

Structural Load Calculations for the Foster Residence

Job: 21-002

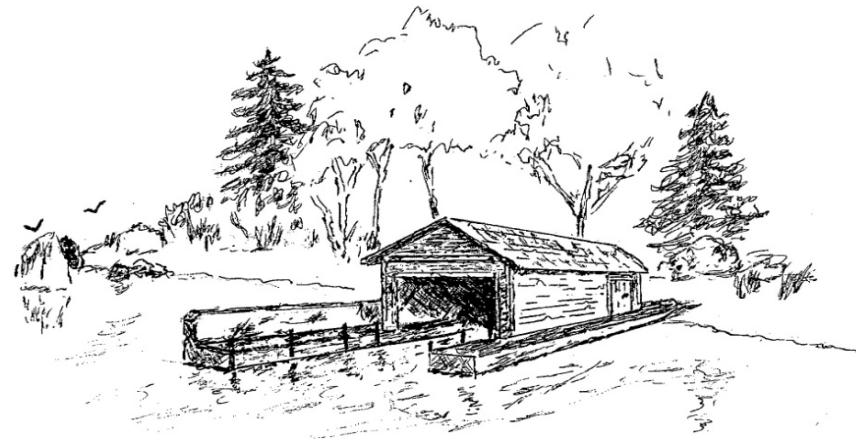
Site 7247 SE 29th Street

Address : Mercer Island, WA 98040

Date: March 19, 2021



Stoney Point Engineering



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Sheet: 2 Design Criteria

3 - 4 Vertical Load Calculations

5 - 6 Vertical Load Keyplans

7 - 9 Lateral Load Calculations

10 - 12 Lateral Load Keyplans

Post Calculations

Post				Bearing		Loading						Adjustment Factors					Stresses (psi)				Loads (lbs.)			Footin g Size (in ²) 1500						
#	Location	I.D.	Length (ft).		I.D.	X-section (in.)		Load Factors		Load Type		Span	Placement (ft.)		Spacing (ft.)		C _D	C _F	C _b	K _f	C _P	Bearing			Buckling		All.	Trib.		Total
			y-y	x-x		y-y	x-x	Live	Dead	#1 _i	#1 _f	(ft.)	X _i /X _p	X _f	Sp _i	Sp _f	F _v , F _c	F _c	F _{c⊥}	All.	Act.	All.	Act.		Live	Dead				
1	Roof	2x4		8.00	SPF					R	R	3.20		3.20	4.00	4.00					0.50	425	50	399	50	2,095	160	96	260	5
2	Roof	2x4		8.00	SPF					R	R	2.20		2.20	12.10	12.10					0.50	425	103	399	103	2,095	333	200	540	7
3	Roof	2x4		8.00	SPF					R	R	5.70		5.20	17.10	17.10					0.50	425	370	399	370	2,095	1,209	725	1,940	14
4	Roof	2x4		8.00	SPF					R	R	3.20		3.20	12.60	12.60					0.50	425	154	399	154	2,095	504	302	810	9
5	Roof	2x4		8.00	SPF					R	R	3.20		3.20	17.10	17.10					0.50	425	210	399	210	2,095	684	410	1,100	
6	Roof	2x4		8.00	SPF					R	R	6.20		6.20	12.60	12.60					0.50	425	299	399	299	2,095	977	586	1,570	12
7	Roof	2x4		8.00	SPF					R	R	8.60		8.60	2.00	2.00					0.50	425	99	399	99	2,095	215	129	520	7
										W	W	8.60		8.60	4.00	4.00										0	172			
8	Deck	4x4	2.00	2.00	SPF					D	D	5.90	-1.00	5.90	3.10	3.10					0.97	425	77	1,309	77	5,206	750	188	940	9
9	Deck	4x4	2.00	2.00	SPF					D	D	11.80		11.80	3.10	3.10					0.97	425	113	1,309	113	5,206	1,097	274	1,380	12
10	Deck	4x4	2.00	2.00	SPF					D	D	5.90	-1.00	5.90	4.40	4.40					0.97	425	109	1,309	109	5,206	1,065	266	1,340	11
11	Deck	4x4	2.00	2.00	SPF					D	D	11.80		11.80	4.40	4.40					0.97	425	159	1,309	159	5,206	1,558	389	1,950	14

