STATE OF MAINE
DEPARTMENT OF TRANSPORTATION
16 STATE HOUSE STATION
AUGUSTA, MAINE 04333-0016

Janet T. Mills
GOVERNOR

Bruce A. Van Note
COMMISSIONER

July 1, 2025
Subject: Bridge Replacement
WIN: 022382.00
Location: **Cumberland-Yarmouth**
Amendment No. 2

Dear Sir/Ms.:

In the existing plans:

ADD the attached LED LIGHT FIXTURE DESIGN CALCULATIONS (21 pages).

The following questions have been received:

Question: (1)How does Maine DOT plan to install the Cyclone LEDs on the existing poles? Are there any specific mounting specifications?

Response: MaineDOT uses Stainless steel ¾ inch banding of a tenon. Light optics can fit in different fixtures so specific mounting instructions depend on the fixture selected.

Question (2)Does Maine DOT have the drawings and calculations for the existing lighting poles needed for the LFRD calculations? These calculations wouldn't be possible without those specifications.

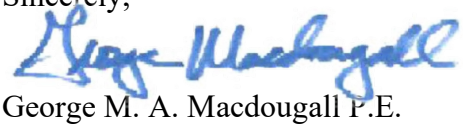
Response: See the attached light fixture drawings and calculations.

Question (3)Please confirm that the outside housing of the LED fixtures will be grey.
Response: Light fixture housing will be gray.

Question (4) Will Maine DOT obligate the Cyclone crosswalk distribution fixtures before the nationwide BABA waiver for FHWA-funded projects expires on 10/1/2025?
Response: The contractor is encouraged to order the fixtures before the BABA waiver expiration.

Consider these changes and information prior to submitting your bid on **July 16, 2025.**

Sincerely,



George M. A. Macdougall P.E.
Contracts & Specifications Engineer

SHAW BROTHERS CONSTRUCTION, INC.
P.O. Box 69 • 341 Mosher Rd. • Gorham, ME 04038
Tel: (207) 839-2552 • Fax: (207)839-6239
Website: www.shawbrothers.com

Submittal #: 844-29
Date: 04/01/2013

SUBMITTAL DATA

To: Maine DOT
16 State House Station
Augusta, ME 04333-0016
Attn: Beecher Whitcomb

Project: Yarmouth Interchange
Yarmouth, ME 04096

We hereby submit the following for your approval.

Sheet / Spec. No.	Section No.	Item No.	Material
634.2101 & 634.2102		1	Light Standards

Remarks:
n/a

Chris Dyer
Assistant Project Manager
Shaw Brothers Construction

MOULISON NORTH CORPORATION
HEAVY ELECTRICAL

SUBMITTAL

DATE: **Wednesday March, 27, 2013**

CONTRACTOR: Shaw Brothers

PROJECT: Yarmouth, ME Exit 15 & Park-N-Ride PIN#11086

PRODUCT: Autobahn 17500 Lumen LED Light Fixture & 22500 Lumen LED Light Fixture

SPECIFICATION: 643.2041 & 643.2042

MANUFACTURER: American Electric Lighting

SUPPLIER: Moulison North Corp

DEVIATION from SPEC: NO

NO. of COPIES: 1

COMMENTS:

www.moulisonnorth.com
Biddeford Station ♦ 10 Iron Trail Road ♦ Biddeford, ME 04005 ♦ (207) 282-0759 ♦ Fax: (207) 282-3935
Direct Mail to: P.O. BOX 348, BIDDEFORD, ME 04005-0348

MILLERBERND
MANUFACTURING COMPANY

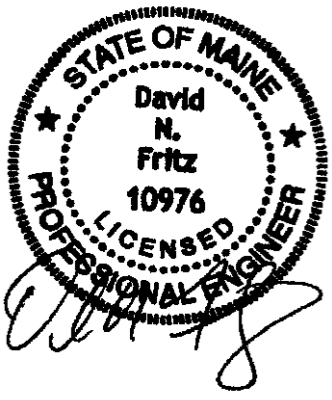
STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

Yarmouth
I-295 Exit 15

MMC #49309

Design Calculations

Item	Page
7RABD7937300-1S24-1H8-NC-ME	1
7RABD8630400-1S24-1H8-NC-ME	6



3/15/13

SINGLE PIECE POLE ANALYSIS
2009 AASHTO

Job : Yarmouth, Maine
Pole Description : 7RAB7937300

3/11/13

WIND

Wind Speed =	110	(mph)
Ice Load =	0	(psf)
I_r =	1	(Wind Imp Factor)
C_v =	1	(Velocity Conv Factor)
P-Δ Factor =	1.45	Section 4.8.2

LUMINAIRE

Projected Area =	5	(sq ft)
Weight =	60	(lbs)
C_d =	1	
Elevation*=	30	(ft)
Post Top Mntd? =	y	

BASEPLATE

Square =	12	(in)
Thick =	1	(in)
F_y =	36	(ksi)

ANCHOR BOLTS

Diameter =	1	(in)
Bolt Circle =	11	(in)
F_y =	55	(ksi)

MISC LOAD 1

Projected Area =	0	(sq ft)
Weight =	0	(lbs)
Cd =	0	
Elevation* =	0	(ft)
Torque Arm =	0	(ft)

SHAFT

Shape =	R	
Taper =	0.14	(in/ft)
BDAC =	7.9	(in)
Length =	30	(ft)
Wall =	0.1875	(in)
Fy =	55	(ksi)

ARM

Tag =	0	
Length =	0	(ft)
EPA =	0.00	(sq ft)
Weight =	0	(lbs)
Torque Arm =	0.00	(ft)
Y Centroid* =	0.00	(ft)
Twin? =	n	

ELEVATIONS

Base Elev =	0	(ft)
Grade Elev =	0	(ft)

T-BASE BOLTS

Diameter =	0	(in)
Bolt Circle =	0	(in)
Fy =	0	(ksi)

MISC LOAD 2

Projected Area =	0	(sq ft)
Weight =	0	(lbs)
Cd =	0	
Elevation* =	0	(ft)
Torque Arm =	0	(ft)

SHAFT DIMENSIONS

Shape =	ROUND	Base OD (in) =	7.9
Length (ft) =	30	Top OD (in) =	3.70

*Above base elevation

ROUND

SHAFT SECTION PROPERTIES

Location	DAC (in)	DAF (in)	R (in)	I (in4)	S (in3)	A (in2)	Kp	r (in)	C
1	7.90	na	3.86	33.76	8.76	4.54	1.27	2.73	3.14
2	7.48	na	3.65	28.54	7.83	4.29	1.27	2.58	3.14
3	7.06	na	3.44	23.89	6.95	4.05	1.27	2.43	3.14
4	6.64	na	3.23	19.77	6.13	3.80	1.27	2.28	3.14
5	6.22	na	3.02	16.16	5.36	3.55	1.27	2.13	3.14
6	5.80	na	2.81	13.01	4.64	3.30	1.27	1.98	3.14
7	5.38	na	2.60	10.30	3.97	3.06	1.27	1.84	3.14
8	4.96	na	2.39	8.00	3.35	2.81	1.27	1.69	3.14
9	4.54	na	2.18	6.07	2.79	2.56	1.27	1.54	3.14
10	4.12	na	1.97	4.48	2.28	2.32	1.27	1.39	3.14
11	3.70	na	1.76	3.19	1.82	2.07	1.27	1.24	3.14

ALLOWABLE STRESSES

Location	DAF (in)	b (in)	b/t	Compact Limit	Non Comp Limit	Slender Limit	Fb (ksi)	Fv (ksi)
1	7.90	na	42.13	68.55	137.09	237.27	48.28	24.14
2	7.48	na	39.89	68.55	137.09	237.27	48.28	24.14
3	7.06	na	37.65	68.55	137.09	237.27	48.28	24.14
4	6.64	na	35.41	68.55	137.09	237.27	48.28	24.14
5	6.22	na	33.17	68.55	137.09	237.27	48.28	24.14
6	5.80	na	30.93	68.55	137.09	237.27	48.28	24.14
7	5.38	na	28.69	68.55	137.09	237.27	48.28	24.14
8	4.96	na	26.45	68.55	137.09	237.27	48.28	24.14
9	4.54	na	24.21	68.55	137.09	237.27	48.28	24.14
10	4.12	na	21.97	68.55	137.09	237.27	48.28	24.14
11	3.70	na	19.73	68.55	137.09	237.27	48.28	24.14

