

STRUCTURAL CALCULATIONS:

PROJECT NO.:

221489

PROJECT NAME:

Nevada County Bost House

PROJECT TYPE:

Renovation

Two-Story, Residential Building

PROJECT ADDRESS:

145 Bost Avenue

Nevada City, CA 95959

ARCHITECT:

Russell Davidson

149 Crown Point Ct., Suite C

Grass Valley, CA 95945

PROJECT ENGINEER:

Colin A. Grimm

DATE:

June 1, 2023



JOB SET



TABLE OF CONTENTS

DESIGN PARAMETERS	A.1 - A.3
Loading Information	A.2
Seismic Parameters	A.3
FLOOR FRAMING	1.1 - 1.5
Second Floor Framing Layout	1.1
First Floor Framing Layout	1.2
Beam Calculations	1.3
Post Calculations	1.4
LATERAL ANALYSIS	2.1 - 2.8
Lateral Cover Sheet	2.1
Seismic Forces	2.2
Wind Forces	2.4
Shearwall Layouts	2.5
Shearwall Forces	2.7
Overturning Forces	2.8
FOUNDATIONS	3.1 - 3.2
Foundation Layout	3.1
Pad Foundation Calculations	3.2

JOB SET

DESIGN PARAMETERS

Code: 2022 CBC (based upon the 2021 IBC)

Design Materials :

(Please refer to General Notes & Specifications for more detailed information)

Wood : Douglas Fir-Larch

Foundations:

Concrete	2500 psi
Rebar	60 ksi

Note:

The intent of lateral design is to prevent structural failures, in the event of seismic activities or high-winds, but not to prevent the damage of architectural finishes or systems. The lateral calculations herein conform to the specifications of the current California Building Code (CBC). Ashley & Vance Engineering Inc. provides no guarantees, expressed or implied, as to the adequacy of the CBC provisions.

These calculations, specifications, details and drawings are instruments of service and are the property of Ashley & Vance Engineering Inc. The information contained herein is for use on the specific project referenced above and shall not be used otherwise without the written authorization of Ashley & Vance Engineering Inc.

JOB SET

Job: [221489 - Nevada County Bost House - RDA](#)

Load Sheet

ROOF LOADSTypical Roof Live Loads **20.0** psf

Snow Load	Ps = 0.7·Ce·Ct·I·Cs·Pg	
Ground Snow Load: psf		49.0 psf
Exposure Factor: Ce		1.0 psf
Thermal Factor: Ct		1.1 psf
Importance Factor: I		1.0 psf
Roof Slope Factor: Cs		1.0 psf
Minimum Roof Snow Load per Jurisdiction		20.0 psf
		37.7 psf

Typical Roof Dead Loads

Asphalt Shingles		3.0 psf
1/2" Plywood		1.7 psf
Wood Framing		2.8 psf
10" Batt Insulation		0.8 psf
5/8" Gyp. Board Ceiling		2.8 psf
Misc. Mechanical / Solar		3.9 psf
Total Dead Load		15.0 psf

FLOOR LOADSTypical Floor Live Loads **40** psf

Typical Floor Dead Loads

Tile over Thinset		5.0 psf
3/4" Plywood		2.5 psf
Wood Framing		3.3 psf
10" Batt Insulation		0.8 psf
5/8" Gyp. Board Ceiling		2.8 psf
Misc. Loads		1.6 psf
Total Dead Load		16.0 psf

Partition Load

Assumed Partition Load **20** psf

Wall Dead Weight

10 psf**JOB SET**



Job: 221489 - Nevada County Bost House - RDA

Criteria Sheet

DEFLECTION CRITERIA:

Construction	L	S	E W	D + L
Roof	240	240	240	180
Floor	360	---	---	240
Exterior Walls	---	---	240	---
Interior Partitions	360	---	---	---

LOAD CASE LEGEND**ASCE 07 Equations**

- 2 D + L
- 3 D + L_R|S
- 4 D + 0.75[L + L_R|S]
- 5 D + 0.6W
- 6 D + 0.75(0.6W) + 0.75(L + L_R|S)
- 7 0.6D - 0.6W
- 8 (1.0 + 0.14*S_{DS})D + 0.7Ω₀E
- 9 (1.0 + 0.105*S_{DS})D + 0.525Ω₀E + 0.75[L + S]*
- 10 (0.6 - 0.14*S_{DS})D - 0.7Ω₀E*

SEISMIC CRITERIA

$$S_{DS} = 0.516$$

$$\Omega_0 = 2.5$$

LOAD MATRIX

Description:		D	L _R	L	L ₂	S	W	E	
1r = 1 ft of roof trib	Roof	15	20	0	0	37.73	0	0	psf
2f = 2 ft of floor trib	Floor	16	0	40	0	0	0	0	psf
3g = 3 ft of garage trib	Garage	0	0	0	0	0	0	0	psf
4d = 4 ft of deck trib	Deck	0	0	0	0	0	0	0	psf
5w = 5 ft of wall trib	Wall	10	0	0	0	0	0	0	psf

