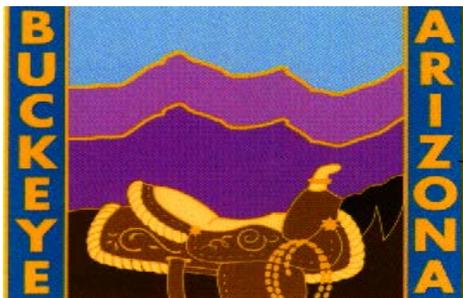


**LIGHTING**

**Section 7-2**

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**PUBLIC  
STREETLIGHTS**



The Town Of *Buckeye* Arizona

Engineering Design Standards

Section 7-2

Adopted December 2012



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## Section 7-2 – Public Streetlights

This section provides policy and standards establishing design criteria for constructing and modifying the public streetlights adjacent to public streets. These lights are owned and operated by the Town of Buckeye (Town). However, the Town utilizes Arizona Public Service (APS) standards and specifications for light and pole construction. The light levels required are set by the Town for all public and private streets. This section provides guidance on the design of the streetlights, and final plans preparation.

The requirements of this section may be modified at any time by the Town Engineer.

The Town Engineer may approve variances to the requirements of this design standard. Variance requests must be submitted in writing and include a justification for the variance requested. A copy of the Town approved variance shall be included with the submittal of any plans or design reports to the Town that incorporate the variance.

The Town Engineer is required, pursuant to Chapter 23, Article 23-2, of the Town Code, to develop standards and detail regarding public improvements to be constructed within the Town. The standards, design criteria, and policy set forth in this section were developed and recommended by the Town Engineer pursuant to Chapter 23, Article 23-2 and adopted by Town Council in Resolution No. 139-12.



## 7-2 Public Streetlights

### 7-2.000 General Information:

#### 7-2.001 **Streetlight Infrastructure Requirements:**

- A. This section is to aid the engineer in developing a streetlight design to meet the Town of Buckeye minimum standards.
- B. Developers/Landowners are required, pursuant to Town Code, including the Town Development Code, to design and install street lighting on all streets within and adjacent to their sites.
- C. Developers/Landowners shall install, at their expense, all on-site and off-site street lighting necessary to serve their developments.
- D. The Town street lighting requirements are to be in accordance with the *American National Standard Practice for Roadway Lighting* (RP-8-00) as published by American National Standards Institute (ANSI) and the Illuminating Engineering Society of North America (IES).
- E. All new development is subject to the implementation of a Streetlight Improvement District (SLID) in accordance with Town of Buckeye Ordinance 43-05 as found in Chapter 20, Article 20-15-1 of Town Code and in Resolution No. 109-12.
- F. All street lighting in the Town shall be in compliance with A.R.S. Title 49, Chapter 7, Article 1 – Light Pollution.
- G. All dark sky requirements adopted by the State of Arizona or MAG shall be complied with whether or not they are listed specifically in this document.

#### 7-2.002 **Definitions and Abbreviations:**

- A. AASHTO - American Association of State Highway and Transportation Officials
- B. ANSI - American National Standards Institute
- C. APS - Arizona Public Service
- D. A.R.S. - Arizona Revised Statutes
- E. AWG - American Wire Gauge
- F. CAP - Central Arizona Project
- G. CMP - Community Master Plan
- H. Developer - Shall mean the individual or entity causing Development of land in the Town, including Development companies authorized to act on behalf of the Developer and the term Developer shall also mean a contractor (“Contractor”) authorized to act on behalf of the Landowner or Developer. Developer shall also be interpreted to mean Landowner.
- I. Development or development - Shall have the same meaning as defined in the Town Development Code.
- J. Engineer or engineer - An engineer registered professionally in the State of Arizona pursuant to the provisions of A.R.S. §32-101; §§32-121-131; §§32-141-152, as amended.
- K. EIA - Electronic Industries Association



