pole base®

DESIGN CHARTS

SECTION 4: DESIGN CHARTS

THE HARD PART IS ALREADY DONE

© 2014 Redi-Rock International, L.L.C. All Rights Reserved. Pole Base® is a wholly owned subsidiary of Redi-Rock International.

Important Notice

The design specifications for Pole Base™ units suggest earth embedment depths with certain assumed conditions. The earth embedments were calculated using the assumed material properties and loading conditions described in the Design Resource Manual. These will vary from location to location depending upon the soil properties and terrain. Since soil conditions and topography vary greatly from site to site, a detailed engineering analysis must be performed for each Pole Base™ installation.

Because Pole Base™ does not manufacture nor install these units, it does not assume any responsibility regarding structural suitability of its products for any particular project. In addition, Pole Base™ assumes no responsibility in connection with any injury, death, or property damage claim whatsoever whether asserted against a Leasee, Leasor, Purchaser or others, arising out of or attributable to the operation of or produced with Pole Base™ equipment.

© 2014 Redi-Rock International, L.L.C. All Rights Reserved. Pole Base® is a wholly owned subsidiary of Redi-Rock International.

Pole Base™ – Foundation Design Guide

Analysis Methods:

- This Guide was prepared for preliminary estimating and conceptual purposes only. All information is believed to be true and accurate; however, Pole Base™ assumes no responsibility for the use of this design guide for actual construction. Determination of the suitability of each chart is the sole responsibility of the user. Final designs for construction purposes must be performed by a licensed Professional Engineer, using the actual conditions of the site.
- The foundation design guide for embedment of the round concrete poles is based upon the provisions described in the American Association of State Highway and Transportation Officials (AASHTO) publication: Standard Specifications for Structural Supports for Highway Signs, Luminaries, and Traffic Signals, 6th Edition, 2013 (LTS-6), Washington, DC.

Wind Loading Assumptions:

- The wind loading on the fixtures, poles, and bases is based upon Section 3.8 – Wind Load
- The Basic Wind Speed Section 3.8.2. Assumed wind speed 90 mph (40 m/s).
- The following factors and assumptions were used in the creation of the guide. These factors will need to be analyzed and verified by the Licensed Professional Engineer of the project:
    - Wind Importance Factor, I_r = 1.00 (Section 3.8.3)
    - Velocity Conversion Factor, C_v = 1.00 (Table 3.8.3-3)
    - Height and Exposure Factor, Pole & Fixture K_z = 1.00; Base K_z = 0.86 (Section 3.8.4)
    - Gust Effect Factor, G=1.14 (Section 3.8.5)
    - Drad Coefficients, C_d: (Table 3.8.6-1)
        - Light Fixture, C_d=1.2
        - Light Pole, 6” square, C_d=1.875; 6” round, C_d= 0.915
        - Pole Base (40” tall), 24” square, C_d=1.75; 24” round, C_d= 0.45

Foundation Design Assumptions:

- The formulas for the earth embedment depth are based upon Section 13: Foundation Design.
- The following factors and assumptions were used in the creation of the guide. These factors will need to be analyzed and verified by the Licensed Professional Engineer of the project:
    - Dense backfill around the base: 2000 psi concrete, Well compacted clean sand, or (CLSM).
    - Minimum earth embedment of Pole Base™ units is at least: the calculated value, 3’-0” (0.9 m), or the depth of local frost penetration.
    - Overload Factor = 2.5; Undercapacity Factor = 0.7 (Section C13.6.1.1)
    - Embedment Length in Granular Soil, Equation (C13.6.1.1-3)
    - Embedment Length in Cohesive Soil, Equation (C13.6.1.1-7)

© 2014 Redi-Rock International, L.L.C. All Rights Reserved. Pole Base® is a wholly owned subsidiary of Redi-Rock International.