WIND FORCES

Section	Length (ft)	Area (sq ft)	Centroid Elev (ft)	Kz	G	CvVd	Cd	Pressure (psf)	Force (lbs)
Misc #1	na	0.00	0.00	0.86	1.14	na	0.00	0.00	0.00
Misc #2	na	0.00	0.00	0.86	1.14	na	0.00	0.00	0.00
1-2	3.00	1.92	1.49	0.86	1.14	70.49	0.51	15.51	29.82
2-3	3.00	1.82	4.49	0.86	1.14	66.64	0.55	16.69	30.33
3-4	3.00	1.71	7.48	0.86	1.14	62.79	0.59	18.03	30.88
4-5	3.00	1.61	10.48	0.86	1.14	58.94	0.64	19.58	31.47
5-6	3.00	1.50	13.48	0.86	1.14	55.09	0.70	21.37	32.11
6-7	3.00	1.40	16.48	0.87	1.14	51.24	0.77	23.63	33.02
7-8	3.00	1.29	19.48	0.90	1.14	47.39	0.86	27.09	35.02
8-9	3.00	1.19	22.48	0.92	1.14	43.54	0.96	31.17	37.02
9-10	3.00	1.08	25.48	0.95	1.14	39.69	1.08	36.10	39.08
10-11	3.00	0.98	28.47	0.97	1.14	35.84	1.10	37.74	36.89
Arm	na	0.00	0.00	0.86	1.14	na	1.00	30.39	0.00
Luminaire	na	5.00	30.00	0.98	1.14	na	1.00	34.69	173.43

ROUND

TORSION & DEAD LOAD MOMENTS

Section	Torsion Arm (ft)	Force (lbs)	Torsion M_z (ft-lbs)	Dead Load Arm (ft)	Dead Load (lbs)	DL Moment M_x (ft-lbs)
Misc #1	0	0.00	0.0	0.0	0.0	0.0
Misc #2	0	0.00	0.0	0.0	0.0	0.0
1-2	0	29.82	0.0	0.0	45.1	0.0
2-3	0	30.33	0.0	0.0	42.6	0.0
3-4	0	30.88	0.0	0.0	40.0	0.0
4-5	0	31.47	0.0	0.0	37.5	0.0
5-6	0	32.11	0.0	0.0	35.0	0.0
6-7	0	33.02	0.0	0.0	32.5	0.0
7-8	0	35.02	0.0	0.0	29.9	0.0
8-9	0	37.02	0.0	0.0	27.4	0.0
9-10	0	39.08	0.0	0.0	24.9	0.0
10-11	0	36.89	0.0	0.0	22.4	0.0
Arm	0	0.00	0.0	0.0	0.0	0.0
Luminaire	0	173.43	0.0	0.0	60.0	0.0

MOMENTS

Elevation (ft)	Wind Moment M_y (ft-lbs)	2ndary Moment M_y (ft-lbs)	DL Moment M_x (ft-lbs)	Load Case 1 n_c=1.0BL, t_c=0.2BL M_y (ft-lbs)	Load Case 1 M_x (ft-lbs)	Load Case 2 n_c=0.6BL, t_c=0.3BL M_y (ft-lbs)	Load Case 2 M_x (ft-lbs)	Control LC
Grade	10482	62.8	0.0	NA	NA	NA	NA	NA
0.00	10482	62.8	0.0	NA	NA	NA	NA	NA
3.00	8999	62.8	0.0	NA	NA	NA	NA	NA
6.00	7608	58.4	0.0	NA	NA	NA	NA	NA
9.00	6308	53.2	0.0	NA	NA	NA	NA	NA
12.00	5101	47.3	0.0	NA	NA	NA	NA	NA
15.00	3990	40.7	0.0	NA	NA	NA	NA	NA
18.00	2977	33.5	0.0	NA	NA	NA	NA	NA
21.00	2066	25.7	0.0	NA	NA	NA	NA	NA
24.00	1263	17.4	0.0	NA	NA	NA	NA	NA
27.00	575	8.8	0.0	NA	NA	NA	NA	NA
30.00	0	0.0	0.0	NA	NA	NA	NA	NA

ROUND

SUMMARY OF FORCES AND MOMENTS

Elevation (ft)	M_y (ft-lbs)	M_x (ft-lbs)	Torsion (ft-lbs)	Shear (lbs)	Axial (lbs)	Deflection (in)
Grade	10544	0	0	509	397	0.0
0.00	10544	0	0	509	397	0.0
3.00	9062	0	0	479	352	0.2
6.00	7666	0	0	449	310	0.4
9.00	6361	0	0	418	270	0.6
12.00	5149	0	0	387	232	1.0
15.00	4031	0	0	354	197	1.4
18.00	3011	0	0	321	165	2.0
21.00	2092	0	0	286	135	2.7
24.00	1281	0	0	249	107	3.7
27.00	583	0	0	210	82	4.9
30.00	0	0	0	0	0	6.7

P-Δ Factor = 1.45

STRESSES & COMBINED STRESS RATIO

Elevation (ft)	Bending fb f_b (psi)	Transv. Shear f_{vb} (psi)	Torsional Shear f_{vt} (psi)	Axial f_a (psi)	CSR
0					
0.00	14452	224	0	88	0.30
3.00	13893	223	0	82	0.29
6.00	13233	222	0	77	0.28
9.00	12456	220	0	71	0.26
12.00	11535	218	0	65	0.24
15.00	10433	215	0	60	0.22
18.00	9104	210	0	54	0.19
21.00	7488	204	0	48	0.16
24.00	5512	195	0	42	0.12
27.00	3076	182	0	36	0.06
30.00	0	0	0	0	0.00

ROUND

ANCHOR BOLTS

Bolt No.	Calculated Forces Axial (lbs)	Calculated Forces Shear (lbs)	Calculated Stresses Axial (psi)	Calculated Stresses Shear (psi)	Allowable Stresses Axial (psi)	Allowable Stresses Shear (psi)	CSR
4	11602	127	19154	210	43890	21945	0.19
3	99	127	164	210	43890	21945	0.00
2	-11404	127	-18826	210	36575	21945	0.27
1	99	127	164	210	43890	21945	0.00

T-BASE BOLTS

Bolt No.	Calculated Forces Axial (lbs)	Calculated Forces Shear (lbs)	Calculated Stresses Axial (psi)	Calculated Stresses Shear (psi)	Allowable Stresses Axial (psi)	Allowable Stresses Shear (psi)	CSR

BASE PLATE

Bend Line Length (in) =	9.07
Bend Line Section Modulus (in^3) =	1.51
Bolt Moment Arm (in) =	1.55
Moment (in-lbs) =	17983
Bending Stress (psi) =	11896
Allowable Bending Stess (psi) =	35910
CSR =	0.33

SINGLE PIECE POLE ANALYSIS
2009 AASHTO

Job : Yarmouth, Maine
Pole Description : 7RAB8630400

3/5/13

WIND

Wind Speed =	110	(mph)
Ice Load =	0	(psf)
Ir =	1	(Wind Imp Factor)
Cv =	1	(Velocity Conv Factor)
P-Δ Factor =	1.45	Section 4.8.2

LUMINAIRE

Projected Area =	5	(sq ft)
Weight =	60	(lbs)
Cd =	1	
Elevation*=	40	(ft)
Post Top Mntd? =	y	

BASEPLATE

Square =	12	(in)
Thick =	1	(in)
Fy =	36	(ksi)

ANCHOR BOLTS

Diameter =	1	(in)
Bolt Circle =	12	(in)
Fy =	55	(ksi)

MISC LOAD 1

Projected Area =	0	(sq ft)
Weight =	0	(lbs)
Cd =	0	
Elevation* =	0	(ft)
Torque Arm =	0	(ft)

SHAFT

Shape =	R	
Taper =	0.14	(in/ft)
BDAC =	8.6	(in)
Length =	40	(ft)
Wall =	0.1875	(in)
Fy =	55	(ksi)

ARM

Tag =	0	
Length =	0	(ft)
EPA =	0.00	(sq ft)
Weight =	0	(lbs)
Torque Arm =	0.00	(ft)
Y Centroid* =	0.00	(ft)
Twin? =	n	

ELEVATIONS

Base Elev =	0	(ft)
Grade Elev =	0	(ft)

T-BASE BOLTS

Diameter =	0	(in)
Bolt Circle =	0	(in)
Fy =	0	(ksi)

MISC LOAD 2

Projected Area =	0	(sq ft)
Weight =	0	(lbs)
Cd =	0	
Elevation* =	0	(ft)
Torque Arm =	0	(ft)

