEDIA PRODUCTION</b>		
CAMERA ROOM	300 (30)	(Notes: a)
DARKROOM, FILM PROCESSING	300 (30)	(Notes: a, c)
FINISHING ROOM	500 (50)	(Notes: a)
GRAPHICS ILLUSTRATION ROOM; ILLUSTRATION PREP. AREA	700 (70); Tables 2000 (200)	(Notes: a, d)
PHOTOMICROGRAPHY	300 (30)	(Notes: a)
PRINTING AND ENLARGING	300 (30)	(Notes: a, c)
MEDICAL RESEARCH STORAGE (SEE STOREROOM)		
MINOR OPERATING ROOM		4.2.13
MULTIPURPOSE ROOM		4.3.12
MUSIC ROOM		4.3.12



APPENDIX A: ILLUMINATION LEVELS

AREA DESCRIPTION	ILLUMINATION LEVEL Lx (FC)*	GUIDELINE REFERENCE
NOURISHMENT KITCHEN		4.3.10
NUCLEAR MEDICINE		
COMMON VIEWING AND CONFERENCE		6.2
EQUIPMENT CALIBRATION		4.2.4
ISOTOPIC STORAGE AND PREPARATION AREA		4.2.18
RADIOPHARMACY		4.2.18
RECTILINEAR ORGAN SCAN		4.2.5
SPECIAL PROCEDURE		4.2.5
STATIONARY IMAGING		4.2.5
THYROID UPTAKE		4.2.5
WALK-IN REFRIGERATOR		7.1
NURSE'S STATION/WARD CLERK/DOCTOR'S CHARTING		
GENERAL; DAY		4.3.1
DESK/TABLE/COUNTER		4.3.1
OFFICES; GENERAL		6.1
OFFICES; STAFF		6.1
OFFICES; WORKSTATION CLERICAL OR TECHNICAL STAFF		6.1
ON-CALL ROOM		6.3
ONCOLOGY CHEMOTHERAPY AGENT PREPARATION		4.2.8
ONCOLOGY CHEMOTHERAPY TREATMENT		4.2.8
OPERATING ROOMS (SEE SURGERY SUITES)		
ORTHOPEDIC CAST ROOM		4.2.3
OXYGEN STORAGE		7.1
PARKING GARAGE		
ENTRANCE		3.8
GENERAL TRAFFIC, PARKING, AND PEDESTRIAN AREAS		3.8
PATIENT ROOMS		
GENERAL		4.3.4
ANTEROOM (ISOLATION)		4.3.5
BATH, PRIVATE, OR CONNECTING		4.3.5
NIGHT OBSERVATION		4.3.5
OVER-BED TASK ILLUMINATION		4.3.5
OVER HEAD OF BED		4.3.5
PATIENT LOCKER AREA		6.4
SECURITY/SECLUSION BEDROOM		4.3.5
SERVICE ALCOVE		4.3.5
TOILET		4.3.8
PHARMACY		
CONTROLLED SUBSTANCES VAULT AND SECURED DISPENSING		4.2.18
DRUG RECEIVING		4.2.18
DRUG UTILIZATION REVIEW		4.2.18
EXTEMPORANEOUS COMPOUNDING		4.2.18
EXTEMPORANEOUS REPACKAGING		4.2.18

APPENDIX A: ILLUMINATION LEVELS

AREA DESCRIPTION	ILLUMINATION LEVEL Lx (FC)*	GUIDELINE REFERENCE
FILING AND ASSEMBLY		4.2.18
HEMODIALYSIS (STORAGE)		4.2.18
INTERVENOUS ADMIXTURE AND ASEPTIC TRANSFER		4.2.18
MEDICATION ASSIGNMENT		4.2.18
MEDICATION PREPARATION AREAS		4.2.18
POISON CONTROL STORAGE		4.2.18
PREPACKAGING		4.2.18
PRESCRIPTION RECEIVING		4.2.18
PROSTHETICS AND MEDICAL SUPPLIES		7.1
RECEIVING		4.2.18
RECEIVING, STORAGE, AND RECORD CONTROL		4.2.18
STAT		4.2.18
STERILE FLUIDS AND ADMIXTURE SETS STORAGE		4.2.18
SUPPORT AREA		4.2.18
UNIT DOSE DISPENSING		4.2.18
VAULT (DRUGS)		4.2.18
PHONO-CARDIOGRAPHY		4.2.7
PLASTER AND SPLINT CLOSET		7.1
PNEUMATIC TUBE EQUIPMENT ROOM		7.10
POST OPERATIVE/RECOVERY WARD (RESEARCH)		4.2.15
PROJECTION, PREPARATION, AND STORAGE		6.1
PREFABRICATED SOUND SUITE-CONTROL ROOM		4.2.12
QUIET AREA (PSYCHIATRIC)		4.3.11
QUIET ROOM		4.3.11
RADIOLOGY SUITE		
ANESTHESIOLOGY PREPARATION AND RECOVERY		4.2.15
AUTOMATED ROOM		4.2.6
BARIUM PREPARATION		4.2.6
CENTRAL SILVER COLLECTION AREA		4.2.6
COMPUTERIZED AXIAL TOMOGRAPHY (CT)		4.2.6
CONTROL BOOTH/ALCOVE		4.2.6
DARKROOM		4.2.6
DEDICATED CHEST ROOM		4.2.6
EXAMINATION ROOM/AREA		4.2.6
FILM LIBRARY		4.2.6
FILM STORAGE UNDEVELOPED		4.2.6
MEGAVOLTAGE UNIT		4.2.6
PROCESSING AREA		4.2.6
RADIATION THERAPY		4.2.6
SCRUB ROOM		4.2.6
SPECIAL PROCEDURES		
FLUORESCENT	500 (50)	(Notes: a, c)
INCANDESCENT	200 (20)	(Notes: a, c)

