
N Wahneta St
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MPH


D
LAN
324
215 319
610-776-7433
lantabus.com
NO STOPPING
BUS STOP
4126

UZMAN ENGINEERING
A: 116 E King Street, Malvern, PA 19355
O: 610.320.2100

JOB TITLE 6263 LANTA SolStop

JOB NO. PA2101 SHEET NO.
CALCULATED BY GRW DATE 8/10/20
CHECKED BY DATE

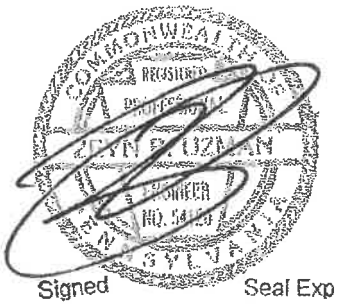
CS2018 Ver 2018.09.10 www.struware.com

STRUCTURAL CALCULATIONS

FOR

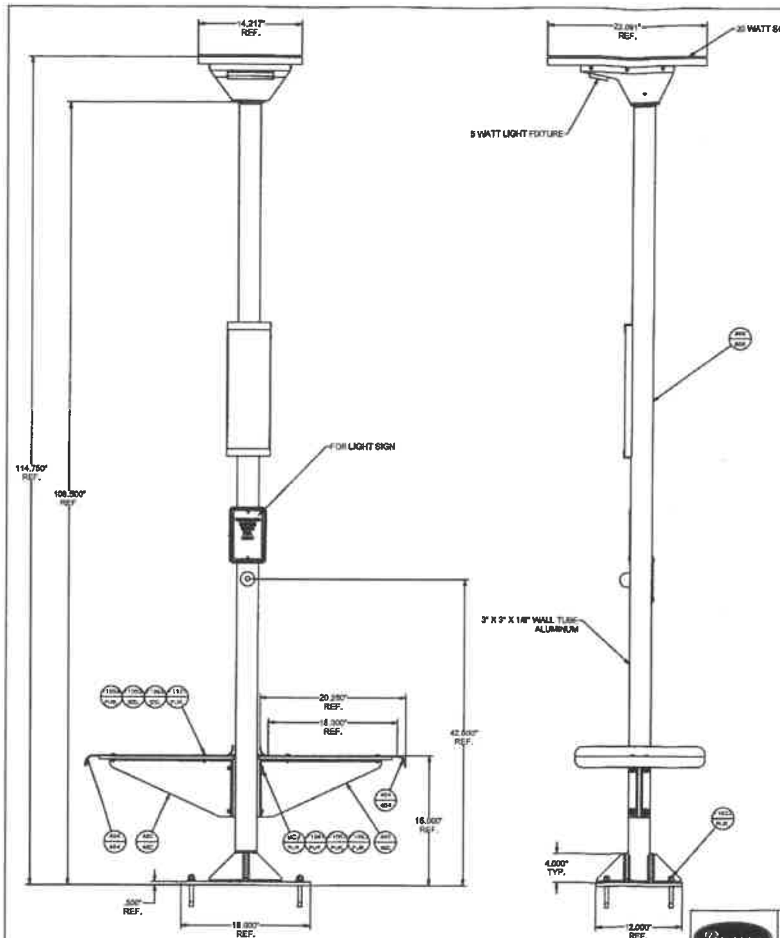
6263 LANTA SolStop

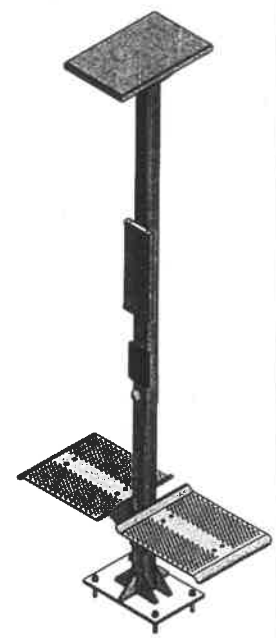
Bethlehem, PA



Signed Seal Exp.

AUG 29 2020 - SEP 30 2021

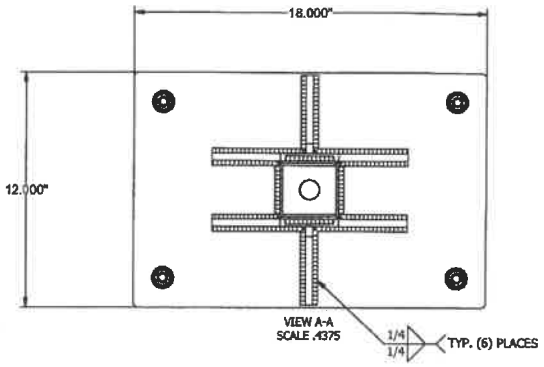


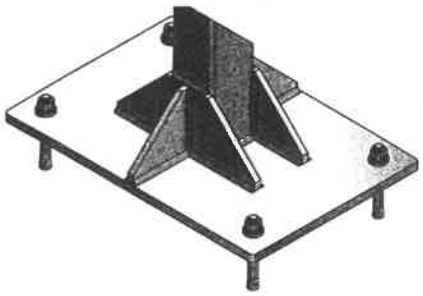


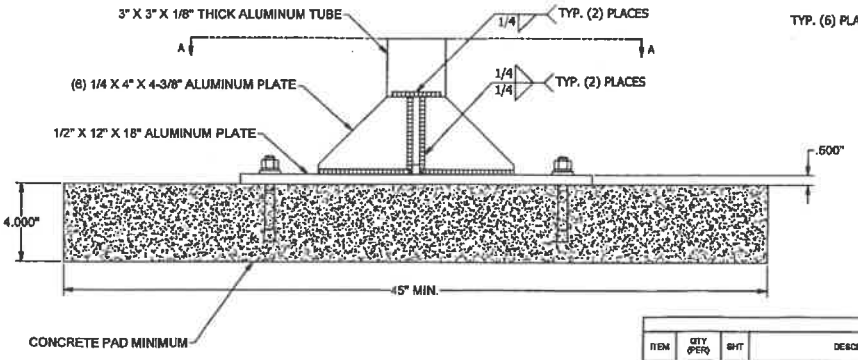
BRASCO INTERNATIONAL SUB ASSEMBLY PARTS LIST						
ITEM	QTY	UNIT	DESCRIPTION	MODEL NUMBER	PART NUMBER	NOTES
[illegible]	1	[illegible]	[illegible] HOLDER ASSY	[illegible]		SEE DWG.
400	2	400	[illegible] ARM WELDMENT	[illegible]		SEE DWG.
404	2	404	[illegible] SEAT	[illegible]	[illegible]	SEE DWG.
[illegible]	1	[illegible]	[illegible]			SEE DWG.
[illegible]	4	PUR.	[illegible] S.S. [illegible] ANCHOR BOLT		[illegible]	
[illegible]	4	STD.	[illegible] S.S. FLAT WASHER		[illegible]	
[illegible]	4	PUR.	[illegible] S.S. FLAT WASHER		[illegible]	
[illegible]	[illegible]	STD.	[illegible] S.S. LOCKWASHER		[illegible]	
[illegible]	[illegible]	PUR.	[illegible] S.S. LOCK WASHER		[illegible]	
[illegible]	4	PUR.	[illegible] S.S. LOCK WASHER		[illegible]	
[illegible]	[illegible]	PUR.	[illegible] S.S. NUT		[illegible]	
[illegible]	4	PUR.	[illegible] S.S. NUT		[illegible]	
[illegible]	[illegible]	PUR.	[illegible] S.S. T[illegible] NUT		[illegible]	
[illegible]	[illegible]	PUR.	[illegible] X 1 S.S. TAMPER RESISTANT BUTTON SOCKET CAP SCREW			
[illegible]	[illegible]	PUR.	[illegible] S.S. SOC. HD. CAP SCREWS		[illegible]	

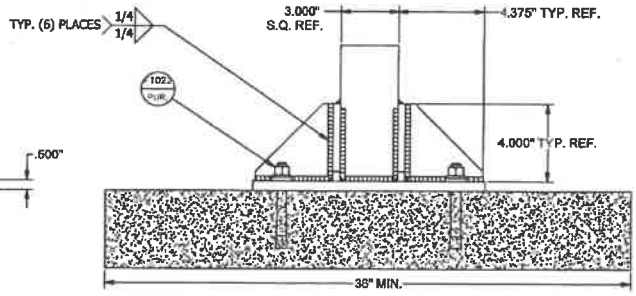
BRASCO INTERNATIONAL, INC. 32400 INDUSTRIAL DR. MADISON HEIGHTS, MICHIGAN 48071 1-800-893-3665 WWW.BRASCO.COM	LANTA		CMP
[illegible]	SOLSTOP SOLAR LIGHTING ASSEMBLY		[illegible]
	SO-20-[illegible]	[illegible]	[illegible]

Seal Exp.
SEP 3 0 2021









BRASCO INTERNATIONAL PARTS LIST

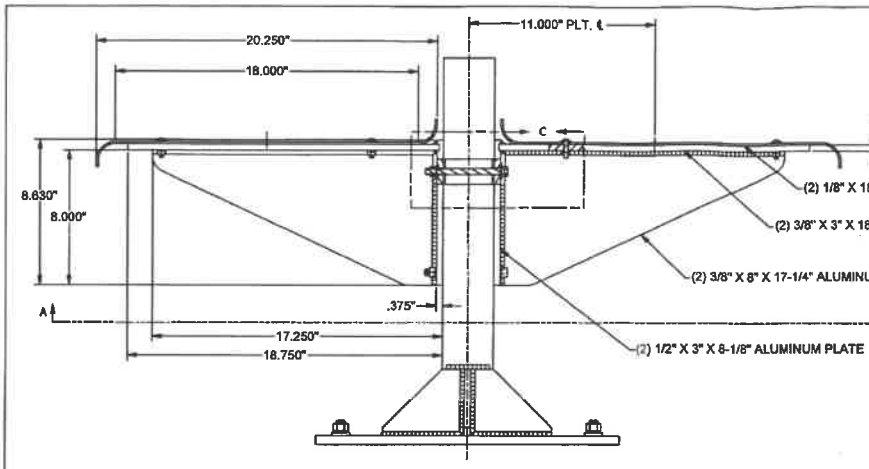
ITEM	QTY (PER)	SHT	DESCRIPTION	MODEL NUMBER	PART NUMBER	STOCK SIZE	MATERIAL	NOTES	PART
F1022	4	PUR.	1/2-13 X 3 3/4" S.S. WEDGE ANCHOR BOLT		F1022		PUR.		
F1058	4	PUR.	1/2" S.S. LOCK WASHER		F1058		PUR.		
F1119	4	PUR.	1/2"-13 S.S. TRIDENT NUT		F1119		PUR.		
001	1	001	SCHEDULER HOLDER ASS'Y	IF-06-18.5					

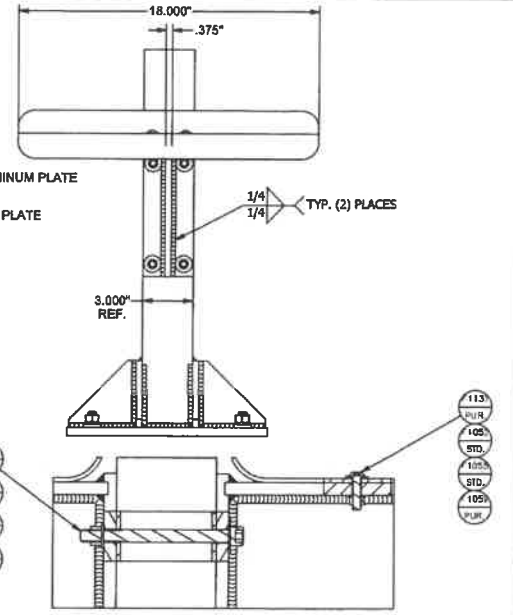
FOUNDATION NOTE:
ALTERNATIVE TO CONCRETE SLAB SHOWN FOR PROPER ANCHORING PURPOSES IS AS FOLLOWS;
CIRCULAR PIER Ø30" X 45" DEEP.

Brasco

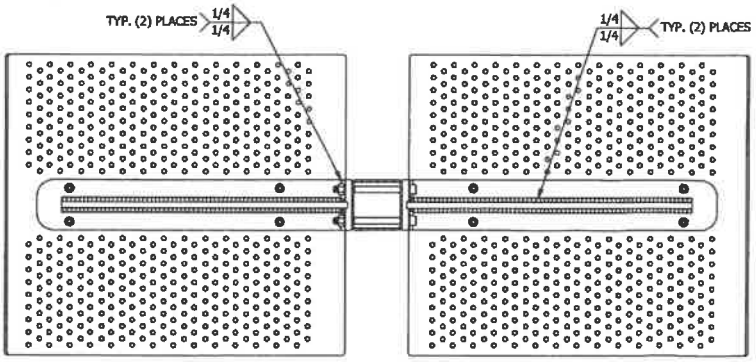
BRASCO INTERNATIONAL, INC.
32400 INDUSTRIAL DR.
MADISON HEIGHTS, MICHIGAN 48071
1-800-853-3865 WWW.BRASCO.COM

CUSTOMER: LANTA
PROJECT: SOLSTOP SOLAR LIGHTING ASSEMBLY
MODEL: ANCHOR ATTACHMENT
JOB: 6263
SHT: 2
REV: A





DETAIL C



SECTION A-A

BRASCO INTERNATIONAL SUB ASSEMBLY PARTS LIST

ITEM	QTY	SHT	DESCRIPTION	MODEL NUMBER	PART NUMBER	NOTES
F1052	8	STD.	1/4" S.S. FLAT WASHER		F1052	
F1055	8	STD.	1/4" S.S. LOCKWASHER		F1055	
F1057	4	PUR.	3/8" S.S. LOCK WASHER		F1057	
F1059	8	PUR.	1/4"-20 S.S. NUT		F1059	
F1061	4	PUR.	3/8"-16 S.S. NUT		F1061	
F1137	8	PUR.	1/4-20 X 1 S.S. TAMPER RESISTANT BUTTON SOCKET CAP SCREW		[illegible]	
MC8	4	PUR.	1/4-20 X 4 1/2" LG. S.S. SOC. HD. CAP SCREW		[illegible]	

BRASCO INTERNATIONAL, INC.
32400 INDUSTRIAL DR.
MADISON HEIGHTS, MICHIGAN 48071
1-800-883-3665 WWW.BRASCO.COM

CUSTOMER: LANTA
CHKD: CMP
PROJECT: SOLSTOP SOLAR LIGHTING ASSEMBLY
DRAWN: [illegible] 08-06-20
MODEL: SEAT ATTACHMENT
6263
3
A

SOLSTOP®

Solar Powered Push Button Light

The SolStop® is an ideal solution for bus stops without seating or adequate security lighting. It provides push button activated lighting through renewable solar energy with minimal to no maintenance required.

Optional accessories include static information displays, digital real-time displays, "push button for light" sign and attached aluminum bench.

Tailor the SolStop® by powder coating it with your agency colors, add decals to the head or pole, and engrave the bench seat with a custom logo.

5W Bright White LED

20W Solar Panel Option

Add-on Perforated Aluminum Bench

Push Button Activation

SOLSTOP®

Brasco's SolStop® is made in the USA and is the highest performing solar bus stop lights available. Expect a pre-wired and pre-assembled unit of exceptional quality & unparalleled off-the-grid performance.

SolStop® Highlights

- Available with or without pole
- Easily branded: powder coat to color(s) of choice
- ADA compliant push button activation
- Add column mounted information displays

Improved Safety & Experience

- Delivers safety and improves ridership confidence
- Transit stop lighting is a crime deterrent
- Reduces ridership pass-bys
- Positions transit agency as green energy leader
- Better illuminates pole-mounted wayfinding

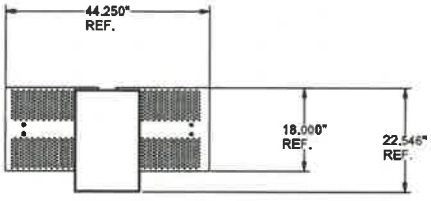
Reduced Operating Costs

- One-time expense, no monthly utility bills
- No trenching needed; reduces installation cost
- 50,000 hour LED operating life span

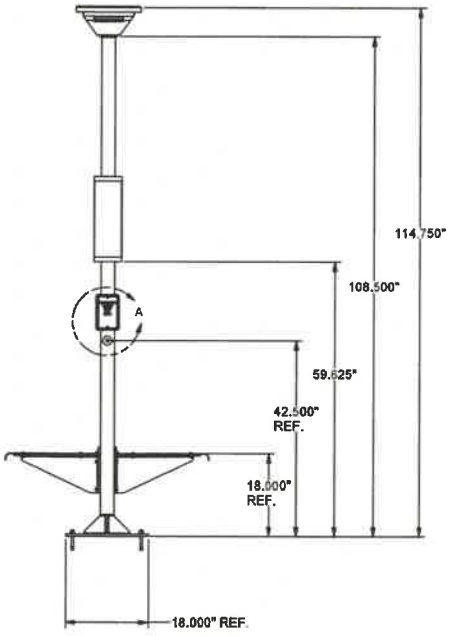
GENERAL SPECIFICATIONS	
Photovoltaic Panel	High Efficiency Multi-crystalline Photovoltaic Module, UL Listed
Operating Temperature	-30° to 50° C (-22° to 122° F)
Panel Sizes	20 Watt
Maximum Operating Voltage	17V
Maximum Operating Current	12V
LED	Cool Tone White Light with High Brightness, 5500K Output Color
Operational Lifetime	Minimum 50,000 Hours
Illumination Level	20+ Foot Candles Peak, 9 Ft. from Source
Brasco Pole Height	9 ft.
Brasco Pole Dimensions	3 in. W x 3 in. W X 1/8" Thick
Existing Pole Acceptance	1.75", 2", 2.5", 3" Square
Maximum Battery Voltage	18V
Maximum Battery Current	12V
Low Voltage Disconnect	Yes, 40% Battery Life Disconnect
Lighting Control	On Demand via Push Button for 5 Minute Increments
Finishing Options	Standard Powder Coat

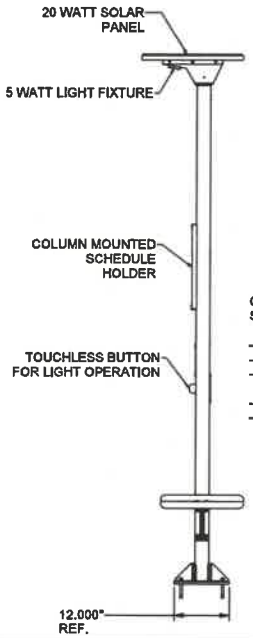
OPTIONAL ACCESSORIES	
"Press Button for Light" Sign	Vinyl Decal on Powder Coated Aluminum Plate
Static Schedule Holders	(1) 6X18", (2) 9X24"
Digital Real Time Display	ConnectPoint® 10", 13", 32" eInk Display
Attached Bench	Two-seat Attached Bench with Perforated Seat
Detached Bench	Select from Brasco's 10 Standard Freestanding Benches
Attached Waste Receptacle	Pole Mounted 10G Perforated Aluminum
Detached Waste Receptacle	Surface Mounted 32G Perforated Aluminum on Pedestal

WARRANTY	
Photovoltaic Panel	3 years
Mounting Hardware	3 years
LED Light Fixture & Light Engine	3 Years
Wire Harnesses and Connectors	3 Years
Solar Charge Controller	3 Years
Solar Batteries	3 Year Proration (0-12 Months: 100%, 13-24 Months: 50%, 25-36 Months: 25% Refunded / Applied)
Powder Coat Finish	3 Years



DETAIL A
SILVER SIGN PLATE WITH
BLACK RAISED TEXT





QUANTITY (2) SOLSTOP ASSEMBLIES THUS:
SPECIFICATIONS:

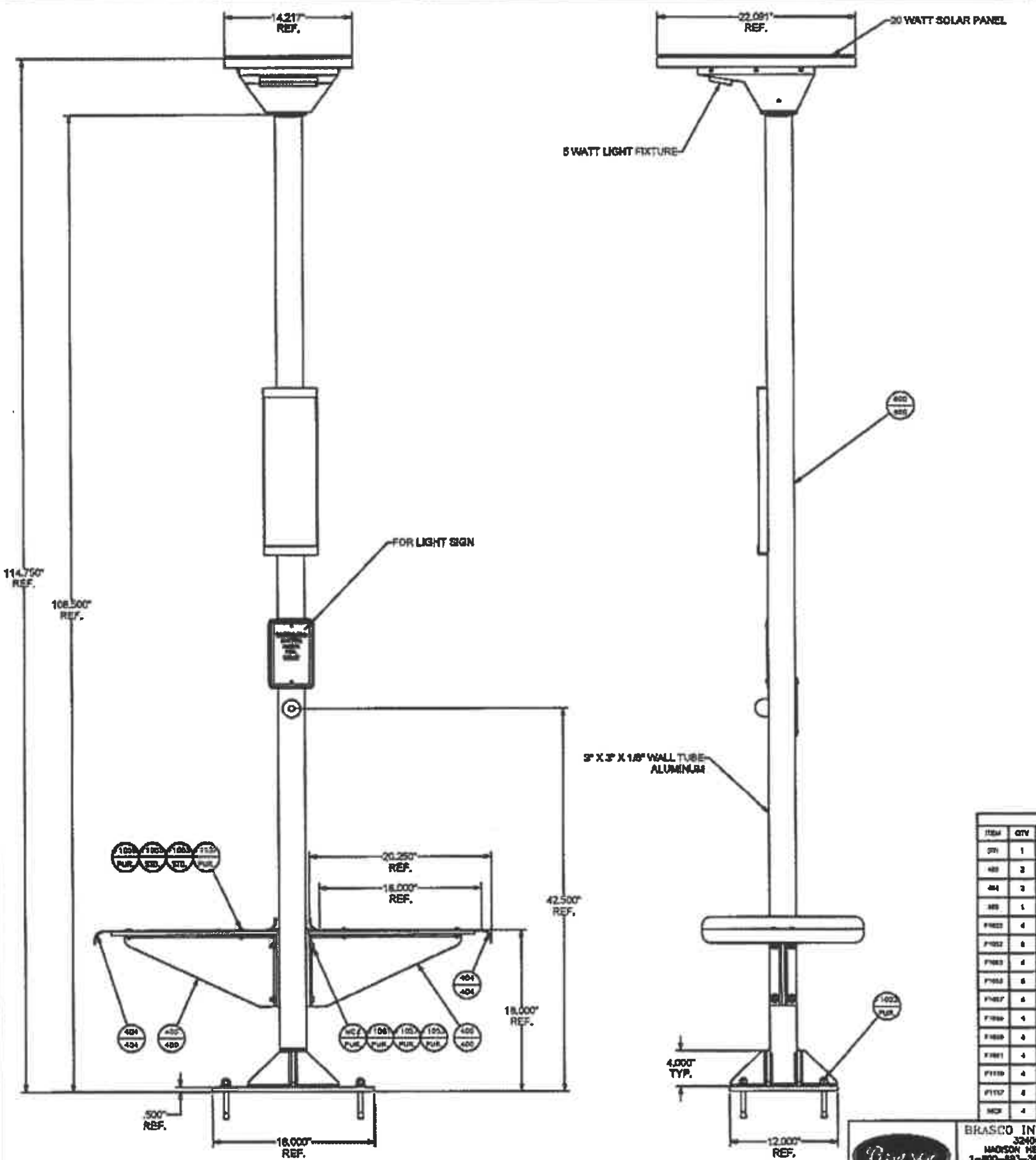
- POWDER COATED ALUMINUM STRUCTURE - RAL TBD
- 20 WATT SOLAR PANEL WITH A 5 WATT LIGHT FIXTURE
- TOUCHLESS ACTIVATED LIGHT (WHITE LIGHT WHEN OFF - GREEN LIGHT WHEN ON) WITH SIGN PLATE
- TWO SEAT PERFORATED ALUMINUM BENCH POWDER COATED - RAL TBD
- COLUMN MOUNTED 6" x 18.5" ALUMINUM SCHEDULE HOLDER

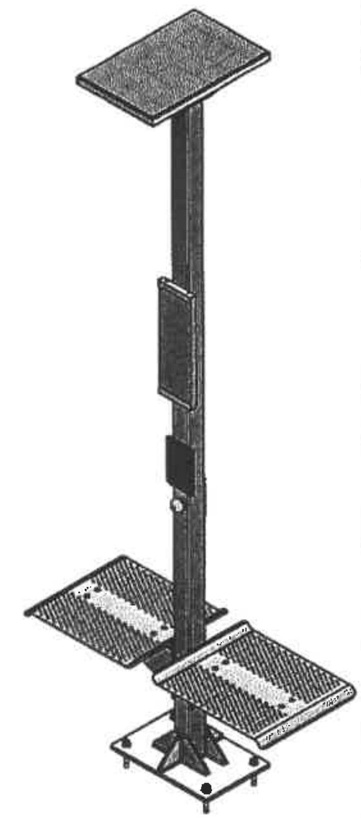
BRASCO INTERNATIONAL, INC.
32400 INDUSTRIAL DRIVE
MADISON HEIGHTS, MICHIGAN 48071
1-800-893-3665 WWW.BRASCO.COM

SIGNED:_____ DATE:_____

BRASCO INTERNATIONAL, INC.
32400 INDUSTRIAL DR.
MADISON HEIGHTS, MICHIGAN 48071
1-800-893-3665 WWW.BRASCO.COM

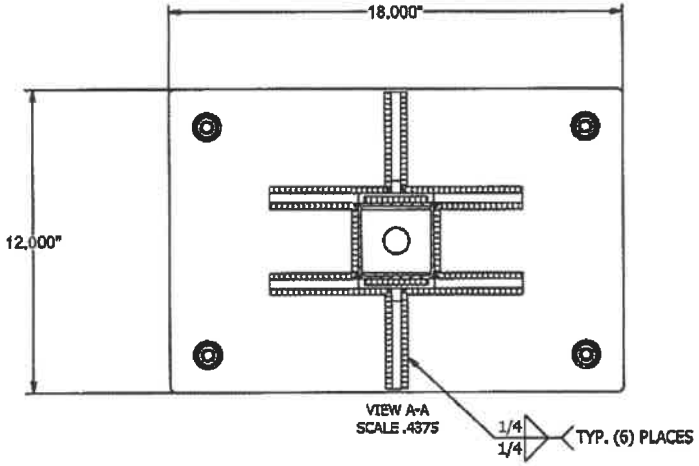
CUSTOMER:			DESIGNER:	CHECKER:
LANTA			CMP	SJT
PROJECT:			DATE:	DATE:
SOLSTOP ASSEMBLY			06-08-20	06-11-20
MODEL:	JOB #	SHEET:	REVISION:	
SO-20-09-2-0-B	6263	001	A	

