## Lighting

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Introduction

About this Chapter
This chapter, which constitutes the current DOT Lighting Catalogue, outlines options for both new and replacement street and pedestrian lighting for New York City streets, pedestrian bridges, walkways, bikeways, plazas, and parks. Streetlights currently installed on the street but not included in this chapter are not permitted in new projects. The streetlights herein meet DOT engineering standards and technical requirements for safety and energy efficiency. They are appropriate for use in a variety of contexts, pending DOT design review.

Selection Criteria
DOT uses guidelines established by the Illuminating Engineering Society of North America (IES) to provide sufficient light intensity and uniformity in the ROW to produce a comfortable and safe street environment. In addition to lighting characteristics, the agency considers the design qualities of poles and fixtures with an eye to maintaining an aesthetically consistent and coherent streetscape within each neighborhood. As part of this effort, the agency does not approve block-by-block variations in types of streetlights.

- Streetlight Components
A streetlight comprises four elements: 1) the base (sometimes with a “skirt” that covers the base, for a desired appearance), 2) the pole, 3) the lamp — i.e., the actual light source — and 4) the fixture, which houses the lamp. The desired aesthetic and engineering outcomes can be achieved by combining poles with a variety of fixtures; acceptable pole-fixture combinations and options for lamps are described in this chapter.

In some cases, poles, fixtures, and bases are integral to the streetlights. Such streetlights are called “integrated streetlights.”

- Energy Standards
To comply with current citywide energy standards, DOT decreased the maximum allowable wattage to 150W (watts) in 2009; DOT engineers have determined 100W to be appropriate for particular applications. DOT is now phasing in LED lamps for all streetlights; this will further reduce the energy load of streetlight fixtures. These LED fixtures produce a white, full-spectrum light.

- Engineering Review
In all cases, the suitability of the streetlight for particular street and lighting conditions must be approved by DOT engineers.
Usage Categories

Streetlights and components are categorized as Standard, Distinctive, Historic, and Pilot. DOT maintains equipment in all four usage categories, and replaces damaged streetlights in kind. The installation of new streetlights as part of a streetscape project is included in that project’s budget and implemented by the project contractor. For any such project, an additional 10% of the total number of streetlights in the project must be purchased; DOT stores these extra streetlights and uses them to replace damaged streetlights in the project area.

- **Standard**
  
  DOT routinely installs and maintains Standard streetlights. The current Standard fixtures are the 100W and 150W HPS Cobra Head for street lighting and the 70W and 100W HPS Cobra Head for pedestrian lighting; DOT is phasing in 110W LED Cobra Heads for street lighting and 75W LED Cobra Heads for pedestrian lighting. For street and pedestrian lighting, the Standard light pole is the Davit; the Round and Octagonal are only used for in-kind replacements. The M-2A and the S-1A signal poles are Standard for use at traffic signal locations.

  With DOT approval, modifications and alternate combinations of components are possible. Poles can be painted black, brown, or green; Standard poles can be combined with the Helm or Stad fixture; and alternate treatments for bases can be used. While such modifications are considered Standard, they typically require a maintenance agreement.

- **Distinctive**
  
  Any streetlights other than those that are listed as Standard or Historic are considered Distinctive; they are installed as part of streetscape projects — in which case they require Public Design Commission (PDC) approval — or as in-kind replacements for damaged streetlights. DOT is responsible for submitting Distinctive streetlight proposals to PDC on behalf of neighborhood associations and other groups that request the treatments. In preparation for these submittals, DOT works closely with applicants to develop consistent streetlighting plans that are sensitive to local contexts. DOT maintains Distinctive streetlight components unless otherwise stipulated in a maintenance agreement.

- **Historic**
  
  Historic poles and integrated streetlights can only be used in historic districts or in neighborhoods with substantial, intact historic fabric — i.e., three or more contiguous blocks. They require Landmark Preservation Commission (LPC) approval for use in historic districts, and PDC approval for use in non-designated areas with substantial, intact historic fabric. The Historic streetlights are currently used with only the Teardrop and Shielded Teardrop fixtures, with a 150W LED lamp or 250W HPS.

  The TBTA pole (4.1.3) is considered Historic when combined with the Teardrop or Shielded Teardrop fixture. Accordingly, it requires LPC approval in historic districts and PDC approval in non-designated areas with substantial and intact historic fabric.

- **Pilot**
  
  Streetlights in this category are being tested by DOT and are not yet approved for wider use in New York City.