SHAFT DIMENSIONS

Shape =	ROUND	Base OD (in) =	8.6
Length (ft) =	40	Top OD (in) =	3.00

*Above base elevation

ROUND

SHAFT SECTION PROPERTIES

Location	DAC (in)	DAF (in)	R (in)	I (in4)	S (in3)	A (in2)	Kp	r (in)	C
1	8.60	na	4.21	43.81	10.42	4.95	1.27	2.97	3.14
2	8.04	na	3.93	35.63	9.08	4.62	1.27	2.78	3.14
3	7.48	na	3.65	28.54	7.83	4.29	1.27	2.58	3.14
4	6.92	na	3.37	22.46	6.67	3.96	1.27	2.38	3.14
5	6.36	na	3.09	17.31	5.61	3.63	1.27	2.18	3.14
6	5.80	na	2.81	13.01	4.64	3.30	1.27	1.98	3.14
7	5.24	na	2.53	9.49	3.76	2.97	1.27	1.79	3.14
8	4.68	na	2.25	6.67	2.97	2.64	1.27	1.59	3.14
9	4.12	na	1.97	4.48	2.28	2.32	1.27	1.39	3.14
10	3.56	na	1.69	2.82	1.67	1.99	1.27	1.19	3.14
11	3.00	na	1.41	1.64	1.16	1.66	1.27	0.99	3.14

ALLOWABLE STRESSES

Location	DAF (in)	b (in)	b/t	Compact Limit	Non Comp Limit	Slender Limit	Fb (ksi)	Fv (ksi)
1	8.60	na	45.87	68.55	137.09	237.27	48.28	24.14
2	8.04	na	42.88	68.55	137.09	237.27	48.28	24.14
3	7.48	na	39.89	68.55	137.09	237.27	48.28	24.14
4	6.92	na	36.91	68.55	137.09	237.27	48.28	24.14
5	6.36	na	33.92	68.55	137.09	237.27	48.28	24.14
6	5.80	na	30.93	68.55	137.09	237.27	48.28	24.14
7	5.24	na	27.95	68.55	137.09	237.27	48.28	24.14
8	4.68	na	24.96	68.55	137.09	237.27	48.28	24.14
9	4.12	na	21.97	68.55	137.09	237.27	48.28	24.14
10	3.56	na	18.99	68.55	137.09	237.27	48.28	24.14
11	3.00	na	16.00	68.55	137.09	237.27	48.28	24.14

WIND FORCES

Section	Length (ft)	Area (sq ft)	Centroid Elev (ft)	Kz	G	CvVd	Cd	Pressure (psf)	Force (lbs)
Misc #1	na	0.00	0.00	0.86	1.14	na	0.00	0.00	0.00
Misc #2	na	0.00	0.00	0.86	1.14	na	0.00	0.00	0.00
1-2	4.00	2.77	1.98	0.86	1.14	76.27	0.46	14.00	38.84
2-3	4.00	2.59	5.98	0.86	1.14	71.13	0.50	15.33	39.66
3-4	4.00	2.40	9.97	0.86	1.14	66.00	0.56	16.90	40.56
4-5	4.00	2.21	13.97	0.86	1.14	60.87	0.62	18.77	41.55
5-6	4.00	2.03	17.97	0.88	1.14	55.73	0.69	21.57	43.72
6-7	4.00	1.84	21.97	0.92	1.14	50.60	0.79	25.52	46.95
7-8	4.00	1.65	25.96	0.95	1.14	45.47	0.90	30.38	50.22
8-9	4.00	1.47	29.96	0.98	1.14	40.33	1.05	36.58	53.65
9-10	4.00	1.28	33.95	1.01	1.14	35.20	1.10	39.16	50.13
10-11	4.00	1.09	37.94	1.03	1.14	30.07	1.10	40.09	43.83
Arm	na	0.00	0.00	0.86	1.14	na	1.00	30.39	0.00
Luminaire	na	5.00	40.00	1.04	1.14	na	1.00	36.85	184.26

ROUND

TORSION & DEAD LOAD MOMENTS

Section	Torsion Arm (ft)	Force (lbs)	Torsion M_z (ft-lbs)	Dead Load Arm (ft)	Dead Load (lbs)	DL Moment M_x (ft-lbs)
Misc #1	0	0.00	0.0	0.0	0.0	0.0
Misc #2	0	0.00	0.0	0.0	0.0	0.0
1-2	0	38.84	0.0	0.0	65.2	0.0
2-3	0	39.66	0.0	0.0	60.7	0.0
3-4	0	40.56	0.0	0.0	56.2	0.0
4-5	0	41.55	0.0	0.0	51.7	0.0
5-6	0	43.72	0.0	0.0	47.2	0.0
6-7	0	46.95	0.0	0.0	42.7	0.0
7-8	0	50.22	0.0	0.0	38.2	0.0
8-9	0	53.65	0.0	0.0	33.8	0.0
9-10	0	50.13	0.0	0.0	29.3	0.0
10-11	0	43.83	0.0	0.0	24.8	0.0
Arm	0	0.00	0.0	0.0	0.0	0.0
Luminaire	0	184.26	0.0	0.0	60.0	0.0

MOMENTS

Elevation (ft)	Wind Moment M_y (ft-lbs)	2ndary Moment M_y (ft-lbs)	DL Moment M_x (ft-lbs)	Load Case 1 n_c=1.0BL, t_c=0.2BL M_y (ft-lbs)	Load Case 1 M_x (ft-lbs)	Load Case 2 n_c=0.6BL, t_c=0.3BL M_y (ft-lbs)	Load Case 2 M_x (ft-lbs)	Control LC
Grade	16762	204.7	0.0	NA	NA	NA	NA	NA
0.00	16762	204.7	0.0	NA	NA	NA	NA	NA
4.00	14307	204.7	0.0	NA	NA	NA	NA	NA
8.00	12010	192.2	0.0	NA	NA	NA	NA	NA
12.00	9872	177.3	0.0	NA	NA	NA	NA	NA
16.00	7899	159.9	0.0	NA	NA	NA	NA	NA
20.00	6097	140.1	0.0	NA	NA	NA	NA	NA
24.00	4476	117.7	0.0	NA	NA	NA	NA	NA
28.00	3050	92.9	0.0	NA	NA	NA	NA	NA
32.00	1832	65.2	0.0	NA	NA	NA	NA	NA
36.00	822	34.4	0.0	NA	NA	NA	NA	NA
40.00	0	0.0	0.0	NA	NA	NA	NA	NA

ROUND

SUMMARY OF FORCES AND MOMENTS

Elevation (ft)	M_y (ft-lbs)	M_x (ft-lbs)	Torsion (ft-lbs)	Shear (lbs)	Axial (lbs)	Deflection (in)
Grade	16967	0	0	633	510	0.0
0.00	16967	0	0	633	510	0.0
4.00	14512	0	0	595	445	0.3
8.00	12202	0	0	555	384	0.8
12.00	10049	0	0	514	328	1.4
16.00	8059	0	0	473	276	2.3
20.00	6237	0	0	429	229	3.5
24.00	4594	0	0	382	186	5.1
28.00	3143	0	0	332	148	7.3
32.00	1898	0	0	278	114	10.6
36.00	857	0	0	228	85	15.4
40.00	0	0	0	0	0	23.2

P-Δ Factor = 1.45

STRESSES & COMBINED STRESS RATIO

Elevation (ft)	Bending fb f_b (psi)	Transv. Shear f_{vb} (psi)	Torsional Shear f_{vt} (psi)	Axial f_a (psi)	CSR
0					
0.00	19546	256	0	103	0.41
4.00	19188	257	0	96	0.40
8.00	18706	258	0	89	0.39
12.00	18076	260	0	83	0.38
16.00	17245	260	0	76	0.36
20.00	16143	260	0	69	0.34
24.00	14672	257	0	63	0.31
28.00	12697	251	0	56	0.26
32.00	10004	240	0	49	0.21
36.00	6140	230	0	43	0.13
40.00	0	0	0	0	0.00

ROUND

ANCHOR BOLTS

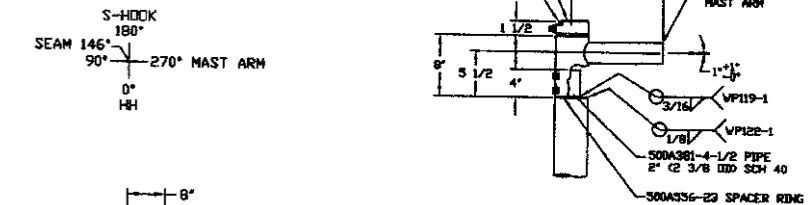
Bolt No.	Calculated Forces		Calculated Stresses		Allowable Stresses		CSR
	Axial (lbs)	Shear (lbs)	Axial (psi)	Shear (psi)	Axial (psi)	Shear (psi)	
4	17095	158	28221	261	43890	21945	0.41
3	127	158	210	261	43890	21945	0.00
2	-16840	158	-27800	261	36575	21945	0.58
1	127	158	210	261	43890	21945	0.00

T-BASE BOLTS

Bolt No.	Calculated Forces		Calculated Stresses		Allowable Stresses		CSR
	Axial (lbs)	Shear (lbs)	Axial (psi)	Shear (psi)	Axial (psi)	Shear (psi)	

