

Parking Lot Light Pole Base: Installation & Standards Guide

A field-ready reference for contractors, project managers, and inspectors covering installation sequence, foundation requirements, electrical standards, and inspection checkpoints for parking lot light pole base installations.

The parking lot light pole base is one of the most frequently installed — and most frequently under-specified — structural elements in commercial site construction. It is treated as a commodity line item on most project budgets, yet it is the component most likely to generate a failed inspection, a structural failure callback, or a contractor dispute when it is not installed correctly.

This guide is for the people who build and inspect these installations: general contractors, electrical contractors, site supervisors, project managers, and municipal or private inspectors. It covers the standards that govern parking lot light pole base installations, the correct installation sequence from excavation through backfill and energization, the most common installation errors and how to avoid them, and the inspection checkpoints that must be satisfied before energization.

It also serves design engineers and specifiers who want to write installation specifications that translate correctly from the drawing to the field.

Scope of This Guide

This guide covers direct-burial and anchor-bolt foundation installations for steel and aluminum parking lot light pole bases in standard commercial parking environments. It does not cover highway or roadside installations subject to AASHTO LTS-6, which have additional structural and traffic safety requirements addressed in a separate guide.

Governing Standards and Code References

A correct parking lot light pole base installation must satisfy multiple overlapping standards. The following table summarizes the primary references and what each governs:

Item	Standard / Requirement
ASCE 7-22	Minimum design wind loads; required basis for structural calculations
ANSI C136.31	Luminaire vibration and pole attachment; referenced by most pole manufacturers
NFPA 70 (NEC) Art. 225	Outside branch circuits and feeders; wiring method to pole bases
NFPA 70 (NEC) Art. 300	General wiring requirements; underground conduit burial depths
NFPA 70 (NEC) Art. 410	luminaires (fixtures); applies to luminaire wiring within the pole
NFPA 70 (NEC) Art. 250	Grounding and bonding; pole and base must be bonded to EGC
ASTM A123	Hot-dip galvanizing specification for steel pole bases and anchor bolts

ASTM F1554	Anchor bolt material specification; Grade 55 most common for light poles
ACI 318	Concrete foundation design; applies to anchor bolt cage and drilled pier design
IBC / local building code	Foundation depth, frost depth, and permit requirements by jurisdiction
ADA Standards	Clear ground space, accessible routes around pole bases in pedestrian areas

Before beginning any installation, confirm which edition of each standard has been adopted by the local Authority Having Jurisdiction (AHJ). NEC editions vary by municipality; some jurisdictions have adopted 2023, others remain on 2017 or 2020. The structural standard (ASCE 7) edition matters for wind load calculations — confirm with the engineer of record.

Pre-Installation Requirements

Design Documents to Have on Site

Before breaking ground, the following documents should be on site and reviewed by the installation crew supervisor:

- Approved construction drawings showing pole base locations, layout dimensions, and setbacks
- Pole and base shop drawings or cut sheets showing anchor bolt circle, projection, and pole base dimensions
- Structural engineer's foundation design (if project-specific rather than catalog standard)
- Electrical single-line diagram showing circuit routing and conduit schedule
- Soils report or geotechnical summary if soft, expansive, or fill soils are present
- Utility locate confirmation (811 call and markings in field)

Utility Locates

Utility locates (811 / Call Before You Dig) are legally required in every U.S. state before any excavation. Locate markings are valid for a defined window — typically 3 business days to 10 days depending on jurisdiction — and must be renewed if excavation has not begun before the window expires. Confirm the locate window with your state's 811 program before scheduling the excavation crew.

Critical Pre-Installation Check

Never assume a parking lot is clear of utilities based on age or prior use. Abandoned conduit, undocumented irrigation, private fiber, and legacy fuel lines are frequently encountered in parking lot excavations and are not always in utility locate databases. Proceed carefully for the first 18 inches of any excavation and hand-dig within 18 inches of any marked utility.

Layout and Positioning

Pole base center locations should be established by survey or layout from established control points on the site plan. Do not layout from painted parking stall lines — pavement markings are frequently not in the exact positions shown on drawings. Confirm the following before excavation:

- Pole base center location confirmed from survey control or established benchmark

- Setback from parking stall bumper stop confirmed (typically 2 ft minimum from face of base to bumper stop face)
 - Clearance from accessible stall access aisle confirmed per ADA requirements
 - Overhead clearance confirmed for pole height plus luminaire: no conflicts with overhead utilities, trees, or building overhangs
 - Underground conduit routing confirmed from panel or junction box to each base location
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Direct-Burial Installation: Step-by-Step