JOB SET

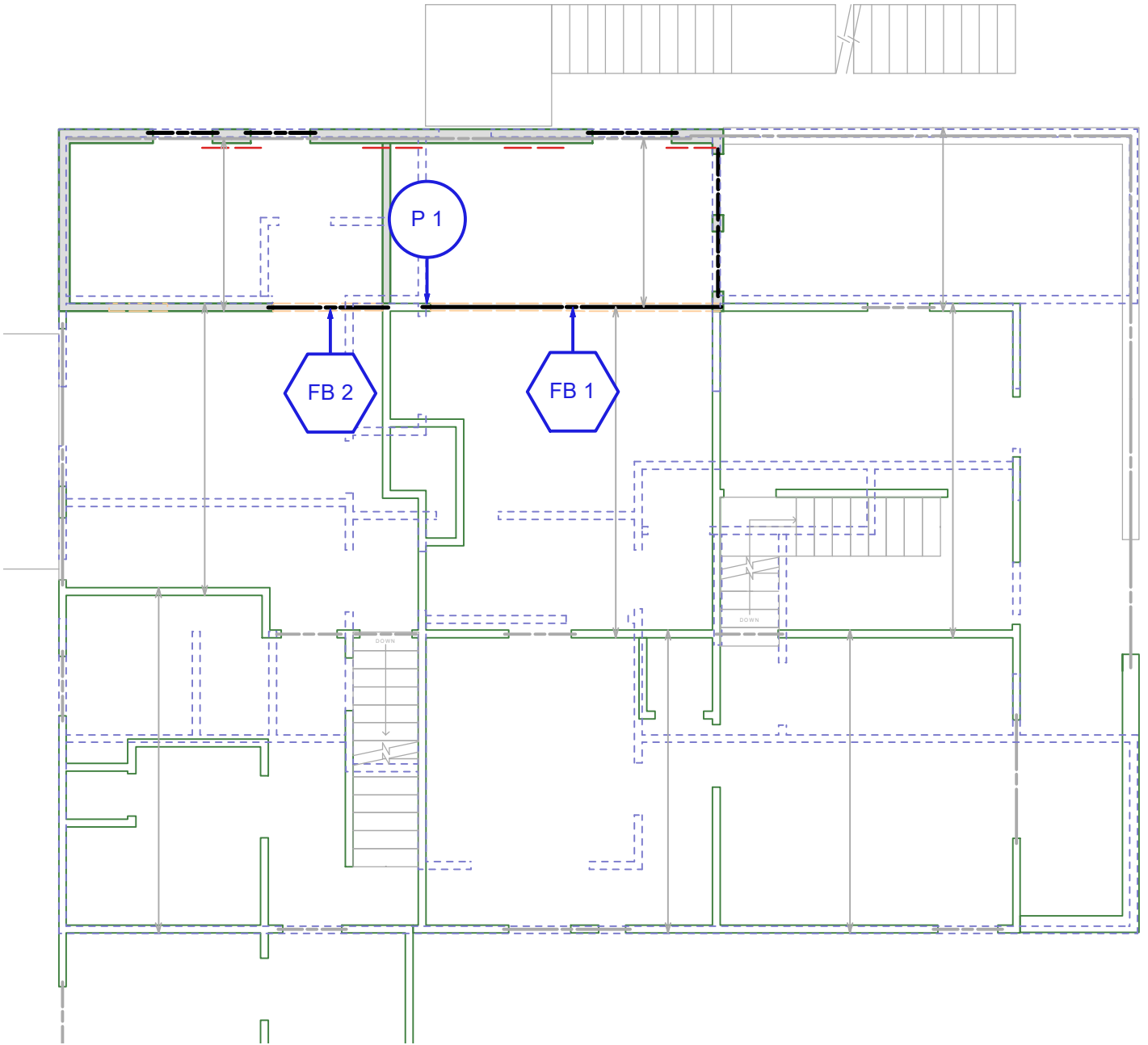


Bost House Renovation

Job No.: 221489

145 Bost Avenue
Nevada City, CA 95959

Second Floor Framing Layout



JOB SET

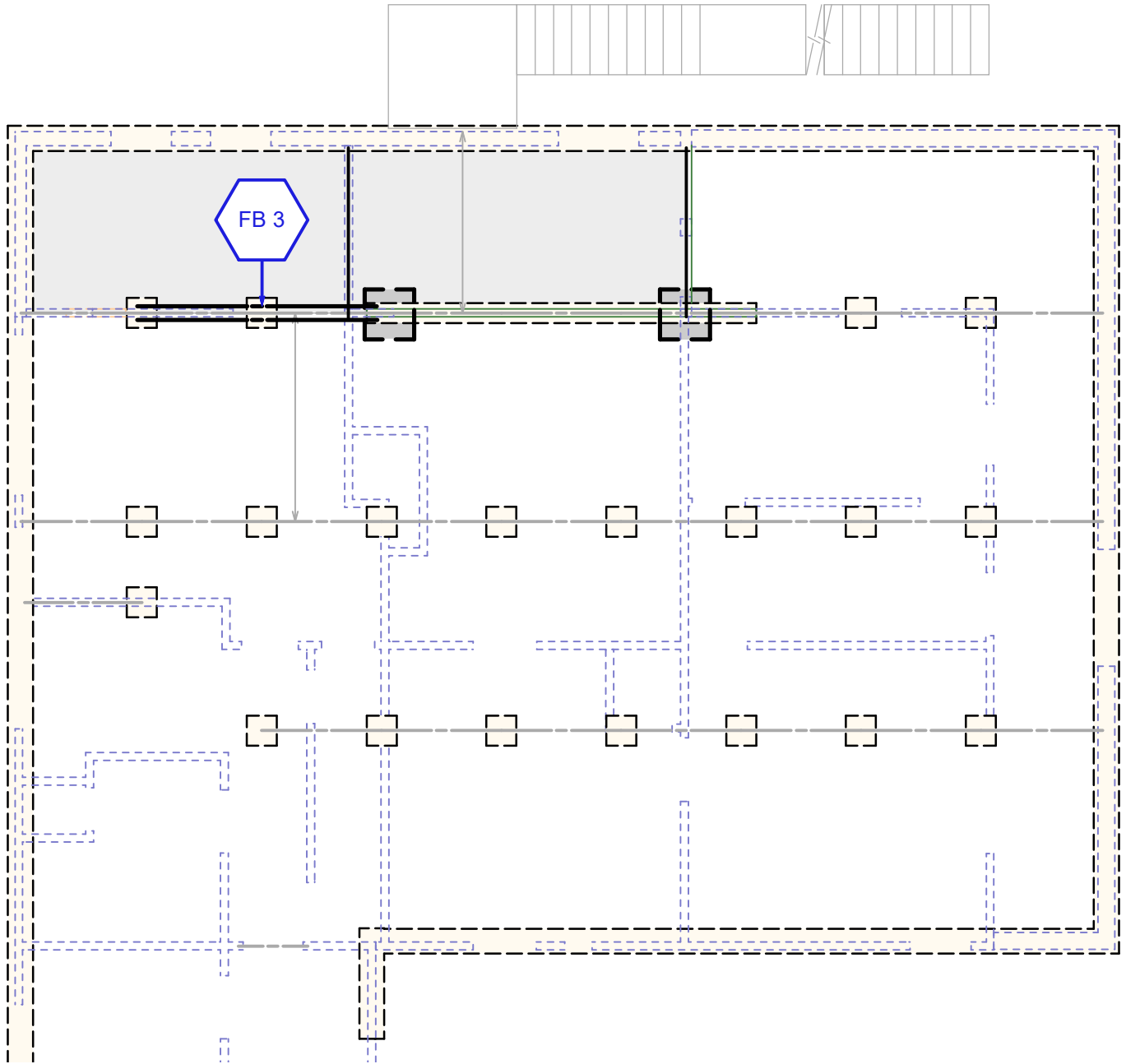


Bost House Renovation

Job No.: 221489

145 Bost Avenue
Nevada City, CA 95959

First Floor Framing Layout



JOB SET



Job: 221489 - Nevada County Best House - RDA

Beam/Joist Input Data

Description:		D	L _R	L	S	W	E	
1r = 1 ft of roof trib	Roof	15	20	0	37.7	0	0	psf
2f = 2 ft of floor trib	Floor	16	0	40	0	0	0	psf
3g = 3 ft of garage trib	Garage	0	0	0	0	0	0	psf
4d = 4 ft of deck trib	Deck	0	0	0	0	0	0	psf
5w = 5 ft of wall trib	Wall	10	0	0	0	0	0	psf