APPENDIX A: ILLUMINATION LEVELS

AREA DESCRIPTION	ILLUMINATION LEVEL Lx (FC)*	GUIDELINE REFERENCE
SUPERFICIAL THERAPY UNIT AND CONTROLS	300 (30)	(Notes: a, c)
SUPERVOLTAGE UNIT (COBALT 60)	300 (30)	(Notes: a, c)
ULTRASOUND		4.2.6
VIEWING ROOM COMMON		4.2.6
X-RAY ROOMS		4.2.6
RECEIVING AND CLEANING		7.6
RECEIVING AND ISSUE AREA		7.11
RECEIVING AND SHIPPING DOCK		7.11
RECEPTION AND WAITING		5.8, 5.3
RECOVERY ROOM (SEE SURGERY SUITE)		
RECREATION/MULTIPURPOSE ROOM		4.3.12
RESIDENT CLOTHING AND LUGGAGE STORAGE		7.1
RESIDENT'S LAUNDRY		4.4.10
SCRUB ALCOVE		4.2.14
SEAMSTRESS		7.5
SHOPS, MAINTENANCE AND REPAIR		
AIR CONDITIONING SHOP		7.5
CARPENTER SHOP		7.5
ELECTRICAL SHOP		7.5
GROUNDS MAINTENANCE SHOP		7.5
MACHINE SHOP		7.5
MASON SHOP		7.5
PAINT SHOP		7.5
PARTS AND TOOLS CLERK		7.5
PLUMBING SHOP		7.5
REPAIRING AND DEVELOPMENT		7.5
STORAGE (SEE STOREROOMS)		
SHOWER		4.3.8
SITZ BATH		4.3.8
SPECIMEN TOILET		4.3.8
SOILED UTILITY/SPD CART		7.3
STAGE (GEN. ILLUM.)		7.11
STAIRWAYS		5.4
STERILIZATION AND SOLUTION PREPARATION		7.7
STOREROOMS		
FINE		7.1
MEDIUM		7.1
BULKY		7.1
STRETCHER AND WHEELCHAIR STORAGE		7.1
STRETCHER WAITING SPACE		5.3
SUBSTERILIZATION AND WORK AREA		7.7
STERILE PROCESSING AND LOGISTICS (SPL)		
AUTOMATIC CART WASH		7.8
BULK STORAGE AREA		7.6
CLEAN RECEIVING AND BREAKOUT		7.6
CLEAN SIDE		7.6
DISPATCHERS CONTROL STATION/OFFICE		6.1
SURGICAL LINEN AND PACKS		7.6