Specifications

For design criteria, technical information, finishes, and color specification, refer to DOT’s Bureau of Traffic Division of Streetlighting specifications. The latest edition is available for purchase for $50 from the Office of the Agency Chief Contracting Officer, 55 Water Street, Ground Level, New York NY 10041. For further information, call (212) 839-9435.

DOT will make the transition to the new BUG ratings system in late 2014.
Cutoff Ratings
DOT categorizes fixtures according to the IES’s four classifications — full cutoff, cutoff, semi-cutoff, and non-cutoff — to distinguish the range in quantity of upward light and light above a horizontal plane emitted by a light source.

- **Full Cutoff:** Full cutoff streetlights do not emit any upward light (at or above 90 degrees) and up to 10% of their light at or above 80 degrees. They create the narrowest spread of light.

- **Cutoff:** Cutoff streetlights emit up to 2.5% of their light upward (at or above 90 degrees) and up to 10% of their light at or above 80 degrees. They create a slightly wider spread of light.

- **Semi-Cutoff:** Semi-cutoff streetlights emit up to 5% of their light upward (at or above 90 degrees) and up to 20% of their light at or above 80 degrees. They create a wider spread of light.

- **Non-Cutoff:** Non-cutoff streetlights emit light in all directions. They create the widest spread of light.

The IES is in the process of establishing a new system — BUG ("backlight, uplight, glare") — for evaluating a fixture’s performance. DOT will begin to use the BUG ratings system in 2014.

Lighting Levels & Uniformity
DOT’s lighting-levels and uniformity guidelines are based on those established by the IES. All lighting designs must be reviewed and approved by DOT engineers.

<table>
<thead>
<tr>
<th>Roadways</th>
<th>Average Illuminance</th>
<th>Illuminance Uniformity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collector*</td>
<td>8 – 12 lux (.74 – 1.11 footcandles)</td>
<td>4:1</td>
</tr>
<tr>
<td>Local**</td>
<td>6 – 9 lux (.56 – .84 footcandles)</td>
<td>6:1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Intersections</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Collector/Collector</td>
<td>16 – 24 lux (1.49 – 2.23 footcandles)</td>
</tr>
<tr>
<td>Collector/Local</td>
<td>14 – 20 lux (1.30 – 1.86 footcandles)</td>
</tr>
<tr>
<td>Local/Local</td>
<td>12 – 18 lux (1.11 – 1.67 footcandles)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Plazas, Walkways, &amp; Bikeways</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5 – 10 lux (.46 – .93 footcandles)</td>
</tr>
</tbody>
</table>

*Collector roadways serve motor vehicle traffic between major and local roadways — major roadways being those that serve as the principal network for through traffic. DOT’s Lighting Division generally classifies avenues and boulevards as collector roadways.

**Local roadways provide direct motor vehicle access to abutting properties. DOT’s Lighting Division generally classifies cross streets as local roadways.

<table>
<thead>
<tr>
<th>Fixtures</th>
<th>Standard Poles</th>
<th>Distinctive Poles</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Davit</td>
<td>Octagonal</td>
</tr>
<tr>
<td>Cobra Head</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Standard LED</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Helm</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Stad</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Helm</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Teardrop</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Shielded Teardrop</td>
<td>●</td>
<td>●</td>
</tr>
</tbody>
</table>

The table above illustrates what pole-fixture combinations are allowed. Integrated Streetlights are not included.
## Notes and Symbols

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CCMH</td>
<td>Compact Ceramic Metal Halide lamping. CCMH is a full-spectrum light that can be installed as part of a streetscape project, and is maintained by DOT.</td>
</tr>
<tr>
<td>HDG</td>
<td>Hot Dipped Galvanized Steel</td>
</tr>
<tr>
<td>HPS</td>
<td>High-Pressure Sodium</td>
</tr>
<tr>
<td>IES</td>
<td>Illuminating Engineering Society of North America</td>
</tr>
<tr>
<td>IES Type</td>
<td>IES classification of lighting based on its photometric properties. Five types are relevant to the city’s streetlights: I, II, III, IV, and V.</td>
</tr>
<tr>
<td>LED</td>
<td>Light-Emitting Diode. DOT is phasing in LEDs that produce white, full-spectrum light.</td>
</tr>
<tr>
<td>SS</td>
<td>Standard Streetlight: Standard pole (Davit, Round, or Octagonal), standard fixture (Cobra Head), or standard pole and fixture (Cobra Head on Round, Octagonal, or Davit)</td>
</tr>
<tr>
<td>W</td>
<td>Watts</td>
</tr>
<tr>
<td>$</td>
<td>Costs: Shown for each pole or fixture as a $ symbol, representing relative costs compared to the Standard Streetlight (SS). A scale of one to five $ symbols is used rather than specific monetary amounts because actual costs are subject to change.</td>
</tr>
</tbody>
</table>
4.1 Poles