S_{DS} = 0.516
 Ω₀ = 2.5

FLOOR BEAMS

adVanceBeam 2.0

Member	Trib (ft)	SPAN INFO		D (plf)	L _R (plf)	L (plf)	S (plf)	W (plf)	E (plf)	Span/Load Type	BEAM DESIGN					
		L/X _a (ft)	L _u /X _b (ft)								Force	Loc(ft)	%Max			
FB 1	13.0 r			195	260	0	490	0	0		3 1/2" x 16" PSL					
	12.8 f			204	0	510	0	0	0							
	0.0 g			0	0	0	0	0	0		Bending	-35kft	7.5	86%		
	0.0 d			0	0	0	0	0	0		Shear	9,415#	15	74%		
	8.0 w			80	0	0	0	0	0							
Spans											REACTIONS	Loc(ft)	M(k*ft)	Rmin	Rmax	
	1	15.0	4.0	479	260	510	490	0	0	Simple Span	Roller 1	0	---	1,896#	9,415#	
											Roller 2	15	---	1,896#	9,415#	
Additional Loads											DEFLECTIONS	I / x	Defl(in)	Loc(ft)	%Max	
											Max(ASD)	---	0.54	7.5	---	
											L 360	539	0.33	7.5	67%	
											E W S	---	847	0.21	7.5	---
											D+L 240	333	0.54	7.5	72%	
FB 2	13.0 r			195	260	0	490	0	0		4x12 D.F. #1					
	12.8 f			204	0	510	0	0	0							
	0.0 g			0	0	0	0	0	0		Bending	-5.6kft	3.0	72%		
	0.0 d			0	0	0	0	0	0		Shear	-3,766#	0	68%		
	8.0 w			80	0	0	0	0	0							
Spans											REACTIONS	Loc(ft)	M(k*ft)	Rmin	Rmax	
	1	6.0	6.0	479	260	510	490	0	0	Simple Span	Roller 1	0	---	758#	3,766#	
											Roller 2	6	---	758#	3,766#	
Additional Loads											DEFLECTIONS	I / x	Defl(in)	Loc(ft)	%Max	
											Max(ASD)	---	0.05	3.0	---	
											L 360	2264	0.03	3.0	16%	
											E W S	---	3554	0.02	3.0	---
											D+L 240	1396	0.05	3.0	17%	
FB 3	0.0 r			0	0	0	0	0	0		(2)-1 3/4" x 9 1/2" LVL					
	12.8 f			204	0	510	0	0	0							
	0.0 g			0	0	0	0	0	0		Bending	8.3kft	6.0	54%		
	0.0 d			0	0	0	0	0	0		Shear	8,968#	6	94%		
	1.0 w			10	0	0	0	0	0							
Spans											REACTIONS	Loc(ft)	M(k*ft)	Rmin	Rmax	
	1	6.0	6.0	214	0	510	0	0	0	Simple Span	Roller 1	0	---	156#	4,082#	
	2	6.0	6.0	214	0	510	0	0	0	Simple Span	Roller 2	6	---	-814#	13.1k	
											Roller 3	12	0	406#	4,002#	
Additional Loads											DEFLECTIONS	I / x	Defl(in)	Loc(ft)	%Max	
											Max(ASD)	---	0.08	3.0	---	
											L 360	1566	0.05	3.0	23%	
											E W S	---	1926	0.04	3.2	---
											D+L 240	1079	0.07	3.0	22%	

JOB SET

Wood Column

Project File: 221489 - Bost House.ec6

LIC#: KW-06013931, Build:20.22.12.28

Ashley & Vance Engineering

(c) ENERCALC INC 1983-2022

DESCRIPTION: P1

Code References

Calculations per NDS 2018, IBC 2021, CBC 2022, ASCE 7-16
Load Combinations Used : IBC 2021

General Information

Analysis Method :	Allowable Stress Design	Wood Section Name	3.5x5.25
End Fixities	Top & Bottom Pinned	Wood Grading/Manuf.	Trus-Joist
Overall Column Height	10 ft	Wood Member Type	Parallam PSL
<i>(Used for non-slender calculations)</i>			
Wood Species	iLevel Truss Joist	Exact Width	3.50 in
Wood Grade	Parallam PSL 1.8E	Exact Depth	5.250 in
Fb +	2,400.0 psi	Fv	190.0 psi
Fb -	2,400.0 psi	Ft	1,755.0 psi
Fc - Prll	2,500.0 psi	Density	45.070 pcf
Fc - Perp	425.0 psi		
E : Modulus of Elasticity . . .	x-x Bending	y-y Bending	Axial
	Basic	1,800.0	1,800.0
	Minimum	914.88	914.88
			1,800.0 ksi
			Brace condition for deflection (buckling) along columns :
			X-X (width) axis : Unbraced Length for buckling ABOUT Y-Y Axis = 10 ft, k
			Y-Y (depth) axis : Unbraced Length for buckling ABOUT X-X Axis = 10 ft, k

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Column self weight included : 57.511 lbs * Dead Load Factor

AXIAL LOADS . . .

Axial Load at 10.0 ft, D = 3.60, Lr = 2.0, L = 3.850, S = 3.70 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio = **0.8147 : 1**

Load Combination	+D+0.750L+0.750S
Governing NDS Formula	Comp Only, fc/Fc'
Location of max.above base	0.0 ft
At maximum location values are .	
Applied Axial	9.320 k
Applied Mx	0.0 k-ft
Applied My	0.0 k-ft
Fc : Allowable	622.54 psi

Maximum SERVICE Lateral Load Reactions . .

Top along Y-Y	0.0 k	Bottom along Y-Y	0.0 k
Top along X-X	0.0 k	Bottom along X-X	0.0 k

Maximum SERVICE Load Lateral Deflections . . .

Along Y-Y	0.0 in	at	0.0 ft	above base
for load combination : n/a				
Along X-X	0.0 in	at	0.0 ft	above base
for load combination : n/a				

Other Factors used to calculate allowable stresses . . .

<u>Bending</u>	<u>Compression</u>	<u>Tension</u>
----------------	--------------------	----------------

PASS Maximum Shear Stress Ratio = **0.0 : 1**

Load Combination	+0.60D
Location of max.above base	10.0 ft
Applied Design Shear	0.0 psi
Allowable Shear	304.0 psi

Load Combination Results

Load Combination	C _D	C _P	Maximum Axial + Bending Stress Ratios			Maximum Shear Ratios		
			Stress Ratio	Status	Location	Stress Ratio	Status	Location
D Only	0.900	0.274	0.3229	PASS	0.0 ft	0.0	PASS	10.0 ft
+D+L	1.000	0.248	0.6597	PASS	0.0 ft	0.0	PASS	10.0 ft
+D+Lr	1.250	0.200	0.4933	PASS	0.0 ft	0.0	PASS	10.0 ft
+D+S	1.150	0.217	0.6432	PASS	0.0 ft	0.0	PASS	10.0 ft
+D+0.750Lr+0.750L	1.250	0.200	0.7014	PASS	0.0 ft	0.0	PASS	10.0 ft
+D+0.750L+0.750S	1.150	0.217	0.8147	PASS	0.0 ft	0.0	PASS	10.0 ft
+0.60D	1.600	0.157	0.1902	PASS	0.0 ft	0.0	PASS	10.0 ft