- L. Foot Candle - A unit of illumination on a surface that is everywhere one foot from a uniform point source of light of one candle and equal to one lumen per square foot.
- M. GPS - Geographic Positioning System
- N. HPS - High Pressure Sodium
- O. IES - Illuminating Engineering Society of North America (IESNA)
- P. Landowner - Shall mean the owner of the land in the Town on which Development occurs. "Landowner" shall also be interpreted to mean Contractor and/or Developer, including Development companies authorized to act on behalf of the Developer/Landowner.
- Q. LED - Light Emitting Diode
- R. Lumen - A unit of luminous flux equal to the light emitted in a steradian by a uniform point source of one candle intensity.
- S. Luminary - An object that gives off or emits light.
- T. MAG - Refers to the Maricopa Association of Governments Uniform Standard Specifications and Details for Public Works Construction current edition.
- U. NEC - National Electric Code
- V. NEMA - National Electrical Manufacturers Association
- W. NESC - National Electric Safety Code
- X. Photometric - Measurement of the properties of light, especially luminous intensity.
- Y. Plan(s) or plan(s) - Design drawings that are 100% complete and sealed by a registered professional Engineer as defined above.
- Z. ROW - Rights-of-Way
- AA. SLID - Streetlight Improvement District (Refer to Chapter 20 of the Town Code)
- BB. SRP - Salt River Project
- CC. TOB - Town of Buckeye
- DD. Town - Town of Buckeye
- EE. Town Engineer - Town of Buckeye Town Engineer or designee
- FF. WAPA - Western Area Power Administration

### 7-2.003 Design Policy:

- A. Developers/Landowners must adhere to the Town's requirements for street lighting within the Town of Buckeye limits.
- B. Generally, streetlights are required on all public and private streets within the Town (certain large lot developments do not require streetlights, depending upon the determination of the Town Engineer).
- C. Streetlight plans shall be prepared and sealed by a licensed Professional Electrical Engineer registered in the State of Arizona.
- D. The street lighting design shall be submitted to the Town for review and approval.



- E. Town approval of plans and associated designs are valid for one (1) year from the date of the Town Engineer's signature.
- F. All construction documents shall be prepared by a registered Professional Electrical Engineer licensed and practicing in the State of Arizona pursuant to the provisions of A.R.S. §§32-101, 32-121 to 131; 32-141 to 152. Each sheet of the plans shall include the appropriate professional State of Arizona seal, signature, date and date of expiration below seal. The Town does not require original seals and or signatures (wet seal) on design documents during the review cycle.
- G. All final plans shall be submitted to the Town of Buckeye for review and approval. Plan review fees shall be paid at the time of plan submittal.

**7-2.004 Diligence:**

- A. Developers/Landowners shall verify the need for any streetlight improvements necessary. It is the Developer's responsibility to become familiar with all of the existing site conditions. Available resources in which to find this information:
  - 1. Records – obtain existing utility maps and As-Built drawings.
  - 2. Town's website – <http://www.buckeyeaz.gov>.
- B. Any apparent field condition, error, omission, etc. shall be brought to the attention of the Town Engineer.

**7-2.005 Implementation:**

- A. The implementation and enforcement of the design standards set forth in this section shall be effective the date of Town Council's adoption of the resolution approving the standards and requirements of this section and shall apply to the following:
  - 1. All new plans and reports submitted to the Town following the effective date of Town Council's adoption of the resolution approving the standards and requirements of this section.
  - 2. All plans seeking a new Town Engineer's signature or a re-approval from the Town Engineer.
  - 3. All expired plans shall be brought into conformance with the design standards of this section.
  - 4. All plans produced under an approved CMP shall follow or be brought into conformance with the design standards of this section.
  - 5. All current approved plans that have not been permitted shall comply with the requirements of this section. Prior to the issuance of the construction permit, the design engineer shall submit a written letter to the Town Engineer acknowledging the construction and materials shall be performed and supplied pursuant to the requirements of this section.
  - 6. All expired or abandoned plans as defined below.
    - a. The Town will not hold or store plans. Any plan set that has not been picked up from the Town within 90 days of the Town's first notification to the applicant that the plans are ready to be picked up will be deemed abandoned. The Developer/Landowner will be notified that the expired plan set will no longer be considered by the Town. If a plan is abandoned, the Developer/Landowner will be required to resubmit the abandoned plan and pay the Town all associated fees.



- b. If a construction permit for the plans has not been issued within 1 year from the date of approval noted on the cover sheet, the plans will be required to be resubmitted to the Town for review and re-approval.
  - i. In order to resubmit plans, the design engineer shall bring the plans into conformance of the Town's current standards and requirements.
  - ii. All revised plans will be subject to the Town's current fee schedule.
  - iii. This resubmittal is required to go through a comprehensive review of all plan sheets.
- c. If plans have not been resubmitted to the Town for review or permitting within 2 years from the date of the last Town action the plans shall be considered expired. Once a plan has expired, the plan shall be resubmitted for first review and all associated fees shall be paid to the Town.
  - i. In order to resubmit plans, the design engineer shall bring the plans into conformance of the Town's current standards and requirements.
  - ii. All expired plans being resubmitted will be subject to the Town's current fee schedule.
  - iii. This new submittal is required to go through a comprehensive review of all plan sheets.

**7-2.100 State Lighting Regulations:**

- A. All dark sky and light pollution requirements adopted by the State of Arizona or MAG shall be complied with whether or not they are listed specifically in this document.
- B. Dark Sky Compliance:
  1. The intent of dark sky compliance is to improve the visibility of the nighttime sky without causing or creating any impacts on safety by reducing lighting conditions that include, but are not limited to light trespass, sky-glow, and glare. All new roadway lighting fixtures shall be fully shielded so as to emit zero light above a horizontal plane (100% cut-off).
  2. The provision is intended to control the use of outdoor artificial illuminating devices emitting rays into the night sky which have a detrimental effect on astronomical observations. It is the intention of this provision to encourage good lighting practices such that lighting systems are designed to conserve energy and money, while increasing nighttime safety, utility, security and productivity.
  3. Conformance with Applicable Codes:
    - a. All outdoor artificial illuminating devices shall be installed in conformance with the provisions of this section and any building code now in effect or which may hereafter be enacted, as applicable.
    - b. Where any provisions of the Arizona Revised Statutes, any Federal law, or any companion Ordinance conflicts with the requirements of this outdoor light control provision; the most restrictive shall govern.
    - c. The provisions of this section are not intended to prevent the use of any material or method of installation not specifically prescribed.



- d. As new lighting technology develops which is useful in reducing light above the horizontal, consideration shall be given to use of state of the art technology in keeping with the intent of this provision.
4. Shielding:
    - a. All exterior illuminating devices, except those shall be fully or partially shielded as described in the requirements for shielding and filtering below:
      - i. There are typically four degrees of shielding in outdoor lighting fixtures (luminaires), depending on the light they emit upward and at an angle:
        1. “Fully Shielded” or “Full Cutoff” shall mean that those fixtures so designated shall be shielded in such a manner that light rays emitted by the fixture, either directly from the lamp or indirectly from the fixture, are projected below a horizontal plane running through the lowest point of the fixture where light is emitted; zero light emitted and no more than 10% of light emitted at the 80 degree angle.
        2. “Partially shielded” shall mean that those fixtures so designated shall conform to the classification of “Cutoff,” defined as follows:
          - a. 2.5% of light or less emitted upward; 10% or less emitted at the 80 degree angle. A luminaire light distribution is designated as cutoff when the candle-power per 1,000 lamp lumens does not numerically exceed 25 lumens (2.5%) at an angle of 90 degrees above Nadir (horizontal), and 100 lumens (10%) at a vertical angle of 80 degrees above Nadir. This applies to any lateral angle around the luminaire.
        3. “Semi-Cutoff” shall mean that 5% of light or less is emitted upward; 20% or less emitted at the 80 degree angle.
        4. “Non-Cutoff” shall mean no limits.
      - ii. **All new streetlight luminaires installed shall be full cutoff as defined above. The other three (3) fixture styles are mentioned as reference only, and will not be utilized in street lighting design.**
      - iii. A full cutoff fixture has a slightly narrower footprint of illumination than the semi-cutoff at a given height above the ground, but allows no upward light emission, and casts no more than 10% of its light at a high (80 degree) angle, thereby reducing lateral glare, energy loss, and sky-glow.
      - iv. For all streetlight design and installation, the fixture type shall be fully shielded and shall meet the State of Arizona dark sky and light pollution provisions contained in the Arizona Revised Statutes.

#### 7-2.200 Street Lighting:

##### 7-2.201 **General Requirements:**

- A. The Developer/Landowner shall retain a Professional Electrical Engineer, registered in the State of Arizona, to prepare the lighting system design and appropriate calculations relative to illumination levels. Illumination design shall follow the recommendation of the American National Standard Practice for Roadway Lighting, IES RP-8.00.



- B. HPS fixtures are the standard for all non-metered installations; however the Town will consider proven energy efficient fixtures such as LED fixtures and others when accompanied by an analysis of the capital and life-cycle costs of providing those fixtures.
- C. Luminaires provided on traffic signals for intersection lighting shall be LED fixtures (see Design Standards – Section 6-4 Traffic Signals).
- D. All Town owned metered streetlights shall be LED.
- E. The photometric analysis shall include all lights being proposed and all area to be lit.
- F. A maximum of a 4 foot grid shall be used in the photometric analysis.

**7-2.202 Photometric Distribution Design Requirements:**

- A. The luminance criteria, with light loss factors of 0.80, shall be used to determine the compliance with the IES RP-8.00 and Town street lighting design standards.
- B. A photometric lighting analysis is required for all streetlight submittals to ensure the Town minimums are being met.
- C. All street lighting designs shall meet the photometric requirements as stated in [Table 1](#) for the appropriate street classification.
- D. Intersection light levels shall be least equal to the sum of the values recommended by IES for each street that forms the intersection. Photometric lighting analysis shall be provided to show that this requirement is satisfied and LED fixtures shall be utilized at those intersections that are traffic signal warranted (see Design Standards – Section 6-4 Traffic Signals).

**Table 1 Photometrics by Street Classification**

STREET CLASSIFICATION	AREA TYPE	AVERAGE FOOT-CANDLES		AVERAGE TO MINIMUM
		Min	Max	
Arterial Street	Commercial	1.58	2.05	3:1
Arterial Street	Residential	0.84	1.09	3:1
Collector Street	Commercial / Industrial	1.11	1.44	4:1
Collector Street	Residential	0.56	0.73	4:1
Local	Commercial	0.84	1.10	6:1
Local	Residential	0.37	0.48	6:1

**7-2.203 Pole Requirements:**

- A. Arterial-to-arterial intersections must have four (4) streetlights. All other intersections require two (2) streetlights, and cul-de-sacs require a minimum of one (1) streetlight. There shall be no more than one (1) light per lot.
- B. All poles shall be 5 inches square steel construction and powder coated, dark bronze, (cocoa) in color.
- C. Direct bury pole bottoms shall be uniformly half lap taped with Scotch 50 corrosion protection tape or approved equal, up to 2 inches below hand hole.
- D. All location dimensions shall be measured from the center of the streetlight to the center of the obstacle unless the back of curb, or an item’s edge is specified, then the measurements shall be taken from the defining edge.



- E. Poles shall be located no closer than 2 feet to any pedestrian path, trail, or sidewalk.
- F. Poles shall be located /centered at 6 feet to the back of curb and no closer on streets having posted speeds greater than 35 miles per hour.
- G. Poles shall be located no closer than 4 feet to the back of curb on streets having posted speeds less than or equal to 35 miles per hour.
- H. Poles shall be located no closer than 9 feet from the edge of pavement on streets having posted speeds less than 35 miles per hour where vertical curb or roll curb does not exist.
- I. Poles shall be located per the AASHTO Roadside Design Guidelines on streets having posted speeds greater than or equal to 35 miles per hour where vertical curb does not exist.
- J. A minimum of 4 feet of clearance is required between streetlights and other utilities.
- K. Streetlight poles are not to be located in the radius of intersections or commercial driveways.
- L. Streetlights shall not be located within 6 feet of a residential driveway.
- M. Streetlights shall not be located any closer than 20 feet to a tree.
- N. Streetlights shall be no closer than 6 feet to a fire hydrant.
- O. All streetlights are to be located within ROW.
- P. All pole foundations and pull boxes are to be at sidewalk grade unless otherwise noted.
- Q. Streetlights on lot frontages in residential areas shall be located at property lines whenever possible.
- R. All streetlights shall have a station and offset.

**Table 2 Pole Criteria by Classification**

Street Classification	Area Type	Maximum Spacing * (Feet)	Pole Height (Feet)	Pole Foundation	Mast Arm (Feet)	Fixture Height (Feet)
Arterial, no Median	Commercial / Residential	140 **	32	Pedestal	Single, 8 x 8	40
Arterial, with Median	Commercial / Residential	180	32	Pedestal	Double, 8 x 8	40
Collector, no Median	Commercial / Industrial	150 **	32	Pedestal	Single, 8 x 8	40
Collector, with Median	Commercial / Industrial	170	32	Pedestal	Single, 8 x 8	40
Collector, no Median	Residential	120 **	38	Direct Bury	4	32
Collector, with Median	Residential	140	38	Direct Bury	4	32
Local	Commercial	180	38	Direct Bury	4	32
Local	Residential	200	38	Direct Bury	4	32

\*Average streetlight spacing is a recommendation. The minimum photometrics must be verified by a registered electrical engineer through a sealed photometric lighting analysis.  
 \*\*Poles staggered.

**7-2.204 Luminary Requirements:**

- A. Architectural style light luminaire fixtures shall be the “shoebox” type, powder coated, dark bronze, (cocoa) in color.



- B. Luminaries shall be fuseless with photoelectric control.
- C. In-line fuses installed in pullbox shall be waterproof.
- D. All photo cells shall fail in the on position.
- E. Luminaires shall have an identification tag indicating the lamp wattage and type of lamp by color code; visible from the ground.

**Table 3 Fixture Criteria by Classification**

Street Classification	Lumens, Max.	Type	Wattage, Max.	Voltage	Ballast	Photometric Distribution
Arterial	30,000	HPS	250	Per APS	HPF	Type III
Industrial	30,000	HPS	250	Per APS	HPF	Type III
Collector, Commercial	30,000	HPS	250	Per APS	HPF	Type III
Collector, Residential	15,000	HPS	150	Per APS	HPF	Type II, III
Local	9500	HPS	100	Per APS	HPF	Type II

**7-2.300 Plan Preparation:**

**7-2.301 General Requirements:**

- A. All plans shall comply with “Design Standards - Section 1-2 Plan Submittal Requirements” General Construction Notes and Standard Sheets for Infrastructure Plan Submittals.

**7-2.302 Design Plan Requirements:**

- A. All plans shall be neat and legible.
- B. All plans shall be drawn to scale.
- C. Horizontal scale shall not be smaller than 1:40 feet on plan views.
- D. A summary table shall be added to the Town standard cover sheet that has the following information:
  1. Item number
  2. Symbol
  3. Street type
  4. Offset behind back of curb
  5. Quantity:
    - a. Pole height
    - b. Pole foundation
  6. Mast arm size
  7. Luminaire:
    - a. Mounting height



- b. Lumens
  - c. Wattage
  - d. IES distribution
  - e. Voltage
  - f. Type
  - g. Style
8. APS standard specification number
  9. GPS coordinates of pole
- E. The luminaire voltage on non-metered streetlights shall be per the APS design.
- F. All future and existing streetlights adjacent to and within 300 feet of the first proposed streetlight must be shown with stationing and dimensional ties to the street centerline.
- G. The plans shall show all existing and proposed fire hydrants and provide dimensional ties to fire hydrants where potential conflicts may occur.
- H. Lights in elbows and cul-de-sacs (anywhere other than standard street locations) require radial ties and shall be provided with APS standard backlight shields.
- I. Phasing is not allowed.
- J. A minimum of four (4) monuments for subdivisions and two (2) for standalone street lighting shall be labeled with information tying this plan set to the other development plans.
- K. If the lighting plan is not associated with a set of paving plans survey data is required for street centerlines (bearing and distances).
- L. Provide stations at all intersections and changes of alignment.
- M. A photometric analysis is required for entire area being designed.
- N. Additional photometrics shall be required for ultimate build-out condition.
- O. Voltage drop calculations shall be provided. Voltage drop on any given run should not be greater than 4.0%. Length of the run, wire size, voltage, load amps, and percent drop shall be submitted for review.
- P. Two (2) sets of photometrics shall be required when only a portion of a street is being developed at the current time (typically half-street improvements):
1. The first set of photometrics shall be for the current conditions only and shall prove that required lighting levels, pole spacing, etc. is in compliance with these design standards.
  2. The second set of photometrics shall be for the future conditions and shall prove that either the staggered pole placement design or the median light (dual mast arm) design is in compliance with these design standards.
- Q. Assure that future streetlight photometrics show lights at build-out street offsets.