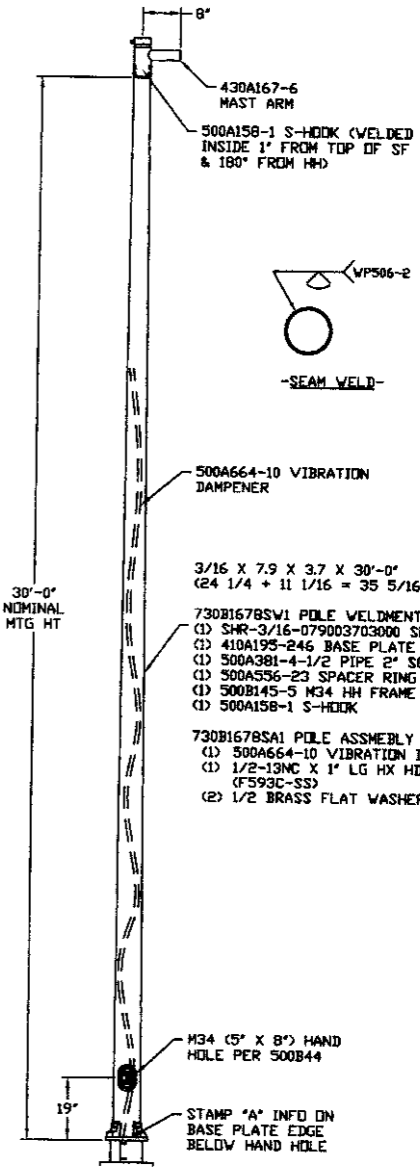
BASE PLATE

Bend Line Length (in) =	8.37
Bend Line Section Modulus (in^3) =	1.40
Bolt Moment Arm (in) =	1.7
Moment (in-lbs) =	29061
Bending Stress (psi) =	20831
Allowable Bending Stess (psi) =	35910
CSR =	0.58

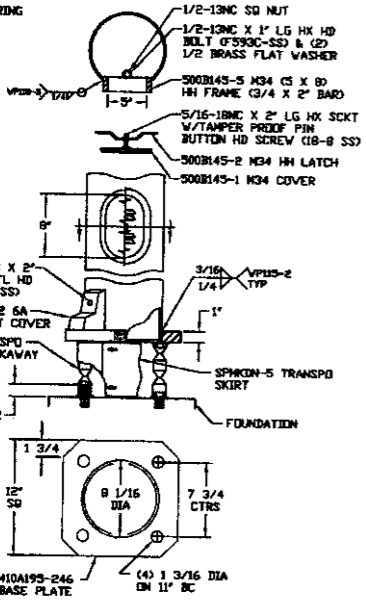


-POLE TOP DETAIL-

3/15/13



-SEAM WELD-



-POLE BASE & HAND HOLE DETAIL-

NOTE:

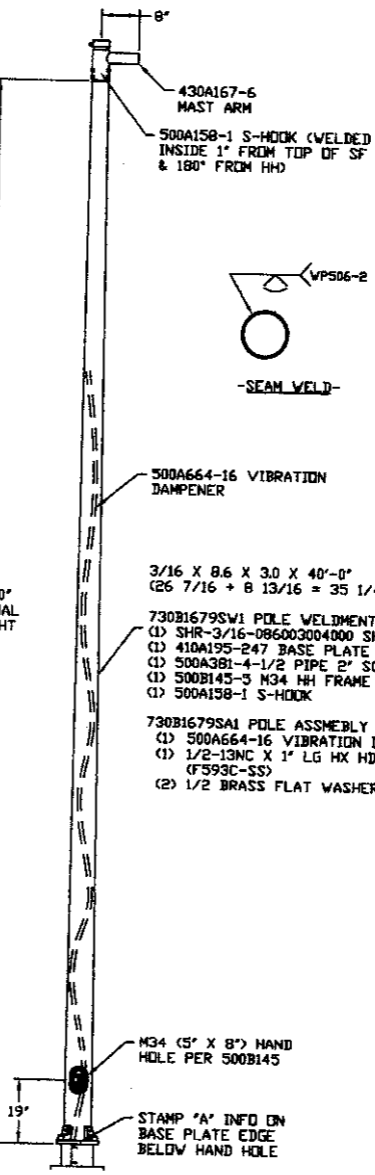
1. POLE MATERIAL--HIGH STRENGTH LOW ALLOY STEEL 55,000 PSI MIN YIELD PER ASTM A1011.
2. BASE PLATE MATERIAL 36,000 PSI MIN YIELD PER ASTM A36.
3. STEEL PLATE GREATER THAN 1/2 THICK MUST MEET FRACTURE CRITICAL IMPACT TEST ENERGY REQUIREMENTS FOR ZONE 3 GIVEN IN ASTM A709.
4. DO NOT GROUT BETWEEN BASE PLATE AND FOUNDATION. AIR MUST BE ALLOWED TO FLOW THROUGH THE POLE TO PREVENT MOISTURE INSIDE THE POLE.
5. THE POLE, MAST ARM AND THE FOLLOWING PARTS ARE SHIPPED UNASSEMBLED:
   (1) 500B145-1 M34 HH COVER
   (1) 500B145-2 M34 HH LATCH
   (1) 5/16-18NC 2" LG HX SCKT W/TAMPER PROOF PIN BUTTON HD SCREW (18-8 SS)
   (4) 1/2-13NC X 1" LG HX SCKT CUP PT SET SCREW (18-8 SS)
   (4) 57082 6A CAST ALUMINUM NUT COVER
   (4) 5/16-18NC X 2" LG HX SCKT FL HD SCREW (18-8 SS)
   (4) 4100 TRANSPO BREAKAWAY COUPLING
   (1) SPMKDN-5 TRANSPO SKIRT
   (1) 590A51 TENON CAP
6. FINISH-BLAST CLEANED TO SSPC SP6, THEN HOT DIP GALVANIZED PER ASTM A123

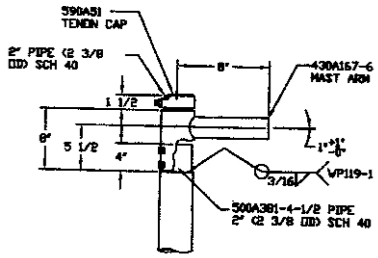
ITEM #634.2102 →

730B1678-1	6	A36A1011 7GA7937	7RABD7937300-1S24-1H8-NC-ME
PART NO	QTY	"A" BASE PLATE STAMPING INFO	DESCRIPTION

NDOT YARMOUTH PARK & RIDE, I-295 EXIT 15, IM-1108(600) EXIT 15, CM-1749(000) PARK & RIDE LOT
MILLERBERND SALES ORDER #49309

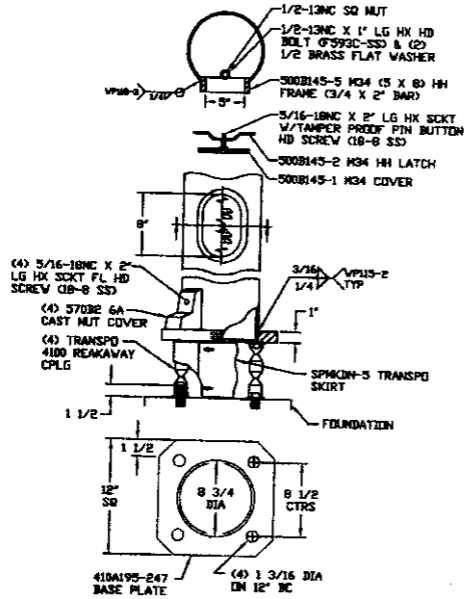
DWN: DOUG F.	7RABD7937300-1S24-1H8-NC-ME	
DATE: 3-8-13	ROUND LIGHTING STANDARD	
CHK: JAMIE D.	Millerbernd MANUFACTURING CO. WINSTED, MN	730B1678
SCALE: NTS		





-POLE TOP DETAIL-

-SEAM WELD-



-POLE BASE & HAND HOLE DETAIL-

NOTE:

1. POLE MATERIAL-HIGH STRENGTH LOW ALLOY STEEL 55,000 PSI MIN YIELD PER ASTM A1011.
2. BASE PLATE MATERIAL 36,000 PSI MIN YIELD PER ASTM A36.
3. STEEL PLATE GREATER THAN 1/2 THICK MUST MEET FRACTURE CRITICAL IMPACT TEST ENERGY REQUIREMENTS FOR ZONE 3 GIVEN IN ASTM A709.
4. DO NOT GROUT BETWEEN BASE PLATE AND FOUNDATION. AIR MUST BE ALLOWED TO FLOW THROUGH THE POLE TO PREVENT MOISTURE INSIDE THE POLE.
5. THE POLE, MAST ARM AND THE FOLLOWING PARTS ARE SHIPPED UNASSEMBLED:
   (1) 500B145-1 M34 HH COVER
   (1) 500B145-2 M34 HH LATCH
   (1) 5/16-18NC 2" LG HX SCKT W/TAMPER PROOF PIN BUTTON HD SCREW (18-8 SS)
   (4) 1/2-13NC X 1" LG HX SCKT CUP PT SET SCREW (18-8 SS)
   (4) 57032 6A CAST ALUMINUM NUT COVER
   (4) 5/16-18NC X 2" LG HX SCKT FL HD SCREW (18-8 SS)
   (4) 4100 TRANSPO BREAKAWAY COUPLING
   (1) SPMKDN-5 TRANSPO SKIRT
   (1) 590A51 TENON CAP
6. FINISH-BLAST CLEANED TO SSPC SP6, THEN HOT DIP GALVANIZED PER ASTM A123.