JOB SET

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Wood Column Project File: 221489 - Bost House.ec6

LIC#: KW-06013931, Build:20.22.12.28

Ashley & Vance Engineering

(c) ENERCALC INC 1983-2022

DESCRIPTION: P1

Maximum Reactions

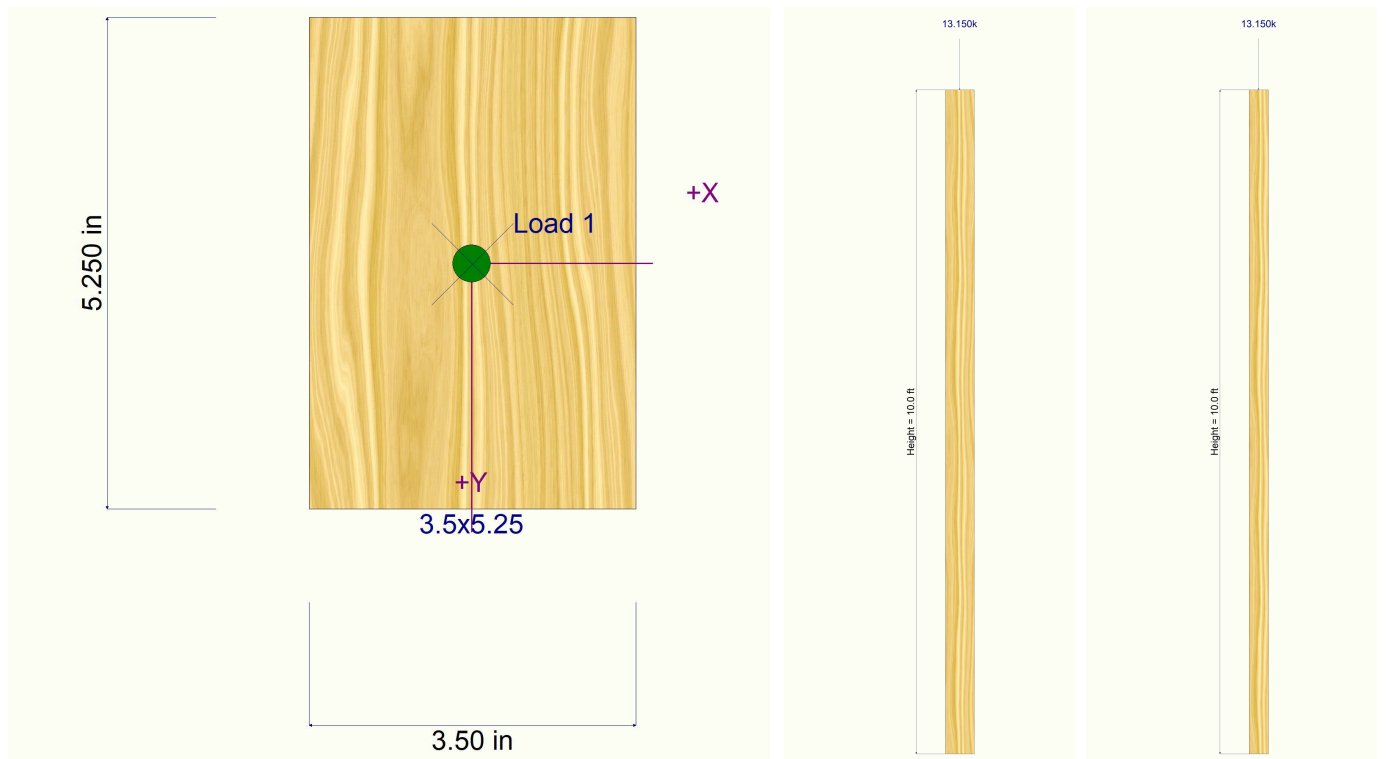
Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction		k	Y-Y Axis Reaction		Axial Reaction	My - End Moments		Mx - End Moments	
	@ Base	@ Top		@ Base	@ Top		@ Base	@ Top	@ Base	@ Top
D Only						3.658				
+D+L						7.508				
+D+Lr						5.658				
+D+S						7.358				
+D+0.750Lr+0.750L						8.045				
+D+0.750L+0.750S						9.320				
+0.60D						2.195				
Lr Only						2.000				
L Only						3.850				
S Only						3.700				

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection	Distance	Max. Y-Y Deflection	Distance
D Only	0.0000 in	0.000ft	0.000 in	0.000ft
+D+L	0.0000 in	0.000ft	0.000 in	0.000ft
+D+Lr	0.0000 in	0.000ft	0.000 in	0.000ft
+D+S	0.0000 in	0.000ft	0.000 in	0.000ft
+D+0.750Lr+0.750L	0.0000 in	0.000ft	0.000 in	0.000ft
+D+0.750L+0.750S	0.0000 in	0.000ft	0.000 in	0.000ft
+0.60D	0.0000 in	0.000ft	0.000 in	0.000ft
Lr Only	0.0000 in	0.000ft	0.000 in	0.000ft
L Only	0.0000 in	0.000ft	0.000 in	0.000ft
S Only	0.0000 in	0.000ft	0.000 in	0.000ft