MINIMUM EMBEDMENT GUIDE

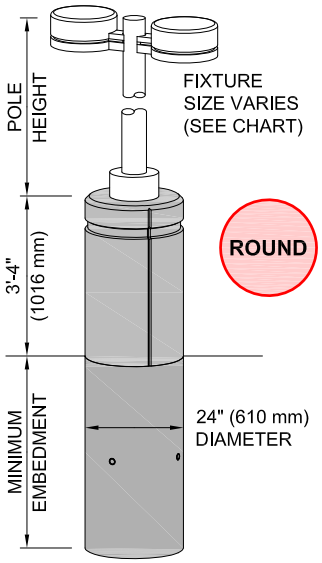
24" (610 mm) DIAMETER ROUND POLE BASE™ UNITS [1] **6" (150 mm) DIAMETER ROUND LIGHT POLE**

MINIMUM EMBEDMENT

POLE HEIGHT	SIGN OR FIXTURE AREA			
	2 ft² (0.186 m²)	**4 ft²** (0.372 m²)	**6 ft²** (0.557 m²)	**8 ft²** (0.743 m²)
BASES IN GRAVEL SOILS (GW, GP) [2] [7]				
15' (4.6 m)	**3'-0"** (0.9 m)	**3'-6"** (1.1 m)	**3'-6"** (1.1 m)	**4'-0"** (1.2 m)
20' (6.1 m)	**3'-6"** (1.1 m)	**4'-0"** (1.2 m)	**4'-0"** (1.2 m)	**4'-6"** (1.4 m)
25' (7.6 m)	**4'-0"** (1.2 m)	**4'-6"** (1.4 m)	**4'-6"** (1.4 m)	**5'-0"** (1.5 m)
30' (9.1 m)	**4'-6"** (1.4 m)	**4'-6"** (1.4 m)	**5'-0"** (1.5 m)	**5'-6"** (1.7 m)
35' (10.7 m)	**5'-0"** (1.5 m)	**5'-6"** (1.7 m)	**5'-6"** (1.7 m)	**5'-6"** (1.7 m)
BASES IN SANDY SOILS (SW, SP, SM, SC, GM, GC) [3] [7]				
15' (4.6 m)	**3'-6"** (1.1 m)	**4'-0"** (1.2 m)	**4'-0"** (1.2 m)	**4'-6"** (1.4 m)
20' (6.1 m)	**4'-0"** (1.2 m)	**4'-6"** (1.4 m)	**4'-6"** (1.4 m)	**5'-0"** (1.5 m)
25' (7.6 m)	**4'-6"** (1.4 m)	**4'-6"** (1.4 m)	**5'-0"** (1.5 m)	**5'-6"** (1.7 m)
30' (9.1 m)	**5'-0"** (1.5 m)	**5'-0"** (1.5 m)	**5'-6"** (1.7 m)	**5'-6"** (1.7 m)
35' (10.7 m)	**5'-6"** (1.7 m)	**5'-6"** (1.7 m)	**6'-0"** (1.8 m)	**6'-0"** (1.8 m)
BASES IN CLAYEY SOILS (CL, ML, CH, MH) [4] [7]				
15' (4.6 m)	**6'-6"** (2.0 m)	**7'-0"** (2.1 m)	**7'-6"** (2.3 m)	**8'-0"** (2.4 m)
20' (6.1 m)	**7'-6"** (2.3 m)	**8'-0"** (2.4 m)	**8'-6"** (2.6 m)	**9'-0"** (2.7 m)
25' (7.6 m)	**8'-0"** (2.4 m)	**9'-0"** (2.7 m)	**9'-6"** (2.9 m)	**10'-0"** (3.0 m)
30' (9.1 m)	**9'-0"** (2.7 m)	**9'-6"** (2.9 m)	**10'-0"** (3.0 m)	**10'-6"** (3.2 m)
35' (10.7 m)	**10'-0"** (3.0 m)	**10'-6"** (3.2 m)	**11'-0"** (3.4 m)	**11'-6"** (3.5 m)

