STRUCTURAL CALCULATIONS

A CUSTOM ALTERATION

FOR
SHIELDS RESIDENCE

5191 E. LAKESIDE DR.
PALM SPRINGS, CALIFORNIA

CHARLES D. GARLAND, ARCHITECT
LICENSE NO. 11991 EXP 10/31/25
74-991 JONI DR. SUITE #9 PALM DESERT CA 92260

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APPROVED
By Ashley Cummins at 1:39 pm, Jan 17, 2024

LICENSED ARCHITECT
CHARLES D. GARLAND
No. C11991
10 / 31 / 2025
EXP. DATE
STATE OF CALIFORNIA

PLAN REVIEW ACCEPTANCE

FOR COMPLIANCE WITH THE APPLICABLE CALIFORNIA BUILDING, PLUMBING, MECHANICAL, ELECTRICAL, AND ENERGY CODES AS AMENDED BY THE JURISDICTION.
PLAN REVIEW ACCEPTANCE OF DOCUMENTS DOES NOT AUTHORIZE CONSTRUCTION TO PROCEED IN VIOLATION OF ANY FEDERAL, STATE, NOR LOCAL REGULATION.

Maram Aljamal
BY: Greg Mason DATE: 1/8/24

WEST COAST CODE CONSULTANTS, INC. (WC³)

11/22/23

GOVERNING CODES

CBC 2022 & ASCE 7-22. ACI318-19, 2018NDS, 2018NDS SDPWS

A- DESIGN LOADS

a. ROOF LIVE LOAD 20, PSF
b. ROOF DEAD LOAD 12 PSF
c. WIND IMPORTANCE FACTOR 1.00 WIND ZONE
   INTERNAL PRESSURE COEFFICIENT GCpi=+/-0.18
   ENCLOSED BUILDINGS
   WIND SPEED 130 MPH
   EXPOSURE C IW=1.00 Kzt=1.00
d. SITE CLASS DEFINITION (D)
e. RISK CATEGORY II
f. SEISMIC DESIGN CATEGORY (D)
g. COEFFICIENT Cs 0.26(ASD)
h. SEISMIC Ss 1.604g
i. SEISMIC S1 0.66g
j. FACTOR R 6.5
k. SEISMIC SDs 1.28
l. SEISMIC SD1 0.75

L O A D S :

FLAT ROOF

	PSF
TAR / GRAVEL	1.7
PLYWOOD =	2.8
RAFTERS =	3
INSULATION =	0.5
CEILING =	4
D.L =	12
L.L =	20
TOTAL LOAD =	32 PSF

EXTERIOR WALLS :

	PSF
WOOD STUDS =	2
1/2" GYP BD. =	2
7/8" STUCCO =	10
INSULATION=	1
D.L.=	15 PSF

INTERIOR WALLS :

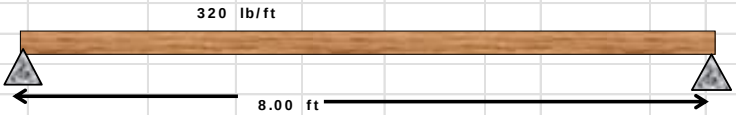
	PSF
WOOD STUDS =	2
1/2 GYP.BD.2SIDES =	3
INSULATION =	2
D.L =	7 PSF

BEAM DESIGN

HDR1

DOUGLAS FIR-LARCH No 1=

										Fb =	1000	psi		
SPAN =	8.0	ft								Fv =	95	psi		
TRIB. AREA =		10.0	ft							E =	1700000	psi		
				Load Factor C_D =				1.25						
				Wet. Service Factor C_M =				1.00						
D.L =	12.0	lb/ft		Temperature Factor Ct =				1.00						
L.L =	20.0	lb/ft		Size Factor C_F =				1.00						
TOTAL	32.0	lb/ft		Repetitive m. Fact. Cr =				1.00						
				Incising Factor Ci =				1.00						
				Shear stress Factor C_H =				1.00		W =	320.0	lb/ft		



M= W x L² / 8
M= 2560.0 ft-lb
M= 30720 in-lb
V= W x L / 2
V= 1280 lb

BENDING

F´b = Fbx(CD)(CM)(Ct)(CF)(Cr)(Ci)

	F´b =	1250	psi					USE						
Req´d S =	M / F´b		S=	24.58	in^3			4	X	8	Area =	25.4	in^2	
					f b =	M/S					Section=	30.7	in^3	
ALLOW F´b =				ACT. f b =							Moment of Inertia=	111	in^4	
	1250	psi		>		1002.0	psi		**OK**					

SHEAR

F´v = Fv(CD)(CM)(Ct)(CH)

					f v =	1.5 V / A								
	F´v =	119	psi	>	f v =	75.65	psi		**OK**					

DEFLECTION

$5W_L L^4$ / 384 E´ I	.=	0.16	in						**OK**					
E´=	E (C_M)(C_t)(C_i)			1700000	psi									
							BEAM	4	X	8				
d max =	L / 240 =		0.40	in										

BEAM DESIGN

HDR2

DOUGLAS FIR-LARCH No 1=

										Fb =	1000	psi		
SPAN =	6.0	ft								Fv =	95	psi		
TRIB. AREA =	10.0	ft								E =	1700000	psi		
				Load Factor C_D =				1.25						
				Wet. Service Factor C_M =				1.00						
D.L =	12.0	lb/ft		Temperature Factor Ct =				1.00						
L.L =	20.0	lb/ft		Size Factor C_F =				1.00						
TOTAL	32.0	lb/ft		Repetitive m. Fact. Cr =				1.00						
				Incising Factor Ci =				1.00						
				Shear stress Factor C_H =				1.00		W =	320.0	lb/ft		

M= W x L² / 8
M= 1440.0 ft-lb
M= 17280 in-lb

V= W x L / 2
V= 960 lb

BENDING

F´b = Fbx(CD)(CM)(Ct)(CF)(Cr)(Ci)

F´b = 1250 psi

USE 4 X 6 Area = 19.3 in^2

Req´d S = M / F´b S= 13.82 in^3

f b = M/S Section= 17.7 in^3

Moment of Inertia= 48.5 in^4

ALLOW F´b = 1250 psi > ACT. f b = 979.0 psi **OK**

SHEAR

F´v = Fv(CD)(CM)(Ct)(CH)

f v = 1.5 V / A

F´v = 119 psi > f v = 74.81 psi **OK**

DEFLECTION

$\frac{5W_L L^4}{384\,E'\,I}$.= 0.11 in **OK**

E´= E (C_M)(C_t)(C_i) 1700000 psi

BEAM 4 X 6

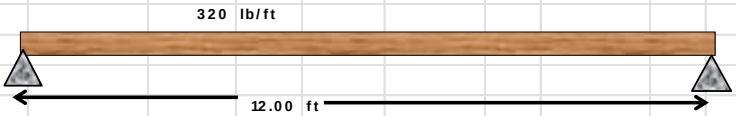
d max = L / 240 = 0.30 in

BEAM DESIGN

HDR3

DOUGLAS FIR-LARCH No 1=

												Fb =	1000	psi		
SPAN =	12.0	ft										Fv =	95	psi		
TRIB. AREA =	10.0	ft										E =	1700000	psi		
				Load Factor C_D =				1.25								
				Wet. Service Factor C_M =				1.00								
D.L =	12.0	lb/ft		Temperature Factor Ct =				1.00								
L.L =	20.0	lb/ft		Size Factor C_F =				1.00								
TOTAL	32.0	lb/ft		Repetitive m. Fact. Cr =				1.00								
				Incising Factor Ci =				1.00								
				Shear stress Factor C_H =				1.00				W =	320.0	lb/ft		