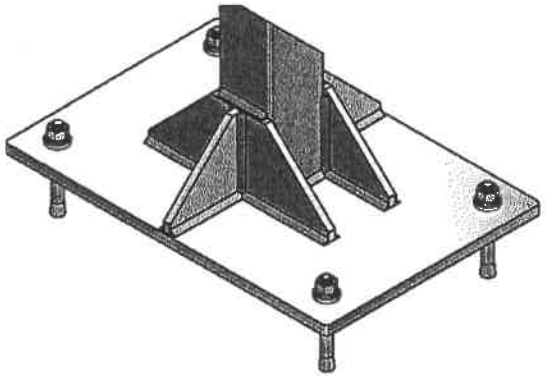


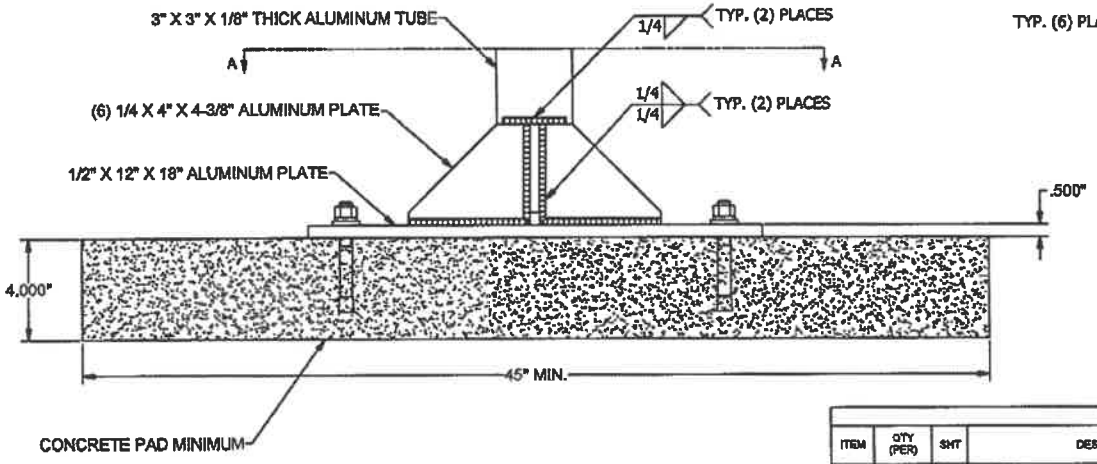


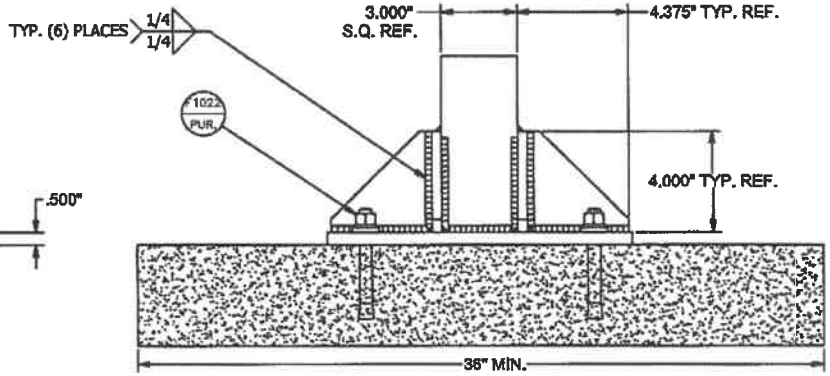
BRASCO INTERNATIONAL SUB ASSEMBLY PARTS LIST						
ITEM	QTY	SHT	DESCRIPTION	MODEL NUMBER	PART NUMBER	NOTES
[illegible]	1	[illegible]	SCHEDULER HOLDER ASSY	[illegible]		SEE DWG.
[illegible]	2	[illegible]	BENCH ARM WELDMENT	SSTP-[illegible]		SEE DWG.
404	2	404	BENCH SEAT	SSTP-404	PERF-AL-125-[illegible] 14 X 22.364, 1/4 X 3/4	SEE DWG.
[illegible]	1	[illegible]	SOLSTOP (SSTP-[illegible])			SEE DWG.
F1022	4	PUR.	1/2-13 X 3 3/4" S.S. WEDGE ANCHOR BOLT		F1022	
F1052	6	STD.	1/4" S.S. FLAT WASHER		F1050	
F1053	4	PUR.	3/8" S.S. FLAT WASHER		F1053	
F1055	6	STD.	1/4" S.S. LOCKWASHER		F1055	
F1057	4	PUR.	3/8" S.S. LOCKWASHER		F1057	
F1058	4	PUR.	1/2" S.S. LOCK WASHER		F1058	
F1059	4	PUR.	1/4"-20 S.S. NUT		F1059	
F1061	4	PUR.	3/8"-16 S.S. NUT		F1061	
F1110	4	PUR.	1/4"-20 S.S. TRIDENT NUT		F1110	
F1117	4	PUR.	1/4-20 X 1 S.S. TAMPER RESISTANT BUTTON SOCKET CAP SCREW		F1117	
MCX	4	PUR.	1/4-20 X 4 1/2" LG. S.S. SOC. HD. CAP SCREW		McMASTER CARR [illegible]	

BRASCO INTERNATIONAL, INC. 32400 INDUSTRIAL DR. MADISON HEIGHTS, MICHIGAN 48071 1-800-893-3665 WWW.BRASCO.COM	CUSTOMER: LANTA		DRAWN: CMP	CHECKED: CMP
	PROJECT: SOLSTOP SOLAR LIGHTING ASSEMBLY		DATE: 08-05-20	SIZE: - -
[illegible]	MODEL: SO-20-9-2-0-5	JOB #: 6263	SHEET: 1	REVISION: A









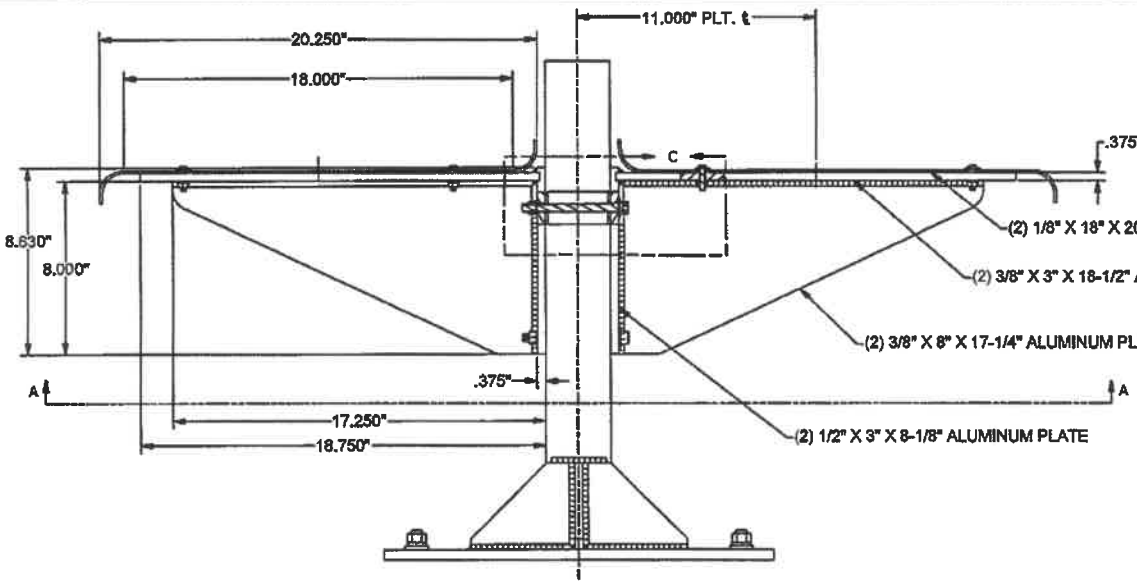
BRASCO INTERNATIONAL PARTS LIST

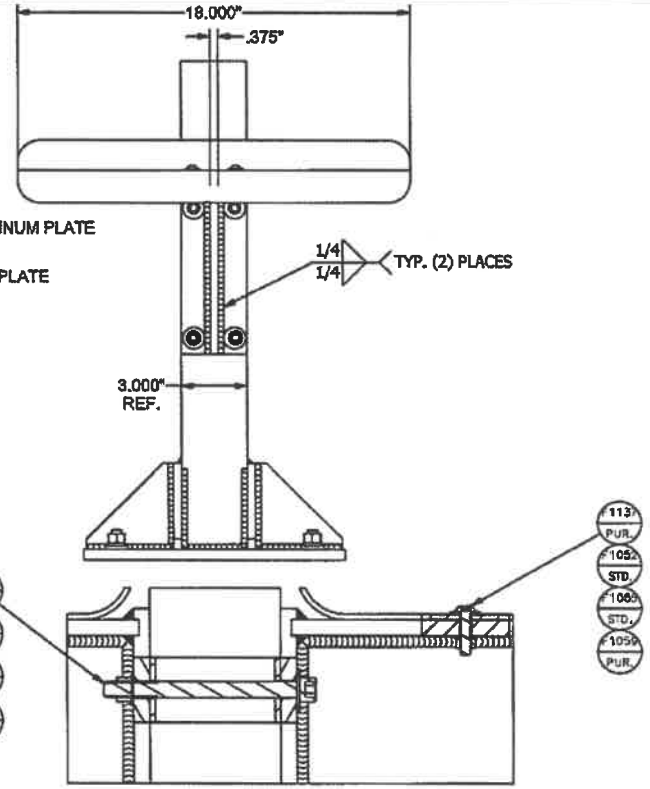
ITEM	QTY (PER)	SHT	DESCRIPTION	MODEL NUMBER	PART NUMBER	STOCK SIZE	MATERIAL	NOTES	PAINT
F1022	4	PUR.	1/2-13 X 3 3/4" S.S. WEDGE ANCHOR BOLT		F1022		PUR.		-
F1058	4	PUR.	1/2" S.S. LOCK WASHER		F1058		PUR.		-
F1119	4	PUR.	1/2"-13 S.S. TRIDENT NUT		F1119		PUR.		-
001	1	001	SCHEDULER HOLDER ASS'Y	SF-06-18.5			ASS'Y	SEE DWG.	-

FOUNDATION NOTE:
ALTERNATIVE TO CONCRETE SLAB SHOWN FOR PROPER ANCHORING PURPOSES IS AS FOLLOWS:
CIRCULAR PIER Ø30" X 45" DEEP.

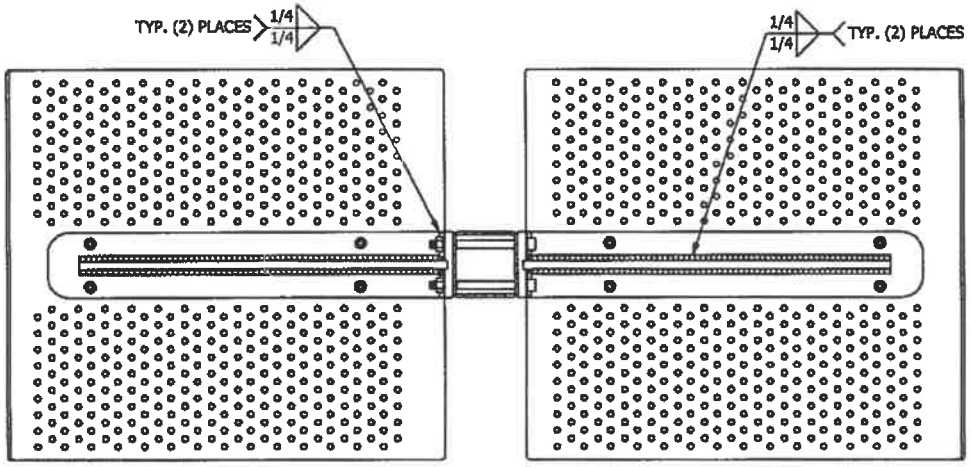
BRASCO INTERNATIONAL, INC.
32400 INDUSTRIAL DR.
MADISON HEIGHTS, MICHIGAN 48071
1-800-893-3865 WWW.BRASCO.COM

CUSTOMER:		DESIGNER:	CHECKED:
	LANTA	CMP	CMP
PROJECT:		DATE:	DATE:
	SOLSTOP SOLAR LIGHTING ASSEMBLY	08-06-20	- -
MODEL:	JOB #	SHEET:	REVISION:
ANCHOR ATTACHMENT	6263	2	A





DETAIL C



SECTION A-A

BRASCO INTERNATIONAL SUB ASSEMBLY PARTS LIST

ITEM	QTY	SHT	DESCRIPTION	MODEL NUMBER	PART NUMBER	NOTES
F1052	8	STD.	1/4" S.S. FLAT WASHER		F1052	
F1065	8	STD.	1/4" S.S. LOCKWASHER		F1065	
F1057	4	PUR.	3/8" S.S. LOCK WASHER		F1057	
F1059	8	PUR.	1/4"-20 S.S. NUT		F1059	
F1061	4	PUR.	3/8"-16 S.S. NUT		F1061	
F1137	8	PUR.	1/4-20 X 1 S.S. TAMPER RESISTANT BUTTON SOCKET CAP SCREW		F1137	
MCS	4	PUR.	1/4-20 X 4 1/2" LG. S.S. SOC. HD. CAP SCREW		McMASTER CARR 92210SA542	

