EXTENDED
DESIGN TABLES

The Future of Precast **Light Pole Bases**

LPB
A DIVISION OF RECON

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Overview and Assumptions

The LPB Design Tables have been prepared to demonstrate the capabilities of the foundation system with a variety of pole and fixture size scenarios. They have been prepared using a number of assumptions that can be found on each individual table. It is important to read and understand all of these assumptions. The tables have been prepared by ReCon Wall Systems, Inc. and to the best of ReCon's knowledge accurately represent the product use in the intended application. Anyone making use of these tables does so at their own risk and assumes all liability for such use. Final design, for construction purposes, must be completed by a Professional Engineer who is familiar with the project and has considered the specific site conditions.

The tables have been prepared in general accordance, as described in the Design Approach section of the LPB Engineering Reference Manual, with the requirements found in the American Association of State Highway and Transportation Officials (AASHTO) publications: LRFD Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, First Edition, 2015 (LRFDLTS-1)

Table Sets Included:

- 105 mph, Exposure C
  - 4-inch, 6-inch, and 8-inch Round Poles, 4-inch and 6-inch Square Poles
- 110 mph, Exposure C
  - 4-inch, 6-inch, and 8-inch Round Poles, 4-inch and 6-inch Square Poles
- 120 mph, Exposure C
  - 4-inch, 6-inch, and 8-inch Round Poles, 4-inch and 6-inch Square Poles
- 130 mph, Exposure C
  - 4-inch, 6-inch, and 8-inch Round Poles, 4-inch and 6-inch Square Poles
- 140 mph, Exposure C
  - 4-inch, 6-inch, and 8-inch Round Poles, 4-inch and 6-inch Square Poles
- 150 mph, Exposure C
  - 4-inch, 6-inch, and 8-inch Round Poles, 4-inch and 6-inch Square Poles
- 160 mph, Exposure C
  - 4-inch, 6-inch, and 8-inch Round Poles, 4-inch and 6-inch Square Poles

General:

- The LPB is produced with an embedded anchoring system that consists of four slots, created by plastic inserts, each containing an anchoring nut that is located approximately 4-½-inches below the top concrete surface. Each anchoring nut receives one (1) ¾-inch diameter threaded anchor rod that projects from the top of the foundation. The anchor rod is secured in place using a single nut and a 3-inch by 3-inch bearing washer. The capacity of the anchoring system was determined through load testing completed by Braun Intertec. Refer to Appendix A in the LPB Engineering Reference Manual for additional information regarding the testing completed.

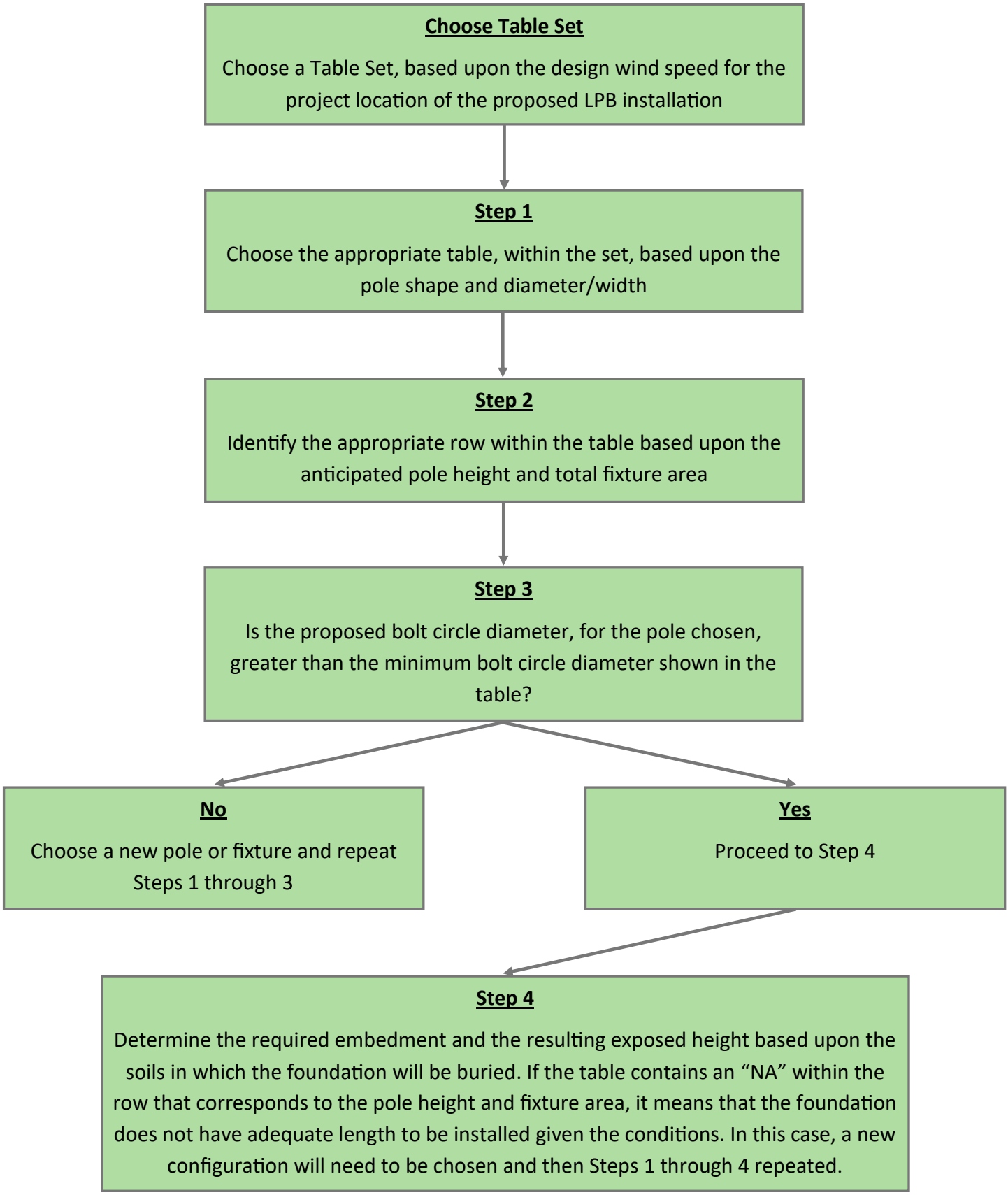
- For the purposes of the Design Tables, the LPB is assumed to be round, 24-inches in diameter, with a total height of 8-feet (maximum of 3-feet exposed above grade). A 6-foot foundation may be used in lieu of the 8-foot foundation shown in the tables provided the minimum bury depth does not exceed 6-feet.

- For round-tapered and square-tapered light poles, the average diameter or width should be used to determine minimum bolt circle diameter and embedment depth within the tables.

- The tables assume a double light fixture with a total wind surface area equal to that shown. Single light fixtures, creating an unbalanced load condition, are not covered within the Design Tables.

- The weight of the fixtures, pole, and foundation are neglected as resisting forces in the calculation process.

How to use the LPB Design Tables



LPB Design Tables - 105 mph, Exposure C

Determining Minimum Bolt Circle Diameter and Embedment (8-foot LPB with 3-feet Exposed)

Step 1

Pole Size: 4-inch Diameter Pole Shape: Round

Step 4

Step 2		*Step 3*	**Cohesionless Soils ϕ = 30° and c = 0 psf**		**Cohesive Soils ϕ = 12° and c = 250 psf**	
Pole Height (ft)	Fixture Area (ft^2)	Minimum Bolt Circle Diameter (in)	Minimum Bury Depth (ft)	Resulting Exposed Height (ft)	Minimum Bury Depth (ft)	Resulting Exposed Height (ft)
15	1.0	7.5	5.0	3.0	5.8	2.2
	2.0	7.5	5.0	3.0	6.1	1.9
	4.0	7.5	5.0	3.0	6.5	1.5
	6.0	7.5	5.0	3.0	7.0	1.0
20	1.0	7.5	5.0	3.0	6.4	1.6
	2.0	7.5	5.0	3.0	6.7	1.3
	4.0	7.5	5.0	3.0	7.2	0.8
	6.0	7.5	5.0	3.0	7.6	0.4
25	1.0	7.5	5.0	3.0	7.0	1.0
	2.0	7.5	5.0	3.0	7.4	0.6
	4.0	7.5	5.0	3.0	8.0	0.0
	6.0	7.5	5.0	3.0	NA	
30	1.0	7.5	5.0	3.0	7.6	0.4
	2.0	7.5	5.0	3.0	8.0	0.0
	4.0	7.5	5.0	3.0	NA	
	6.0	9.0	5.1	2.9	NA	

General Notes:

- A 6-foot (total height) LPB may be used in lieu of the 8-foot LPB provided that the minimum bury depth is less than 6-feet. The resulting exposed height would then need to be adjusted accordingly.
- LPB size: round, 24" diameter
- For round-tapered and square-tapers poles, use average diameter or width.
- Table assumes double light fixture with total fixture as shown. Single light fixtures creating an unbalanced load condition are not covered by this table.
- Weight of fixtures, pole, and foundation are neglected as resisting forces.

Wind Loading Assumptions:

- Load Combinations and Load Factors: per AASHTO Section 3.4 and Table 3.4-1. For Extreme I the Load Factor for wind is 1.0.
- The basic wind speed *V*: per AASHTO Section 3.8.2. *V* = 105 mph; Risk Category: Low; Mean Recurrence Interval: 300 Years
- Wind Exposure Category: C
- Height and Exposure Factor *Kz*: per AASHTO Section 3.8.4. For poles and fixtures this value is calculated for Exposure C and the actual height of the pole. For the pole foundation, K_z = 0.86.
- Directionality Factor *Kd*: per AASHTO Section 3.8.5. K_d = 0.95 for round poles.
- Gust Effect Factor *G*: per AASHTO Section 3.8.6. *G* = 1.14

Wind Loading Assumptions Cont.:

- Drag Coefficients C_d: per AASHTO Section 3.8.7
  C_v = 0.8 for Extreme Limit Case
  Light Fixture, C_d = 1.2 (flat side shapes)
  Round Light Poles, C_d = 1.10 (4-inch dia)

Fatigue Analysis Assumptions (for bolt circle diameter only):

- Yearly Mean Wind Velocity V_{mean}: per AASHTO Section C11.7.1.2. V_{mean} = 11.2 miles per hour
- Drag Coefficients C_d: per AASHTO Section 3.8.7
  C_v = 1.0 for Non-Extreme Limit Case
  Light Fixture, C_d = 1.2 (flat side shapes)
  Round Light Poles, C_d = 1.10
- Fatigue Importance Factor I_F: per AASHTO Section 11.6 and Table 11.6-1. I_F = 0.55 for noncantilevered traffic signals; Category III
- Fatigue loading check per AASHTO LRFDLTS-1 and NCHRP Report 496. Refer to the Design Approach section of the LPB Engineering Manual for additional information.

Foundation Analysis Assumptions:

- Foundation analysis per AASHTO Section 13.6.1.1
- Minimum Bury in Cohesionless Soils per AASHTO Equation C13.6.1.1-5
- Minimum Bury in Cohesive Soils per AASHTO Equation C13.6.1.1-1
- Overload Factor = 2.0 per AASHTO (LTS-6) Section C13.6.1.1
- Under Capacity Factor = 0.7 per AASHTO (LTS-6) Section C13.6.1.1

LPB Design Tables - 105 mph, Exposure C

Determining Minimum Bolt Circle Diameter and Embedment (8-foot LPB with 3-feet Exposed)

Step 1

Pole Size: 6-inch Diameter Pole Shape: Round

Step 4

Step 2		*Step 3*	**Cohesionless Soils ϕ = 30° and c = 0 psf**		**Cohesive Soils ϕ = 12° and c = 250 psf**	
Pole Height (ft)	Fixture Area (ft^2)	Minimum Bolt Circle Diameter (in)	Minimum Bury Depth (ft)	Resulting Exposed Height (ft)	Minimum Bury Depth (ft)	Resulting Exposed Height (ft)
15	1.0	7.5	5.0	3.0	6.1	1.9
	2.0	7.5	5.0	3.0	6.3	1.7
	4.0	7.5	5.0	3.0	6.8	1.2
	6.0	7.5	5.0	3.0	7.2	0.8
20	1.0	7.5	5.0	3.0	6.8	1.2
	2.0	7.5	5.0	3.0	7.0	1.0
	4.0	7.5	5.0	3.0	7.5	0.5
	6.0	7.5	5.0	3.0	8.0	0.0
25	1.0	7.5	5.0	3.0	7.5	0.5
	2.0	7.5	5.0	3.0	7.8	0.2
	4.0	7.5	5.0	3.0	NA	
	6.0	8.0	5.0	3.0	NA	
30	1.0	7.5	5.0	3.0	NA	
	2.0	7.5	5.0	3.0	NA	
	4.0	9.0	5.1	2.9	NA	
	6.0	10.5	5.4	2.6	NA	

General Notes:

- A 6-foot (total height) LPB may be used in lieu of the 8-foot LPB provided that the minimum bury depth is less than 6-feet. The resulting exposed height would then need to be adjusted accordingly.
- LPB size: round, 24" diameter
- For round-tapered and square-tapers poles, use average diameter or width.
- Table assumes double light fixture with total fixture as shown. Single light fixtures creating an unbalanced load condition are not covered by this table.
- Weight of fixtures, pole, and foundation are neglected as resisting forces.

Wind Loading Assumptions:

- Load Combinations and Load Factors: per AASHTO Section 3.4 and Table 3.4-1. For Extreme I the Load Factor for wind is 1.0.
- The basic wind speed *V*: per AASHTO Section 3.8.2. *V* = 105 mph; Risk Category: Low; Mean Recurrence Interval: 300 Years
- Wind Exposure Category: C
- Height and Exposure Factor K_z: per AASHTO Section 3.8.4. For poles and fixtures this value is calculated for Exposure C and the actual height of the pole. For the pole foundation, K_z = 0.86.
- Directionality Factor K_d: per AASHTO Section 3.8.5. K_d = 0.95 for round poles.
- Gust Effect Factor *G*: per AASHTO Section 3.8.6. *G* = 1.14

Wind Loading Assumptions Cont.:

- Drag Coefficients C_d: per AASHTO Section 3.8.7
  C_v = 0.8 for Extreme Limit Case
  Light Fixture, C_d = 1.2 (flat side shapes)
  Round Light Poles, C_d = 1.0 (6-inch dia.)

Fatigue Analysis Assumptions (for bolt circle diameter only):

- Yearly Mean Wind Velocity V_{mean}: per AASHTO Section C11.7.1.2. V_{mean} = 11.2 miles per hour
- Drag Coefficients C_d: per AASHTO Section 3.8.7
  C_v = 1.0 for Non-Extreme Limit Case
  Light Fixture, C_d = 1.2 (flat side shapes)
  Round Light Poles, C_d = 1.10
- Fatigue Importance Factor I_F: per AASHTO Section 11.6 and Table 11.6-1. I_F = 0.55 for noncantilevered traffic signals; Category III
- Fatigue loading check per AASHTO LRFDLTS-1 and NCHRP Report 496. Refer to the Design Approach section of the LPB Engineering Manual for additional information.

Foundation Analysis Assumptions:

- Foundation analysis per AASHTO Section 13.6.1.1
- Minimum Bury in Cohesionless Soils per AASHTO Equation C13.6.1.1-5
- Minimum Bury in Cohesive Soils per AASHTO Equation C13.6.1.1-1
- Overload Factor = 2.0 per AASHTO (LTS-6) Section C13.6.1.1
- Under Capacity Factor = 0.7 per AASHTO (LTS-6) Section C13.6.1.1

LPB Design Tables - 105 mph, Exposure C

Determining Minimum Bolt Circle Diameter and Embedment (8-foot LPB with 3-feet Exposed)

Step 1

Pole Size: 8-inch Diameter Pole Shape: Round

Step 4

Step 2		*Step 3*	**Cohesionless Soils ϕ = 30° and c = 0 psf**		**Cohesive Soils ϕ = 12° and c = 250 psf**	
Pole Height (ft)	Fixture Area (ft^2)	Minimum Bolt Circle Diameter (in)	Minimum Bury Depth (ft)	Resulting Exposed Height (ft)	Minimum Bury Depth (ft)	Resulting Exposed Height (ft)
15	1.0	7.5	5.0	3.0	6.0	2.0
	2.0	7.5	5.0	3.0	6.3	1.7
	4.0	7.5	5.0	3.0	6.7	1.3
	6.0	7.5	5.0	3.0	7.1	0.9
20	1.0	7.5	5.0	3.0	6.7	1.3
	2.0	7.5	5.0	3.0	6.9	1.1
	4.0	7.5	5.0	3.0	7.4	0.6
	6.0	7.5	5.0	3.0	7.8	0.2
25	1.0	7.5	5.0	3.0	7.3	0.7
	2.0	7.5	5.0	3.0	7.6	0.4
	4.0	7.5	5.0	3.0	NA	
	6.0	7.5	5.0	3.0	NA	
30	1.0	7.5	5.0	3.0	8.0	0.0
	2.0	7.5	5.0	3.0	NA	
	4.0	8.5	5.0	3.0	NA	
	6.0	10.5	5.3	2.7	NA	

General Notes:

- A 6-foot (total height) LPB may be used in lieu of the 8-foot LPB provided that the minimum bury depth is less than 6-feet. The resulting exposed height would then need to be adjusted accordingly.
- LPB size: round, 24" diameter
- For round-tapered and square-tapers poles, use average diameter or width.
- Table assumes double light fixture with total fixture as shown. Single light fixtures creating an unbalanced load condition are not covered by this table.
- Weight of fixtures, pole, and foundation are neglected as resisting forces.

Wind Loading Assumptions:

- Load Combinations and Load Factors: per AASHTO Section 3.4 and Table 3.4-1. For Extreme I the Load Factor for wind is 1.0.
- The basic wind speed *V*: per AASHTO Section 3.8.2. *V* = 105 mph; Risk Category: Low; Mean Recurrence Interval: 300 Years
- Wind Exposure Category: C
- Height and Exposure Factor K_z: per AASHTO Section 3.8.4. For poles and fixtures this value is calculated for Exposure C and the actual height of the pole. For the pole foundation, K_z = 0.86.
- Directionality Factor K_d: per AASHTO Section 3.8.5. K_d = 0.95 for round poles.
- Gust Effect Factor *G*: per AASHTO Section 3.8.6. *G* = 1.14

Wind Loading Assumptions Cont.:

- Drag Coefficients C_d: per AASHTO Section 3.8.7
  C_v = 0.8 for Extreme Limit Case
  Light Fixture, C_d = 1.2 (flat side shapes)
  Round Light Poles, C_d = 0.69 (8-inch dia.)

Fatigue Analysis Assumptions (for bolt circle diameter only):

- Yearly Mean Wind Velocity V_{mean}: per AASHTO Section C11.7.1.2. V_{mean} = 11.2 miles per hour
- Drag Coefficients C_d: per AASHTO Section 3.8.7
  C_v = 1.0 for Non-Extreme Limit Case
  Light Fixture, C_d = 1.2 (flat side shapes)
  Round Light Poles, C_d = 1.10
- Fatigue Importance Factor I_F: per AASHTO Section 11.6 and Table 11.6-1. I_F = 0.55 for noncantilevered traffic signals; Category III
- Fatigue loading check per AASHTO LRFDLTS-1 and NCHRP Report 496. Refer to the Design Approach section of the LPB Engineering Manual for additional information.