M= W x L² / 8
M= 5760.0 ft-lb
M= 69120 in-lb
V= W x L / 2
V= 1920 lb

BENDING

F´b = Fbx(CD)(CM)(Ct)(CF)(Cr)(Ci)

	F´b =	1250	psi						USE							
Req´d S =	M / F´b		S=	55.30	in^3				6	X	10	Area =	52.3	in^2		
					f b =	M/S						Section=	82.7	in^3		
ALLOW F´b =				ACT. f b =								Moment of Inertia=	393	in^4		
	1250	psi		>		835.5	psi		**OK**							

SHEAR

F´v = Fv(CD)(CM)(Ct)(CH) f v = 1.5 V / A

	F´v =	119	psi	>	f v =	55.12	psi		**OK**							

DEFLECTION

$5W_L L^4$	.=	0.22	in													
384 E´ I									**OK**							
E´=	E (C_M)(C_t)(C_i)			1700000	psi											
							BEAM		6	X	10					
d max =	L / 240 =		0.60	in												

PARALLAM 5 1/4" X 9 1/2"

BEAM DESIGN

HDR4

DOUGLAS FIR-LARCH No 1=

											Fb =	1000	psi	
SPAN =	3.0	ft									Fv =	95	psi	
TRIB. AREA =	15.0	ft									E =	1700000	psi	
				Load Factor C_D =				1.25						
				Wet. Service Factor C_M =				1.00						
D.L =	12.0	lb/ft		Temperature Factor Ct =				1.00						
L.L =	20.0	lb/ft		Size Factor C_F =				1.00						
TOTAL	32.0	lb/ft		Repetitive m. Fact. Cr =				1.00						
				Incising Factor Ci =				1.00						
				Shear stress Factor C_H =				1.00			W =	480.0	lb/ft	

480 lb/ft

3.00 ft

M= W x L² / 8
M= 540.0 ft-lb
M= 6480 in-lb
V= W x L / 2
V= 720 lb

BENDING

F´b = Fbx(CD)(CM)(Ct)(CF)(Cr)(Ci)

	F´b =	1250	psi					USE						
Req´d S =	M / F´b		S=	5.18	in^3			4	X	6	Area =	19.3	in^2	
					f b =	M/S					Section=	17.7	in^3	
ALLOW F´b =				ACT. f b =							Moment of Inertia=	48.5	in^4	
	1250	psi		>		367.1	psi		**OK**					

SHEAR

F´v = Fv(CD)(CM)(Ct)(CH)

					f v =	1.5 V / A								
	F´v =	119	psi	>	f v =	56.10	psi		**OK**					

DEFLECTION

$5W_L L^4$	.=	0.01	in											
384 E´ I									**OK**					
E´=	E (C_M)(C_t)(C_i)			1700000	psi									
							BEAM	4	X	6				
d max =	L / 240 =	0.15	in											

BEAM DESIGN

HDR5

DOUGLAS FIR-LARCH No 1=

											Fb =	1000	psi		
SPAN =	9.5	ft									Fv =	95	psi		
TRIB. AREA =	9.0	ft									E =	1700000	psi		
				Load Factor C_D =				1.25							
				Wet. Service Factor C_M =				1.00							
D.L =	12.0	lb/ft		Temperature Factor Ct =				1.00							
L.L =	20.0	lb/ft		Size Factor C_F =				1.00							
TOTAL	32.0	lb/ft		Repetitive m. Fact. Cr =				1.00							
				Incising Factor Ci =				1.00							
				Shear stress Factor C_H =				1.00			W =	288.0	lb/ft		
											M=	W x L² / 8			
	288 lb/ft										M=	3249.0	ft-lb		
											M=	38988	in-lb		
	9.50 ft										V=	W x L / 2			
BENDING											V=	1368	lb		
F´b =	Fbx(CD)(CM)(Ct)(CF)(Cr)(Ci)														
	F´b =	1250	psi						USE						
Req´d S =	M / F´b		S=	31.19	in^3				4	X	10	Area =	32.4	in^2	
					f b =	M/S						Section=	49.9	in^3	
ALLOW F´b =				ACT. f b =								Moment of Inertia=	231	in^4	
	1250	psi		>		781.2	psi		**OK**						
SHEAR															
F´v = Fv(CD)(CM)(Ct)(CH)					f v =	1.5 V / A									
	F´v =	119	psi	>	f v =	63.37	psi		**OK**						
DEFLECTION															
$5W_L L^4$	.=	0.13	in												
384 E´ I									**OK**						
E´=	E (C_M)(C_t)(C_i)			1700000	psi										
							BEAM	4	X	10					
d max =	L / 240 =	0.48	in												

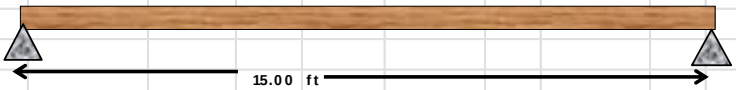
PARALLAM - 3 1/2" X 9 1/2"

BEAM DESIGN

BEAM #1

DOUGLAS FIR-LARCH No 1=

										Fb =	1000	psi	
SPAN =	15.0	ft								Fv =	95	psi	
TRIB. AREA =	12.0	ft								E =	1700000	psi	
				Load Factor C_D =				1.25					
				Wet. Service Factor C_M =				1.00					
D.L =	12.0	lb/ft		Temperature Factor Ct =				1.00					
L.L =	20.0	lb/ft		Size Factor C_F =				1.00					
TOTAL	32.0	lb/ft		Repetitive m. Fact. Cr =				1.00					
				Incising Factor Ci =				1.00					
				Shear stress Factor C_H =				1.00		W =	384.0	lb/ft	



M= W x L² / 8

M= 10800.0 ft-lb

M= 129600 in-lb

V= W x L / 2

V= 2880 lb

BENDING

F´b = Fbx(CD)(CM)(Ct)(CF)(Cr)(Ci)

	F´b =	1250	psi						USE				
Req´d S =	M / F´b		S=	103.68	in^3				6	X	12	Area =	63.3 in^2
					f b =	M/S						Section=	121 in^3
ALLOW F´b =				ACT. f b =								Moment of Inertia=	697 in^4
	1250	psi		>		1069.3	psi		**OK**				

SHEAR

F´v = Fv(CD)(CM)(Ct)(CH) f v = 1.5 V / A

	F´v =	119	psi	>	f v =	68.30	psi	**OK**	

DEFLECTION

$5W_L L^4$ / 384 E´ I	.=	0.37	in										
									OK				
E´=	E (C_M)(C_t)(C_i)			1700000	psi								
							BEAM	6	X	12			
d max =	L / 240 =		0.75	in									

PARALLAM - 5 1/4" X 11 7/8"