STATE OF MAINE
David N. Fritz
10976
LICENSED PROFESSIONAL ENGINEER

3/15/13

ITEM #634.2101

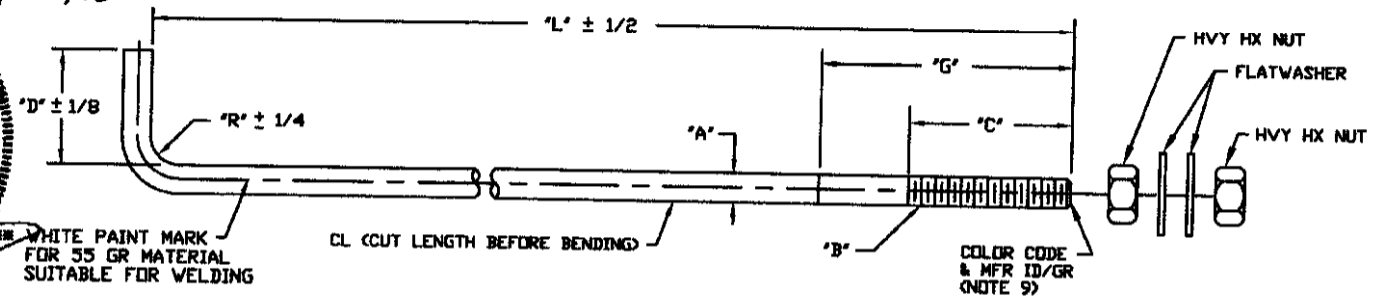
730B1679-1	48	A36A1011 7GA8630	7RABDB630400-1S24-1H8-NC-ME
PART NO	QTY	BASE PLATE STAMPING INFO "A"	DESCRIPTION

MDOT YARMOUTH PARK & RIDE, I-295 EXIT 15, IM-1108(600) EXIT 15, CM-1749(000) PARK & RIDE LOT
MILLERBERND SALES ORDER #49309

DWN: DOUG F.	7RABD8630400-1S24-1H8-NC-ME	
DATE: 3-8-13	ROUND LIGHTING STANDARD	
CHK: JAMIE D.	Millerbernd MANUFACTURING CO. WINSTED, MN	730B1679
SCALE: NTS		

3/15/13

STATE OF MAINE
David N. Fritz
10976
LICENSED PROFESSIONAL ENGINEER



WASHERS NOT INCLUDED

NOTES:

1. HIGH STRENGTH STEEL ANCHOR BOLT PER ASTM F1554 GRADE 105 MATERIAL - QUENCHED AND TEMPERED COLD DRAWN STRESS-RELIEVED (SAE 4140) ROD WITH 105,000 PSI MIN YIELD AND 125,000 - 150,000 PSI TENSILE STRENGTH, 15% MIN ELONGATION AND 45% MIN REDUCTION OF AREA

* LOW STRENGTH STEEL ANCHOR BOLT PER ASTM F1554 GRADE 36

MATERIAL - ASTM A36 ROD WITH 36,000 PSI MIN YIELD AND 58,000 - 80,000 PSI TENSILE STRENGTH

*** ANCHOR BOLT PER F1554 GRADE 55 MATERIAL - 55,000 PSI MIN YIELD, 75,000 - 95,000 PSI TENSILE STRENGTH AND SUITABLE FOR WELDING

*** PAINT A WHITE MARK ON THE SIDE OF THE BOLT NEAR THE HOOK END (PER SUPP-S1) TO DESIGNATE GRADE 55 MATERIAL SUITABLE FOR WELDING

2. HOT DIP GALVANIZE PER ASTM A153.

3. THREAD TO BE CLASS 2A PER AMERICAN STD. B 1.1 .030 OVER SIZE AFTER GALVANIZING

4. ALL BOLTS ROLLED THREAD EXCEPT 1/2 (ITEM 7)

5. GALVANIZED HEAVY HEX NUTS (A563GV) PER ASTM A563 GR DH (.030 OVER SIZE) OR (A194 2H EQUIVALENT)

* NUTS (A563GV) FOR LOW STRENGTH ANCHOR BOLTS PER ASTM A563 GR A

6. NO WELDING IS ALLOWED ON ANCHOR BOLTS

7. GALVANIZED FLAT WASHERS PER ASTM F436.

9. THE END OF ANCHOR BOLT TO PROJECT FROM THE CONCRETE PAINTED PER COLOR CODE AND STAMPED WITH NAME OF MANUFACTURER (PER SUPP-S2) AND GRADE (PER SUPP-S3)

GRADE	COLOR CODE	MFR ID/GR
36	BLUE	MFR ID/AB36
55	YELLOW	MFR ID/AB55
105	RED	MFR ID/AB105

PART NO BOLT (ONLY)	PART NO BOLT W/2 NUTS	PART NO BOLT W/2 NUTS & 2 FLAT WASHERS	PART NO BOLT W/3 NUTS	PART NO BOLT W/3 NUTS & 2 FLAT WASHERS	"A" ROD DIA	CL	"B" THD SIZE	"C" EFF MIN THD LG	"D" LENGTH BENT END	"G" MIN LG OF GALV	"L" LENGTH	"R" RADIUS	COLOR CODE (NOTE 9)	MFR ID & GRADE (NOTE 9)	QTY BOLTS	QTY NUTS	QTY FLAT WASHERS	QTY LOCK WASHERS
* 460A12-1	460A12-1DN	460A12-1DNW	460A12-1TN	460A12-1TNW	.68	27"	3/4-10	3 1/2	3 1/4	FULLY	24 1/8	3/4	BLUE	MFR ID/AB36				
*** 460A12-2	460A12-2DN	460A12-2DNW	460A12-2TN	460A12-2TNW	.91	40"	1-8	8"	4"	FULLY	36"	2 1/2	YELLOW	MFR ID/AB55	216	432	-----	-----
460A12-3	460A12-3DN	460A12-3DNW	460A12-3TN	460A12-3TNW	.91	40"	1-8	8"	4"	12"	36"	2 1/2	RED	MFR ID/AB105				
*** 460A12-4	460A12-4DN	460A12-4DNW	460A12-4TN	460A12-4TNW	1.148	48"	1 1/4-7	8"	4"	FULLY	44 3/8	2 1/2	YELLOW	MFR ID/AB55				
460A12-5	460A12-5DN	460A12-5DNW	460A12-5TN	460A12-5TNW	1.148	48"	1 1/4-7	8"	4"	12"	44 3/8	2 1/2	RED	MFR ID/AB105				
460A12-6	460A12-6DN	460A12-6DNW	460A12-6TN	460A12-6TNW	1.381	60"	1 1/2-6	8"	6 1/4	12"	55 3/4	3 3/8	RED	MFR ID/AB105				
* 460A12-7	460A12-7DN	460A12-7DNW	460A12-7TN	460A12-7TNW	.50	12"	1/2-13	2 1/4	1 1/2	FULLY	10 3/8	1/2	BLUE	MFR ID/AB36				
460A12-8	460A12-8DN	460A12-8DNW	460A12-8TN	460A12-8TNW	1.845	96"	2-4 1/2	10"	6 1/2	14"	89 3/4	2 1/2	RED	MFR ID/AB105				
460A12-9	460A12-9DN	460A12-9DNW	460A12-9TN	460A12-9TNW	1.613	90"	1 3/4-5	12"	6"	14"	84"	3 1/2	RED	MFR ID/AB105				
460A12-10	460A12-10DN	460A12-10DNW	460A12-10TN	460A12-10TNW	1.845	90"	2-4 1/2	12"	6"	14"	84"	4"	RED	MFR ID/AB105				

NOTE: ANCHOR BOLTS CRITERIA ASTM A576 GR 1541 IS NO LONGER AVAILABLE OR LISTED BY ASTM. IT HAS BEEN REPLACED BY ASTM F1554 GRADE 105 WITH 105,000 PSI MIN YIELD