BRASCO INTERNATIONAL, INC.
32400 INDUSTRIAL DR.
MADISON HEIGHTS, MICHIGAN 48071
1-800-893-3665 WWW.BRASCO.COM

CUSTOMER:		DESIGNER:	CHECKED:
LANTA		CMP	CMP
PROJECT:		DATE:	DATE:
SOLSTOP SOLAR LIGHTING ASSEMBLY		08-06-20	- -
MODEL:	JOB #:	SHEET:	REVISION:
SEAT ATTACHMENT	6283	3	A

UZMAN
A: 116 E King Street, Malvern, PA 19355
O: 610.320.2100

JOB TITLE 6263 LANTA SolStop

JOB NO. PA2101 SHEET NO.
CALCULATED BY GRW DATE 8/10/20
CHECKED BY DATE

www.struware.com

Code Search

Code: International Building Code 2015

Occupancy:

Occupancy Group = A Assembly

Risk Category & Importance Factors:

Risk Category =	II
Wind factor =	1.00
Snow factor =	1.00
Seismic factor =	1.00

Type of Construction:

Fire Rating:

Roof =	0.0 hr
Floor =	0.0 hr

Building Geometry:

Roof angle (θ)	2.00 / 12	9.5 deg
Building length (L)	2.0 ft	
Least width (B)	1.3 ft	
Mean Roof Ht (h)	9.6 ft	
Parapet ht above grd	0.0 ft	
Minimum parapet ht	0.0 ft	

Live Loads:

Roof
0 to 200 sf: 20 psf
200 to 600 sf: 24 - 0.02Area, but not less than 12 psf
over 600 sf: 12 psf

Floor:

Typical Floor	N/A
Partitions	N/A

UZMAN
A: 116 E King Street, Malvern, PA 19355
O: 610.320.2100

JOB TITLE 6263 LANTA SolStop

JOB NO. PA2101 SHEET NO.
CALCULATED BY GRW DATE 8/10/20
CHECKED BY DATE

Wind Loads : ASCE 7- 10

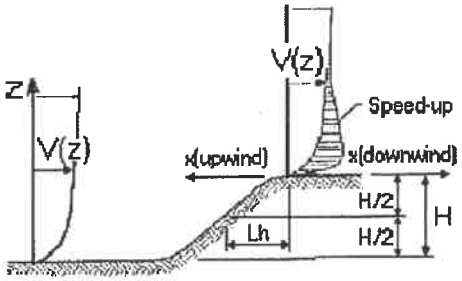
Ultimate Wind Speed	115 mph
Nominal Wind Speed	89.1 mph
Risk Category	II
Exposure Category	C
Enclosure Classif.	Open Building
Internal pressure	+/-0.00
Directionality (Kd)	0.85
Kh case 1	0.849
Kh case 2	0.849
Type of roof	Monoslope

Topographic Factor (Kzt)

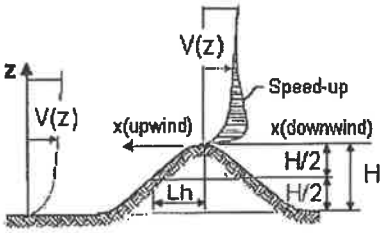
Topography		Flat
Hill Height	(H)	80.0 ft
Half Hill Length (Lh)		100.0 ft
Actual H/Lh	=	0.80
Use H/Lh	=	0.50
Modified Lh	=	160.0 ft
From top of crest: x =		50.0 ft
Bldg up/down wind?		downwind

H/Lh= 0.50 K_1 = 0.000
x/Lh = 0.31 K_2 = 0.792
z/Lh = 0.09 K_3 = 1.000

At Mean Roof Ht:
Kzt = $(1+K_1K_2K_3)^2$ = 1.00



ESCARPMENT



2D RIDGE or 3D AXISYMMETRICAL HILL

Gust Effect Factor

h =	9.6 ft
B =	1.3 ft
/z (0.6h) =	15.0 ft

Flexible structure if natural frequency < 1 Hz (T > 1 second).
If building h/B>4 then may be flexible and should be investigated.
h/B = 7.67 May be flexible structure

G = 0.85 Using rigid structure default

Rigid Structure

$\bar{e}$ =	0.20
ℓ =	500 ft
z_{min} =	15 ft
c =	0.20
g_Q, g_v =	3.4
L_z =	427.1 ft
Q =	0.97
I_z =	0.23
G =	0.91 use G = 0.85

Flexible or Dynamically Sensitive Structure

34 1cy (n_1) =	0.0 Hz				
Damping ratio (β) =	0				
/b =	0.65				
/α =	0.15				
Vz =	97.1				
N_1 =	0.00				
R_n =	0.000				
R_h =	28.282	η =	0.000	h =	9.6 ft
R_B =	28.282	η =	0.000		
R_L =	28.282	η =	0.000		
g_R =	0.000				
R =	0.000				
Gf =	0.000				

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Wind Loads - MWFRS all h (Except for Open Buildings)

Open Building - procedure doesn't apply

Kh (case 2) =	0.85	h =	9.6 ft	GCpi =	+/-0.00
Base pressure (q_h) =	24.4 psf	ridge ht =	9.7 ft	G =	0.85
Roof Angle (θ) =	9.5 deg	L =	2.0 ft	qi = qh	
Roof tributary area - (h/2)*L:	10 sf	B =	1.3 ft		
(h/2)*B:	6 sf				

Ultimate Wind Surface Pressures (psf)

Surface	Wind Normal to Ridge B/L = 0.63		h/L = 7.67		Wind Parallel to Ridge L/B = 1.60		h/L = 4.79	
	Cp	q_hGC_p	w/+q_iGC_{pi}	w/-q_hGC_{pi}	Dist.*	Cp	q_hGC_p	w/ +q_iGC_{pi}	w/ -q_hGC_{pi}
Windward Wall (WW)	0.80	16.6	see table below			0.80	16.6	see table below	
Leeward Wall (LW)	-0.50	-10.4	-10.4	-10.4		-0.38	-7.9	-7.9	-7.9
Side Wall (SW)	-0.70	-14.5	-14.5	-14.5		-0.70	-14.5	-14.5	-14.5
Leeward Roof (LR)		**				Included in windward roof			
Neg Windward Roof: 0 to h/2*	-1.30	-27.0	-27.0	-27.0	0 to h/2*	-1.30	-27.0	-27.0	-27.0
> h/2*	-0.70	-14.5	-14.5	-14.5	> h/2*	-0.70	-14.5	-14.5	-14.5
Pos/min windward roof press.	-0.18	-3.7	-3.7	-3.7	Min press.	-0.18	-3.7	-3.7	-3.7

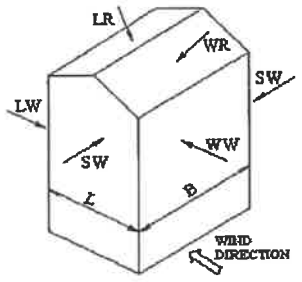
**Roof angle < 10 degrees. Therefore, leeward roof is included in windward roof pressure zones.

*Horizontal distance from windward edge

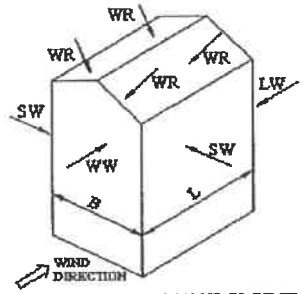
For monoslope roofs, entire roof surface is either windward or leeward surface.

Windward Wall Pressures at "z" (psf)

	z	Kz	Kzt	Windward Wall q_zGC_p	Windward Wall w/+q_iGC_{pi}	Windward Wall w/-q_hGC_{pi}	Combined WW + LW Normal to Ridge	Combined WW + LW Parallel to Ridge
h=	0 to 15'	0.85	1.00	16.6	16.6	16.6	27.0	24.5

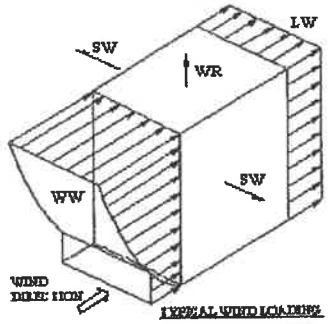


WIND NORMAL TO RIDGE



WIND PARALLEL TO RIDGE

NOTE:
See figure in ASCE7 for the application of full and partial loading of the above wind pressures. There are 4 different loading cases.



TYPICAL WIND LOADING

Parapet

z	Kz	Kzt	qp (psf)
0.0 ft	0.85	1.00	0.0

Windward parapet: 0.0 psf (GCpn = +1.5)
Leeward parapet: 0.0 psf (GCpn = -1.0)

Windward roof overhangs (add to windward roof pressure) : 16.6 psf (upward)

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Wind Loads - Open Buildings: 0.25 ≤ h/L ≤ 1.0

Ultimate Wind Pressures

Type of roof = Monoslope Free Roofs
Wind Flow = Clear

G = 0.85
Roof Angle = 9.5 deg

NOTE: The code requires the MWFRS be designed for a minimum pressure of 16 psf.

Main Wind Force Resisting System

Kz = Kh (case 2) = 0.85

Base pressure (qh) = **24.4 psf**

Procedure not allowed h/L is greater than 1.0

Roof pressures - Wind Normal to Ridge

Wind Flow	Load Case		Wind Direction γ = 0 deg		Wind Direction γ = 180 deg	
			Cnw	Cnl	Cnw	Cnl
Clear Wind Flow	A	Cn =	-0.68	-1.08	1.00	1.53
		p =	-14.1 psf	-22.4 psf	20.9 psf	31.7 psf
	B	Cn =	-1.53	0.00	1.65	0.38
		p =	-31.8 psf	0.0 psf	34.3 psf	7.9 psf

NOTE: 1). Cnw and Cnl denote combined pressures from top and bottom roof surfaces.
2). Cnw is pressure on windward half of roof. Cnl is pressure on leeward half of roof.
3). Positive pressures act toward the roof. Negative pressures act away from the roof.

Roof pressures - Wind Parallel to Ridge, γ = 90 deg

Procedure not allowed h/L is greater than 1.0

h = 9.6 ft
2h = 19.2 ft

Wind Flow	Load Case		Horizontal Distance from Windward Edge		
			≤ h	>h ≤ 2h	> 2h
Clear Wind Flow	A	Cn =	-0.80	-0.60	-0.30
		p =	-16.6 psf	-12.5 psf	-6.2 psf
	B	Cn =	0.80	0.50	0.30
		p =	16.6 psf	10.4 psf	6.2 psf

Fascia Panels -Horizontal pressures

qp = 0.0 psf

Fascia pressures not applicable - roof angle exceeds 5 degrees.

Windward fascia: 0.0 psf (GCpn = +1.5)
Leeward fascia: 0.0 psf (GCpn = -1.0)

Components & Cladding - roof pressures

Kz = Kh (case 1) = 0.85
Base pressure (qh) = **24.4 psf**
G = 0.85

a = 3.0 ft

a^2 = 9.0 sf
$4a^2$ = 36.0 sf

	Effective Wind Area	Clear Wind Flow					
		zone 3		zone 2		zone 1	
		positive	negative	positive	negative	positive	negative
C_N	≤ 9 sf	3.30	-4.10	2.48	-2.31	1.65	-1.53
	>9, ≤ 36 sf	2.48	-2.31	2.48	-2.31	1.65	-1.53
	> 36 sf	1.65	-1.53	1.65	-1.53	1.65	-1.53
Wind pressure	≤ 9 sf	68.6 psf	-85.0 psf	51.5 psf	-48.0 psf	34.3 psf	-31.8 psf
	>9, ≤ 36 sf	51.5 psf	-48.0 psf	51.5 psf	-48.0 psf	34.3 psf	-31.8 psf
	> 36 sf	34.3 psf	-31.8 psf	34.3 psf	-31.8 psf	34.3 psf	-31.8 psf

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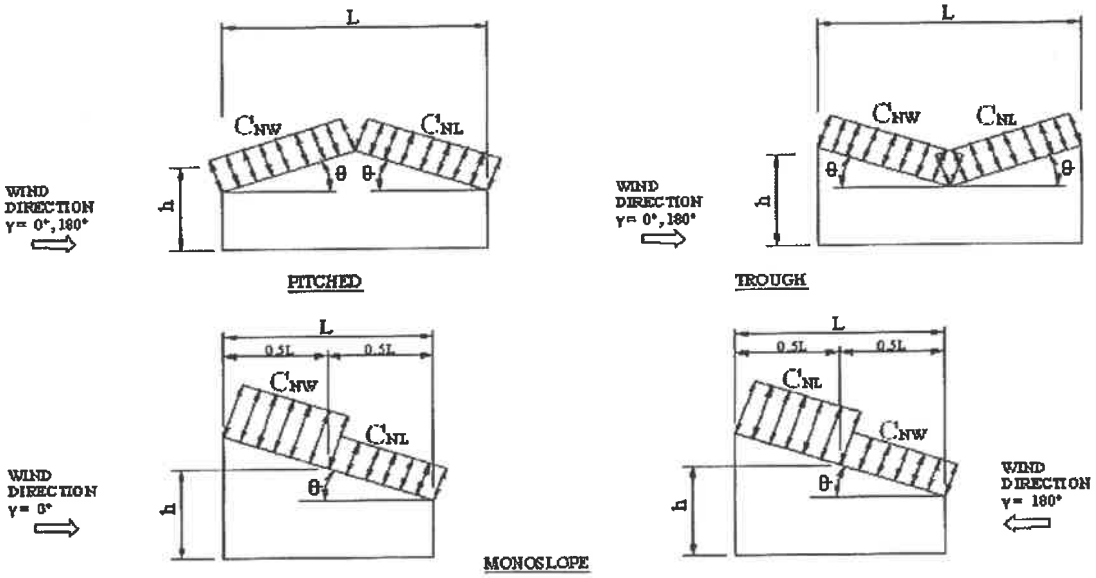
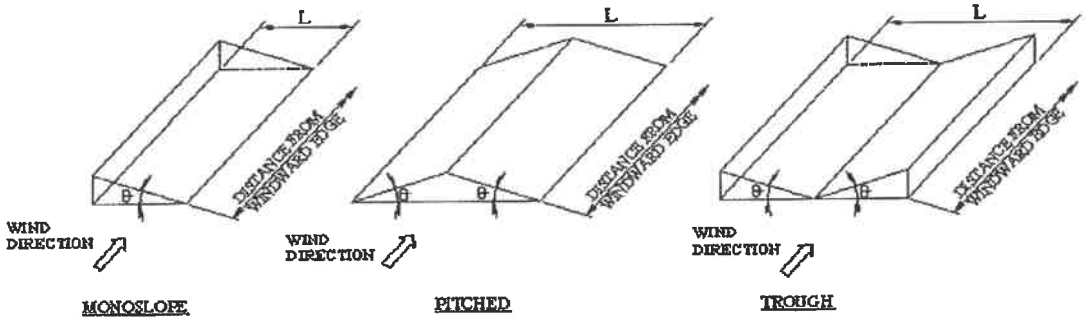
Location of Wind Pressure Zones

