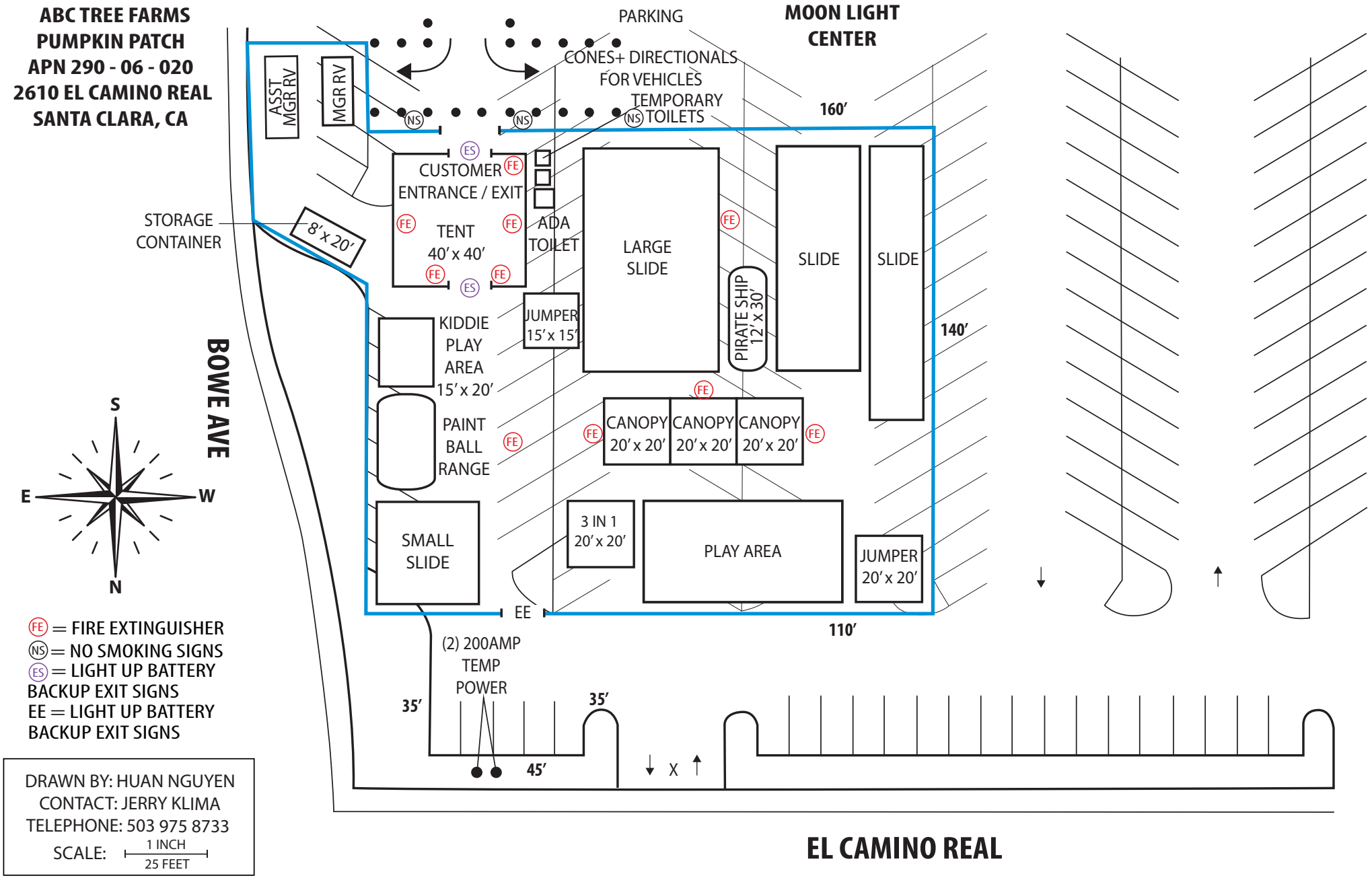
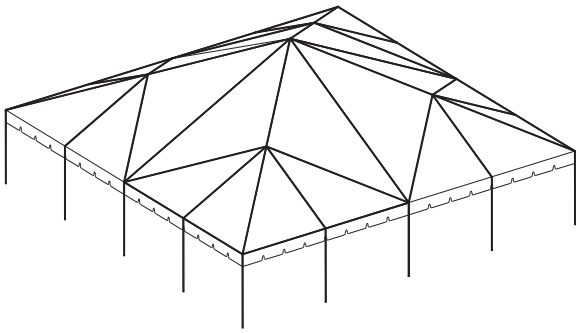
ABC TREE FARMS
PUMPKIN PATCH
APN 290 - 06 - 020
2610 EL CAMINO REAL
SANTA CLARA, CA

