PREFACE

This publication has been prepared as a guide for Architectural and Engineering (A&E) firms in the preparation of documents for the design and construction of new structures and the remodeling of existing structure for Indiana University. Items pertinent to requirements of Indiana University are contained herein.

The specification section numbers referenced by these standards are to help the A&E firms identify where IU Engineering standards are to be applied. These specification section numbers are based upon CSI standards and may not correspond to a particular A&E firm’s standard specification section numbering scheme.

Compliance with codes and OSHA regulations are minimum requirements. When requirements of Federal and/or State Codes are at variance with the contents of this publication, the most demanding requirements shall be observed.

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IT IS NOT INTENDED THAT THESE STANDARDS BE COPIED AND USED AS A SPECIFICATION!

MATERIAL CONTAINED HEREIN SHALL NOT BE COPIED VERBATIM IN SPECIFICATIONS OR IN NOTES ON THE DRAWINGS EXCEPT WHEN INSTRUCTIONS ARE GIVEN TO COPY CERTAIN ARTICLES OR PARAGRAPHS.

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Changing technology and changes in State or University policies will require continuing revisions of these standards. Revisions will be maintained online at www.indiana.edu/~uao. Architects and Engineers doing work for the University are expected to ensure that they are working with the latest revision of the standards.

Throughout these standards, cross-references have been made frequently to emphasize the importance of coordination of all parts of the contract documents for a project. Because of the requirement for complete coordination, the holder of this document is cautioned to furnish complete standards to consultants or to ascertain that consultants have copies of the referenced sections and paragraphs affecting the consultant’s work.

If questions arise concerning instructions contained herein, please request clarification from Indiana University, Department of Engineering Services, (812) 856 - 7055.
A. General

1. Exterior lighting systems shall conform to the requirements, standards and recommendations found in the latest edition of the following:
   a. ANSI/NFPA 70 - National Electrical Code, with Indiana Amendments.

2. All exterior lighting systems and components shall be classified by Underwriter's Laboratories, Inc. (UL) as suitable for purpose specified and shown and shall bear an appropriate "UL" label.

3. Lighting designers shall employ IES standards for the selection of proper illumination levels for any given area or activity.

4. The University has established campus standards regarding exterior site lighting fixture styles. Contact Engineering Services or CFS for approved site lighting fixtures to be utilized in specific areas.

5. The use of Energy Star compliant lighting solutions is encouraged.

6. The use of dark sky friendly light fixtures approved by the International Dark Sky Association (darksky.org) is encouraged. On the IUPUI campus, this is required.

7. During the design process and prior to completion of construction documents, provide point-by-point photometric calculations of lighting design to Engineering Services or CFS for review and comment.

8. Exterior lighting shall include, but is not limited to the following.
   a. Exterior area and walkways
   b. Security
   c. Roadway
   d. Portal and informational signs
   e. Parking lot lighting
   f. Traffic lights (IUPUI only)

9. To allow the University the ability to add future exterior light fixtures to a branch circuit, loading of exterior lighting system power circuits shall not exceed 80 percent of the maximum allowed by the National Electrical Code. To accomplish this, the lighting designer shall not exceed 13 amps connected load.
on a branch circuit utilizing a 20 amp overcurrent protective device.

10. Light Emitting Diode (LED) lamps are to be used in exterior light fixtures. Other lamps / lighting sources may be used on the various IU campuses. Verify permitted lamp types with Engineering Services or CFS.

11. Control of exterior lighting shall be by photocell, time clock, lighting contactor or combination of same, as applicable for the installation. Preferred control method is by photocell. Where time clocks are used, they are to be totally digital true astronomical type that can be set to automatically compensate for Daylight Saving and Leap Year.

12. Concrete light pole bases shall be designed with 4,000 PSI concrete and properly sized re-bar necessary to support light fixture to withstand wind load for typical regional weather.
   a. Base diameter and depth below grade will vary with the light fixture to be supported and actual underground conditions. The diameter of the concrete base shall be a minimum of 2” larger than the base of the light fixture.
   b. Base height above grade will vary with the light fixture location. In grassy areas and alongside of walkways, the height above grade is to be a minimum of 6”. In parking lots and along roadways, the height above grade is to be a minimum of 36”.
   c. Top edge of base shall have continuous 1-inch, 45° chamfer.
   d. Exposed concrete shall have hand rubbed finish.