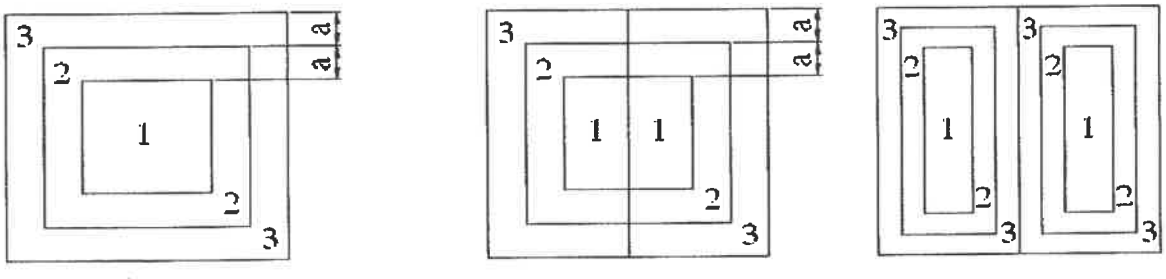


WIND DIRECTION $\gamma = 0°, 180°$



WIND DIRECTION $\gamma = 90°$

MAIN WIND FORCE RESISTING SYSTEM



COMPONENTS AND CLADDING

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Snow Loads : ASCE 7-10

Nominal Snow Forces

Roof slope	=	9.5 deg
Horiz. eave to ridge dist (W)	=	1.3 ft
Roof length parallel to ridge (L)	=	2.0 ft
Type of Roof		Monoslope
Ground Snow Load	Pg =	30.0 psf
Risk Category	=	II
Importance Factor	I =	1.0
Thermal Factor	Ct =	1.20
Exposure Factor	Ce =	1.2
Pf = 0.7*Ce*Ct*I*Pg	=	30.2 psf
Unobstructed Slippery Surface		yes
Sloped-roof Factor	Cs =	1.00
Balanced Snow Load	=	**30.2 psf**
Rain on Snow Surcharge Angle		0.03 deg
Code Maximum Rain Surcharge		5.0 psf
Rain on Snow Surcharge	=	0.0 psf
Ps plus rain surcharge	=	30.2 psf
Minimum Snow Load	Pm =	20.0 psf
Uniform Roof Design Snow Load	=	**30.2 psf**

Near ground level surface balanced snow load = **30.0 psf**

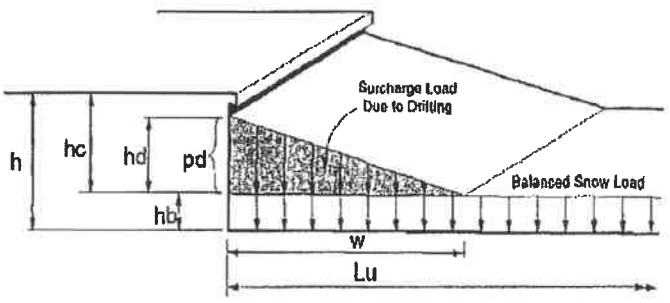
NOTE: Alternate spans of continuous beams shall be loaded with half the design roof snow load so as to produce the greatest possible effect - see code for loading diagrams and exceptions for gable roofs..

Windward Snow Drifts 1 - Against walls, parapets, etc

Upwind fetch	lu =	3.0 ft
Projection height	h =	20.0 ft
Snow density	g =	17.9 pcf
Balanced snow height	hb =	1.69 ft
	hd =	1.08 ft
	hc =	18.31 ft
hc/hb >0.2 = 10.8	lu<15', drift not req'd	
Drift height (hd)	=	1.08 ft
Drift width	w =	4.31 ft
Surcharge load:	pd = γ*hd =	**19.3 psf**
Balanced Snow load:	=	30.2 psf
		49.5 psf

Windward Snow Drifts 2 - Against walls, parapets, etc

Upwind fetch	lu =	0.0 ft
Projection height	h =	0.0 ft
Snow density	g =	17.9 pcf
Balanced snow height	hb =	1.69 ft
	hd =	1.08 ft
	hc =	-1.69 ft
hc/hb <0.2 = -1.0	lu<15', drift not req'd	
Drift height (hc)	=	0.00 ft
Drift width	w =	-13.52 ft
Surcharge load:	pd = γ*hd =	**0.0 psf**
Balanced Snow load:	=	30.2 psf
		30.2 psf



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Design Loads:

D = 10 psf
L = 175 psf

Aluminium Type: 6061-T6

F_y = 35,000 psi
E = 10,100,000 psi

Load Combinations:

D+Lr = 185.0 psf

Seat:

L = 1.71 ft
Mmax = 809.86 ft-lb
Vmax = 948 lb
I = 2.00 in^4
y = 2.00 in
S = 1.00 in^3

Fy = 16035.2 psi OK
Limit = 0.117 in L/175
D = 0.021 in OK

Section = 3/8" x 4" Plate

Weld:

L = 16 in
thickness = 4 16ths
allowable = 0.928 k/in/16th
Force allowable = 59.39 k
Force applied = 0.95 k OK

Bolts:

Diameter = 0.375 in
Moment = 9718.28 lb-in
D = 6 in
Pullout = 1620 lb
Shear = 948 lb
# of Bolts Pullout = 1 Both Sides of Seat
# of Bolts Shear = 4
Pullout per Bolt = 1620 lb
Shear per Bolt = 237 lb

Allowable Tension = 2274 lb
Allowable Shear = 894 lb
Interaction = 0.977
Bearing = 1875 lb

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Column

3x3x.125

Height =	9.04 ft				
Trib Width =	1.84 ft				
Trib Depth =	1.18 ft				
Defl Limit =	L/170	=	0.64 in		
DL =	0 psf				
WL =	10 psf				
w_{total} =	18 psf				
End Rxn's =	166 lbs				
Moment =	750 ft-lb	=	9000 in-lb		
				Provided	OK?
Sx >=	0.2 in^3		1.32 in^3		OK
Ix >=	0.3 in^4		1.98 in^4		OK
Axial Force =	1048 lb				
Moment M_x =	750 lb-ft				
Moment M_y =	483 lb-ft				
k =	1		F_{ex} =	11591.3 psi	
L_x =	9.04 ft		λ =	93	
L_y =	9.04 ft		F_{cy} =	35000 psi	
r_x =	1.17 in		B_c =	307222	
r_y =	1.17 in		D_c =	5358	
kL/r_x =	93		C_c =	24	
kL/r_y =	93		λ_1 =	51	
			λ_2 =	24	
Limit State =	YIELDING				
F_c =	35000 psi				
A_g =	1.4 in^2				
P_{nc} =	30545 lb				
F_b =	21212 psi				
S_{xc} =	1.32 in^3				
M_{nx} =	2333 lb-ft				
S_{yc} =	1.32 in^3				
M_{ny} =	2333 lb-ft				
Interaction	0.56 <=		1 OK		

Base Plate Design:

P =	1048 lb		Area =	2.18 ft^2	
Bearing Area =	32.0 in^2		Uplift =	-22.2 lb	
f_{brg} =	33 psi	OK	t =	0.12 in	
F_{brg} =	1,000 psi		Actual t =	0.5 in	OK

Company:		Page:	1
Specifier:		Project:	
Address:		Sub-Project I Pos. No.:	
Phone I Fax:		Date:	8/24/2020
E-Mail:			

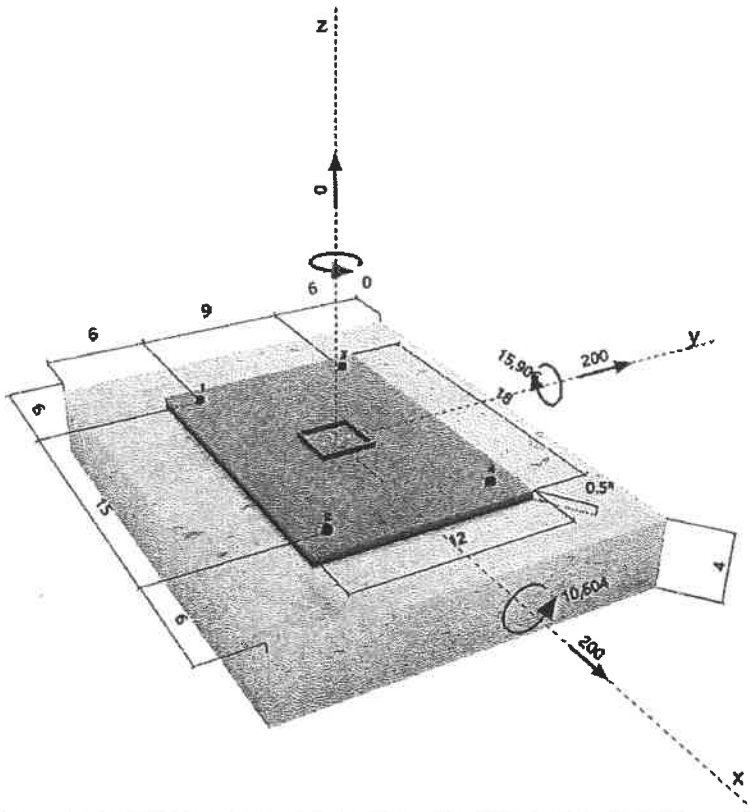
Specifier's comments:

1 Input data

Anchor type and diameter:	**Kwik Bolt TZ - SS 316 1/2 (2)**
Effective embedment depth:	h_{ef} = 2.000 in., h_{nom} = 2.375 in.
Material:	AISI 316
Evaluation Service Report:	ESR-1917
Issued I Valid:	5/1/2019 | 5/1/2021
Proof:	Design method ACI 318 / AC193
Stand-off installation:	e_b = 0.000 in. (no stand-off); t = 0.500 in.
Anchor plate:	l_x x l_y x t = 18.000 in. x 12.000 in. x 0.500 in.; (Recommended plate thickness: not calculated
Profile:	Square HSS (AISC), HSS3X3X.125; (L x W x T) = 3.000 in. x 3.000 in. x 0.125 in.
Base material:	cracked concrete, 2500, f_c' = 2,500 psi; h = 4.000 in.
Reinforcement:	tension: condition B, shear: condition B; no supplemental splitting reinforcement present edge reinforcement: none or < No. 4 bar
Seismic loads (cat. C, D, E, or F)	no

R - The anchor calculation is based on a rigid anchor plate assumption.

Geometry [in.] & Loading [lb, in.lb]



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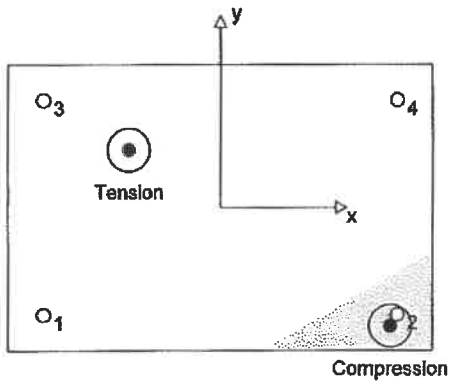
2 Load case/Resulting anchor forces

Load case: Design loads



Anchor reactions [lb]
Tension force: (+Tension, -Compression)

Anchor	Tension force	Shear force	Shear force x	Shear force y
1	329	71	50	50
2	0	71	50	50
3	758	71	50	50
4	345	71	50	50

max. concrete compressive strain: 0.07 [‰]
max. concrete compressive stress: 292 [psi]
resulting tension force in (x/y)=(-3.886/2.432): 1,433 [lb]
resulting compression force in (x/y)=(7.215/-4.969): 1,433 [lb]

Anchor forces are calculated based on the assumption of a rigid anchor plate.