### 7-2.303 Plan Submittal Requirements:

- A. All plans submittals shall comply with the Town submittal requirements "Design Standards - Section 1-2 Plan Submittal Requirements" General Construction Notes and Standard Sheets for Infrastructure Plan Submittals.

**7-2.304 Town of Buckeye Permit:**

1. The Developer/Landowner shall secure a permit from the Town for constructing all streetlights on the approved streetlight plans.
2. If a revised plan set is submitted, approved, and signed then the Developer/Landowner is responsible for securing a revised permit from the Town.

**7-2.305 Materials:****A. Submittals:**

1. All streetlights that are to be owned by the Town are not required to have material submittals submitted to the Town for review and approval. However, all streetlight components shall meet APS standards.
2. All streetlights on metered services are required to have material submittals, submitted, reviewed, and approved by the Town.
3. All delivered materials shall match the approved technical data or it will be rejected.
4. The contractor shall submit four (4) copies of the submittals to the Town Engineer.
5. All work installed prior to approval of submittals is subject to rejection by the Town.
6. A copy of the approved material submittals shall be on the jobsite at all times.
7. Each of the submittals shall clearly show the manufacturer and have comprehensive technical data for the proposed product.

**B. All non-metered streetlights owned by the Town shall meet all APS standards.****C. All metered streetlights owned by the Town are required to have approved architectural requirements and specifications on the lighting being proposed.****7-2.306 As-Built Drawings:****A. All plans shall comply with "Design Standards - Section 1-2 Plan Submittal Requirements."****B. Final As-Built drawings (only Final As-Built are required):**

1. Final As-Built drawings required for submittal.
2. All pole numbers shall be As-Built.
3. All stations and offsets shall be As-Built.
4. All monuments shown shall be As-Built.
5. All GPS coordinates of streetlights shall be As-Built.

**7-2.307 Tolerances and Corrections:**

- A. Streetlights that have moved greater than 10 feet from their design locations shall have the photometric plan redone to ensure the lighting levels are still in conformance with the Town requirements.
- B. If the streetlight is not in the location per plan and the Town deems it a hazard, the Developer/Landowner shall move the light out of harm's way to a location as approved by the Town and new GPS coordinates provided.



- C. If a streetlight is determined by APS, SRP, WAPA, and/or CAP to be within the sag of clearances of high power electrical lines, the development shall move or reduce the height of the pole to meet the requirements and new GPS coordinates provided if the pole is moved.
- D. If other improvements to the project have been modified for any reason (different site conditions, unknown utilities, construction errors, surveying errors, etc.) and the streetlight locations must be moved beyond acceptable tolerances, Town approval will be required prior to installing streetlights in new locations. Failure to comply will result in removal of the streetlight(s) at the Developer/Landowner's or Contractors expense.

[END OF SECTION]



**Appendix 1 Standard Details**

- 72100-1 Streetlight Notes Page 1 of 2
- 72100-2 Streetlight Notes Page 2 of 2
- 72300 Street Lighting Schedule

**STREET LIGHTING NOTES**

1. All materials and construction shall conform to the requirements of the specification.
2. Pole shall comply with current AASHTO loading requirements for Structural Supports for Highway Signs, Luminaires, and Traffic Signals.
3. Refer to APS detail for anchor bolt details.
4. The foundation hole shall be augered and MAG Class "A" (3,000 PSI) concrete, poured against undisturbed compacted earth.
5. Unstable soil and/or a steep slope will require a deeper foundation. Refer to manufacturer requirements, design plans, and special provisions for details.
6. Each pole shall have an 8' X 5/8" copper clad ground rod, driven outside the area excavated for the pole. Ground rods shall be located in the J-box. A #6 bare copper lead shall be used between the ground rod and the landing lug.
7. The pole shall be straight pipe.
8. All welds shall be ground smooth, and all burrs and sharp edges shall be removed prior to any painting.
9. All dimensions are nominal.
10. Refer to plan details for variations in pole applications.
11. At no time shall slip-base poles, bases, foundations, etc. be permitted for use.
12. A metal tag shall be permanently attached to the pole above the hand hole stating the manufacturers name, pole type and mast arm type per the Town's plans, pole drawing number, shaft length, and gage number.
13. A metal tag shall be permanently attached to the mast arm next to the mounting plate, and oriented so that it faces the ground stating the manufacturers name, pole type and mast arm type per the Town's plans, pole drawing number, shaft length, and gage number.
14. Once the pole installation is completed the open space between the base plate and foundation shall be grouted with a non-shrink grout.
15. If an inboard tenon is specified, refer to tenon detail on the design plans and special provisions.
16. All poles, mast arms, foundations, j-bolts, anchor plates, washers, nuts, etc. shall conform to manufacturer's specifications. All materials shall include a structural engineer's certification indicating compliance with the AASHTO criteria and this specification, and shop drawings covering the specified material requirements for signal poles, mast arms, and appurtenances shall be furnished.
17. Conductors hanging within the pole shall be supported from the top by an approved cable hanger.
18. A hand hole cover locking device shall be used.
19. The hand hold shall be 3"x5", and the cover plate will be at least 16 gauge.
20. Pole ground shall be 5/16" Diameter National Coarse (NC) tapped hole.
21. Hand hole shall be oriented so that it is aligned with the mast arm.
22. Hand hole height shall be 2'-6" from center of hand hole to the base plate of the pole.