Poles
Davit, Round, & Octagonal Poles

Usage: Standard

Applications
Streetlight Pole:
- Streets and highways
- Single and twin mounting

Pedestrian Pole:
- Parks, plazas, esplanades, pedestrian bridges, walkways, and bikeways

Fixtures
Cobra Head (Standard)
Helm (Distinctive)
Stad (Distinctive)

Material/Color
HDG Steel/silver (street) — black, brown, and green are also allowed but require a maintenance agreement
Aluminum/silver (highway)

Cost Compared to SS
The Davit, Octagonal, and Round Poles are Standard poles

Each of the Standard poles, combined with the Cobra Head fixture, constitutes a Standard Streetlight. The Standard poles can also hold other fixtures. The Davit is required for streetscape projects with Standard poles; the Round and Octagonal are for in-kind replacement only.
4.1.1 Davit, Round, & Octagonal Poles

**Standard Poles with Various Fixtures**
The three fixtures shown here can go on all Standard poles.

![Standard Poles](image)

**Standard Pedestrian Poles with Various Fixtures**
The three fixtures shown here can go on all Standard pedestrian poles.

![Standard Pedestrian Poles](image)
Flatbush Avenue Pole

Usage: Distinctive

Applications
Commercial and residential streets
Single or twin mounting (center medians)
Streets with roadway width of 36 feet or more

Fixtures
Helm
Stad
Teardrop and Shielded Teardrop

Material/Color
Fabricated steel pole/black, brown, and green

Cost Compared to SS
$$

The Flatbush Avenue pole was first installed in 1988 on Flatbush Avenue in Brooklyn. Its post-modern design is appropriate for areas with historic character.

Flatbush pole and Historic Teardrop fixture: 49th Street, Queens
4.1.3 TBTA Pole

TBTA Pole

Usage: Distinctive

Applications

Streetlight Pole:
- Commercial and residential streets
- Single or twin mounting
- Streets with roadway width of 36 feet or more

Pedestrian Pole:
- Parks, plazas, esplanades, pedestrian bridges, walkways, and bikeways

Fixtures

Stad
Teardrop and Shielded Teardrop (historic districts only)

Material/Color

Fabricated steel pole/black, brown, and green

Cost Compared to SS

$$$$$
TBTA Pole
with Various Fixtures

TBTA Pedestrian Pole
with Various Fixtures
4.2 Fixtures

Fixtures
**Cobra Head**

**Usage:** Standard

**Applications**

- **Street light:** Streets and highways; single or twin mounting
- **Pedestrian light:** Parks, esplanades, pedestrian bridges, walkways, ramps, under elevated trains, and bikeways; single mounting only

**Lamp/Optics**

- **Road:**
  - 100W HPS,
  - Medium Semi–Cutoff, IES Type I
  - 150W HPS, Medium Semi–Cutoff, IES Type II
- **Pedestrian:**
  - 70W and 100W HPS, Medium Semi–Cutoff, IES Type I

**Cost Compared to SS**

Cobra Head is the SS

The Cobra Head was originally introduced by the Westinghouse and General Electric companies in 1957.

**Cobra Head with Standard Poles**

Poles shown here are the standard poles provided, tested, and maintained by DOT.

Cobra Head fixture: Manhattan Bridge, Manhattan
Standard LED Fixture

Usage: Standard

Applications

Street light: Streets and highways; single or twin mounting

Pedestrian light: Parks, esplanades, pedestrian bridges, walkways, ramps, under elevated trains, and bikeways; single mounting only

Lamp/Optics

Road:
- 110W LED
- Medium Semi-Cutoff, IES Type I

Pedestrian:
- 75W LED (being phased in)
- Cutoff, IES Type II or III

Cost Compared to SS

The Standard LED Fixture is the SS

DOT is phasing in the 110W Standard LED fixture. Its full-spectrum, white light substantially improves visibility and clarity.
Helm Fixture

Usage: Distinctive

Applications
Commercial districts

Lamp/Optics
90W and 140W CCMH
Curved sag glass optics
Cutoff or Semi-Cutoff, IES Type II or III

Cost Compared to SS
$$$$$$

DOT piloted the Helm on Queens Boulevard in 2008. This fixture is a contemporary alternative to the Cobra Head at an additional cost.
Helm with Standard Poles
Standard poles are provided and maintained by DOT.