3 Tension load

	Load N_{ua} [lb]	Capacity ϕN_n [lb]	Utilization $\beta_N = N_{ua}/\phi N_n$	Status
Steel Strength*	758	8,665	9	OK
Pullout Strength*	758	1,749	44	OK
Concrete Breakout Strength**	1,433	2,923	50	OK

* anchor having the highest loading **anchor group (anchors in tension)

3.1 Steel Strength

N_{sa} = ESR value — refer to ICC-ES ESR-1917
$\phi N_{sa} \geq N_{ua}$ — ACI 318-08 Eq. (D-1)

Variables

$A_{se,N}$ [in.^{2}]	f_{uta} [psi]
0.10	115,000

Calculations

N_{sa} [lb]
11,554

Results

N_{sa} [lb]	ϕ_{steel}	ϕN_{sa} [lb]	N_{ua} [lb]
11,554	0.750	8,665	758

3.2 Pullout Strength

$N_{pn,f_c} = N_{p,2500} \sqrt{\frac{f'_c}{2500}}$ refer to ICC-ES ESR-1917

$\phi\ N_{pn,f_c} \geq N_{ua}$ ACI 318-08 Eq. (D-1)

Variables

f'_c [psi]	$N_{p,2500}$ [lb]
2,500	3,180

Calculations

$\sqrt{\frac{f'_c}{2500}}$
1.000

Results

N_{pn,f'_c} [lb]	ϕ concrete	$\phi\ N_{pn,f'_c}$ [lb]	N_{ua} [lb]
3,180	0.550	1,749	758

3.3 Concrete Breakout Strength

$N_{cbg} = \left(\frac{A_{Nc}}{A_{Nc0}}\right) \Psi_{ec,N} \Psi_{ed,N} \Psi_{c,N} \Psi_{cp,N} N_b$ ACI 318-08 Eq. (D-5)

$\phi\ N_{cbg} \geq N_{ua}$ ACI 318-08 Eq. (D-1)

A_{Nc} see ACI 318-08, Part D.5.2.1, Fig. RD.5.2.1(b)

$A_{Nc0} = 9\ h_{ef}^2$ ACI 318-08 Eq. (D-6)

$\Psi_{ec,N} = \left(\frac{1}{1 + \frac{2\ e'_N}{3\ h_{ef}}}\right) \leq 1.0$ ACI 318-08 Eq. (D-9)

$\Psi_{ed,N} = 0.7 + 0.3 \left(\frac{c_{a,min}}{1.5 h_{ef}}\right) \leq 1.0$ ACI 318-08 Eq. (D-11)

$\Psi_{cp,N} = MAX\left(\frac{c_{a,min}}{c_{ac}}, \frac{1.5 h_{ef}}{c_{ac}}\right) \leq 1.0$ ACI 318-08 Eq. (D-13)

$N_b = k_c\ \lambda\ \sqrt{f'_c}\ h_{ef}^{1.5}$ ACI 318-08 Eq. (D-7)

Variables

h_{ef} [in.]	$e_{c1,N}$ [in.]	$e_{c2,N}$ [in.]	$c_{a,min}$ [in.]	$\Psi_{c,N}$
2.000	1.386	0.932	6.000	1.000

c_{ac} [in.]	k_c	λ	f'_c [psi]
5.500	24	1	2,500

Calculations

A_{Nc} [in.^{2}]	A_{Nc0} [in.^{2}]	$\Psi_{ec1,N}$	$\Psi_{ec2,N}$	$\Psi_{ed,N}$	$\Psi_{cp,N}$	N_b [lb]
108.00	36.00	0.684	0.763	1.000	1.000	3,394

Results

N_{cbg} [lb]	ϕ concrete	$\phi\ N_{cbg}$ [lb]	N_{ua} [lb]
5,315	0.550	2,923	1,433

Company:
Specifier:
Address:
Phone I Fax:
E-Mail:

4 Shear load

	Load V_{ua} [lb]	Capacity ϕV_n [lb]	Utilization $\beta_V = V_{ua}/\phi V_n$	Status
Steel Strength*	71	4,472	2	OK
Steel failure (with lever arm)*	N/A	N/A	N/A	N/A
Pryout Strength**	283	9,504	3	OK
Concrete edge failure in direction x+**	283	2,613	11	OK

* anchor having the highest loading **anchor group (relevant anchors)

4.1 Steel Strength

V_{sa} = ESR value refer to ICC-ES ESR-1917
$\phi V_{steel} \geq V_{ua}$ ACI 318-08 Eq. (D-2)

Variables

$A_{se,V}$ [in.^{2}]	f_{uta} [psi]	$\alpha_{V,seis}$
0.10	115,000	1.000

Calculations

V_{sa} [lb]
6,880

Results

V_{sa} [lb]	ϕ_{steel}	ϕV_{sa} [lb]	V_{ua} [lb]
6,880	0.650	4,472	71

4.2 Pryout Strength

$V_{cpg} = k_{cp}\left[\left(\frac{A_{Nc}}{A_{Nc0}}\right)\psi_{ec,N}\,\psi_{ed,N}\,\psi_{c,N}\,\psi_{cp,N}\,N_b\right]$ ACI 318-08 Eq. (D-31)

$\phi V_{cpg} \geq V_{ua}$ ACI 318-08 Eq. (D-2)

A_{Nc} see ACI 318-08, Part D.5.2.1, Fig. RD.5.2.1(b)

$A_{Nc0} = 9 h_{ef}^2$ ACI 318-08 Eq. (D-6)

$\psi_{ec,N} = \left(\frac{1}{1+\frac{2\,e'_N}{3\,h_{ef}}}\right) \leq 1.0$ ACI 318-08 Eq. (D-9)

$\psi_{ed,N} = 0.7 + 0.3\left(\frac{c_{a,min}}{1.5h_{ef}}\right) \leq 1.0$ ACI 318-08 Eq. (D-11)

$\psi_{cp,N} = MAX\left(\frac{c_{a,min}}{c_{ac}}, \frac{1.5h_{ef}}{c_{ac}}\right) \leq 1.0$ ACI 318-08 Eq. (D-13)

$N_b = k_c\,\lambda\,\sqrt{f'_c}\,h_{ef}^{1.5}$ ACI 318-08 Eq. (D-7)

Variables

k_{cp}	h_{ef} [in.]	$e_{c1,N}$ [in.]	$e_{c2,N}$ [in.]	$c_{a,min}$ [in.]
1	2.000	0.000	0.000	6.000

$\psi_{c,N}$	c_{ac} [in.]	k_c	λ	f'_c [psi]
1.000	5.500	24	1	2,500

Calculations

A_{Nc} [in.^{2}]	A_{Nc0} [in.^{2}]	$\psi_{ec1,N}$	$\psi_{ec2,N}$	$\psi_{ed,N}$	$\psi_{cp,N}$	N_b [lb]
144.00	36.00	1.000	1.000	1.000	1.000	3,394

Results

V_{cpg} [lb]	$\phi_{concrete}$	ϕV_{cpg} [lb]	V_{ua} [lb]
13,576	0.700	9,504	283

Company:
Specifier:
Address:
Phone I Fax:
E-Mail:

4.3 Concrete edge failure in direction x+

$V_{cbg} = \left(\frac{A_{Vc}}{A_{Vc0}}\right) \Psi_{ec,V} \Psi_{ed,V} \Psi_{c,V} \Psi_{h,V} \Psi_{parallel,V} V_b$ ACI 318-08 Eq. (D-22)

$\phi V_{cbg} \geq V_{ua}$ ACI 318-08 Eq. (D-2)

A_{Vc} see ACI 318-08, Part D.6.2.1, Fig. RD.6.2.1(b)

$A_{Vc0} = 4.5 c_{a1}^2$ ACI 318-08 Eq. (D-23)

$\Psi_{ec,V} = \left(\frac{1}{1 + \frac{2e_v}{3c_{a1}}}\right) \leq 1.0$ ACI 318-08 Eq. (D-26)

$\Psi_{ed,V} = 0.7 + 0.3\left(\frac{c_{a2}}{1.5c_{a1}}\right) \leq 1.0$ ACI 318-08 Eq. (D-28)

$\Psi_{h,V} = \sqrt{\frac{1.5c_{a1}}{h_a}} \geq 1.0$ ACI 318-08 Eq. (D-29)

$V_b = \left(7\left(\frac{l_e}{d_a}\right)^{0.2}\sqrt{d_a}\right) \lambda \sqrt{f'_c}\, c_{a1}^{1.5}$ ACI 318-08 Eq. (D-24)

Variables

c_{a1} [in.]	c_{a2} [in.]	e_{cV} [in.]	$\Psi_{c,V}$	h_a [in.]
4.000	6.000	0.000	1.000	4.000

l_e [in.]	λ	d_a [in.]	f'_c [psi]	$\Psi_{parallel,V}$
2.000	1.000	0.500	2,500	1.000

Calculations

A_{Vc} [in.^{2}]	A_{Vc0} [in.^{2}]	$\Psi_{ec,V}$	$\Psi_{ed,V}$	$\Psi_{h,V}$	V_b [lb]
84.00	72.00	1.000	1.000	1.225	2,612

Results

V_{cbg} [lb]	$\phi_{concrete}$	ϕV_{cbg} [lb]	V_{ua} [lb]
3,733	0.700	2,613	283

5 Combined tension and shear loads

β_N	β_V	ζ	Utilization $\beta_{N,V}$ [%]	Status
0.490	0.108	5/3	33	OK

$\beta_{NV} = \beta_N^{\zeta} + \beta_V^{\zeta} <= 1$

6 Warnings

- The anchor design methods in PROFIS Anchor require rigid anchor plates per current regulations (ETAG 001/Annex C, EOTA TR029, etc.). This means load re-distribution on the anchors due to elastic deformations of the anchor plate are not considered - the anchor plate is assumed to be sufficiently stiff, in order not to be deformed when subjected to the design loading. PROFIS Anchor calculates the minimum required anchor plate thickness with FEM to limit the stress of the anchor plate based on the assumptions explained above. The proof if the rigid anchor plate assumption is valid is not carried out by PROFIS Anchor. Input data and results must be checked for agreement with the existing conditions and for plausibility!
- Condition A applies when supplementary reinforcement is used. The Φ factor is increased for non-steel Design Strengths except Pullout Strength and Pryout strength. Condition B applies when supplementary reinforcement is not used and for Pullout Strength and Pryout Strength. Refer to your local standard.
- Refer to the manufacturer's product literature for cleaning and installation instructions.
- Checking the transfer of loads into the base material and the shear resistance are required in accordance with ACI 318 or the relevant standard!

Fastening meets the design criteria!

Company:
Specifier:
Address:
Phone I Fax:
E-Mail:

7 Installation data

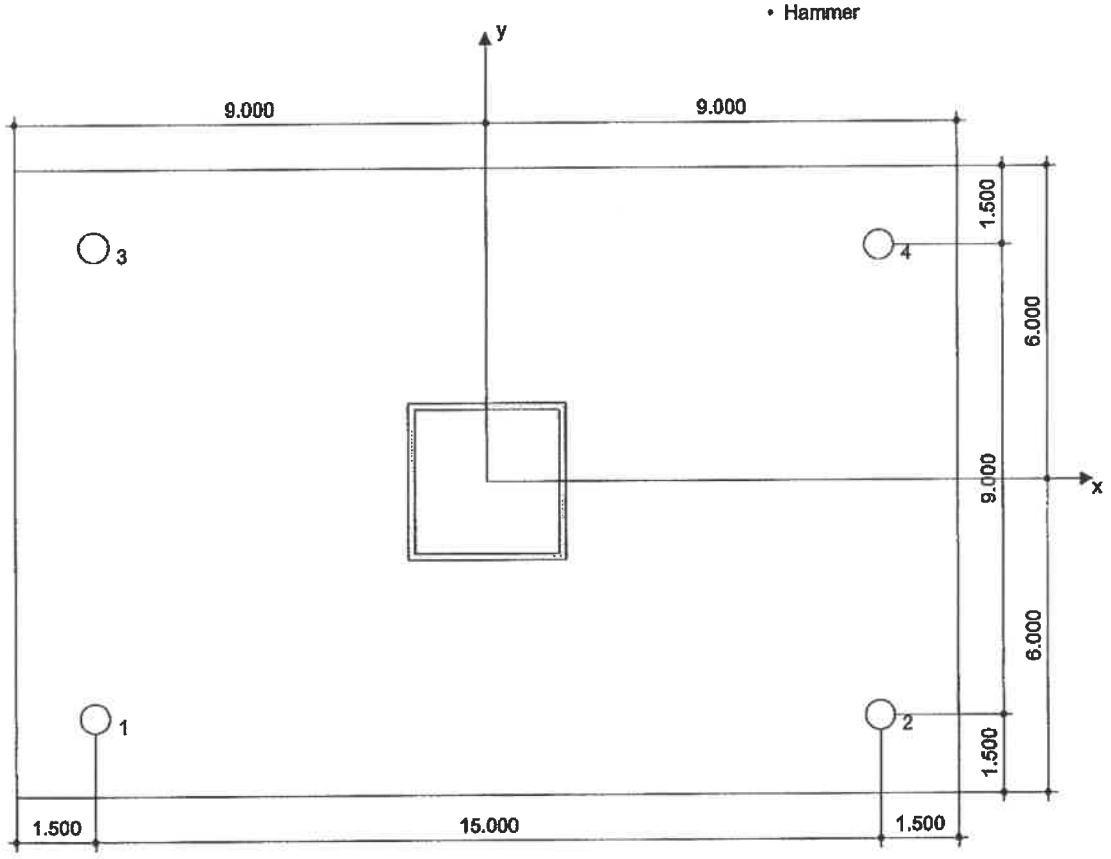
Anchor plate, steel: -
Profile: Square HSS (AISC), HSS3X3X.125; (L x W x T) = 3.000 in. x 3.000 in. x 0.125 in.
Hole diameter in the fixture: d_f = 0.563 in.
Plate thickness (input): 0.500 in.
Recommended plate thickness: not calculated
Drilling method: Hammer drilled
Cleaning: Manual cleaning of the drilled hole according to instructions for use is required.

