BEYLER CONSULTING

5920 100th Street, Suite 25, Lakewood, WA 98499
(253) 984-2900
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Plan. Design. Manage.

Date: 12/04/2019
Design by: AEL

Structural calculations for vertical and lateral design

Reviewed for code compliance with IRC 2015
Kitsap County Building Department
GShapiro@co.kitsap.wa.us
05/05/2020

Project & Location:

Structural Calculations for

Wheeler Residence

xxxxx Ludvick Lake Dr
Seabeck, WA 98380
Kitsap County

Client: **Coval Homes, LLC**
2023 125th St E
Tacoma, WA 98445

Structural Engineer: **Beyler Consulting, LLC.**
5920 100th Street SW, Suite 25
Lakewood, WA 98499
Elizabeth Emerick, P.E.
elizabeth@beylerconsulting.com

Project Number: 19.00402.00

Code: 2015 IBC

Loads:

I. Vertical Loads:
- Roof (Snow) 25 PSF
- Floor (Live) 40 PSF

II. Lateral Loads:
- Wind: Exposure "B"
  Speed: 110 mph
  Kzt = 1.00
- Seismic: Site Class: D
  Seismic Spectral Response: Sds = 0.9467
  Sd1= 0.5847
  Va= 0.1040 (ASD)

ELIZABETH J. EMERICK
STATE OF WASHINGTON
52643
REGISTERED
PROFESSIONAL ENGINEER

12/4/19

Permit Number: 20-01497

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VERTICAL DESIGN

By: AEL

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Job # 1910 **Sheet:**
Designed: AEL **Date:** 12/3/19
Checked: **Date:**
Project: Olympic

Sloped Roof Snow Loads, Ps

1608 2015 IBC / 7.4 ASCE 7-10

EXPOSURE FACTOR

C_e = 1 — 7.3.1 — Terrain Category: C — Exposure: Partially Exposed

THERMAL FACTOR

C_t = 1.1 — 7.3.2 — Structure kept just above freezing — Cold Roof

IMPORTANCE FACTOR

I = 1 — 7.3.3 — II — Classification of Structure Section 1.5

GROUND SNOW LOAD

P_g = 25 psf

FLAT ROOF SNOW LOAD

P_f = 20 psf — 19.25 (Eq 7.3-1) = 0.7*Ce * Ct * I * Pg'

SLOPED ROOF SNOW LOAD

P_s= 20 psf — Roof Snow Load NOT Reducible
Roof Angle = 22.6 Degrees
C_s = 1.0 — Non Slippery Roof

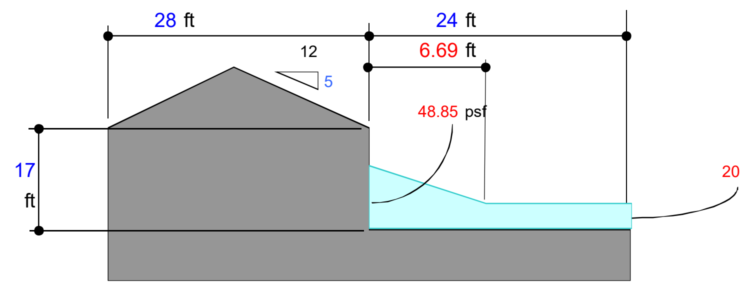
DRIFTED SNOW (Leeward)

Drift Load Analysis Required

DRIFTED SNOW (Windward)

(Windward) L_U= 24 ft — Leeward Drift Controls

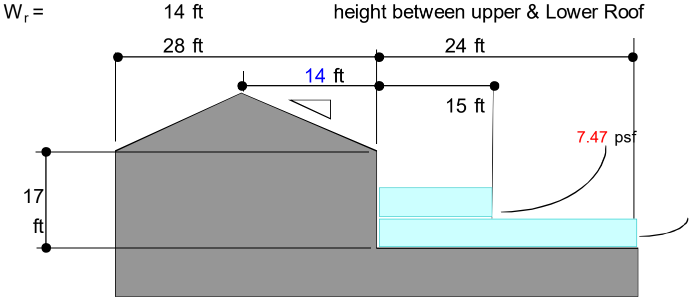
(Leeward) L_U=	28	ft	
h_d =	1.67	ft	0.43 * (LU^1/3) * (Pg + 10)^1/4) - 1.5
Density D =	17.25	pcf	0.13 * P_g + 14 <= 30pcf
h_b =	1.16	ft	P_f / Density — Height of balanced snow load
W =	6.69	ft	4 * hd
h_C =	15.84	ft	h-h_b — Height between upper roof @ top of balanced snow load
P_d =	28.85	psf	



SLIDING SNOW ON LOWER ROOF

Sliding Snow Analysis Required

0.4*P_f*W_r 112.00 PLF along eve — h_s= 1.16 ft
W_r = 14 ft — height between upper & Lower Roof