Direct-burial is the most common installation method for parking lot light poles in new construction. The pole base is set in a concrete foundation poured in place around the lower section of the pole shaft. Follow this sequence:

Step 1 — Excavation

1. Excavate to the depth specified on the structural drawings. If no project-specific depth is specified, use the pole manufacturer's catalog foundation depth — typically 10–15% of pole height plus 2 feet, but never less than 48 inches in non-frost areas or below the local frost depth in frost-prone climates.
2. Excavation diameter should be a minimum of 6 inches larger than the pole base diameter on all sides to allow concrete placement without voids.
3. In soft or sandy soils, install a form tube (Sonotube or equivalent) to prevent soil collapse into the excavation before concrete placement.
4. Confirm excavation bottom is firm and undisturbed. If soft or disturbed material is encountered at the bottom, over-excavate and backfill with compacted gravel to a firm bearing surface.

Step 2 — Conduit Installation

5. Install underground conduit into the excavation before concrete placement. Schedule 40 PVC is standard for underground runs; RMC (rigid metal conduit) is used where conduit will be exposed above grade or where additional mechanical protection is required.
6. Extend conduit into the excavation to the height specified for conduit entry into the pole base — typically 3 to 6 inches above the finished concrete surface.
7. Install a pull string or mule tape in each conduit before concrete placement. Conduit access is not possible after concrete is poured.
8. Cap all conduit ends during concrete placement to prevent concrete intrusion.
9. Install a separate conduit stub if a ground rod is required at the base location. Confirm grounding electrode requirements with the electrical engineer of record.

Field Tip: Conduit Positioning

Mark the conduit position on the form tube or excavation walls before placing concrete. Once concrete is placed, conduit that has shifted is impossible to reposition without demolition. Use conduit supports or temporary stakes to hold conduit in position during pour.

Step 3 — Concrete Placement

10. Use concrete mix meeting the specification — typically 3,000 psi minimum 28-day compressive strength ($f'_c = 3,000$ psi) per ACI 318. In freeze-thaw environments, specify air-entrained concrete with 5–7% air content.
11. Place concrete in lifts, consolidating each lift with a vibrator or rod to eliminate voids. Voids in the concrete column significantly reduce the moment capacity of the foundation.

12. Set the pole base into the wet concrete, maintaining plumb within the tolerance specified — typically 1/8 inch per foot of pole height, not to exceed 1 inch total out of plumb.
13. Finish the top of the concrete to drain away from the pole base on all sides. A slight crown or slope prevents water pooling at the base-to-concrete interface, which accelerates corrosion.
14. Protect fresh concrete from freezing (below 40°F) or rapid drying (above 90°F or high wind) per ACI 305/306 requirements. Cold weather and hot weather concrete practices apply to pole base foundations the same as to structural slabs.

Step 4 — Curing and Pole Erection

15. Allow concrete to cure to minimum 70% of design strength before erecting the pole and applying any load. At standard temperatures, this is typically 7 days for 3,000 psi concrete. Accelerated cure mixes or warm weather may permit earlier loading — confirm with the mix design.
16. Do not allow vehicle or equipment traffic over the freshly poured foundation area during cure.
17. After cure, erect the pole shaft, attach the luminaire arm and fixture, and pull conductors from the service point through the conduit to the pole base.

Anchor-Bolt Installation: Step-by-Step

Anchor-bolt (cast-in-place) foundations are used where future pole replacement without excavation is required, for larger poles or heavier equipment loads, and in structured parking decks or hardscape where direct burial is not feasible. The sequence differs from direct burial primarily in the foundation preparation phase.

Anchor Bolt Cage Preparation

- Anchor bolts must meet ASTM F1554 Grade 55 (most common for light poles) or Grade 105 as specified by the structural engineer
- The bolt circle diameter, bolt quantity, bolt diameter, projection above top of concrete, and thread length must match the pole base bolt pattern exactly — confirm against the pole shop drawing before ordering
- Anchor bolt cages should be fabricated with a template plate at the top to maintain bolt spacing and alignment during concrete placement
- J-bolt configurations (bent lower end) are common for light poles; straight bolts with nut-and-washer at bottom are used for larger loads

Setting and Leveling

18. Set the anchor bolt cage in the excavation, aligned to the pole orientation shown on the drawings.
19. Verify bolt projection above the top of the planned concrete elevation. Projection must match the pole base specification — typically 3 to 6 inches for standard light pole bases.
20. Level the template plate and brace the cage to prevent movement during concrete placement. Any shift during the pour that exceeds the bolt pattern tolerance on the pole base (typically $\pm 1/8$ inch on bolt circle) will require field correction or pole base modification.
21. Place conduit through the anchor bolt cage area before concrete placement. Most anchor bolt foundations include a central conduit sleeve or open center for conduit routing.

Leveling and Final Pole Setting

22. After concrete cures, clean anchor bolt threads and install leveling nuts at the specified elevation.
23. Set the pole base over the anchor bolts, engage the leveling nuts, and plumb the pole before tightening.
24. Install washers and top nuts; torque to the value specified by the pole manufacturer (typically 50–150 ft-lbs depending on bolt diameter and grade).
25. After final tightening, inspect for full thread engagement — minimum 1.5 bolt diameters of thread engagement in the nut.

Do Not Grout Without Engineer Approval

Base plate grouting (filling the gap between the base plate and concrete surface) changes the load path of the connection and must only be done if specified or approved by the structural engineer of record. Unapproved grouting on anchor bolt installations is a common field error that can invalidate the structural design.

Electrical Installation Requirements

Underground Wiring Methods

NEC Article 225 governs outside branch circuits and feeders to pole bases. NEC Article 300 governs underground installation requirements. The most common wiring methods for parking lot light pole circuits are:

Wiring Method	Minimum Burial Depth (NEC Table 300.5)	Notes
RMC (Rigid Metal Conduit)	6 inches under concrete; 6 inches general	Most protection; used at transitions to above-grade
IMC (Intermediate Metal Conduit)	6 inches under concrete; 6 inches general	Lighter than RMC; same burial depth
Schedule 40 PVC	18 inches general; 12 inches under concrete	Most common for underground parking lot runs
Schedule 80 PVC	18 inches general; 12 inches under concrete	Required where conduit may be exposed to physical damage
Direct burial cable (UF)	24 inches general	Rarely used for parking lot pole circuits; no conduit protection

Grounding and Bonding

NEC Article 250 and Article 410 govern grounding of luminaire poles. Key requirements for parking lot light pole base installations:

- An equipment grounding conductor (EGC) must be installed in each conduit run from the overcurrent protective device to the pole base — bare copper or green insulated, sized per NEC Table 250.122
- The pole shaft and luminaire must be bonded to the EGC — most pole bases include a grounding lug inside the handhole or base for this connection
- Where a grounding electrode (ground rod) is installed at the pole base, it must be bonded to the EGC and the pole base per NEC 250.54 and 250.60
- Bonding jumpers must have green insulation or green marking tape applied at both ends
- Grounding connections inside the pole base must be accessible for inspection — do not encapsulate in concrete or sealant

Conductor Installation

- Pull conductors after conduit is in place and concrete has cured — never pull conductors through conduit that is embedded in uncured concrete
- Use pulling lubricant rated for the conductor insulation type; do not use petroleum-based lubricants on THWN-2 or XHHW insulated conductors
- Maximum conductor fill per NEC Chapter 9, Table 1: 40% for three or more conductors

- Conductor splices inside pole bases must be made with listed connectors; twist-on wire connectors (wire nuts) are not listed for wet or damp locations — use waterproof splice connectors or terminal blocks rated for the environment
 - Label all conductors at both ends with circuit identification before energization
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Most Common Installation Errors

The following errors account for the majority of failed inspections, warranty callbacks, and structural failures in parking lot light pole base installations. Each is preventable with proper pre-installation planning and field supervision.

1. Insufficient Foundation Depth

Installing a pole base at less than the specified or required embedment depth is the most common structural error. It is usually caused by encountering rock, unexpected underground obstructions, or simply stopping excavation short of the required depth. A pole at insufficient depth will fail at a lower wind load than designed. This is not a visible defect at installation — it only becomes apparent during a storm event.

Prevention

Measure and document foundation depth before concrete placement. Photograph the tape measure in the excavation. This takes 2 minutes and creates a permanent record that protects the contractor in the event of a future failure investigation.

2. Conduit Not Installed Before Concrete

Forgetting to install conduit — or installing it in the wrong location — before concrete placement requires breaking out and re-pouring the foundation. This is a day-long repair that costs significantly more than the 15 minutes required to confirm the conduit schedule before the concrete truck arrives. Confirm conduit count, size, and position against the electrical drawings before every pour.

3. Pole Set Out of Plumb

A pole set out of plumb more than the specified tolerance looks wrong, deflects luminaire aim, and can indicate insufficient concrete consolidation around the base. Plumb must be checked in two perpendicular directions during concrete placement — not after the concrete begins to set. Once concrete has begun to stiffen, correction requires demolition.

4. Missing or Undersized Equipment Grounding Conductor

Parking lot lighting circuits are long runs with multiple poles, and grounding conductors are sometimes omitted or undersized to reduce material cost. This is a NEC violation that creates a shock hazard and will fail electrical inspection. Size the EGC per NEC Table 250.122 based on the overcurrent protective device rating — not the conductor size.

5. Concrete Poured Against Bare Steel Without Corrosion Protection

Carbon steel pole bases installed in direct contact with concrete in wet or freeze-thaw environments corrode at the concrete-to-steel interface over time, eventually compromising structural integrity. Specify and confirm hot-dip galvanizing per ASTM A123 on all embedded steel, or use a coal tar epoxy or bituminous coating on the buried portion of the base. Do not rely on standard primer or paint for buried service.

6. Anchor Bolt Cage Shift During Pour

Even a small shift in the anchor bolt cage during concrete placement can result in a bolt pattern that does not match the pole base. This is caught at pole setting — too late to correct without demolishing the foundation. Brace anchor bolt cages in at least two directions before the pour and do not remove bracing until concrete has set.

Inspection Checkpoints

The following inspection checkpoints should be completed and documented before energization. For projects requiring AHJ inspection, confirm which checkpoints require a physical inspection versus a documented record.

Foundation Inspection (Before Concrete)

- Excavation depth measured and documented
- Conduit count, size, and position confirmed against electrical drawings
- Pull string or mule tape installed in each conduit
- Conduit ends capped
- Anchor bolt cage plumb and braced (anchor bolt installations)
- Bolt circle, projection, and thread length confirmed against pole shop drawing

Foundation Inspection (After Concrete Cure)

- Concrete cure time confirmed before pole erection
- Top of foundation elevation confirmed
- Foundation surface drains away from pole base
- No visible honeycombing or voids in concrete surface

Electrical Rough-In Inspection

- Conductors pulled and labeled
- Conduit fill confirmed within NEC limits
- EGC present and sized correctly
- Grounding lug connection made in pole base handhole
- No open conduit ends (all sealed or bushed)
- Splice connections made with listed wet-location connectors

Final Inspection (Before Energization)

- Pole plumb confirmed in two directions
- Luminaire arm and fixture installed and aimed per lighting plan
- Handhole cover installed and secured
- Base cover or anchor bolt cover installed (if specified)
- Continuity of EGC confirmed with meter
- Insulation resistance of conductors confirmed (megohm test) if required by spec
- All covers and access points secured
- As-built conduit routing documented

Frequently Asked Questions

How deep does a parking lot light pole base need to be buried?

The minimum embedment depth is set by the structural design for the specific pole, luminaire, and wind load. As a general guideline, most pole manufacturers specify embedment of 10% of the pole length plus 2 feet — so a 30-foot pole typically requires approximately 5 feet of embedment. However, this is a starting point, not a universal rule. Soft soils, high wind zones, large luminaires, or heavy equipment on the pole all increase the required embedment. Always use the structural engineer's specified depth, not a rule of thumb.

Can I reuse an existing concrete foundation for a new pole?

Sometimes. The existing foundation must be evaluated by a structural engineer against the load requirements of the new pole and equipment. If the anchor bolt pattern matches and the concrete is in sound condition with no cracking, spalling, or corrosion of embedded steel, reuse may be feasible. If the anchor bolt pattern does not match, a new foundation is typically required. Never assume an existing foundation is adequate without a structural review.

What is the correct torque for anchor bolt nuts on a light pole?

Torque values are specified by the pole manufacturer and depend on bolt diameter, grade, and thread condition. Values typically range from 50 ft-lbs for 3/4-inch Grade 55 bolts to 150 ft-lbs or more for 1-1/4-inch bolts. Always use the manufacturer's specified torque — do not estimate. Under-torqued connections allow movement at the base plate; over-torqued connections can yield the bolt threads. A calibrated torque wrench is required; impact wrenches are not acceptable for final torquing of structural anchor bolts.

Do parking lot light poles require a GFCI breaker?

NEC 210.8(B) requires GFCI protection for outdoor receptacles, but standard parking lot luminaire circuits (lighting only, no receptacle) are not required to be GFCI protected under current NEC editions. However, some AHJs require GFCI protection on all outdoor circuits regardless of use, and some pole bases with receptacles for maintenance or EV charging do require GFCI. Confirm with the AHJ and review the electrical drawings carefully if any receptacle is present in the pole base or on the pole.

Need Installation Documentation or CAD Details?

We provide project-ready installation detail drawings, anchor bolt templates, foundation schedules, and specification section language for parking lot light pole base installations. Contact us to request a standard detail package, project-specific submittal, or consultation with our engineering team.

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