Foundation Analysis Assumptions:

- Foundation analysis per AASHTO Section 13.6.1.1
- Minimum Bury in Cohesionless Soils per AASHTO Equation C13.6.1.1-5
- Minimum Bury in Cohesive Soils per AASHTO Equation C13.6.1.1-1
- Overload Factor = 2.0 per AASHTO (LTS-6) Section C13.6.1.1
- Under Capacity Factor = 0.7 per AASHTO (LTS-6) Section C13.6.1.1

LPB Design Tables - 105 mph, Exposure C

Determining Minimum Bolt Circle Diameter and Embedment (8-foot LPB with 3-feet Exposed)

Step 1

Pole Size: 4-inch Width **Pole Shape: Square**

Step 2		*Step 3*	*Step 4*			
			Cohesionless Soils ϕ = 30° and c = 0 psf		**Cohesive Soils ϕ = 12° and c = 250 psf**	
Pole Height (ft)	Fixture Area (ft^2)	Minimum Bolt Circle Diameter (in)	Minimum Bury Depth (ft)	Resulting Exposed Height (ft)	Minimum Bury Depth (ft)	Resulting Exposed Height (ft)
15	1.0	7.5	5.0	3.0	6.2	1.8
	2.0	7.5	5.0	3.0	6.4	1.6
	4.0	7.5	5.0	3.0	6.8	1.2
	6.0	7.5	5.0	3.0	7.2	0.8
20	1.0	7.5	5.0	3.0	7.0	1.0
	2.0	7.5	5.0	3.0	7.2	0.8
	4.0	7.5	5.0	3.0	7.6	0.4
	6.0	7.5	5.0	3.0	8.0	0.0
25	1.0	7.5	5.0	3.0	7.7	0.3
	2.0	7.5	5.0	3.0	8.0	0.0
	4.0	7.5	5.0	3.0	NA	
	6.0	8.0	5.0	3.0	NA	
30	1.0	7.5	5.0	3.0	NA	
	2.0	8.0	5.0	3.0	NA	
	4.0	9.5	5.2	2.8	NA	
	6.0	11.5	5.5	2.5	NA	

General Notes:

- A 6-foot (total height) LPB may be used in lieu of the 8-foot LPB provided that the minimum bury depth is less than 6-feet. The resulting exposed height would then need to be adjusted accordingly.
- LPB size: round, 24" diameter
- For round-tapered and square-tapers poles, use average diameter or width.
- Table assumes double light fixture with total fixture as shown. Single light fixtures creating an unbalanced load condition are not covered by this table.
- Weight of fixtures, pole, and foundation are neglected as resisting forces.

Wind Loading Assumptions:

- Load Combinations and Load Factors: per AASHTO Section 3.4 and Table 3.4-1. For Extreme I the Load Factor for wind is 1.0.
- The basic wind speed *V*: per AASHTO Section 3.8.2. *V* = 105 mph; Risk Category: Low; Mean Recurrence Interval: 300 Years
- Wind Exposure Category: C
- Height and Exposure Factor K_z: per AASHTO Section 3.8.4. For poles and fixtures this value is calculated for Exposure C and the actual height of the pole. For the pole foundation, K_z = 0.86.
- Directionality Factor K_d: per AASHTO Section 3.8.5. K_d = 0.90 for square poles.
- Gust Effect Factor *G*: per AASHTO Section 3.8.6. *G* = 1.14

Wind Loading Assumptions Cont.:

- Drag Coefficients C_d: per AASHTO Section 3.8.7
  - C_v = 0.8 for Extreme Limit Case
  - Light Fixture, C_d = 1.2 (flat side shapes)
  - Square Light Poles, C_d = 1.81 (4-inch wide)

Fatigue Analysis Assumptions (for bolt circle diameter only):

- Yearly Mean Wind Velocity V_{mean}: per AASHTO Section C11.7.1.2. V_{mean} = 11.2 miles per hour
- Drag Coefficients C_d: per AASHTO Section 3.8.7
  - C_v = 1.0 for Non-Extreme Limit Case
  - Light Fixture, C_d = 1.2 (flat side shapes)
  - Square Light Poles, C_d = 1.81 (4-inch wide)
- Fatigue Importance Factor I_F: per AASHTO Section 11.6 and Table 11.6-1. I_F = 0.55 for noncantilevered traffic signals; Category III
- Fatigue loading check per AASHTO LRFDLTS-1 and NCHRP Report 496. Refer to the Design Approach section of the LPB Engineering Manual for additional information.

Foundation Analysis Assumptions:

- Foundation analysis per AASHTO Section 13.6.1.1
- Minimum Bury in Cohesionless Soils per AASHTO Equation C13.6.1.1-5
- Minimum Bury in Cohesive Soils per AASHTO Equation C13.6.1.1-1
- Overload Factor = 2.0 per AASHTO (LTS-6) Section C13.6.1.1
- Under Capacity Factor = 0.7 per AASHTO (LTS-6) Section C13.6.1.1

LPB Design Tables - 105 mph, Exposure C

Determining Minimum Bolt Circle Diameter and Embedment (8-foot LPB with 3-feet Exposed)

Step 1

Pole Size: 6-inch Width **Pole Shape: Square**

Step 4

Step 2		*Step 3*	**Cohesionless Soils ϕ = 30° and c = 0 psf**		**Cohesive Soils ϕ = 12° and c = 250 psf**	
Pole Height (ft)	Fixture Area (ft^2)	Minimum Bolt Circle Diameter (in)	Minimum Bury Depth (ft)	Resulting Exposed Height (ft)	Minimum Bury Depth (ft)	Resulting Exposed Height (ft)
15	1.0	7.5	5.0	3.0	6.8	1.2
	2.0	7.5	5.0	3.0	7.0	1.0
	4.0	7.5	5.0	3.0	7.3	0.7
	6.0	7.5	5.0	3.0	7.6	0.4
20	1.0	7.5	5.0	3.0	7.7	0.3
	2.0	7.5	5.0	3.0	7.9	0.1
	4.0	7.5	5.0	3.0	NA	
	6.0	7.5	5.0	3.0	NA	
25	1.0	7.5	5.0	3.0	NA	
	2.0	8.0	5.0	3.0	NA	
	4.0	9.5	5.3	2.7	NA	
	6.0	10.5	5.5	2.5	NA	
30	1.0	9.5	5.5	2.5	NA	
	2.0	11.0	5.6	2.4	NA	
	4.0	13.0	5.8	2.2	NA	
	6.0	NA	NA		NA	

General Notes:

- A 6-foot (total height) LPB may be used in lieu of the 8-foot LPB provided that the minimum bury depth is less than 6-feet. The resulting exposed height would then need to be adjusted accordingly.
- LPB size: round, 24" diameter
- For round-tapered and square-tapers poles, use average diameter or width.
- Table assumes double light fixture with total fixture as shown. Single light fixtures creating an unbalanced load condition are not covered by this table.
- Weight of fixtures, pole, and foundation are neglected as resisting forces.

Wind Loading Assumptions:

- Load Combinations and Load Factors: per AASHTO Section 3.4 and Table 3.4-1. For Extreme I the Load Factor for wind is 1.0.
- The basic wind speed *V*: per AASHTO Section 3.8.2. *V* = 105 mph; Risk Category: Low; Mean Recurrence Interval: 300 Years
- Wind Exposure Category: C
- Height and Exposure Factor K_z: per AASHTO Section 3.8.4. For poles and fixtures this value is calculated for Exposure C and the actual height of the pole. For the pole foundation, K_z = 0.86.
- Directionality Factor K_d: per AASHTO Section 3.8.5. K_d = 0.90 for square poles.
- Gust Effect Factor *G*: per AASHTO Section 3.8.6. *G* = 1.14

Wind Loading Assumptions Cont.:

- Drag Coefficients C_d: per AASHTO Section 3.8.7
  C_v = 0.8 for Extreme Limit Case
  Light Fixture, C_d = 1.2 (flat side shapes)
  Square Light Poles, C_d = 1.875 (6-inch wide)

Fatigue Analysis Assumptions (for bolt circle diameter only):

- Yearly Mean Wind Velocity V_{mean}: per AASHTO Section C11.7.1.2. V_{mean} = 11.2 miles per hour
- Drag Coefficients C_d: per AASHTO Section 3.8.7
  C_v = 1.0 for Non-Extreme Limit Case
  Light Fixture, C_d = 1.2 (flat side shapes)
  Square Light Poles, C_d = 1.875 (6-inch wide)
- Fatigue Importance Factor I_F: per AASHTO Section 11.6 and Table 11.6-1. I_F = 0.55 for noncantilevered traffic signals; Category III
- Fatigue loading check per AASHTO LRFDLTS-1 and NCHRP Report 496. Refer to the Design Approach section of the LPB Engineering Manual for additional information.

Foundation Analysis Assumptions:

- Foundation analysis per AASHTO Section 13.6.1.1
- Minimum Bury in Cohesionless Soils per AASHTO Equation C13.6.1.1-5
- Minimum Bury in Cohesive Soils per AASHTO Equation C13.6.1.1-1
- Overload Factor = 2.0 per AASHTO (LTS-6) Section C13.6.1.1
- Under Capacity Factor = 0.7 per AASHTO (LTS-6) Section C13.6.1.1

LPB Design Tables - 110 mph, Exposure C

Determining Minimum Bolt Circle Diameter and Embedment (8-foot LPB with 3-feet Exposed)

Step 1

Pole Size: 4-inch Diameter Pole Shape: Round

Step 2		*Step 3*	*Step 4*			
			Cohesionless Soils ϕ = 30° and c = 0 psf		**Cohesive Soils ϕ = 12° and c = 250 psf**	
Pole Height (ft)	Fixture Area (ft^2)	Minimum Bolt Circle Diameter (in)	Minimum Bury Depth (ft)	Resulting Exposed Height (ft)	Minimum Bury Depth (ft)	Resulting Exposed Height (ft)
15	1.0	7.5	5.0	3.0	5.9	2.1
	2.0	7.5	5.0	3.0	6.2	1.8
	4.0	7.5	5.0	3.0	6.7	1.3
	6.0	7.5	5.0	3.0	7.1	0.9
20	1.0	7.5	5.0	3.0	6.4	1.6
	2.0	7.5	5.0	3.0	6.8	1.2
	4.0	7.5	5.0	3.0	7.4	0.6
	6.0	7.5	5.0	3.0	7.9	0.1
25	1.0	7.5	5.0	3.0	7.2	0.8
	2.0	7.5	5.0	3.0	7.5	0.5
	4.0	7.5	5.0	3.0	NA	
	6.0	7.5	5.0	3.0	NA	
30	1.0	7.5	5.0	3.0	7.8	0.2
	2.0	7.5	5.0	3.0	NA	
	4.0	8.0	5.0	3.0	NA	
	6.0	9.5	5.3	2.7	NA	

General Notes:

- A 6-foot (total height) LPB may be used in lieu of the 8-foot LPB provided that the minimum bury depth is less than 6-feet. The resulting exposed height would then need to be adjusted accordingly.
- LPB size: round, 24" diameter
- For round-tapered and square-tapers poles, use average diameter or width.
- Table assumes double light fixture with total fixture as shown. Single light fixtures creating an unbalanced load condition are not covered by this table.
- Weight of fixtures, pole, and foundation are neglected as resisting forces.

Wind Loading Assumptions:

- Load Combinations and Load Factors: per AASHTO Section 3.4 and Table 3.4-1. For Extreme I the Load Factor for wind is 1.0.
- The basic wind speed *V*: per AASHTO Section 3.8.2. *V* = 110 mph; Risk Category: Low; Mean Recurrence Interval: 300 Years
- Wind Exposure Category: C
- Height and Exposure Factor *Kz*: per AASHTO Section 3.8.4. For poles and fixtures this value is calculated for Exposure C and the actual height of the pole. For the pole foundation, K_z = 0.86.
- Directionality Factor *Kd*: per AASHTO Section 3.8.5. K_d = 0.95 for round poles.
- Gust Effect Factor *G*: per AASHTO Section 3.8.6. *G* = 1.14

Wind Loading Assumptions Cont.:

- Drag Coefficients C_d: per AASHTO Section 3.8.7
  C_v = 0.8 for Extreme Limit Case
  Light Fixture, C_d = 1.2 (flat side shapes)
  Round Light Poles, C_d = 1.10 (4-inch dia.)

Fatigue Analysis Assumptions (for bolt circle diameter only):

- Yearly Mean Wind Velocity V_{mean}: per AASHTO Section C11.7.1.2. V_{mean} = 11.2 miles per hour
- Drag Coefficients C_d: per AASHTO Section 3.8.7
  C_v = 1.0 for Non-Extreme Limit Case
  Light Fixture, C_d = 1.2 (flat side shapes)
  Round Light Poles, C_d = 1.10
- Fatigue Importance Factor I_F: per AASHTO Section 11.6 and Table 11.6-1. I_F = 0.55 for noncantilevered traffic signals; Category III
- Fatigue loading check per AASHTO LRFDLTS-1 and NCHRP Report 496. Refer to the Design Approach section of the LPB Engineering Manual for additional information.

Foundation Analysis Assumptions:

- Foundation analysis per AASHTO Section 13.6.1.1
- Minimum Bury in Cohesionless Soils per AASHTO Equation C13.6.1.1-5
- Minimum Bury in Cohesive Soils per AASHTO Equation C13.6.1.1-1
- Overload Factor = 2.0 per AASHTO (LTS-6) Section C13.6.1.1
- Under Capacity Factor = 0.7 per AASHTO (LTS-6) Section C13.6.1.1

LPB Design Tables - 110 mph, Exposure C

Determining Minimum Bolt Circle Diameter and Embedment (8-foot LPB with 3-feet Exposed)

Step 1

Pole Size: 6-inch Diameter Pole Shape: Round

Step 4

Step 2		*Step 3*	**Cohesionless Soils ϕ = 30° and c = 0 psf**		**Cohesive Soils ϕ = 12° and c = 250 psf**	
Pole Height (ft)	Fixture Area (ft^2)	Minimum Bolt Circle Diameter (in)	Minimum Bury Depth (ft)	Resulting Exposed Height (ft)	Minimum Bury Depth (ft)	Resulting Exposed Height (ft)
15	1.0	7.5	5.0	3.0	6.2	1.8
	2.0	7.5	5.0	3.0	6.4	1.6
	4.0	7.5	5.0	3.0	6.9	1.1
	6.0	7.5	5.0	3.0	7.2	0.8
20	1.0	7.5	5.0	3.0	6.9	1.1
	2.0	7.5	5.0	3.0	7.1	0.9
	4.0	7.5	5.0	3.0	7.7	0.3
	6.0	7.5	5.0	3.0	NA	
25	1.0	7.5	5.0	3.0	7.6	0.4
	2.0	7.5	5.0	3.0	7.9	0.1
	4.0	7.5	5.0	3.0	NA	
	6.0	8.0	5.0	3.0	NA	
30	1.0	7.5	5.0	3.0	NA	
	2.0	7.5	5.0	3.0	NA	
	4.0	9.0	5.2	2.8	NA	
	6.0	10.5	5.5	2.5	NA	

General Notes:

- A 6-foot (total height) LPB may be used in lieu of the 8-foot LPB provided that the minimum bury depth is less than 6-feet. The resulting exposed height would then need to be adjusted accordingly.
- LPB size: round, 24" diameter
- For round-tapered and square-tapers poles, use average diameter or width.
- Table assumes double light fixture with total fixture as shown. Single light fixtures creating an unbalanced load condition are not covered by this table.
- Weight of fixtures, pole, and foundation are neglected as resisting forces.

Wind Loading Assumptions:

- Load Combinations and Load Factors: per AASHTO Section 3.4 and Table 3.4-1. For Extreme I the Load Factor for wind is 1.0.
- The basic wind speed *V*: per AASHTO Section 3.8.2. *V* = 110 mph; Risk Category: Low; Mean Recurrence Interval: 300 Years
- Wind Exposure Category: C
- Height and Exposure Factor K_z: per AASHTO Section 3.8.4. For poles and fixtures this value is calculated for Exposure C and the actual height of the pole. For the pole foundation, K_z = 0.86.
- Directionality Factor K_d: per AASHTO Section 3.8.5. K_d = 0.95 for round poles.
- Gust Effect Factor *G*: per AASHTO Section 3.8.6. *G* = 1.14

Wind Loading Assumptions Cont.:

- Drag Coefficients C_d: per AASHTO Section 3.8.7
  C_v = 0.8 for Extreme Limit Case
  Light Fixture, C_d = 1.2 (flat side shapes)
  Round Light Poles, C_d = 0.94 (6-inch dia.)

Fatigue Analysis Assumptions (for bolt circle diameter only):

- Yearly Mean Wind Velocity V_{mean}: per AASHTO Section C11.7.1.2. V_{mean} = 11.2 miles per hour
- Drag Coefficients C_d: per AASHTO Section 3.8.7
  C_v = 1.0 for Non-Extreme Limit Case
  Light Fixture, C_d = 1.2 (flat side shapes)
  Round Light Poles, C_d = 1.10
- Fatigue Importance Factor I_F: per AASHTO Section 11.6 and Table 11.6-1. I_F = 0.55 for noncantilevered traffic signals; Category III
- Fatigue loading check per AASHTO LRFDLTS-1 and NCHRP Report 496. Refer to the Design Approach section of the LPB Engineering Manual for additional information.

Foundation Analysis Assumptions:

- Foundation analysis per AASHTO Section 13.6.1.1
- Minimum Bury in Cohesionless Soils per AASHTO Equation C13.6.1.1-5
- Minimum Bury in Cohesive Soils per AASHTO Equation C13.6.1.1-1
- Overload Factor = 2.0 per AASHTO (LTS-6) Section C13.6.1.1
- Under Capacity Factor = 0.7 per AASHTO (LTS-6) Section C13.6.1.1

LPB Design Tables - 110 mph, Exposure C

Determining Minimum Bolt Circle Diameter and Embedment (8-foot LPB with 3-feet Exposed)

Step 1

Pole Size: 8-inch Diameter Pole Shape: Round

Step 4

Step 2		*Step 3*	**Cohesionless Soils ϕ = 30° and c = 0 psf**		**Cohesive Soils ϕ = 12° and c = 250 psf**	
Pole Height (ft)	Fixture Area (ft^2)	Minimum Bolt Circle Diameter (in)	Minimum Bury Depth (ft)	Resulting Exposed Height (ft)	Minimum Bury Depth (ft)	Resulting Exposed Height (ft)
15	1.0	7.5	5.0	3.0	6.1	1.9
	2.0	7.5	5.0	3.0	6.3	1.7
	4.0	7.5	5.0	3.0	6.8	1.2
	6.0	7.5	5.0	3.0	7.2	0.8
20	1.0	7.5	5.0	3.0	6.7	1.3
	2.0	7.5	5.0	3.0	7.0	1.0
	4.0	7.5	5.0	3.0	7.6	0.4
	6.0	7.5	5.0	3.0	8.0	0.0
25	1.0	7.5	5.0	3.0	7.4	0.6
	2.0	7.5	5.0	3.0	7.7	0.3
	4.0	7.5	5.0	3.0	NA	
	6.0	7.5	5.0	3.0	NA	
30	1.0	7.5	5.0	3.0	NA	
	2.0	7.5	5.0	3.0	NA	
	4.0	8.5	5.1	2.9	NA	
	6.0	10.5	5.4	2.6	NA	

General Notes:

- A 6-foot (total height) LPB may be used in lieu of the 8-foot LPB provided that the minimum bury depth is less than 6-feet. The resulting exposed height would then need to be adjusted accordingly.
- LPB size: round, 24" diameter
- For round-tapered and square-tapers poles, use average diameter or width.
- Table assumes double light fixture with total fixture as shown. Single light fixtures creating an unbalanced load condition are not covered by this table.
- Weight of fixtures, pole, and foundation are neglected as resisting forces.