Sketches



JOB SET

SEISMIC DESIGN PARAMETERS

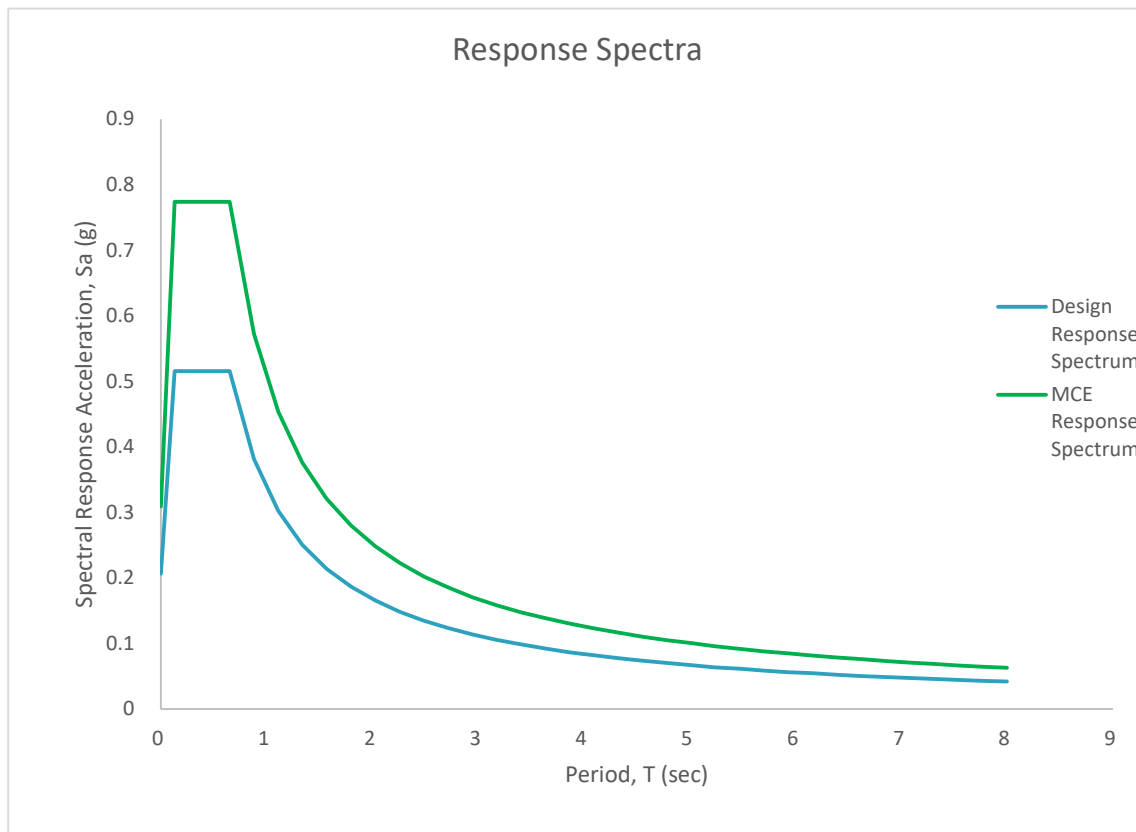
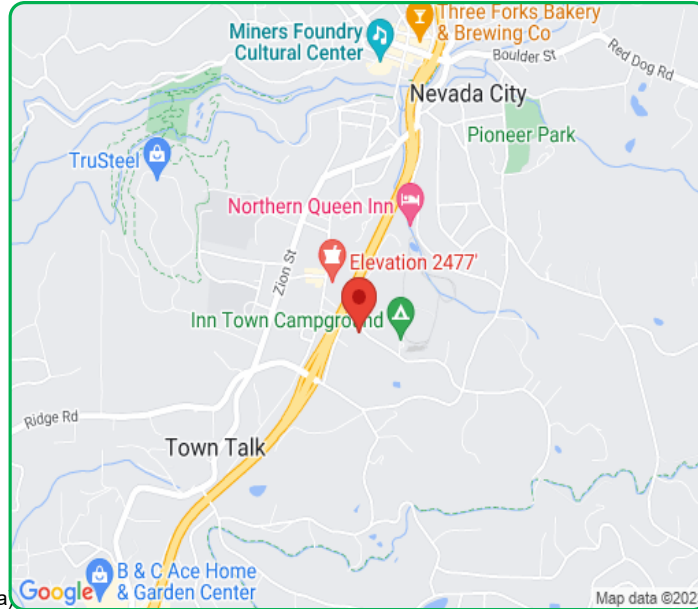
Criteria:

Building Code: **ASCE7-16**
 Site Latitude: **39.25012**
 Site Longitude: **-121.02173**
 Risk Category: **II**
 Soil Classification: **D**

Ground Motion Values:

S_s : 0.579	S_1 : 0.237
F_a : 1.337	F_v : 2.126
S_{MS} : 0.774	S_{M1} : 0.504
S_{DS} : 0.516	S_{D1} : 0.336

(S_s & S_1 Taken From Raw USGS Data)



JOB SET



ASD Lateral Force Analysis
2022 CBC

Job: **221489 - Nevada County Bost House - RDA**

SEISMIC DESIGN BASE SHEAR (STATIC)

Risk Category: II (CBC Table 1604.5)
 $I_e = 1.00$ (ASCE Table 1.5-2)
 $R = 6.5$ (ASCE Table 12.2-1)
 $C_d = 4$ (ASCE Table 12.2-1)
 $\Omega_o = 2.5$ (ASCE Table 12.2-1)
 Reduced by 1/2 for flexible diaphragms
 per ASCE Table 12.2-1 footnote b

SEISMIC GROUND MOTION VALUES

Latitude: 39.2501191

Longitude: -121.021729

Site Classification = D

Soils Report? **No** Fa Min = 1.2 per 1613.2.3

Short Period

Long Period

$S_S = 0.579$

$S_1 = 0.237$

$F_a = 1.337$ (CBC Table 1613.2.3(1))

$F_v = 2.126$ (CBC Table 1613.2.3(2))

$S_{MS} = 0.774$ (CBC Eq. 16-36)

$S_{M1} = 0.504$ (CBC Eq. 16-37)

$S_{DS} = 0.516$ (CBC Eq. 16-38)

$S_{D1} = 0.336$ (CBC Eq. 16-39)

APPROXIMATE FUNDAMENTAL PERIOD

Building Type: **All Other Structural Systems**

Maximum Height = **36.0 ft**

$T_a = 0.29$ sec (ASCE Eq. 12.8-7)

$T_L = 8$ sec (ASCE Figure 22-14)

$T_0 = 0.13$ sec (ASCE 11.3)

$T_S = 0.65$ sec (ASCE 11.3)

SEISMIC DESIGN CATEGORY

SDC = D

(ASCE 11.6)

SEISMIC BASE SHEAR

$C_S = 0.0794$ **Govs** (ASCE Eq. 12.8-2)

$C_{S\ MAX} = 0.1758$ (ASCE Eq. 12.8-3 & Eq. 12.8-4)

$C_{S\ MIN} = 0.0227$ (ASCE Eq. 12.8-5 & Eq. 12.8-6)

$C_S = 0.0794$

$V = 0.079 * W$

JOB SET



Job: **221489 - Nevada County Bost House - RDA**

ASD Lateral Force Analysis 2022 CBC

C_s : 0.079 k = 1.00 (ASCE Eq. 12.8-12)
--

VERTICAL SEISMIC FORCE DISTRIBUTION (ASCE 12.8.3)										
Level	Height (ft)	DL (psf)	PL (psf)	Floor Area (sq.ft.)	Weight (lbs)	wh^k (k-ft)	C_v (12.8-12)	Story Shear (lbs)	Story Shear (psf)	% Total
Roof	17.0	22.5	10.0	2330	75832	1289.1	0.583	7390	3.2	58.3%
Main Flr.	11.0	16.0	20.0	2330	83880	922.7	0.417	5289	2.3	100.0%
Totals:					159712	2211.8	1.0	12679	5.4	

DIAPHRAGM LOADS (ASCE 12.10)											
Level	DL (psf)	NORTH-SOUTH DIRECTION					EAST-WEST DIRECTION				
		PL (psf)	(12.10-1) (psf)	Max (psf)	Min (psf)	Gov (psf)	PL (psf)	(12.10-1) (psf)	Max (psf)	Min (psf)	Gov (psf)
Roof	22.546	10	3.1716	6.7	3.4	3.4	10	3.2	6.7	3.4	3.4
Main Flr.	16	20	2.9	7.4	3.7	3.7	20	2.9	7.4	3.7	3.7

JOB SET



Job: **221489 - Nevada County Bost House - RDA**

ASD Lateral Force Analysis 2022 CBC

ASCE Ch. 28 Part 2: SIMPLIFIED ENVELOPE PROCEDURE

DESIGN WIND PRESSURE

Exposure Category = **C** (IBC 1609.4.3)
 Roof Pitch = **12.0 :12** -----> Angle = **45** °
 Eave Height = **25.0 ft**
 Maximum Height = **36.0 ft**
 Mean Roof Height = **30.5 ft**

N-S Dimension **42.0** ft
 E-W Dimension **55.5** ft
 Enclosure: **Enclosed**
 a = **4.2 ft**

Main Wind Force:

$V_{ult} = 95$ mph (Figure 1609.3(1))
 $V_{asd} = 74$ mph
 $\lambda = 1.41$ (ASCE Figure 28.5-1)
 $K_{zt} = 1.00$ (ASCE 26.8 & Fig. 28.5-1)
 $I_w = 1.00$ (ASCE 7 Table 1.5-2)

$p_s = \lambda * K_{zt} * p_{s30}$ (ASCE Eq. 28.5-1)

Zone	p_{s30} (psf)	p_s (psf)
A	16.10	22.6
B	11.00	15.5
C	12.80	18.0
D	8.80	12.4

WIND DISTRIBUTION ON NORTH-SOUTH WALLS														
Level	Zone A			Zone B			Zone C			Zone D			0.6 x Total Wind	
	Height (ft)	Width (ft)	Force (lbs)	Height (ft)	Width (ft)	Force (lbs)	Height (ft)	Width (ft)	Force (lbs)	Height (ft)	Width (ft)	Force (lbs)	(lbs)	(plf)
Roof	5.5	8.4	1045.1	11.0	8.4	1428	5.5	33.6	3323	11.0	33.6	4570	6220	148.1
L2	5.5	8.4	1045.1				5.5	33.6	3323				2621	62.4

WIND DISTRIBUTION ON EAST-WEST WALLS														
Level	Zone A			Zone B			Zone C			Zone D			0.6 x Total Wind	
	Height (ft)	Width (ft)	Force (lbs)	Height (ft)	Width (ft)	Force (lbs)	Height (ft)	Width (ft)	Force (lbs)	Height (ft)	Width (ft)	Force (lbs)	(lbs)	(plf)
Roof	5.5	8.4	1045.1	11.0	8.4	1428	5.5	47.1	4659	11.0	47.1	6406	8123	146.4
L2	5.5	8.4	1045.1				5.5	47.1	4659				3422	61.7