Helm with Distinctive Poles
Distinctive poles require additional funding.
**Stad Fixture**

Usage: Distinctive

**Applications**
Commercial districts
Pedestrian fixture: Parks, plazas, esplanades, pedestrian bridges, walkways, and bikeways
Single or twin mounting

**Lamp/Optics**
Road: 90W and 140W CCMH
Pedestrian: 60W and 90W CCMH
Sag or flat lens optics
Cutoff or Semi-Cutoff, IES Type II or III

**Cost Compared to SS**
$$$$

**Stad with Standard Poles**
Standard poles are provided and maintained by DOT.

The Stad fixture was introduced on the Robert F. Kennedy Bridge (formerly the Triboro Bridge). The design of the fixture provides a contemporary alternative to the standard Cobra Head at an additional cost.
4.2.4 Stad Fixture

**Stad with Distinctive Poles**
Distinctive poles require additional funding.

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**Stad with Standard Pedestrian Poles**
The Teardrop and Shielded Teardrop fixtures are intended for use in historic districts and are allowed in areas with substantial, intact historic fabric. DOT is phasing in 150W LED versions of these fixtures.

**Teardrop & Shielded Teardrop Fixtures**

**Usage:** Historic

**Applications**

Selected historic districts

**Lamp/Optics**

- 250W HPS
- 150W LED
- Teardrop: Non-Cutoff
- Shielded Teardrop: Cutoff
- IES Type III or V

**Cost Compared to SS**

$$$$

**Historic Fixtures with Various Poles**

- Teardrop
- Shielded Teardrop

- Flatbush Avenue: 8'-0"
- TBTA: 27'-0"
- Bishops Crook: 26'-3"
Integrated Streetlights
Alliance Fixture & Pole

Usage: Distinctive

Applications
- Commercial districts
- Roadways with widths of 36 feet or more

Lamp/Optics
- 100W and 150W HPS
- Cutoff, or Semi-Cutoff, IES Type II or III

Material/Color
- Steel/silver and black

Cost Compared to SS
- $$$$$

The Alliance streetlight was originally introduced in Lower Manhattan by the Downtown Alliance business improvement district. The streetlight is a contemporary alternative to the standard poles with the Cobra Head fixture, at an additional cost.
Bishops Crook Fixture & Pole

Usage: Historic

Applications
Selected historic districts, per LPC approval
Streets with roadway width of 36 feet or less

Lamp/Optics
150W LED Teardrop: Non-Cutoff, IES Type III or V
150W LED Shielded Teardrop: Cutoff, IES Type III or V

Material/Color
Ductile iron pole/black, brown, and green

Cost Compared to SS
$$$$$
An international design competition to develop a new streetlight for New York City was held in 2004. The City Light design was selected as the winning entry. DOT and DDC are developing the proposed design. Prototypes of the light are currently being tested on city streets. The City Light, with its distinctive LED arm and sculpted base, offers the most contemporary look in DOT’s lighting catalogue.
Flushing Meadows Fixture & Pole

Usage: Distinctive

Applications
Parks, plazas, esplanades, pedestrian bridges, walkways, and bikeways

Lamp/Optics
70W, 100W, and 150W HPS
Cutoff, IES Type III or V
Flushing Meadows Head

Material/Color
Steel/black, brown, green, and silver

Cost Compared to SS
$$$

The Flushing Meadows integrated pedestrian light was first installed in 2004 by the Department of Parks and Recreation in Canarsie Park in Brooklyn. The pole is now installed in many city parks, plazas, and along walkways and bikeways.
Type B Fixture & Pole

Usage: Distinctive

Applications
Parks, plazas, esplanades, pedestrian bridges, walkways, and bikeways

Lamp/Optics
150W and 100W HPS
80W LED
Non-Cutoff, IES Type V

Material/Color
Ductile iron pole/black, brown, or green

Cost Compared to SS
$$

The Type B integrated pedestrian light was originally introduced in 1911 by designer Henry Bacon for the Central Park Mall and later installed in other city parks. This version of the fixture was developed in the late twentieth century. As of 2012, the Type B can hold an LED lamp. This pole is a more traditional design for pedestrian areas such as parks and plazas.