13. Exterior lighting fixtures shall be finished in Dark Architectural Bronze baked enamel unless otherwise specified.

14. Stand-alone lighting bollards shall not be used. However, lighting bollards utilized as architectural lighting integral in building railings or architectural features may be acceptable. Verify with Engineering Services or CFS prior to designing around this type of fixture.

B. IUB (Bloomington) Specific Exterior Lighting Requirements

1. Exterior light levels are to be 1 foot-candle minimum, maintained.

2. Voltage Source: All power sources shall originate in Campus buildings.

3. Walkway light fixture
   a. Washington style
      1) Fixture shall be Spring City 118 Refractive Globe with cast iron Bryn Mawr style casing with factory applied iron oxide red prime paint. Globe shall be heavy duty, injection molded refractive prismatic polycarbonate (“Acorn” type). Lamp shall be 150 Watt HPS or LED equivalent. Use NEMA Type III or V light distribution. Provide with gold colored finial where directed by Engineering
2) Pole shall be Spring City Washington Pedestrian, round, fluted, 11’ tall, one-piece heavy wall cast iron with access door in base. Provide with factory applied iron oxide red prime paint.

3) Finish of metal components shall be minimum two coats of Rust-O-Lastic #074-679 Foliage Green.

b. Arcadian style

1) Fixture shall be Spring City William & Mary. Cast aluminum housing with 3/16” pebbled finish polycarbonate panels. Lamp shall be 150 Watt HPS or LED equivalent. Use NEMA Type III or V light distribution. Provide with factory applied Rust-O-Lastic #074-679 Foliage Green paint.

2) Pole shall be Spring City Arcadian, octagonal, 12’ tall, one-piece heavy wall cast iron with access door in base. Provide with factory applied iron oxide red prime paint.

3) Finish of metal components shall be minimum two coats of Rust-O-Lastic #074-679 Foliage Green.

4) Sternberg is also an acceptable manufacturer of the Arcadian style fixture and pole. Note the Sternberg pole is cast aluminum, not cast iron.

c. Solitaire style

1) Fixture shall be Kim “Solitaire” SRS1 style. Die-cast aluminum housing elements with clear high-temperature acrylic lens. Fixture shall be fully gasketed and shall use stainless steel hardware. Fixture shall attach directly to pole; use type “FM” (flush mount) mounting feature. Lamp shall be 150 Watt HPS or LED equivalent. Provide with appropriate NEMA distribution pattern(s), as determined by calculations, to provide proper walkway illumination.

2) Pole shall be Kim Type PRA, 4” round, non-tapered, seamless 6063-T6 alloy extruded aluminum shaft welded to a 356 alloy cast aluminum base. Pole shall be 12’ tall. Provide complete with hand-hole and base cover.

3) Finish of fixture shall be Dark Bronze polyester powder coat paint. Finish of pole shall be factory applied Dark Bronze anodized finish to match fixture.

d. Square Linear Element style

1) Fixture shall be Bega “Linear Element – Square”. Fixture and pole shall be integrated to appear as single 8-5/8” square column comprised of a “solid” base section, a four (4) post open-air center section, and a “solid” top section. Construction of this fixture/pole shall be cast and extruded aluminum components. Fixture/pole shall be fully gasketed and shall use stainless steel hardware. Mounting base (anchorage unit) shall be made of galvanized steel. Lamp shall be 150 Watt Metal Halide or LED equivalent.

2) Finish of fixture and pole shall be Dark Bronze polyester powder coat paint.
4. Roadway / parking lot light fixture
   a. Archetype style
      1) Fixture shall be Kim “Archetype”, Model AR. One-piece cast aluminum housing and lens frame, completely gasketed with 3/16” thick clear tempered glass lens. Support arm shall be one-piece extruded aluminum with internal bolt guides. All hardware shall be stainless steel. Lamp shall be 250 or 400 Watt HPS or LED equivalent. Provide with appropriate NEMA distribution pattern(s), as determined by calculations, to provide proper illumination for area being lit.
      2) Pole shall be Kim Type PRA, 6” round, non-tapered, seamless 6063-T6 alloy extruded aluminum shaft welded to a 356 alloy cast aluminum base. Pole shall be 25’ or 30’ tall, as required by project. Provide complete with hand-hole and base cover. Poles shall have a factory installed pendulum vibration dampener. Vibration dampener shall be internally mounted with stainless steel hardware, finished to match pole.
      3) Finish of fixture shall be Dark Bronze polyester powder coat paint. Finish of pole shall be factory applied Dark Bronze anodized finish to match fixture.