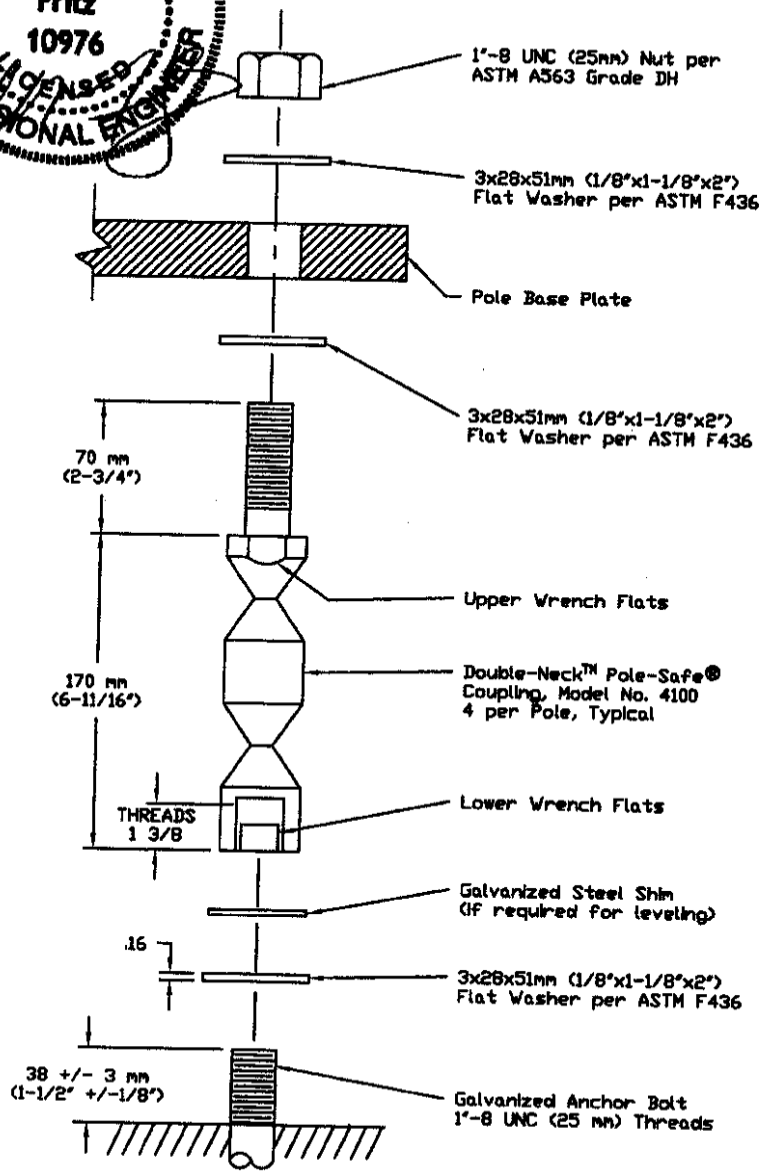
REV 8-9-10 ADD MFR ID & GR STAMPING AND WHITE PAINT MARKING FOR 55 GR MAT'L SUITABLE FOR WELDING
REV 9-2-09 REMOVED BUCKET FROM -9 & -10
REV 5-13-09 REMOVED LOCKWASHER FROM DRAWING
REV 4-30-07 CHG DIA & "L" LENGTH TO INSIDE EDGE
REV 12-11-06 CHANGE 460A12-2 & -4 TO F1554 GR 55
REV 9-6-06 CHANGE 460A12-9 "C" FROM 10" TO 12"
REV 10-8-04 ADDED COLOR CODE
REV 2-13-03 UPDATE NOTE 1
REV 5-2-02 -1, -2, -4 & -7 TO FULLY GALVANIZED
REV 1-20-98 REV 7-12-00 12" TO 40" REV 9-19-00 REV 2-6-01

MDOT YARMOUTH PARK & RIDE, I-295 EXIT 15, IM-1108(600) EXIT 15, CM-1749(000) PARK & RIDE LOT / MILLERBERND SALES ORDER #49309

DWN: FLOYD F.	ANCHOR BOLTS
DATE: 10-14-85	
CHK: GERRY N.	Millerbernd MANUFACTURING CO. WINSTED, MN — 460A12
SCALE: NTS	

STATE OF MAINE
David N. Fritz
10976
LICENSED PROFESSIONAL ENGINEER

3/15/13



Patent No. 5,474,408 2/00

SPECIFICATIONS

Performance Criteria:

1. Double-Neck™ Pole-Safe® conforms to AASHTO "Standard specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals."
2. Double-Neck™ Pole-Safe® has been crash-tested and FHWA approved in accordance with the requirements of NCHRP Report 350, "Recommended Procedures for the Safety Performance Evaluation of Highway Features."
3. Maximum Allowable Pole Mass: 450 kg (992 LB.) (total, including fixtures).

Physical Properties per Coupling:

1. Ultimate Tensile Strength = 221.5 kN (49.8 kips), minimum.
2. Tensile Yield Strength = 192.0 kN (43.2 kips), minimum.
3. Ultimate Restrained shear Strength = 24.5 kN (5.5 kips), minimum.

Corrosion Protection:

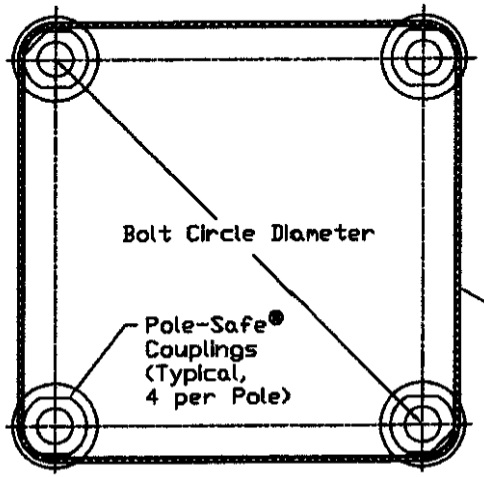
1. All Double-Neck™ Pole-Safe® couplings, nuts, bolts, washers, and shims are galvanized after fabrication in accordance with ASTM A153.

QTY 54 (SET OF 4)

JOB MDOT YARMOUTH PARK & RIDE, I-295 EXIT 15, IM-1108(600)
EXIT 15, CM-1749(000) PARK & RIDE LOT / MMC #49309

Pole-Safe® Model No. 4100
Breakaway Support System for Light Poles

TRANSPO® INDUSTRIES, Inc.
The Smart Solutions Company
20 Jones Street
New Rochelle, NY 10801
914-636-1000



STATE OF MAINE
David
N.
Fritz
10976
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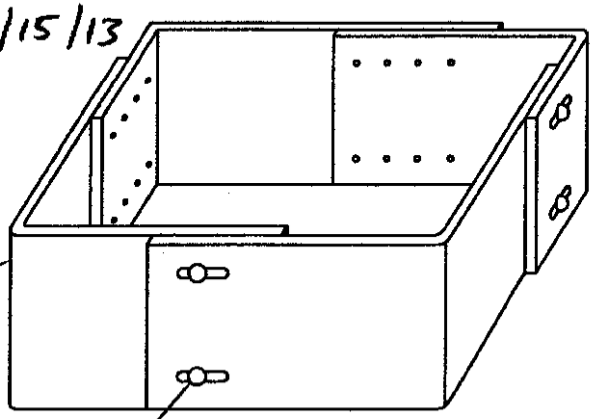
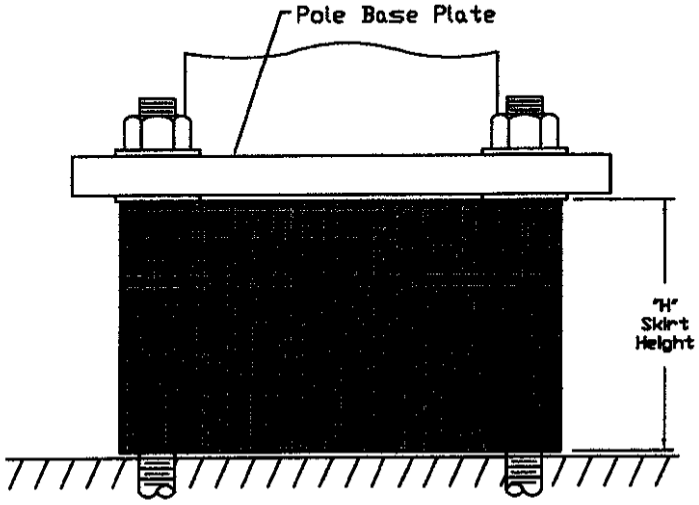
PROFESSIONAL ENGINEER

3/15/13



Pole-Safe® Skirt
3003-H14 Aluminum Sheet,
1.6 mm (1/16") Thick
(4 panels per Skirt)