Anchor type and diameter: Kwik Bolt TZ - SS 316 1/2 (2)
Installation torque: 480.001 in.lb

Hole diameter in the base material: 0.500 in.
Hole depth in the base material: 2.625 in.
Minimum thickness of the base material: 4.000 in.

7.1 Recommended accessories

Drilling	Cleaning	Setting
• Suitable Rotary Hammer • Properly sized drill bit	• Manual blow-out pump	• Torque controlled cordless impact tool (Hilti Safeset System) • Torque wrench • Hammer



Coordinates Anchor in.

Anchor	x	y	c_{-x}	c_{+x}	c_{-y}	c_{+y}
1	-7.500	-4.500	6.000	21.000	6.000	15.000
2	7.500	-4.500	21.000	6.000	6.000	15.000
3	-7.500	4.500	6.000	21.000	15.000	6.000
4	7.500	4.500	21.000	6.000	15.000	6.000

Company:		Page:	7
Specifier:		Project:	
Address:		Sub-Project I Pos. No.:	
Phone I Fax:	|	Date:	8/24/2020
E-Mail:			

8 Remarks; Your Cooperation Duties

- Any and all information and data contained in the Software concern solely the use of Hilti products and are based on the principles, formulas and security regulations in accordance with Hilti's technical directions and operating, mounting and assembly instructions, etc., that must be strictly complied with by the user. All figures contained therein are average figures, and therefore use-specific tests are to be conducted prior to using the relevant Hilti product. The results of the calculations carried out by means of the Software are based essentially on the data you put in. Therefore, you bear the sole responsibility for the absence of errors, the completeness and the relevance of the data to be put in by you. Moreover, you bear sole responsibility for having the results of the calculation checked and cleared by an expert, particularly with regard to compliance with applicable norms and permits, prior to using them for your specific facility. The Software serves only as an aid to interpret norms and permits without any guarantee as to the absence of errors, the correctness and the relevance of the results or suitability for a specific application.
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General Footing

DESCRIPTION: Footing Check

Code References

Calculations per ACI 318-14, IBC 2015, CBC 2016, ASCE 7-10
Load Combinations Used : ASCE 7-16

General Information

Material Properties

f'c : Concrete 28 day strength	=	3.0 ksi
fy : Rebar Yield	=	60.0 ksi
Ec : Concrete Elastic Modulus	=	3,122.0 ksi
Concrete Density	=	145.0 pcf
φ Values Flexure	=	0.90
Shear	=	0.750

Analysis Settings

Min Steel % Bending Reinf.	=	
Min Allow % Temp Reinf.	=	0.00180
Min. Overturning Safety Factor	=	1.0 : 1
Min. Sliding Safety Factor	=	1.0 : 1
Add Ftg Wt for Soil Pressure	:	Yes
Use ftg wt for stability, moments & shears	:	Yes
Add Pedestal Wt for Soil Pressure	:	No
Use Pedestal wt for stability, mom & shear	:	No

Soil Design Values

Allowable Soil Bearing	=	1.50 ksf
Increase Bearing By Footing Weight	=	No
Soil Passive Resistance (for Sliding)	=	250.0 pcf
Soil/Concrete Friction Coeff.	=	0.30

Increases based on footing Depth

Footing base depth below soil surface	=	0.50 ft
Allow press. increase per foot of depth	=	ksf
when footing base is below	=	ft

Increases based on footing plan dimension

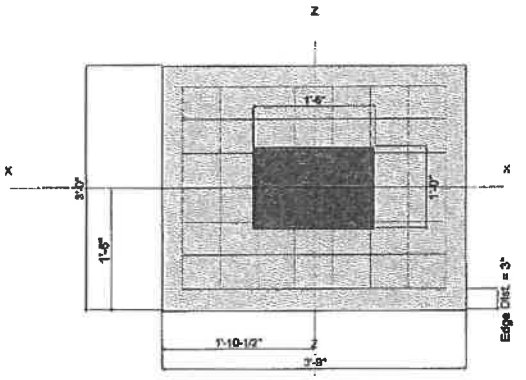
Allowable pressure increase per foot of depth	=	ksf
when max. length or width is greater than	=	ft

Dimensions

Width parallel to X-X Axis	=	3.750 ft
Length parallel to Z-Z Axis	=	3.0 ft
Footing Thickness	=	4 in

Pedestal dimensions...

px : parallel to X-X Axis	=	18.0 in
pz : parallel to Z-Z Axis	=	12.0 in
Height	=	2.0 in
Rebar Centerline to Edge of Concrete...		
at Bottom of footing	=	3.0 in

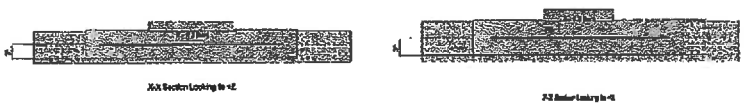


Reinforcing

Bars parallel to X-X Axis		
Number of Bars	=	7.0
Reinforcing Bar Size	=	# 3
Bars parallel to Z-Z Axis		
Number of Bars	=	8.0
Reinforcing Bar Size	=	# 3

Bandwidth Distribution Check (ACI 15.4.4.2)
Direction Requiring Closer Separation

	Bars along Z-Z Axis
# Bars required within zone	88.9 %
# Bars required on each side of zone	11.1 %



Applied Loads

		D	Lr	L	S	W	E	H	
P : Column Load	=	0.050							k
OB : Overburden	=								ksf
M-xx	=	0.8440							k-ft
M-zz	=	1.326							k-ft
V-x	=	0.20							k
V-z	=	0.20							k

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General Footing

File: solstop foundation.ec6

Lic. # : KW-05004488
ZEYN UZMAN CONSULTANTS

DESCRIPTION: Footing Check

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.6557	Soil Bearing	0.9835 ksf	1.50 ksf	+D+0.750L+0.750S+0.5250E+H about Z-
PASS	1.329	Overturning - X-X	0.9773 k-ft	1.298 k-ft	+D+H
PASS	1.112	Overturning - Z-Z	1.459 k-ft	1.623 k-ft	+D+H
PASS	1.767	Sliding - X-X	0.20 k	0.3534 k	+D+H
PASS	1.884	Sliding - Z-Z	0.20 k	0.3769 k	+D+H
PASS	n/a	Uplift	0.0 k	0.0 k	No Uplift
PASS	0.09880	Z Flexure (+X)	0.3136 k-ft/ft	3.174 k-ft/ft	+1.40D+1.60H
PASS	0.02023	Z Flexure (-X)	0.06423 k-ft/ft	3.174 k-ft/ft	+1.40D+1.60H
PASS	0.05218	X Flexure (+Z)	0.1526 k-ft/ft	2.925 k-ft/ft	+1.40D+1.60H
PASS	0.01735	X Flexure (-Z)	0.05075 k-ft/ft	2.925 k-ft/ft	+1.40D+1.60H
PASS	0.1070	1-way Shear (+X)	8.788 psi	82.158 psi	+1.40D+1.60H
PASS	0.02960	1-way Shear (-X)	2.432 psi	82.158 psi	+1.40D+1.60H
PASS	0.07191	1-way Shear (+Z)	5.908 psi	82.158 psi	+1.40D+1.60H
PASS	0.02574	1-way Shear (-Z)	2.115 psi	82.158 psi	+1.40D+1.60H
PASS	0.008930	2-way Punching	1.345 psi	150.624 psi	+1.40D+1.60H

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc (in)	Zecc (in)	Actual Soil Bearing Stress @ Location: Bottom, -Z	Top, +Z	Left, -X	Right, +X	Actual / Allow Ratio
X-X, +D+H	1.50	n/a	13.549	0.0	0.4093	n/a	n/a	0.273
X-X, +D+L+H	1.50	n/a	13.549	0.0	0.4093	n/a	n/a	0.273
X-X, +D+Lr+H	1.50	n/a	13.549	0.0	0.4093	n/a	n/a	0.273
X-X, +D+S+H	1.50	n/a	13.549	0.0	0.4093	n/a	n/a	0.273
X-X, +D+0.750Lr+0.750L+H	1.50	n/a	13.549	0.0	0.4093	n/a	n/a	0.273
X-X, +D+0.750L+0.750S+H	1.50	n/a	13.549	0.0	0.4093	n/a	n/a	0.273
X-X, +D+0.60W+H	1.50	n/a	13.549	0.0	0.4093	n/a	n/a	0.273
X-X, +D+0.750Lr+0.450W+H	1.50	n/a	13.549	0.0	0.4093	n/a	n/a	0.273
X-X, +D+0.750S+0.450W+H	1.50	n/a	13.549	0.0	0.4093	n/a	n/a	0.273
X-X, +0.60D+0.60W+0.60H	1.50	n/a	13.549	0.0	0.2456	n/a	n/a	0.164
X-X, +D+0.70E+0.60H	1.50	n/a	13.549	0.0	0.4093	n/a	n/a	0.273
X-X, +D+0.750L+0.750S+0.5250E+H	1.50	n/a	13.549	0.0	0.4093	n/a	n/a	0.273
X-X, +0.60D+0.70E+H	1.50	n/a	13.549	0.0	0.2456	n/a	n/a	0.164
Z-Z, +D+H	1.50	20.230	n/a	n/a	n/a	0.0	0.9835	0.656
Z-Z, +D+L+H	1.50	20.230	n/a	n/a	n/a	0.0	0.9835	0.656
Z-Z, +D+Lr+H	1.50	20.230	n/a	n/a	n/a	0.0	0.9835	0.656
Z-Z, +D+S+H	1.50	20.230	n/a	n/a	n/a	0.0	0.9835	0.656
Z-Z, +D+0.750Lr+0.750L+H	1.50	20.230	n/a	n/a	n/a	0.0	0.9835	0.656
Z-Z, +D+0.750L+0.750S+H	1.50	20.230	n/a	n/a	n/a	0.0	0.9835	0.656
Z-Z, +D+0.60W+H	1.50	20.230	n/a	n/a	n/a	0.0	0.9835	0.656
Z-Z, +D+0.750Lr+0.450W+H	1.50	20.230	n/a	n/a	n/a	0.0	0.9835	0.656
Z-Z, +D+0.750S+0.450W+H	1.50	20.230	n/a	n/a	n/a	0.0	0.9835	0.656
Z-Z, +0.60D+0.60W+0.60H	1.50	20.230	n/a	n/a	n/a	0.0	0.5901	0.393
Z-Z, +D+0.70E+0.60H	1.50	20.230	n/a	n/a	n/a	0.0	0.9835	0.656
Z-Z, +D+0.750L+0.750S+0.5250E+H	1.50	20.230	n/a	n/a	n/a	0.0	0.9835	0.656
Z-Z, +0.60D+0.70E+H	1.50	20.230	n/a	n/a	n/a	0.0	0.5901	0.393

Overturning Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
X-X, +D+H	0.9773 k-ft	1.298 k-ft	1.329	OK
X-X, +D+L+H	0.9773 k-ft	1.298 k-ft	1.329	OK
X-X, +D+Lr+H	0.9773 k-ft	1.298 k-ft	1.329	OK
X-X, +D+S+H	0.9773 k-ft	1.298 k-ft	1.329	OK
X-X, +D+0.750Lr+0.750L+H	0.9773 k-ft	1.298 k-ft	1.329	OK
X-X, +D+0.750L+0.750S+H	0.9773 k-ft	1.298 k-ft	1.329	OK
X-X, +D+0.60W+H	0.9773 k-ft	1.298 k-ft	1.329	OK
X-X, +D+0.750Lr+0.450W+H	0.9773 k-ft	1.298 k-ft	1.329	OK
X-X, +D+0.750S+0.450W+H	0.9773 k-ft	1.298 k-ft	1.329	OK
X-X, +0.60D+0.60W+0.60H	0.5864 k-ft	0.7791 k-ft	1.329	OK

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General Footing

DESCRIPTION: Footing Check

Overturning Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
X-X, +D+0.70E+0.60H	0.9773 k-ft	1.298 k-ft	1.329	OK
X-X, +D+0.750L+0.750S+0.5250E+H	0.9773 k-ft	1.298 k-ft	1.329	OK
X-X, +0.60D+0.70E+H	0.5864 k-ft	0.7791 k-ft	1.329	OK
Z-Z, +D+H	1.459 k-ft	1.623 k-ft	1.112	OK
Z-Z, +D+L+H	1.459 k-ft	1.623 k-ft	1.112	OK
Z-Z, +D+Lr+H	1.459 k-ft	1.623 k-ft	1.112	OK
Z-Z, +D+S+H	1.459 k-ft	1.623 k-ft	1.112	OK
Z-Z, +D+0.750Lr+0.750L+H	1.459 k-ft	1.623 k-ft	1.112	OK
Z-Z, +D+0.750L+0.750S+H	1.459 k-ft	1.623 k-ft	1.112	OK
Z-Z, +D+0.60W+H	1.459 k-ft	1.623 k-ft	1.112	OK
Z-Z, +D+0.750Lr+0.450W+H	1.459 k-ft	1.623 k-ft	1.112	OK
Z-Z, +D+0.750S+0.450W+H	1.459 k-ft	1.623 k-ft	1.112	OK
Z-Z, +0.60D+0.60W+0.60H	0.8756 k-ft	0.9738 k-ft	1.112	OK
Z-Z, +D+0.70E+0.60H	1.459 k-ft	1.623 k-ft	1.112	OK
Z-Z, +D+0.750L+0.750S+0.5250E+H	1.459 k-ft	1.623 k-ft	1.112	OK
Z-Z, +0.60D+0.70E+H	0.8756 k-ft	0.9738 k-ft	1.112	OK