Wind Loading Assumptions:

- Load Combinations and Load Factors: per AASHTO Section 3.4 and Table 3.4-1. For Extreme I the Load Factor for wind is 1.0.
- The basic wind speed *V*: per AASHTO Section 3.8.2. *V* = 110 mph; Risk Category: Low; Mean Recurrence Interval: 300 Years
- Wind Exposure Category: C
- Height and Exposure Factor K_z: per AASHTO Section 3.8.4. For poles and fixtures this value is calculated for Exposure C and the actual height of the pole. For the pole foundation, K_z = 0.86.
- Directionality Factor K_d: per AASHTO Section 3.8.5. K_d = 0.95 for round poles.
- Gust Effect Factor *G*: per AASHTO Section 3.8.6. *G* = 1.14

Wind Loading Assumptions Cont.:

- Drag Coefficients C_d: per AASHTO Section 3.8.7
  C_v = 0.8 for Extreme Limit Case
  Light Fixture, C_d = 1.2 (flat side shapes)
  Round Light Poles, C_d = 0.65 (8-inch dia.)

Fatigue Analysis Assumptions (for bolt circle diameter only):

- Yearly Mean Wind Velocity V_{mean}: per AASHTO Section C11.7.1.2. V_{mean} = 11.2 miles per hour
- Drag Coefficients C_d: per AASHTO Section 3.8.7
  C_v = 1.0 for Non-Extreme Limit Case
  Light Fixture, C_d = 1.2 (flat side shapes)
  Round Light Poles, C_d = 1.10
- Fatigue Importance Factor I_F: per AASHTO Section 11.6 and Table 11.6-1. I_F = 0.55 for noncantilevered traffic signals; Category III
- Fatigue loading check per AASHTO LRFDLTS-1 and NCHRP Report 496. Refer to the Design Approach section of the LPB Engineering Manual for additional information.

Foundation Analysis Assumptions:

- Foundation analysis per AASHTO Section 13.6.1.1
- Minimum Bury in Cohesionless Soils per AASHTO Equation C13.6.1.1-5
- Minimum Bury in Cohesive Soils per AASHTO Equation C13.6.1.1-1
- Overload Factor = 2.0 per AASHTO (LTS-6) Section C13.6.1.1
- Under Capacity Factor = 0.7 per AASHTO (LTS-6) Section C13.6.1.1

LPB Design Tables - 110 mph, Exposure C

Determining Minimum Bolt Circle Diameter and Embedment (8-foot LPB with 3-feet Exposed)

Step 1

Pole Size: 4-inch Width **Pole Shape: Square**

Step 2		*Step 3*	*Step 4*			
			Cohesionless Soils ϕ = 30° and c = 0 psf		**Cohesive Soils ϕ = 12° and c = 250 psf**	
Pole Height (ft)	Fixture Area (ft^2)	Minimum Bolt Circle Diameter (in)	Minimum Bury Depth (ft)	Resulting Exposed Height (ft)	Minimum Bury Depth (ft)	Resulting Exposed Height (ft)
15	1.0	7.5	5.0	3.0	6.4	1.6
	2.0	7.5	5.0	3.0	6.6	1.4
	4.0	7.5	5.0	3.0	7.0	1.0
	6.0	7.5	5.0	3.0	7.4	0.6
20	1.0	7.5	5.0	3.0	7.1	0.9
	2.0	7.5	5.0	3.0	7.4	0.6
	4.0	7.5	5.0	3.0	7.8	0.2
	6.0	7.5	5.0	3.0	NA	
25	1.0	7.5	5.0	3.0	7.9	0.1
	2.0	7.5	5.0	3.0	8.0	0.0
	4.0	7.5	5.0	3.0	NA	
	6.0	8.0	5.2	2.8	NA	
30	1.0	7.5	5.0	3.0	NA	
	2.0	8.0	5.1	2.9	NA	
	4.0	9.5	5.4	2.6	NA	
	6.0	11.5	5.6	2.4	NA	

General Notes:

- A 6-foot (total height) LPB may be used in lieu of the 8-foot LPB provided that the minimum bury depth is less than 6-feet. The resulting exposed height would then need to be adjusted accordingly.
- LPB size: round, 24" diameter
- For round-tapered and square-tapers poles, use average diameter or width.
- Table assumes double light fixture with total fixture as shown. Single light fixtures creating an unbalanced load condition are not covered by this table.
- Weight of fixtures, pole, and foundation are neglected as resisting forces.

Wind Loading Assumptions:

- Load Combinations and Load Factors: per AASHTO Section 3.4 and Table 3.4-1. For Extreme I the Load Factor for wind is 1.0.
- The basic wind speed *V*: per AASHTO Section 3.8.2. *V* = 110 mph; Risk Category: Low; Mean Recurrence Interval: 300 Years
- Wind Exposure Category: C
- Height and Exposure Factor K_z: per AASHTO Section 3.8.4. For poles and fixtures this value is calculated for Exposure C and the actual height of the pole. For the pole foundation, K_z = 0.86.
- Directionality Factor K_d: per AASHTO Section 3.8.5. K_d = 0.90 for square poles.
- Gust Effect Factor *G*: per AASHTO Section 3.8.6. *G* = 1.14

Wind Loading Assumptions Cont.:

- Drag Coefficients C_d: per AASHTO Section 3.8.7
  - C_v = 0.8 for Extreme Limit Case
  - Light Fixture, C_d = 1.2 (flat side shapes)
  - Square Light Poles, C_d = 1.81 (4-inch wide)

Fatigue Analysis Assumptions (for bolt circle diameter only):

- Yearly Mean Wind Velocity V_{mean}: per AASHTO Section C11.7.1.2. V_{mean} = 11.2 miles per hour
- Drag Coefficients C_d: per AASHTO Section 3.8.7
  - C_v = 1.0 for Non-Extreme Limit Case
  - Light Fixture, C_d = 1.2 (flat side shapes)
  - Square Light Poles, C_d = 1.81 (4-inch wide)
- Fatigue Importance Factor I_F: per AASHTO Section 11.6 and Table 11.6-1. I_F = 0.55 for noncantilevered traffic signals; Category III
- Fatigue loading check per AASHTO LRFDLTS-1 and NCHRP Report 496. Refer to the Design Approach section of the LPB Engineering Manual for additional information.

Foundation Analysis Assumptions:

- Foundation analysis per AASHTO Section 13.6.1.1
- Minimum Bury in Cohesionless Soils per AASHTO Equation C13.6.1.1-5
- Minimum Bury in Cohesive Soils per AASHTO Equation C13.6.1.1-1
- Overload Factor = 2.0 per AASHTO (LTS-6) Section C13.6.1.1
- Under Capacity Factor = 0.7 per AASHTO (LTS-6) Section C13.6.1.1

LPB Design Tables - 110 mph, Exposure C

Determining Minimum Bolt Circle Diameter and Embedment (8-foot LPB with 3-feet Exposed)

Step 1

Pole Size: 6-inch Width **Pole Shape: Square**

Step 4

Step 2		*Step 3*	**Cohesionless Soils ϕ = 30° and c = 0 psf**		**Cohesive Soils ϕ = 12° and c = 250 psf**	
Pole Height (ft)	Fixture Area (ft^2)	Minimum Bolt Circle Diameter (in)	Minimum Bury Depth (ft)	Resulting Exposed Height (ft)	Minimum Bury Depth (ft)	Resulting Exposed Height (ft)
15	1.0	7.5	5.0	3.0	6.9	1.1
	2.0	7.5	5.0	3.0	7.1	0.9
	4.0	7.5	5.0	3.0	7.5	0.5
	6.0	7.5	5.0	3.0	7.8	0.2
20	1.0	7.5	5.0	3.0	7.9	0.1
	2.0	7.5	5.0	3.0	NA	
	4.0	7.5	5.0	3.0	NA	
	6.0	7.5	5.0	3.0	NA	
25	1.0	7.5	5.0	3.0	NA	
	2.0	8.0	5.2	2.8	NA	
	4.0	9.5	5.4	2.6	NA	
	6.0	10.5	5.6	2.4	NA	
30	1.0	10.0	5.6	2.4	NA	
	2.0	11.5	5.7	2.3	NA	
	4.0	13.0	6.0	2.0	NA	
	6.0	NA	NA		NA	

General Notes:

- A 6-foot (total height) LPB may be used in lieu of the 8-foot LPB provided that the minimum bury depth is less than 6-feet. The resulting exposed height would then need to be adjusted accordingly.
- LPB size: round, 24" diameter
- For round-tapered and square-tapers poles, use average diameter or width.
- Table assumes double light fixture with total fixture as shown. Single light fixtures creating an unbalanced load condition are not covered by this table.
- Weight of fixtures, pole, and foundation are neglected as resisting forces.

Wind Loading Assumptions:

- Load Combinations and Load Factors: per AASHTO Section 3.4 and Table 3.4-1. For Extreme I the Load Factor for wind is 1.0.
- The basic wind speed *V*: per AASHTO Section 3.8.2. *V* = 110 mph; Risk Category: Low; Mean Recurrence Interval: 300 Years
- Wind Exposure Category: C
- Height and Exposure Factor K_z: per AASHTO Section 3.8.4. For poles and fixtures this value is calculated for Exposure C and the actual height of the pole. For the pole foundation, K_z = 0.86.
- Directionality Factor K_d: per AASHTO Section 3.8.5. K_d = 0.90 for square poles.
- Gust Effect Factor *G*: per AASHTO Section 3.8.6. *G* = 1.14

Wind Loading Assumptions Cont.:

- Drag Coefficients C_d: per AASHTO Section 3.8.7
  C_v = 0.8 for Extreme Limit Case
  Light Fixture, C_d = 1.2 (flat side shapes)
  Square Light Poles, C_d = 1.875 (6-inch wide)

Fatigue Analysis Assumptions (for bolt circle diameter only):

- Yearly Mean Wind Velocity V_{mean}: per AASHTO Section C11.7.1.2. V_{mean} = 11.2 miles per hour
- Drag Coefficients C_d: per AASHTO Section 3.8.7
  C_v = 1.0 for Non-Extreme Limit Case
  Light Fixture, C_d = 1.2 (flat side shapes)
  Square Light Poles, C_d = 1.875 (6-inch wide)
- Fatigue Importance Factor I_F: per AASHTO Section 11.6 and Table 11.6-1. I_F = 0.55 for noncantilevered traffic signals; Category III
- Fatigue loading check per AASHTO LRFDLTS-1 and NCHRP Report 496. Refer to the Design Approach section of the LPB Engineering Manual for additional information.

Foundation Analysis Assumptions:

- Foundation analysis per AASHTO Section 13.6.1.1
- Minimum Bury in Cohesionless Soils per AASHTO Equation C13.6.1.1-5
- Minimum Bury in Cohesive Soils per AASHTO Equation C13.6.1.1-1
- Overload Factor = 2.0 per AASHTO (LTS-6) Section C13.6.1.1
- Under Capacity Factor = 0.7 per AASHTO (LTS-6) Section C13.6.1.1

LPB Design Tables - 120 mph, Exposure C

Determining Minimum Bolt Circle Diameter and Embedment (8-foot LPB with 3-feet Exposed)

Step 1

Pole Size: 4-inch Diameter Pole Shape: Round

Step 2		*Step 3*	*Step 4*			
			Cohesionless Soils ϕ = 30° and c = 0 psf		**Cohesive Soils ϕ = 12° and c = 250 psf**	
Pole Height (ft)	Fixture Area (ft^2)	Minimum Bolt Circle Diameter (in)	Minimum Bury Depth (ft)	Resulting Exposed Height (ft)	Minimum Bury Depth (ft)	Resulting Exposed Height (ft)
15	1.0	7.5	5.0	3.0	6.2	1.8
	2.0	7.5	5.0	3.0	6.5	1.5
	4.0	7.5	5.0	3.0	7.0	1.0
	6.0	7.5	5.0	3.0	7.5	0.5
20	1.0	7.5	5.0	3.0	6.8	1.2
	2.0	7.5	5.0	3.0	7.1	0.9
	4.0	7.5	5.0	3.0	7.7	0.3
	6.0	7.5	5.0	3.0	NA	
25	1.0	7.5	5.0	3.0	7.5	0.5
	2.0	7.5	5.0	3.0	7.8	0.2
	4.0	7.5	5.0	3.0	NA	
	6.0	8.0	5.0	3.0	NA	
30	1.0	7.5	5.0	3.0	NA	
	2.0	7.5	5.0	3.0	NA	
	4.0	8.5	5.2	2.8	NA	
	6.0	10.5	5.6	2.4	NA	

General Notes:

- A 6-foot (total height) LPB may be used in lieu of the 8-foot LPB provided that the minimum bury depth is less than 6-feet. The resulting exposed height would then need to be adjusted accordingly.
- LPB size: round, 24" diameter
- For round-tapered and square-tapers poles, use average diameter or width.
- Table assumes double light fixture with total fixture as shown. Single light fixtures creating an unbalanced load condition are not covered by this table.
- Weight of fixtures, pole, and foundation are neglected as resisting forces.

Wind Loading Assumptions:

- Load Combinations and Load Factors: per AASHTO Section 3.4 and Table 3.4-1. For Extreme I the Load Factor for wind is 1.0.
- The basic wind speed *V*: per AASHTO Section 3.8.2. *V* = 120 mph; Risk Category: Low; Mean Recurrence Interval: 300 Years
- Wind Exposure Category: C
- Height and Exposure Factor K_z: per AASHTO Section 3.8.4. For poles and fixtures this value is calculated for Exposure C and the actual height of the pole. For the pole foundation, K_z = 0.86.
- Directionality Factor K_d: per AASHTO Section 3.8.5. K_d = 0.95 for round poles.
- Gust Effect Factor *G*: per AASHTO Section 3.8.6. *G* = 1.14

Wind Loading Assumptions Cont.:

- Drag Coefficients C_d: per AASHTO Section 3.8.7
  C_v = 0.8 for Extreme Limit Case
  Light Fixture, C_d = 1.2 (flat side shapes)
  Round Light Poles, C_d = 1.10 (4-inch dia)

Fatigue Analysis Assumptions (for bolt circle diameter only):

- Yearly Mean Wind Velocity V_{mean}: per AASHTO Section C11.7.1.2. V_{mean} = 11.2 miles per hour
- Drag Coefficients C_d: per AASHTO Section 3.8.7
  C_v = 1.0 for Non-Extreme Limit Case
  Light Fixture, C_d = 1.2 (flat side shapes)
  Round Light Poles, C_d = 1.10
- Fatigue Importance Factor I_F: per AASHTO Section 11.6 and Table 11.6-1. I_F = 0.55 for noncantilevered traffic signals; Category III
- Fatigue loading check per AASHTO LRFDLTS-1 and NCHRP Report 496. Refer to the Design Approach section of the LPB Engineering Manual for additional information.

Foundation Analysis Assumptions:

- Foundation analysis per AASHTO Section 13.6.1.1
- Minimum Bury in Cohesionless Soils per AASHTO Equation C13.6.1.1-5
- Minimum Bury in Cohesive Soils per AASHTO Equation C13.6.1.1-1
- Overload Factor = 2.0 per AASHTO (LTS-6) Section C13.6.1.1
- Under Capacity Factor = 0.7 per AASHTO (LTS-6) Section C13.6.1.1

LPB Design Tables - 120 mph, Exposure C

Determining Minimum Bolt Circle Diameter and Embedment (8-foot LPB with 3-feet Exposed)

Step 1

Pole Size: 6-inch Diameter Pole Shape: Round

Step 4

Step 2		*Step 3*	**Cohesionless Soils ϕ = 30° and c = 0 psf**		**Cohesive Soils ϕ = 12° and c = 250 psf**	
Pole Height (ft)	Fixture Area (ft^2)	Minimum Bolt Circle Diameter (in)	Minimum Bury Depth (ft)	Resulting Exposed Height (ft)	Minimum Bury Depth (ft)	Resulting Exposed Height (ft)
15	1.0	7.5	5.0	3.0	6.3	1.7
	2.0	7.5	5.0	3.0	6.6	1.4
	4.0	7.5	5.0	3.0	7.1	0.9
	6.0	7.5	5.0	3.0	7.6	0.4
20	1.0	7.5	5.0	3.0	7.0	1.0
	2.0	7.5	5.0	3.0	7.3	0.7
	4.0	7.5	5.0	3.0	7.8	0.2
	6.0	7.5	5.0	3.0	NA	
25	1.0	7.5	5.0	3.0	7.7	0.3
	2.0	7.5	5.0	3.0	NA	
	4.0	7.5	5.0	3.0	NA	
	6.0	8.5	5.2	2.8	NA	
30	1.0	7.5	5.0	3.0	NA	
	2.0	7.5	5.0	3.0	NA	
	4.0	9.5	5.4	2.6	NA	
	6.0	11.5	5.7	2.3	NA	

General Notes:

- A 6-foot (total height) LPB may be used in lieu of the 8-foot LPB provided that the minimum bury depth is less than 6-feet. The resulting exposed height would then need to be adjusted accordingly.
- LPB size: round, 24" diameter
- For round-tapered and square-tapers poles, use average diameter or width.
- Table assumes double light fixture with total fixture as shown. Single light fixtures creating an unbalanced load condition are not covered by this table.
- Weight of fixtures, pole, and foundation are neglected as resisting forces.

Wind Loading Assumptions:

- Load Combinations and Load Factors: per AASHTO Section 3.4 and Table 3.4-1. For Extreme I the Load Factor for wind is 1.0.
- The basic wind speed *V*: per AASHTO Section 3.8.2. *V* = 120 mph; Risk Category: Low; Mean Recurrence Interval: 300 Years
- Wind Exposure Category: C
- Height and Exposure Factor K_z: per AASHTO Section 3.8.4. For poles and fixtures this value is calculated for Exposure C and the actual height of the pole. For the pole foundation, K_z = 0.86.
- Directionality Factor K_d: per AASHTO Section 3.8.5. K_d = 0.95 for round poles.
- Gust Effect Factor *G*: per AASHTO Section 3.8.6. *G* = 1.14

Wind Loading Assumptions Cont.:

- Drag Coefficients C_d: per AASHTO Section 3.8.7
  C_v = 0.8 for Extreme Limit Case
  Light Fixture, C_d = 1.2 (flat side shapes)
  Round Light Poles, C_d = 0.84 (6-inch dia.)

Fatigue Analysis Assumptions (for bolt circle diameter only):

- Yearly Mean Wind Velocity V_{mean}: per AASHTO Section C11.7.1.2. V_{mean} = 11.2 miles per hour
- Drag Coefficients C_d: per AASHTO Section 3.8.7
  C_v = 1.0 for Non-Extreme Limit Case
  Light Fixture, C_d = 1.2 (flat side shapes)
  Round Light Poles, C_d = 1.10
- Fatigue Importance Factor I_F: per AASHTO Section 11.6 and Table 11.6-1. I_F = 0.55 for noncantilevered traffic signals; Category III
- Fatigue loading check per AASHTO LRFDLTS-1 and NCHRP Report 496. Refer to the Design Approach section of the LPB Engineering Manual for additional information.