#10 x 10 mm (#10x3/8")
Stainless Steel Sheet Metal
Screw, Typical, 8 per Skirt



Pole-Safe® Model No.	QTY (SET OF 4 WITH 8 SCREWS)	Bolt Circle Diameter		"H" Skirt Height mm (in.)
		Skirt Part No. 254 mm to 380 mm (10" TO 15" BC)	Skirt Part No. 380 mm to 500 mm (15" TO 20" BC)	
4062		SPMKDN-4	———	146 (5-3/4)
		———	SPMKDN-4L	
4075		SPMKDN-4	———	146 (5-3/4)
		———	SPMKDN-4L	
4100	54	SPMKDN-5	———	168 (6-5/8)
		———	SPMKDN-5L	
4125		SPMKDN-5	———	168 (6-5/8)
		———	SPMKDN-5L	
5062		SPMKDN-1	———	108 (4-1/4)
		———	SPMKDN-1L	
5075		SPMKDN-1	———	108 (4-1/4)
		———	SPMKDN-1L	
5100		SPMKDN-2	———	127 (5")
		———	SPMKDN-2L	
5125		SPMKDN-3	———	133 (5-1/4)
		———	SPMKDN-3L	

MDOT YARMOUTH PARK & RIDE, I-295 EXIT 15, IM-1108(600)EXIT 15, CM-1749(000) PARK & RIDE LOT / MILLERBERND SALES ORDER #49309

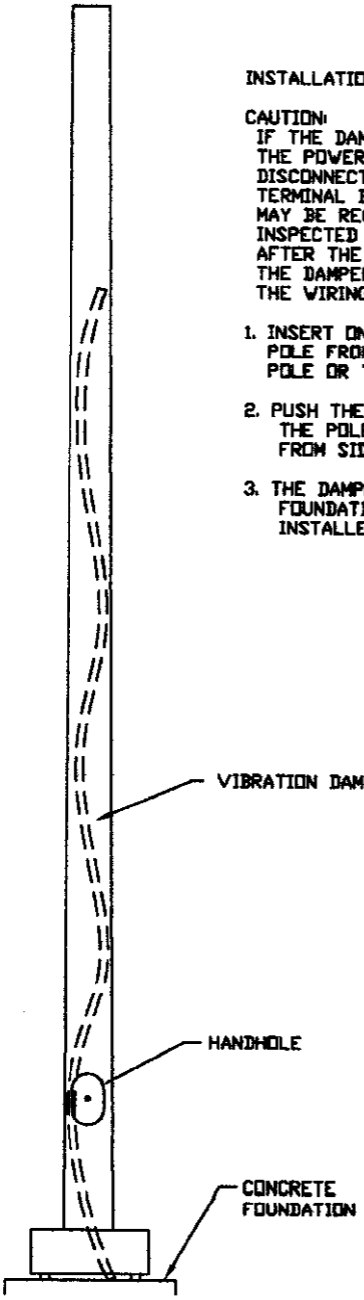
INTALLATION INSTRUCTIONS

1. Place 4 skirt panels around Pole-Safe Couplings using overlap configuration shown. All 4 sides of the skirt box should have 2 slots facing outside.
2. Thread 8 sheet metal screws through the outside slots into the closest corresponding holes in the adjacent inside panel.
3. Position panels snug against the Pole-Safe Couplings.
4. Tighten all 8 sheet metal screws

Pole-Safe® Skirt Details
Breakaway Support System for Light Poles

TRANSPO®
INDUSTRIES, Inc.
The Smart Solutions Company

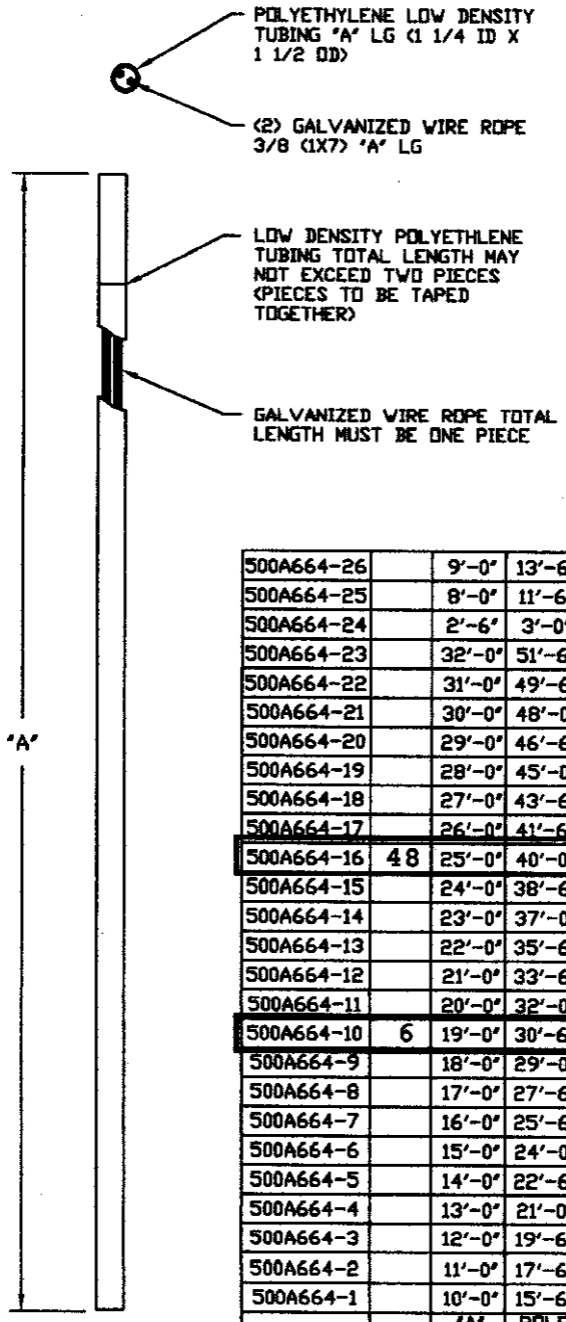
20 Jones Street
New Rochelle, NY 10801
914-636-1000



INSTALLATION PROCEDURE:

CAUTION:
IF THE DAMPENER IS FIELD INSTALLED THE POWER TO THE POLE SHOULD BE DISCONNECTED. TEMPORARY REMOVAL OF TERMINAL BLOCK AND FUSE ASSEMBLIES MAY BE REQUIRED. THE POLE SHOULD BE INSPECTED BY AN AUTHORIZED ELECTRICIAN AFTER THE INSTALLATION TO MAKE SURE THE DAMPENER IS NOT INTERFERING WITH THE WIRING AND ELETRICAL COMPONENTS

1. INSERT ONE END OF THE DAMPENER INTO POLE FROM EITHER THE BOTTOM OF THE POLE OR THRU THE HANDHOLE
2. PUSH THE DAMPENER COMPLETELY INTO THE POLE (THE DAMPENER SHOULD LOOP FROM SIDE TO SIDE INSIDE OF THE POLE
3. THE DAMPENER SHOULD REST ON THE FOUNDATION WHEN IT IS PROPERLY INSTALLED IN THE FIELD



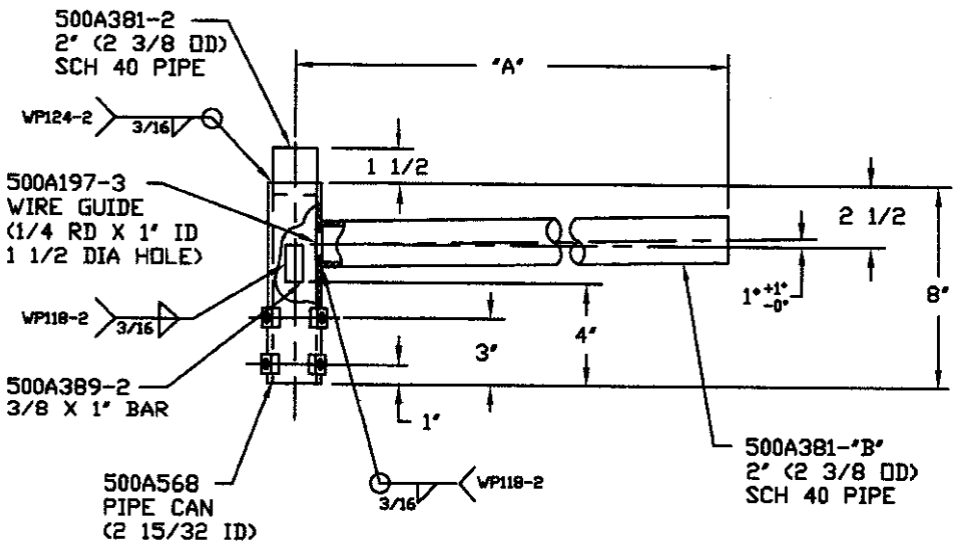
PART NO	QTY	'A' LG	POLE HEIGHT
500A664-26		9'-0"	13'-6"
500A664-25		8'-0"	11'-6"
500A664-24		2'-6"	3'-0"
500A664-23		32'-0"	51'-6"
500A664-22		31'-0"	49'-6"
500A664-21		30'-0"	48'-0"
500A664-20		29'-0"	46'-6"
500A664-19		28'-0"	45'-0"
500A664-18		27'-0"	43'-6"
500A664-17		26'-0"	41'-6"
500A664-16	48	25'-0"	40'-0"
500A664-15		24'-0"	38'-6"
500A664-14		23'-0"	37'-0"
500A664-13		22'-0"	35'-6"
500A664-12		21'-0"	33'-6"
500A664-11		20'-0"	32'-0"
500A664-10	6	19'-0"	30'-6"
500A664-9		18'-0"	29'-0"
500A664-8		17'-0"	27'-6"
500A664-7		16'-0"	25'-6"
500A664-6		15'-0"	24'-0"
500A664-5		14'-0"	22'-6"
500A664-4		13'-0"	21'-0"
500A664-3		12'-0"	19'-6"
500A664-2		11'-0"	17'-6"
500A664-1		10'-0"	15'-6"