DESIGN FORCES

POLE HEIGHT	UNFACTORED SHEAR FORCE / OVERTURNING MOMENT [5] [6]			
15' (4.6 m)	**255 lb** (1.14 kN) **2,579 lb * ft** (3.50 kN * m)	**305 lb** (1.37 kN) **3,500 lb * ft** (4.75 kN * m)	**355 lb** (1.59 kN) **4,421 lb * ft** (5.99 kN * m)	**406 lb** (1.82 kN) **5,342 lb * ft** (7.24 kN * m)
20' (6.1 m)	**315 lb** (1.41 kN) **4,022 lb * ft** (5.45 kN * m)	**368 lb** (1.65 kN) **5,255 lb * ft** (7.12 kN * m)	**421 lb** (1.89 kN) **6,488 lb * ft** (8.80 kN * m)	**474 lb** (2.12 kN) **7,722 lb * ft** (10.47 kN * m)
25' (7.6 m)	**379 lb** (1.70 kN) **5,816 * ft** (7.89 kN * m)	**434 lb** (1.94 kN) **7,376 lb * ft** (10.00 kN * m)	**489 lb** (2.19 kN) **8,936 lb * ft** (12.12 kN * m)	**544 lb** (2.44 kN) **10,497 lb * ft** (14.23 kN * m)
30' (9.1 m)	**444 lb** (1.99 kN) **7,975 lb * ft** (10.81 kN * m)	**501 lb** (2.24 kN) **9,874 lb * ft** (13.39 kN * m)	**558 lb** (2.50 kN) **11,773 lb * ft** (15.96 kN * m)	**615 lb** (2.76 kN) **13,672 lb * ft** (18.54 kN * m)
35' (10.7 m)	**511 lb** (2.29 kN) **10,507 lb * ft** (14.25 kN * m)	**570 lb** (2.55 kN) **12,757 lb * ft** (17.30 kN * m)	**629 lb** (2.82 kN) **15,006 lb * ft** (20.34 kN * m)	**687 lb** (3.08 kN) **17,255 lb * ft** (23.40 kN * m)



Design Reference: *AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals*, 6th Edition, 2013 (LTS-6).

[1] Calculations have been run for a 24" (610 mm) diameter round base 3'-4" (1016 mm) above grade with a 24" (610 mm) diameter bury portion in the soil.

[2] Assumed $\phi = 34°$, $\gamma = 130$ lb/ft^3 (2080 kg/m^3), c = 0 lb/ft^2 (0 kPa).

[3] Assumed $\phi = 30°$, $\gamma = 120$ lb/ft^3 (1920 kg/m^3), c = 0 lb/ft^2 (0 kPa).

[4] Assumed $\phi = 10°$, $\gamma = 130$ lb/ft^3 (2080 kg/m^3), c = 250 lb/ft^2 (12.0 kPa).

[5] Calculations run with the following factors and assumptions:

- Exposure Condition C
- Basic Wind Speed, V = 90 mph (40m/s)
- Importance Factor, $I_r = 1.0$
- Velocity Conversion Factor, $C_v = 1.00$
- Gust Factor, G = 1.14
- Overload Factor = 2.5
- Drag Coefficient (Fixture), $C_{d\ fixture} = 1.2$
- Drag Coefficient (Pole), $C_{d\ pole} = 0.915$
- Drag Coefficient (Base), $C_{d\ base} = 0.45$
- Height and Exposure Factor (Pole and Fixture), $K_{z\ pole} = 1.00$
- Height and Exposure Factor (Base), $K_{z\ base} = 0.86$
- Undercapacity Factor = 0.7

[6] Calculations assume a double light fixture with the total surface area of both fixtures equal to the value shown in the chart. Unbalanced loading from a single offset fixture is not included in this preliminary guide, and must be addressed in final design calculations if planned for use.

[7] Minimum recommended embedment shall be the calculated value, depth of local frost penetration, or 3'-0" (0.9 m), whichever is greater.

This preliminary guide was prepared by Pole Base™ for estimating and conceptual purposes only. All information is believed to be true and accurage; however, Pole Base™ assumes no responsibility for the use of these preliminary guides for actual construction. Determination of the suitability of each recommendation is the sole responsibility of the User. Final designs for construction must be performed by a licensed Professional Engineer using the actual conditions of the site. *(Rev. 5SEP2014)*

© 2014 Redi-Rock International, L.L.C. All Rights Reserved. Pole Base® is a wholly owned subsidiary of Redi-Rock International.

MINIMUM EMBEDMENT GUIDE

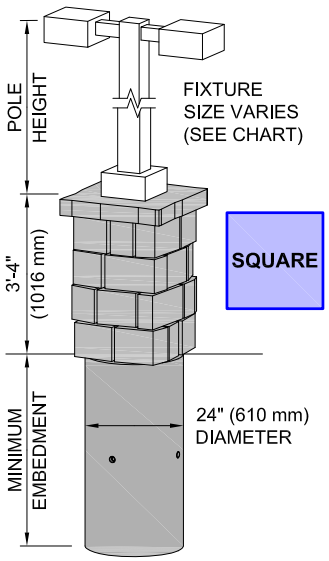
LEDGESTONE OR 24" (610 mm) SQUARE POLE BASE™ UNITS [1] **6" (150 mm) SQUARE LIGHT POLE**

