



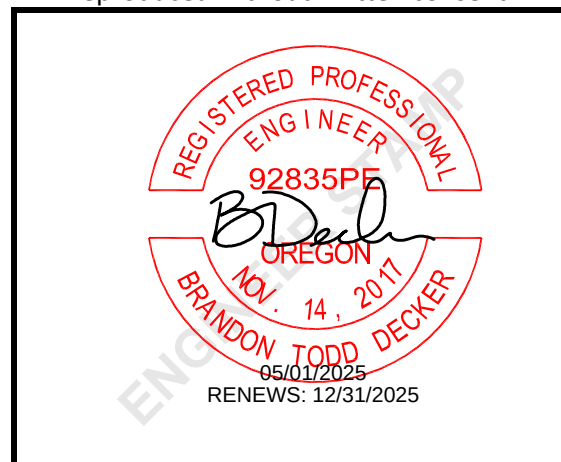
Structural Calculations

Project Name: Fairview Residence Remodel (Portland)
3160824
Project Location: 3126 Fairview Blvd
Portland, Oregon 97205
Project Number: 3160824
Date: 5/1/2025

Issues / Revisions

Date	Number	Comment
1/23/2025	6100125	Change in Scope
4/23/2025	6580425	Opening Change

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Fairview Residence Remodel (Portland) 3160824

3160824
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GS

Issues / Revisions

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Project information

Address / location * = 3126 Fairview Blvd
Area / subdivision
Area / subdiv. No. 1 = Other
City, county = Portland (Multnomah county)
State, Zip Code = Oregon 97205

* The structural calculations report and corresponding construction documents are valid for a single use at the project location and shall not be reused, copied, or reproduced without written consent.

Jurisdiction / occupancy information

Jurisdiction = Oregon
Building code = Oregon Code
Model building code = 2021 IRC 2021 IBC 101.2 & IRC R301.1.3
Use and occupancy classification = Residential - 1-unit dwelling (R)
Risk category = Not occupancy categories I, III, IV (II)

** Building code compliance of non-structural issues is not addressed. Refer to the architect or designer for compliance.

Environmental load parameters

Earthquake

Latitude, longitude	= 45.5197, -122.7137	
Mapped short period	Ss = 0.892	2021 IBC Figure 1613.2.1(1)
Mapped 1-sec. period	S1 = 0.402	2021 IBC Figure 1613.2.1(2)

Wind

Basic design wind speed	V = 98 mph	2021 IBC Figure 1609.3(1), 1609.3(2), 1609.3(3)
Exposure category	= B	2021 IBC 1609.4.3

Soil

Geotechnical design basis †

Area / subdiv. No. 1	= Presumptive values, 2021 IBC Table 1806.2	
Minimum frost cover	= 18 in.	2021 IBC 1809.5
Site class	= D-Default	
Special requirements	= None	

Lateral active press.	= 30 psf/ft
Lateral at-rest press.	= 60 psf/ft
Lateral passive press.	= 150 psf/ft
Coeff. of friction	= 0.25
Allow. vert. bearing	Qa = 1500 psf
Min. cont. footing	= 18 in.
Min. spot footing	= 20 in.

† It is recommended that a geotechnical investigation be conducted unless satisfactory data from adjacent areas is available that demonstrates an investigation is not necessary for any of the conditions in 2021 IBC 1803.5 (1-12). The structural calculations report and corresponding construction documents are only valid for the soil parameters listed herein. The design professional in responsible charge shall be notified if observations or field conditions differ.

Snow

Elevation (max)	= 735 ft	
Flat roof snow load	Pf = 25 psf	Jurisdiction

Rain

15-min. rainfall intensity	= in/hr
60-min. rainfall intensity	= in/hr

Deferred submittals

None

LOAD SETS

Roof dead loads

(2021 IBC 1606, ASCE 7-16 Table C3.1-1a)

Asphalt shingles	= 2 psf
Felt or ready roofing, roof sheathing	= 3 psf
Wood trusses, misc	= 5 psf
Insulation, gypsum sheathing	= 5 psf
MISC	= 2 psf
Roof DL No. 1	Total = 17 psf

ASCE 7-16 Table C3.1-1a

ASCE 7-16 Table C3.1-1a

Estimated

ASCE 7-16 Table C3.1-1a

Estimated

Floor dead loads

(2021 IBC 1606, ASCE 7-16 Table C3.1-1a)

Floor sheathing	= 2 psf	ASCE 7-16 Table C3.1-1a
Wood joists/trusses, MEP, misc	= 6 psf	ASCE 7-16 Table C3.1-1a
Gypsum sheathing	= 2 psf	ASCE 7-16 Table C3.1-1a
Interior Walls	= 2 psf	Estimated
Floor DL No. 1	Total = 12 psf	

6" suspended concrete slab	= 75 psf	Estimated
Floor DL No. 2	Total = 75 psf	

Wall dead loads

(2021 IBC 1606, ASCE 7-16 Table C3.1-1a)

Interior stud walls	= 10 psf	ASCE 7-16 12.14.8.1
Exterior 2x4@16"o.c., 5/8" gyp, insul., 7/16" sheathi	= 11 psf	ASCE 7-16 Table C3.1-1a

Roof live loads

(2021 IBC 1607)

Occupancy or use		Unif. (psf)	Conc. (lb)	Ref.
Roofs (ordinary construction)	=	20	300	2021 IBC Table 1607.1 No. 27

Floor live loads

(2021 IBC 1607)

Occupancy or use		Unif. (psf)	Conc. (lb)	Ref.
Residential (1-2 unit dwelling)	=	40	0	2021 IBC Table 1607.1 No. 26
Stairs and exits (residential 1-2 unit dwelling)	=	40	300	2021 IBC Table 1607.1 No. 31
Decks	=	60	0	2021 IBC Table 1607.1 No. 5
Garages (passenger vehicles)	=	50	3000	

Load sets

Live load (occupancy or use)	(psf)	Dead load	(psf)	Abbrev.
Flat roof snow load	25	Roof DL No. 1	17	S 25 17
Residential (1-2 unit dwelling)	40	Floor DL No. 1	12	L 40 12
Stairs and exits (residential 1-2 unit dwelling)	40	Floor DL No. 1	12	Ex 40 12
Decks	60	Floor DL No. 1	12	D 60 12
Residential (1-2 unit dwelling)	40	Floor DL No. 2	75	C 40 75
Garages (passenger vehicles)	50	Floor DL No. 2	75	GA 50 75

Deflection limits (L/limit)

(2021 IBC 1604.3.1)

Construction		L	S or W	D+L
Roof members (supporting plaster ceiling)	=	360	360	240
Floor members (joists)	=	480		240
Floor members (beams/headers)	=	360		240
Exterior walls and interior partitions (with other britt)	=		240	

SNOW CALCULATIONS

Ground snow loads

(ASCE 7-16 Chap. 7.2)

Basis	=	Jurisdiction defined
County	=	Multnomah
Elevation	=	735 ft
Ground snow load	P _g =	30 psf

Flat roof snow loads

(ASCE 7-16 Chap. 7.3)

Basis	=	Jurisdiction	
Roof exposure definition	=	Not fully exposed or sheltered (ASCE 7-16 Table 7.3-1, Notes a and b).	
Roof exposure	=	Partial	ASCE 7-16 Table 7.3-1 (notes a,b)
Terrain category (wind)	=	B	
Exposure factor	C _e =	1	ASCE 7-16 Table 7.3-1
Roof thermal condition	=	Cold, ventilated roofs exceeing R-25 between ventilated and heated space.	
Thermal factor	C _t =	1.1	ASCE 7-16 Table 7.3-2
Risk category	=	II	
Snow importance factor	I _s =	1	ASCE 7-16 Table 1.5-2
Flat roof snow load	P _f =	25 psf	Jurisdiction

WIND CALCULATIONS

Design wind pressure

(2021 IBC 1609, ASCE 7-16 Chap. 26)