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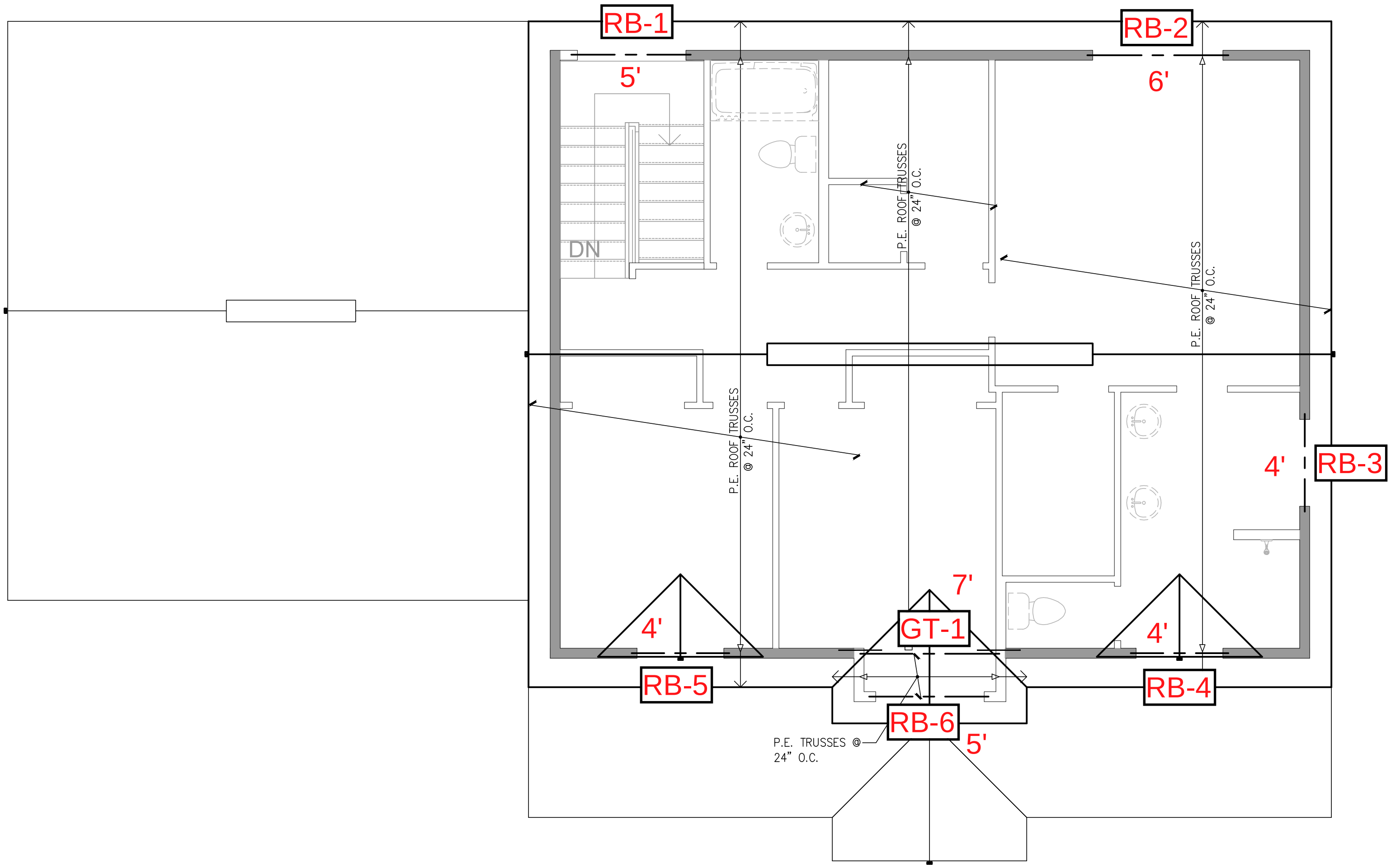
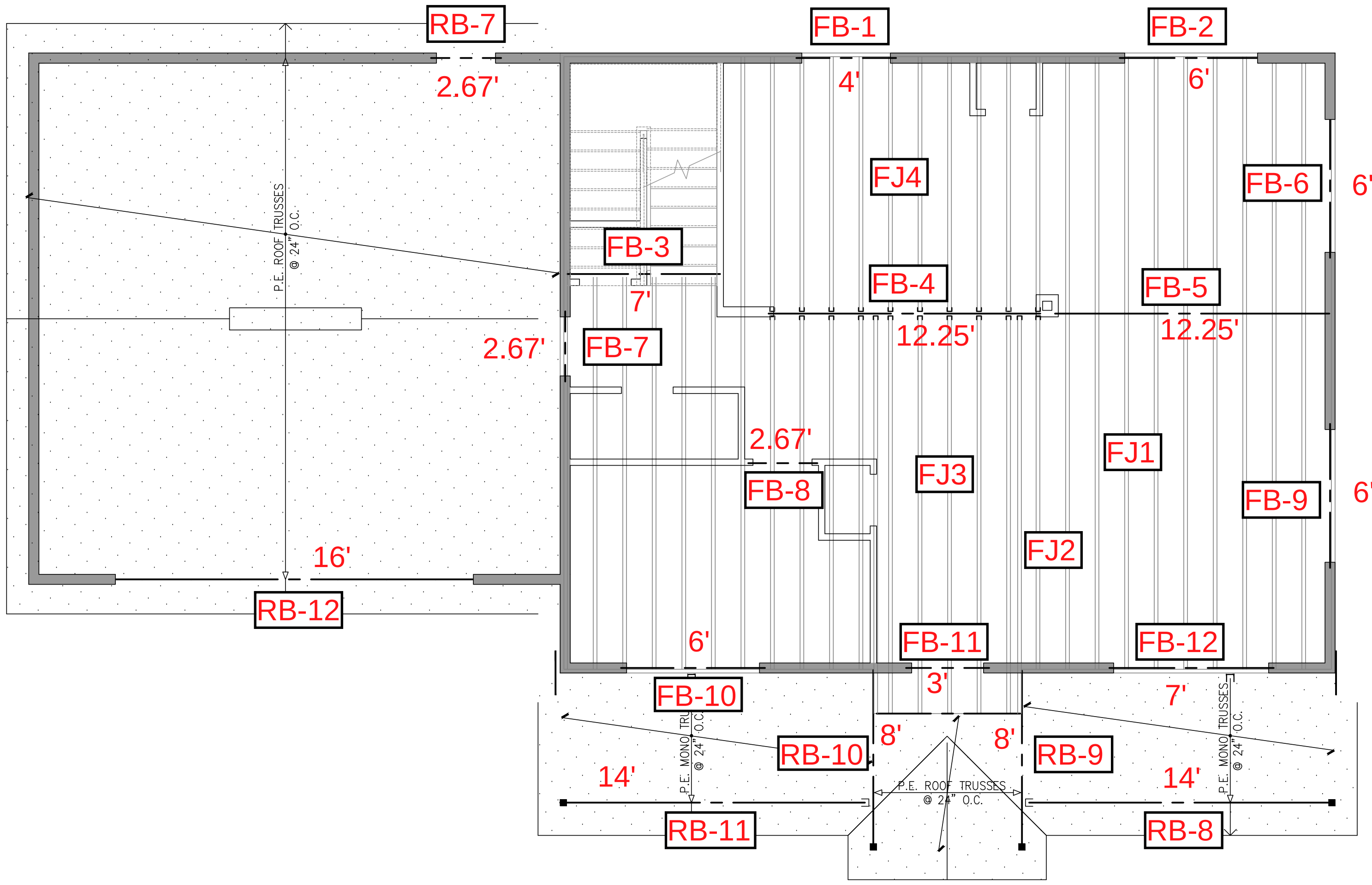
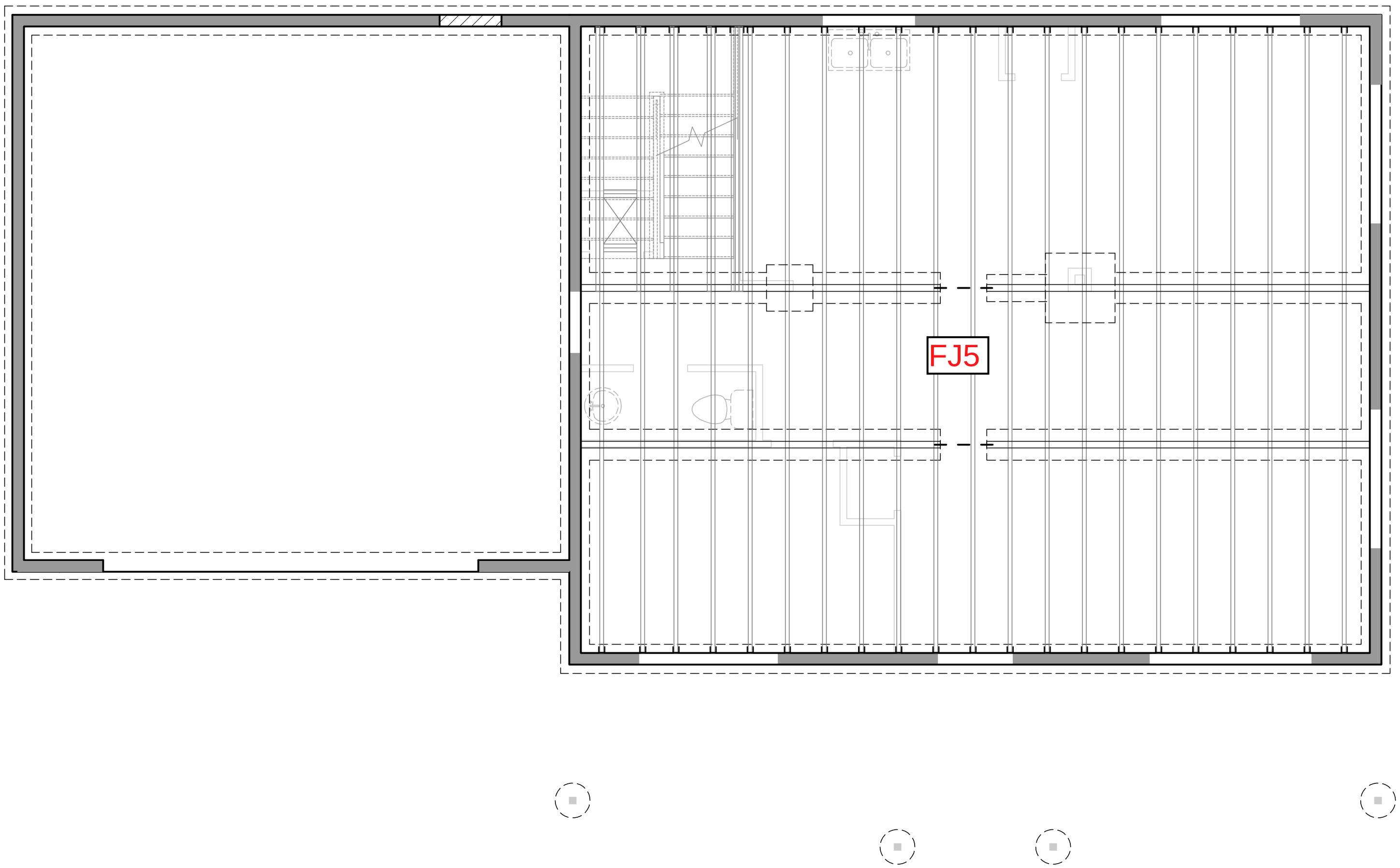


Permit Number: 20-01497



Permit Number: **20-01497**


FJ5

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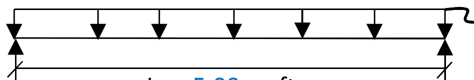
LOADS ONLY

RB-1



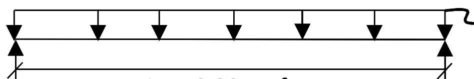
L = 5.00 ft

	Roof PSF	Roof Tributary			Roof PSF	Roof Tributary		PLF
W_1 = DL	15	15.46	+ DL	0	+ DL 0	0.00	= DL	232
SL	25	15.46		Wall	SL 0	0.00	SL	387
							∑	619

R_1 = DL 0.58, SL 0.97, ∑ 1.55 k

R_2 = DL 0.58, SL 0.97, ∑ 1.55 k

RB-2



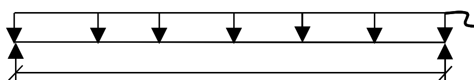
L = 6.00 ft

	Roof PSF	Roof Tributary			Roof PSF	Roof Tributary		PLF
W_1 = DL	15	15.46	+ DL	0	+ DL 0	0.00	= DL	232
SL	25	15.46		Wall	SL 0	0.00	SL	387
							∑	619

R_1 = DL 0.70, SL 1.16, ∑ 1.86 k

R_2 = DL 0.70, SL 1.16, ∑ 1.86 k

RB-3



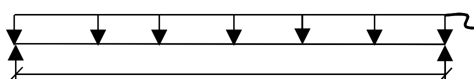
L = 4.00 ft

	Roof PSF	Roof Tributary			Roof PSF	Roof Tributary		PLF
W_1 = DL	15	2.46	+ DL	0	+ DL 0	0.00	= DL	37
SL	25	2.46		Wall	SL 0	0.00	SL	62
							∑	99

R_1 = DL 0.07, SL 0.12, ∑ 0.20 k

R_2 = DL 0.07, SL 0.12, ∑ 0.20 k

RB-4



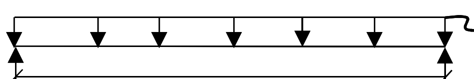
L = 4.00 ft

	Roof PSF	Roof Tributary			Roof PSF	Roof Tributary		PLF
W_1 = DL	15	15.46	+ DL	0	+ DL 0	0.00	= DL	232
SL	25	15.46		Wall	SL 0	0.00	SL	387
							∑	619

R_1 = DL 0.46, SL 0.77, ∑ 1.24 k

R_2 = DL 0.46, SL 0.77, ∑ 1.24 k

RB-5



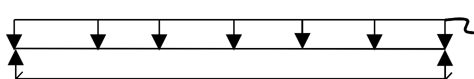
L = 4.00 ft

	Roof PSF	Roof Tributary			Roof PSF	Roof Tributary		PLF
W_1 = DL	15	15.46	+ DL	0	+ DL 0	0.00	= DL	232
SL	25	15.46		Wall	SL 0	0.00	SL	387
							∑	619

R_1 = DL 0.46, SL 0.77, ∑ 1.24 k

R_2 = DL 0.46, SL 0.77, ∑ 1.24 k

RB-6



L = 5.00 ft

	Roof PSF	Roof Tributary			Roof PSF	Roof Tributary		PLF
W_1 = DL	15	2.46	+ DL	0	+ DL 0	0.00	= DL	37
SL	25	2.46		Wall	SL 0	0.00	SL	62
							∑	99

R_1 = DL 0.09, SL 0.15, ∑ 0.25 k

R_2 = DL 0.09, SL 0.15, ∑ 0.25 k

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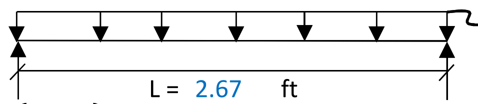
RB-7



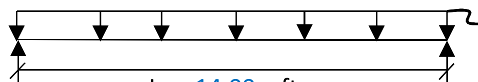
L = 2.67 ft

	Roof PSF	Roof Tributary		Wall		Roof PSF	Roof Tributary		PLF
W_1 = DL	15	13.46	+ DL	0	+ DL	0	0.00	= DL	202
SL	25	13.46		Wall	SL	0	0.00	SL	337
								∑	539

R_1 = DL 0.27, SL 0.45; ∑ 0.72 k

R_2 = 0.27, 0.45; ∑ 0.72 k

RB-8



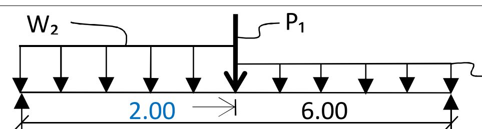
L = 14.00 ft

	Roof PSF	Roof Tributary		Wall		Roof PSF	Roof Tributary		PLF
W_1 = DL	15	4.46	+ DL	0	+ DL	0	0.00	= DL	67
SL	25	4.46		Wall	SL	0	0.00	SL	112
								∑	179