Foundation Analysis Assumptions:

- Foundation analysis per AASHTO Section 13.6.1.1
- Minimum Bury in Cohesionless Soils per AASHTO Equation C13.6.1.1-5
- Minimum Bury in Cohesive Soils per AASHTO Equation C13.6.1.1-1
- Overload Factor = 2.0 per AASHTO (LTS-6) Section C13.6.1.1
- Under Capacity Factor = 0.7 per AASHTO (LTS-6) Section C13.6.1.1

LPB Design Tables - 120 mph, Exposure C

Determining Minimum Bolt Circle Diameter and Embedment (8-foot LPB with 3-feet Exposed)

Step 1

Pole Size: 8-inch Diameter **Pole Shape: Round**

Step 4

Step 2		*Step 3*	**Cohesionless Soils ϕ = 30° and c = 0 psf**		**Cohesive Soils ϕ = 12° and c = 250 psf**	
Pole Height (ft)	Fixture Area (ft^2)	Minimum Bolt Circle Diameter (in)	Minimum Bury Depth (ft)	Resulting Exposed Height (ft)	Minimum Bury Depth (ft)	Resulting Exposed Height (ft)
15	1.0	7.5	5.0	3.0	6.2	1.8
	2.0	7.5	5.0	3.0	6.5	1.5
	4.0	7.5	5.0	3.0	7.0	1.0
	6.0	7.5	5.0	3.0	7.5	0.5
20	1.0	7.5	5.0	3.0	6.9	1.1
	2.0	7.5	5.0	3.0	7.1	0.9
	4.0	7.5	5.0	3.0	7.8	0.2
	6.0	7.5	5.0	3.0	NA	
25	1.0	7.5	5.0	3.0	7.6	0.4
	2.0	7.5	5.0	3.0	8.0	0.0
	4.0	7.5	5.0	3.0	NA	
	6.0	8.5	5.1	2.9	NA	
30	1.0	7.5	5.0	3.0	NA	
	2.0	7.5	5.0	3.0	NA	
	4.0	9.5	5.3	2.7	NA	
	6.0	11.0	5.6	2.4	NA	

General Notes:

- A 6-foot (total height) LPB may be used in lieu of the 8-foot LPB provided that the minimum bury depth is less than 6-feet. The resulting exposed height would then need to be adjusted accordingly.
- LPB size: round, 24" diameter
- For round-tapered and square-tapers poles, use average diameter or width.
- Table assumes double light fixture with total fixture as shown. Single light fixtures creating an unbalanced load condition are not covered by this table.
- Weight of fixtures, pole, and foundation are neglected as resisting forces.

Wind Loading Assumptions:

- Load Combinations and Load Factors: per AASHTO Section 3.4 and Table 3.4-1. For Extreme I the Load Factor for wind is 1.0.
- The basic wind speed *V*: per AASHTO Section 3.8.2. *V* = 120 mph; Risk Category: Low; Mean Recurrence Interval: 300 Years
- Wind Exposure Category: C
- Height and Exposure Factor K_z: per AASHTO Section 3.8.4. For poles and fixtures this value is calculated for Exposure C and the actual height of the pole. For the pole foundation, K_z = 0.86.
- Directionality Factor K_d: per AASHTO Section 3.8.5. K_d = 0.95 for round poles.
- Gust Effect Factor *G*: per AASHTO Section 3.8.6. *G* = 1.14

Wind Loading Assumptions Cont.:

- Drag Coefficients C_d: per AASHTO Section 3.8.7
  C_v = 0.8 for Extreme Limit Case
  Light Fixture, C_d = 1.2 (flat side shapes)
  Round Light Poles, C_d = 0.58 (8-inch dia.)

Fatigue Analysis Assumptions (for bolt circle diameter only):

- Yearly Mean Wind Velocity V_{mean}: per AASHTO Section C11.7.1.2. V_{mean} = 11.2 miles per hour
- Drag Coefficients C_d: per AASHTO Section 3.8.7
  C_v = 1.0 for Non-Extreme Limit Case
  Light Fixture, C_d = 1.2 (flat side shapes)
  Round Light Poles, C_d = 1.10
- Fatigue Importance Factor I_F: per AASHTO Section 11.6 and Table 11.6-1. I_F = 0.55 for noncantilevered traffic signals; Category III
- Fatigue loading check per AASHTO LRFDLTS-1 and NCHRP Report 496. Refer to the Design Approach section of the LPB Engineering Manual for additional information.

Foundation Analysis Assumptions:

- Foundation analysis per AASHTO Section 13.6.1.1
- Minimum Bury in Cohesionless Soils per AASHTO Equation C13.6.1.1-5
- Minimum Bury in Cohesive Soils per AASHTO Equation C13.6.1.1-1
- Overload Factor = 2.0 per AASHTO (LTS-6) Section C13.6.1.1
- Under Capacity Factor = 0.7 per AASHTO (LTS-6) Section C13.6.1.1

LPB Design Tables - 120 mph, Exposure C

Determining Minimum Bolt Circle Diameter and Embedment (8-foot LPB with 3-feet Exposed)

Step 1

Pole Size: 4-inch Width **Pole Shape: Square**

Step 4

Step 2		*Step 3*	**Cohesionless Soils ϕ = 30° and c = 0 psf**		**Cohesive Soils ϕ = 12° and c = 250 psf**	
Pole Height (ft)	Fixture Area (ft^2)	Minimum Bolt Circle Diameter (in)	Minimum Bury Depth (ft)	Resulting Exposed Height (ft)	Minimum Bury Depth (ft)	Resulting Exposed Height (ft)
15	1.0	7.5	5.0	3.0	6.6	1.4
	2.0	7.5	5.0	3.0	6.9	1.1
	4.0	7.5	5.0	3.0	7.3	0.7
	6.0	7.5	5.0	3.0	7.7	0.3
20	1.0	7.5	5.0	3.0	7.5	0.5
	2.0	7.5	5.0	3.0	7.7	0.3
	4.0	7.5	5.0	3.0	NA	
	6.0	7.5	5.0	3.0	NA	
25	1.0	7.5	5.0	3.0	NA	
	2.0	7.5	5.0	3.0	NA	
	4.0	8.0	5.0	3.0	NA	
	6.0	9.5	5.2	2.8	NA	
30	1.0	8.5	5.0	3.0	NA	
	2.0	9.0	5.2	2.8	NA	
	4.0	11.0	5.5	2.5	NA	
	6.0	13.0	5.7	2.3	NA	

General Notes:

- A 6-foot (total height) LPB may be used in lieu of the 8-foot LPB provided that the minimum bury depth is less than 6-feet. The resulting exposed height would then need to be adjusted accordingly.
- LPB size: round, 24" diameter
- For round-tapered and square-tapers poles, use average diameter or width.
- Table assumes double light fixture with total fixture as shown. Single light fixtures creating an unbalanced load condition are not covered by this table.
- Weight of fixtures, pole, and foundation are neglected as resisting forces.

Wind Loading Assumptions:

- Load Combinations and Load Factors: per AASHTO Section 3.4 and Table 3.4-1. For Extreme I the Load Factor for wind is 1.0.
- The basic wind speed *V*: per AASHTO Section 3.8.2. *V* = 120 mph; Risk Category: Low; Mean Recurrence Interval: 300 Years
- Wind Exposure Category: C
- Height and Exposure Factor K_z: per AASHTO Section 3.8.4. For poles and fixtures this value is calculated for Exposure C and the actual height of the pole. For the pole foundation, K_z = 0.86.
- Directionality Factor K_d: per AASHTO Section 3.8.5. K_d = 0.90 for square poles.
- Gust Effect Factor *G*: per AASHTO Section 3.8.6. *G* = 1.14

Wind Loading Assumptions Cont.:

- Drag Coefficients C_d: per AASHTO Section 3.8.7
  C_v = 0.8 for Extreme Limit Case
  Light Fixture, C_d = 1.2 (flat side shapes)
  Square Light Poles, C_d = 1.81 (4-inch wide)

Fatigue Analysis Assumptions (for bolt circle diameter only):

- Yearly Mean Wind Velocity V_{mean}: per AASHTO Section C11.7.1.2. V_{mean} = 11.2 miles per hour
- Drag Coefficients C_d: per AASHTO Section 3.8.7
  C_v = 1.0 for Non-Extreme Limit Case
  Light Fixture, C_d = 1.2 (flat side shapes)
  Square Light Poles, C_d = 1.81 (4-inch wide)
- Fatigue Importance Factor I_F: per AASHTO Section 11.6 and Table 11.6-1. I_F = 0.55 for noncantilevered traffic signals; Category III
- Fatigue loading check per AASHTO LRFDLTS-1 and NCHRP Report 496. Refer to the Design Approach section of the LPB Engineering Manual for additional information.

Foundation Analysis Assumptions:

- Foundation analysis per AASHTO Section 13.6.1.1
- Minimum Bury in Cohesionless Soils per AASHTO Equation C13.6.1.1-5
- Minimum Bury in Cohesive Soils per AASHTO Equation C13.6.1.1-1
- Overload Factor = 2.0 per AASHTO (LTS-6) Section C13.6.1.1
- Under Capacity Factor = 0.7 per AASHTO (LTS-6) Section C13.6.1.1

LPB Design Tables - 120 mph, Exposure C

Determining Minimum Bolt Circle Diameter and Embedment (8-foot LPB with 3-feet Exposed)

Step 1

Pole Size: 6-inch Width **Pole Shape: Square**

Step 4

Step 2		*Step 3*	**Cohesionless Soils ϕ = 30° and c = 0 psf**		**Cohesive Soils ϕ = 12° and c = 250 psf**	
Pole Height (ft)	Fixture Area (ft^2)	Minimum Bolt Circle Diameter (in)	Minimum Bury Depth (ft)	Resulting Exposed Height (ft)	Minimum Bury Depth (ft)	Resulting Exposed Height (ft)
15	1.0	7.5	5.0	3.0	7.3	0.7
	2.0	7.5	5.0	3.0	7.5	0.5
	4.0	7.5	5.0	3.0	7.9	0.1
	6.0	7.5	5.0	3.0	NA	
20	1.0	7.5	5.0	3.0	7.9	0.1
	2.0	7.5	5.0	3.0	NA	
	4.0	7.5	5.1	2.9	NA	
	6.0	8.0	5.4	2.6	NA	
25	1.0	8.5	5.4	2.6	NA	
	2.0	9.0	5.5	2.5	NA	
	4.0	10.5	5.7	2.3	NA	
	6.0	12.0	6.0	2.0	NA	
30	1.0	12.0	6.1	1.9	NA	
	2.0	13.0	6.3	1.7	NA	
	4.0	NA	NA		NA	
	6.0	NA	NA		NA	

General Notes:

- A 6-foot (total height) LPB may be used in lieu of the 8-foot LPB provided that the minimum bury depth is less than 6-feet. The resulting exposed height would then need to be adjusted accordingly.
- LPB size: round, 24" diameter
- For round-tapered and square-tapers poles, use average diameter or width.
- Table assumes double light fixture with total fixture as shown. Single light fixtures creating an unbalanced load condition are not covered by this table.
- Weight of fixtures, pole, and foundation are neglected as resisting forces.

Wind Loading Assumptions:

- Load Combinations and Load Factors: per AASHTO Section 3.4 and Table 3.4-1. For Extreme I the Load Factor for wind is 1.0.
- The basic wind speed *V*: per AASHTO Section 3.8.2. *V* = 120 mph; Risk Category: Low; Mean Recurrence Interval: 300 Years
- Wind Exposure Category: C
- Height and Exposure Factor K_z: per AASHTO Section 3.8.4. For poles and fixtures this value is calculated for Exposure C and the actual height of the pole. For the pole foundation, K_z = 0.86.
- Directionality Factor K_d: per AASHTO Section 3.8.5. K_d = 0.90 for square poles.
- Gust Effect Factor *G*: per AASHTO Section 3.8.6. *G* = 1.14

Wind Loading Assumptions Cont.:

- Drag Coefficients C_d: per AASHTO Section 3.8.7
  - C_v = 0.8 for Extreme Limit Case
  - Light Fixture, C_d = 1.2 (flat side shapes)
  - Square Light Poles, C_d = 1.875 (6-inch wide)

Fatigue Analysis Assumptions (for bolt circle diameter only):

- Yearly Mean Wind Velocity V_{mean}: per AASHTO Section C11.7.1.2. V_{mean} = 11.2 miles per hour
- Drag Coefficients C_d: per AASHTO Section 3.8.7
  - C_v = 1.0 for Non-Extreme Limit Case
  - Light Fixture, C_d = 1.2 (flat side shapes)
  - Square Light Poles, C_d = 1.875 (6-inch wide)
- Fatigue Importance Factor I_F: per AASHTO Section 11.6 and Table 11.6-1. I_F = 0.55 for noncantilevered traffic signals; Category III
- Fatigue loading check per AASHTO LRFDLTS-1 and NCHRP Report 496. Refer to the Design Approach section of the LPB Engineering Manual for additional information.

Foundation Analysis Assumptions:

- Foundation analysis per AASHTO Section 13.6.1.1
- Minimum Bury in Cohesionless Soils per AASHTO Equation C13.6.1.1-5
- Minimum Bury in Cohesive Soils per AASHTO Equation C13.6.1.1-1
- Overload Factor = 2.0 per AASHTO (LTS-6) Section C13.6.1.1
- Under Capacity Factor = 0.7 per AASHTO (LTS-6) Section C13.6.1.1

LPB Design Tables - 130 mph, Exposure C

Determining Minimum Bolt Circle Diameter and Embedment (8-foot LPB with 3-feet Exposed)

Step 1

Pole Size: 4-inch Diameter Pole Shape: Round

Step 4

Step 2		*Step 3*	**Cohesionless Soils ϕ = 30° and c = 0 psf**		**Cohesive Soils ϕ = 12° and c = 250 psf**	
Pole Height (ft)	Fixture Area (ft^2)	Minimum Bolt Circle Diameter (in)	Minimum Bury Depth (ft)	Resulting Exposed Height (ft)	Minimum Bury Depth (ft)	Resulting Exposed Height (ft)
15	1.0	7.5	5.0	3.0	6.3	1.7
	2.0	7.5	5.0	3.0	6.7	1.3
	4.0	7.5	5.0	3.0	7.3	0.7
	6.0	7.5	5.0	3.0	7.8	0.2
20	1.0	7.5	5.0	3.0	7.1	0.9
	2.0	7.5	5.0	3.0	7.4	0.6
	4.0	7.5	5.0	3.0	NA	
	6.0	7.5	5.0	3.0	NA	
25	1.0	7.5	5.0	3.0	7.8	0.2
	2.0	7.5	5.0	3.0	NA	
	4.0	7.5	5.1	2.9	NA	
	6.0	9.5	5.4	2.6	NA	
30	1.0	7.5	5.0	3.0	NA	
	2.0	8.0	5.1	2.9	NA	
	4.0	10.0	5.5	2.5	NA	
	6.0	12.5	5.9	2.1	NA	

General Notes:

- A 6-foot (total height) LPB may be used in lieu of the 8-foot LPB provided that the minimum bury depth is less than 6-feet. The resulting exposed height would then need to be adjusted accordingly.
- LPB size: round, 24" diameter
- For round-tapered and square-tapers poles, use average diameter or width.
- Table assumes double light fixture with total fixture as shown. Single light fixtures creating an unbalanced load condition are not covered by this table.
- Weight of fixtures, pole, and foundation are neglected as resisting forces.

Wind Loading Assumptions:

- Load Combinations and Load Factors: per AASHTO Section 3.4 and Table 3.4-1. For Extreme I the Load Factor for wind is 1.0.
- The basic wind speed *V*: per AASHTO Section 3.8.2. *V* = 130 mph; Risk Category: Low; Mean Recurrence Interval: 300 Years
- Wind Exposure Category: C
- Height and Exposure Factor K_z: per AASHTO Section 3.8.4. For poles and fixtures this value is calculated for Exposure C and the actual height of the pole. For the pole foundation, K_z = 0.86.
- Directionality Factor K_d: per AASHTO Section 3.8.5. K_d = 0.95 for round poles.
- Gust Effect Factor *G*: per AASHTO Section 3.8.6. *G* = 1.14

Wind Loading Assumptions Cont.:

- Drag Coefficients C_d: per AASHTO Section 3.8.7
  C_v = 0.8 for Extreme Limit Case
  Light Fixture, C_d = 1.2 (flat side shapes)
  Round Light Poles, C_d = 1.10 (4-inch dia)

Fatigue Analysis Assumptions (for bolt circle diameter only):

- Yearly Mean Wind Velocity V_{mean}: per AASHTO Section C11.7.1.2. V_{mean} = 11.2 miles per hour
- Drag Coefficients C_d: per AASHTO Section 3.8.7
  C_v = 1.0 for Non-Extreme Limit Case
  Light Fixture, C_d = 1.2 (flat side shapes)
  Round Light Poles, C_d = 1.10
- Fatigue Importance Factor I_F: per AASHTO Section 11.6 and Table 11.6-1. I_F = 0.55 for noncantilevered traffic signals; Category III
- Fatigue loading check per AASHTO LRFDLTS-1 and NCHRP Report 496. Refer to the Design Approach section of the LPB Engineering Manual for additional information.

Foundation Analysis Assumptions:

- Foundation analysis per AASHTO Section 13.6.1.1
- Minimum Bury in Cohesionless Soils per AASHTO Equation C13.6.1.1-5
- Minimum Bury in Cohesive Soils per AASHTO Equation C13.6.1.1-1
- Overload Factor = 2.0 per AASHTO (LTS-6) Section C13.6.1.1
- Under Capacity Factor = 0.7 per AASHTO (LTS-6) Section C13.6.1.1

LPB Design Tables - 130 mph, Exposure C

Determining Minimum Bolt Circle Diameter and Embedment (8-foot LPB with 3-feet Exposed)

Step 1

Pole Size: 6-inch Diameter Pole Shape: Round

Step 4

Step 2		*Step 3*	**Cohesionless Soils ϕ = 30° and c = 0 psf**		**Cohesive Soils ϕ = 12° and c = 250 psf**	
Pole Height (ft)	Fixture Area (ft^2)	Minimum Bolt Circle Diameter (in)	Minimum Bury Depth (ft)	Resulting Exposed Height (ft)	Minimum Bury Depth (ft)	Resulting Exposed Height (ft)
15	1.0	7.5	5.0	3.0	6.4	1.6
	2.0	7.5	5.0	3.0	6.7	1.3
	4.0	7.5	5.0	3.0	7.3	0.7
	6.0	7.5	5.0	3.0	7.8	0.2
20	1.0	7.5	5.0	3.0	7.1	0.9
	2.0	7.5	5.0	3.0	7.5	0.5
	4.0	7.5	5.0	3.0	NA	
	6.0	7.5	5.0	3.0	NA	
25	1.0	7.5	5.0	3.0	7.9	0.1
	2.0	7.5	5.0	3.0	NA	
	4.0	7.5	5.1	2.9	NA	
	6.0	9.5	5.5	2.5	NA	
30	1.0	7.5	5.0	3.0	NA	
	2.0	8.0	5.2	2.8	NA	
	4.0	10.5	5.6	2.4	NA	
	6.0	12.5	5.9	2.1	NA	

General Notes:

- A 6-foot (total height) LPB may be used in lieu of the 8-foot LPB provided that the minimum bury depth is less than 6-feet. The resulting exposed height would then need to be adjusted accordingly.
- LPB size: round, 24" diameter
- For round-tapered and square-tapers poles, use average diameter or width.
- Table assumes double light fixture with total fixture as shown. Single light fixtures creating an unbalanced load condition are not covered by this table.
- Weight of fixtures, pole, and foundation are neglected as resisting forces.