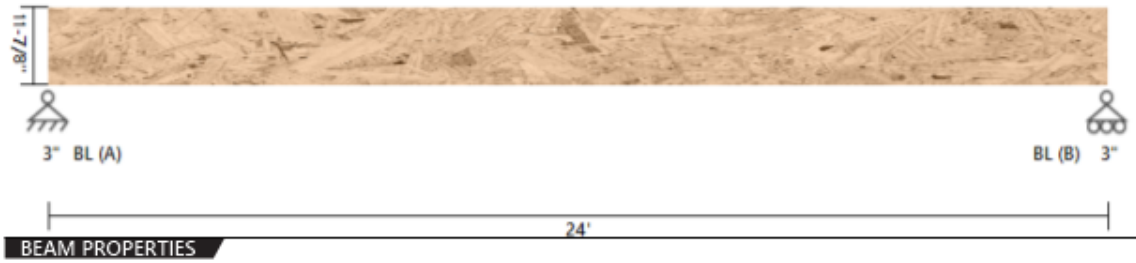
PASS

Page 1

DATE:	9/23/2023	COMPANY:	GLS ARCHITECTURE GROUP
STRUCALC BUILD:	StruCalc Pro	DESIGNED BY:	EFRAIN CARDENAS
CUSTOMER:		REVIEWED BY:	--
PROJ. ADDRESS:	--	PROJECT NAME:	5191 E LAKESIDE
	--		
LEVEL:	NOT YET ASSIGNED	LOADING:	ASD
MEMBER NAME:	New Roof Beam 2	CODE:	2021 International Building Code
MEMBER TYPE:	ROOF BEAM	NDS:	2018 NDS
MATERIAL:	Structural Composite Lumber		

Weyerhaeuser	2.2E Parallam PSL	(1) 5.25 X 11.875	DRY		

New Roof Beam 2 DIAGRAM



BEAM PROPERTIES

Start (ft): 0 End (ft): 24 Member Slope: 0/12 Actual Length (ft): 24

Area (in^2)	Ix (in^4)	Iy (in^4)	BSW (lbf/ft)	Lams	Cfn	Kcr Creep Factor
62.34	732.62	143.2	19.48	1	9	1

STRENGTH PROPERTIES

	Fb (psi)	Ft (psi)	Fv (psi)	Fc (psi)	Fc⊥ (psi)	E (psi) x10^6	Emin (psi) x10^6
Base Values	2900	2300	290	2900	625	2200	1118.19
Adjusted Values	2900	2300	290	2900	625	2200	1118
C_M	1	1	1	1	1	1	1
C_T	1	1	1	1	1	1	1

Bending Adjustment Factors C_V = 1 C_r = 1 Volume factor is applied on a load combination basis And is Not reflected in the adjusted values

BEAM DATA

Span	Length (ft)	Unbraced Length (ft) Top	Unbraced Length (ft) Bottom	Beam End Elev. Diff (ft)	CL(Top)	CL(Bottom)	CL(Left)	CL(Right)
1	24	0	24	0	1.00	0.96	1.00	1.00

PASS-FAIL

	PASS/FAIL	MAGNITUDE	STRENGTH	LOCATION (ft)	LOAD COMBO	DURATION FACTOR CD
Shear Stress Y (psi)	PASS (68.7%)	90.8	290.0	0	D+L	1
Bending Stress Y (psi)	PASS (42.0%)	1683.0	2903.4	6.96	D+L	1
Deflection Y (in)	PASS (32.5%)	0.811 (=L/355)	1.200 (=L/240)	10.8	L	0
Bearing Stress (psi)	PASS (57.3%)	267.1	625.0	0	D+0.75L+0.75Lr	1.25

REACTIONS

Units for V: lbf Units for M: lbf-ft

Y axis	DEAD	LIVE	LIVE ROOF	TOTAL
A	522	3251	1663	5436
B	522	1209	438	2169

Reaction Location

A B

Member Name: New Roof Beam 2

Page 2

LOAD LIST

Type	Name	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Uniform (lbf/ft)	Uniform	40	40	0	24	Live	Y
Uniform (lbf/ft)	Uniform	24	24	0	24	Dead	Y
Point (lbf)	Point	1750	-	7	-	Live	Y
Point (lbf)	Point	1050	-	7	-	RoofLive	Y
Point (lbf)	Point	1750	-	3	-	Live	Y
Point (lbf)	Point	1050	-	3	-	RoofLive	Y
Self Weight (lbf/ft)	-	19.48	19.48	0	24	Dead	Y

Wind Analysis for Low-rise Building, Based on ASCE 7-2022

LATERAL FORCE ANALYSIS

WIND: 130mph Exposure C

ENCLOSED

$qz = 0.00256X\ Kz\ Kzt\ Kd\ V^2\ I$

INPUT DATA

Exposure category (B, C or D, ASCE 7-10 26.7.3)		
Importance factor (ASCE 7-10 Table 1.5-2)	I_w =	1.00
Basic wind speed (ASCE 7-10 26.5.1 or 2012 IBC)	V =	130
Topographic factor (ASCE 7-10 26.8 & Table 26.8-1)	K_{zt} =	1.00
Building height to eave	h_e =	10
Building height to ridge	h_r =	14

q_h = velocity pressure at mean roof height, h. (Eq. 28.3-1 page 298 & Eq. 30.3-1 page 316)

K_h = velocity pressure exposure coefficient evaluated at height, h, (Tab. 28.3-1, pg 299)	=	0.85
K_d = wind directionality factor. (Tab. 26.6-1, for building, page 250)	=	0.85
h = mean roof height	=	12.00

qz= 31.26 PSF

WIND LOAD = qz*(1E+2E+3E+4E +0.18)*H/2

ANALYSIS WIND LOAD= 181 # ft

$p = q_h\ [(G\ C_{pf})-(G\ C_{pi})]$

where: p = pressure in appropriate zone. (Eq. 28.4-1, page 298) p_{min} = **16** psf (ASCE 7-10 28.4.4)

$G\ C_{pf}$ = product of gust effect factor and external pressure coefficient, see table below. (Fig. 28.4-1, page 300 & 301)

$G\ C_{pi}$ = product of gust effect factor and internal pressure coefficient.(Tab. 26.11-1, Enclosed Building, page 258)

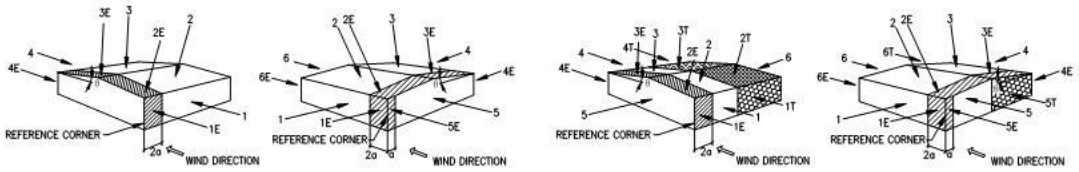
a = width of edge strips, Fig 28.4-1, note 9, page 301, MAX[MIN(0.1B, 0.1L, 0.4h), MIN(0.04B, 0.04L), 3] =

Net Pressures (psf), Basic Load Cases

Surface	Roof angle θ = 15.64			Roof angle θ = 0.00		
	$G\ C_{pf}$	Net Pressure with		$G\ C_{pf}$	Net Pressure with	
		$(+GC_{pi})$	$(-GC_{pi})$		$(+GC_{pi})$	$(-GC_{pi})$
1	0.49	6.68	14.37	-0.45	-13.47	-5.77
2	-0.69	-18.60	-10.90	-0.69	-18.60	-10.90
3	-0.45	-13.43	-5.73	-0.37	-11.76	-4.06
4	-0.39	-12.17	-4.48	-0.45	-13.47	-5.77
5				0.40	4.70	12.40
6				-0.29	-10.05	-2.35
1E	0.74	12.08	19.77	-0.48	-14.11	-6.41
2E	-1.07	-26.73	-19.03	-1.07	-26.73	-19.03