R_1 = DL 0.47, SL 0.78; ∑ 1.25 k

R_2 = 0.47, 0.78; ∑ 1.25 k

RB-9



L = 8.00 ft

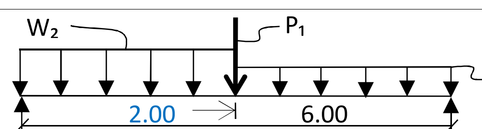
	Roof PSF	Roof Tributary		Wall		Floor PSF	Floor Tributary		PLF
W_1 = DL	15	4.96	+ DL	0	+ DL	0	0.00	= DL	74
SL	25	4.96		Wall	SL	0	0.00	SL	30
W_2 = DL	15	3.50	+ DL	0	+ DL	0	0.00	= DL	53
SL	25	3.50		Wall	SL	0	0.00	SL	88

R_1 = DL 0.61, SL 0.81 k; ∑ 1.42 k

R_2 = 0.41, 0.33 k; ∑ 0.74 k

P_1 = RB-8: DL 0.47, SL 0.78 k + NA: DL 0.00, SL 0.00 = DL 0.47, SL 0.78 k

RB-10



L = 8.00 ft

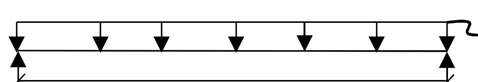
	Roof PSF	Roof Tributary		Wall		Floor PSF	Floor Tributary		PLF
W_1 = DL	15	4.96	+ DL	0	+ DL	0	0.00	= DL	74
SL	25	4.96		Wall	SL	0	0.00	SL	30
W_2 = DL	15	3.50	+ DL	0	+ DL	0	0.00	= DL	53
SL	25	3.50		Wall	SL	0	0.00	SL	88

R_1 = DL 0.61, SL 0.81 k; ∑ 1.42 k

R_2 = 0.41, 0.33 k; ∑ 0.74 k

P_1 = RB-8: DL 0.47, SL 0.78 k + NA: DL 0.00, SL 0.00 = DL 0.47, SL 0.78 k

RB-11



L = 14.00 ft

	Roof PSF	Roof Tributary		Wall		Roof PSF	Roof Tributary		PLF
W_1 = DL	15	4.46	+ DL	0	+ DL	0	0.00	= DL	67
SL	25	4.46		Wall	SL	0	0.00	SL	112
								∑	179

R_1 = DL 0.47, SL 0.78; ∑ 1.25 k

R_2 = 0.47, 0.78; ∑ 1.25 k

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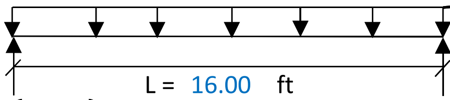
RB-12



	Roof PSF	Tributary			Roof PSF	Tributary		PLF
W_1 = DL	15	13.46	+ DL 0	+ DL	0	0.00	= DL	202
SL	25	13.46	Wall	SL	0	0.00	SL	337
							∑	539

R_1 = DL 1.62, SL 2.69; ∑ 4.31 k

R_2 = 1.62, 2.69; ∑ 4.31 k

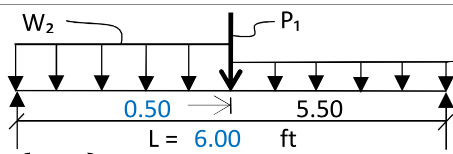
FB-1

	Floor PSF	Tributary			Roof PSF	Tributary		PLF
W_1 = DL	15	6.00	+ DL 0	+ DL	15	15.46	= DL	322
LL	40	6.00	Wall	SL	25	15.46	LL	627
							∑	949

R_1 = DL 0.64, LL 1.25; ∑ 1.90 k

R_2 = 0.64, 1.25; ∑ 1.90 k

FB-2



	Roof PSF	Tributary			Floor PSF	Tributary		PLF
W_1 = DL	0	0.00	+ DL 0	+ DL	15	6.00	= DL	90
SL	0	0.00	Wall	LL	40	6.00	LL	240
							SL	0
W_2 = DL	15	15.46	+ DL 0	+ DL	15	6.00	= DL	322
SL	25	15.46	Wall	LL	40	6.00	LL	240
							SL	387

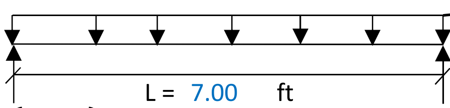
R_1 = DL 1.02, LL 0.72, SL 1.25 k; ∑ 2.99 k

R_2 = 0.33, 0.72, 0.10 k; ∑ 1.16 k

	R_1	R_2
DL+LL:	1.74	1.05
DL+SL:	2.27	0.44
;(L+S):	2.50	0.95

P_1 = RB-2: DL 0.70, LL 0.00, SL 1.16 k + NA: DL 0.00, LL 0.00, SL 0.00 = DL 0.70, LL 0.00, SL 1.16 k

FB-3

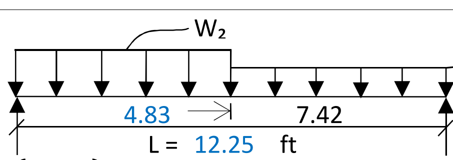


	Floor PSF	Tributary			Floor PSF	Tributary		PLF
W_1 = DL	15	4.34	+ DL 0	+ DL	0	0.00	= DL	65
LL	40	4.34	Wall	LL	0	0.00	LL	173
							∑	238

R_1 = DL 0.23, LL 0.61; ∑ 0.83 k

R_2 = 0.23, 0.61; ∑ 0.83 k

FB-4

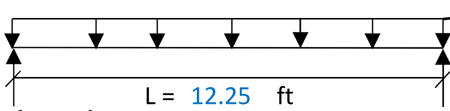


	Roof PSF	Tributary			Floor PSF	Tributary		PLF
W_1 = DL	15	14.00	+ DL 0	+ DL	0	0.00	= DL	210
LL	40	14.00	Wall	LL	0	0.00	LL	560
W_2 = DL	15	9.17	+ DL 0	+ DL	0	0.00	= DL	137
LL	40	9.17	Wall	LL	0	0.00	LL	367

R_1 = DL 1.01, LL 2.68 k; ∑ 3.69 k

R_2 = 1.22, 3.25 k; ∑ 4.46 k

FB-5



	Floor PSF	Tributary			Floor PSF	Tributary		PLF
W_1 = DL	15	14.00	+ DL 0	+ DL	0	0.00	= DL	210
LL	40	14.00	Wall	LL	0	0.00	LL	560
							∑	770

R_1 = DL 1.29, LL 3.43; ∑ 4.72 k

R_2 = 1.29, 3.43; ∑ 4.72 k

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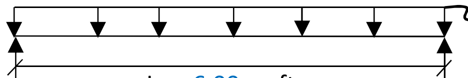
FB-6

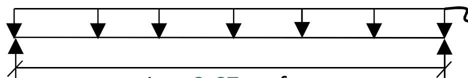


L = 6.00 ft

	Floor PSF	Tributary	+	Wall	+		Roof PSF	Tributary	=		PLF
W_1 = DL	15	0.67	+ DL	0	+	DL	15	2.46	=	DL	47
LL	40	0.67		Wall		SL	25	2.46		LL	88
										∑	135