C. IUPUI (Indianapolis) Specific Exterior Lighting Requirements

1. Exterior light levels are to be in the 1 to 5 foot-candle range with a target of 2 to 3 foot-candles and a minimum at any one point of 0.9 fc. Grass areas are not expected to be lit unless there is a landscape feature.

2. Voltage Source: Exterior lighting shall utilize 120V source wherever possible. New lighting systems and those to be connected to existing, or upgrades of existing, shall utilize 120V source. This may require conversion of existing lights to new voltage source and replacement of wiring, ballasts and lamps or the addition of transformers or use of multi-tap ballasts.

   All power sources shall originate in Campus buildings. Parking lot lighting, if fed from a building, shall be supplied from a separate metered source. Consult IUPUI CFS Utilities for metering requirements.

3. Controls: Outside lighting circuits shall be controlled by dedicated photo cell and contactor arrangement. Time clocks shall not be used. Where upgrade to existing lighting circuits or controls is required, contact CFS Utilities.

4. Spare Parts
   a. New construction or upgrade projects shall provide three (3) complete spare light pole and fixture assemblies including lamps.
   b. Where parking lot lighting is included in the project, two (2) spare pole and fixture assemblies shall be provided including lamps. In addition, light assemblies shall be chosen from manufacturers that maintain adequate spare parts inventories for no less than 10 years from date of
5. Conduit & Wiring: All lighting circuits shall be placed in PVC coated rigid steel conduit or continuous HDPE, at minimum depth of 30”. Circuit conductors shall be sized to minimize voltage drop and maximize light fixtures per circuit. #8 AWG copper protected by a 20 Amp circuit breaker is preferred. Wire insulation shall be rated THWN. Outside lighting circuits shall be dedicated sharing no other loads.

6. Walkway Lighting
   a. Fixture shall be Visionaire Lighting “Aria”, 100 Watt 41K Icetron induction lamp, part number: ARI-T5100-AM-BZ-SF-RPP4BOA.
   b. Pole shall be Valmont part number: R-12004040SHL-D1-317RH450-40RPT with the following features.
      1) Aluminum, non-tapered, 4” outside diameter
      2) Hinged base
      3) Hand-hole
      4) 9” bolt circle
      5) Have adequate wind load withstand capability for typical regional weather
      6) Drilled for the Visionaire fixture
      7) Fixture mount shall be capable of 90° and 180° rotation in relation to hinged base opening to allow mounting next to obstacles such as buildings, trees, etc. An adapter is acceptable as long as overall height limit maintained.
      8) 12’ overall height
   c. Fixture and pole color shall be matching bronze, powder coated finish.
   d. Concrete light pole base requirements shall comply with general requirements with the following modifications.
      1) 24" diameter
      2) 12” above grade. All poles in a given area or within a single project shall be the same finished height. Base height above grade may need to be adjusted if area contains sidewalk and grass installations.
      3) Refer to Drawing E1 – Non-Vehicular Area Lightpole Base Detail, at the end of this section, for additional installation requirements on the IUPUI campus.

7. Roadway Lighting
   a. The University typically does not supply roadway lighting. Roadway lighting is provided by the City of Indianapolis thru the local utility.
   b. Roadway lighting shall be aluminum 30’ poles with base suitable to withstand regional wind loading.
   c. Power source is preferred from the local utility (including pole).
   d. Poles may have single or double arm “cobra head” fixtures or floods suitable for the application. Contact CFS Utilities for approval.
   e. Lamps shall be 400W HPS standard. For other lamps types, e.g. metal halide, LED, etc., contact CFS Utilities.
8. Portal and Informational Signs  
a. Unlit signs are preferred. If sign is to be lighted, exterior, in-ground reflective lighting is preferred. If interior lighted, preferred sign light source is LED.  
b. Exterior lighted signs shall be powered from Campus buildings where possible. Voltage shall be 120V. Control shall be by photocell with override switch. OCP shall be provided by an exterior accessible molded case circuit breaker.  
c. For other power sources, contact IUPUI CFS Utilities.  