APPENDIX A: ILLUMINATION LEVELS

AREA DESCRIPTION	ILLUMINATION LEVEL Lx (FC)*	GUIDELINE REFERENCE
MANUAL EQUIPMENT WASH		7.8
PREPARATION ASSEMBLY AND STERILIZATION		7.7
SOILED RECEIVING AND DECONTAMINATION		7.6
STERILE/NON-STERILE STORAGE		7.6
STERILIZATION AND PREPARATION		7.7
VOLUNTEER AND TRAINING		6.1
WORK STATION/COMPUTER		6.1
<b>SURGICAL SUITE</b>		
CLEAN AND STERILE SUPPLIES		7.6
CLEAN CORE SUPPORT AREA		4.2.13
CONTROL ROOM (CYSTOSCOPIC)		4.2.13
DICTATION CUBICLE		4.2.13
EQUIPMENT AND APPARATUS STORAGE		7.1
EXTERNAL RADIOGRAPHIC CONTROL ROOM OR HOUSEKEEPING AIDS CLOSETS		4.2.13 7.2
OPERATING ROOMS CARDIAC; CYSTOSCOPIC; GENERAL PURPOSE; NEUROSURGERY; ORTHOPEDIC		4.2.13
PATIENT HOLDING ROOM OR ALCOVE	500 (50)	(Notes: a, c)
PUMP TECHNICIAN'S PREPARATION ROOM	700 (70)	(Notes: a)
RECOVERY		4.2.15
SCRUB-UP ALCOVE		4.2.14
SOILED HOLDING AREA		7.3
SPECIAL EQUIPMENT RECORDING ROOM		7.4
WORKROOM, ANESTHESIA, AND EQUIPMENT STORAGE		7.10
SWITCHGEAR		7.9
THEATER	100 (10)	(Notes: a, c)
SUPPLEMENTAL	200 (20)	(Notes: a, c)
FOYER	100 (10)	(Notes: a, c)
<b>THERAPY</b>		
CORRECTIVE CLINIC		4.2.11
EDUCATIONAL/VOCATIONAL		4.2.11
ASSIGNMENT SPACE		4.2.11
COMPENSATED WORK THERAPY CLINIC		4.2.11
EVALUATION		4.2.11
INSTRUCTION, ORIENTATION, & SIMULATOR SPACE (DRIVER TRAINING)		4.2.11
PATIENT REST AREA		4.2.11
GROUP THERAPY ROOM		4.4.11
TABLE		4.4.11
CONFERENCE RM		6.2
INHALATION		4.2.11
OCCUPATIONAL		4.2.11
CLINICAL		4.2.11
ORTHOTIC AND SPLINTING AREA		4.2.11
PHYSICAL		

APPENDIX A: ILLUMINATION LEVELS

AREA DESCRIPTION	ILLUMINATION LEVEL Lx (FC)*	GUIDELINE REFERENCE
ARM AND LEG WHIRLPOOLS		4.2.11
CLINIC		4.2.11
HUBBARD TANKS		4.2.11
HYDROTHERAPY		4.2.11
SPECIAL TREATMENT		4.2.11
TABLES AND INDIVIDUAL EXERCISE		4.2.11
TREATMENT AREA		4.2.11
<b>RADIATION</b>		
ORTHOVOLTAGE THERAPY UNIT		4.2.9
PATIENT PRETREATMENT		4.2.9
RADIUM SEALED SOURCE ROOM		4.2.9
SIMULATOR		4.2.9
TREATMENT AREA		4.2.9
TREATMENT PLANNING AREAS		4.2.9
VIEWING AND CONSULTATION		4.2.9
<b>RECREATION</b>		
ARTS, CRAFTS, AND HOBBY		4.4.4
MULTIPURPOSE RECREATION		4.4.4
<b>SPINAL CORD INJURY</b>		
CLINIC		4.2.11
HUBBARD TANKS		4.2.11
WHIRLPOOL, ARM, LEG AND LO-BOY		4.2.11
THERAPEUTIC POOL		4.2.11
TOILETS		4.3.8
TRAINEE/STUDENT STUDY CUBICLE		6.1
TRANSFORMER ROOM		7.9
TRASH/COLLECTION ROOM		7.1
TUB ROOM		4.3.8
ULTRASOUND DIAGNOSIS		4.2.7
UNIFORMS		4.3.13
URINE TESTING ALCOVE		4.3.8
UTILITY AREAS		7.3, 7.4
VAULT		7.1
VECTORCARDIOGRAPHY		4.2.7
VENDING/MACHINE AREA/ALCOVE	100 (10)	(Notes: a)
VENTILATORY TEST		4.2.7
VESTIBULE		5.5
VESTIBULE AND WAITING AREA		5.5, 5.3
VOLUNTEER/ESCORT SPACE		6.1
VOLUNTEER SIGN-IN		6.1
WAITING ROOMS		5.3
WALK- IN REFRIGERATOR (COLD ROOM)		7.1
WARD CLERK		6.1
WARD SUPPLY		7.4
WHEELCHAIR AND SPECIAL BED STORAGE		7.1
WHEELCHAIR AND STRETCHER		7.1
WORD PROCESSING/COMPUTER ROOM		6.1
WORKROOM AND DRESSING ROOM		4.3.13

AREA DESCRIPTION	ILLUMINATION LEVEL Lx (FC)*	GUIDELINE REFERENCE
WORK-STATION (COMPUTER)		6.1

**Notes:**

- (a) No guideline reference. Use Illumination levels as a guide. A/E shall follow the most appropriate lighting guidance based on area/room function, latest code requirements, industry and professional design practices.
- (b) Provide variable illumination with time schedule and manual control.
- (c) Vary illumination levels by dimming control devices in accordance with specific project requirements.
- (d) Provide illumination levels with a combination of general and localized lighting.
- (e) Match color temperature of the surgical light(s).

(\* Average maintained horizontal illumination measured in Lux (Lx) (Footcandles (FC)) at 2'-6" above finished floor (AFF), unless otherwise noted.