	R_1		R_2	
DL	0.14		0.14	
LL	0.26		0.26	
∑	0.41	k	0.41	k

FB-7

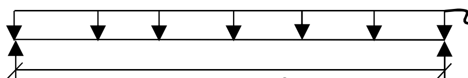


L = 2.67 ft

	Floor PSF	Tributary	+	Wall	+		Roof PSF	Tributary	=		PLF
W_1 = DL	15	0.67	+ DL	0	+	DL	15	2.46	=	DL	47
LL	40	0.67		Wall		SL	25	2.46		LL	88
										∑	135

	R_1		R_2	
DL	0.06		0.06	
LL	0.12		0.12	
∑	0.18	k	0.18	k

FB-8

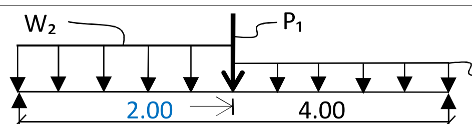


L = 2.67 ft

	Floor PSF	Tributary	+	Wall	+		Floor PSF	Tributary	=		PLF
W_1 = DL	15	8.00	+ DL	0	+	DL	0	0.00	=	DL	120
LL	40	8.00		Wall		LL	0	0.00		LL	320
										∑	440

	R_1		R_2	
DL	0.16		0.16	
LL	0.43		0.43	
∑	0.59	k	0.59	k

FB-9



L = 6.00 ft

	Roof PSF	Tributary	+	Wall	+		Floor PSF	Tributary	=		PLF
W_1 = DL	0	0.00	+ DL	0	+	DL	15	6.00	=	DL	90
SL	0	0.00		Wall		LL	40	6.00		LL	240
										SL	0
W_2 = DL	15	2.46	+ DL	0	+	DL	15	0.67	=	DL	47
SL	25	2.46		Wall		LL	40	0.67		LL	27
										SL	62

	R_1		R_2	
DL	0.25		0.28	
LL	0.36	k	0.65	k
SL	0.18		0.06	
∑	0.80	k	0.99	k

	RB-3		+	NA	=	
P_1 = DL	0.07			DL 0.00		DL 0.07
LL	0.00	k	+	LL 0.00	=	LL 0.00 k
SL	0.12			SL 0.00		SL 0.12

	R_1	R_2
DL+LL:	0.61	0.93
DL+SL:	0.43	0.34
(L+S):	0.66	0.81

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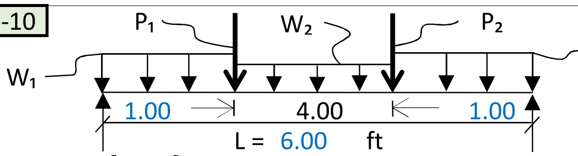
LOADS ONLY

FB-10



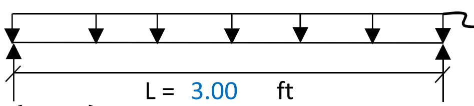
R_1 =	DL	1.00	R_2 =	1.00
	LL	0.58 k		0.58 k
	SL	1.31		1.31
	∑	2.89 k	∑	2.89 k
DL+LL:		1.58		1.58
DL+SL:		2.31		2.31
(L+S):		2.42		2.42

P_1 = RB-5: DL 0.46, LL 0.00, SL 0.77 k + NA: DL 0.00, LL 0.00, SL 0.00 = DL 0.46, LL 0.00, SL 0.77 k

P_2 = RB-5: DL 0.46, LL 0.00, SL 0.77 k + NA: DL 0.00, LL 0.00, SL 0.00 = DL 0.46, LL 0.00, SL 0.77 k

	Roof PSF	Roof Tributary	+	DL Wall	+	Floor PSF	Floor Tributary	=	PLF
W_1 = DL	15	15.46	+	0	+ DL	15	4.84	= DL	304
SL	25	15.46		Wall	LL	40	4.84	LL	193
								SL	387
W_2 = DL	15	3.00	+	0	+ DL	15	4.84	= DL	118
SL	25	3.00		Wall	LL	40	4.84	LL	193
								SL	75

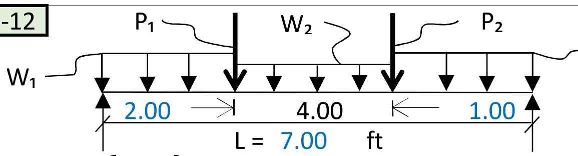
FB-11



R_1 =	DL	0.24	R_2 =	0.24
	LL	0.63		0.63
	∑	0.86 k	∑	0.86 k

	Floor PSF	Floor Tributary	+	DL Wall	+	Floor PSF	Floor Tributary	=	PLF
W_1 = DL	15	10.45	+	0	+ DL	0	0.00	= DL	157
LL	40	10.45		Wall	LL	0	0.00	LL	418
								∑	575

FB-12



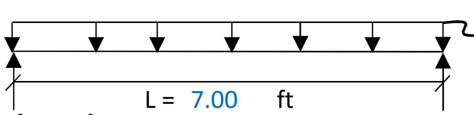
R_1 =	DL	1.32	R_2 =	1.35
	LL	1.16 k		1.16 k
	SL	1.48		1.52
	∑	3.96 k	∑	4.03 k
DL+LL:		2.48		2.50
DL+SL:		2.80		2.87
(L+S):		3.30		3.36

P_1 = RB-4: DL 0.46, LL 0.00, SL 0.77 k + NA: DL 0.00, LL 0.00, SL 0.00 = DL 0.46, LL 0.00, SL 0.77 k

P_2 = RB-4: DL 0.46, LL 0.00, SL 0.77 k + NA: DL 0.00, LL 0.00, SL 0.00 = DL 0.46, LL 0.00, SL 0.77 k

	Roof PSF	Roof Tributary	+	DL Wall	+	Floor PSF	Floor Tributary	=	PLF
W_1 = DL	15	15.46	+	0	+ DL	15	8.25	= DL	356
SL	25	15.46		Wall	LL	40	8.25	LL	330
								SL	387
W_2 = DL	15	3.00	+	0	+ DL	15	8.25	= DL	169
SL	25	3.00		Wall	LL	40	8.25	LL	330
								SL	75

GT-1



R_1 =	DL	0.79	R_2 =	0.79
	SL	1.31		1.31
	∑	2.10 k	∑	2.10 k

	Roof PSF	Roof Tributary	+	DL Wall	+	Roof PSF	Roof Tributary	=	PLF
W_1 = DL	15	15.00	+	0	+ DL	0	0.00	= DL	225
SL	25	15.00		Wall	SL	0	0.00	SL	375
								∑	600

Multiple Simple Beam

Description : Roof Beams

Wood Beam Design : RB-1

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10

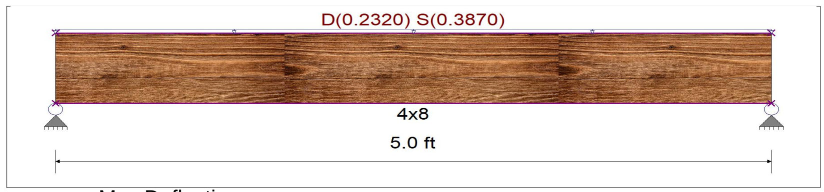
BEAM Size : **4x8, Sawn, Fully Braced**
Using Allowable Stress Design with IBC 2015 Load Combinations, Major Axis Bending