Net Pressures (psf), Torsional Load Cases

Surface	Roof angle θ = 15.64		
	$G\ C_{pf}$	Net Pressure with	
		$(+GC_{pi})$	$(-GC_{pi})$
1T	0.49	1.67	3.59
2T	-0.69	-4.65	-2.73
3T	-0.45	-3.36	-1.43
4T	-0.39	-3.04	-1.12
Surface	Roof angle θ = 0.00		
	$G\ C_{pf}$	Net Pressure with	
		$(+GC_{pi})$	$(-GC_{pi})$
5T	0.40	1.18	3.10



Load Case A (Transverse) Load Case B (Longitudinal) Load Case A (Transverse) Load Case B (Longitudinal)

Basic Load Cases Torsional Load Cases

Basic Load Case A (Transverse Direction)

Surface	Area (ft^2)	Pressure (k) with $(+GC_{pi})$	Pressure (k) with $(-GC_{pi})$
1	990	6.61	14.23
2	2337	-43.46	-25.48
3	2337	-31.38	-13.39
4	990	-12.05	-4.43
1E	110	1.33	2.18
2E	260	-6.94	-4.94
3E	260	-4.57	-2.57
4E	110	-1.79	-0.94
Σ	Horiz.	17.88	17.88
	Vert.	-83.15	-44.67
Min. wind 28.4.4	Horiz.	28.80	28.80
	Vert.	-80.00	-80.00

Basic Load Case B (Longitudinal Direction)

Surface	Area (ft^2)	Pressure (k) with $(+GC_{pi})$	Pressure (k) with $(-GC_{pi})$
2	2337	-43.46	-25.48
3	2337	-27.48	-9.49
5	608	2.86	7.54
6	608	-6.11	-1.43
2E	260	-6.94	-4.94
3E	260	-3.94	-1.94
5E	117	1.08	1.98
6E	117	-1.53	-0.63
Σ	Horiz.	11.57	11.57
	Vert.	-68.75	-32.37
Min. wind 28.4.4	Horiz.	11.60	11.60
	Vert.	-80.00	-80.00

Torsional Load Case A (Transverse Direction)

Surface	Area (ft^2)	Pressure (k) with $(+GC_{pi})$	Pressure (k) with $(-GC_{pi})$	Torsion (ft-k) $(+GC_{pi})$	Torsion (ft-k) $(-GC_{pi})$
1	440	2.94	6.32	66	142
2	1038	-19.32	-11.32	-117	-69
3	1038	-13.94	-5.95	85	36
4	440	-5.36	-1.97	121	44
1E	110	1.33	2.18	60	98
2E	260	-6.94	-4.94	-84	-60
3E	260	-4.57	-2.57	55	31
4E	110	-1.79	-0.94	80	42
1T	550	0.92	1.98	-23	-49
2T	1298	-6.04	-3.54	41	24
3T	1298	-4.36	-1.86	-29	-13
4T	550	-1.67	-0.62	-42	-15
Total Horiz. Torsional Load, M_T				212	212

Torsional Load Case B (Longitudinal Direction)

Surface	Area (ft^2)	Pressure (k) with $(+GC_{pi})$	Pressure (k) with $(-GC_{pi})$	Torsion (ft-k) $(+GC_{pi})$	Torsion (ft-k) $(-GC_{pi})$
2	2337	-43.46	-25.48	-29	-17
3	2337	-27.48	-9.49	19	6
5	246	1.15	3.04	11	29
6	246	-2.47	-0.58	23	5
2E	260	-6.94	-4.94	89	63
3E	260	-3.94	-1.94	-50	-25
5E	117	1.08	1.98	24	44
6E	117	-1.53	-0.63	34	14
5T	363	0.43	1.12	-5	-13
6T	363	-0.91	-0.21	-10	-2
Total Horiz. Torsional Load, M_T				104.6	104.6

Design pressures for components and cladding

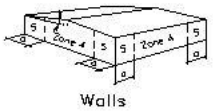
$p = q_h[(G C_p) - (G C_{pi})]$

where: p = pressure on component. (Eq. 30.4-1, pg 318)

p_{min} = 16.00 psf (ASCE 7-10 30.2.2)

$G C_p$ = external pressure coefficient.

see table below. (ASCE 7-10 30.4.2)

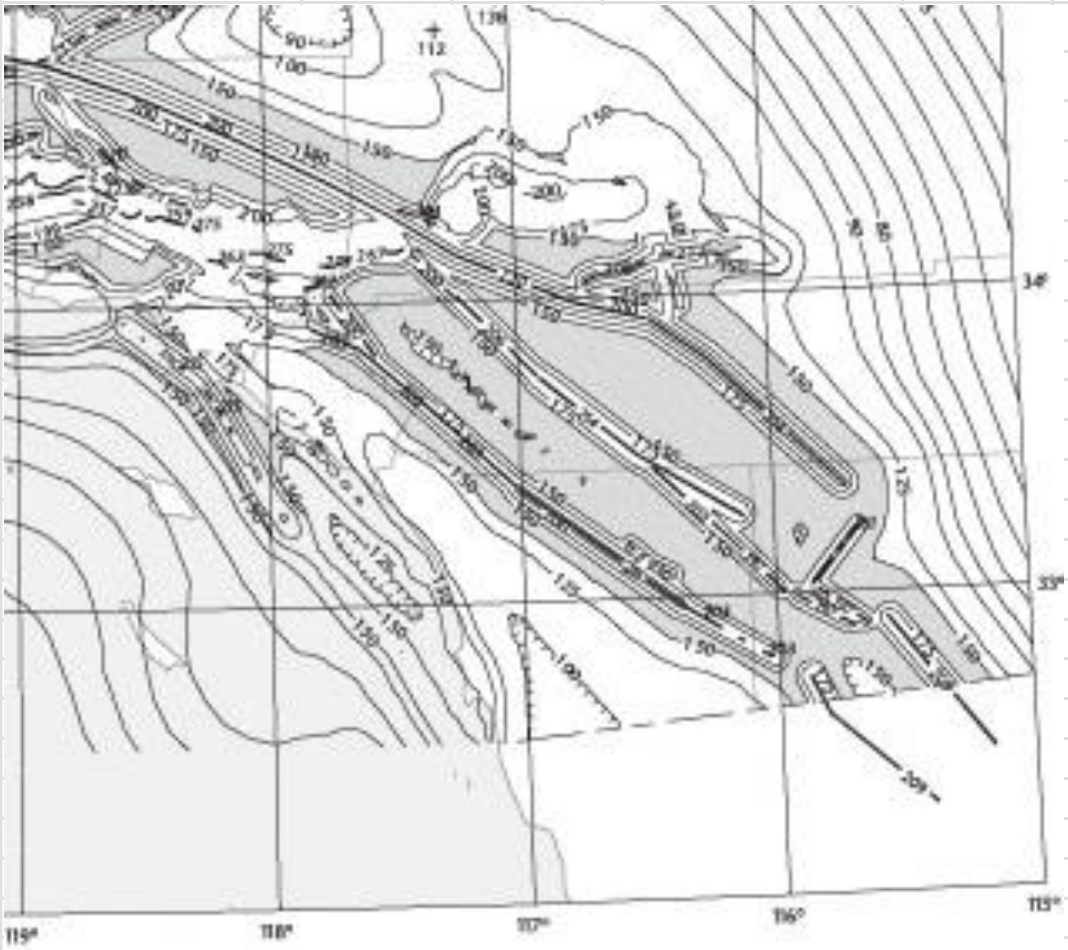


	Effective Area (ft^2)	Zone 1 GC_p	Zone 1 $-GC_p$	Zone 2 GC_p	Zone 2 $-GC_p$	Zone 3 GC_p	Zone 3 $-GC_p$	Zone 4 GC_p	Zone 4 $-GC_p$	Zone 5 GC_p	Zone 5 $-GC_p$
Comp.	28	0.41	-0.86	0.41	-1.48	0.41	-2.33	0.92	-1.02	0.92	-1.24