Wind Loading Assumptions:

- Load Combinations and Load Factors: per AASHTO Section 3.4 and Table 3.4-1. For Extreme I the Load Factor for wind is 1.0.
- The basic wind speed *V*: per AASHTO Section 3.8.2. *V* = 130 mph; Risk Category: Low; Mean Recurrence Interval: 300 Years
- Wind Exposure Category: C
- Height and Exposure Factor K_z: per AASHTO Section 3.8.4. For poles and fixtures this value is calculated for Exposure C and the actual height of the pole. For the pole foundation, K_z = 0.86.
- Directionality Factor K_d: per AASHTO Section 3.8.5. K_d = 0.95 for round poles.
- Gust Effect Factor *G*: per AASHTO Section 3.8.6. *G* = 1.14

Wind Loading Assumptions Cont.:

- Drag Coefficients C_d: per AASHTO Section 3.8.7
  C_v = 0.8 for Extreme Limit Case
  Light Fixture, C_d = 1.2 (flat side shapes)
  Round Light Poles, C_d = 0.76 (6-inch dia.)

Fatigue Analysis Assumptions (for bolt circle diameter only):

- Yearly Mean Wind Velocity V_{mean}: per AASHTO Section C11.7.1.2. V_{mean} = 11.2 miles per hour
- Drag Coefficients C_d: per AASHTO Section 3.8.7
  C_v = 1.0 for Non-Extreme Limit Case
  Light Fixture, C_d = 1.2 (flat side shapes)
  Round Light Poles, C_d = 1.10
- Fatigue Importance Factor I_F: per AASHTO Section 11.6 and Table 11.6-1. I_F = 0.55 for noncantilevered traffic signals; Category III
- Fatigue loading check per AASHTO LRFDLTS-1 and NCHRP Report 496. Refer to the Design Approach section of the LPB Engineering Manual for additional information.

Foundation Analysis Assumptions:

- Foundation analysis per AASHTO Section 13.6.1.1
- Minimum Bury in Cohesionless Soils per AASHTO Equation C13.6.1.1-5
- Minimum Bury in Cohesive Soils per AASHTO Equation C13.6.1.1-1
- Overload Factor = 2.0 per AASHTO (LTS-6) Section C13.6.1.1
- Under Capacity Factor = 0.7 per AASHTO (LTS-6) Section C13.6.1.1

LPB Design Tables - 130 mph, Exposure C

Determining Minimum Bolt Circle Diameter and Embedment (8-foot LPB with 3-feet Exposed)

Step 1

Pole Size: 8-inch Diameter Pole Shape: Round

Step 4

Step 2		*Step 3*	**Cohesionless Soils ϕ = 30° and c = 0 psf**		**Cohesive Soils ϕ = 12° and c = 250 psf**	
Pole Height (ft)	Fixture Area (ft^2)	Minimum Bolt Circle Diameter (in)	Minimum Bury Depth (ft)	Resulting Exposed Height (ft)	Minimum Bury Depth (ft)	Resulting Exposed Height (ft)
15	1.0	7.5	5.0	3.0	6.3	1.7
	2.0	7.5	5.0	3.0	6.7	1.3
	4.0	7.5	5.0	3.0	7.2	0.8
	6.0	7.5	5.0	3.0	7.8	0.2
20	1.0	7.5	5.0	3.0	7.0	1.0
	2.0	7.5	5.0	3.0	7.2	0.8
	4.0	7.5	5.0	3.0	8.0	0.0
	6.0	7.5	5.0	3.0	NA	
25	1.0	7.5	5.0	3.0	7.7	0.3
	2.0	7.5	5.0	3.0	NA	
	4.0	7.5	5.0	3.0	NA	
	6.0	9.5	5.4	2.6	NA	
30	1.0	7.5	5.0	3.0	NA	
	2.0	8.0	5.1	2.9	NA	
	4.0	10.0	5.5	2.5	NA	
	6.0	12.5	5.8	2.2	NA	

General Notes:

- A 6-foot (total height) LPB may be used in lieu of the 8-foot LPB provided that the minimum bury depth is less than 6-feet. The resulting exposed height would then need to be adjusted accordingly.
- LPB size: round, 24" diameter
- For round-tapered and square-tapers poles, use average diameter or width.
- Table assumes double light fixture with total fixture as shown. Single light fixtures creating an unbalanced load condition are not covered by this table.
- Weight of fixtures, pole, and foundation are neglected as resisting forces.

Wind Loading Assumptions:

- Load Combinations and Load Factors: per AASHTO Section 3.4 and Table 3.4-1. For Extreme I the Load Factor for wind is 1.0.
- The basic wind speed *V*: per AASHTO Section 3.8.2. *V* = 130 mph; Risk Category: Low; Mean Recurrence Interval: 300 Years
- Wind Exposure Category: C
- Height and Exposure Factor K_z: per AASHTO Section 3.8.4. For poles and fixtures this value is calculated for Exposure C and the actual height of the pole. For the pole foundation, K_z = 0.86.
- Directionality Factor K_d: per AASHTO Section 3.8.5. K_d = 0.95 for round poles.
- Gust Effect Factor *G*: per AASHTO Section 3.8.6. *G* = 1.14

Wind Loading Assumptions Cont.:

- Drag Coefficients C_d: per AASHTO Section 3.8.7
  C_v = 0.8 for Extreme Limit Case
  Light Fixture, C_d = 1.2 (flat side shapes)
  Round Light Poles, C_d = 0.52 (8-inch dia.)

Fatigue Analysis Assumptions (for bolt circle diameter only):

- Yearly Mean Wind Velocity V_{mean}: per AASHTO Section C11.7.1.2. V_{mean} = 11.2 miles per hour
- Drag Coefficients C_d: per AASHTO Section 3.8.7
  C_v = 1.0 for Non-Extreme Limit Case
  Light Fixture, C_d = 1.2 (flat side shapes)
  Round Light Poles, C_d = 1.10
- Fatigue Importance Factor I_F: per AASHTO Section 11.6 and Table 11.6-1. I_F = 0.55 for noncantilevered traffic signals; Category III
- Fatigue loading check per AASHTO LRFDLTS-1 and NCHRP Report 496. Refer to the Design Approach section of the LPB Engineering Manual for additional information.

Foundation Analysis Assumptions:

- Foundation analysis per AASHTO Section 13.6.1.1
- Minimum Bury in Cohesionless Soils per AASHTO Equation C13.6.1.1-5
- Minimum Bury in Cohesive Soils per AASHTO Equation C13.6.1.1-1
- Overload Factor = 2.0 per AASHTO (LTS-6) Section C13.6.1.1
- Under Capacity Factor = 0.7 per AASHTO (LTS-6) Section C13.6.1.1

LPB Design Tables - 130 mph, Exposure C

Determining Minimum Bolt Circle Diameter and Embedment (8-foot LPB with 3-feet Exposed)

Step 1

Pole Size: 4-inch Width **Pole Shape: Square**

Step 2		*Step 3*	*Step 4*			
			Cohesionless Soils ϕ = 30° and c = 0 psf		**Cohesive Soils ϕ = 12° and c = 250 psf**	
Pole Height (ft)	Fixture Area (ft^2)	Minimum Bolt Circle Diameter (in)	Minimum Bury Depth (ft)	Resulting Exposed Height (ft)	Minimum Bury Depth (ft)	Resulting Exposed Height (ft)
15	1.0	7.5	5.0	3.0	6.9	1.1
	2.0	7.5	5.0	3.0	7.2	0.8
	4.0	7.5	5.0	3.0	7.7	0.3
	6.0	7.5	5.0	3.0	NA	
20	1.0	7.5	5.0	3.0	7.8	0.2
	2.0	7.5	5.0	3.0	NA	
	4.0	7.5	5.0	3.0	NA	
	6.0	7.5	5.2	2.8	NA	
25	1.0	7.5	5.0	3.0	NA	
	2.0	7.5	5.2	2.8	NA	
	4.0	9.5	5.5	2.5	NA	
	6.0	11.0	5.8	2.2	NA	
30	1.0	9.5	5.5	2.5	NA	
	2.0	10.5	5.7	2.3	NA	
	4.0	13.0	6.0	2.0	NA	
	6.0	NA	NA		NA	

General Notes:

- A 6-foot (total height) LPB may be used in lieu of the 8-foot LPB provided that the minimum bury depth is less than 6-feet. The resulting exposed height would then need to be adjusted accordingly.
- LPB size: round, 24" diameter
- For round-tapered and square-tapers poles, use average diameter or width.
- Table assumes double light fixture with total fixture as shown. Single light fixtures creating an unbalanced load condition are not covered by this table.
- Weight of fixtures, pole, and foundation are neglected as resisting forces.

Wind Loading Assumptions:

- Load Combinations and Load Factors: per AASHTO Section 3.4 and Table 3.4-1. For Extreme I the Load Factor for wind is 1.0.
- The basic wind speed *V*: per AASHTO Section 3.8.2. *V* = 130 mph; Risk Category: Low; Mean Recurrence Interval: 300 Years
- Wind Exposure Category: C
- Height and Exposure Factor K_z: per AASHTO Section 3.8.4. For poles and fixtures this value is calculated for Exposure C and the actual height of the pole. For the pole foundation, K_z = 0.86.
- Directionality Factor K_d: per AASHTO Section 3.8.5. K_d = 0.90 for square poles.
- Gust Effect Factor *G*: per AASHTO Section 3.8.6. *G* = 1.14

Wind Loading Assumptions Cont.:

- Drag Coefficients C_d: per AASHTO Section 3.8.7
  C_v = 0.8 for Extreme Limit Case
  Light Fixture, C_d = 1.2 (flat side shapes)
  Square Light Poles, C_d = 1.81 (4-inch wide)

Fatigue Analysis Assumptions (for bolt circle diameter only):

- Yearly Mean Wind Velocity V_{mean}: per AASHTO Section C11.7.1.2. V_{mean} = 11.2 miles per hour
- Drag Coefficients C_d: per AASHTO Section 3.8.7
  C_v = 1.0 for Non-Extreme Limit Case
  Light Fixture, C_d = 1.2 (flat side shapes)
  Square Light Poles, C_d = 1.81 (4-inch wide)
- Fatigue Importance Factor I_F: per AASHTO Section 11.6 and Table 11.6-1. I_F = 0.55 for noncantilevered traffic signals; Category III
- Fatigue loading check per AASHTO LRFDLTS-1 and NCHRP Report 496. Refer to the Design Approach section of the LPB Engineering Manual for additional information.

Foundation Analysis Assumptions:

- Foundation analysis per AASHTO Section 13.6.1.1
- Minimum Bury in Cohesionless Soils per AASHTO Equation C13.6.1.1-5
- Minimum Bury in Cohesive Soils per AASHTO Equation C13.6.1.1-1
- Overload Factor = 2.0 per AASHTO (LTS-6) Section C13.6.1.1
- Under Capacity Factor = 0.7 per AASHTO (LTS-6) Section C13.6.1.1

LPB Design Tables - 130 mph, Exposure C

Determining Minimum Bolt Circle Diameter and Embedment (8-foot LPB with 3-feet Exposed)

Step 1

Pole Size: 6-inch Width **Pole Shape: Square**

Step 4

Step 2		*Step 3*	**Cohesionless Soils ϕ = 30° and c = 0 psf**		**Cohesive Soils ϕ = 12° and c = 250 psf**	
Pole Height (ft)	Fixture Area (ft^2)	Minimum Bolt Circle Diameter (in)	Minimum Bury Depth (ft)	Resulting Exposed Height (ft)	Minimum Bury Depth (ft)	Resulting Exposed Height (ft)
15	1.0	7.5	5.0	3.0	7.6	0.4
	2.0	7.5	5.0	3.0	7.8	0.2
	4.0	7.5	5.0	3.0	NA	
	6.0	7.5	5.0	3.0	NA	
20	1.0	7.5	5.0	3.0	NA	
	2.0	7.5	5.2	2.8	NA	
	4.0	8.0	5.4	2.6	NA	
	6.0	9.5	5.6	2.4	NA	
25	1.0	9.5	5.7	2.3	NA	
	2.0	10.5	5.8	2.2	NA	
	4.0	12.5	6.0	2.0	NA	
	6.0	NA	NA		NA	
30	1.0	NA	NA		NA	
	2.0	NA	NA		NA	
	4.0	NA	NA		NA	
	6.0	NA	NA		NA	

General Notes:

- A 6-foot (total height) LPB may be used in lieu of the 8-foot LPB provided that the minimum bury depth is less than 6-feet. The resulting exposed height would then need to be adjusted accordingly.
- LPB size: round, 24" diameter
- For round-tapered and square-tapers poles, use average diameter or width.
- Table assumes double light fixture with total fixture as shown. Single light fixtures creating an unbalanced load condition are not covered by this table.
- Weight of fixtures, pole, and foundation are neglected as resisting forces.

Wind Loading Assumptions:

- Load Combinations and Load Factors: per AASHTO Section 3.4 and Table 3.4-1. For Extreme I the Load Factor for wind is 1.0.
- The basic wind speed *V*: per AASHTO Section 3.8.2. *V* = 130 mph; Risk Category: Low; Mean Recurrence Interval: 300 Years
- Wind Exposure Category: C
- Height and Exposure Factor K_z: per AASHTO Section 3.8.4. For poles and fixtures this value is calculated for Exposure C and the actual height of the pole. For the pole foundation, K_z = 0.86.
- Directionality Factor K_d: per AASHTO Section 3.8.5. K_d = 0.90 for square poles.
- Gust Effect Factor *G*: per AASHTO Section 3.8.6. *G* = 1.14

Wind Loading Assumptions Cont.:

- Drag Coefficients C_d: per AASHTO Section 3.8.7
  C_v = 0.8 for Extreme Limit Case
  Light Fixture, C_d = 1.2 (flat side shapes)
  Square Light Poles, C_d = 1.875 (6-inch wide)

Fatigue Analysis Assumptions (for bolt circle diameter only):

- Yearly Mean Wind Velocity V_{mean}: per AASHTO Section C11.7.1.2. V_{mean} = 11.2 miles per hour
- Drag Coefficients C_d: per AASHTO Section 3.8.7
  C_v = 1.0 for Non-Extreme Limit Case
  Light Fixture, C_d = 1.2 (flat side shapes)
  Square Light Poles, C_d = 1.875 (6-inch wide)
- Fatigue Importance Factor I_F: per AASHTO Section 11.6 and Table 11.6-1. I_F = 0.55 for noncantilevered traffic signals; Category III
- Fatigue loading check per AASHTO LRFDLTS-1 and NCHRP Report 496. Refer to the Design Approach section of the LPB Engineering Manual for additional information.

Foundation Analysis Assumptions:

- Foundation analysis per AASHTO Section 13.6.1.1
- Minimum Bury in Cohesionless Soils per AASHTO Equation C13.6.1.1-5
- Minimum Bury in Cohesive Soils per AASHTO Equation C13.6.1.1-1
- Overload Factor = 2.0 per AASHTO (LTS-6) Section C13.6.1.1
- Under Capacity Factor = 0.7 per AASHTO (LTS-6) Section C13.6.1.1

LPB Design Tables - 140 mph, Exposure C

Determining Minimum Bolt Circle Diameter and Embedment (8-foot LPB with 3-feet Exposed)

Step 1

Pole Size: 4-inch Diameter Pole Shape: Round

Step 4

Step 2		*Step 3*	**Cohesionless Soils ϕ = 30° and c = 0 psf**		**Cohesive Soils ϕ = 12° and c = 250 psf**	
Pole Height (ft)	Fixture Area (ft^2)	Minimum Bolt Circle Diameter (in)	Minimum Bury Depth (ft)	Resulting Exposed Height (ft)	Minimum Bury Depth (ft)	Resulting Exposed Height (ft)
15	1.0	7.5	5.0	3.0	6.6	1.4
	2.0	7.5	5.0	3.0	7.0	1.0
	4.0	7.5	5.0	3.0	7.6	0.4
	6.0	7.5	5.0	3.0	NA	
20	1.0	7.5	5.0	3.0	7.4	0.6
	2.0	7.5	5.0	3.0	7.8	0.2
	4.0	7.5	5.0	3.0	NA	
	6.0	8.0	5.2	2.8	NA	
25	1.0	7.5	5.0	3.0	NA	
	2.0	7.5	5.0	3.0	NA	
	4.0	8.5	5.3	2.7	NA	
	6.0	11.0	5.7	2.3	NA	
30	1.0	8.0	5.1	2.9	NA	
	2.0	9.0	5.4	2.6	NA	
	4.0	11.5	5.8	2.2	NA	
	6.0	13.5	6.1	1.9	NA	

General Notes:

- A 6-foot (total height) LPB may be used in lieu of the 8-foot LPB provided that the minimum bury depth is less than 6-feet. The resulting exposed height would then need to be adjusted accordingly.
- LPB size: round, 24" diameter
- For round-tapered and square-tapers poles, use average diameter or width.
- Table assumes double light fixture with total fixture as shown. Single light fixtures creating an unbalanced load condition are not covered by this table.
- Weight of fixtures, pole, and foundation are neglected as resisting forces.

Wind Loading Assumptions:

- Load Combinations and Load Factors: per AASHTO Section 3.4 and Table 3.4-1. For Extreme I the Load Factor for wind is 1.0.
- The basic wind speed *V*: per AASHTO Section 3.8.2. *V* = 140 mph; Risk Category: Low; Mean Recurrence Interval: 300 Years
- Wind Exposure Category: C
- Height and Exposure Factor K_z: per AASHTO Section 3.8.4. For poles and fixtures this value is calculated for Exposure C and the actual height of the pole. For the pole foundation, K_z = 0.86.
- Directionality Factor K_d: per AASHTO Section 3.8.5. K_d = 0.95 for round poles.
- Gust Effect Factor *G*: per AASHTO Section 3.8.6. *G* = 1.14

Wind Loading Assumptions Cont.:

- Drag Coefficients C_d: per AASHTO Section 3.8.7
  - C_v = 0.8 for Extreme Limit Case
  - Light Fixture, C_d = 1.2 (flat side shapes)
  - Round Light Poles, C_d = 1.10 (4-inch dia)

Fatigue Analysis Assumptions (for bolt circle diameter only):

- Yearly Mean Wind Velocity V_{mean}: per AASHTO Section C11.7.1.2. V_{mean} = 11.2 miles per hour
- Drag Coefficients C_d: per AASHTO Section 3.8.7
  - C_v = 1.0 for Non-Extreme Limit Case
  - Light Fixture, C_d = 1.2 (flat side shapes)
  - Round Light Poles, C_d = 1.10
- Fatigue Importance Factor I_F: per AASHTO Section 11.6 and Table 11.6-1. I_F = 0.55 for noncantilevered traffic signals; Category III
- Fatigue loading check per AASHTO LRFDLTS-1 and NCHRP Report 496. Refer to the Design Approach section of the LPB Engineering Manual for additional information.