MINIMUM EMBEDMENT

POLE HEIGHT	SIGN OR FIXTURE AREA			
	2 ft² (0.186 m²)	**4 ft²** (0.372 m²)	**6 ft²** (0.557 m²)	**8 ft²** (0.743 m²)
BASES IN GRAVEL SOILS (GW, GP) [2] [7]				
15' (4.6 m)	**4'-0"** (1.2 m)	**4'-0"** (1.2 m)	**4'-6"** (1.4 m)	**4'-6"** (1.4 m)
20' (6.1 m)	**4'-6"** (1.4 m)	**4'-6"** (1.4 m)	**5'-0"** (1.5 m)	**5'-0"** (1.5 m)
25' (7.6 m)	**5'-0"** (1.5 m)	**5'-0"** (1.5 m)	**5'-6"** (1.7 m)	**5'-6"** (1.7 m)
30' (9.1 m)	**5'-6"** (1.7 m)	**6'-0"** (1.8 m)	**6'-0"** (1.8 m)	**6'-0"** (1.8 m)
35' (10.7 m)	**6'-0"** (1.8 m)	**6'-6"** (2.0 m)	**6'-6"** (2.0 m)	**6'-6"** (2.0 m)
BASES IN SANDY SOILS (SW, SP, SM, SC, GM, GC) [3] [7]				
15' (4.6 m)	**4'-6"** (1.4 m)	**4'-6"** (1.4 m)	**4'-6"** (1.4 m)	**5'-0"** (1.5 m)
20' (6.1 m)	**5'-0"** (1.5 m)	**5'-0"** (1.5 m)	**5'-6"** (1.7 m)	**5'-6"** (1.7 m)
25' (7.6 m)	**5'-6"** (1.7 m)	**5'-6"** (1.7 m)	**6'-0"** (1.8 m)	**6'-0"** (1.8 m)
30' (9.1 m)	**6'-0"** (1.8 m)	**6'-6"** (2.0 m)	**6'-6"** (2.0 m)	**6'-6"** (2.0 m)
35' (10.7 m)	**6'-6"** (2.0 m)	**7'-0"** (2.1 m)	**7'-0"** (2.1 m)	**7'-0"** (2.1 m)
BASES IN CLAYEY SOILS (CL, ML, CH, MH) [4] [7]				
15' (4.6 m)	**8'-0"** (2.4 m)	**8'-6"** (2.6 m)	**9'-0"** (2.7 m)	**9'-6"** (2.9 m)
20' (6.1 m)	**9'-0"** (2.7 m)	**9'-6"** (2.9 m)	**10'-0"** (3.0 m)	**10'-6"** (3.2 m)
25' (7.6 m)	**10'-6"** (3.2 m)	**11'-0"** (3.4 m)	**11'-0"** (3.4 m)	**11'-6"** (3.5 m)
30' (9.1 m)	**11'-6"** (3.5 m)	**12'-0"** (3.7 m)	**12'-6"** (3.8 m)	**13'-0"** (4.0 m)
35' (10.7 m)	**12'-6"** (3.8 m)	**13'-0"** (4.0 m)	**13'-6"** (4.1 m)	**14'-0"** (4.3 m)

DESIGN FORCES

POLE HEIGHT	UNFACTORED SHEAR FORCE / OVERTURNING MOMENT [5] [6]			
15' (4.6 m)	**582 lb** (2.61 kN) **4,506 lb * ft** (6.11 kN * m)	**632 lb** (2.83 kN) **5,427 lb * ft** (7.36 kN * m)	**682 lb** (3.06 kN) **6,348 lb * ft** (8.61 kN * m)	**733 lb** (3.28 kN) **7,269 lb * ft** (9.86 kN * m)
20' (6.1 m)	**703 lb** (3.15 kN) **7,135 lb * ft** (9.67 kN * m)	**756 lb** (3.39 kN) **8,368 lb * ft** (11.35 kN * m)	**809 lb** (3.63 kN) **9,601 lb * ft** (13.02 kN * m)	**862 lb** (3.86 kN) **10,834 lb * ft** (14.69 kN * m)
25' (7.6 m)	**830 lb** (3.72 kN) **10,469 * ft** (14.19 kN * m)	**885 lb** (3.97 kN) **12,029 lb * ft** (16.31 kN * m)	**940 lb** (4.21 kN) **13,589 lb * ft** (18.42 kN * m)	**995 lb** (4.46 kN) **15,149 lb * ft** (20.54 kN * m)
30' (9.1 m)	**962 lb** (4.31 kN) **14,536 lb * ft** (19.71 kN * m)	**1,019 lb** (4.57 kN) **16,435 lb * ft** (22.28 kN * m)	**1,076 lb** (4.82 kN) **18,334 lb * ft** (24.86 kN * m)	**1,133 lb** (5.08 kN) **20,234 lb * ft** (27.43 kN * m)
35' (10.7 m)	**1,098 lb** (4.92 kN) **19,358 lb * ft** (26.25 kN * m)	**1,157 lb** (5.19 kN) **21,608 lb * ft** (29.30 kN * m)	**1,216 lb** (5.45 kN) **23,857 lb * ft** (32.35 kN * m)	**1,274 lb** (5.71 kN) **26,106 lb * ft** (35.40 kN * m)