Comp. & Cladding Pressure (psf)	Zone 1 Positive	Zone 1 Negative	Zone 2 Positive	Zone 2 Negative	Zone 3 Positive	Zone 3 Negative	Zone 4 Positive	Zone 4 Negative	Zone 5 Positive	Zone 5 Negative
	16.00	-22.14	16.00	-35.42	16.00	-53.70	23.54	-25.68	23.54	-30.41

CALIFORNIA BUILDING CODE 2022

MAXIMUM CONSIDERED EARTHQUAKE GROUND MOTION FOR REGION



ASCE 7 Hazards Report

Address:
5191 E Lakeside Dr
Palm Springs, California
92264

Standard: ASCE/SEI 7-16
Risk Category: II
Soil Class: D - Default (see Section 11.4.3)

Latitude: 33.794518
Longitude: -116.489736
Elevation: 339.4890190493438 ft (NAVD 88)

Wind

Results:

Wind Speed	97 Vmph
10-year MRI	67 Vmph
25-year MRI	73 Vmph
50-year MRI	78 Vmph
100-year MRI	83 Vmph

Data Source: ASCE/SEI 7-16, Fig. 26.5-1B and Figs. CC.2-1–CC.2-4, and Section 26.5.2
Date Accessed: Sat Sep 23 2023

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-16 Standard. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (annual exceedance probability = 0.00143, MRI = 700 years).

Site is not in a hurricane-prone region as defined in ASCE/SEI 7-16 Section 26.2.

ASCE
AMERICAN SOCIETY OF CIVIL ENGINEERS

Seismic

Site Soil Class: D - Default (see Section 11.4.3)

Results:

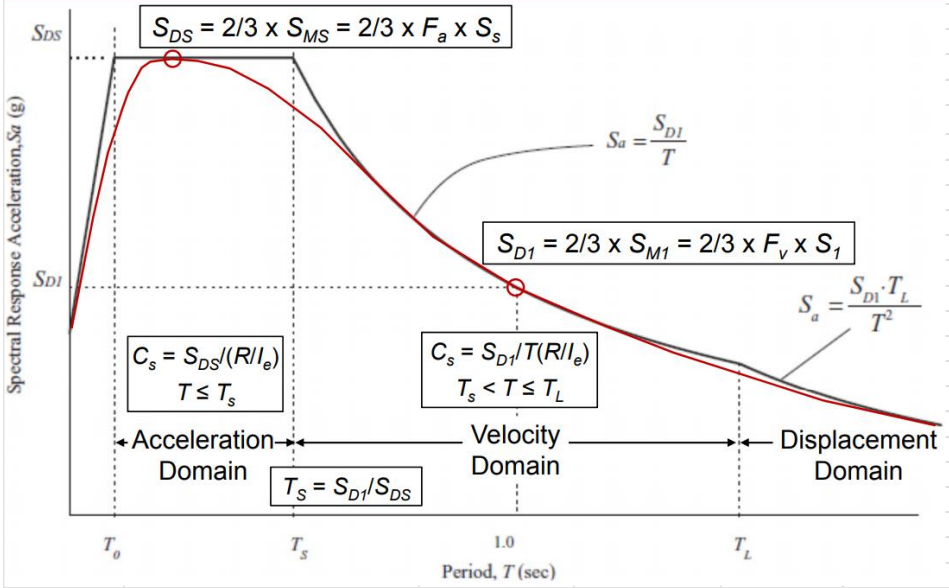
S_S :	1.604	S_{D1} :	N/A
S_1 :	0.66	T_L :	8
F_a :	1.2	PGA :	0.701
F_v :	N/A	PGA_M :	0.841
S_{MS} :	1.924	F_{PGA} :	1.2
S_{M1} :	N/A	I_e :	1
S_{DS} :	1.283	C_v :	1.421

Ground motion hazard analysis may be required. See ASCE/SEI 7-16 Section 11.4.8.

Data Accessed: Sat Sep 23 2023

Date Source: USGS Seismic Design Maps

ASCE/SEI 7-16				
DESIGN RESPONSE SPECTRUM.				
TWO RESPONSE PERIODS (0.2s AND 1.0s)				
SITE CLASS DEFINITION=			**D**	
OCCUPANCY CATEGORY =			**II**	
SEISMIC DESIGN CATEGORY =			**D**	
RANCHO MIRAGE CALIFORNIA			**92270**	
0.2 seg Ss = 150%g = 1.5g		**1.0 seg S1 = 60%g = 0.60g**		
Fa = SHORT - PERIOD SITE COEFFICIENT SECTION 11.4.3				
SDs= 2/3 * SMS = 2/3 * Fa * Ss		**SD1 = 2/3 * SM1 = 2/3 * Fv * S1**		
SMS = Fa * Ss	**SM1 = Fv * S1**		**SM1=**	**1.122**
SDs =	**1.28**	**S1 =**	**0.66**	
SD1 =	**0.75**	**Fv =**	**1.7**	SECTION 11.4.8
R =	**6.5**	**TABLE 12.2 ASCE 7-16**		
IE =	**1.0**	**Fa =**	**1.2**	
t=	**0.2**	**REDUNDANCY FACTOR**		
CATEGORY D,E,F ASCE 7 SECTION 12.3.4.2 p=			**1.30**	
				ASCE
BASE SHEAR V= Cs W		**0.197**	**W**	**(12.8-1)**
Cs = SDS / (R/Ie)	T<Ts	**0.197**		**(12.8-2)**
NOT EXCEED				
Cs = SD1 / T(R/Ie)	Ts<T<TL	**0.575**		**(12.8-3)**
NOT LESS THAN				
Cs =0.01		**0.010**		**(12.8-5)**
	V=	**0.26**	**W**	



New Site Coefficients F_a

Table 11.4-1 Short-Period Site Coefficient, F_a

Site Class	Mapped Risk-Targeted Maximum Considered Earthquake (MCE_R) Spectral Response Acceleration Parameter at Short Period					
	$S_S \le 0.25$	$S_S = 0.5$	$S_S = 0.75$	$S_S = 1.0$	$S_S = 1.25$	$S_S \ge 1.5$
A	0.8	0.8	0.8	0.8	0.8	0.8
B	0.9	0.9	0.9	0.9	0.9	0.9
C	1.3	1.3	1.2	1.2	1.2	1.2
D	1.6	1.4	1.2	1.1	1.0	1.0
E	2.4	1.7	1.3	See Section 11.4.8	See Section 11.4.8	See Section 11.4.8
F	See Section 11.4.8	See Section 11.4.8	See Section 11.4.8	See Section 11.4.8	See Section 11.4.8	See Section 11.4.8

Note: Use straight-line interpolation for intermediate values of S_s.

New Site Coefficients F_v

Table 11.4-2 Long-Period Site Coefficient, F_v

Site Class	Mapped Risk-Targeted Maximum Considered Earthquake (MCE_R) Spectral Response Acceleration Parameter at 1-s Period					
	$S_1 \le 0.1$	$S_1 = 0.2$	$S_1 = 0.3$	$S_1 = 0.4$	$S_1 = 0.5$	$S_1 \ge 0.6$
A	0.8	0.8	0.8	0.8	0.8	0.8
B	0.8	0.8	0.8	0.8	0.8	0.8
C	1.5	1.5	1.5	1.5	1.5	1.4
D	2.4	2.2[a]	2.0[a]	1.9[a]	1.8[a]	1.7[a]
E	4.2	See Section 11.4.8	See Section 11.4.8	See Section 11.4.8	See Section 11.4.8	See Section 11.4.8
F	See Section 11.4.8	See Section 11.4.8	See Section 11.4.8	See Section 11.4.8	See Section 11.4.8	See Section 11.4.8

Note: Use straight-line interpolation for intermediate values of S_1.
[a]Also, see requirements for site-specific ground motions in Section 11.4.8.

