

## DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Street Light Fixture	51.6	(E) Seasonal Banner	42.4
54.5"x10.75" DIA. Ant. w/ Shroud (Modus ATJ)	51.4	(E) Seasonal Banner	42.4
		(E) Warning Sign	38.9
7' x 4" Light pole Arm	50.1 - 49.7	Warning Sign	38.4
Seasonal Banner	42.9	mRRUS w/ mount (Modus ATJ)	37.65
Seasonal Banner	42.9	mRRUS w/ mount (Modus ATJ)	34.9

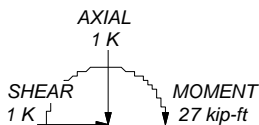
## MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A36	36 ksi	58 ksi			

## TOWER DESIGN NOTES

1. Tower designed for Exposure C to the TIA-222-G Standard.
2. Tower designed for a 85 mph basic wind in accordance with the TIA-222-G Standard.
3. Deflections are based upon a 60 mph wind.
4. Tower Structure Class II.
5. Topographic Category 1 with Crest Height of 0.00 ft
6. Weld together tower sections have flange connections.
7. Connections use galvanized A325 bolts, nuts and locking devices. Installation per TIA/EIA-222 and AISC Specifications.
8. Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
9. Welds are fabricated with ER-70S-6 electrodes.
10. TOWER RATING: 92%

ALL REACTIONS  
ARE FACTORED



TORQUE 1 kip-ft  
REACTIONS - 85 mph WIND

50.2 ft

21.4 ft



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Job: **Polygon-3\_Node-28P 28.8' Light Pole**Project: **61 - Modus AT&T CRAN**

Client: Modus AT&amp;T

Drawn by: LeT

App'd:

Code: TIA-222-G

Date: 08/11/16

Scale: NTS

Path:

Dwg No. E-1

P:\61 - Modus AT&amp;T CRAN\Polygon-3\_Node-28P1 - Structural Light Pole Analysis\Light Pole\Polygon-3\_Node-28 Light Pole.dwg



**ALL STATES**  
ENGINEERING & SURVEYING  
A ZALZALI & ASSOCIATES COMPANY  
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JOB: Polygon-3\_Node-28P  
SUBJECT: \_\_\_\_\_  
BY: LeT DATE 8/9/2016  
SHEET NO: \_\_\_\_\_ of \_\_\_\_\_

#### Scope of Calculation:

Analyze wind load on (E) & (N) signs

V = 85 mph (Basic Wind Speed for Occupancy Category II)

#### Existing Banner / Street Sign

Height of Street Sign (Centerline) :			Length (ft)	Height (ft)	Sign area (ft <sup>2</sup> )	Shielded area of the pole/ RRU	Projected Area
21.5	ft	(2) Banners	2.75	5.75	15.81	0.00	31.63
17.5	ft	Warning Sign	1.5	1.5	2.25	0.00	2.25

#### Design Wind Force on Street Sign:

$$q_z = 0.00256 * K_z * K_{zt} * K_d * V^2 * I \quad \text{TIA-G, Section 2.6.9.6}$$

Exposure "C"

$$I = 1 \quad \text{(TIA-G, Table 2-3)}$$

$$K_z = 2.01 (z/z_g)^{(2/a)} \quad \text{(TIA -G, Section 2.6.5.2)}$$

$$K_z = 0.92$$

$$K_d = 0.95 \quad \text{(TIA-G, Table 2-2)}$$

$$K_{zt} = 1.0 \quad \text{(TIA -G, Section 2.6.6.4)}$$

$$q_z = 16.09 \text{ psf}$$

$$F_A = q_z G_h (EPA)_A \quad \text{(TIA -G, Section 2.6.9.2)}$$

$$G_h = 0.85 \quad \text{(TIA -G, Section 2.6.7)}$$

$$EPA = C_a A_A =$$

$$C_a = 1.2 \quad \text{(TIA-G, Table 2-8)}$$

	$F_A$ (lbs)	
(2) Banners	420.42	(19% Reduction for banners)
Warning Sign	36.93	

## Square, Stiffened / Unstiffened Base Plate, Any Rod Material - Rev. F / G

- Assumptions:**
- 1) Rod groups at corners. Total # rods divisible by 4. Maximum total # of rods = 48 (12 per Corner).
  - 2) Rod Spacing = Straight Center-to-Center distance between any (2) adjacent rods (same corner)
  - 3) Clear space between bottom of leveling nut and top of concrete **not** exceeding (1)\*(Rod Diameter)