All units k

Sliding Stability

Force Application Axis Load Combination...	Sliding Force	Resisting Force	Stability Ratio	Status
X-X, +D+H	0.20 k	0.3534 k	1.767	OK
X-X, +D+L+H	0.20 k	0.3534 k	1.767	OK
X-X, +D+Lr+H	0.20 k	0.3534 k	1.767	OK
X-X, +D+S+H	0.20 k	0.3534 k	1.767	OK
X-X, +D+0.750Lr+0.750L+H	0.20 k	0.3534 k	1.767	OK
X-X, +D+0.750L+0.750S+H	0.20 k	0.3534 k	1.767	OK
X-X, +D+0.60W+H	0.20 k	0.3534 k	1.767	OK
X-X, +D+0.750Lr+0.450W+H	0.20 k	0.3534 k	1.767	OK
X-X, +D+0.750S+0.450W+H	0.20 k	0.3534 k	1.767	OK
X-X, +0.60D+0.60W+0.60H	0.120 k	0.2496 k	2.080	OK
X-X, +D+0.70E+0.60H	0.20 k	0.3534 k	1.767	OK
X-X, +D+0.750L+0.750S+0.5250E+H	0.20 k	0.3534 k	1.767	OK
X-X, +0.60D+0.70E+H	0.120 k	0.2496 k	2.080	OK
Z-Z, +D+H	0.20 k	0.3769 k	1.884	OK
Z-Z, +D+L+H	0.20 k	0.3769 k	1.884	OK
Z-Z, +D+Lr+H	0.20 k	0.3769 k	1.884	OK
Z-Z, +D+S+H	0.20 k	0.3769 k	1.884	OK
Z-Z, +D+0.750Lr+0.750L+H	0.20 k	0.3769 k	1.884	OK
Z-Z, +D+0.750L+0.750S+H	0.20 k	0.3769 k	1.884	OK
Z-Z, +0.60D+0.60W+0.60H	0.120 k	0.2730 k	2.275	OK
Z-Z, +D+0.70E+0.60H	0.20 k	0.3769 k	1.884	OK
Z-Z, +D+0.750L+0.750S+0.5250E+H	0.20 k	0.3769 k	1.884	OK
Z-Z, +0.60D+0.70E+H	0.120 k	0.2730 k	2.275	OK
Z-Z, +D+0.60W+H	0.20 k	0.3769 k	1.884	OK
Z-Z, +D+0.750Lr+0.450W+H	0.20 k	0.3769 k	1.884	OK
Z-Z, +D+0.750S+0.450W+H	0.20 k	0.3769 k	1.884	OK

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.40D+1.60H	0.1526	+Z	Bottom	0.1296	Min Temp %	0.2347	2.925	OK
X-X, +1.40D+1.60H	0.05075	-Z	Top	0.1296	Min Temp %	0.2347	2.925	OK
X-X, +1.20D+0.50Lr+1.60L+1.60H	0.1308	+Z	Bottom	0.1296	Min Temp %	0.2347	2.925	OK
X-X, +1.20D+0.50Lr+1.60L+1.60H	0.04350	-Z	Top	0.1296	Min Temp %	0.2347	2.925	OK
X-X, +1.20D+1.60L+0.50S+1.60H	0.1308	+Z	Bottom	0.1296	Min Temp %	0.2347	2.925	OK
X-X, +1.20D+1.60L+0.50S+1.60H	0.04350	-Z	Top	0.1296	Min Temp %	0.2347	2.925	OK
X-X, +1.20D+1.60Lr+L+1.60H	0.1308	+Z	Bottom	0.1296	Min Temp %	0.2347	2.925	OK
X-X, +1.20D+1.60Lr+L+1.60H	0.04350	-Z	Top	0.1296	Min Temp %	0.2347	2.925	OK
X-X, +1.20D+1.60Lr+0.50W+1.60H	0.1308	+Z	Bottom	0.1296	Min Temp %	0.2347	2.925	OK
X-X, +1.20D+1.60Lr+0.50W+1.60H	0.04350	-Z	Top	0.1296	Min Temp %	0.2347	2.925	OK
X-X, +1.20D+L+1.60S+1.60H	0.1308	+Z	Bottom	0.1296	Min Temp %	0.2347	2.925	OK
X-X, +1.20D+L+1.60S+1.60H	0.04350	-Z	Top	0.1296	Min Temp %	0.2347	2.925	OK

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General Footing

DESCRIPTION: Footing Check

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.20D+1.60S+0.50W+1.60H	0.1308	+Z	Bottom	0.1296	Min Temp %	0.2347	2.925	OK
X-X, +1.20D+1.60S+0.50W+1.60H	0.04350	-Z	Top	0.1296	Min Temp %	0.2347	2.925	OK
X-X, +1.20D+0.50Lr+L+W+1.60H	0.1308	+Z	Bottom	0.1296	Min Temp %	0.2347	2.925	OK
X-X, +1.20D+0.50Lr+L+W+1.60H	0.04350	-Z	Top	0.1296	Min Temp %	0.2347	2.925	OK
X-X, +1.20D+L+0.50S+W+1.60H	0.1308	+Z	Bottom	0.1296	Min Temp %	0.2347	2.925	OK
X-X, +1.20D+L+0.50S+W+1.60H	0.04350	-Z	Top	0.1296	Min Temp %	0.2347	2.925	OK
X-X, +0.90D+W+1.60H	0.09812	+Z	Bottom	0.1296	Min Temp %	0.2347	2.925	OK
X-X, +0.90D+W+1.60H	0.03262	-Z	Top	0.1296	Min Temp %	0.2347	2.925	OK
X-X, +1.20D+L+0.20S+E+1.90H	0.1308	+Z	Bottom	0.1296	Min Temp %	0.2347	2.925	OK
X-X, +1.20D+L+0.20S+E+1.90H	0.04350	-Z	Top	0.1296	Min Temp %	0.2347	2.925	OK
X-X, +0.90D+E+0.90H	0.09812	+Z	Bottom	0.1296	Min Temp %	0.2347	2.925	OK
X-X, +0.90D+E+0.90H	0.03262	-Z	Top	0.1296	Min Temp %	0.2347	2.925	OK
Z-Z, +1.40D+1.60H	0.06423	-X	Top	0.1296	Min Temp %	0.2567	3.174	OK
Z-Z, +1.40D+1.60H	0.3136	+X	Bottom	0.1296	Min Temp %	0.2567	3.174	OK
Z-Z, +1.20D+0.50Lr+1.60L+1.60H	0.05506	-X	Top	0.1296	Min Temp %	0.2567	3.174	OK
Z-Z, +1.20D+0.50Lr+1.60L+1.60H	0.2688	+X	Bottom	0.1296	Min Temp %	0.2567	3.174	OK
Z-Z, +1.20D+1.60L+0.50S+1.60H	0.05506	-X	Top	0.1296	Min Temp %	0.2567	3.174	OK
Z-Z, +1.20D+1.60L+0.50S+1.60H	0.2688	+X	Bottom	0.1296	Min Temp %	0.2567	3.174	OK
Z-Z, +1.20D+1.60Lr+L+1.60H	0.05506	-X	Top	0.1296	Min Temp %	0.2567	3.174	OK
Z-Z, +1.20D+1.60Lr+L+1.60H	0.2688	+X	Bottom	0.1296	Min Temp %	0.2567	3.174	OK
Z-Z, +1.20D+1.60Lr+0.50W+1.60H	0.05506	-X	Top	0.1296	Min Temp %	0.2567	3.174	OK
Z-Z, +1.20D+1.60Lr+0.50W+1.60H	0.2688	+X	Bottom	0.1296	Min Temp %	0.2567	3.174	OK
Z-Z, +1.20D+L+1.60S+1.60H	0.05506	-X	Top	0.1296	Min Temp %	0.2567	3.174	OK
Z-Z, +1.20D+L+1.60S+1.60H	0.2688	+X	Bottom	0.1296	Min Temp %	0.2567	3.174	OK
Z-Z, +1.20D+1.60S+0.50W+1.60H	0.05506	-X	Top	0.1296	Min Temp %	0.2567	3.174	OK
Z-Z, +1.20D+1.60S+0.50W+1.60H	0.2688	+X	Bottom	0.1296	Min Temp %	0.2567	3.174	OK
Z-Z, +1.20D+0.50Lr+L+W+1.60H	0.05506	-X	Top	0.1296	Min Temp %	0.2567	3.174	OK
Z-Z, +1.20D+0.50Lr+L+W+1.60H	0.2688	+X	Bottom	0.1296	Min Temp %	0.2567	3.174	OK
Z-Z, +1.20D+L+0.50S+W+1.60H	0.05506	-X	Top	0.1296	Min Temp %	0.2567	3.174	OK
Z-Z, +1.20D+L+0.50S+W+1.60H	0.2688	+X	Bottom	0.1296	Min Temp %	0.2567	3.174	OK
Z-Z, +0.90D+W+1.60H	0.04129	-X	Top	0.1296	Min Temp %	0.2567	3.174	OK
Z-Z, +0.90D+W+1.60H	0.2016	+X	Bottom	0.1296	Min Temp %	0.2567	3.174	OK
Z-Z, +1.20D+L+0.20S+E+1.90H	0.05506	-X	Top	0.1296	Min Temp %	0.2567	3.174	OK
Z-Z, +1.20D+L+0.20S+E+1.90H	0.2688	+X	Bottom	0.1296	Min Temp %	0.2567	3.174	OK
Z-Z, +0.90D+E+0.90H	0.04129	-X	Top	0.1296	Min Temp %	0.2567	3.174	OK
Z-Z, +0.90D+E+0.90H	0.2016	+X	Bottom	0.1296	Min Temp %	0.2567	3.174	OK

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D+1.60H	2.43 psi	8.79 psi	2.12 psi	5.91 psi	8.79 psi	82.16 psi	0.11	OK
+1.20D+0.50Lr+1.60L+1.60H	2.08 psi	7.53 psi	1.81 psi	5.06 psi	7.53 psi	82.16 psi	0.09	OK
+1.20D+1.60L+0.50S+1.60H	2.08 psi	7.53 psi	1.81 psi	5.06 psi	7.53 psi	82.16 psi	0.09	OK
+1.20D+1.60Lr+L+1.60H	2.08 psi	7.53 psi	1.81 psi	5.06 psi	7.53 psi	82.16 psi	0.09	OK
+1.20D+1.60Lr+0.50W+1.60H	2.08 psi	7.53 psi	1.81 psi	5.06 psi	7.53 psi	82.16 psi	0.09	OK
+1.20D+L+1.60S+1.60H	2.08 psi	7.53 psi	1.81 psi	5.06 psi	7.53 psi	82.16 psi	0.09	OK
+1.20D+1.60S+0.50W+1.60H	2.08 psi	7.53 psi	1.81 psi	5.06 psi	7.53 psi	82.16 psi	0.09	OK
+1.20D+0.50Lr+L+W+1.60H	2.08 psi	7.53 psi	1.81 psi	5.06 psi	7.53 psi	82.16 psi	0.09	OK
+1.20D+L+0.50S+W+1.60H	2.08 psi	7.53 psi	1.81 psi	5.06 psi	7.53 psi	82.16 psi	0.09	OK
+0.90D+W+1.60H	1.56 psi	5.65 psi	1.36 psi	3.80 psi	5.65 psi	82.16 psi	0.07	OK
+1.20D+L+0.20S+E+1.90H	2.08 psi	7.53 psi	1.81 psi	5.06 psi	7.53 psi	82.16 psi	0.09	OK
+0.90D+E+0.90H	1.56 psi	5.65 psi	1.36 psi	3.80 psi	5.65 psi	82.16 psi	0.07	OK

Two-Way "Punching" Shear

All units k

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D+1.60H	1.35 psi	150.62psi	0.00893	OK
+1.20D+0.50Lr+1.60L+1.60H	1.15 psi	150.62psi	0.007654	OK
+1.20D+1.60L+0.50S+1.60H	1.15 psi	150.62psi	0.007654	OK
+1.20D+1.60Lr+L+1.60H	1.15 psi	150.62psi	0.007654	OK
+1.20D+1.60Lr+0.50W+1.60H	1.15 psi	150.62psi	0.007654	OK
+1.20D+L+1.60S+1.60H	1.15 psi	150.62psi	0.007654	OK
+1.20D+1.60S+0.50W+1.60H	1.15 psi	150.62psi	0.007654	OK
+1.20D+0.50Lr+L+W+1.60H	1.15 psi	150.62psi	0.007654	OK

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General Footing

DESCRIPTION: Footing Check

Two-Way "Punching" Shear — All units k

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.20D+L+0.50S+W+1.60H	1.15 psi	150.62psi	0.007654	OK
+0.90D+W+1.60H	0.86 psi	150.62psi	0.00574	OK
+1.20D+L+0.20S+E+1.90H	1.15 psi	150.62psi	0.007654	OK
+0.90D+E+0.90H	0.86 psi	150.62psi	0.00574	OK