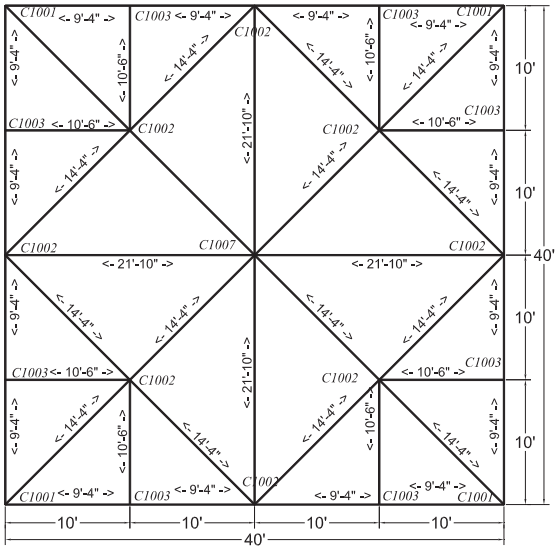


FE = FIRE EXTINGUISHER
NS = NO SMOKING SIGNS
ES = LIGHT UP BATTERY BACKUP EXIT SIGNS
EE = LIGHT UP BATTERY BACKUP EXIT SIGNS

DRAWN BY: HUAN NGUYEN
CONTACT: JERRY KLIMA
TELEPHONE: 503 975 8733
SCALE: 1 INCH = 25 FEET

40x40 Frame Tent





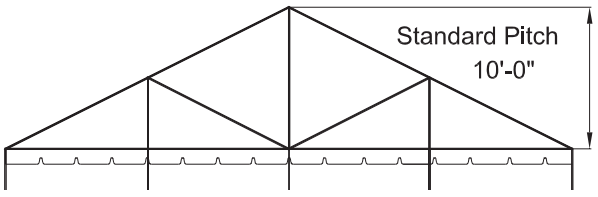
Fittings		
4	Corner	C1001
1	8 Way Crown	C1007
8	Side Tee Joint	C1003
4	6 Way Side Tee	C1002
4	6 Way Hip Joint	C1009
120	Canopy Pins	P102

Poles			Color
4	21'10"	Hip Rafter	Red
16	14'4"	Spreader	Red
8	10'6"	Rafter	Green
16	9'4"	Spreader	White
16	7'8"	Legs	Black

Tops Options
White 13oz. Translucent
White 15oz. Blackout
Colors (Solid or stripe)
Expandable 2 pieces.

Frame Options
2 in. Frame standard
D-Tube Heavy duty

Accessories	
4	Corner Leg Braces
8	Tee Joint Leg Braces
20	Ropes and Stakes (16 Minimum)
160	Feet-Sidewall



Central Tent — Commercial Frame Tent — Central Tent — Quality Frame Tent — Central Tent — Commercial Frame Tent — Central Tent — Quality Frame Tent — Central Tent — Commercial Frame Tent — Central

Central Tent — Commercial Frame Tent — Central Tent — Quality Frame Tent — Central Tent — Commercial Frame Tent — Central Tent — Quality Frame Tent — Central Tent — Commercial Frame Tent — Central

Certificate of Flame Resistance

REGISTERED APPLICATION CONCERN No.

FA-41501

ISSUED BY
ANZA TENT DESIGN
375 MAPLE AVE
TORRANCE, CA.

Date treated or manufactured

11/2007

This is to certify that the materials described on the reverse side hereof have been flame-retardant treated (or are inherently nonflammable).

FOR ABC Seasonal Specialty Supply ADDRESS 2380 Monroe Street

CITY Santa Clara STATE California

Certification is hereby made that: (Check "a" or "b")

☐ (a) The articles described on the reverse side of this Certificate have been treated with a flame-retardant chemical approved and registered by the State Fire Marshal and that the application of said chemical was done in conformance with the laws of the State of California and the Rules and Regulations of the State Fire Marshal.

Name of chemical used.....Chem. Reg. No.....

Method of application.....

☒ (b) The articles described on the reverse side hereof are made from a flame-resistant fabric or material registered and approved by the State Fire Marshal for such use.