Type B fixture and pole: Grand Army Plaza, Brooklyn

Type B fixture and pole with LED lamp
The Type F pole, originally known as the Reverse Scroll Bracket, was developed in 1913 and installed on narrow streets downtown on Seventh Avenue. Bracket versions of the Reverse Scroll were also attached to the facades of buildings. The reproduction of the Reverse Scroll was introduced in the late twentieth century as the Type F pole.
Type M Fixture & Pole

Usage: Historic

Applications
- Selected historic districts
- Streets with roadway width of 36 feet or more
- Single or twin mounting

Lamp/Optics
- 150W LED Teardrop fixture
- Non-Cutoff, IES Type III or V

Material/Color
- Ductile iron pole/black, brown, and green

Cost Compared to SS
- $$$$$

The Type M pole, originally known as the Mast-Arm post, was introduced in 1908 for wide streets at corners on Broadway north of Columbus Circle and on Seventh Avenue north of Central Park. Bracket versions of the Mast-Arm were also attached to the facades of buildings. The reproduction of the Mast-Arm was introduced in the late twentieth century as the Type M pole.

Historic Type M fixture and pole: West 11th Street, Manhattan
World’s Fair Fixture & Pole

Usage: Distinctive

Applications
Parks, plazas, esplanades, pedestrian bridges, walkways, and bikeways

Lamp/Optics
Type 2085 fixture
100W and 150W HPS
Non-Cutoff, IES Type V

Material/Color
Steel/black, brown, or green

Cost Compared to SS
$

The World’s Fair pedestrian light was first installed in 1964 during the World’s Fair held in Flushing Meadows Park in Queens. The pole is now installed in many city parks, in plazas, and along walkways and bikeways.
4.4 Signal Poles
4.4.1 Type M-2A Signal Pole

**Type M-2A Signal Pole**

Usage: Standard

Introduced in 1964 as the M-2, the octagonal M-2A traffic signal pole is standard for use at all traffic signal locations. It can be mounted on a 9-inch concrete cylinder to provide necessary clearance or to avoid moisture in the base. A 5-foot mast-arm extension can be used to bring the signal farther out over the roadway, if necessary.

With a 5-foot 6-inch shaft extension, the M-2A can be used to hold a standard streetlight arm and a fixture. It can also be made to resemble nearby Bishops Crook, Type F, or Type M poles when paired with the Type M skirt and a matching arm and fixture.

**Applications**

- Holds signals and/or signs
- Single or double mounting
- Two M-2A poles per intersection, diagonally opposite from each other
- Sometimes mounted on 9-inch concrete cylinder to provide necessary clearance or avoid moisture in the base

- 5-foot 6-inch shaft extension provides necessary clearance or holds a fixture, if necessary
- 5-foot mast-arm extension to hold signal farther out over the roadway, if necessary
- Can be retrofitted to resemble nearby Bishops Crook, Type F, or Type M light poles

**Fixtures**

- Cobra Head (Standard)
- Stad (Distinctive)
- Helm (Distinctive)
- Teardrop (Historic)

**Material/Color**

- H.D.G. Steel/silver, black, brown, or green
Type M-2A signal pole with Historic Bishops Crook arm: Foley Square, Manhattan

Type M-2A Signal Pole with Cobra Head Fixture
Type S-1A Signal Pole

Usage: Standard

Applications
Holds pedestrian and/or traffic signals

Fixtures
This pole does not hold a fixture

Material/Color
H.D.G. Steel/silver, black, brown, or green

Introduced as the S-1 in 1965, the round S-1A signal pole holds pedestrian signals at corners where an M-2A signal pole or a light pole is not necessary. It also holds traffic signals on medians and traffic islands.

Type S-1A signal pole with a pedestrian signal: Hoyt Street, Brooklyn
Alliance Signal Pole

Usage: Distinctive

Applications
Intersections

Lamp/Optics
100W HPS or 150W HPS

Material/Color
H.D.G. steel/silver and black

The Alliance streetlights were introduced in the Lower Manhattan financial district by the Alliance for Downtown New York business improvement district. The signal pole can be used as a contemporary alternative to the standard M-2A signal pole in conjunction with nearby Alliance streetlights, but at an additional cost.