Terrain exposure

Surface roughness (upwind)	= Terrain with numerous closely spaced obstructions having the size of single-family dwellings or larger.	
Exposure category	= B	2021 IBC 1609.4.3
Terrain exp. constant	alpha = 7	ASCE 7-16 Table 26.11-1
Terrain exp. constant	Zg = 1200	ASCE 7-16 Table 26.11-1
Terrain exp. constant	Zmin = 30 ft	ASCE 7-16 Table 26.11-1
Topographic factor	Kzt = 1	ASCE 7-16 Chap. 26.8.2

Basic wind pressure

Basic design wind speed	V = 98 mph	2021 IBC Figures 1609.3(1), (2), (3)
Structure type	= Buildings - MWFRS	
Wind directionality factor	Kd = 0.85	ASCE 7-16 Table 26.6-1
Risk category	= II	2021 IBC Table 1604.5
Approx. fundamental freq.	= 4.16 hz	
Structure type	= Rigid	ASCE 7-16 Chap. 26.2
Gust effect factor	G = 0.85	ASCE 7-16 Chap. 26.11.1
Enclosure	= Enclosed (A building having less than 4 sq ft of openings in each wall)	
Roof pitch	= 0:12	
Internal pressure coeff.	GCpi = 0.18	ASCE 7-16 Chap. 26.13, Table 26.13-1
Basic velocity pressure	q = 20.35 psf	ASCE 7-16 Equation 26.10-1

Directional Procedure: Components and cladding

(ASCE 7-16 Chap. 30.3)

Roof mean height	h = 34 ft	ASCE 7-16 Chap. 26.2
Effective wind area (wall components)	Aeff = 25 sf	
Velocity press. exp. coeff.	Kz = 0.73	ASCE 7-16 Table 26.10-1 Note 1.
Velocity pressure	qh = 14.78 psf	ASCE 7-16 Equation 26.10-1
Pressure coefficients	End Interior	
Positive (wall)	GCp = 0.93 0.93	ASCE 7-16 Figure 30.3-1
Negative (wall)	GCp = -1.26 -1.03	ASCE 7-16 Figure 30.3-1
Maximum pressure (wall)	max p = 21.27 17.87 psf	ASCE 7-16 Equation 30.3-1
Positive (roof)	GCp = 0.30 0.30	ASCE 7-16 Equation 30.3-1
Negative (roof)	GCp = -3.20 -1.70	ASCE 7-16 Equation 30.3-1
Maximum pressure (roof)	max p = 49.94 27.78 psf	ASCE 7-16 Equation 30.3-1

Elevation Geometry

Level	Trib. Height (ft)	Horiz. dim. (ft)		Max roof Elev. (ft)	Front Proj. A (sf)		Side Proj. A (sf)	
		Front	Side		Gable	Sloped	Gable	Sloped
3	4.5	55.833333	58	40.5	236.5	231	111	434
2	9.0	53.833333	44	0	0	0	0	0
1	9.0	55.833333	39.583333	0	0	0	0	0

Directional Procedure: MWFRS external pressure coefficients

(ASCE 7-16 Chap. 26.10, Figure 27.3-1 weighted Cp for sloped / gabled area)

Level	Front, Cp				Side, Cp			
Roof	Windward		Leeward		Windward		Leeward	
Level	Max Cp	Min Cp	Max Cp	Min Cp	Max Cp	Min Cp	Max Cp	Min Cp
3	0.32	-0.12	-0.34	-0.48	0.02	-0.70	-0.25	-0.48
2	-0.18	-0.90	-0.18	-0.30	-0.18	-0.90	-0.18	-0.30
1	-0.18	-0.90	-0.18	-0.30	-0.18	-0.90	-0.18	-0.30
	Windward	Leeward	Side		Windward	Leeward	Side	
Walls	0.80	-0.49	-0.70		0.80	-0.50	-0.70	

Directional Procedure: MWFRS wind pressures

(ASCE 7-16 Chap. 26.10.1, Table 26.10-1)

Level	Elev. (ft)	Kz	qz (psf)	Front pressure (psf)			Side pressure (psf)		
				+GCpi	-GCpi	Total	+GCpi	-GCpi	Total
Walls - Leeward									
Max h	27.50	0.68	13.91	-8.32	-3.32		-8.41	-3.41	
Walls - Windward									
3	27.50	0.68	13.91	6.95	11.96	16.00	6.95	11.96	16.00
2	18.50	0.61	12.42	5.94	10.95	16.00	5.94	10.95	16.00
1	9.50	0.57	11.70	5.45	10.46	16.00	5.45	10.46	16.00
Roofs - Leeward									
3	40.50	0.76	15.53	-9.08	-1.67		-9.19	-0.44	
2	0.00	0.57	11.70	-5.09	0.32		-5.09	0.32	
1	0.00	0.57	11.70	-5.09	0.32		-5.09	0.32	
Roofs - Windward									
3	40.50	0.76	15.53	-4.36	6.97	8.63	-12.00	3.05	8.00
2	0.00	0.57	11.70	-11.05	0.32	8.00	-11.05	0.32	8.00
1	0.00	0.57	11.70	-11.05	0.32	8.00	-11.05	0.32	8.00

Directional Procedure: Wind Lateral Loads

(ASCE 7-16 Chap. 27.2-27.3)

Level	Front				Side			
	Walls (lb)	Roof (lb)	Fx (ASD) (lb)	Vx (ASD) (lb)	Walls (lb)	Roof (lb)	Fx (ASD) (lb)	Vx (ASD) (lb)
3	2,412	2,421	4,833	4,833	2,506	2,616	5,122	5,122
2	4,738	0	4,738	9,571	4,406	0	4,406	9,528
1	4,738	0	4,738	14,308	3,611	0	3,611	13,139

SEISMIC CALCULATIONS

Seismic Design Criteria

(2021 IBC 1613.2, ASCE 7-16 Chap. 11)

Mapped acceleration parameters

Latitude	= 45.52
Longitude	= -122.714
MCE short period	Ss = 0.892 g
MCE 1.0 sec. period	S1 = 0.402 g

Design acceleration parameters

Site class	= D-Default		
Site coefficient	Fa = 1.2		
Site coefficient	Fv = 1.898		
Adjusted short period	SMS = 1.07	Design short period	SDS = 0.71
Adjusted 1.0 sec. period	SM1 = 0.76	Design 1.0 sec. period	SD1 = 0.51
Risk category	= II		
IRC Seismic design category	= D1		

Dead loads

(2021 IBC 1606; ASCE 7-16 Chap. 12.7.2, Table C3.1-1a)

Effective seismic snow weight	= 0 psf	ASCE 7-16 Chap. 12.7.2
Roof DL No. 1	= 17 psf	
Floor DL No. 1	= 12 psf	
Interior stud walls	= 10 psf	
Exterior 2x4@16"o.c., 5/8" gyp, insul., 7/16" sheathi	= 11 psf	

Equivalent Lateral Force Procedure

(ASCE 7-16 Chap. 12.8)

	Primary LFRS
Basic structural system	= Bearing wall systems
Seismic force-resisting system	= Light-frame wood walls (wood sheathii

Structural design parameters

Response modification factor	R = 6.5	ASCE 7-16 Table 12.2-1 No. A15
System overstrength factor	Omega = 3	ASCE 7-16 Table 12.2-1 No. A15
Deflection amplification factor	Cd = 4	ASCE 7-16 Table 12.2-1 No. A15
Building height limit	= 65 ft	ASCE 7-16 Table 12.2-1 No. A15

Fundamental period

Structure type	= All other	
Approximate period parameter	Ct = 0.02	ASCE 7-16 Table 12.8-2
Approximate period parameter	x = 0.75	ASCE 7-16 Table 12.8-2
Height above base	= 27.5 ft	
Approximate fundamental period	Ta = 0.24 sec.	ASCE 7-16 Equation 12.8-7
Approximate fundamental freq.	n = 4.16 hz	
Long period transition period	TL = 8 sec.	ASCE 7-16 Figure 22-14

Seismic base shear

Seismic importance factor	Ie = 1.00	ASCE 7-16 Table 1.5-2
Seismic response coefficient	Csmin = 0.031	ASCE 7-16 Equations 12.8-5,6
Seismic response coefficient	Csmax = 0.326	ASCE 7-16 Equations 12.8-3,4
Seismic response coefficient	Cs = 0.11	ASCE 7-16 Equation 12.8-2
Seismic base shear (LRFD)	V = 16687 lb	ASCE 7-16 Equation 12.8-1

Weight Parameters

	Trib.	Exterior Wall		Roof		Floor + Int Wall		Total Weight (lb)
		Permtr 1 (ft)	Permtr 2 (ft)	Area (sf)	Weight (psf)	Area (sf)	Weight (psf)	
3	5	270	0	2,580	17	2,305	12	84,901
1	9	192	0	0	17	0	12	21,112
Total								151,998

Seismic Lateral Loads

(ASCE 7-16 Chap. 12.8.3)

Level	Height (ft)	Floor (in)	Hx (ft)	Cvx	Fx (lb)	Vx (Shear walls)	
						LRFD (lb)	ASD (lb)
3	9.0	0	27.50	0.7	11,506	11,506	8,054
1	9.0	0	9.50	0.1	988	16,687	11,681



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5/1/2025

LFRS (SHEAR) CALCULATIONS

Level 2 - Longitudinal LFRS (2021 IBC 2305)

Wind lateral load (ASD)	=	9,528 lb
Seismic lateral load (ASD)	=	10,989 lb

Line	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
W =	1,620														
E =	1,868														

Wall segment			Opening (ft)		LFRS					Anchorage		Hold-down	
Line	L (ft)	h (ft)	b total	h max	Type	Wind	Allow	Seismic	Allow	D (in.)	Type	T (lb)	Type
A	8.33	9	3	5	SW3	304	525	350	375	0.99	16d @ 12"	786	CS16

DIAPHRAGMS

Sheathing analysis

APA Engineered Wood Construction Guide, Form No. E30W (2016 APA)

Location	Applied loads (OOP)			Sheathing		Support spacing (in.)	Allow	Result
	Label	LL (psf)	DL (psf)	Size	Rating		LL (psf)	
Roof	S 25 17	25	17	5/8"	40/20	24	139	OK 82%
Upper Floor	L 40 12	40	12	3/4"	48/24	16	335	OK 88%
Main Floor	L 40 12	40	12	3/4"	48/24	16	335	OK 88%

Diaphragm parameters

Level	Seismic Fpx	Transverse (front)		Longitudinal (side)		Minimum Sheathing Thickness	Diaphragm Nailing		
		Wind	Horz.	Wind	Horz.				
		MWFRS	dim. (ft)	MWFRS	dim. (ft)		Edge 1	Edge 2	Blocking
3	8,482	4,833	55.833333	5,122	58	7/16"	8d @ 6"	8d @ 6"	Unblocked
2	4,594	4,738	53.833333	4,406	44	15/32"	8d @ 6"	8d @ 6"	Unblocked
1	2,109	4,738	55.833333	3,611	39.583333	15/32"	8d @ 6"	8d @ 6"	Unblocked

Diaphragm analysis

Level	Max	Reaction Load (lb)		Line L (ft)	Diaphragm	Wind		Seismic	
	Span (ft)	Wind	Seismic		Layout	v (plf)	Allow (plf)	v (plf)	Allow (plf)
Transverse (front) direction									
3	55.833333	2,417	4,241	58	Case 1	42	322.5	73	230.35714
2	53.833333	2,369	2,297	44	Case 1	54	335	52	239.28571
1	55.833333	2,369	1,055	39.583333	Case 1	60	335	27	239.28571
Longitudinal (side) direction									
3	58	2,561	4,241	55.833333	Case 3	46	237.5	76	169.64286
2	44	2,203	2,297	53.833333	Case 3	41	252.5	43	180.35714
1	39.583333	1,805	1,055	55.833333	Case 3	32	252.5	19	180.35714

Chord Analysis

Level	Max Span (ft)	Depth (ft)	% Total Load	Chord Force (lb)	Collector Type	Allow (lb)
Transverse (front) direction			on Diaph.			
3	55.833333	58	100%	1,021	TP Splice (12) 16d	2,700
2	53.833333	44	100%	725	TP Splice (12) 16d	2,700
1	55.833333	40	100%	835	TP Splice (12) 16d	2,700
Longitudinal (side) direction						
3	58	56	100%	1,101	TP Splice (12) 16d	2,700
2	44	54	100%	469	TP Splice (12) 16d	2,700
1	39.583333	56	100%	320	TP Splice (12) 16d	2,700

Strut Analysis

Level	Line Length (ft)	Strut Length (ft)	% Total Load	Strut Force (lb)	Collector Type	Allow (lb)
Transverse (front) direction						
3	58	29	50%	2,120	TP Splice (12) 16d	2,700
2	44	22	50%	1,184	TP Splice (12) 16d	2,700
1	39.583333	20	50%	1,184	TP Splice (12) 16d	2,700
Longitudinal (side) direction			0			
3	55.833333	28	50%	2,120	TP Splice (12) 16d	2,700
2	53.833333	27	50%	1,149	TP Splice (12) 16d	2,700
1	55.833333	28	50%	903	TP Splice (12) 16d	2,700

WALL CALCULATIONS

Stud walls fall within the limits of table 2308.5.1 per IBC or calculated tables with the presumed loading.

BEAMS AND POSTS

Summary

Mark	=	RB 01
Section	=	4 X 6 DF #2 [DF #2]
Span	=	5.08333333333333 ft
Result	=	Section adequate by 27 % - Load Combo. No.3 DL + RLL - Flexure

RB 01
4 X 6 DF #2 [DF #2]

Distributed Loads

Class	LL (psf)	DL (psf)	Load Start		Load End	
			Trib (ft)	x1 (ft)	Trib (ft)	x2 (ft)
Roof	25	17	1.00	0.00	1.00	5.08
Roof	25	17	9.00	0.00	9.00	5.08

Dead Loads

Self Weight	BSW =	5 plf
Cont. Dead Load	W =	25 plf

Allowable Stress

Shear Stress	Fv =	180 psi
Bending Stress	Fb =	900 psi

Beam Adjustment Factors

Load Duration	Cd =	1.15
Form	CF =	1.30
Repetitive	Cr / Cv =	1.00

Load Reduction Factors

Live Load	LLRF =	1.00
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Beam Section Properties

Width	b =	3.5 in.
Depth	d =	5.5 in.
Area	A =	19 in.2
Shear Area	As =	13 in.2
Moment of Inertia	I =	49 in.4
Section Modulus	S =	18 in.3

Beam Material Properties

Modulus of Elasticity	E =	1600000 psi
Flexure Stiffness	EI =	78000000 lb-in.2

Req'd bearing length = 0.52"

Deflection Criteria

Span	DLD (in.)	LLD (in.)	Result	TLD (in.)	Result
Center	0.04	0.05	71 %	0.09	66 %

Strength Criteria

Condition	Maximum	Allowable	Result
Shear (lb)	937	2,657	65 %
Moment (lb-ft)	1,452	1,979	27 %

Support Reactions

	Left	Right
RLL (lb)	635	635
FLL (lb)	0	0
DL (lb)	507	507
Total (lb)	1,143	1,143
Post	Capacity	

Left: 2 X 4 (1) K 3260 lb

Summary

Mark = UB 01
 Section = (2) 2 X 12 [DF #2]
 Span = 5 ft
 Result = Section adequate by 76 % - Load Combo. No.2 DL + FLL - Flexure

UB 01	(2) 2 X 12 [DF #2]
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Distributed Loads

Class	LL (psf)	DL (psf)	Load Start		Load End	
			Trib (ft)	x1 (ft)	Trib (ft)	x2 (ft)
Floor	40	12	7.00	0.00	7.00	5.00

Dead Loads

Self Weight BSW = 8 plf

Allowable Stress

Shear Stress Fv = 180 psi
 Bending Stress Fb = 900 psi

Beam Adjustment Factors

Load Duration Cd = 1.00
 Form CF = 1.00
 Repetitive Cr / Cv = 1.00

Load Reduction Factors

Live Load LLRF = 1.00

Beam Section Properties

Width b = 3 in.
 Depth d = 11.25 in.
 Area A = 34 in.²
 Shear Area As = 23 in.²
 Moment of Inertia I = 356 in.⁴
 Section Modulus S = 63 in.³

Beam Material Properties

Modulus of Elasticity E = 1600000 psi
 Flexure Stiffness EI = 570000000 lb-in.²

Req'd bearing length = 0.5"

Deflection Criteria

Span	DLD (in.)	LLD (in.)	Result	TLD (in.)	Result
Center	0.00	0.01	96 %	0.01	96 %

Strength Criteria

Condition	Maximum	Allowable	Result
Shear (lb)	581	4,050	86 %
Moment (lb-ft)	1,163	4,746	76 %

Support Reactions

	Left	Right
RLL (lb)	0	0
FLL (lb)	700	700
DL (lb)	230	230
Total (lb)	930	930
Post		Capacity

Left: (2) 2 X 4 4008 lb

Summary

Mark	=	UB 03
Section	=	(3) 2 X 8 [DF #2]
Span	=	5 ft
Result	=	Section adequate by 28 % - Load Combo. No.2 DL + FLL - Flexure

UB 03	(3) 2 X 8 [DF #2]
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Distributed Loads

Class	LL (psf)	DL (psf)	Load Start		Load End	
			Trib (ft)	x1 (ft)	Trib (ft)	x2 (ft)
Roof	25	17	12.00	0.00	12.00	5.00
Floor	40	12	12.00	0.00	12.00	5.00

Dead Loads

Self Weight	BSW =	8 plf
Cont. Dead Load	W =	108 plf

Allowable Stress

Shear Stress	Fv =	180 psi
Bending Stress	Fb =	900 psi

Beam Adjustment Factors

Load Duration	Cd =	1.00
Form	CF =	1.20
Repetitive	Cr / Cv =	1.15

Load Reduction Factors

Live Load	LLRF =	1.00
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Beam Section Properties

Width	b =	4.5 in.
Depth	d =	7.25 in.
Area	A =	33 in.2
Shear Area	As =	22 in.2
Moment of Inertia	I =	143 in.4
Section Modulus	S =	39 in.3

Beam Material Properties

Modulus of Elasticity	E =	1600000 psi
Flexure Stiffness	EI =	229000000 lb-in.2

Req'd bearing length = 0.93"

Deflection Criteria

Span	DLD (in.)	LLD (in.)	Result	TLD (in.)	Result
Center	0.00	0.04	78 %	0.06	61 %

Strength Criteria

Condition	Maximum	Allowable	Result
Shear (lb)	1,789	3,915	54 %
Moment (lb-ft)	2,949	4,080	28 %

Support Reactions

	Left	Right
RLL (lb)	750	750
FLL (lb)	1,200	1,200
DL (lb)	1,159	1,159
Total (lb)	2,622	2,622
Post	Capacity	

Left: 2 X 6 2767 lb

Summary

Mark	=	UB 02
Section	=	4 X 6 DF #2 [DF #2]
Span	=	2.75 ft
Result	=	Section adequate by 82 % - Load Combo. No.2 DL + FLL - Flexure

UB 02
4 X 6 DF #2 [DF #2]
Distributed Loads

Class	LL (psf)	DL (psf)	Load Start		Load End	
			Trib (ft)	x1 (ft)	Trib (ft)	x2 (ft)
Floor	40	12	6.38	0.00	6.38	2.75

Dead Loads

Self Weight BSW = 5 plf

Allowable Stress

Shear Stress Fv = 180 psi

Bending Stress Fb = 900 psi

Beam Adjustment Factors

Load Duration Cd = 1.00

Form CF = 1.30

Repetitive Cr / Cv = 1.00

Load Reduction Factors

Live Load LLRF = 1.00

Beam Section Properties

Width b = 3.5 in.

Depth d = 5.5 in.

Area A = 19 in.²

Shear Area As = 13 in.²

Moment of Inertia I = 49 in.⁴

Section Modulus S = 18 in.³
Beam Material Properties

Modulus of Elasticity E = 1600000 psi

Flexure Stiffness EI = 78000000 lb-in.²
Req'd bearing length = 0.21"
Deflection Criteria

Span	DLD (in.)	LLD (in.)	Result	TLD (in.)	Result
Center	0.00	0.00	95 %	0.01	96 %

Strength Criteria

Condition	Maximum	Allowable	Result
Shear (lb)	308	2,310	87 %
Moment (lb-ft)	318	1,720	82 %

Support Reactions

	Left	Right
RLL (lb)	0	0
FLL (lb)	351	351
DL (lb)	111	111
Total (lb)	462	462
Post		Capacity

Left: 2 X 4 (1) K 3282 lb

FOUNDATIONS

Foundation Walls and Footings

ACI 318-19 Section 11

Foundation Wall				Line Loads			Point Loads			Continuous Footing			Spot Footing		
		Soil		RLL	FLL	DL	RLL	FLL	DL	Brg. Press.			Brg. Press.		
Section	Mark	(ft)	Result	(plf)	(plf)	(plf)	(plf)	(plf)	(plf)	Mark	(psf)	Result	Mark	(psf)	Result



Fairview Residence Remodel (Portland) 3160824

3126 Fairview Blvd

Portland, Oregon 97205

5/1/2025

APPENDIX

General Information		
Lateral line	A-LEFT	
Seismic force	800	lb
Wind force	700	lb

Wall Geometric Information		
Wall height	9	ft
Lengths between openings		
Segment 1	1.583333	ft
Segment 2	1.916667	ft
Segment 3		ft
Segment 4		ft
First opening		
Width	3	ft
Height	5	ft
Height below	2	ft
Height above	2	ft
Second opening		
Width		ft
Height		ft
Height below		ft
Height above		ft
Third opening		
Width		ft
Height		ft
Height below		ft
Height above		ft
Total length	6.5	ft

Internal Forces	
Uplift force	1108 lb
First opening	
Unit shear above	277 plf
Total force above opening	831 lb
Left corner force	376 lb
Right corner force	455 lb
Second Opening	
Unit shear above	plf
Total force above opening	lb
Left corner force	lb
Right corner force	lb
Third Opening	
Unit shear above	plf
Total force above opening	lb
Left corner force	lb
Right corner force	lb

Corner Straps Autosizer	
Max corner force	455 lbs
Required corner straps	CS16
Minimum end lengths	11 in

General Information		
Lateral line	A-RIGHT	
Seismic force	1200	lb
Wind force	1000	lb
Wall Geometric Information		
Wall height	9	ft
Lengths between openings		
Segment 1	1.916667	ft
Segment 2	3.416667	ft
Segment 3		ft
Segment 4		ft
First opening		
Width	3	ft
Height	5	ft
Height below	2	ft
Height above	2	ft
Second opening		
Width		ft
Height		ft
Height below		ft
Height above		ft
Third opening		
Width		ft
Height		ft
Height below		ft
Height above		ft
Total length	8.333333	ft

Internal Forces	
Uplift force	1296 lb
First opening	
Unit shear above	324 plf
Total force above opening	972 lb
Left corner force	349 lb
Right corner force	623 lb
Second Opening	
Unit shear above	plf
Total force above opening	lb
Left corner force	lb
Right corner force	lb
Third Opening	
Unit shear above	plf
Total force above opening	lb
Left corner force	lb
Right corner force	lb
Corner Straps Autosizer	
Max corner force	623 lbs
Required corner straps	CS16
Minimum end lengths	11 in