Design Reference: *AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals*, 6th Edition, 2013 (LTS-6).

[1] Calculations have been run for a 24" (610 mm) square base 3'-4" (1016 mm) above grade with a 24" (610 mm) diameter round bury portion in the soil.

[2] Assumed $\phi = 34°$, $\gamma = 130$ lb/ft^3 (2080 kg/m^3), c = 0 lb/ft^2 (0 kPa).

[3] Assumed $\phi = 30°$, $\gamma = 120$ lb/ft^3 (1920 kg/m^3), c = 0 lb/ft^2 (0 kPa).

[4] Assumed $\phi = 10°$, $\gamma = 130$ lb/ft^3 (2080 kg/m^3), c = 250 lb/ft^2 (12.0 kPa).

[5] Calculations run with the following factors and assumptions:

- Exposure Condition C
- Basic Wind Speed, V = 90 mph (40m/s)
- Importance Factor, $I_r = 1.0$
- Velocity Conversion Factor, $C_v = 1.00$
- Gust Factor, G = 1.14
- Overload Factor = 2.5
- Drag Coefficient (Fixture), $C_{d\ fixture} = 1.2$
- Drag Coefficient (Pole), $C_{d\ pole} = 1.875$
- Drag Coefficient (Base), $C_{d\ base} = 1.75$
- Height and Exposure Factor (Pole and Fixture), $K_{z\ pole} = 1.00$
- Height and Exposure Factor (Base), $K_{z\ base} = 0.86$
- Undercapacity Factor = 0.7

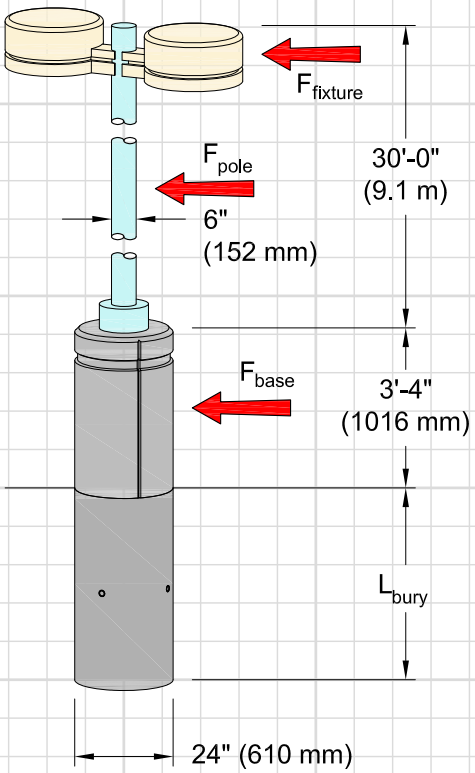
[6] Calculations assume a double light fixture with the total surface area of both fixtures equal to the value shown in the chart. Unbalanced loading from a single offset fixture is not included in this preliminary guide, and must be addressed in final design calculations if planned for use.

[7] Minimum recommended embedment shall be the calculated value, depth of local frost penetration, or 3'-0" (0.9 m), whichever is greater.

This preliminary guide was prepared by Pole Base™ for estimating and conceptual purposes only. All information is believed to be true and accurage; however, Pole Base™ assumes no responsibility for the use of these preliminary guides for actual construction. Determination of the suitability of each recommendation is the sole responsibility of the User. Final designs for construction must be performed by a licensed Professional Engineer using the actual conditions of the site. *(Rev. 5SEP2014)*

© 2014 Redi-Rock International, L.L.C. All Rights Reserved. Pole Base® is a wholly owned subsidiary of Redi-Rock International.

pole base™ www.polebase.com	PROJECT: *EXAMPLE CALCULATION*	SHEET: *1 of 4*
	PREPARED BY: *B. LINDFORS*	DATE: *5SEP2014*



EXAMPLE CALCULATION

Determine minimum required embedment for a Pole Base™ Unit in the following conditions:

Pole Base™ Unit = 24" (610 mm) diameter round base with 3'-4" (1016 mm) textured portion above grade and a 24" (610 mm) diameter round bury portion.