Beam Calculations

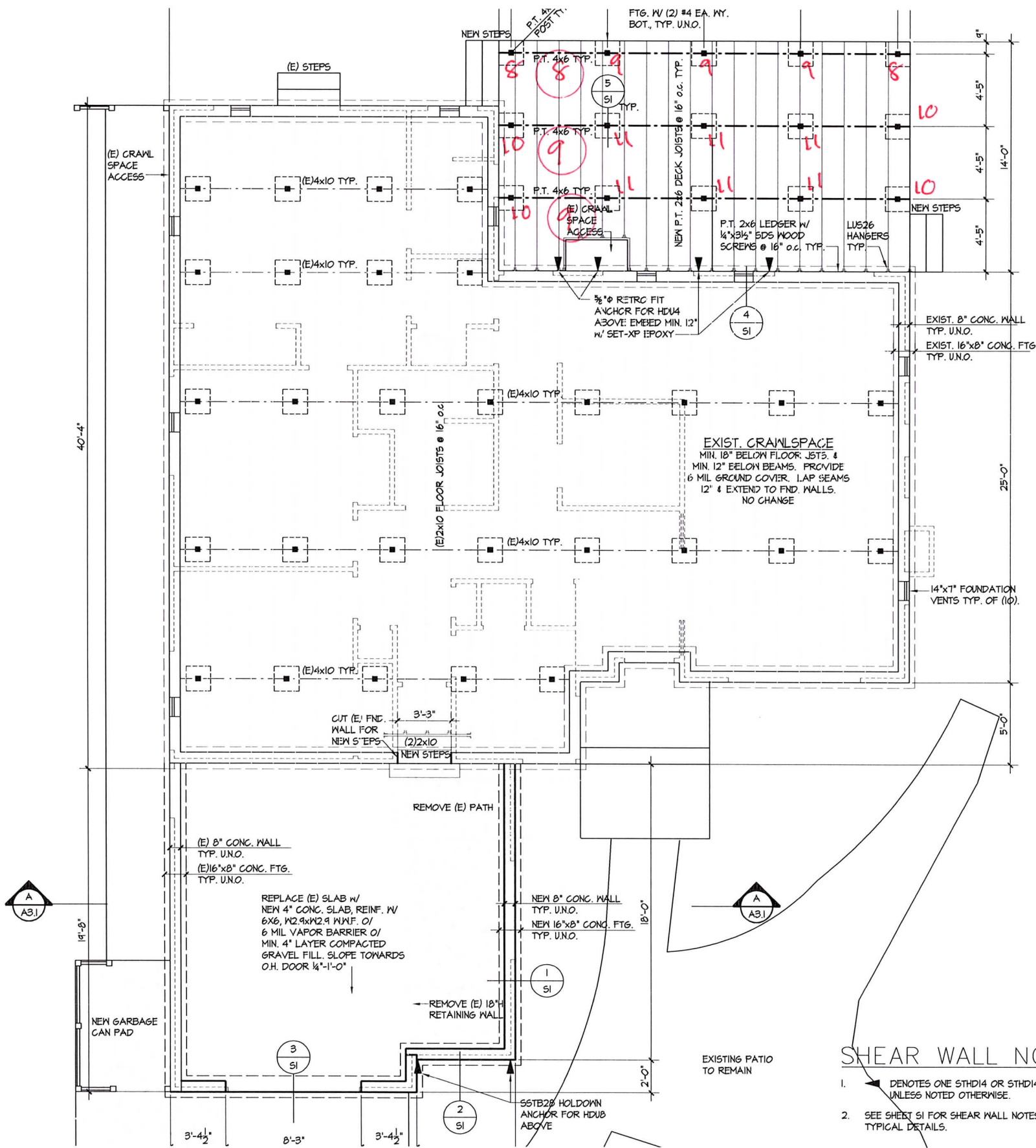
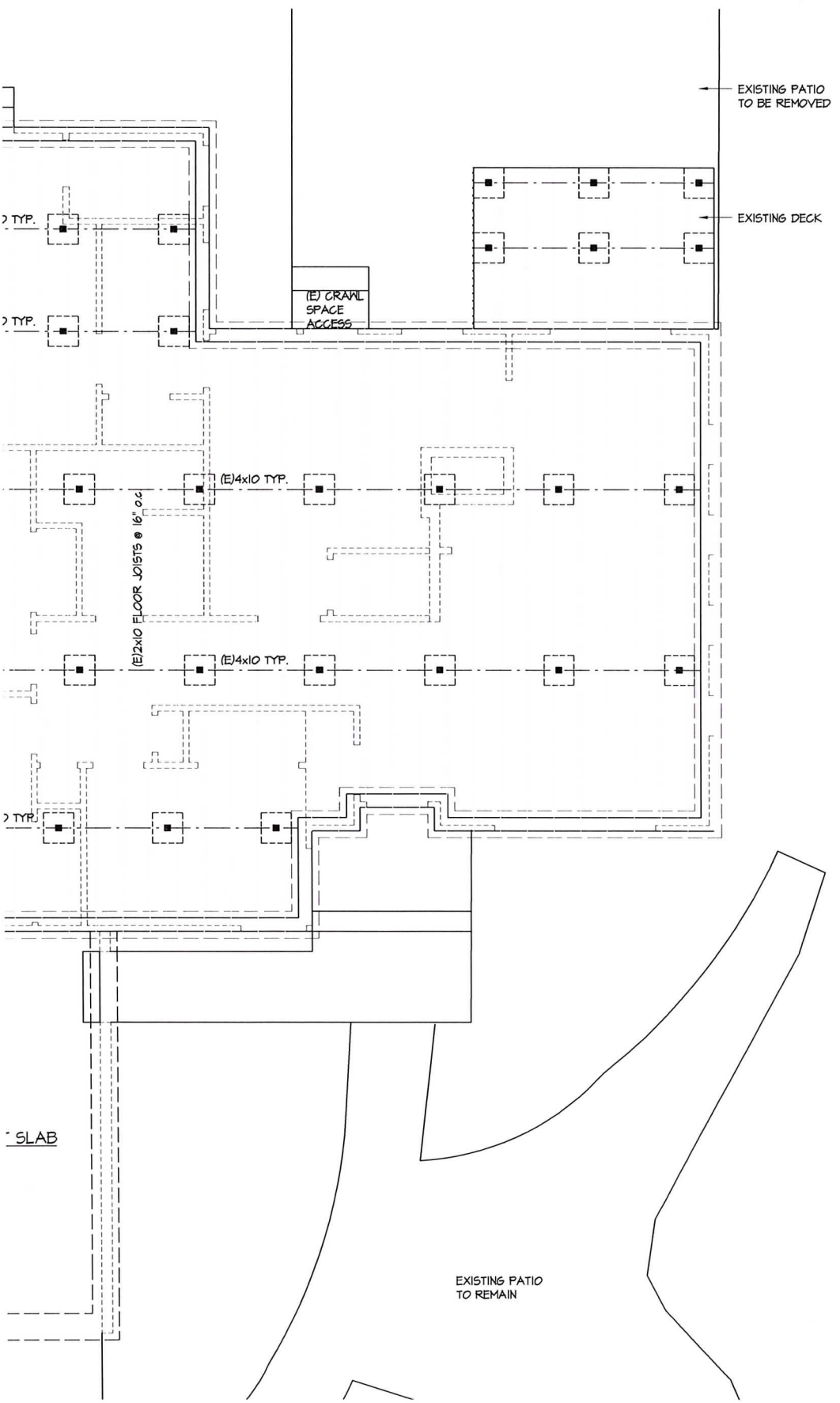
Beam			Loading								Adjustment factors				Stresses								Deflection								
#			Load Factors		Type		Span	Placement (ft.)		Spacing (ft.)		C _D	C _r	C _F	C _v	Loads (lb)		Shear (psi)			Moments				Live			Total			#
#	Location	I.D.	Live	Dead	#1 _i	#1 _f	(ft.)	X _i /X _p	X _f	Sp _i	Sp _f					Left	Right	f _V	F' _V	%	M _{max} (lb-ft)	f _b	F' _b	%	Δ _{act.}	Δ _{all.}	%	Δ _{act.}	Δ _{all.}	%	#
1	Roof	4x8			R	R	3.20		3.20	4.00	4.00			1.30		256	256	15	250		205	80	1235		0.00	0.16		0.00	0.21		1
2	Roof	4x8			R	R	2.20		2.20	12.10	12.10			1.30		532	532	31	250	794	293	115	1235		0.00	0.11		0.00	0.15		2
3	Roof	4x8			R	R	5.70		5.20	17.10	17.10			1.30		1934	1622	114	250	219	2735	1070	1235	115	0.06	0.29	477	0.10	0.38	397	3
4	Roof	4x8			R	R	3.20		3.20	12.60	12.60			1.30		806	806	48	250	524	645	252	1235	489	0.00	0.16		0.01	0.21		4
5	Roof	4x8			R	R	3.20		3.20	17.10	17.10			1.30		1094	1094	65	250	386	876	343	1235	360	0.01	0.16		0.01	0.21		5
6	Roof	4x8			R	R	6.20		6.20	12.60	12.60			1.30		1562	1562	92	250	271	2422	948	1235	130	0.06	0.31	494	0.10	0.41	411	6
7	Roof	4x8			R	R	8.60		8.60	2.00	2.00			1.30		516	516	31	250	820	1109	434	1235	284	0.04	0.43		0.09	0.57	647	7
					W	W	8.60		8.60	4.00	4.00																				
8	Deck	P.T. 4x6			D	D	5.90		5.90	3.10	3.10			1.30		686	686	53	150	281	1012	688	1105	161	0.07	0.20	301	0.08	0.20	241	8
9	Deck	P.T. 4x6			D	D	5.90		5.90	4.40	4.40			1.30		973	974	76	150	198	1436	976	1105	113	0.09	0.20	212	0.12	0.20	170	9



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SHEAR WALL NOTES

1. DENOTES ONE STD14 OR STD14RJ HOLD DOWN, UNLESS NOTED OTHERWISE.
2. SEE SHEET S1 FOR SHEAR WALL NOTES, SCHEDULES, AND TYPICAL DETAILS.

Gravity Load Keyplan

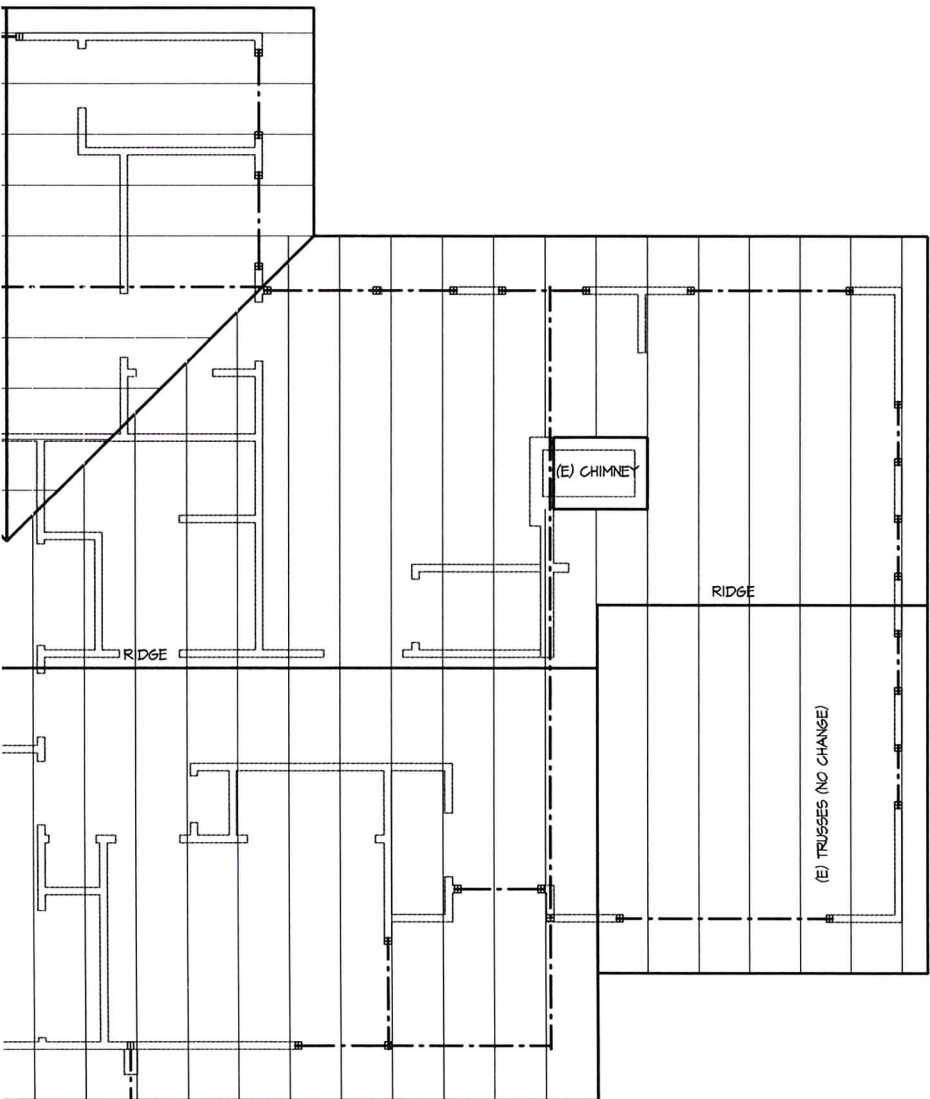


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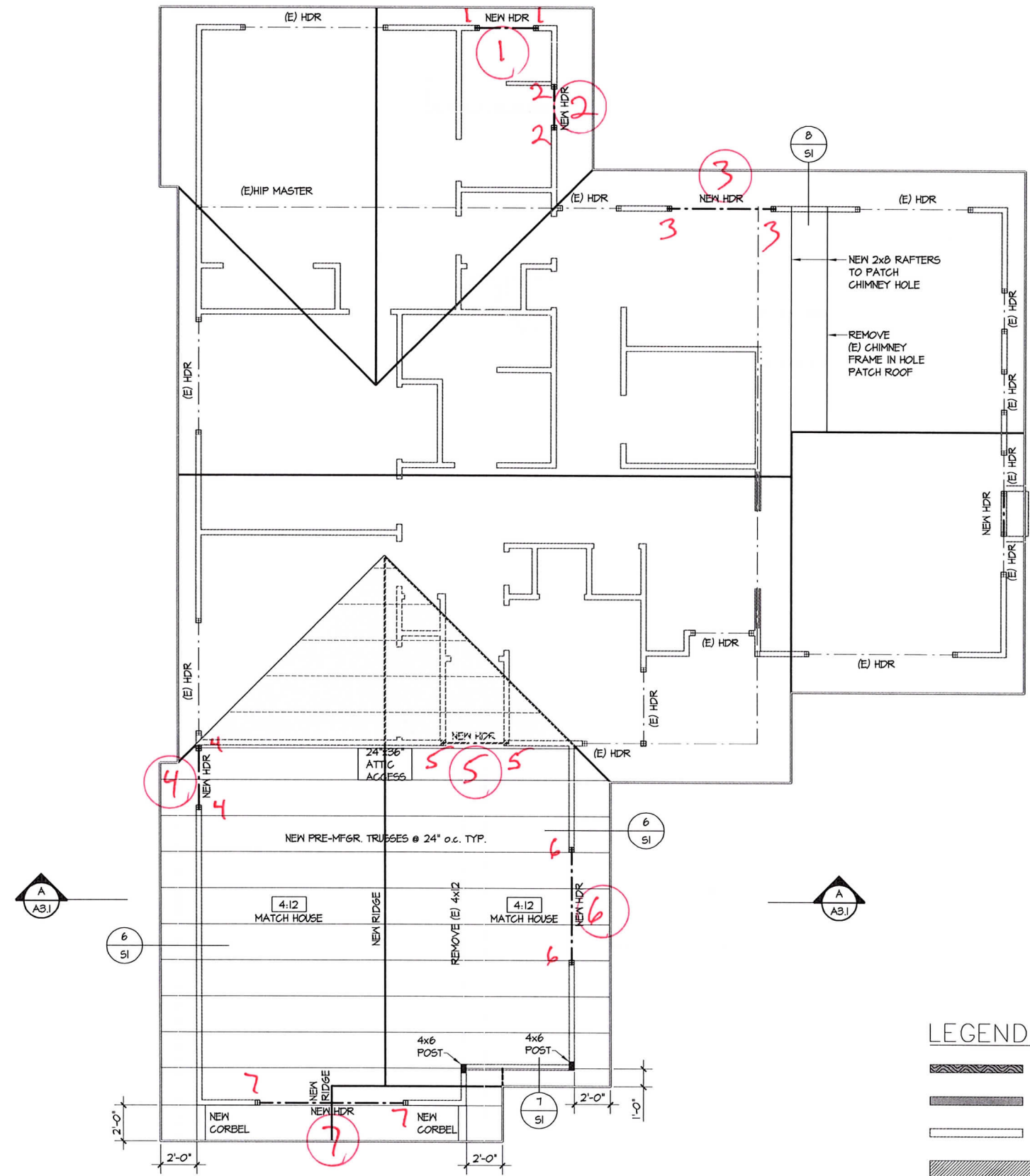
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Gravity Load Keyplan 6



ROOF VENT CALCULATIONS						
ROOF AREA	AREA SQ. FT.	REQ. VENT 1/300 SQ. INCH	METHOD	SOFFIT (LF)	RIDGE (LF)	TOTAL AREA
A	408	146		34	340	680
VENTING TYPE	SQ. IN. / LIN. FT.	MANUFACTURER OR MODEL				
STRIP VENT	10	COR-A-VENT S-400				
RIDGE VENT	17	CORE-A-VENT X-5 or Eq.				
ROOF JACKS	50	ROOF JACK (SQ. IN. / EA)				
*RIDGE & JACK VENTS MUST BE 40-50% OF TOTAL AREA & CLASS 1 VAPOR RETARDER MUST BE INSTALLED ON THE WARM-IN-WINTER SIDE OF THE CEILING TO USE 1/300						



LEGEND

- DENOTES INTERIOR UPPER FLOOR BEARING WALLS.
- DENOTES UPPER FLOOR WALLS.
- DENOTES MAIN FLOOR WALLS.
- DENOTES OVER-FRAMING ABOVE ROOF FRAMING BELOW.
- DENOTES BEAMS, HEADERS, OR TRUSSES

Main Wind Force Resisting System

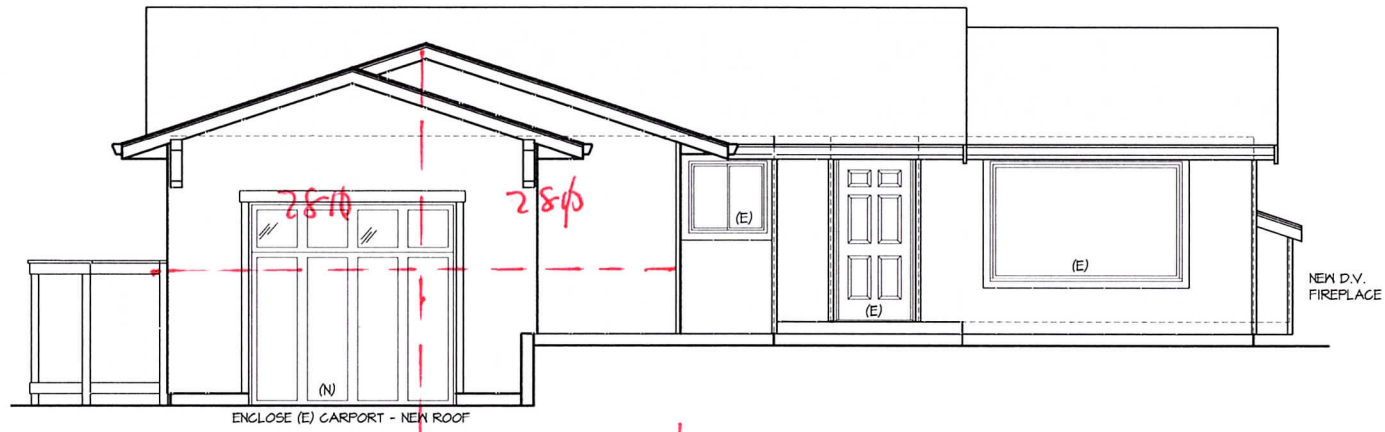
Grid #	Factor	Grid # for Load Above	L (ft)	B (ft)	Proj. Area (ft ²)	Surface Direction	Surface Type	Roof Angle		Pressure Coefficients		Design Pressure p (psf) (Eq 27.3-1)	Design Load		Min. Design Load		Load used for Design F (lb)
								Pitch	θ (Deg)	C_p (Fig 27.3.1) External	GC_{pi} (Table 26.13-1) Internal		Tributary F (lb)	Total F (lb)	Tributary F (lb)	Total F (lb)	
1M			60.0	45.0	78	Windward	Wall			0.80	-0.18	20.1	1565	1565	1248	1248	939
2M			60.0	45.0	78	Windward	Wall			0.80	-0.18	20.1	1565	1565	1248	1248	939
AM			45.0	60.0	20	Windward	Wall			0.80	-0.18	20.1	401	1305	320	528	783
			45.0	60.0	20	Leeward	Wall			-0.50	0.18	12.5	251				
			45.0	60.0	26	Windward	Roof	4	18.4	0.40	-0.18	10.0	261		208		
			45.0	60.0	26	Leeward	Roof	4	18.4	-0.60	0.18	15.1	391				
BM			45.0	60.0	120	Windward	Wall			0.80	-0.18	20.1	2408	4817	1920	2208	2890
			45.0	60.0	120	Leeward	Wall			-0.50	0.18	12.5	1505				
			45.0	60.0	36	Windward	Roof	4	18.4	0.40	-0.18	10.0	361		288		
			45.0	60.0	36	Leeward	Roof	4	18.4	-0.60	0.18	15.1	542				
CM			45.0	60.0	144	Windward	Wall			0.80	-0.18	20.1	2890	6954	2304	3280	4172
			45.0	60.0	80	Leeward	Wall			-0.50	0.18	12.5	1003				
			45.0	60.0	122	Windward	Roof	4	18.4	0.40	-0.18	10.0	1224		976		
			45.0	60.0	122	Leeward	Roof	4	18.4	-0.60	0.18	15.1	1836				

Seismic Calculations

Spectral Response Acceleration, $S_s = 140.10$ Site Class = D Site Coefficient, $F_a = 1.00$ Height Coefficient, $F = 1.00$																		
Maximum Spectral Response Acceleration, $S_{MS} = 1.40$ 5%Damped Design Spectral Response Acceleration, $S_{DS} = 0.93$ Default Response Modification Coefficient, $R = 6.50$ Seismic Design Category = D																		
Grid #	Load Type	Level	Direction (On Page)	Areas (ft ²)	Code Sect.	Fctr.	Ω_o	R	Loads							Eq. 12.4-3 $E = \rho Q_E$ (lb)	Eq. 5 0.7*E (lb)	Eq. 12.4-7 $E_m = \Omega_o Q_E$ (lb)
									Live (lb/ft ²)	Dead (lb/ft ²)	w_x (lb)	FS_{DS}/R	F_{xi} (lb)	Q_E (lb)	ρ_{used}			
1M	R	Main Floor	U-D	282						15.0	4230	0.144	608	608	1.30	790	608	
2M	R	Main Floor	U-D	266						15.0	3990	0.144	573	573	1.30	745	574	
AM	R	Main Floor	L-R	144						15.0	2160	0.144	310	310	1.30	403	311	
BM	R	Main Floor	L-R	844						15.0	12660	0.144	1819	1819	1.30	2365	1821	
CM	R	Main Floor	L-R	548						15.0	8220	0.144	1181	1181	1.30	1535	1182	

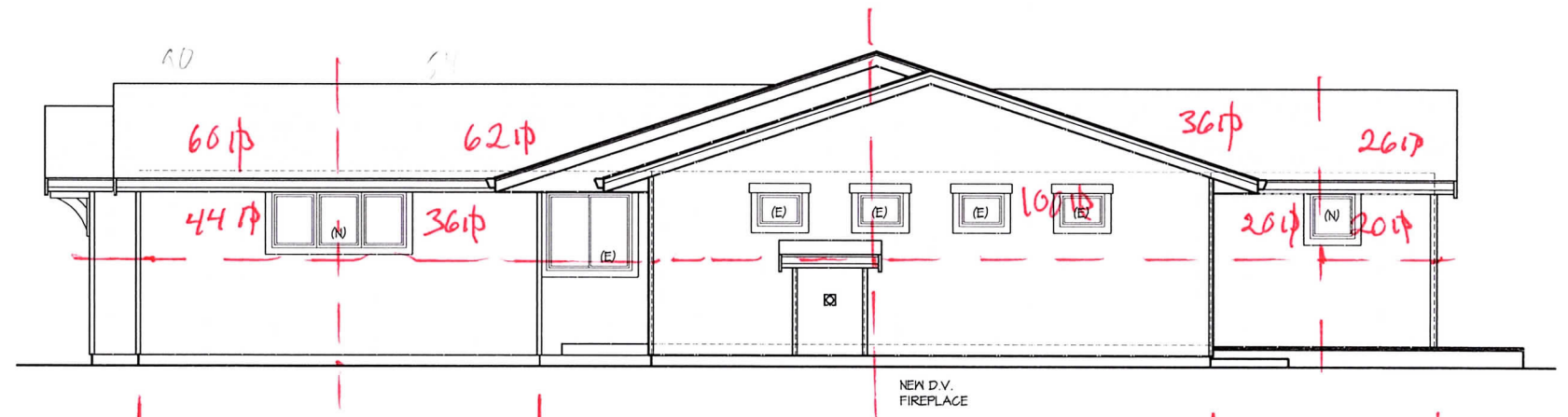
Panel Analysis

Panel															Design Loads		Panel Shears								Holdown Options												
Grid #		Materials				Height (ft.)	Individual Panel Lengths						Shear Panel Adjustments			Wind (lb)	Seismic (lb)	Wind			Seismic				Post Loads			Anchor Bolt Holdowns				Tie Straps					
Level _i	Grid Above	Wall Size	Nail Size	Panel Type	S.G.		#1 (ft)	#2 (ft)	#3 (ft)	#4 (ft)	#5 (ft)	#6 (ft)	Perforated Panel					S.G.	Act. (lb/ft)	Allowable			Act. (lb/ft)	Allowable				Uplift (lb)	2/3 Dead (lb)	Net (lb)	Model	Post		Cap. (lb)	Model	Cap. (lb)	Min. Lgth. (in)
													Max Height (ft)	Total Width (ft)	%					C _o	C _{SG}	Type		Base (lb/ft)	Cap. (lb/ft)	Type	Base (lb/ft)					C _s	Cap. (lb/ft)				
Defaults (Dflt.)				Perforated Panel		Allowable		Allowable		Post		Tie Straps																									
2x6		8d		15/32" Ply		0.4		Max Height (ft)		Total Width (ft)		% C _o C _{SG}		Type Base (lb/ft) Cap. (lb/ft)		Type Base (lb/ft) C _s Cap. (lb/ft)				SPF 2-2x		Model Cap. (lb)		Model Cap. (lb) Min. Lgth. (in)													
1M						11.0	16.4							0.93	939	608	57	P1-6	365	339	37	P1-6	260		242	630		630									
2M						8.0	5.8	5.8						0.93	939	574	81	P1-6	365	339	49	P1-6	260		242	648		648									
AM						8.0	5.0	2.5						0.93	783	311	104	P1-6	365	339	41	P1-6	260	0.63	151	835		835									
BM						8.0	5.0	3.0						0.93	2,890	1,821	361	P1-4	532	495	228	P1-4	380	0.75	265	2890		2890	HDU4			3285	MSTC52	3645	15		
CM						8.0	5.9							0.93	4,172	1,182	707	P1-2	895	832	200	P1-6	260		242	5658		5658	HDU8	DF	4x6	6970	MSTC78	5860	29		



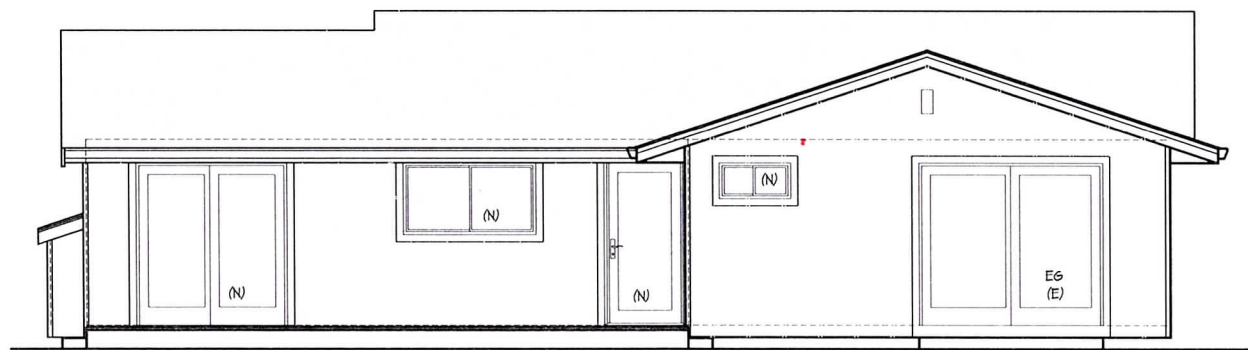
FRONT ELEVATION

SCALE: 1/4"=1'-0"

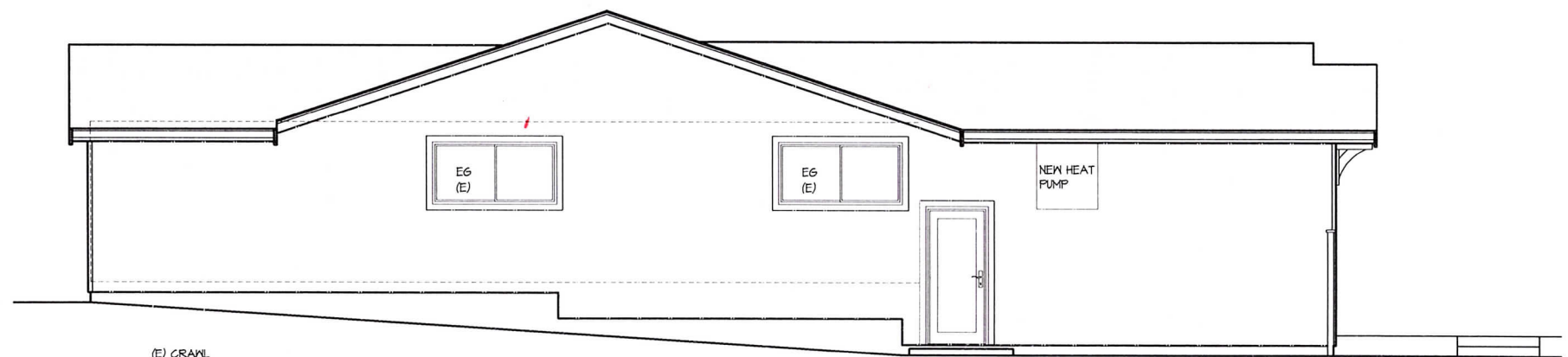


RIGHT ELEVATION

SCALE: 1/4"=1'-0"



REAR ELEVATION



LEFT ELEVATION