SEISMIC (CONTINUED)

		D.L.													
ROOF		12	psi												
											EXT. WALLS		16		
SEISMIC , V,=			0.26								WALL HT =		15	ft	
DIAPH=35X44															
			TRANSVERSEL								LONGITUDINAL				
WORST		35	FT			WORST		44	FT						
			ROOF =	420							ROOF =	528			
		1	Walls =	120					1		Walls =	120			
				540								648			
			X	0.26							X	0.26			
				140.4	# ft	(MAX)						168.48	# ft	(MAX)	

SEISMIC =169PLF <181= WIND

W= 181

T=C = WL^2 / 8b

L= 44 = 1251.485714

B = 35

NAIL = TABLE 23-III-C-2

TOTAL NAIL = LOAD /NAIL= 6.674

PROVIDE (8 PAIR) 16 d COMMON
@ E.A 4'-0" SPACE @ TOP CHORDS

SHEAR WALL REQUIREMENTS

ROOF D.L. = 15 PSF
WALLS D.L. = 15 PSF
WALL HT,1 = 8 FT

UPLIFT FORMULA:
(Vh-(2/3 (wb L^2/2)+(WwL/2)))/ L

APPENDIX D
STRENGTH REDUCTION FACT
SHEAR = 0.65
(0.65* 850*1.33*12)/shear force

FIRST FLOOR

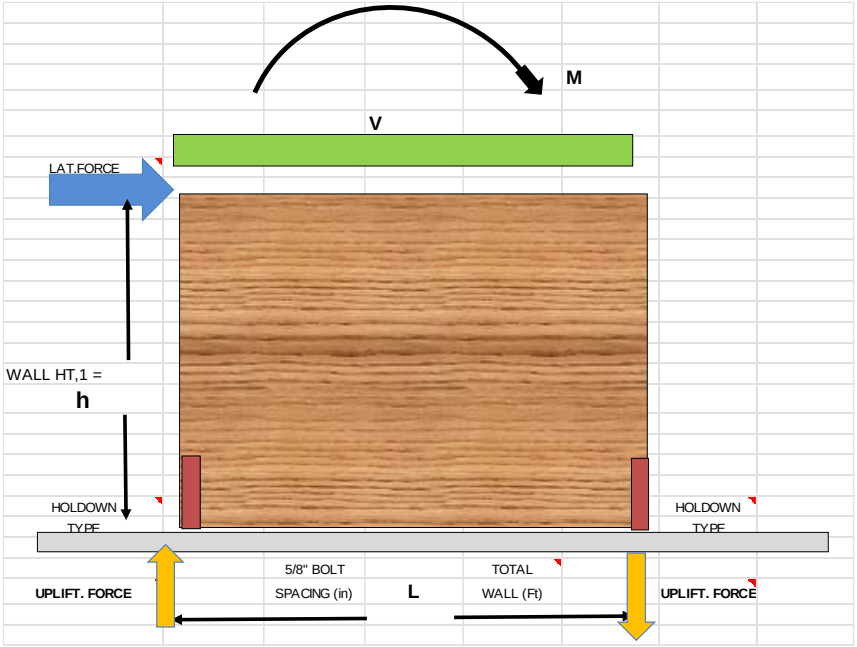
WALL No.	LAT.FORCE (PLF)	TRIB. AREA (Ft.)	TOTAL FORCE (LB)	TOTAL WALL (Ft)	RESIST,WALL (FT) **(L)**	SHEAR FORCE (# / ft)	LOAD **(V)** WALL- SEG	**UPLIFT. FORCE** #	SHEAR WALL TYPE	HOLDOWN TYPE	A35 E.A. BLOCK	5/8" BOLT SPACING (in)	STRUC NOTES
A	186	10	1860	11	5	169	845	1061	1	HDU2	1	48	1
A	186	10	1860	11	6	169	1015	1011	1	HDU2	1	48	1
B	186	15	2790	12	12	233	2790	915	1	HDU2	1	48	1
C	186	10	1860	8	8	233	1860	1418	1	HDU2	1	48	1
D	186	16	2976	12	12	248	2976	979	1	HDU2	1	48	1
E	186	20	3720	16	16	233	3720	212	1	HDU2	1	48	1
F	186	15	2790	8	8	349	2790	2147	2	HDU2	2	32	1
G	186	10	1860	8	8	233	1860	1418	1	HDU2	1	48	1

FT
WALL HT,1 = 8

UPLIFT FORMULA:
(Vh-(2/3 (wb L^2/2)+(WwL/2)))/ L

TOTAL WALL (Ft)	RESIST,WALL (FT) **(L)**	SHEAR FORCE (# / ft)	LOAD **(V)** WALL- SEG	WALL No.	**Vh**	**Wb**	**2/3(WbL^2/2)**	**WwL/2**	**UPLIFT. FORCE** #
11	5	169	845	A	6764	150	1256	300	1061
11	6	169	1015	A	8116	150	1809	360	1011
12	12	233	2790	B	22320	225	10854	720	915
8	8	233	1860	C	14880	150	3216	480	1418
12	12	248	2976	D	23808	240	11578	720	979
16	16	233	3720	E	29760	300	25728	960	212
8	8	349	2790	F	22320	225	4824	480	2147
8	8	233	1860	G	14880	150	3216	480	1418

HDU2 tension load = 2215# > UPLIFT LOAD
HDU4 tension load = 3285# > UPLIFT LOAD



SHEAR WALL CONSTRUCTION

▷ 1/2" GYPSUM WALL BOARD APPLIED DIRECTLY TO 2x STUDS WITH STANDARD WALL BOARD NAILS (1 1/2" x 0.12" DIAMETER w/ 3/8" HEADS) OR 5d COOLER NAILS AT 7" O/C MAX. TO ALL STUDS, SILLS, PLATES AND BLOCKING. ANCHOR w/ 5/8" DIAMETER x 10" LONG ANCHOR BOLTS (w/ 3" x 3" x 0.229" THICK PLATE WASHERS BETWEEN NUT AND WOOD SILL) @ 6'-0" O/C MAX
16" O.C. FRAMING

(ALLOWABLE LOAD: 75 plf – PER CBC 2022 TABLE 2306.3(3)

- ▷ 7/8" PORTLAND CEMENT PLASTER ON WOVEN WIRE OR EXPANDED METAL LATH NAILED AT EACH STUD, SILL AND PLATE @ 6" O/C MAX. w/ No. 11 x 1½" GALVANIZED NAILS WITH 7/16' DIAMETER HEADS OR ATTACHED w/ No. 16 GAUGE STAPLES HAVING 7/8" LONG LEGS. ANCHOR w/ 5/8" DIAMETER x 10" LONG ANCHOR BOLTS 7" EMBED MIN (w/ 3" x 3" x 0.229" THICK PLATE WASHERS –SDC D ,BETWEEN NUT AND WOOD SILL) @ 48" O/C MAX. 16" O.C. FRAMING

  (ALLOWABLE LOAD: 180 plf – PER CBC 2022 TABLE 2306.3(3)

THE NEXT THREE (3) SHEAR WALL TYPES SHALL ALL HAVE THE FOLLOWING IDENTICAL STRUCTURAL I WOOD PANEL DIAPHRAGM: (WALL1 , 2 & 3 ONLY)

3/8" C-D EXPOSURE I APA PLYWOOD OR 3/8" ORIENTED STRAND BOARD APPLIED DIRECTLY TO THE STUDS, WITH THE LONG DIMENSION OF FULL PANELS LAID PARALLEL OR PERPENDICULAR TO THE LENGTH OF THE STUDS, ALL EDGES OF EACH PANEL SUPPORTED ON STUDS, SILLS, PLATES OR BLOCKING AND NAILED AND ANCHORED AS FOLLOWS:

1 ▷ 8d COMMON NAILS @ 6" O/C AT ALL PANEL EDGES AND 8d COMMON NAILS @ 12" O/C AT ALL FIELDS. ANCHOR WITH 5/8" DIAMETER BY 12" LONG ANCHOR BOLTS AT 48" O/C.