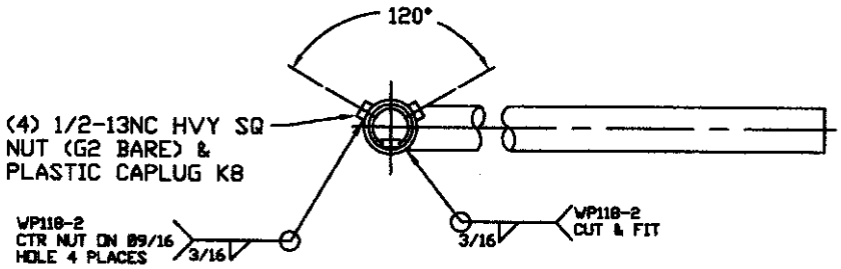
STATE OF MAINE
David N. Fritz
10976
LICENSED PROFESSIONAL ENGINEER

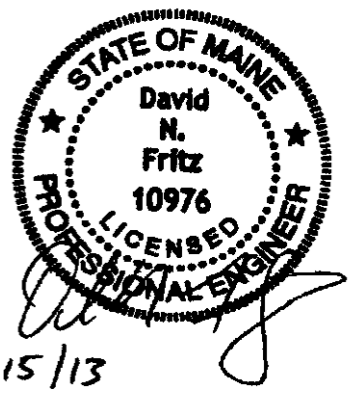
3/15/13

MDOT YARMOUTH PARK & RIDE, I-295 EXIT 15, IM-1108(600) EXIT 15, CM-1749(000) PARK & RIDE LOT / MILLERBERND SALES ORDER #49309

DWN: DAVE V.	POLY/CABLE VIBRATION DAMPENER ASSY FOR 15' THRU 50' POLES	
DATE: 5-13-03		
CHK:	Millerbernd MANUFACTURING CO. WINSTED, MN	500A664
SCALE: NTS		







3/15/13

NOTE:

1. PIPE MATERIAL- HI-Y50 STRUCTURAL PIPE 50,000 PSI MIN YIELD PER ASTM A500 GRB (A618 GR3 IF SELF WEATHERING)

3. THE FOLLOWING PARTS WILL BE SHIPPED UNASSEMBLED:
   (4) 1/2-13NC X 1" LG HX SCKT CUP PT SET SCREW (18-8 SS)
   (1) 2 3/8 FLEX CAP (SC SHORT BLACK)

3. FINSIH-BLAST CLEANED TO SSPC SP6, THEN HOT DIP GALVANIZED PER ASTM A123

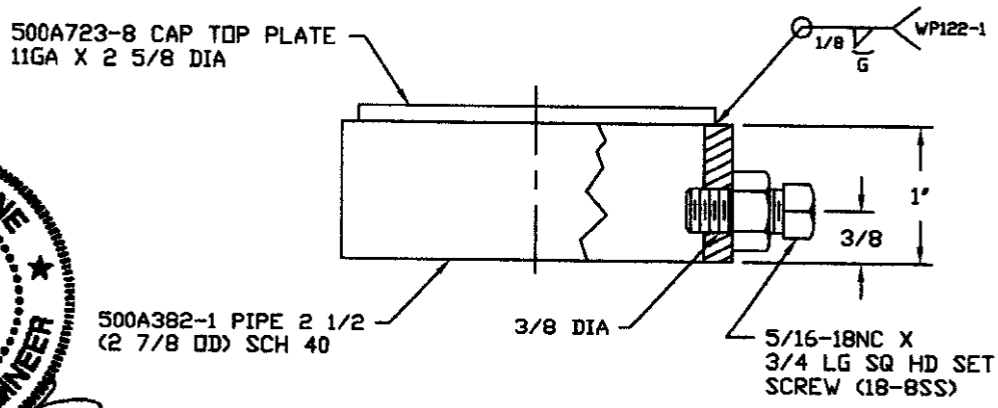
PART NO	QTY	"A"	"B"	MODEL NO
430A167-6	54	8"	6 3/4	1S24/1H8
430A167-5		20"	18 3/4	1S24/1H20
430A167-4		72"	70 3/4	1S24/1H72
430A167-3		36"	34 3/4	1S24/1H36
430A167-2		24"	22 3/4	1S24/1H24
430A167-1		12"	10 3/4	1S24/1H12

MDOT YARMOUTH PARK & RIDE, I-295 EXIT 15, IM-1108(600) EXIT 15, CM-1749(000)

PARK & RIDE LOT / MILLERBERND SALES ORDER #49309

REV 4-11-06 MADE "B" 1/4 SMALLER
REV 6-17-02 CHG 2" PIPE FROM 1-1/2LG TO 2"LG
REV 4-19-02 PUT 1" ON ARM
REV 4-18-02 UPDATED FOR M2M
REV 6-8-01 ADD 6' ARM
REV 5-17-01 ADD 1' & 2' ARM
REV 12-14-00 3/4 - 1", 2 3/4 - 3"
3 1/2 - 4'
REV 10-4-00 UPDATE

DWN: FLOYD F.	1S24/1H MASTARM FOR 2" PIPE TENON	
DATE: 4-22-96		
CHK: WADE L.	Millerbernd MANUFACTURING CO. WINSTED, MN	430A167
SCALE: NTS		



STATE OF MAINE
David
N.
Fritz
10976
LICENSED
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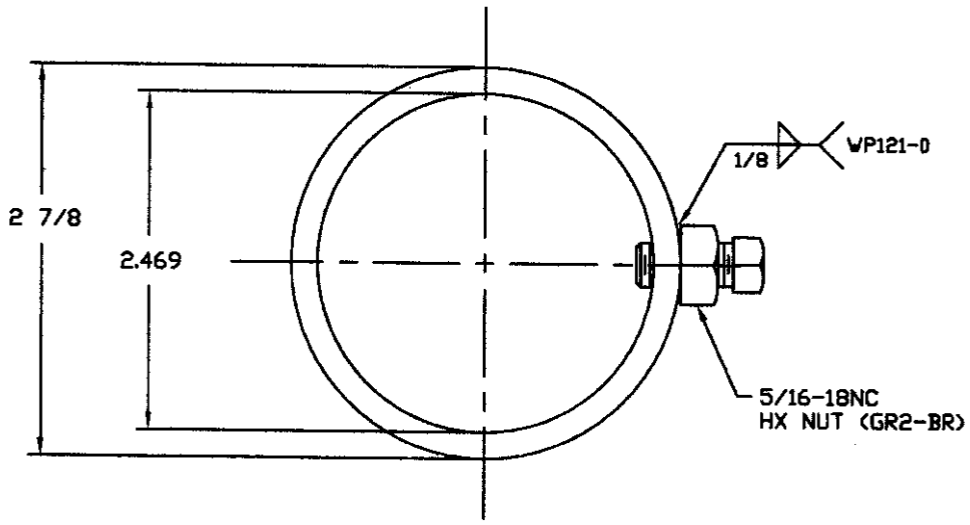
3/15/13



NOTE:

1. PLATE MATERIAL- LOW CARBON STEEL
   36,000 PSI MIN YIELD PER ASTM A36
2. PIPE MATERIAL- LOW CARBON STEEL
   35,000 PSI MIN YIELD PER ASTM A53
3. FINISH- HOT DIP GALVANIZED

QTY.54 →

PART NO	DESCRIPTION
590A51-1	CAP LESS/SET SCREW
590A51	CAP W/SET SCREW

MDOT YARMOUTH PARK & RIDE, I-295 EXIT 15, IM-1108(600) EXIT 15, CM-1749(000) PARK & RIDE LOT / MILLERBERND SALES ORDER #49309

DWN: PAUL F.	TENON CAP FOR 2" PIPE	
DATE: 9-14-06		
CHK: WILL Q.	Millerbernd MANUFACTURING CO. WINSTED, MN	590A51
SCALE: NTS		