9. Parking Lot Lighting  
a. Power source for parking lots may be from the local utility provider or from Campus buildings. If from Campus buildings, circuits shall not be combined with any other exterior lighting and must be separately metered. Contact IUPUI CFS Utilities for metering requirements.  
b. Fixtures shall be International Dark Sky Association approved dark sky friendly. Lamps shall be 400 W HPS or as approved.  
c. Parking lot pole bases shall be concrete at least 24” diameter incorporating depth and rebar for suitable regional wind withstand resistance. Poles may incorporate a light pole base protector.  

10. Traffic Lights  
a. Traffic lights shall meet all City of Indianapolis and DOT standards and regulations. Lights shall include left turn arrow function at all intersections and in-lane vehicle-sensing override circuitry for signal cycle change, as well as, emergency vehicle override function. Other vehicle presence override methods may be considered; contact CFS Utilities. One (1) spare lamp of each color shall be included with the installation along with one (1) additional spare for each Controller circuit board.  
b. Lamps shall be LED.  
c. Power source shall be coordinated with local public utility, IPL/AES.  
d. A local safety switch disconnect shall be provided for disconnection and isolation from the utility power source. Enclosure shall be NEMA 4X.  
e. An in-ground enclosure, hand-hole, capable of withstanding commercial vehicle traffic, shall be provided for all splices and connections to the equipment.  
f. Circuit wiring shall be contained in HDPE conduit, minimum 24” deep.  
g. A meter base shall be provided for the local utility power meter.  
h. Contact CFS Utilities if other power sources are considered.  

D. IUS (New Albany) Specific Exterior Lighting Requirements  
1. Exterior light levels are to be 1 foot-candle minimum, maintained.  
2. Voltage Source: All power sources shall originate in Campus buildings.
3. Controls: The IUS campus is currently employing a LightBoss HID lighting control system. Contact IU Engineering Services concerning the continued use or extension of this system.

4. Walkway light fixture
   a. Solitaire style
      1) Fixture shall be Kim “Solitaire” SRS1 style. Die-cast aluminum housing elements with clear high-temperature acrylic lens. Fixture shall be fully gasketed and shall use stainless steel hardware. Fixture shall attach directly to pole; use type “FM” (flush mount) mounting feature. Lamp shall be 150 Watt HPS or LED equivalent. Provide with appropriate NEMA distribution pattern(s), as determined by calculations, to provide proper walkway illumination.
      2) Pole shall be Kim Type PRA, 4” round, non-tapered, seamless 6063-T6 alloy extruded aluminum shaft welded to a 356 alloy cast aluminum base. Pole shall be 12’ tall. Provide complete with hand-hole and base cover.
      3) Finish of fixture shall be Dark Bronze polyester powder coat paint. Finish of pole shall be factory applied Dark Bronze anodized finish to match fixture.

5. Roadway / parking lot light fixture
   a. Archetype style
      1) Fixture shall be Kim “Archetype”, Model AR. One-piece cast aluminum housing and lens frame, completely gasketed with 3/16” thick clear tempered glass lens. Support arm shall be one-piece extruded aluminum with internal bolt guides. All hardware shall be stainless steel. Lamp shall be 250 or 400 Watt HPS or LED equivalent. Provide with appropriate NEMA distribution pattern(s), as determined by calculations, to provide proper illumination for area being lit.
      2) Pole shall be Kim Type PRA, 6” round, non-tapered, seamless 6063-T6 alloy extruded aluminum shaft welded to a 356 alloy cast aluminum base. Pole shall be 25’ or 30’ tall, as required by project. Provide complete with hand-hole and base cover. Poles shall have a factory installed pendulum vibration dampener. Vibration dampener shall be internally mounted with stainless steel hardware, finished to match pole.
      3) Finish of fixture shall be Dark Bronze polyester powder coat paint. Finish of pole shall be factory applied Dark Bronze anodized finish to match fixture.

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