Trade name of flame-resistant fabric or material used.....Reg. No. FA-41501

The Flame Retardant Process Used Will Not (will or will not) Be Removed by Washing

Armando Gonzalez
Name of Applicator or Production Superintendent

By Jim Choura-President
Title

CONTROL NO._____

CUSTOMER ORDER NO._____

CUSTOMER INVOICE NO._____

YARDS OR QUANTITY_____

COLOR_____

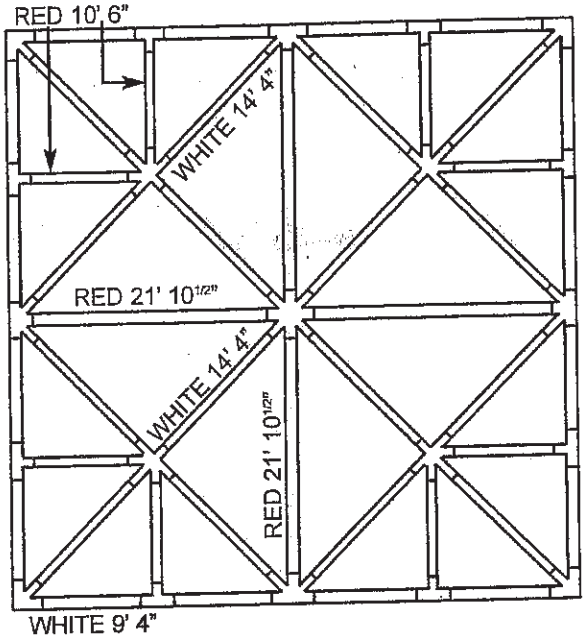
STYLE_____

DATE PROCESSED_____

2- 40'x40' (2pc) 16oz. b/o white frame canopy top

1- 40'x60' (3pc) 16oz. b/o white frame canopy top
with 40'x20' 16oz. b/o white canopy middle

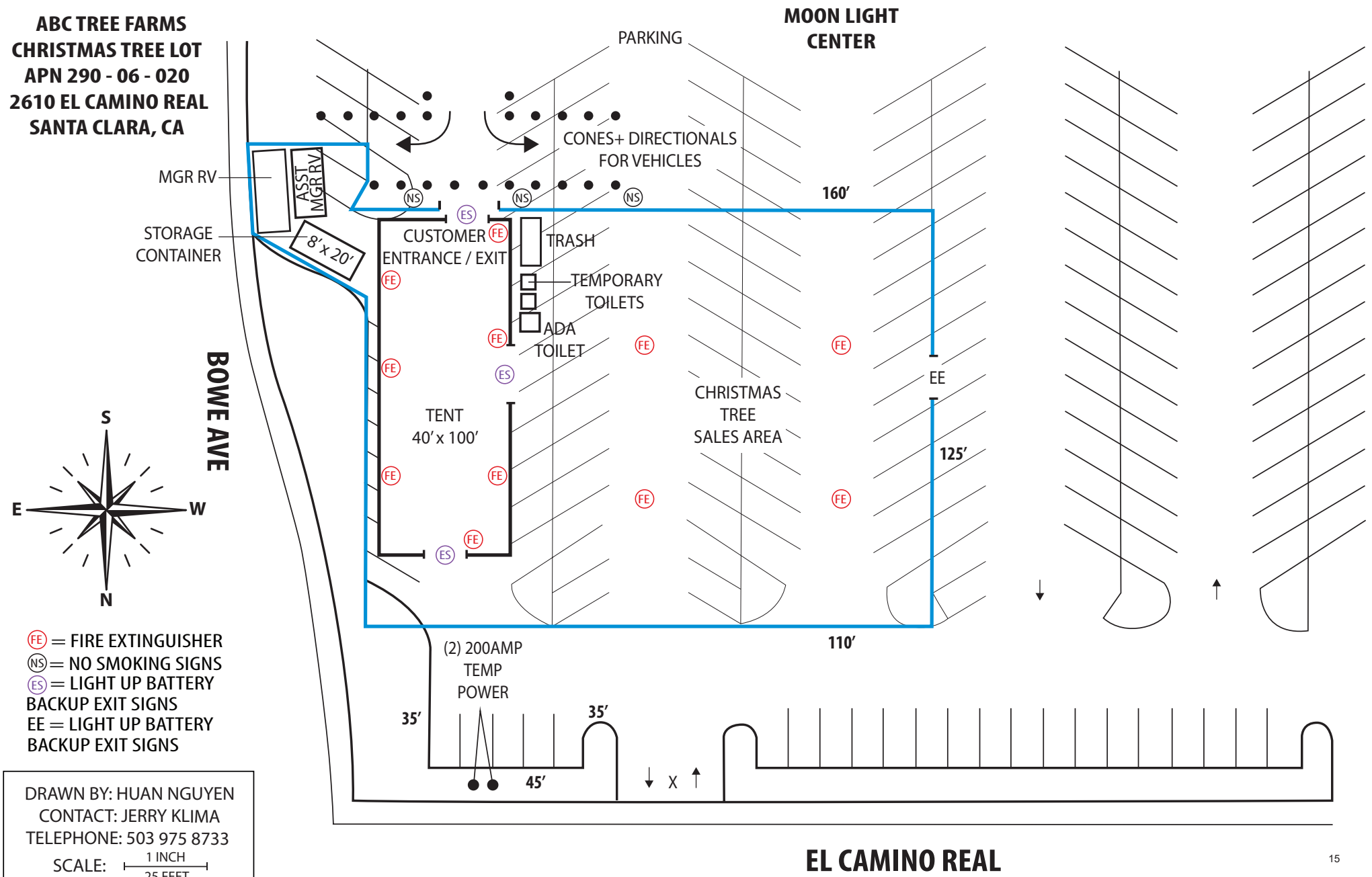
40' x 40' x 8' CANOPY



PARTS LIST

Qty	Pipe	Wt. per	Total	Qty	Fittings	Wt. per	Total	Qty	Accessories	Wt. per	Total
16	7' 8" (Legs)	7 lbs	112lbs	4	Corners	5 lbs	20 lbs	1	40x40 Top	267lbs	267lbs
8	10' 6"(Hip Rafter)	9 lbs	72 lbs	1	8 Way Crown	13 lbs	13 lbs	116	Pins	1/2 lbs	58 lbs
16	14' 4"(Hip Rafter)	13 lbs	208lbs	8	Tee Fittings	6 lbs	48 lbs				
16	9' 4" (Spreader)	8 lbs	128lbs	4	Inter-fittings	6 lbs	24 lbs				
4	21' 10 1/2"(Spreader)	19 lbs	76lbs	4	Special Tee fit.	10 lbs	40 lbs				
										Total Weight:	1066 lbs

ABC TREE FARMS
CHRISTMAS TREE LOT
APN 290 - 06 - 020
2610 EL CAMINO REAL
SANTA CLARA, CA



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DRAWN BY: HUAN NGUYEN
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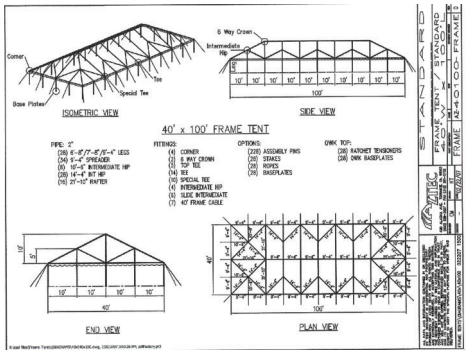
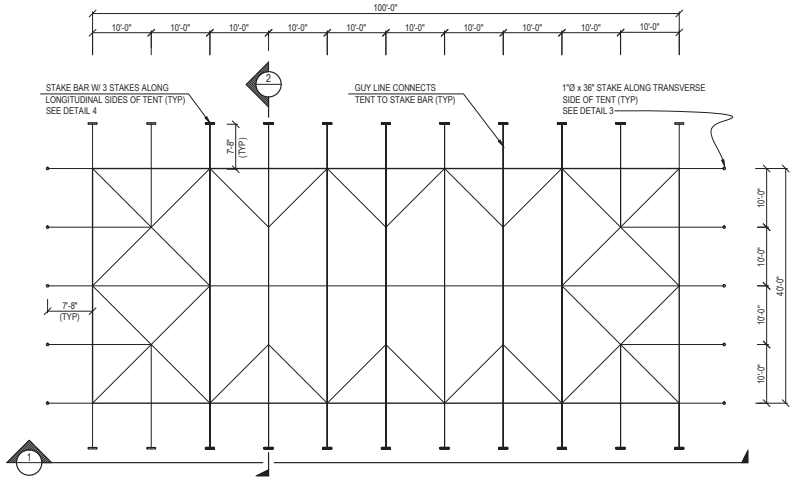
TELEPHONE: 503 975 8733
SCALE: 1 INCH = 25 FEET

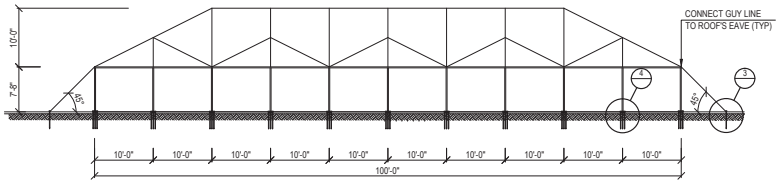
LEGEND	
SINGLE STAKE SEE DETAIL 3	TOTAL NUMBER OF SINGLE-STAKE ANCHORS = 10
STAKE BAR W/ 3 STAKES SEE DETAIL 4	TOTAL NUMBER OF GROUP-STAKE ANCHORS = 22



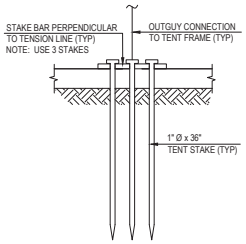
40' x 100' FRAME HIP END TENT
NOT TO SCALE



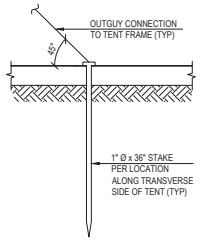
40' x 100' FRAME HIP END TENT
NOT TO SCALE



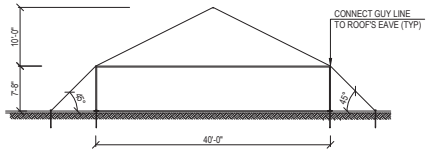
1 LONGITIDUNAL ELEVATION
NOT TO SCALE



4 DETAIL OF GROUP STAKING (TYP)
NOT TO SCALE



3 DETAIL OF SINGLE STAKE (TYP)
NOT TO SCALE



2 TRANSVERSE SECTION
NOT TO SCALE

16

General Notes

40' x 100' FRAME HIP END TENT
2610 EL CAMINO REAL SANTA CLARA, CA 95051

LICENSED PROFESSIONAL ENGINEER
PETER SCOTT GEISSLER
C 44320
EXP. 10/30/23
CIVIL
STATE OF CALIFORNIA

No.	Revision/Issue	Date

Firm Name and Address

GEISSLER ENGINEERING
Civil ⁂ Structural
235 MONTGOMERY STREET SUITE 1011
SAN FRANCISCO, CA 94104
TEL: (415) 760 - 5636

Project Name and Address

40' x 100' HIP END TENT
2610 EL CAMINO REAL
SANTA CLARA, CA 95051

Project	Sheet
E17 - 2343	S1
Date: 10 JUNE 2021	
Scale: NOT TO SCALE	

Peter Geissler, Ph.D., P.E.
Consulting Civil Engineer

WIND LOADING ANALYSIS

40' x 100' AZTEC TENT ANALYSIS

Date: 10th June 2021

Site: 2610 El Camino Real
Santa Clara, CA 95051

Client: Jerry Klima
ABC Tree Farms

Ref: Geissler Engineering Project No. E17 – 2343
Drawings by Geissler Engineering dated 10 June 2021

Building Code: 2019 California Building Code
ASCE 7-10

SCOPE OF WORK

At issue is the anchorage adequacy of the 40' x 100' Aztec Tent Frame.

WIND LOADING ANALYSIS

The Directional Procedure (Sect. 27.1, ASCE 7-10) is used to determine the wind loading pressures and the factored (as per required load combinations) wind loading pressures acting on both structures.

Step 1. – Determine risk category

Risk Category = I (Table 1.5-1, ASCE 7-10)

Step 2. – Determine the basic wind speed

Basic Wind Speed, V = 90 mph (As per local Fire Marshall ordinance)

Step 3. – Determine the wind load parameters

Wind directionality factor, K_d = 0.85 (Table 26.6-1, ASCE 7-10)

Exposure Category = "C" (Sect. 26.7, ASCE 7-10)

Topographic factor, K_{zt} = 1.0 (Sect. 26.8, ASCE 7-10)

Gust Effect Factor, G = 0.85 (Sect. 26.9, ASCE 7-10)

Internal Pressure Coefficient, $GC_{pi} = \pm 0.00$ (Sect. 26.11, ASCE 7-10)

Step 4. – Determine velocity pressure exposure coefficient

The wind velocity pressure exposure coefficient, K_z , varies and is dependent on the height above ground. (Table 27.3-1, ASCE 7-10)

height above ground, **z** (ft)	velocity pressure exposure coefficient, $\mathbf{K_z}$
0 - 15	0.85
20	0.90
25	0.94
30	0.98

K_h is evaluated at the mean roof height. The mean roof height of the tent, h, and K_h is the following.

h = 12.67 ft mean roof height
$K_h = 0.85$ (Table 27.3-1, ASCE 7-10)

Step 5. – Determine velocity pressure

Velocity Pressure, q_z, evaluated at height z is determined by the following equation:

$$q_z = 0.00256\, K_z\, K_{zt}\, K_d\, V^2 \qquad \text{(Eqn. 27.3-1, ASCE 7-10)}$$

Height above ground, **z** (ft)	Velocity pressure exposure coefficient, K_z	Topographic Factor, K_{zt}	Wind Directionality Factor, K_d	Basic Wind Speed, **V** (mph)	velocity pressure, q_z (psf)
0 - 15	0.85	1	0.85	100	14.98
20	0.9	1	0.85	100	15.86
25	0.94	1	0.85	100	16.57
30	0.98	1	0.85	100	17.27

Height of the tent walls do not exceed 15 ft. However, the value for q_z and q_h shall be taken as the same for conservative design.

$$q_z = q_h = 0.00256\,(0.85)\,(1.0)\,(0.85)\,(90)^2 = 14.98 \text{ psf}$$

Step 6. – Determine external pressure coefficients

External pressure coefficients, C_p, are determined for two wind directions: (i) parallel to the short tent dimension and; (ii) parallel to the long tent dimension. External pressure coefficients, C_p, are determined as per Figure 27.4-1, ASCE 7-10 and tabulated below.

The external and net wind pressures are:

MWFRS Pressures: Wind Parallel To Short Building Direction

Surface	**z** (ft)	q_z (psf)	**G**	C_p	$p_{ext} = q_z G C_p$	$p_{net} = p_{ext} - p_i$ (psf)	
						GC_{pi} = 0.18	GC_{pi} = -0.18
Windward Wall	All	14.98	0.85	0.8	10.19	7.49	12.88
Leeward Wall	All	14.98	0.85	-0.5	-6.37	-9.06	-3.67
Side Walls	All	14.98	0.85	-0.7	-8.91	-11.61	-6.22
Windward Roof	-	14.98	0.85	-0.2	-2.55	-5.24	0.15
		14.98	0.85	0.3	3.82	1.12	6.52
Leeward Roof	All	14.98	0.85	-0.6	-7.64	-10.34	-4.94

Plus and minus signs signify pressures acting toward and away from the surfaces respectively.

MWFRS Pressures: Wind Parallel To Long Building Direction

Surface	z (ft)	q_z (psf)	G	C_p	$p_{ext} = q_z G C_p$	$p_{net} = p_{ext} - p_i$ (psf)	
						GC_{pi} = 0.18	GC_{pi} = -0.18
Windward Wall	All	14.98	0.85	0.8	10.19	7.49	12.88
Leeward Wall	All	14.98	0.85	-0.5	-6.37	-9.06	-3.67
Side Walls	All	14.98	0.85	-0.7	-8.91	-11.61	-6.22
Roofs	0 - h	14.98	0.85	-0.9	-11.46	-14.16	-8.76
		14.98	0.85	-0.18	-2.29	-4.99	0.40
	h - 2h	14.98	0.85	-0.5	-6.37	-9.06	-3.67
		14.98	0.85	-0.18	-2.29	-4.99	0.40
	> 2h	14.98	0.85	-0.3	-3.82	-6.52	-1.12
		14.98	0.85	-0.18	-2.29	-4.99	0.40

Plus and minus signs signify pressures acting toward and away from the surfaces respectively.

Step 7 - Determine the wind pressure, P

The tent is enclosed. Therefore, the wind pressure, P, shall be determined as per equation 27.4-1, ASCE 7-10.

$P = qGC_p - q(GC_{pi})$ design wind pressure

Wind Parallel To Short Tent Direction - Design Pressures, P (psf)				
Load Case	Windward Wall	Windward Roof	Leeward Roof	Leeward Wall
A	10.19	-2.55	-7.64	-6.73
B	10.19	3.82	-7.64	-6.73

Wind Parallel To Long Tent Direction - Design Pressures, P (psf)					
Load Case	Windward Wall	Leeward Wall	Roof Zone (0 –h)	Roof Zone (h – 2h)	Roof Zone (>2h)
C	10.19	-6.37	-11.46	-6.37	-3.82
D	10.19	-6.37	-2.29	-2.29	-2.29

The forces acting on each tent surface in all cases are tabulated as follows.

Load Case A: Wind Parallel To Short Tent Direction

Surface	Area (sq. ft.)	$p_{ext} = q_z G C_p$	Force, F (lb)	Horizontal Force, F_X (lb)	Vertical Force, F_Y (lb)	Sum of Horizontal Forces, F_{Xnet} (lb)	Sum of Vertical Forces, F_{Ynet} (lb)
Windward Wall	767	10.19	7,810	7,810	0	17,770	-20,391
Leeward Wall	767	-6.37	-4,882	4,882	0		
Windward Roof	2,236	-2.55	-5,695	-2,539	-5,098		
Leeward Roof	2,236	-7.64	-17,085	7,617	-15,293		

Load Case B: Wind Parallel To Short Tent Direction

Surface	Area (sq. ft.)	$p_{ext} = q_z G C_p$	Force, F (lb)	Horizontal Force, F_X (lb)	Vertical Force, F_Y (lb)	Sum of Horizontal Forces, F_{Xnet} (lb)	Sum of Vertical Forces, F_{Ynet} (lb)
Windward Wall	767	10.19	7,810	7,810	0	24,118	-7,647
Leeward Wall	767	-6.37	-4,882	4,882	0		
Windward Roof	2,236	3.82	8,543	3,809	7,647		
Leeward Roof	2,236	-7.64	-17,085	7,617	-15,293		

Load Case C: Wind Parallel To Long Tent Direction

Surface		Area (sq. ft.)	$p_{ext} = q_z GCp$	Force, F (lb)	Horizontal Force, F_X (lb)	Vertical Force, F_Y (lb)	Sum of Horizontal Forces, F_{Xnet} (lb)	Sum of Vertical Forces, F_{Ynet} (lb)
Windward Wall		507	10.19	5,162	5,162	0	8,388	-20,459
Leeward Wall		507	-6.37	-3,226	3,226	0		
Roof Zone	0 -h	566	-11.46	-6,492	0	-5,811		
	h – 2h	566	-6.37	-3,607	0	-3,229		
	>2h	3,339	-3.82	-12,757	0	-11,419		

Load Case D: Wind Parallel To Long Tent Direction

Surface		Area (sq. ft.)	$p_{ext} = q_z GCp$	Force, F (lb)	Horizontal Force, F_X (lb)	Vertical Force, F_Y (lb)	Sum of Horizontal Forces, F_{Xnet} (lb)	Sum of Vertical Forces, F_{Ynet} (lb)
Windward Wall		507	10.19	5,162	5,162	0	8,388	-9,176
Leeward Wall		507	-6.37	-3,226	3,226	0		
Roof Zone	0 -h	566	-2.29	-1,298	0	-1,162		
	h – 2h	566	-2.29	-1,298	0	-1,162		
	>2h	3339	-2.29	-7,654	0	-6,851		

Step 8 - Consider load combinations

Sum of Lateral and Uplift Forces		
Load Case	F_x	F_y
A	17,770	-20,391
B	24,118	-7,647
C	8,388	-20,459
D	8,388	-9,176

Most severe lateral force ⇒ $F_{lateral}$ = 24,118 lb

Most severe uplift force ⇒ F_{uplift} = -20,459 lb

The basic load combination that accommodates for the worst case shall be taken:

$F_{COMBINATION}$ = 0.6 D + 0.6 W (Sect. 2.4.1, ASCE 7-10)

Factored (0.6W) Sum of Lateral and Uplift Forces		
Load Case	F_x	F_y
A	10,662	-12,234
B	14,471	-4,588
C	5,033	-12,275
D	5,033	-5,506
Governing:	**14,471**	**-12,275**

Factored lateral force ⇒ (0.6) (24,118) = 14,471 lb

Factored uplift force ⇒ (0.6) (-20,459) = -12,275 lb

Evaluate Proposed Staking Layout

Stakes are used as the primary anchoring method to prevent uplift and sliding caused by wind loading. The stakes are connected to the tent's framing members at the roof's eave height by way of guy lines (tension lines). Stakes are 1 inch in diameter and 36 inches in length. Stakes are required to be completely embedded into earth.

See drawings by Geissler Engineering dated 30 August 2017.

Staking Anchorage Requirements:

Stake pullout strength is determined as per *2006 IFAI Pullout Capacity of Tent Stakes*.