### Site Data

Site Name: *Polygon-3\_Node-28P*

Anchor Rod Data		
Eta Factor, $\eta$	0.5	TIA G (Fig. 4-4)
Qty:	4	
Diam:	1	in
Rod Material:	Other	
Yield, $F_y$ :	55	ksi
Strength, $F_u$ :	75	ksi
Bolt Circle:	11.31	in

Plate Data		
W=Side:	11.5	in
Thick:	1	in
Grade:	36	ksi
Clip Distance:	0.75	in

Stiffener Data (Welding at both sides)		
Configuration:	Unstiffened	
Weld Type:		**
Groove Depth:		<-- Disregard
Groove Angle:		<-- Disregard
Fillet H. Weld:		in
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

Pole Data		
Diam:	9.6	in
Thick:	0.125	in
Grade:	36	ksi
# of Sides:	0	"0" IF Round

Base Reactions		
TIA Revision:	G	
Factored Moment, $M_u$ :	27	ft-kips
Factored Axial, $P_u$ :	1	kips
Factored Shear, $V_u$ :	1	kips

### Anchor Rod Results

TIA G --> Max Rod ( $C_u + V_u/\eta$ ): 29.7 Kips  
 Axial Design Strength,  $\Phi F_u A_{net}$ : 36.4 Kips  
 Anchor Rod Stress Ratio: 81.7% **Pass**

### Base Plate Results

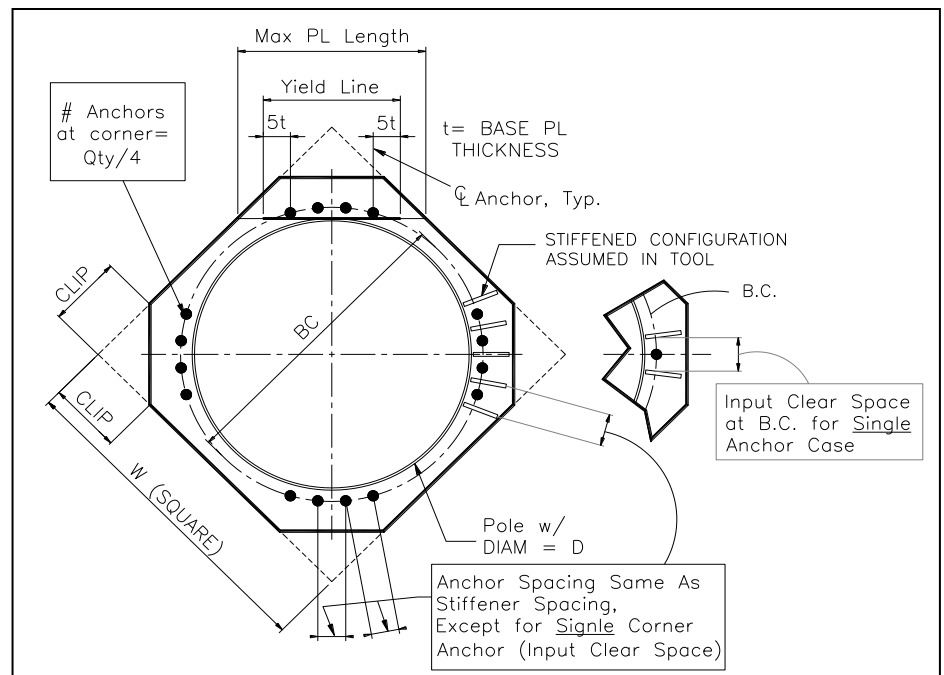
Base Plate Stress: 16.6 ksi  
 PL Design Bending Strength,  $\Phi F_y$ : 32.4 ksi  
 Base Plate Stress Ratio: 51.2% **Pass**

### Flexural Check

PL Ref. Data	
Yield Line (in):	5.98
Max PL Length:	6.66

MATERIAL DATA		
COMPONENT	ASTM DESIGNATION	MIN. YIELD (KSI)
BASE PLATE	A36	36
ANCHOR BOLTS	F1554 GR.55	55

*San Francisco  
Street Light  
Catalogue*



\*\* **Note:** for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes