LOGAR DESIGNS INC

P.O. Box 690, Newman, CA 95360.
Phone: 669-253-0101
Email: admin@logardesign.com

Structural Calculations

For:
GARAGE CONVERSION TO JADU
Into a 1-Story Structure
At:
Residence: 4456 Gina St, Fremont, CA 94538

Prepared for
Jose

May 2, 2024

Job Number: LGRAS24014

Rev. 1

Angelito M Perez P.E.
Professional Enginner, CA 68198

Fremont
APPROVED
CITY OF FREMONT | BUILDING & SAFETY DIVISION
The plans shall remain on the site throughout the duration of work. No building shall be occupied until all final approvals are completed. These documents are approved insofar as the construction and use authorized is correct and lawful. **APPROVAL OF THIS DOCUMENT DOES NOT GIVE AUTHORITY TO VIOLATE ANY CODE OR LAW.** No changes shall occur to these documents without authorization from the Building Official.

5/31/2024, 11:49:37 AM
BLD2024-06273
Khoi Nguyen

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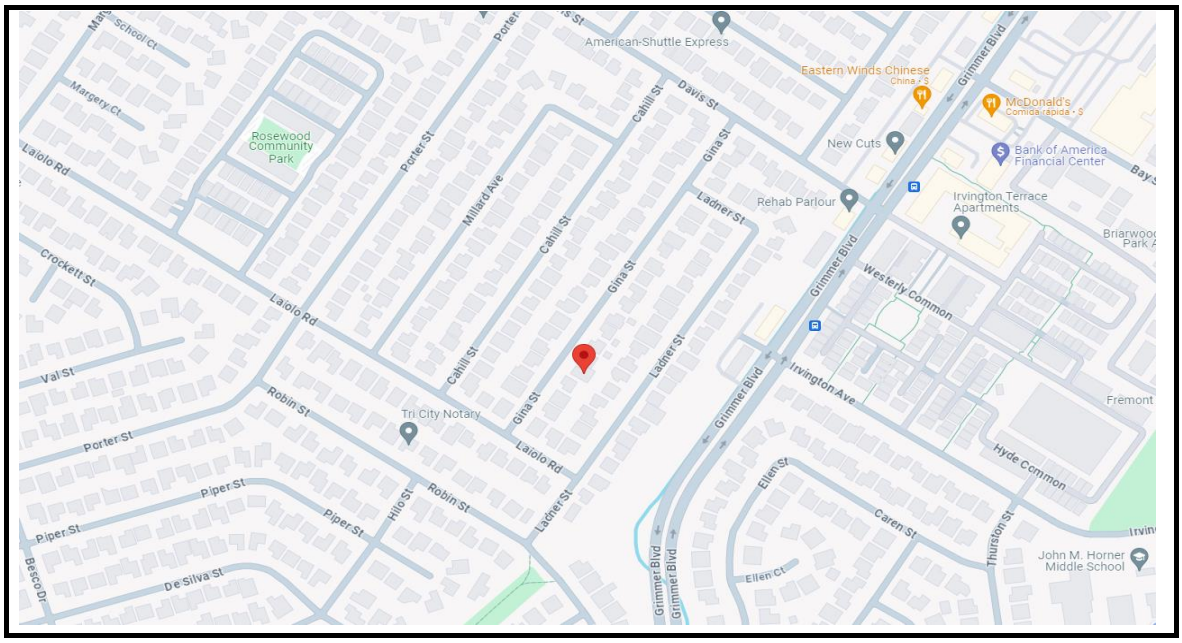
For:
GARAGE CONVERSION
Residence:
4456 Gina St, Fremont, CA 94538

Date: 15/03/2024
Projet No.: LGRAS24014

Source.: Google Maps



VECINITY MAPS

ELEVATION VIEW OF SITE

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VERTICAL LOADING

ROOFING		
A. Roof Dead Load:		
Typical Roof Slope	2	:12

Roofing - Asphalt	8.00	psf
1/2" Plywood/Sheathing	1.50	psf
Rafters 4x @ 24 oc V.I.F.	2.80	psf
Insulation	1.00	psf
Gypsum Ceiling	2.50	psf
Misc.	1.00	psf
	16.80	psf
Adj. for slope	**18.00**	psf

B. Roof Live Load: **20.00** psf per IBC

EXTERIOR WALL		
Gypsum	2.50	psf
Studs	1.00	psf
Insulation	1.00	psf
Plywood & Misc.	2.50	psf
Stucco	10.00	psf
	17.00	psf

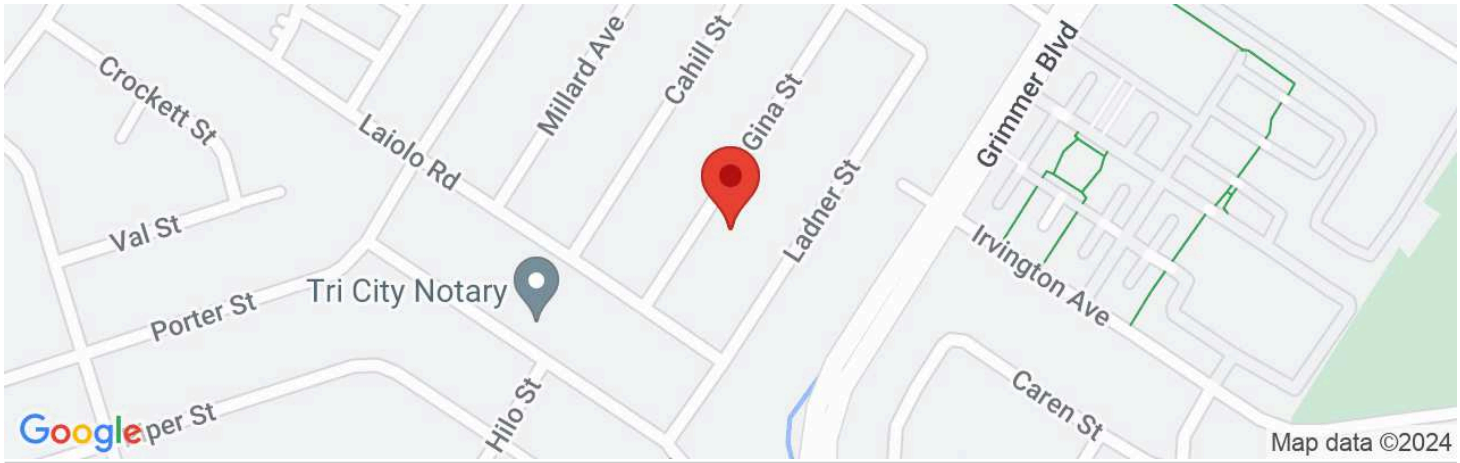
INTERIOR WALL		
Gypsum	2.50	psf
Studs	1.00	psf
Insulation	1.00	psf
Misc.	1.00	psf
Gypsum	2.50	psf
	8.00	psf

USGS web services were down for some period of time and as a result this tool wasn't operational, resulting in *timeout* error.
USGS web services are now operational so this tool should work as expected.

OSHPD

4456 Gina St, Fremont, CA 94538, EE. UU.

Latitude, Longitude: 37.5319577, -121.9710263



Date	12/3/2024, 09:17:24
Design Code Reference Document	ASCE7-16
Risk Category	II
Site Class	D - Default (See Section 11.4.3)

Type	Value	Description
S_S	2.129	MCE_R ground motion. (for 0.2 second period)
S_1	0.82	MCE_R ground motion. (for 1.0s period)
S_{MS}	2.555	Site-modified spectral acceleration value
S_{M1}	null -See Section 11.4.8	Site-modified spectral acceleration value
S_{DS}	1.703	Numeric seismic design value at 0.2 second SA
S_{D1}	null -See Section 11.4.8	Numeric seismic design value at 1.0 second SA

Type	Value	Description
SDC	null -See Section 11.4.8	Seismic design category
F_a	1.2	Site amplification factor at 0.2 second
F_v	null -See Section 11.4.8	Site amplification factor at 1.0 second
PGA	0.894	MCE_G peak ground acceleration
F_{PGA}	1.2	Site amplification factor at PGA
PGA_M	1.073	Site modified peak ground acceleration
T_L	8	Long-period transition period in seconds
SsRT	3.052	Probabilistic risk-targeted ground motion. (0.2 second)
SsUH	3.321	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration
SsD	2.129	Factored deterministic acceleration value. (0.2 second)
S1RT	1.13	Probabilistic risk-targeted ground motion. (1.0 second)
S1UH	1.248	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration.
S1D	0.82	Factored deterministic acceleration value. (1.0 second)
PGAd	0.894	Factored deterministic acceleration value. (Peak Ground Acceleration)
PGA_{UH}	1.256	Uniform-hazard (2% probability of exceedance in 50 years) Peak Ground Acceleration
C_{RS}	0.919	Mapped value of the risk coefficient at short periods
C_{R1}	0.905	Mapped value of the risk coefficient at a period of 1 s
C_V	1.5	Vertical coefficient

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Date: 15/03/2024
Projet No.: LGRAS24014

Bldg Story:	1	Site Class:	Class D
Latitude:	37.5319577	Height, h:	10.8
Longitude:	-121.9710263	Response Modification Coefficient R:	6.5
Type of Framing System:	Bearing Wall	Importance factor I:	1.0
Type of Occupancy:	Category II		

11.4.1 Mapped Acceleration Parameters

SS= 2.129 g = spectral response acceleration parameter at short periods
S1= 0.820 g = spectral response acceleration parameter at a period of 1 s

11.4.3 Site Coefficients and Adjusted MCE Spectral Resoponse Acceleration Parameters

SMS= Fa*SS
Fa= 1.2 = short-period site coefficient (at 0.2 s-period) from Table 11.4-1
SMS= 2.55 g = spectral response acceleration at short periods adjusted for site class effects

SM1= Fv*S1
Fv= 1.50 = short-period site coefficient (at 0.1 s-period) from Table 11.4-2
SM1= 1.23 g = spectral response acceleration at short periods adjusted for site class effects

11.4.4 Design Spectral Acceleration Parameters

SDS= (2/3)*SMS =(2/3)*2.5548
SDS= 1.70 g = spectral response acceleration at short periods adjusted for site class effects

SD1= (2/3)*SM1=(2/3)*1.23
SD1= 0.82 g = spectral response acceleration at short periods adjusted for site class effects

11.4.5 Design Response Spectrum

T=Ta= $(Ct)*(h)^{x}$
Ct= 0.02 = building period coefficient
x= 0.75 = building period coefficient
Ta= 0.12 s = approximate fundamental period of the building

12.8.1.1 Calculation of Seismic Response Coefficient

Cs= S_{DS} / (R / I) (Equation 12.8-2)
Cs= 0.262 g = seismic response coefficient

Check Cs not exceeding the following values:

1.) Cs1 S_{D1} / T (R / I) for T < T_L (equation 12.8-3)
Cs1= 1.062 g — Okay
2.) Cs2 0.01 = seismic response coefficient (equation 12.8-5)
3.) Cs3 0.5 S_1 / (R / I) (Equation 12.8-6)
Cs3= 0.063 g — Okay

Seismic Coefficient, Cs= 0.262 g = seismic response coefficient

W= the total dead load of the building (on following page)
V= C_s W

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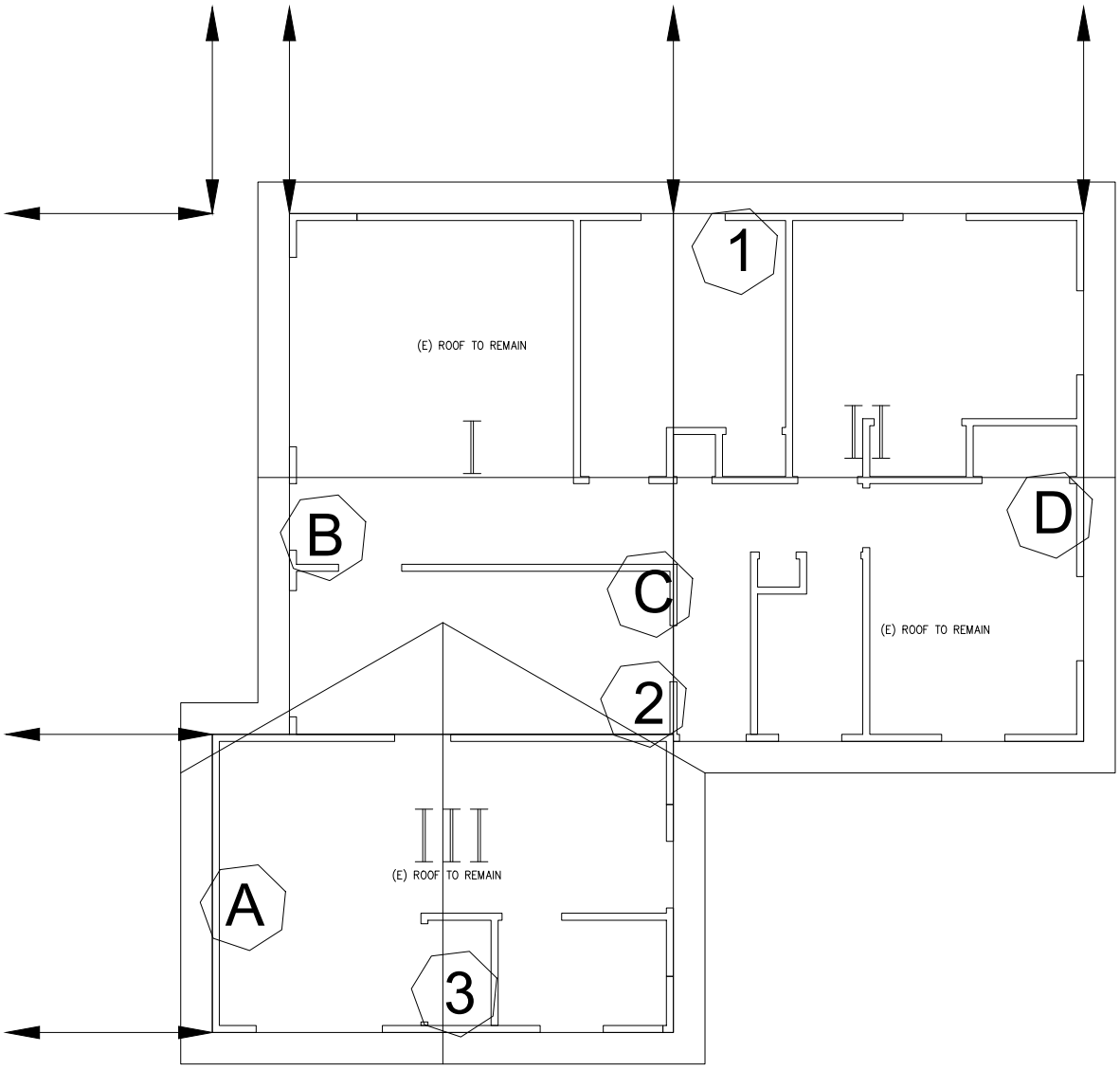
Date:03/14/24

LATERAL ANALYSIS



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For: GARAGE CONVERSION
Residence: 4456 Gina St, Fremont, CA 94538

Date: 02/05/2024
Projet No.: LGRAS24014

Transverse & Longitudinal Lateral Loadings

Tributary Building Weights:

Weight of Roof:	18 psf	1500 sf			27000 lbs
Weight of Exterior Walls:	17 psf	160.0 ft	8 ft	0.5	10880 lbs
Weight of Interior Walls:	8 psf	137.0 ft	8 ft	0.5	4384 lbs
				Total Weight	**42264 lbs**

Cs (Per ASCE 7, Sec. 12.8-1.1)

Cs =	0.262

Seismic Base Shear: V=Cs*W*ρ (Per ASCE 7, Eq. 12.8-1)

V =	0.7	0.262	42264 lbs	1.3
V =	**10078 lbs**			

AREAS FOR GRID LINES

AREA I	452 sf
AREA II	489 sf
AREA III	310 sf
Σ=	1251 sf

Transverse Loading $V_{East-West}$ = 10078 lbs / 1251 sf

$V_{East-West}$ = 8.1 psf

				SW Length	Nailing Sched		Factor
Line 1:	8.1 psf	471 sf	3790 lbs				
Line 2:	8.1 psf	626 sf	5039 lbs				
Line 3:	8.1 psf	155 sf	1249 lbs	7.50 ft	6 in	1	166 plf
	Σ=	1251 sf	Σ= 10078 lbs				

Longitudinal Loading $V_{North-South}$ = 10078 lbs / 1251 sf

$V_{North-South}$ = 8.1 psf

Line A:	8.1 psf	155 sf	1249 lbs
Line B:	8.1 psf	226 sf	1821 lbs
Line C:	8.1 psf	626 sf	5039 lbs
Line D:	8.1 psf	245 sf	1970 lbs
	Σ=	1251 sf	Σ= 10078 lbs

Shearwall Stability:

		SW Ht.	SW Ht*FORCE	(/0.7)	(Ω=2.5)	
Line 3:	166 plf	8.0 ft	1328 lbs	1897 lbs	4743 lbs	Use Simpson HDU2 w/4x4" Post ; Cap. = 3075 lbs.

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SHEAR WALL SCHEDULE

MARK	SHEAR WALL CONNECTION		SHEAR TRANSFER NOTE #11	SILL PLATE CONNECTIONS (SEE NOTE #9 @ EXISTING CONCRETE)		NOTE #12
	MATERIAL	PLYWOOD NAILING	NAILING OR CLIPS (T.N.)	NAILING (S.N.) FOR 2x SOLE PLATE ONLY	ANCHOR BOLTS (A.B.'S) REMARKS: SHEAR BOLTS	SHEAR WALL CAPACITY (#/')
1	3/8" CDX PLYWOOD P.I.: 24/0 *	8d AT 6" O.C. E.N. 8d AT 12" O.C. F.N.	16d AT 5" O.C. OR A35 @ 16" O.C. OR LTP4 AT 24" O.C.	16d AT 5" O.C.	5/8"ø A.B. AT 4'-0" O.C.	260
2	3/8" CDX PLYWOOD P.I.: 24/0 *	8d AT 4" O.C. E.N. 8d AT 12" O.C. F.N.	16d AT 3" O.C. OR A35 @ 12" O.C. OR LTP4 AT 20" O.C.		5/8"ø A.B. AT 3'-3" O.C.	380
3	3/8" CDX PLYWOOD P.I.: 24/0 **	8d AT 3" O.C. E.N. 8d AT 12" O.C. F.N.	A35 @ 10" O.C. OR LTP4 AT 16" O.C.		5/8"ø A.B. AT 2'-4" O.C.	490
4	3/8" CDX PLYWOOD P.I.: 24/0 **	8d AT 2" O.C. E.N. 8d AT 12" O.C. F.N.	A35 @ 10" O.C. OR LTP4 AT 12" O.C.		5/8"ø A.B. AT 1'-8" O.C.	636
5	1/2" CDX PLYWOOD P.I.: 24/0 **	10d AT 2" O.C. E.N. 10d AT 12" O.C. F.N.	2-A35 @ 12" O.C. OR LTP4 AT 10" O.C.		5/8"ø A.B. AT 1'-6" O.C.	770
6	1/2" STR. PLYWOOD P.I.: 24/0 **	10d AT 2" O.C. E.N. 10d AT 12" O.C. F.N.	2-A35 @ 12" O.C. OR LTP4 AT 8" O.C.		5/8"ø A.B. AT 1'-4" O.C.	870
3 3	3/8" CDX PLYWOOD ** EACH SIDE P.I.: 24/0	8d AT 3" O.C. E.N. 8d AT 12" O.C. F.N.	2-A35 @ 12" O.C. OR LTP4 AT 8" O.C.		5/8"ø A.B. AT 1'-2" O.C.	980
4 4	3/8" CDX PLYWOOD ** EACH SIDE P.I.: 24/0	8d AT 2" O.C. E.N. 8d AT 12" O.C. F.N.	NOTE #10 LTP4 AT 12" O.C. EACH SIDE, STAGGER		5/8"ø A.B. AT 11" O.C.	1272
6 6	1/2" STRUCT I PLYWOOD** EACH SIDE P.I.: 24/0	10d AT 2" O.C. E.N. 10d AT 12" O.C. F.N.	NOTE #10 LTP4 AT 8" O.C. EACH SIDE, STAGGER		5/8"ø A.B. AT 8" O.C.	1740

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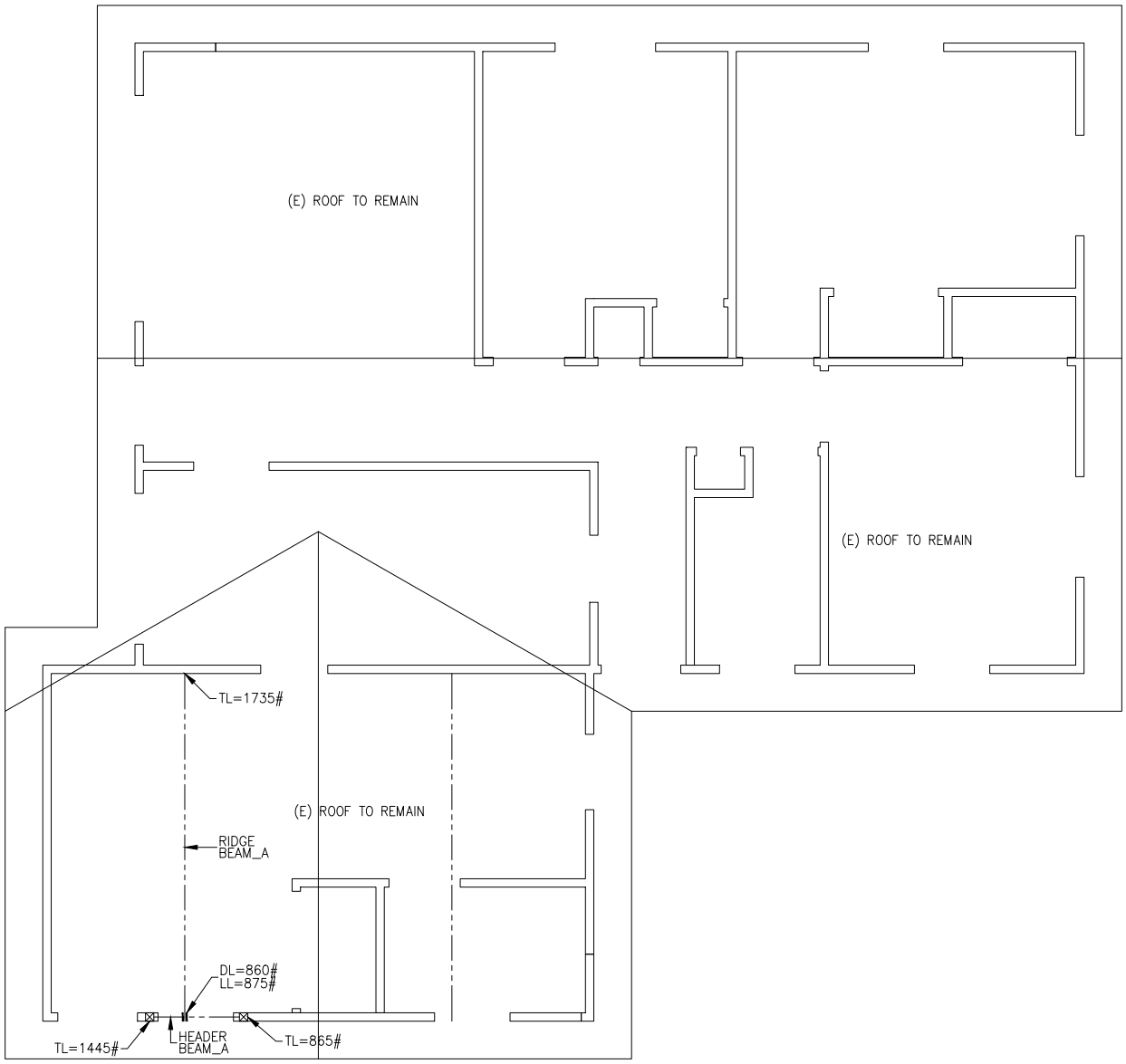
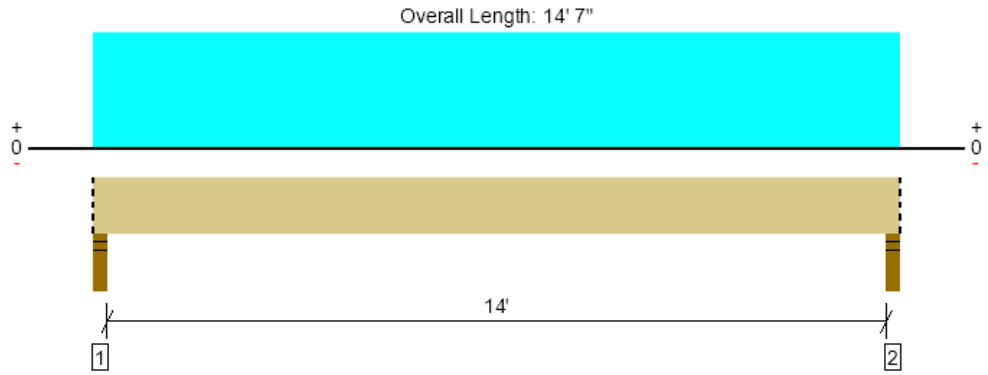


*STRUCTURAL MEMBERS (CHECK LIST)
*LOADS TO SUPPORTS (CHECK LIST)

Roof Members, Ridge Beam_A

1 piece(s) 4 x 12 DF No.2



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1735 @ 2"	7656 (3.50")	Passed (23%)	--	1.0 D + 1.0 Lr (All Spans)
Shear (lbs)	1443 @ 1' 2 3/4"	5906	Passed (24%)	1.25	1.0 D + 1.0 Lr (All Spans)
Moment (Ft-lbs)	6040 @ 7' 3 1/2"	7614	Passed (79%)	1.25	1.0 D + 1.0 Lr (All Spans)
Live Load Defl. (in)	0.168 @ 7' 3 1/2"	0.712	Passed (L/999+)	--	1.0 D + 1.0 Lr (All Spans)
Total Load Defl. (in)	0.332 @ 7' 3 1/2"	0.950	Passed (L/515)	--	1.0 D + 1.0 Lr (All Spans)

Member Length : 14' 7"
System : Roof
Member Type : Drop Beam
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD
Member Pitch : 0/12

- Deflection criteria: LL (L/240) and TL (L/180).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Roof Live	Factored	
1 - Stud wall - DF	3.50"	3.50"	1.50"	860	875	1735	Blocking
2 - Stud wall - DF	3.50"	3.50"	1.50"	860	875	1735	Blocking

• Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	14' 7" o/c	
Bottom Edge (Lu)	14' 7" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Roof Live (1.25)	Comments
0 - Self Weight (PLF)	0 to 14' 7"	N/A	10.0	--	
1 - Uniform (PSF)	0 to 14' 7" (Front)	6'	18.0	20.0	Roof Load

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The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Ismael Arcos Structural Engineering (408) 659-5580 i.arcos@gd-se.com	

Weyerhaeuser

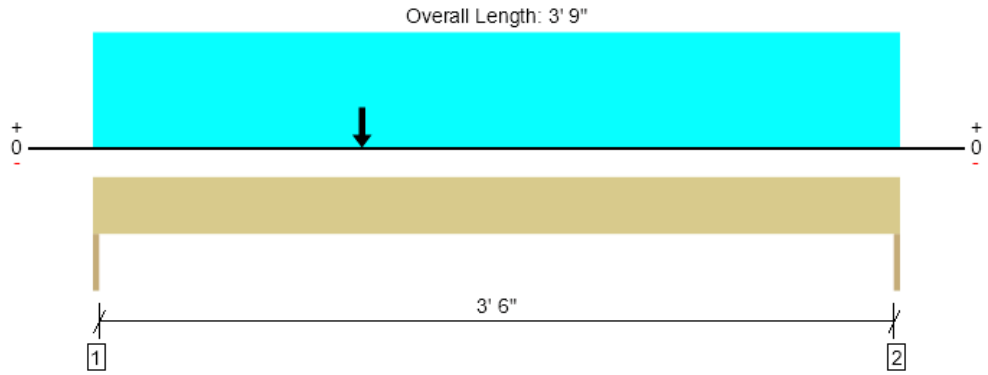
FORTEWEB

MEMBER REPORT

PASSED

Roof Members, Header Beam_A

1 piece(s) 4 x 10 DF No.2



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1442 @ 0	3281 (1.50")	Passed (44%)	--	1.0 D + 1.0 Lr (All Spans)
Shear (lbs)	1306 @ 10 3/4"	4856	Passed (27%)	1.25	1.0 D + 1.0 Lr (All Spans)
Moment (Ft-lbs)	1684 @ 1' 3"	5615	Passed (30%)	1.25	1.0 D + 1.0 Lr (All Spans)
Live Load Defl. (in)	0.004 @ 1' 9 3/4"	0.125	Passed (L/999+)	--	1.0 D + 1.0 Lr (All Spans)
Total Load Defl. (in)	0.009 @ 1' 9 13/16"	0.188	Passed (L/999+)	--	1.0 D + 1.0 Lr (All Spans)

Member Length : 3' 9"
System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Roof Live	Factored	
1 - Trimmer - DF	1.50"	1.50"	1.50"	784	658	1442	None
2 - Trimmer - DF	1.50"	1.50"	1.50"	497	367	864	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	3' 9" o/c	
Bottom Edge (Lu)	3' 9" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Roof Live (1.25)	Comments
0 - Self Weight (PLF)	0 to 3' 9"	N/A	8.2	--	
1 - Uniform (PLF)	0 to 3' 9"	N/A	68.0	-	Exterior wall Load
2 - Uniform (PSF)	0 to 3' 9"	2'	18.0	20.0	Roof Load
3 - Point (lb)	1' 3"	N/A	860	875	Linked from: Ridge Beam_B, Support 1

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The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Ismael Arcos Structural Engineering (408) 659-5580 i.arcos@gd-se.com Rev.1	

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5/2/2024 6:12:35 PM UTC
ForteWEB v3.7, Engine: V8.4.0.40, Data: V8.1.5.0
File Name: 4456 Gina St, Fremont, CA 94538

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Allowable Point Loads on Doug Fir Wood Posts / Columns

Post Size	Height	L_e / d	F_{CE}	C_P	$F_c p^{erp}$	F_c^{prll}	Area of post	P_{ALLOW}
(inches)	(feet)	(in / in)	(psi)		(psi)	(psi)	(in^2)	(lbs)
4 x 4	8	27.4	634	0.41	625	1350	12.25	**6810**
	9	30.9	501	0.34	625	1350	12.25	**5568**
	10	34.3	406	0.28	625	1350	12.25	**4612**
	11	37.7	335	0.23	625	1350	12.25	**3870**
	12	41.1	282	0.20	625	1350	12.25	**3287**
	13	44.6	240	0.17	625	1350	12.25	**2824**
	14	48.0	207	0.15	625	1350	12.25	**2450**
4 x 6	8	27.4	634	0.41	625	1350	19.25	**10701**
	9	30.9	501	0.34	625	1350	19.25	**8750**
	10	34.3	406	0.28	625	1350	19.25	**7247**
	11	37.7	335	0.23	625	1350	19.25	**6081**
	12	41.1	282	0.20	625	1350	19.25	**5165**
	13	44.6	240	0.17	625	1350	19.25	**4437**
	14	48.0	207	0.15	625	1350	19.25	**3849**
4 x 8	8	27.4	634	0.41	625	1350	25.38	**14106**
	9	30.9	501	0.34	625	1350	25.38	**11535**
	10	34.3	406	0.28	625	1350	25.38	**9553**
	11	37.7	335	0.23	625	1350	25.38	**8016**
	12	41.1	282	0.20	625	1350	25.38	**6809**
	13	44.6	240	0.17	625	1350	25.38	**5849**
	14	48.0	207	0.15	625	1350	25.38	**5074**

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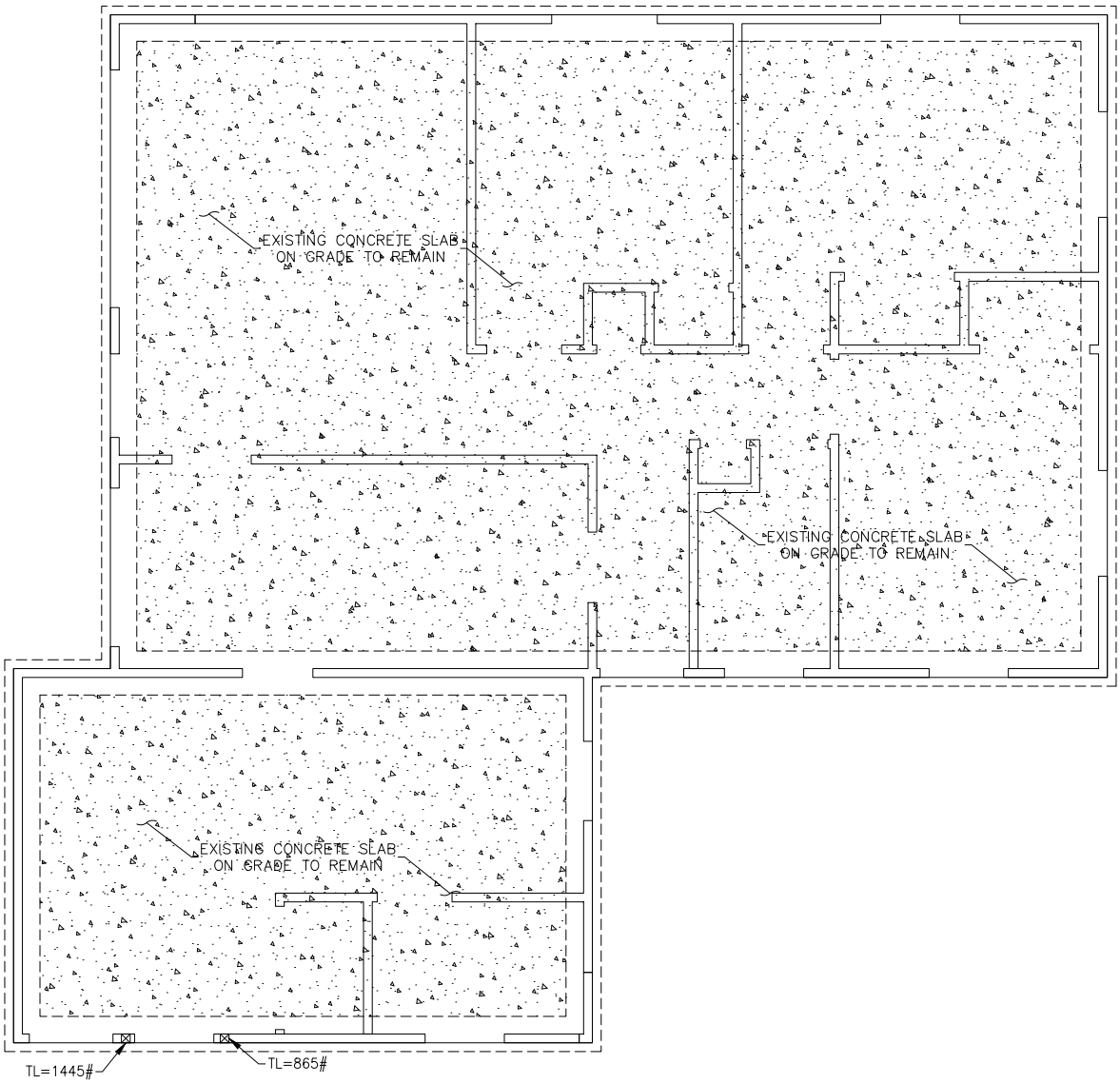
Project:4456 Gina St, Fremont, CA 94538
Date:05/02/24



*STRUCTURAL MEMBERS (CHECK LIST)
*LOADS TO SUPPORTS (CHECK LIST)

LOGAR DESIGNS INC

P.O. Box 690,
NEWMAN, CA. 95360.
Phone: 669-253-0101
Email: admin@logardesign.com

For: GARAGE CONVERSION TO JADU
Residence: 4456 Gina St, Fremont, CA 94538

Date: 02/05/2024
Projet No.: LGRAS24014

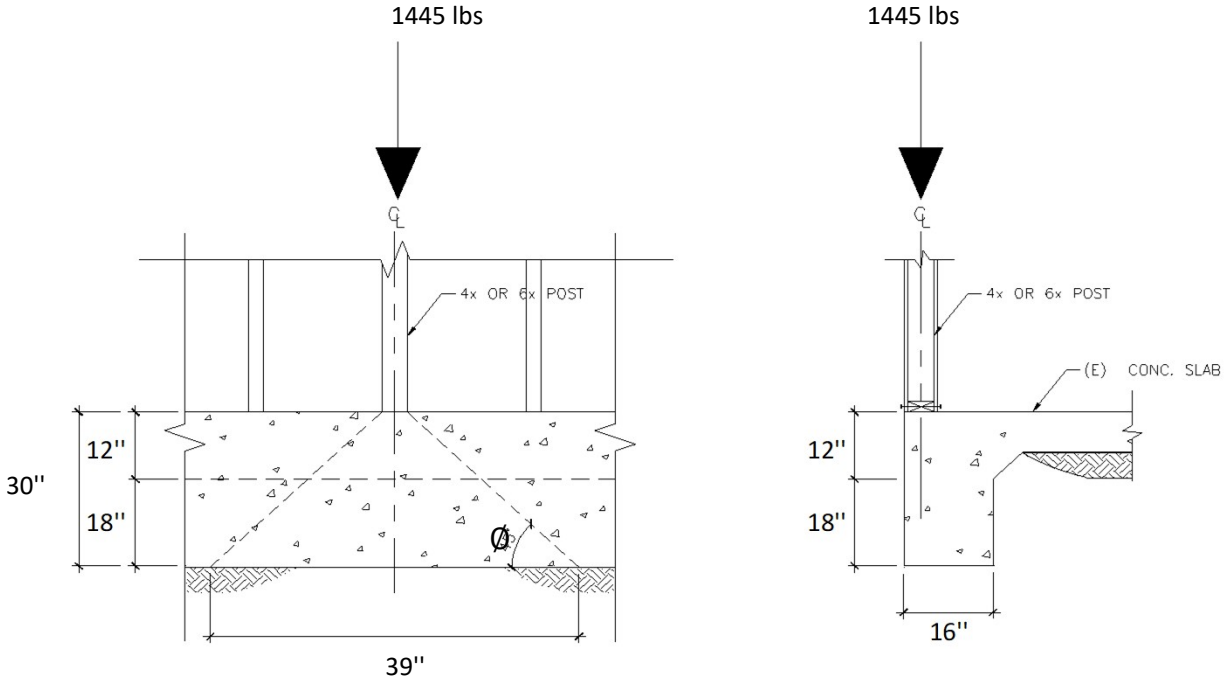
EXISTING FOUNDATION CHECK CAPACITY

Property soil:
SOIL BEARING CAPACITY = 1500 psf
Angle, Φ= 60°

Actuating load :
Pu= 1445 lbs

Property Post:
size post : 4'' x 4''

Dimensions Footing:
height 1: 12'' V.I.F.
height 2: 18'' V.I.F.
Width: 16'' V.I.F.



Area= 39/12*16/12 = 4.3 ft^2

$$f = \frac{P}{A} = \frac{1445 \text{ lbs}}{4.3 \text{ ft}^2} = 333 \text{ psf}$$

333 psf < 1500 psf OK