(ALLOWABLE LOAD: 260 plf – PER 2021 NDS SDPWS TABLE) *
CONSTRUCTION NOTE(S) 1 & 2 APPLY (NOTES 3, 4 AND 6 APPLY ONLY WHEN DIAPHRAGM AT BOTH SIDES)

2 ▷ 8d COMMON NAILS @ 4" O/C AT ALL PANEL EDGES AND 8d COMMON NAILS @ 12" O/C AT ALL FIELDS. ANCHOR WITH 5/8" DIAMETER BY 12" ANCHOR BOLTS AT 32" O/C.

(CALCULATE TO MAXIMUM OF 380 plf – PER 2021 NDS SDPWS TABLE) STUDS @16" O.C
CONSTRUCTION NOTE(S) 1 & 2 APPLY (NOTES 3, 4, 5 AND 6 APPLY WHEN DIAPHRAGM AT BOTH SIDES)

3 ▷ 8d COMMON NAILS @ 3" O/C AT ALL PANEL EDGES AND 8d COMMON NAILS @ 12" O/C AT ALL FIELDS. ANCHOR WITH 5/8" DIAMETER BY 12" LONG ANCHOR BOLTS AT 24" O/C.

(ALLOWABLE LOAD: 490 plf – PER 2021 NDS SDPWS TABLE) *
CONSTRUCTION NOTE(S) 1, 2, 3 & 6 APPLY (NOTES 4 & 5 APPLY WHEN DIAPHRAGM AT BOTH SIDES)

*** NOTE VALUES ARE APPLICABLE TO DOUGLAS FIR LARCH FRAMING @ 16" O.C**

4 ▷15/32" STRUCT. I APA PLYWOOD OR 15/32" ORIENTED STRAND BOARD (OSB) APPLIED DIRECTLY TO THE STUDS, WITH THE LONG DIMENSION OF FULL PANELS PARALLEL OR PERPENDICULAR TO THE LENGTH OF THE STUDS, ALL EDGES SUPPORTED ON STUDS, SILLS, PLATES OR BLOCKING AND NAILED AND ANCHORED AS FOLLOWS: 8d COMMON NAILS @ 2" O/C AT ALL PANEL EDGES AND 8d COMMON NAILS @ 12" O/C AT ALL FIELDS. ANCHOR WITH ¾" DIAMETER ANCHOR BOLTS AT 16" O/C. –STATE EMBEDDED DISTANCE 7" MIN

(ALLOWABLE LOAD: 640 plf – PER 2021 NDS SDPWS TABLE) *

CONSTRUCTION NOTE(S) 1, 2, 3, & 6 APPLY (4 AND 5 APPLY WHEN DIAPHRAGM AT BOTH SIDES)

CONSTRUCTION NOTES:

1 3" x 3" x 0.229" PLATE WASHERS SHALL BE PROVIDED BETWEEN ALL ANCHOR BOLT NUTS AND THE WOOD SILL.
2 SEE ANCHOR BOLT CALCULATIONS FOLLOWING THESE NOTES IN THE CALCULATIONS.
3 EDGE NAILING AT ABUTTING PANEL EDGES FOR WALLS LOADED IN EXCESS OF 350 plf SHALL BE APPLIED TO 3x OR WIDER STUDS.
4 APPLYING EQUAL THICKNESS STRUCTURAL WOOD PANELS TO BOTH STUD FACES OF A SHEAR WALL AND WITH MATCHING NAILING FOR BOTH SIDES SHALL PROVIDE DOUBLE THE LOAD CAPACITY OF WALLS HAVING THE SAME PANELS AND NAILING APPLIED TO ONLY ONE FACE.
5 STRUCTURAL WOOD PANEL SHEAR WALLS WITH PANELS APPLIED TO BOTH FACES AND WITH EDGE NAILING LESS THAN 6" O/C SHALL HAVE ABUTTING PANEL EDGES FOR ONE SIDE OFFSET ONE STUD SPACE FROM THE OTHER SIDE (NOTE No. 3 ALSO APPLIES)
6 ALL SHEAR WALLS HAVING A LOAD CARRYING CAPACITY IN EXCESS OF 350 plf SHALL BE PROVIDED WITH 3x P.T.D.F. SILL PLATES AND 12" LONG ANCHOR BOLTS OF THE DIAMETER PROSCRIBED FOR THAT WALL CONSTRUCTION TYPE (ALL ANCHOR BOLTS SHALL BE SET 7" INTO CONCRETE)
7 WHERE THE CONTRACTOR DESIRES TO CONSTRUCT THE SLAB-ON-GRADE AND THE FOOTINGS AND FOUNDATION IN A TWO POUR SYSTEM, ALL ANCHOR BOLTS SHALL HAVE A MINIMUM LENGTH OF 14", SETTING THEM A MINIMUM OF 4" INTO THE TOP OF THE FOUNDATIONS BEFORE POURING THE SLAB.
8 ALL ANCHOR BOLTING, HOLDOWN BOLTS OR STRAPS AND OTHER FORMS OF CONCRETE INSERTS SHALL BE SECURELY HELD IN PLACE WITH JIGS OR OTHER SUCH DEVISES PRIOR TO REQUESTING FOUNDATION INSPECTION, DURING INSPECTION AND DURING ACTUAL POURING OF CONCRETE.
9 ALL ANCHOR BOLTS AND HOLDOWN BOLTS SHALL BE BROUGHT PLUMB PRIOR TO THE CONCRETE HARDENING. MECHANICAL STRAIGHTENING OF BOLTS AFTER THE CONCRETE HAS HARDENED THAT RESULTS IN SLAB EDGE BREAKING SHALL RESULT IN REJECTION OF A PORTION OF THE SLAB AND FOUNDATION BY THE ARCHITECT OR STRUCTURAL DESIGNER OF RECORD AS HE DEEMS NECESSARY, IT'S REMOVAL AND REPOURING OF THAT PORTION OF THE CONCRETE.
10 HOLDOWN STRAP HOOKS SHALL BE STABLIZED DURING THE CONCRETE POUR IN ORDER TO ENSURE THEY REMAIN AT THE MANUFACTURER'S PROSCRIBED ANGLE OF INSERTION.
11 ATTACHMENT OF A 3x SILLPLATE TO FLOOR FRAMING BELOW SHALL BE MADE WITH THE USE OF SIMPSON SDS ¼x6 WOOD SCREWS AT 3" o/c.
12 ATTACHMENT OF A 2x SILL PLATE TO FLOOR FRAMING BELOW SHALL BE MADE WITH THE USE OF 16d @ SPACING INDICATED AT THE SHEAR WALL TABULATION.