Foundation Analysis Assumptions:

- Foundation analysis per AASHTO Section 13.6.1.1
- Minimum Bury in Cohesionless Soils per AASHTO Equation C13.6.1.1-5
- Minimum Bury in Cohesive Soils per AASHTO Equation C13.6.1.1-1
- Overload Factor = 2.0 per AASHTO (LTS-6) Section C13.6.1.1
- Under Capacity Factor = 0.7 per AASHTO (LTS-6) Section C13.6.1.1

LPB Design Tables - 140 mph, Exposure C

Determining Minimum Bolt Circle Diameter and Embedment (8-foot LPB with 3-feet Exposed)

Step 1

Pole Size: 6-inch Diameter Pole Shape: Round

Step 2		*Step 3*	*Step 4*			
			Cohesionless Soils ϕ = 30° and c = 0 psf		**Cohesive Soils ϕ = 12° and c = 250 psf**	
Pole Height (ft)	Fixture Area (ft^2)	Minimum Bolt Circle Diameter (in)	Minimum Bury Depth (ft)	Resulting Exposed Height (ft)	Minimum Bury Depth (ft)	Resulting Exposed Height (ft)
15	1.0	7.5	5.0	3.0	6.6	1.4
	2.0	7.5	5.0	3.0	6.9	1.1
	4.0	7.5	5.0	3.0	7.6	0.4
	6.0	7.5	5.0	3.0	NA	
20	1.0	7.5	5.0	3.0	7.3	0.7
	2.0	7.5	5.0	3.0	7.7	0.3
	4.0	7.5	5.0	3.0	NA	
	6.0	7.5	5.1	2.9	NA	
25	1.0	7.5	5.0	3.0	8.0	0.0
	2.0	7.5	5.0	3.0	NA	
	4.0	8.5	5.3	2.7	NA	
	6.0	10.5	5.6	2.4	NA	
30	1.0	7.5	5.0	3.0	NA	
	2.0	8.5	5.3	2.7	NA	
	4.0	11.5	5.7	2.3	NA	
	6.0	13.5	6.1	1.9	NA	

General Notes:

- A 6-foot (total height) LPB may be used in lieu of the 8-foot LPB provided that the minimum bury depth is less than 6-feet. The resulting exposed height would then need to be adjusted accordingly.
- LPB size: round, 24" diameter
- For round-tapered and square-tapers poles, use average diameter or width.
- Table assumes double light fixture with total fixture as shown. Single light fixtures creating an unbalanced load condition are not covered by this table.
- Weight of fixtures, pole, and foundation are neglected as resisting forces.

Wind Loading Assumptions:

- Load Combinations and Load Factors: per AASHTO Section 3.4 and Table 3.4-1. For Extreme I the Load Factor for wind is 1.0.
- The basic wind speed *V*: per AASHTO Section 3.8.2. *V* = 140 mph; Risk Category: Low; Mean Recurrence Interval: 300 Years
- Wind Exposure Category: C
- Height and Exposure Factor K_z: per AASHTO Section 3.8.4. For poles and fixtures this value is calculated for Exposure C and the actual height of the pole. For the pole foundation, K_z = 0.86.
- Directionality Factor K_d: per AASHTO Section 3.8.5. K_d = 0.95 for round poles.
- Gust Effect Factor *G*: per AASHTO Section 3.8.6. *G* = 1.14

Wind Loading Assumptions Cont.:

- Drag Coefficients C_d: per AASHTO Section 3.8.7
  C_v = 0.8 for Extreme Limit Case
  Light Fixture, C_d = 1.2 (flat side shapes)
  Round Light Poles, C_d = 0.69 (6-inch dia.)

Fatigue Analysis Assumptions (for bolt circle diameter only):

- Yearly Mean Wind Velocity V_{mean}: per AASHTO Section C11.7.1.2. V_{mean} = 11.2 miles per hour
- Drag Coefficients C_d: per AASHTO Section 3.8.7
  C_v = 1.0 for Non-Extreme Limit Case
  Light Fixture, C_d = 1.2 (flat side shapes)
  Round Light Poles, C_d = 1.10
- Fatigue Importance Factor I_F: per AASHTO Section 11.6 and Table 11.6-1. I_F = 0.55 for noncantilevered traffic signals; Category III
- Fatigue loading check per AASHTO LRFDLTS-1 and NCHRP Report 496. Refer to the Design Approach section of the LPB Engineering Manual for additional information.

Foundation Analysis Assumptions:

- Foundation analysis per AASHTO Section 13.6.1.1
- Minimum Bury in Cohesionless Soils per AASHTO Equation C13.6.1.1-5
- Minimum Bury in Cohesive Soils per AASHTO Equation C13.6.1.1-1
- Overload Factor = 2.0 per AASHTO (LTS-6) Section C13.6.1.1
- Under Capacity Factor = 0.7 per AASHTO (LTS-6) Section C13.6.1.1

LPB Design Tables - 140 mph, Exposure C

Determining Minimum Bolt Circle Diameter and Embedment (8-foot LPB with 3-feet Exposed)

Step 1

Pole Size: 8-inch Diameter Pole Shape: Round

Step 4

Step 2		*Step 3*	**Cohesionless Soils ϕ = 30° and c = 0 psf**		**Cohesive Soils ϕ = 12° and c = 250 psf**	
Pole Height (ft)	Fixture Area (ft^2)	Minimum Bolt Circle Diameter (in)	Minimum Bury Depth (ft)	Resulting Exposed Height (ft)	Minimum Bury Depth (ft)	Resulting Exposed Height (ft)
15	1.0	7.5	5.0	3.0	6.5	1.5
	2.0	7.5	5.0	3.0	6.8	1.2
	4.0	7.5	5.0	3.0	7.5	0.5
	6.0	7.5	5.0	3.0	NA	
20	1.0	7.5	5.0	3.0	7.2	0.8
	2.0	7.5	5.0	3.0	7.6	0.4
	4.0	7.5	5.0	3.0	NA	
	6.0	7.5	5.1	2.9	NA	
25	1.0	7.5	5.0	3.0	7.9	0.1
	2.0	7.5	5.0	3.0	NA	
	4.0	8.0	5.2	2.8	NA	
	6.0	10.5	5.6	2.4	NA	
30	1.0	7.5	5.0	3.0	NA	
	2.0	8.0	5.2	2.8	NA	
	4.0	11.0	5.6	2.4	NA	
	6.0	13.5	6.0	2.0	NA	

General Notes:

- A 6-foot (total height) LPB may be used in lieu of the 8-foot LPB provided that the minimum bury depth is less than 6-feet. The resulting exposed height would then need to be adjusted accordingly.
- LPB size: round, 24" diameter
- For round-tapered and square-tapers poles, use average diameter or width.
- Table assumes double light fixture with total fixture as shown. Single light fixtures creating an unbalanced load condition are not covered by this table.
- Weight of fixtures, pole, and foundation are neglected as resisting forces.

Wind Loading Assumptions:

- Load Combinations and Load Factors: per AASHTO Section 3.4 and Table 3.4-1. For Extreme I the Load Factor for wind is 1.0.
- The basic wind speed *V*: per AASHTO Section 3.8.2. *V* = 140 mph; Risk Category: Low; Mean Recurrence Interval: 300 Years
- Wind Exposure Category: C
- Height and Exposure Factor K_z: per AASHTO Section 3.8.4. For poles and fixtures this value is calculated for Exposure C and the actual height of the pole. For the pole foundation, K_z = 0.86.
- Directionality Factor K_d: per AASHTO Section 3.8.5. K_d = 0.95 for round poles.
- Gust Effect Factor *G*: per AASHTO Section 3.8.6. *G* = 1.14

Wind Loading Assumptions Cont.:

- Drag Coefficients C_d: per AASHTO Section 3.8.7
  C_v = 0.8 for Extreme Limit Case
  Light Fixture, C_d = 1.2 (flat side shapes)
  Round Light Poles, C_d = 0.47 (8-inch dia.)

Fatigue Analysis Assumptions (for bolt circle diameter only):

- Yearly Mean Wind Velocity V_{mean}: per AASHTO Section C11.7.1.2. V_{mean} = 11.2 miles per hour
- Drag Coefficients C_d: per AASHTO Section 3.8.7
  C_v = 1.0 for Non-Extreme Limit Case
  Light Fixture, C_d = 1.2 (flat side shapes)
  Round Light Poles, C_d = 1.10
- Fatigue Importance Factor I_F: per AASHTO Section 11.6 and Table 11.6-1. I_F = 0.55 for noncantilevered traffic signals; Category III
- Fatigue loading check per AASHTO LRFDLTS-1 and NCHRP Report 496. Refer to the Design Approach section of the LPB Engineering Manual for additional information.

Foundation Analysis Assumptions:

- Foundation analysis per AASHTO Section 13.6.1.1
- Minimum Bury in Cohesionless Soils per AASHTO Equation C13.6.1.1-5
- Minimum Bury in Cohesive Soils per AASHTO Equation C13.6.1.1-1
- Overload Factor = 2.0 per AASHTO (LTS-6) Section C13.6.1.1
- Under Capacity Factor = 0.7 per AASHTO (LTS-6) Section C13.6.1.1

LPB Design Tables - 140 mph, Exposure C

Determining Minimum Bolt Circle Diameter and Embedment (8-foot LPB with 3-feet Exposed)

Step 1

Pole Size: 4-inch Width **Pole Shape: Square**

Step 4

Step 2		*Step 3*	**Cohesionless Soils ϕ = 30° and c = 0 psf**		**Cohesive Soils ϕ = 12° and c = 250 psf**	
Pole Height (ft)	Fixture Area (ft^2)	Minimum Bolt Circle Diameter (in)	Minimum Bury Depth (ft)	Resulting Exposed Height (ft)	Minimum Bury Depth (ft)	Resulting Exposed Height (ft)
15	1.0	7.5	5.0	3.0	7.2	0.8
	2.0	7.5	5.0	3.0	7.4	0.6
	4.0	7.5	5.0	3.0	8.0	0.0
	6.0	7.5	5.0	3.0	NA	
20	1.0	7.5	5.0	3.0	NA	
	2.0	7.5	5.0	3.0	NA	
	4.0	7.5	5.2	2.8	NA	
	6.0	9.0	5.5	2.5	NA	
25	1.0	8.0	5.2	2.8	NA	
	2.0	9.0	5.4	2.6	NA	
	4.0	10.5	5.7	2.3	NA	
	6.0	12.5	6.0	2.0	NA	
30	1.0	11.0	5.8	2.2	NA	
	2.0	12.0	6.0	2.0	NA	
	4.0	NA	NA		NA	
	6.0	NA	NA		NA	

General Notes:

- A 6-foot (total height) LPB may be used in lieu of the 8-foot LPB provided that the minimum bury depth is less than 6-feet. The resulting exposed height would then need to be adjusted accordingly.
- LPB size: round, 24" diameter
- For round-tapered and square-tapers poles, use average diameter or width.
- Table assumes double light fixture with total fixture as shown. Single light fixtures creating an unbalanced load condition are not covered by this table.
- Weight of fixtures, pole, and foundation are neglected as resisting forces.

Wind Loading Assumptions:

- Load Combinations and Load Factors: per AASHTO Section 3.4 and Table 3.4-1. For Extreme I the Load Factor for wind is 1.0.
- The basic wind speed *V*: per AASHTO Section 3.8.2. *V* = 140 mph; Risk Category: Low; Mean Recurrence Interval: 300 Years
- Wind Exposure Category: C
- Height and Exposure Factor K_z: per AASHTO Section 3.8.4. For poles and fixtures this value is calculated for Exposure C and the actual height of the pole. For the pole foundation, K_z = 0.86.
- Directionality Factor K_d: per AASHTO Section 3.8.5. K_d = 0.90 for square poles.
- Gust Effect Factor *G*: per AASHTO Section 3.8.6. *G* = 1.14

Wind Loading Assumptions Cont.:

- Drag Coefficients C_d: per AASHTO Section 3.8.7
  - C_v = 0.8 for Extreme Limit Case
  - Light Fixture, C_d = 1.2 (flat side shapes)
  - Square Light Poles, C_d = 1.81 (4-inch wide)

Fatigue Analysis Assumptions (for bolt circle diameter only):

- Yearly Mean Wind Velocity V_{mean}: per AASHTO Section C11.7.1.2. V_{mean} = 11.2 miles per hour
- Drag Coefficients C_d: per AASHTO Section 3.8.7
  - C_v = 1.0 for Non-Extreme Limit Case
  - Light Fixture, C_d = 1.2 (flat side shapes)
  - Square Light Poles, C_d = 1.81 (4-inch wide)
- Fatigue Importance Factor I_F: per AASHTO Section 11.6 and Table 11.6-1. I_F = 0.55 for noncantilevered traffic signals; Category III
- Fatigue loading check per AASHTO LRFDLTS-1 and NCHRP Report 496. Refer to the Design Approach section of the LPB Engineering Manual for additional information.

Foundation Analysis Assumptions:

- Foundation analysis per AASHTO Section 13.6.1.1
- Minimum Bury in Cohesionless Soils per AASHTO Equation C13.6.1.1-5
- Minimum Bury in Cohesive Soils per AASHTO Equation C13.6.1.1-1
- Overload Factor = 2.0 per AASHTO (LTS-6) Section C13.6.1.1
- Under Capacity Factor = 0.7 per AASHTO (LTS-6) Section C13.6.1.1

LPB Design Tables - 140 mph, Exposure C

Determining Minimum Bolt Circle Diameter and Embedment (8-foot LPB with 3-feet Exposed)

Step 1

Pole Size: 6-inch Width **Pole Shape: Square**

Step 4

Step 2		*Step 3*	**Cohesionless Soils ϕ = 30° and c = 0 psf**		**Cohesive Soils ϕ = 12° and c = 250 psf**	
Pole Height (ft)	Fixture Area (ft^2)	Minimum Bolt Circle Diameter (in)	Minimum Bury Depth (ft)	Resulting Exposed Height (ft)	Minimum Bury Depth (ft)	Resulting Exposed Height (ft)
15	1.0	7.5	5.0	3.0	NA	
	2.0	7.5	5.0	3.0	NA	
	4.0	7.5	5.0	3.0	NA	
	6.0	7.5	5.2	2.8	NA	
20	1.0	7.5	5.2	2.7	NA	
	2.0	8.0	5.4	2.6	NA	
	4.0	9.5	5.7	2.3	NA	
	6.0	11.0	5.9	2.1	NA	
25	1.0	11.0	5.9	2.1	NA	
	2.0	12.0	6.1	1.9	NA	
	4.0	13.5	6.3	1.7	NA	
	6.0	NA	NA		NA	
30	1.0	NA	NA		NA	
	2.0	NA	NA		NA	
	4.0	NA	NA		NA	
	6.0	NA	NA		NA	

General Notes:

- A 6-foot (total height) LPB may be used in lieu of the 8-foot LPB provided that the minimum bury depth is less than 6-feet. The resulting exposed height would then need to be adjusted accordingly.
- LPB size: round, 24" diameter
- For round-tapered and square-tapers poles, use average diameter or width.
- Table assumes double light fixture with total fixture as shown. Single light fixtures creating an unbalanced load condition are not covered by this table.
- Weight of fixtures, pole, and foundation are neglected as resisting forces.

Wind Loading Assumptions:

- Load Combinations and Load Factors: per AASHTO Section 3.4 and Table 3.4-1. For Extreme I the Load Factor for wind is 1.0.
- The basic wind speed *V*: per AASHTO Section 3.8.2. *V* = 140 mph; Risk Category: Low; Mean Recurrence Interval: 300 Years
- Wind Exposure Category: C
- Height and Exposure Factor K_z: per AASHTO Section 3.8.4. For poles and fixtures this value is calculated for Exposure C and the actual height of the pole. For the pole foundation, K_z = 0.86.
- Directionality Factor K_d: per AASHTO Section 3.8.5. K_d = 0.90 for square poles.
- Gust Effect Factor *G*: per AASHTO Section 3.8.6. *G* = 1.14

Wind Loading Assumptions Cont.:

- Drag Coefficients C_d: per AASHTO Section 3.8.7
  C_v = 0.8 for Extreme Limit Case
  Light Fixture, C_d = 1.2 (flat side shapes)
  Square Light Poles, C_d = 1.875 (6-inch wide)

Fatigue Analysis Assumptions (for bolt circle diameter only):

- Yearly Mean Wind Velocity V_{mean}: per AASHTO Section C11.7.1.2. V_{mean} = 11.2 miles per hour
- Drag Coefficients C_d: per AASHTO Section 3.8.7
  C_v = 1.0 for Non-Extreme Limit Case
  Light Fixture, C_d = 1.2 (flat side shapes)
  Square Light Poles, C_d = 1.875 (6-inch wide)
- Fatigue Importance Factor I_F: per AASHTO Section 11.6 and Table 11.6-1. I_F = 0.55 for noncantilevered traffic signals; Category III
- Fatigue loading check per AASHTO LRFDLTS-1 and NCHRP Report 496. Refer to the Design Approach section of the LPB Engineering Manual for additional information.

Foundation Analysis Assumptions:

- Foundation analysis per AASHTO Section 13.6.1.1
- Minimum Bury in Cohesionless Soils per AASHTO Equation C13.6.1.1-5
- Minimum Bury in Cohesive Soils per AASHTO Equation C13.6.1.1-1
- Overload Factor = 2.0 per AASHTO (LTS-6) Section C13.6.1.1
- Under Capacity Factor = 0.7 per AASHTO (LTS-6) Section C13.6.1.1

LPB Design Tables - 150 mph, Exposure C

Determining Minimum Bolt Circle Diameter and Embedment (8-foot LPB with 3-feet Exposed)

Step 1

Pole Size: 4-inch Diameter Pole Shape: Round

Step 4

Step 2		*Step 3*	**Cohesionless Soils ϕ = 30° and c = 0 psf**		**Cohesive Soils ϕ = 12° and c = 250 psf**	
Pole Height (ft)	Fixture Area (ft^2)	Minimum Bolt Circle Diameter (in)	Minimum Bury Depth (ft)	Resulting Exposed Height (ft)	Minimum Bury Depth (ft)	Resulting Exposed Height (ft)
15	1.0	7.5	5.0	3.0	6.8	1.2
	2.0	7.5	5.0	3.0	7.2	0.8
	4.0	7.5	5.0	3.0	7.9	0.1
	6.0	7.5	5.0	3.0	NA	
20	1.0	7.5	5.0	3.0	7.6	0.4
	2.0	7.5	5.0	3.0	8.0	0.0
	4.0	7.5	5.0	3.0	NA	
	6.0	9.0	5.4	2.6	NA	
25	1.0	7.5	5.0	3.0	NA	
	2.0	7.5	5.1	2.9	NA	
	4.0	10.0	5.5	2.5	NA	
	6.0	12.0	5.9	2.1	NA	
30	1.0	8.5	5.3	2.7	NA	
	2.0	10.0	5.6	2.4	NA	
	4.0	13.0	6.0	2.0	NA	
	6.0	NA	NA		NA	

General Notes:

- A 6-foot (total height) LPB may be used in lieu of the 8-foot LPB provided that the minimum bury depth is less than 6-feet. The resulting exposed height would then need to be adjusted accordingly.
- LPB size: round, 24" diameter
- For round-tapered and square-tapers poles, use average diameter or width.
- Table assumes double light fixture with total fixture as shown. Single light fixtures creating an unbalanced load condition are not covered by this table.
- Weight of fixtures, pole, and foundation are neglected as resisting forces.

Wind Loading Assumptions:

- Load Combinations and Load Factors: per AASHTO Section 3.4 and Table 3.4-1. For Extreme I the Load Factor for wind is 1.0.
- The basic wind speed *V*: per AASHTO Section 3.8.2. *V* = 150 mph; Risk Category: Low; Mean Recurrence Interval: 300 Years
- Wind Exposure Category: C
- Height and Exposure Factor K_z: per AASHTO Section 3.8.4. For poles and fixtures this value is calculated for Exposure C and the actual height of the pole. For the pole foundation, K_z = 0.86.
- Directionality Factor K_d: per AASHTO Section 3.8.5. K_d = 0.95 for round poles.
- Gust Effect Factor *G*: per AASHTO Section 3.8.6. *G* = 1.14

Wind Loading Assumptions Cont.:

- Drag Coefficients C_d: per AASHTO Section 3.8.7
  C_v = 0.8 for Extreme Limit Case
  Light Fixture, C_d = 1.2 (flat side shapes)
  Round Light Poles, C_d = 1.07 (4-inch dia)

Fatigue Analysis Assumptions (for bolt circle diameter only):

- Yearly Mean Wind Velocity V_{mean}: per AASHTO Section C11.7.1.2. V_{mean} = 11.2 miles per hour
- Drag Coefficients C_d: per AASHTO Section 3.8.7
  C_v = 1.0 for Non-Extreme Limit Case
  Light Fixture, C_d = 1.2 (flat side shapes)
  Round Light Poles, C_d = 1.10
- Fatigue Importance Factor I_F: per AASHTO Section 11.6 and Table 11.6-1. I_F = 0.55 for noncantilevered traffic signals; Category III
- Fatigue loading check per AASHTO LRFDLTS-1 and NCHRP Report 496. Refer to the Design Approach section of the LPB Engineering Manual for additional information.