Pullout Capacity for a Single Stakes

P_b =	800	lb	pullout capacity for a standard stake (the baseline case)
C_e =	1.0		correction factor for embedment depth
C_f =	1.0		correction factor for fastening height
C_i =	1.0		correction factor for stake inclination
C_d =	1.0		correction factor for stake diameter
C_l =	0.9		correction factor for load angle

$P = P_b \times C_e \times C_f \times C_i \times C_l \times C_d$ pullout capacity for a single stake

P =	680	lb	allowable tension for single stake

Pullout Capacity for Grouped Stakes

Number of Stakes =	3	stakes	three stakes installed in a line perpendicular to direction of pull

$P = Pb \times Ce \times Cf \times Ci \times Cl \times Cd \times Cg$ pullout capacity for a grouped stakes

P_g =	1,877	lb	allowable tension for grouped stakes

Longitudinal Wall (Long Wall)		
Single stake anchorage locations =	0	locations
Group stake anchorage locations =	11	locations
Number of anchorage locations =	11	locations
Transverse Wall (Short Wall)		
Single stake anchorage locations =	5	locations
Group stake anchorage locations =	0	locations
Number of anchorage locations =	5	locations
*Total number of anchorage locations for entire tent =	32	locations
(*Corners have 2 anchors installed in both isometric directions. This condition has been considered)		

Check Lateral Wind Loading Against Proposed Anchorage		
Governing Lateral Force, $F_{lateral}$ =	**14,471**	**lb**
Number of anchorage locations in tension =	21	locations
Tension at each anchorage location, F_{TL} =	689	lb
($F_{lateral}$/ number of anchorage locations in tension)		
Number of single-stakes in tension =	10	
Combined tensile strength of single-stake locations =	6,800	lb
Number of group-stakes in tension =	11	
Combined tensile strength of group-stake locations =	20,645	lb
Resistance against lateral wind loading =	**27,456**	**lb**
D/C =	**1.90**	**PASS**

Check Uplift Wind Loading Against Proposed Anchorage		
Governing Uplift Force, F_{uplift} =	**12,275**	**lb**
Number of anchorage locations in tension =	32	locations
Tension at each anchorage location, F_{TL} =	384	lb
(F_{uplift}/ number of anchorage locations in tension)		
Number of single-stakes in tension =	10	
Combined tensile strength of single-stake locations =	6,800	lb
Number of group-stakes in tension =	22	
Combined tensile strength of group-stake locations =	41,290	lb
Resistance against uplift wind loading =	**48,090**	**lb**
D/C =	**3.92**	**PASS**

CALIFORNIA DEPARTMENT OF FORESTRY and FIRE PROTECTION
OFFICE OF THE STATE FIRE MARSHAL

REGISTERED FLAME RESISTANT PRODUCT

Product:
SOLAR TENT 16 OZ; 13 OZ

Registration No.
F-92801

Product Marketed By:
LARK INTERNATIONAL INC
9820 BELL RANCH DR #102
SANTA FE SPRINGS, CA 90670

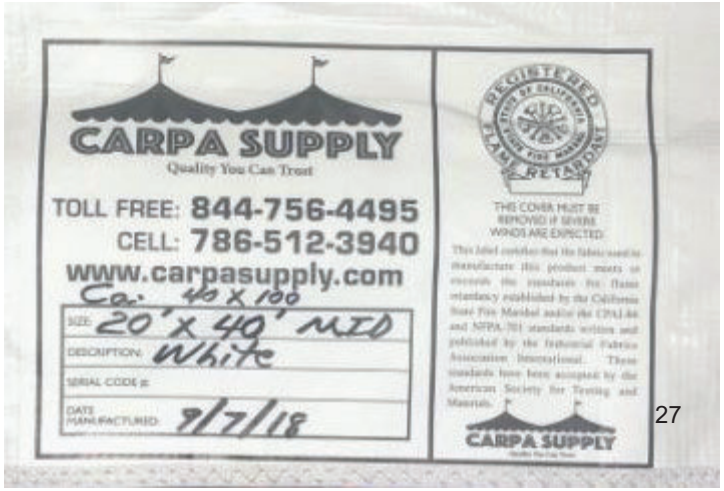
This product meets the minimum requirements of flame resistance established by the California State Fire Marshal for products identified in Section 13115, California Health and Safety Code.

The scope of the approved use of this product is provided in the current edition of the **CALIFORNIA APPROVED LIST OF FLAME RETARDANT CHEMICALS AND FABRICS, GENERAL AND LIMITED APPLICATIONS CONCERNS** published by the California State Fire Marshal.

Deputy State Fire Marshal

Expire: 6/30/2019

FR-8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Quality You Can Trust
TOLL FREE: 844-756-4495
CELL: 786-512-3940
www.carpasupply.com
Co: 40 x 100
SIZE: 20' x 40' MID
DESCRIPTION: White
SERIAL CODE #:
DATE MANUFACTURED: 9/7/18
REGISTERED
FLAME RETARDANT
THIS COVER MUST BE REMOVED IF SEVERE WINDS ARE EXPECTED
CARPA SUPPLY