JOB SET

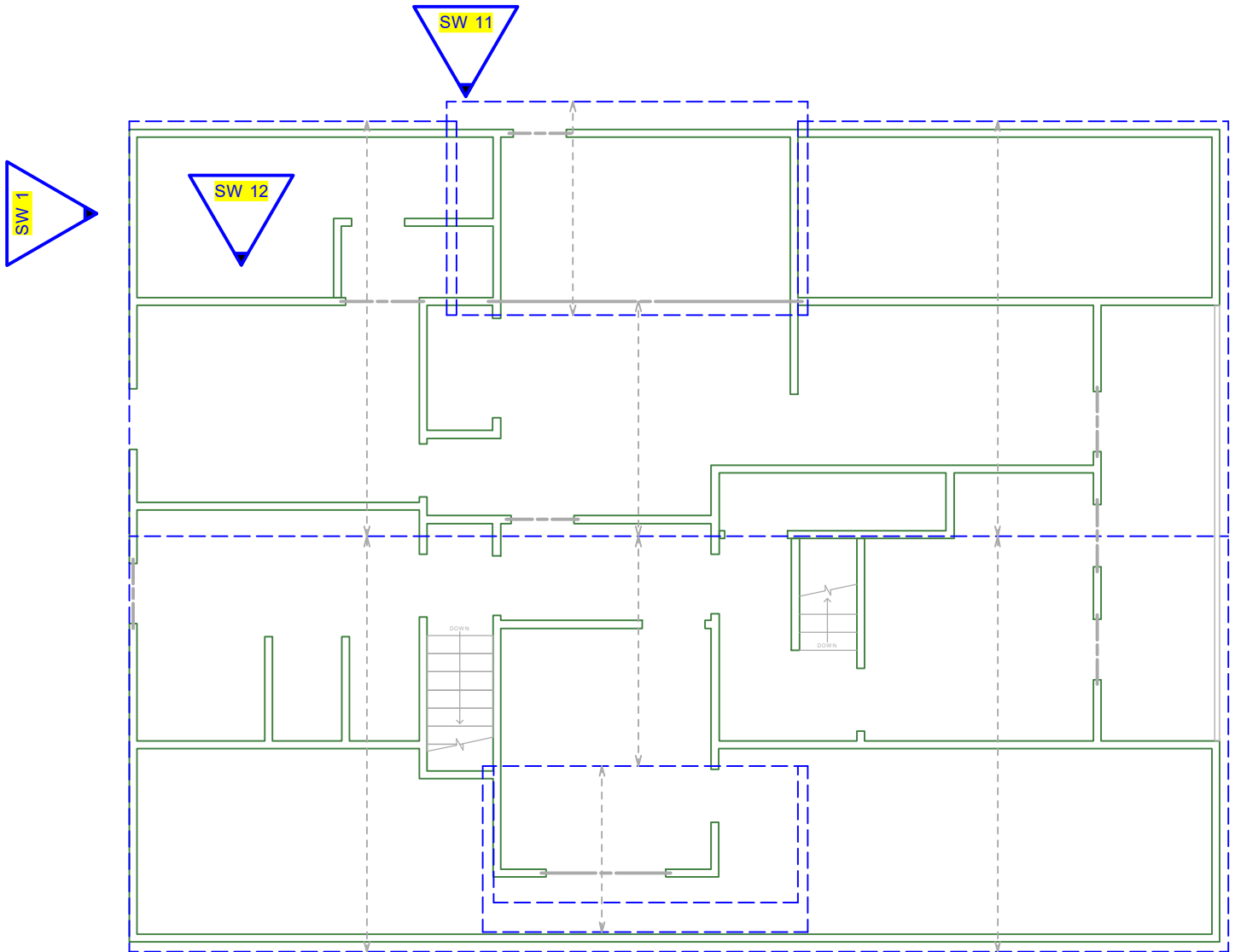


Bost House Renovation

Job No.: 221489

145 Bost Avenue
Newvada City, CA 95959

Upper Shearwall Layout



JOB SET

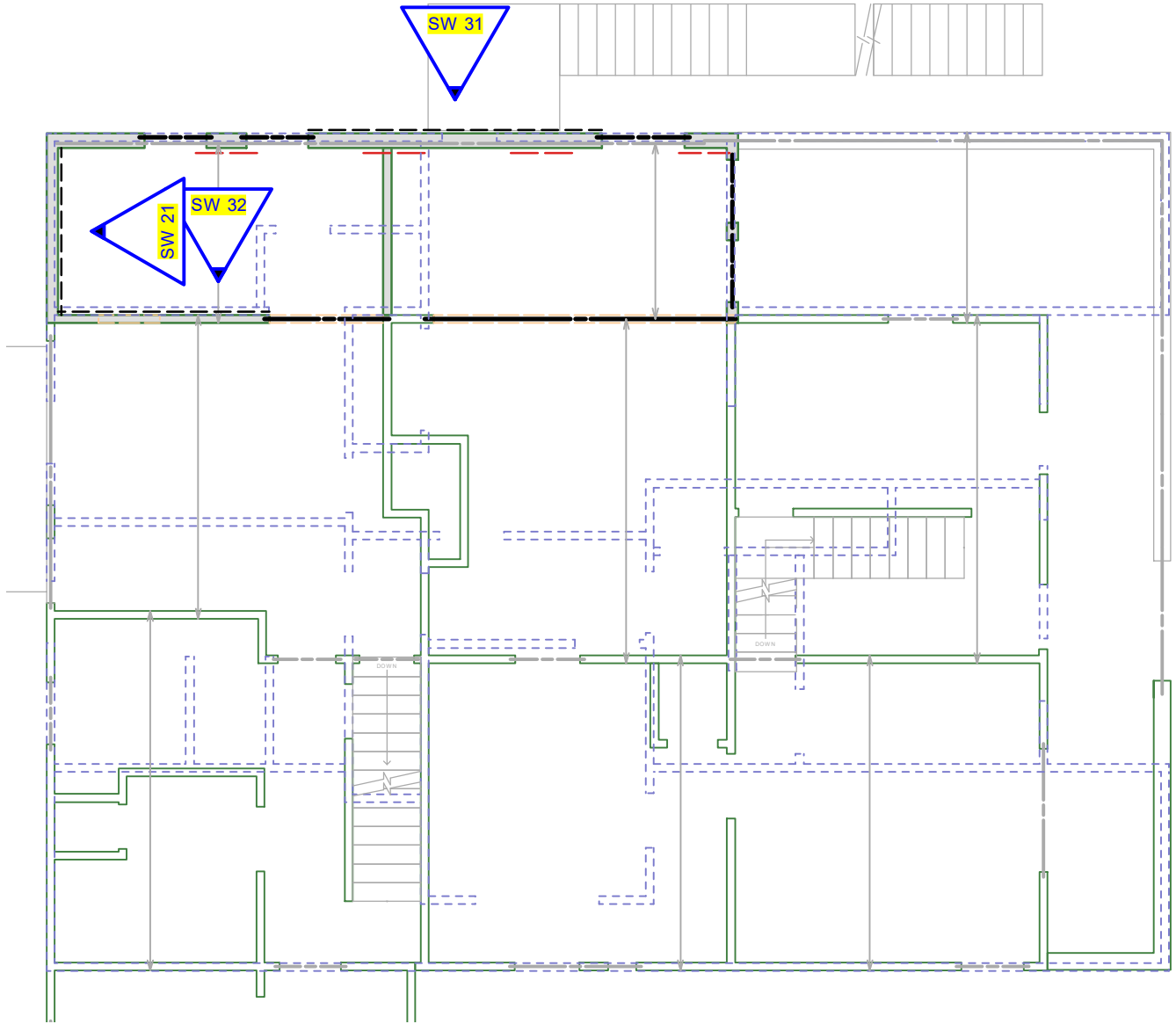


Bost House Renovation

Job No.: 221489

145 Bost Avenue
Nevada City, CA 95959

Lower Shearwall Layout



JOB SET

Job: **221489 - Nevada County Bost House - RDA**

ASD Lateral Force Analysis 2022 CBC

Building Forces		Simple
Level	Seis. (psf)	Wind (plf)
Roof	2.2	148.1
Main Flr	1.6	62.4
Totals:		210.5

TYPE	Materials	Sides	EQ / Wind*
6	1/2" cdx 10d @ 6"	1	310 / 434 plf
4	1/2" cdx 10d @ 4"	1	460 / 644 plf
3	1/2" cdx 10d @ 3"	1	600 / 840 plf
2	1/2" cdx 10d @ 2"	1	770 / 1078 plf
44	1/2" cdx 10d @ 4"	2	920 / 1288 plf
33	1/2" cdx 10d @ 3"	2	1200 / 1680 plf

Total Force = Trib Shear + Add'l Shear

Total Shear = Total Force / Wall Length

*Per 2015 SDPWS Table 4.3A, shearwall capacities have been increased by 40% when walls are governed by wind loading.

Wall ID	Wall Len (ft)	Wall Ht. (ft)	% of Line Load	Seismic Trib		Wind Trib (ft)	Shear		Add'l		Wall H/L Ratio	Gov. Force (lbs)	Wall Shear (plf)	Wall Gov Case	Type
				Len (ft)	Width (ft)		Seis (lbs)	Wind (lbs)	Seis (lbs)	Wind (lbs)					

S-2.3 Roof Framing Plan**NS**SW 1 1.00 11.00 100% 9.7 16.9 16.9 363 2498 0 0 11:1 2498 **2498** Wind **E****EW**SW 11 1.00 11.00 100% 34.2 5.2 5.6 393 835 0 0 11:1 835 **835** Wind **E**SW 12 1.00 11.00 100% 55.4 13.3 13.3 1633 1965 0 0 11:1 1965 **1965** Wind **E****S-2.2 Floor Framing Plan****NS**SW 21 8.00 11.00 100% 9.7 16.9 16.9 260 526 363 1249 1 3/8:1 1775 **222** Wind **6****EW**SW 31 14.00 11.00 100% 34.2 5.2 5.6 282 352 393 835 4/5:1 1187 **85** Wind **6**SW 32 10.00 11.00 100% 55.4 13.3 13.3 1169 828 1633 1965 1 1/9:1 2802 **280** Seis **6**

E: Existing Wall. Calculated for transfer forces only.