Foundation Analysis Assumptions:

- Foundation analysis per AASHTO Section 13.6.1.1
- Minimum Bury in Cohesionless Soils per AASHTO Equation C13.6.1.1-5
- Minimum Bury in Cohesive Soils per AASHTO Equation C13.6.1.1-1
- Overload Factor = 2.0 per AASHTO (LTS-6) Section C13.6.1.1
- Under Capacity Factor = 0.7 per AASHTO (LTS-6) Section C13.6.1.1

LPB Design Tables - 150 mph, Exposure C

Determining Minimum Bolt Circle Diameter and Embedment (8-foot LPB with 3-feet Exposed)

Step 1

Pole Size: 6-inch Diameter **Pole Shape: Round**

Step 4

Step 2		*Step 3*	**Cohesionless Soils ϕ = 30° and c = 0 psf**		**Cohesive Soils ϕ = 12° and c = 250 psf**	
Pole Height (ft)	Fixture Area (ft^2)	Minimum Bolt Circle Diameter (in)	Minimum Bury Depth (ft)	Resulting Exposed Height (ft)	Minimum Bury Depth (ft)	Resulting Exposed Height (ft)
15	1.0	7.5	5.0	3.0	6.7	1.3
	2.0	7.5	5.0	3.0	7.1	0.9
	4.0	7.5	5.0	3.0	7.8	0.2
	6.0	7.5	5.0	3.0	NA	
20	1.0	7.5	5.0	3.0	7.4	0.6
	2.0	7.5	5.0	3.0	7.9	0.1
	4.0	7.5	5.0	3.0	NA	
	6.0	8.5	5.3	2.7	NA	
25	1.0	7.5	5.0	3.0	NA	
	2.0	7.5	5.0	3.0	NA	
	4.0	9.0	5.4	2.6	NA	
	6.0	11.5	5.8	2.2	NA	
30	1.0	8.0	5.2	2.8	NA	
	2.0	9.5	5.4	2.6	NA	
	4.0	12.5	5.9	2.1	NA	
	6.0	NA	NA		NA	

General Notes:

- A 6-foot (total height) LPB may be used in lieu of the 8-foot LPB provided that the minimum bury depth is less than 6-feet. The resulting exposed height would then need to be adjusted accordingly.
- LPB size: round, 24" diameter
- For round-tapered and square-tapers poles, use average diameter or width.
- Table assumes double light fixture with total fixture as shown. Single light fixtures creating an unbalanced load condition are not covered by this table.
- Weight of fixtures, pole, and foundation are neglected as resisting forces.

Wind Loading Assumptions:

- Load Combinations and Load Factors: per AASHTO Section 3.4 and Table 3.4-1. For Extreme I the Load Factor for wind is 1.0.
- The basic wind speed *V*: per AASHTO Section 3.8.2. *V* = 150 mph; Risk Category: Low; Mean Recurrence Interval: 300 Years
- Wind Exposure Category: C
- Height and Exposure Factor K_z: per AASHTO Section 3.8.4. For poles and fixtures this value is calculated for Exposure C and the actual height of the pole. For the pole foundation, K_z = 0.86.
- Directionality Factor K_d: per AASHTO Section 3.8.5. K_d = 0.95 for round poles.
- Gust Effect Factor *G*: per AASHTO Section 3.8.6. *G* = 1.14

Wind Loading Assumptions Cont.:

- Drag Coefficients C_d: per AASHTO Section 3.8.7
  C_v = 0.8 for Extreme Limit Case
  Light Fixture, C_d = 1.2 (flat side shapes)
  Round Light Poles, C_d = 0.63 (6-inch dia.)

Fatigue Analysis Assumptions (for bolt circle diameter only):

- Yearly Mean Wind Velocity V_{mean}: per AASHTO Section C11.7.1.2. V_{mean} = 11.2 miles per hour
- Drag Coefficients C_d: per AASHTO Section 3.8.7
  C_v = 1.0 for Non-Extreme Limit Case
  Light Fixture, C_d = 1.2 (flat side shapes)
  Round Light Poles, C_d = 1.10
- Fatigue Importance Factor I_F: per AASHTO Section 11.6 and Table 11.6-1. I_F = 0.55 for noncantilevered traffic signals; Category III
- Fatigue loading check per AASHTO LRFDLTS-1 and NCHRP Report 496. Refer to the Design Approach section of the LPB Engineering Manual for additional information.

Foundation Analysis Assumptions:

- Foundation analysis per AASHTO Section 13.6.1.1
- Minimum Bury in Cohesionless Soils per AASHTO Equation C13.6.1.1-5
- Minimum Bury in Cohesive Soils per AASHTO Equation C13.6.1.1-1
- Overload Factor = 2.0 per AASHTO (LTS-6) Section C13.6.1.1
- Under Capacity Factor = 0.7 per AASHTO (LTS-6) Section C13.6.1.1

LPB Design Tables - 150 mph, Exposure C

Determining Minimum Bolt Circle Diameter and Embedment (8-foot LPB with 3-feet Exposed)

Step 1

Pole Size: 8-inch Diameter Pole Shape: Round

Step 4

Step 2		*Step 3*	**Cohesionless Soils ϕ = 30° and c = 0 psf**		**Cohesive Soils ϕ = 12° and c = 250 psf**	
Pole Height (ft)	Fixture Area (ft^2)	Minimum Bolt Circle Diameter (in)	Minimum Bury Depth (ft)	Resulting Exposed Height (ft)	Minimum Bury Depth (ft)	Resulting Exposed Height (ft)
15	1.0	7.5	5.0	3.0	6.6	1.4
	2.0	7.5	5.0	3.0	7.0	1.0
	4.0	7.5	5.0	3.0	7.8	0.2
	6.0	7.5	5.0	3.0	NA	
20	1.0	7.5	5.0	3.0	7.3	0.7
	2.0	7.5	5.0	3.0	7.8	0.2
	4.0	7.5	5.0	3.0	NA	
	6.0	8.0	5.3	2.7	NA	
25	1.0	7.5	5.0	3.0	NA	
	2.0	7.5	5.0	3.0	NA	
	4.0	9.0	5.4	2.6	NA	
	6.0	11.5	5.8	2.2	NA	
30	1.0	7.5	5.1	2.9	NA	
	2.0	9.0	5.4	2.6	NA	
	4.0	12.0	5.8	2.2	NA	
	6.0	NA	NA		NA	

General Notes:

- A 6-foot (total height) LPB may be used in lieu of the 8-foot LPB provided that the minimum bury depth is less than 6-feet. The resulting exposed height would then need to be adjusted accordingly.
- LPB size: round, 24" diameter
- For round-tapered and square-tapers poles, use average diameter or width.
- Table assumes double light fixture with total fixture as shown. Single light fixtures creating an unbalanced load condition are not covered by this table.
- Weight of fixtures, pole, and foundation are neglected as resisting forces.

Wind Loading Assumptions:

- Load Combinations and Load Factors: per AASHTO Section 3.4 and Table 3.4-1. For Extreme I the Load Factor for wind is 1.0.
- The basic wind speed *V*: per AASHTO Section 3.8.2. *V* = 150 mph; Risk Category: Low; Mean Recurrence Interval: 300 Years
- Wind Exposure Category: C
- Height and Exposure Factor K_z: per AASHTO Section 3.8.4. For poles and fixtures this value is calculated for Exposure C and the actual height of the pole. For the pole foundation, K_z = 0.86.
- Directionality Factor K_d: per AASHTO Section 3.8.5. K_d = 0.95 for round poles.
- Gust Effect Factor *G*: per AASHTO Section 3.8.6. *G* = 1.14

Wind Loading Assumptions Cont.:

- Drag Coefficients C_d: per AASHTO Section 3.8.7
  C_v = 0.8 for Extreme Limit Case
  Light Fixture, C_d = 1.2 (flat side shapes)
  Round Light Poles, C_d = 0.45 (8-inch dia.)

Fatigue Analysis Assumptions (for bolt circle diameter only):

- Yearly Mean Wind Velocity V_{mean}: per AASHTO Section C11.7.1.2. V_{mean} = 11.2 miles per hour
- Drag Coefficients C_d: per AASHTO Section 3.8.7
  C_v = 1.0 for Non-Extreme Limit Case
  Light Fixture, C_d = 1.2 (flat side shapes)
  Round Light Poles, C_d = 1.10
- Fatigue Importance Factor I_F: per AASHTO Section 11.6 and Table 11.6-1. I_F = 0.55 for noncantilevered traffic signals; Category III
- Fatigue loading check per AASHTO LRFDLTS-1 and NCHRP Report 496. Refer to the Design Approach section of the LPB Engineering Manual for additional information.

Foundation Analysis Assumptions:

- Foundation analysis per AASHTO Section 13.6.1.1
- Minimum Bury in Cohesionless Soils per AASHTO Equation C13.6.1.1-5
- Minimum Bury in Cohesive Soils per AASHTO Equation C13.6.1.1-1
- Overload Factor = 2.0 per AASHTO (LTS-6) Section C13.6.1.1
- Under Capacity Factor = 0.7 per AASHTO (LTS-6) Section C13.6.1.1

LPB Design Tables - 150 mph, Exposure C

Determining Minimum Bolt Circle Diameter and Embedment (8-foot LPB with 3-feet Exposed)

Step 1

Pole Size: 4-inch Width **Pole Shape: Square**

Step 2		*Step 3*	*Step 4*			
			Cohesionless Soils ϕ = 30° and c = 0 psf		**Cohesive Soils ϕ = 12° and c = 250 psf**	
Pole Height (ft)	Fixture Area (ft^2)	Minimum Bolt Circle Diameter (in)	Minimum Bury Depth (ft)	Resulting Exposed Height (ft)	Minimum Bury Depth (ft)	Resulting Exposed Height (ft)
15	1.0	7.5	5.0	3.0	7.4	0.6
	2.0	7.5	5.0	3.0	7.7	0.3
	4.0	7.5	5.0	3.0	NA	
	6.0	7.5	5.0	3.0	NA	
20	1.0	7.5	5.0	3.0	NA	
	2.0	7.5	5.0	3.0	NA	
	4.0	8.5	5.4	2.6	NA	
	6.0	10.0	5.7	2.3	NA	
25	1.0	9.0	5.5	2.5	NA	
	2.0	10.0	5.7	2.3	NA	
	4.0	12.0	6.0	2.0	NA	
	6.0	13.5	6.3	1.7	NA	
30	1.0	12.5	6.1	1.9	NA	
	2.0	13.5	6.2	1.8	NA	
	4.0	NA	NA		NA	
	6.0	NA	NA		NA	

General Notes:

- A 6-foot (total height) LPB may be used in lieu of the 8-foot LPB provided that the minimum bury depth is less than 6-feet. The resulting exposed height would then need to be adjusted accordingly.
- LPB size: round, 24" diameter
- For round-tapered and square-tapers poles, use average diameter or width.
- Table assumes double light fixture with total fixture as shown. Single light fixtures creating an unbalanced load condition are not covered by this table.
- Weight of fixtures, pole, and foundation are neglected as resisting forces.

Wind Loading Assumptions:

- Load Combinations and Load Factors: per AASHTO Section 3.4 and Table 3.4-1. For Extreme I the Load Factor for wind is 1.0.
- The basic wind speed *V*: per AASHTO Section 3.8.2. *V* = 150 mph; Risk Category: Low; Mean Recurrence Interval: 300 Years
- Wind Exposure Category: C
- Height and Exposure Factor K_z: per AASHTO Section 3.8.4. For poles and fixtures this value is calculated for Exposure C and the actual height of the pole. For the pole foundation, K_z = 0.86.
- Directionality Factor K_d: per AASHTO Section 3.8.5. K_d = 0.90 for square poles.
- Gust Effect Factor *G*: per AASHTO Section 3.8.6. *G* = 1.14

Wind Loading Assumptions Cont.:

- Drag Coefficients C_d: per AASHTO Section 3.8.7
  - C_v = 0.8 for Extreme Limit Case
  - Light Fixture, C_d = 1.2 (flat side shapes)
  - Square Light Poles, C_d = 1.81 (4-inch wide)

Fatigue Analysis Assumptions (for bolt circle diameter only):

- Yearly Mean Wind Velocity V_{mean}: per AASHTO Section C11.7.1.2. V_{mean} = 11.2 miles per hour
- Drag Coefficients C_d: per AASHTO Section 3.8.7
  - C_v = 1.0 for Non-Extreme Limit Case
  - Light Fixture, C_d = 1.2 (flat side shapes)
  - Square Light Poles, C_d = 1.81 (4-inch wide)
- Fatigue Importance Factor I_F: per AASHTO Section 11.6 and Table 11.6-1. I_F = 0.55 for noncantilevered traffic signals; Category III
- Fatigue loading check per AASHTO LRFDLTS-1 and NCHRP Report 496. Refer to the Design Approach section of the LPB Engineering Manual for additional information.

Foundation Analysis Assumptions:

- Foundation analysis per AASHTO Section 13.6.1.1
- Minimum Bury in Cohesionless Soils per AASHTO Equation C13.6.1.1-5
- Minimum Bury in Cohesive Soils per AASHTO Equation C13.6.1.1-1
- Overload Factor = 2.0 per AASHTO (LTS-6) Section C13.6.1.1
- Under Capacity Factor = 0.7 per AASHTO (LTS-6) Section C13.6.1.1

LPB Design Tables - 150 mph, Exposure C

Determining Minimum Bolt Circle Diameter and Embedment (8-foot LPB with 3-feet Exposed)

Step 1

Pole Size: 6-inch Width **Pole Shape: Square**

Step 4

Step 2		*Step 3*	**Cohesionless Soils ϕ = 30° and c = 0 psf**		**Cohesive Soils ϕ = 12° and c = 250 psf**	
Pole Height (ft)	Fixture Area (ft^2)	Minimum Bolt Circle Diameter (in)	Minimum Bury Depth (ft)	Resulting Exposed Height (ft)	Minimum Bury Depth (ft)	Resulting Exposed Height (ft)
15	1.0	7.5	5.0	3.0	NA	
	2.0	7.5	5.0	3.0	NA	
	4.0	7.5	5.2	2.8	NA	
	6.0	7.5	5.5	2.5	NA	
20	1.0	8.0	5.5	2.5	NA	
	2.0	9.0	5.7	2.3	NA	
	4.0	10.5	5.9	2.1	NA	
	6.0	12.5	6.2	1.8	NA	
25	1.0	12.5	6.2	1.8	NA	
	2.0	13.5	6.4	1.6	NA	
	4.0	NA	NA		NA	
	6.0	NA	NA		NA	
30	1.0	NA	NA		NA	
	2.0	NA	NA		NA	
	4.0	NA	NA		NA	
	6.0	NA	NA		NA	

General Notes:

- A 6-foot (total height) LPB may be used in lieu of the 8-foot LPB provided that the minimum bury depth is less than 6-feet. The resulting exposed height would then need to be adjusted accordingly.
- LPB size: round, 24" diameter
- For round-tapered and square-tapers poles, use average diameter or width.
- Table assumes double light fixture with total fixture as shown. Single light fixtures creating an unbalanced load condition are not covered by this table.
- Weight of fixtures, pole, and foundation are neglected as resisting forces.

Wind Loading Assumptions:

- Load Combinations and Load Factors: per AASHTO Section 3.4 and Table 3.4-1. For Extreme I the Load Factor for wind is 1.0.
- The basic wind speed *V*: per AASHTO Section 3.8.2. *V* = 150 mph; Risk Category: Low; Mean Recurrence Interval: 300 Years
- Wind Exposure Category: C
- Height and Exposure Factor K_z: per AASHTO Section 3.8.4. For poles and fixtures this value is calculated for Exposure C and the actual height of the pole. For the pole foundation, K_z = 0.86.
- Directionality Factor K_d: per AASHTO Section 3.8.5. K_d = 0.90 for square poles.
- Gust Effect Factor *G*: per AASHTO Section 3.8.6. *G* = 1.14

Wind Loading Assumptions Cont.:

- Drag Coefficients C_d: per AASHTO Section 3.8.7
  C_v = 0.8 for Extreme Limit Case
  Light Fixture, C_d = 1.2 (flat side shapes)
  Square Light Poles, C_d = 1.875 (6-inch wide)

Fatigue Analysis Assumptions (for bolt circle diameter only):

- Yearly Mean Wind Velocity V_{mean}: per AASHTO Section C11.7.1.2. V_{mean} = 11.2 miles per hour
- Drag Coefficients C_d: per AASHTO Section 3.8.7
  C_v = 1.0 for Non-Extreme Limit Case
  Light Fixture, C_d = 1.2 (flat side shapes)
  Square Light Poles, C_d = 1.875 (6-inch wide)
- Fatigue Importance Factor I_F: per AASHTO Section 11.6 and Table 11.6-1. I_F = 0.55 for noncantilevered traffic signals; Category III
- Fatigue loading check per AASHTO LRFDLTS-1 and NCHRP Report 496. Refer to the Design Approach section of the LPB Engineering Manual for additional information.

Foundation Analysis Assumptions:

- Foundation analysis per AASHTO Section 13.6.1.1
- Minimum Bury in Cohesionless Soils per AASHTO Equation C13.6.1.1-5
- Minimum Bury in Cohesive Soils per AASHTO Equation C13.6.1.1-1
- Overload Factor = 2.0 per AASHTO (LTS-6) Section C13.6.1.1
- Under Capacity Factor = 0.7 per AASHTO (LTS-6) Section C13.6.1.1

LPB Design Tables - 160 mph, Exposure C

Determining Minimum Bolt Circle Diameter and Embedment (8-foot LPB with 3-feet Exposed)

Step 1

Pole Size: 4-inch Diameter Pole Shape: Round

Step 4

Step 2		*Step 3*	**Cohesionless Soils ϕ = 30° and c = 0 psf**		**Cohesive Soils ϕ = 12° and c = 250 psf**	
Pole Height (ft)	Fixture Area (ft^2)	Minimum Bolt Circle Diameter (in)	Minimum Bury Depth (ft)	Resulting Exposed Height (ft)	Minimum Bury Depth (ft)	Resulting Exposed Height (ft)
15	1.0	7.5	5.0	3.0	6.9	1.1
	2.0	7.5	5.0	3.0	7.3	0.7
	4.0	7.5	5.0	3.0	8.0	0.0
	6.0	7.5	5.0	3.0	NA	
20	1.0	7.5	5.0	3.0	7.7	0.3
	2.0	7.5	5.0	3.0	NA	
	4.0	8.5	5.2	2.8	NA	
	6.0	10.5	5.6	2.4	NA	
25	1.0	7.5	5.0	3.0	NA	
	2.0	8.5	5.2	2.8	NA	
	4.0	11.5	5.7	2.3	NA	
	6.0	13.5	6.1	1.9	NA	
30	1.0	10.0	5.4	2.6	NA	
	2.0	11.5	5.7	2.3	NA	
	4.0	13.5	6.2	1.8	NA	
	6.0	NA	NA		NA	

General Notes:

- A 6-foot (total height) LPB may be used in lieu of the 8-foot LPB provided that the minimum bury depth is less than 6-feet. The resulting exposed height would then need to be adjusted accordingly.
- LPB size: round, 24" diameter
- For round-tapered and square-tapers poles, use average diameter or width.
- Table assumes double light fixture with total fixture as shown. Single light fixtures creating an unbalanced load condition are not covered by this table.
- Weight of fixtures, pole, and foundation are neglected as resisting forces.