FOUNDATION

SOIL PRESSURE =	1500	PSF	
	LOADING		
ROOF =	35		
EXT. WALLS =	15		
H-1 =	13	ft	

TYPICAL PERIMETER FOOTING AT 1 STORY

Trib. Area (ft)=	18		
LOADING :			
ROOF =	630	#1	
WALL =	195	#1	
W =	825	#1	
REQ´D WIDTH =	0.55	FT / FT LENDTH	

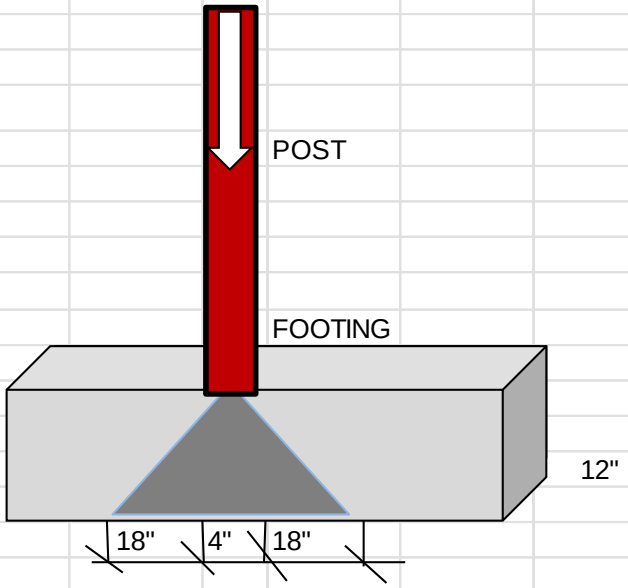
12" WIDE x 12" CONTIN PERIM FT,
, AND 2 # 4 BARS, CONTIN .
TOP & BOTTOM

FOOTING FOR POST 4x4

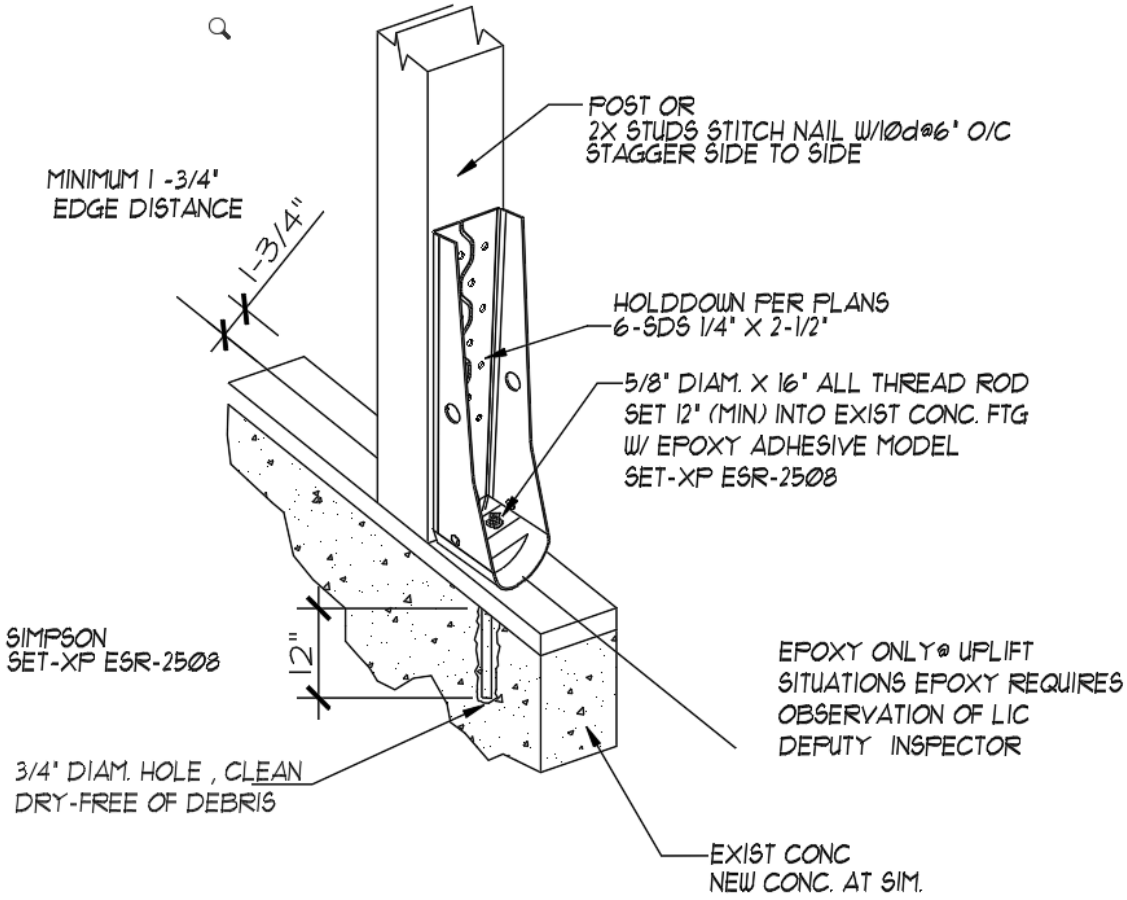
LOADING :			
W=	3800	lb	
AREA =	3.80	sf	

30" SQ x12" THK FOOTING
WI 4- # 4 EA.WAY

FOUNDATION



40" X 12" = 480SQ IN		3.3333	
144 SQ IN			
SOIL PRESSURE =	1500	PSF	
TOTAL LOAD =	4,900.#	>3300#	OK



SPECIAL INSPECTION IS REQUIRED

5/8" SET-XP EPOXY ADHESIVE ANCHOR ASTEM 193 GRADE B7

hef= 12"

ACI 318- 17.2.3.4 IF E<0.20 Nua,, the seismic tension provision of part. D3.3.4 (section 17.2.3.4)can be waived

calculate static steel strength tension per ACI 318-11 sect D 5.1.

$\emptyset_{SA}\ N_{sa}$ = 0.65x 27900= 18135#

calculate static concrete breakout strength in tension per ACI 318-11 sect D 5.2.

$\emptyset_{SA}\ N_{sa}$ = 0.65x 6000 = 3900#

calculate static pullout strength in tension per ACI 318-08 SECT D.5.3 as amended in section 4.1.4 of this repost

$\emptyset_{p}\ N_{a}$ = 0.85x 25175 = 31398#

ACI 318-08 SECT D.4.1.2

$\emptyset\ N_{n}$= 3900# ∝=1.48

3900/1.48 = 2635 #

TABLE 1806.2 PRESUMPTIVE LOAD-BEARING VALUES

CLASS OF MATERIALS	VERTICAL FOUNDATION PRESSURE (psf)	LATERAL BEARING PRESSURE (psf/ft below natural grade)	LATERAL SLIDING RESISTANCE	
			Coefficient of friction[a]	Cohesion (psf)[b]
1.Crystalline bedrock	12,000	1,200	0.70	-
2.Sedimentary and foliated rock	4,000	400	0.35	-
3.Sandy gravel and/or gravel (GW and GP)	3,000	200	0.35	-
4.Sand, silty sand, clayey sand, silty gravel and clayey gravel (SW, SP, SM, SC, GM and GC)	2,000	150	0.25	-
5.Clay, sandy clay, silty clay, clayey silt, silt and sandy silt (CL, ML, MH and CH)	1,500	100	-	130