Site Soils = Poorly graded sand (SP) with:
internal friction angle, ϕ = 30°
unit weight, γ = 120 lb/ft^3 (1920 kg/m^3)
cohesion, c = 0 lb/ft^2 (0 kPa).

Light Pole = 30' (9.1 m) tall, 6" (152 mm) diameter round pole.

Light Fixture Size = 4 ft^2 (0.372 m^2)

Site Exposure Condition = C

Basic Wind Speed = 90 mph (40 m/s)

Design Reference: *AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals*, 6th Edition, 2013 (LTS-6).

- DETERMINE WIND LOADS ON POLE BASE™ UNIT, LIGHT POLE, AND LIGHT FIXTURE:

Site Exposure Condition C (Given)

Basic Wind Speed, V = 90 mps (40 m/s) (Given)	*Reference AASHTO Figures 3.8.3-1 to 3.8.3-5*
Wind Importance Factor, I_r = 1.0	*AASHTO Table 3.8.3-1 (50 year recurrence, non-hurricane region)*
Design Life = 50 years	*AASHTO Table 3.8.3-2*
Velocity Conversion Factor, C_v = 1.00	*AASHTO Table 3.8.3-3 (50 year recurrence, basic wind speed in non-hurricane region)*

© 2014 Redi-Rock International, L.L.C. All Rights Reserved. Pole Base® is a wholly owned subsidiary of Redi-Rock International.

Height and Exposure Factor, K_z — *AASHTO Section 3.8.4*

$K_z = 2.01 * (z / z_g)^{2/alpha}$ — *AASHTO C3.8.4-1*

alpha = 9.5 and z_g = 900 ft (274.3 m) — *AASHTO Commentary C3.8.4*

z = height above ground ≥ 16 ft (5 m)

For Pole Base™:
$K_{z\ base} = 2.01 * (16 / 900)^{2/9.5} = 0.86$

For Light Pole and Fixture:
$K_{z\ pole} = 2.01 * (30 / 900)^{2/9.5} = 1.0$

Gust Factor, G = 1.14 — *AASHTO Commentary C3.8.5*

Drag Coefficients, C_d — *AASHTO Section 3.8.6*

For Light Fixture:
$C_{d\ fixture} = 1.2$ — *AASHTO Table 3.8.6-1 (luminaires with rectangular flat shide shapes)*

For Light Pole:
$C_v*V*d = 1.0 * 90\ mph * 0.5\ ft = 45\ mph * ft$
$C_{d\ pole} = 129 / (C_v*V*d)^{1.3} = 0.915$ — *AASHTO Table 3.8.6-1 (cylindrical)*

For Pole Base Unit:
$C_v*V*d = 1.0 * 90\ mph * 2.0\ ft = 180\ mph * ft$
$C_{d\ base} = 0.45$ — *AASHTO Table 3.8.6-1 (cylindrical)*

Wind Pressure, $P_z = 0.00256 * K_z * G * V^2 * I_r * C_d$ — *AASHTO 3.8.3-1*

For Light Fixture
$P_{z\ fixture} = 0.00256 * 1.0 * 1.14 * 90^2 * 1.0 * 1.2 = 28.5\ psf$

For Light Pole
$P_{z\ pole} = 0.00256 * 1.0 * 1.14 * 90^2 * 1.0 * 0.915 = 21.7\ psf$

For Pole Base™
$P_{z\ base} = 0.00256 * 0.86 * 1.14 * 90^2 * 1.0 * 0.45 = 9.2\ psf$

© 2014 Redi-Rock International, L.L.C. All Rights Reserved. Pole Base® is a wholly owned subsidiary of Redi-Rock International.