Wood Species :	Hem Fir					Wood Grade :	No.2		
Fb - Tension	850.0 psi	Fc - Prll	1,300.0 psi	Fv	150.0 psi	Ebend- xx	1,300.0 ksi	Density	27.70 pcf
Fb - Compr	850.0 psi	Fc - Perp	405.0 psi	Ft	525.0 psi	Eminbend - xx	470.0 ksi		

Applied Loads

Unif Load: D = 0.2320, S = 0.3870 k/ft, Trib= 1.0 ft

Design Summary



Max fb/Fb Ratio = **0.596** : 1
fb : Actual : 757.06 psi at 2.500 ft in Span # 1
Fb : Allowable : 1,270.75 psi
Load Comb : +D+S+H

Max fv/FvRatio = **0.530** : 1
fv : Actual : 91.48 psi at 0.000 ft in Span # 1
Fv : Allowable : 172.50 psi
Load Comb : +D+S+H

Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	0.58			0.97			
Right Support	0.58			0.97			

Max Deflections

Transient Downward	0.038 in	Total Downward	0.061 in
Ratio	1584	Ratio	990
	LC: S Only		LC: +D+S+H
Transient Upward	0.000 in	Total Upward	0.000 in
Ratio	9999	Ratio	9999
	LC:		LC:

Wood Beam Design : RB-2

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10

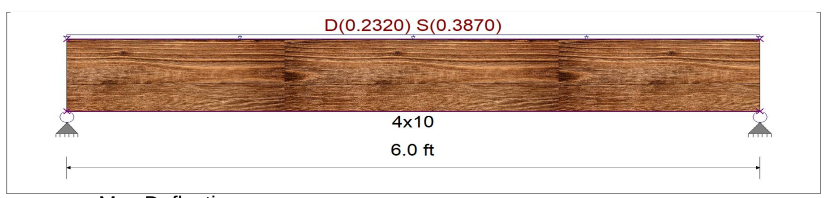
BEAM Size : **4x10, Sawn, Fully Braced**
Using Allowable Stress Design with IBC 2015 Load Combinations, Major Axis Bending

Wood Species :	Hem Fir					Wood Grade :	No.2		
Fb - Tension	850.0 psi	Fc - Prll	1,300.0 psi	Fv	150.0 psi	Ebend- xx	1,300.0 ksi	Density	27.70 pcf
Fb - Compr	850.0 psi	Fc - Perp	405.0 psi	Ft	525.0 psi	Eminbend - xx	470.0 ksi		

Applied Loads

Unif Load: D = 0.2320, S = 0.3870 k/ft, Trib= 1.0 ft

Design Summary



Max fb/Fb Ratio = **0.571** : 1
fb : Actual : 669.71 psi at 3.000 ft in Span # 1
Fb : Allowable : 1,173.00 psi
Load Comb : +D+S+H

Max fv/FvRatio = **0.499** : 1
fv : Actual : 86.04 psi at 6.000 ft in Span # 1
Fv : Allowable : 172.50 psi
Load Comb : +D+S+H

Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	0.70			1.16			
Right Support	0.70			1.16			

Max Deflections

Transient Downward	0.038 in	Total Downward	0.060 in
Ratio	1904	Ratio	1190
	LC: S Only		LC: +D+S+H
Transient Upward	0.000 in	Total Upward	0.000 in
Ratio	9999	Ratio	9999
	LC:		LC:

Permit Number: 20-01497

Multiple Simple Beam

Wood Beam Design : RB-3

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10

BEAM Size : **2-2x8, Sawn, Fully Braced**
Using Allowable Stress Design with IBC 2015 Load Combinations, Major Axis Bending

Wood Species : Hem Fir — Wood Grade : No.2

Fb - Tension	850.0 psi	Fc - Prll	1,300.0 psi	Fv	150.0 psi	Ebend- xx	1,300.0 ksi	Density	27.70 pcf
Fb - Compr	850.0 psi	Fc - Perp	405.0 psi	Ft	525.0 psi	Eminbend - xx	470.0 ksi		

Applied Loads

Unif Load: D = 0.0370, S = 0.0620 k/ft, Trib= 1.0 ft

Design Summary

Max fb/Fb Ratio = **0.077** : 1
fb : Actual : 90.41 psi at 2.000 ft in Span # 1
Fb : Allowable : 1,173.00 psi
Load Comb : +D+S+H
Max fv/FvRatio = **0.079** : 1
fv : Actual : 13.66 psi at 0.000 ft in Span # 1
Fv : Allowable : 172.50 psi
Load Comb : +D+S+H

Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	0.07			0.12			
Right Support	0.07			0.12			

Max Deflections

Transient Downward	0.003 in	Total Downward	0.005 in
Ratio	9999	Ratio	9999
	LC: S Only		LC: +D+S+H
Transient Upward	0.000 in	Total Upward	0.000 in
Ratio	9999	Ratio	9999
	LC:		LC:

Wood Beam Design : RB-4

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10

BEAM Size : **4x8, Sawn, Fully Braced**
Using Allowable Stress Design with IBC 2015 Load Combinations, Major Axis Bending

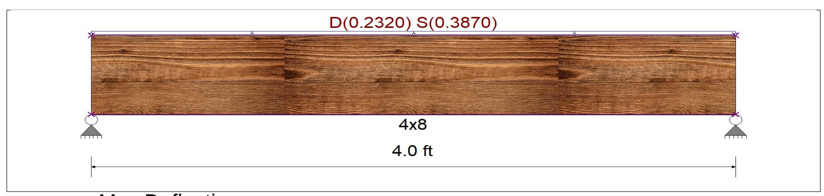
Wood Species : Hem Fir — Wood Grade : No.2

Fb - Tension	850.0 psi	Fc - Prll	1,300.0 psi	Fv	150.0 psi	Ebend- xx	1,300.0 ksi	Density	26.840 pcf
Fb - Compr	850.0 psi	Fc - Perp	405.0 psi	Ft	525.0 psi	Eminbend - xx	470.0 ksi		

Applied Loads

Unif Load: D = 0.2320, S = 0.3870 k/ft, Trib= 1.0 ft

Design Summary



Max fb/Fb Ratio = **0.381** : 1
fb : Actual : 484.52 psi at 2.000 ft in Span # 1
Fb : Allowable : 1,270.75 psi
Load Comb : +D+S+H
Max fv/FvRatio = **0.424** : 1
fv : Actual : 73.18 psi at 0.000 ft in Span # 1
Fv : Allowable : 172.50 psi
Load Comb : +D+S+H

Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	0.46			0.77			
Right Support	0.46			0.77			

Max Deflections

Transient Downward	0.016 in	Total Downward	0.025 in
Ratio	3094	Ratio	1934
	LC: S Only		LC: +D+S+H
Transient Upward	0.000 in	Total Upward	0.000 in
Ratio	9999	Ratio	9999
	LC:		LC:

Permit Number: 20-01497

Wood Beam Design : RB-5

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10

BEAM Size : **4x8, Sawn, Fully Braced**
Using Allowable Stress Design with IBC 2015 Load Combinations, Major Axis Bending

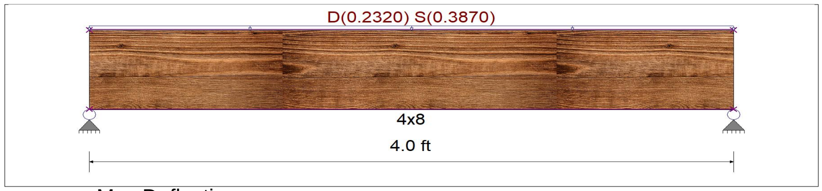
Wood Species : Hem Fir   Wood Grade : No.2

Fb - Tension	850.0 psi	Fc - Prll	1,300.0 psi	Fv	150.0 psi	Ebend- xx	1,300.0 ksi	Density	27.70 pcf
Fb - Compr	850.0 psi	Fc - Perp	405.0 psi	Ft	525.0 psi	Eminbend - xx	470.0 ksi		

Applied Loads

Unif Load: D = 0.2320, S = 0.3870 k/ft, Trib= 1.0 ft

Design Summary



Max fb/Fb Ratio = **0.381** : 1
fb : Actual : 484.52 psi at 2.000 ft in Span # 1
Fb : Allowable : 1,270.75 psi
Load Comb : +D+S+H

Max fv/FvRatio = **0.424** : 1
fv : Actual : 73.18 psi at 0.000 ft in Span # 1
Fv : Allowable : 172.50 psi
Load Comb : +D+S+H

Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	0.46			0.77			
Right Support	0.46			0.77			

Max Deflections

Transient Downward	0.016 in	Total Downward	0.025 in
Ratio	3094	Ratio	1934
	LC: S Only		LC: +D+S+H
Transient Upward	0.000 in	Total Upward	0.000 in
Ratio	9999	Ratio	9999
	LC:		LC:

Wood Beam Design : RB-6

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10

BEAM Size : **2-2x8, Sawn, Fully Braced**
Using Allowable Stress Design with IBC 2015 Load Combinations, Major Axis Bending

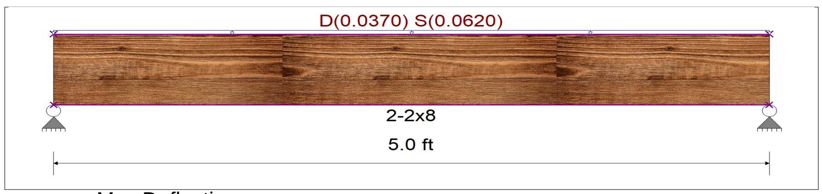
Wood Species : Hem Fir   Wood Grade : No.2

Fb - Tension	850.0 psi	Fc - Prll	1,300.0 psi	Fv	150.0 psi	Ebend- xx	1,300.0 ksi	Density	27.70 pcf
Fb - Compr	850.0 psi	Fc - Perp	405.0 psi	Ft	525.0 psi	Eminbend - xx	470.0 ksi		

Applied Loads

Unif Load: D = 0.0370, S = 0.0620 k/ft, Trib= 1.0 ft

Design Summary



Max fb/Fb Ratio = **0.120** : 1
fb : Actual : 141.26 psi at 2.500 ft in Span # 1
Fb : Allowable : 1,173.00 psi
Load Comb : +D+S+H

Max fv/FvRatio = **0.099** : 1
fv : Actual : 17.07 psi at 0.000 ft in Span # 1
Fv : Allowable : 172.50 psi
Load Comb : +D+S+H

Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	0.09			0.16			
Right Support	0.09			0.16			

Max Deflections

Transient Downward	0.007 in	Total Downward	0.011 in
Ratio	8477	Ratio	5309
	LC: S Only		LC: +D+S+H
Transient Upward	0.000 in	Total Upward	0.000 in
Ratio	9999	Ratio	9999
	LC:		LC:

Wood Beam Design : RB-7

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10

BEAM Size : **4x8, Sawn, Fully Braced**
Using Allowable Stress Design with IBC 2015 Load Combinations, Major Axis Bending

Wood Species : Hem Fir				Wood Grade : No.2			
Fb - Tension	850.0 psi	Fc - Prll	1,300.0 psi	Fv	150.0 psi	Ebend- xx	1,300.0 ksi	Density	27.70 pcf
Fb - Compr	850.0 psi	Fc - Perp	405.0 psi	Ft	525.0 psi	Eminbend - xx	470.0 ksi		

Applied Loads

Unif Load: D = 0.2020, S = 0.3370 k/ft, Trib= 1.0 ft

Design Summary

Max fb/Fb Ratio = **0.148** : 1
fb : Actual : 187.98 psi at 1.335 ft in Span # 1
Fb : Allowable : 1,270.75 psi
Load Comb : +D+S+H

Max fv/FvRatio = **0.247** : 1
fv : Actual : 42.54 psi at 0.000 ft in Span # 1
Fv : Allowable : 172.50 psi
Load Comb : +D+S+H

Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	0.27			0.45			
Right Support	0.27			0.45			

Max Deflections

Transient Downward	0.003 in	Total Downward	0.004 in
Ratio	9999	Ratio	7471
	LC: S Only		LC: +D+S+H
Transient Upward	0.000 in	Total Upward	0.000 in
Ratio	9999	Ratio	9999
	LC:		LC:

Wood Beam Design : RB-8

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10

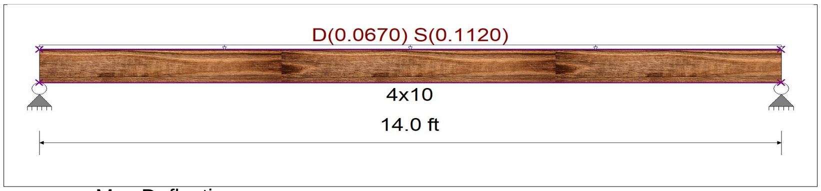
BEAM Size : **4x10, Sawn, Fully Braced**
Using Allowable Stress Design with IBC 2015 Load Combinations, Major Axis Bending

Wood Species : Hem Fir				Wood Grade : No.1			
Fb - Tension	975.0 psi	Fc - Prll	1,350.0 psi	Fv	150.0 psi	Ebend- xx	1,500.0 ksi	Density	26.840 pcf
Fb - Compr	975.0 psi	Fc - Perp	405.0 psi	Ft	625.0 psi	Eminbend - xx	550.0 ksi		

Applied Loads

Unif Load: D = 0.0670, S = 0.1120 k/ft, Trib= 1.0 ft

Design Summary



Max fb/Fb Ratio = **0.784** : 1
fb : Actual : 1,054.39 psi at 7.000 ft in Span # 1
Fb : Allowable : 1,345.50 psi
Load Comb : +D+S+H

Max fv/FvRatio = **0.337** : 1
fv : Actual : 58.05 psi at 0.000 ft in Span # 1
Fv : Allowable : 172.50 psi
Load Comb : +D+S+H

Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	0.47			0.78			
Right Support	0.47			0.78			