Wind Loading Assumptions:

- Load Combinations and Load Factors: per AASHTO Section 3.4 and Table 3.4-1. For Extreme I the Load Factor for wind is 1.0.
- The basic wind speed *V*: per AASHTO Section 3.8.2. *V* = 160 mph; Risk Category: Low; Mean Recurrence Interval: 300 Years
- Wind Exposure Category: C
- Height and Exposure Factor K_z: per AASHTO Section 3.8.4. For poles and fixtures this value is calculated for Exposure C and the actual height of the pole. For the pole foundation, K_z = 0.86.
- Directionality Factor K_d: per AASHTO Section 3.8.5. K_d = 0.95 for round poles.
- Gust Effect Factor *G*: per AASHTO Section 3.8.6. *G* = 1.14

Wind Loading Assumptions Cont.:

- Drag Coefficients C_d: per AASHTO Section 3.8.7
  C_v = 0.8 for Extreme Limit Case
  Light Fixture, C_d = 1.2 (flat side shapes)
  Round Light Poles, C_d = 0.98 (4-inch dia)

Fatigue Analysis Assumptions (for bolt circle diameter only):

- Yearly Mean Wind Velocity V_{mean}: per AASHTO Section C11.7.1.2. V_{mean} = 11.2 miles per hour
- Drag Coefficients C_d: per AASHTO Section 3.8.7
  C_v = 1.0 for Non-Extreme Limit Case
  Light Fixture, C_d = 1.2 (flat side shapes)
  Round Light Poles, C_d = 1.10
- Fatigue Importance Factor I_F: per AASHTO Section 11.6 and Table 11.6-1. I_F = 0.55 for noncantilevered traffic signals; Category III
- Fatigue loading check per AASHTO LRFDLTS-1 and NCHRP Report 496. Refer to the Design Approach section of the LPB Engineering Manual for additional information.

Foundation Analysis Assumptions:

- Foundation analysis per AASHTO Section 13.6.1.1
- Minimum Bury in Cohesionless Soils per AASHTO Equation C13.6.1.1-5
- Minimum Bury in Cohesive Soils per AASHTO Equation C13.6.1.1-1
- Overload Factor = 2.0 per AASHTO (LTS-6) Section C13.6.1.1
- Under Capacity Factor = 0.7 per AASHTO (LTS-6) Section C13.6.1.1

LPB Design Tables - 160 mph, Exposure C

Determining Minimum Bolt Circle Diameter and Embedment (8-foot LPB with 3-feet Exposed)

Step 1

Pole Size: 6-inch Diameter Pole Shape: Round

Step 4

Step 2		*Step 3*	**Cohesionless Soils ϕ = 30° and c = 0 psf**		**Cohesive Soils ϕ = 12° and c = 250 psf**	
Pole Height (ft)	Fixture Area (ft^2)	Minimum Bolt Circle Diameter (in)	Minimum Bury Depth (ft)	Resulting Exposed Height (ft)	Minimum Bury Depth (ft)	Resulting Exposed Height (ft)
15	1.0	7.5	5.0	3.0	6.8	1.2
	2.0	7.5	5.0	3.0	7.2	0.8
	4.0	7.5	5.0	3.0	8.0	0.0
	6.0	7.5	5.0	3.0	NA	
20	1.0	7.5	5.0	3.0	7.5	0.5
	2.0	7.5	5.0	3.0	8.0	0.0
	4.0	7.5	5.1	2.9	NA	
	6.0	9.5	5.5	2.5	NA	
25	1.0	7.5	5.0	3.0	NA	
	2.0	7.5	5.1	2.9	NA	
	4.0	10.5	5.6	2.4	NA	
	6.0	13.5	6.0	2.0	NA	
30	1.0	8.5	5.3	2.7	NA	
	2.0	10.5	5.6	2.4	NA	
	4.0	13.5	6.1	1.9	NA	
	6.0	NA	NA		NA	

General Notes:

- A 6-foot (total height) LPB may be used in lieu of the 8-foot LPB provided that the minimum bury depth is less than 6-feet. The resulting exposed height would then need to be adjusted accordingly.
- LPB size: round, 24" diameter
- For round-tapered and square-tapers poles, use average diameter or width.
- Table assumes double light fixture with total fixture as shown. Single light fixtures creating an unbalanced load condition are not covered by this table.
- Weight of fixtures, pole, and foundation are neglected as resisting forces.

Wind Loading Assumptions:

- Load Combinations and Load Factors: per AASHTO Section 3.4 and Table 3.4-1. For Extreme I the Load Factor for wind is 1.0.
- The basic wind speed *V*: per AASHTO Section 3.8.2. *V* = 160 mph; Risk Category: Low; Mean Recurrence Interval: 300 Years
- Wind Exposure Category: C
- Height and Exposure Factor K_z: per AASHTO Section 3.8.4. For poles and fixtures this value is calculated for Exposure C and the actual height of the pole. For the pole foundation, K_z = 0.86.
- Directionality Factor K_d: per AASHTO Section 3.8.5. K_d = 0.95 for round poles.
- Gust Effect Factor *G*: per AASHTO Section 3.8.6. *G* = 1.14

Wind Loading Assumptions Cont.:

- Drag Coefficients C_d: per AASHTO Section 3.8.7
  C_v = 0.8 for Extreme Limit Case
  Light Fixture, C_d = 1.2 (flat side shapes)
  Round Light Poles, C_d = 0.58 (6-inch dia.)

Fatigue Analysis Assumptions (for bolt circle diameter only):

- Yearly Mean Wind Velocity V_{mean}: per AASHTO Section C11.7.1.2. V_{mean} = 11.2 miles per hour
- Drag Coefficients C_d: per AASHTO Section 3.8.7
  C_v = 1.0 for Non-Extreme Limit Case
  Light Fixture, C_d = 1.2 (flat side shapes)
  Round Light Poles, C_d = 1.10
- Fatigue Importance Factor I_F: per AASHTO Section 11.6 and Table 11.6-1. I_F = 0.55 for noncantilevered traffic signals; Category III
- Fatigue loading check per AASHTO LRFDLTS-1 and NCHRP Report 496. Refer to the Design Approach section of the LPB Engineering Manual for additional information.

Foundation Analysis Assumptions:

- Foundation analysis per AASHTO Section 13.6.1.1
- Minimum Bury in Cohesionless Soils per AASHTO Equation C13.6.1.1-5
- Minimum Bury in Cohesive Soils per AASHTO Equation C13.6.1.1-1
- Overload Factor = 2.0 per AASHTO (LTS-6) Section C13.6.1.1
- Under Capacity Factor = 0.7 per AASHTO (LTS-6) Section C13.6.1.1

LPB Design Tables - 160 mph, Exposure C

Determining Minimum Bolt Circle Diameter and Embedment (8-foot LPB with 3-feet Exposed)

Step 1

Pole Size: 8-inch Diameter Pole Shape: Round

Step 2 / *Step 3* / *Step 4*

Pole Height (ft)	Fixture Area (ft^2)	Minimum Bolt Circle Diameter (in)	Cohesionless Soils ϕ = 30° and c = 0 psf		Cohesive Soils ϕ = 12° and c = 250 psf	
			Minimum Bury Depth (ft)	Resulting Exposed Height (ft)	Minimum Bury Depth (ft)	Resulting Exposed Height (ft)
15	1.0	7.5	5.0	3.0	6.8	1.2
	2.0	7.5	5.0	3.0	7.3	0.7
	4.0	7.5	5.0	3.0	8.0	0.0
	6.0	7.5	5.0	3.0	NA	
20	1.0	7.5	5.0	3.0	7.6	0.4
	2.0	7.5	5.0	3.0	NA	
	4.0	7.5	5.1	2.9	NA	
	6.0	9.5	5.5	2.5	NA	
25	1.0	7.5	5.0	3.0	NA	
	2.0	7.5	5.1	2.9	NA	
	4.0	10.0	5.6	2.4	NA	
	6.0	13.0	6.0	2.0	NA	
30	1.0	8.5	5.3	2.7	NA	
	2.0	10.0	5.6	2.4	NA	
	4.0	13.5	6.1	1.9	NA	
	6.0	NA	NA		NA	

General Notes:

- A 6-foot (total height) LPB may be used in lieu of the 8-foot LPB provided that the minimum bury depth is less than 6-feet. The resulting exposed height would then need to be adjusted accordingly.
- LPB size: round, 24" diameter
- For round-tapered and square-tapers poles, use average diameter or width.
- Table assumes double light fixture with total fixture as shown. Single light fixtures creating an unbalanced load condition are not covered by this table.
- Weight of fixtures, pole, and foundation are neglected as resisting forces.

Wind Loading Assumptions:

- Load Combinations and Load Factors: per AASHTO Section 3.4 and Table 3.4-1. For Extreme I the Load Factor for wind is 1.0.
- The basic wind speed *V*: per AASHTO Section 3.8.2. *V* = 160 mph; Risk Category: Low; Mean Recurrence Interval: 300 Years
- Wind Exposure Category: C
- Height and Exposure Factor K_z: per AASHTO Section 3.8.4. For poles and fixtures this value is calculated for Exposure C and the actual height of the pole. For the pole foundation, K_z = 0.86.
- Directionality Factor K_d: per AASHTO Section 3.8.5. K_d = 0.95 for round poles.
- Gust Effect Factor *G*: per AASHTO Section 3.8.6. *G* = 1.14

Wind Loading Assumptions Cont.:

- Drag Coefficients C_d: per AASHTO Section 3.8.7
  - C_v = 0.8 for Extreme Limit Case
  - Light Fixture, C_d = 1.2 (flat side shapes)
  - Round Light Poles, C_d = 0.45 (8-inch dia.)

Fatigue Analysis Assumptions (for bolt circle diameter only):

- Yearly Mean Wind Velocity V_{mean}: per AASHTO Section C11.7.1.2. V_{mean} = 11.2 miles per hour
- Drag Coefficients C_d: per AASHTO Section 3.8.7
  - C_v = 1.0 for Non-Extreme Limit Case
  - Light Fixture, C_d = 1.2 (flat side shapes)
  - Round Light Poles, C_d = 1.10
- Fatigue Importance Factor I_F: per AASHTO Section 11.6 and Table 11.6-1. I_F = 0.55 for noncantilevered traffic signals; Category III
- Fatigue loading check per AASHTO LRFDLTS-1 and NCHRP Report 496. Refer to the Design Approach section of the LPB Engineering Manual for additional information.

Foundation Analysis Assumptions:

- Foundation analysis per AASHTO Section 13.6.1.1
- Minimum Bury in Cohesionless Soils per AASHTO Equation C13.6.1.1-5
- Minimum Bury in Cohesive Soils per AASHTO Equation C13.6.1.1-1
- Overload Factor = 2.0 per AASHTO (LTS-6) Section C13.6.1.1
- Under Capacity Factor = 0.7 per AASHTO (LTS-6) Section C13.6.1.1

LPB Design Tables - 160 mph, Exposure C

Determining Minimum Bolt Circle Diameter and Embedment (8-foot LPB with 3-feet Exposed)

Step 1

Pole Size: 4-inch Width **Pole Shape: Square**

Step 4

Step 2		*Step 3*	**Cohesionless Soils ϕ = 30° and c = 0 psf**		**Cohesive Soils ϕ = 12° and c = 250 psf**	
Pole Height (ft)	Fixture Area (ft^2)	Minimum Bolt Circle Diameter (in)	Minimum Bury Depth (ft)	Resulting Exposed Height (ft)	Minimum Bury Depth (ft)	Resulting Exposed Height (ft)
15	1.0	7.5	5.0	3.0	7.7	0.3
	2.0	7.5	5.0	3.0	8.0	0.0
	4.0	7.5	5.0	3.0	NA	
	6.0	7.5	5.3	2.7	NA	
20	1.0	7.5	5.1	2.9	NA	
	2.0	8.0	5.3	2.7	NA	
	4.0	9.5	5.6	2.4	NA	
	6.0	11.5	6.0	2.0	NA	
25	1.0	9.5	5.7	2.3	NA	
	2.0	11.0	5.9	2.1	NA	
	4.0	13.5	6.3	1.7	NA	
	6.0	NA	NA		NA	
30	1.0	13.5	6.3	1.7	NA	
	2.0	NA	NA		NA	
	4.0	NA	NA		NA	
	6.0	NA	NA		NA	

General Notes:

- A 6-foot (total height) LPB may be used in lieu of the 8-foot LPB provided that the minimum bury depth is less than 6-feet. The resulting exposed height would then need to be adjusted accordingly.
- LPB size: round, 24" diameter
- For round-tapered and square-tapers poles, use average diameter or width.
- Table assumes double light fixture with total fixture as shown. Single light fixtures creating an unbalanced load condition are not covered by this table.
- Weight of fixtures, pole, and foundation are neglected as resisting forces.

Wind Loading Assumptions:

- Load Combinations and Load Factors: per AASHTO Section 3.4 and Table 3.4-1. For Extreme I the Load Factor for wind is 1.0.
- The basic wind speed *V*: per AASHTO Section 3.8.2. *V* = 160 mph; Risk Category: Low; Mean Recurrence Interval: 300 Years
- Wind Exposure Category: C
- Height and Exposure Factor K_z: per AASHTO Section 3.8.4. For poles and fixtures this value is calculated for Exposure C and the actual height of the pole. For the pole foundation, K_z = 0.86.
- Directionality Factor K_d: per AASHTO Section 3.8.5. K_d = 0.90 for square poles.
- Gust Effect Factor *G*: per AASHTO Section 3.8.6. *G* = 1.14

Wind Loading Assumptions Cont.:

- Drag Coefficients C_d: per AASHTO Section 3.8.7
  - C_v = 0.8 for Extreme Limit Case
  - Light Fixture, C_d = 1.2 (flat side shapes)
  - Square Light Poles, C_d = 1.81 (4-inch wide)

Fatigue Analysis Assumptions (for bolt circle diameter only):

- Yearly Mean Wind Velocity V_{mean}: per AASHTO Section C11.7.1.2. V_{mean} = 11.2 miles per hour
- Drag Coefficients C_d: per AASHTO Section 3.8.7
  - C_v = 1.0 for Non-Extreme Limit Case
  - Light Fixture, C_d = 1.2 (flat side shapes)
  - Square Light Poles, C_d = 1.81 (4-inch wide)
- Fatigue Importance Factor I_F: per AASHTO Section 11.6 and Table 11.6-1. I_F = 0.55 for noncantilevered traffic signals; Category III
- Fatigue loading check per AASHTO LRFDLTS-1 and NCHRP Report 496. Refer to the Design Approach section of the LPB Engineering Manual for additional information.

Foundation Analysis Assumptions:

- Foundation analysis per AASHTO Section 13.6.1.1
- Minimum Bury in Cohesionless Soils per AASHTO Equation C13.6.1.1-5
- Minimum Bury in Cohesive Soils per AASHTO Equation C13.6.1.1-1
- Overload Factor = 2.0 per AASHTO (LTS-6) Section C13.6.1.1
- Under Capacity Factor = 0.7 per AASHTO (LTS-6) Section C13.6.1.1

LPB Design Tables - 160 mph, Exposure C

Determining Minimum Bolt Circle Diameter and Embedment (8-foot LPB with 3-feet Exposed)

Step 1

Pole Size: 6-inch Width **Pole Shape: Square**

Step 4

Step 2		*Step 3*	**Cohesionless Soils ϕ = 30° and c = 0 psf**		**Cohesive Soils ϕ = 12° and c = 250 psf**	
Pole Height (ft)	Fixture Area (ft^2)	Minimum Bolt Circle Diameter (in)	Minimum Bury Depth (ft)	Resulting Exposed Height (ft)	Minimum Bury Depth (ft)	Resulting Exposed Height (ft)
15	1.0	7.5	5.0	3.0	NA	
	2.0	7.5	5.1	2.9	NA	
	4.0	7.5	5.4	2.6	NA	
	6.0	8.5	5.7	2.3	NA	
20	1.0	9.0	5.7	2.3	NA	
	2.0	10.0	5.9	2.1	NA	
	4.0	12.0	6.2	1.8	NA	
	6.0	13.5	6.5	1.5	NA	
25	1.0	13.5	6.5	1.5	NA	
	2.0	NA	NA		NA	
	4.0	NA	NA		NA	
	6.0	NA	NA		NA	
30	1.0	NA	NA		NA	
	2.0	NA	NA		NA	
	4.0	NA	NA		NA	
	6.0	NA	NA		NA	

General Notes:

- A 6-foot (total height) LPB may be used in lieu of the 8-foot LPB provided that the minimum bury depth is less than 6-feet. The resulting exposed height would then need to be adjusted accordingly.
- LPB size: round, 24" diameter
- For round-tapered and square-tapers poles, use average diameter or width.
- Table assumes double light fixture with total fixture as shown. Single light fixtures creating an unbalanced load condition are not covered by this table.
- Weight of fixtures, pole, and foundation are neglected as resisting forces.

Wind Loading Assumptions:

- Load Combinations and Load Factors: per AASHTO Section 3.4 and Table 3.4-1. For Extreme I the Load Factor for wind is 1.0.
- The basic wind speed *V*: per AASHTO Section 3.8.2. *V* = 160 mph; Risk Category: Low; Mean Recurrence Interval: 300 Years
- Wind Exposure Category: C
- Height and Exposure Factor K_z: per AASHTO Section 3.8.4. For poles and fixtures this value is calculated for Exposure C and the actual height of the pole. For the pole foundation, K_z = 0.86.
- Directionality Factor K_d: per AASHTO Section 3.8.5. K_d = 0.90 for square poles.
- Gust Effect Factor *G*: per AASHTO Section 3.8.6. *G* = 1.14

Wind Loading Assumptions Cont.:

- Drag Coefficients C_d: per AASHTO Section 3.8.7
  C_v = 0.8 for Extreme Limit Case
  Light Fixture, C_d = 1.2 (flat side shapes)
  Square Light Poles, C_d = 1.875 (6-inch wide)

Fatigue Analysis Assumptions (for bolt circle diameter only):

- Yearly Mean Wind Velocity V_{mean}: per AASHTO Section C11.7.1.2. V_{mean} = 11.2 miles per hour
- Drag Coefficients C_d: per AASHTO Section 3.8.7
  C_v = 1.0 for Non-Extreme Limit Case
  Light Fixture, C_d = 1.2 (flat side shapes)
  Square Light Poles, C_d = 1.875 (6-inch wide)
- Fatigue Importance Factor I_F: per AASHTO Section 11.6 and Table 11.6-1. I_F = 0.55 for noncantilevered traffic signals; Category III
- Fatigue loading check per AASHTO LRFDLTS-1 and NCHRP Report 496. Refer to the Design Approach section of the LPB Engineering Manual for additional information.

Foundation Analysis Assumptions:

- Foundation analysis per AASHTO Section 13.6.1.1
- Minimum Bury in Cohesionless Soils per AASHTO Equation C13.6.1.1-5
- Minimum Bury in Cohesive Soils per AASHTO Equation C13.6.1.1-1
- Overload Factor = 2.0 per AASHTO (LTS-6) Section C13.6.1.1
- Under Capacity Factor = 0.7 per AASHTO (LTS-6) Section C13.6.1.1