DETERMINE SHEAR FORCES AND OVERTURNING MOMENTS

Shear Forces

For Light Fixture:

$F_{fixture} = P_{z\ fixture} * A_{fixture} = 28.5 * 4.0 = 114.0$ lbf (0.51 kN)

For Light Pole:

$F_{pole} = P_{z\ pole} * A_{pole} = 21.7 * (30 * 0.5) = 325.8$ lbf (1.46 kN)

For Pole Base™:

$F_{base} = P_{z\ base} * A_{base} = 9.2 * (3.33 * 2.0) = 61.0$ lbf (0.27 kN)

Total Applied Shear Force = $F_{fixture} + F_{pole} + F_{base} = 500.8$ lbf (2.24 kN)

Overturning Moment

For Light Fixture:

$M_{fixture} = F_{fixture} * (h_{base} + h_{pole}) = 114.0 * (3.33 + 30) = 3{,}798$ lbf * ft (5.15 kN * m)

For Light Pole:

$M_{pole} = F_{pole} * (h_{base} + h_{pole}/2) = 325.8 * (3.33 + 30/2) = 5{,}973$ lbf * ft (8.10 kN * m)

For Pole Base™:

$M_{base} = F_{base} * (h_{base}/2) = 61.0 * (3.33 / 2) = 102$ lbf * ft (0.14 kN * m)

Total Applied Overturning Moment = $M_{fixture} + M_{pole} + M_{base} = 9{,}874$ lbf * ft (13.39 kN * m)

DETERMINE MINIMUM REQUIRED EMBEDMENT

Factor Shear and Overturning Moment for Use with Broms Design Method

Overload Factor = 2.5 and *AASHTO Commentary C13.6.1.1*
Undercapacity Factor = 0.7

Safety Factor = Overload Factor / Undercapacity Factor = 3.57

V_F = Total Shear * (Safety Factor) = 1.79 kip (8.0 kN) *AASHTO C13.6.1.1-1*

M_F = Total Moment * (Safety Factor) = 35.26 ft * kip (47.8 kN * m) *AASHTO C13.6.1.1-2*

© 2014 Redi-Rock International, L.L.C. All Rights Reserved. Pole Base® is a wholly owned subsidiary of Redi-Rock International.

DETERMINE MINIMUM BURY

For a Foundation in Cohesionless Soil:

$$L^3 - \frac{2 * V_F * L}{K_p * \gamma * D} - \frac{2 * M_F}{K_p * \gamma * D} = 0$$ *AASHTO C13.6.1.1-7*

$\phi = 30°$ (Given)

$\gamma = 120$ lb/ft^3 (1920 kg/m^3) (Given)

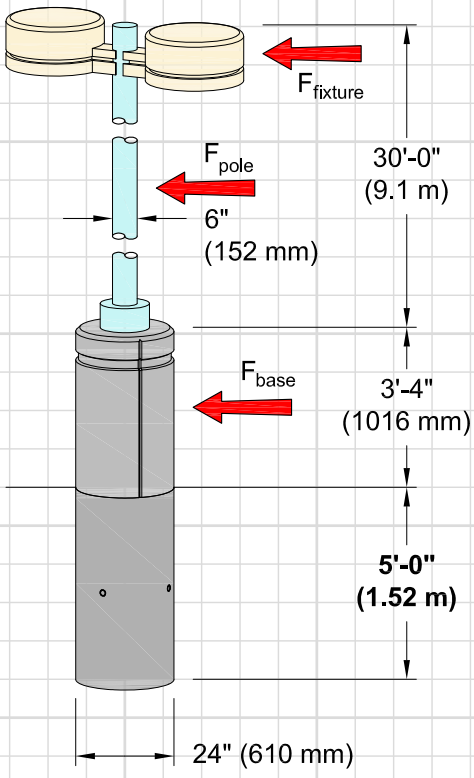
$K_p = \tan^2 (45 + \phi/2) = \tan^2 (45 + 30/2) = 3$ *AASHTO C13.6.1.1-8*

D = Diameter of Base = 2 ft (0.61 m) (Given)

Solve by Iteration to find L = 4.97 ft (1.51 m)

$$L^3 - \frac{2 * V_F * L}{K_p * \gamma * D} - \frac{2 * M_F}{K_p * \gamma * D} = 4.97^3 - \frac{2 * 1.789 * 4.97}{3 * 0.120 * 2} - \frac{2 * 35.26}{3 * 0.120 * 2} \approx 0$$

MINIMUM BURY FOR POLE BASE™ UNIT = 4.97 USE **5'-0" (1.52 m)**.



© 2014 Redi-Rock International, L.L.C. All Rights Reserved. Pole Base® is a wholly owned subsidiary of Redi-Rock International.