**STREET LIGHTING NOTES**

- 23. Hand hole cover may be rectangular shape or oval shape.
- 24. The exact configuration of the hand hole can vary as long as the function and basic size is 3"x5".
- 25. Anchor bolts shall conform to the pole manufacturer's standards and be minimum ASTM F 1554 grade 55 steel.
- 26. All anchor bolts, nuts, and washers shall be fully galvanized per ASTM A153.
- 27. Rebar shall be per ASTM A 615 latest edition grade 60 and shall be tied together. No tack welding allowed.
- 28. Rebar shall not be set closer than 3" to any exterior surface.
- 29. The top of the pole foundation and pull boxes shall match existing sidewalk grade wherever possible. If no sidewalk exists than the pole foundation shall extend 1" above the finished grade. Pull boxes shall be set to match the existing slope.
- 30. Pull boxes shall have bolts installed prior to energizing. The bolts shall be a security type requiring a specialized tool to remove. Minimum of penta-head style bolts shall be required.
- 31. Compaction beneath and around the pull boxes shall be a minimum of 85 percent.
- 32. The pull box cover shall read "Street Lighting"
- 33. Pole offset shall comply with the pole schedule and design plans. Field adjustments may be permitted at the discretion of the design engineer.
- 34. Conduit shall extend a minimum of 2" above the foundation.
- 35. The use of conduit caps shall be required to keep the sweep free from dirt and debris during the foundation construction. Do not glue on caps.
- 36. Anchor bolt projection shall be according to the pole manufacturer's specifications.
- 37. If the streetlight is placed in sidewalk, extend the anchor bolts to a maximum of 3 ¼" above the foundation.
- 38. The foundation shall be poured in drilled holes. Use a minimum of 18" deep sonotube at the top of the foundation to provide uniform and controlled foundation.
- 39. The foundation template shall be removed after the concrete has set.
- 40. The foundation shall be troweled smooth with a slight slope to promote moisture runoff finish with ½" rounded edge.
- 41. If street light pole foundations are to be placed in a concrete pad (sidewalk, handi-cap ramp) there shall be a ½" piece of expansion material between the foundation and the concrete pad.



STREET LIGHTING SCHEDULE															
Key No.	Sym	Street Type	Offset Behind Curb	Qty	Pole		Mast Arm	Luminaire						APS Standard Code No.	
					Pole Height	Foundation	Size	Mounting Height	Lumens	Wattage	I.E.S. Dist.	Voltage	Type		Style
1		Arterial	*		32'-0"	Pedestal	8' X 8'	40'-0"	30,000	250W	Type III	240	HPS	Architectural (Shoebox)	8050.SS8AH4*D
2		Collector	*		38'-0"	Direct Bury	4' - 0"	31'-6"	16,000	150W	Type III	240	HPS	Architectural (Shoebox)	8030.S2AF*D
3		Local	*		38'-0"	Direct Bury	2' - 0"	31'-6"	9,500	100W	Type II	**	HPS	Architectural (Shoebox)	1940.38

Notes:

\* See design standards for acceptable locations.

\*\* Voltage shall be either 120 VAC or 240 VAC