JOB SET

Job: **221489 - Nevada County Bost House - RDA**

ASD Lateral Force Analysis 2022 CBC

Description	Mot	Overturning Moment
of Variables:	Mr Left	Resisting Moment about the Left side of the wall
	Mr Right	Resisting Moment about the Right side of the wall
	HD Left	Hold down force on the left side of the wall
	HD Right	Hold down force on the right side of the wall

$$\text{Seismic: } HD = (\rho 0.7 M_{OT} - (0.6 - 0.14 * S_{DS}) M_R) / L \quad (\text{ASCE 12.4.2.3})$$

$$\text{Wind: } HD = (0.6 M_{OT} - 0.6 M_R) / L \quad (\text{ASCE 2.4.1})$$

Wall ID	M _{OT} (lb-ft)	M _{R Left} (lb-ft)	M _{R Right} (lb-ft)	HD Left (lb)	HD Right (lb)	Gov.	Use Left	Use Right
---------	-------------------------	-----------------------------	------------------------------	--------------	---------------	------	----------	-----------

S-2.2 Floor Framing Plan**NS**

SW 21	32545	7020	7020	2042	2042	Wind	HDU4	HDU4
-------	-------	------	------	------	------	------	------	------

EW

SW 31	21755	25043	25043	-146	-146	Wind	OK	OK
SW 32	44030	22895	22895	1972	1972	Seis	HDU4	HDU4

JOB SET

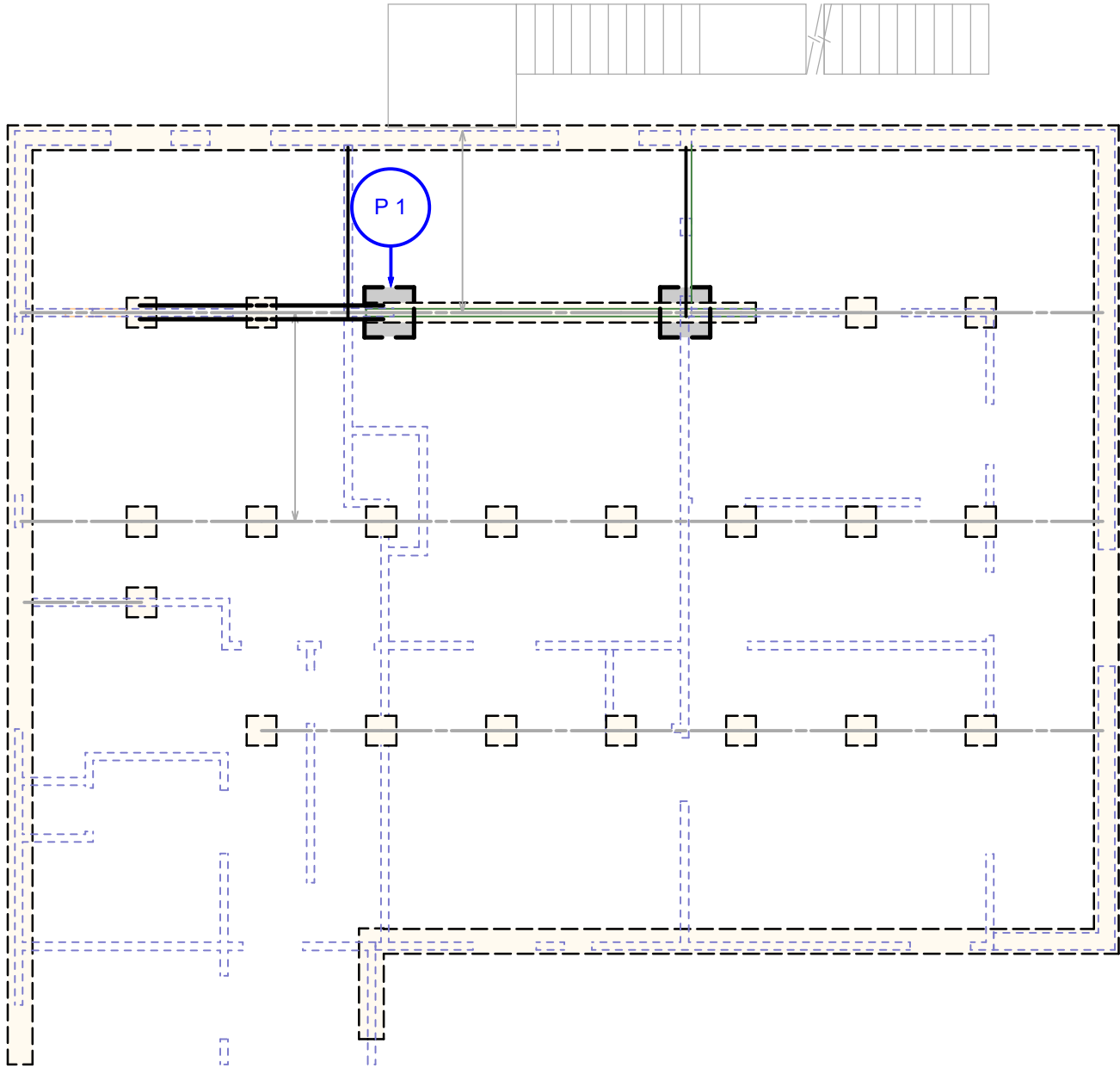


Bost House Renovation

Job No.: 221489

145 Bost Avenue
Newvada City, CA 95959

Foundation Layout



JOB SET

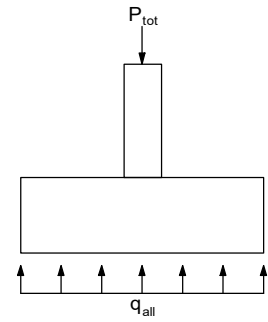


Job: [221489 - Nevada County Bost House - RDA](#)

Pad Footing Design Calculation:

$q_{all} = 1,500$ psf Allowable Bearing Pressure (per Table 1806.2)
 + 33% Increase for Transient Loading
 $q_{all} = 1,995$ psf Allowable Bearing Pressure with Transient Loading

* Allowable Bearing Capacity Based on ASD Load Combinations (ASCE 7-16 2.4.1)
 * Reinforcement design based on LRFD Load Combinations (Per ASCE 7-16 2.3.1)



Pad	Reactions on Footing	Point Loads							Bearing Design	Pad Design
		D	LR	L	L2	S	W	E		
P1	FB 1 1	3.59 k	1.95 k	3.83 k		3.68 k			Pad Width, W = 30 in.	Use (3) #5 @ 12" oc EW Bending Check $q_u = 15.58$ psi $M_u = 35.07$ kip-in $A_s \text{ Req'd} = 0.062$ in. ² $A_s = 0.92$ in ³ OK
									Pad Length, L = 30 in.	
									Pad Thick., d = 18 in.	Shear Check $V_u = 7.47$ kips (2-Way) $\phi V_c = 184.50$ kips $V_u/\phi V_c = 0.04$ OK
	Totals	3.59 k	1.95 k	3.83 k		3.68 k			$P_{tot} = 9220$ lbs $q_{bear} = 1475$ psf $q_{bear}/q_{all} = 0.98$ OK	
Worst Case Load Combinations (per ASCE 7-16 2.4 & 2.3)										
ASD Static: Case 4: D + 0.75L + 0.75S										
LRFD Design: Case 3: 1.2D + 1.6S + 1.0L										

JOB SET