Max Deflections

Transient Downward	0.281 in	Total Downward	0.449 in
Ratio	597	Ratio	373
	LC: S Only		LC: +D+S+H
Transient Upward	0.000 in	Total Upward	0.000 in
Ratio	9999	Ratio	9999
	LC:		LC:

Permit Number: 20-01497

Wood Beam Design : RB-9

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10

BEAM Size : **4x10, Sawn, Fully Braced**
Using Allowable Stress Design with IBC 2015 Load Combinations, Major Axis Bending

Wood Species : Hem Fir — Wood Grade : No.2

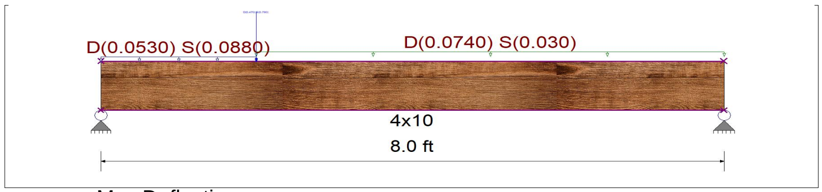
Fb - Tension	850 psi	Fc - Prll	1300 psi	Fv	150 psi	Ebend- xx	1300 ksi	Density	26.84 pcf
Fb - Compr	850 psi	Fc - Perp	405 psi	Ft	525 psi	Eminbend - xx	470 ksi		

Applied Loads

Unif Load: D = 0.0530, S = 0.0880 k/ft, 0.0 ft to 2.0 ft, Trib= 1.0 ft
Unif Load: D = 0.0740, S = 0.030 k/ft, 2.0 to 8.0 ft, Trib= 1.0 ft
Point: D = 0.470, S = 0.780 k @ 2.0 ft

Design Summary

Max fb/Fb Ratio = **0.524** : 1
fb : Actual : 614.17 psi at 2.000 ft in Span # 1
Fb : Allowable : 1,173.00 psi
Load Comb : +D+S+H
Max fv/FvRatio = **0.381** : 1
fv : Actual : 65.71 psi at 0.000 ft in Span # 1
Fv : Allowable : 172.50 psi
Load Comb : +D+S+H



Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	0.61			0.81			
Right Support	0.41			0.33			

Max Deflections

Transient Downward	0.045 in	Total Downward	0.087 in
Ratio	2111	Ratio	1097
	LC: S Only		LC: +D+S+H
Transient Upward	0.000 in	Total Upward	0.000 in
Ratio	9999	Ratio	9999
	LC:		LC:

Wood Beam Design : RB-10

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10

BEAM Size : **4x10, Sawn, Fully Braced**
Using Allowable Stress Design with IBC 2015 Load Combinations, Major Axis Bending

Wood Species : Hem Fir — Wood Grade : No.2

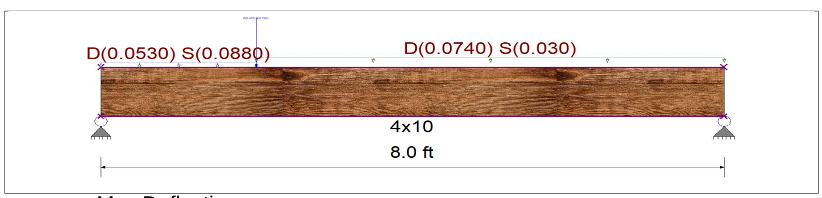
Fb - Tension	850 psi	Fc - Prll	1300 psi	Fv	150 psi	Ebend- xx	1300 ksi	Density	26.84 pcf
Fb - Compr	850 psi	Fc - Perp	405 psi	Ft	525 psi	Eminbend - xx	470 ksi		

Applied Loads

Unif Load: D = 0.0530, S = 0.0880 k/ft, 0.0 ft to 2.0 ft, Trib= 1.0 ft
Unif Load: D = 0.0740, S = 0.030 k/ft, 2.0 to 8.0 ft, Trib= 1.0 ft
Point: D = 0.470, S = 0.780 k @ 2.0 ft

Design Summary

Max fb/Fb Ratio = **0.524** : 1
fb : Actual : 614.17 psi at 2.000 ft in Span # 1
Fb : Allowable : 1,173.00 psi
Load Comb : +D+S+H
Max fv/FvRatio = **0.381** : 1
fv : Actual : 65.71 psi at 0.000 ft in Span # 1
Fv : Allowable : 172.50 psi
Load Comb : +D+S+H



Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	0.61			0.81			
Right Support	0.41			0.33			

Max Deflections

Transient Downward	0.045 in	Total Downward	0.087 in
Ratio	2111	Ratio	1097
	LC: S Only		LC: +D+S+H
Transient Upward	0.000 in	Total Upward	0.000 in
Ratio	9999	Ratio	9999
	LC:		LC:

Beyler Consulting
5920 100th St SW, Suite 25
Lakewood, WA 98499
(253) 984-2900

Project Title: Olympic
Engineer:
Project ID: 1910
Project Descr:

Printed: 2 DEC 2019, 2:01PM

Multiple Simple Beam

.9\19.00402 CH1986 Wheeler\5Structural Engineering\Engineering Files\Gravity\Beams.ec6 .
Software copyright ENERCALC, INC. 1983-2019, Build:12.19.8.31 .
Lic. # : KW-06011448 **Beyler Consulting, LLC**

Wood Beam Design : RB-11

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10

BEAM Size : **4x10, Sawn, Fully Braced**
Using Allowable Stress Design with IBC 2015 Load Combinations, Major Axis Bending

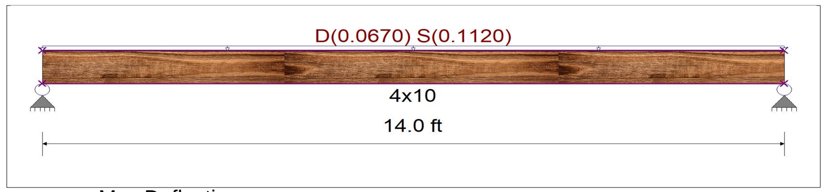
Wood Species : Hem Fir — Wood Grade : No.1

Fb - Tension	975.0 psi	Fc - Prll	1,350.0 psi	Fv	150.0 psi	Ebend- xx	1,500.0 ksi	Density	26.840 pcf
Fb - Compr	975.0 psi	Fc - Perp	405.0 psi	Ft	625.0 psi	Eminbend - xx	550.0 ksi		

Applied Loads

Unif Load: D = 0.0670, S = 0.1120 k/ft, Trib= 1.0 ft

Design Summary



Max fb/Fb Ratio = **0.784** : 1
fb : Actual : 1,054.39 psi at 7.000 ft in Span # 1
Fb : Allowable : 1,345.50 psi
Load Comb : +D+S+H

Max fv/FvRatio = **0.337** : 1
fv : Actual : 58.05 psi at 0.000 ft in Span # 1
Fv : Allowable : 172.50 psi
Load Comb : +D+S+H

Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	0.47			0.78			
Right Support	0.47			0.78			

Max Deflections

Transient Downward	0.281 in	Total Downward	0.449 in
Ratio	597	Ratio	373
	LC: S Only		LC: +D+S+H
Transient Upward	0.000 in	Total Upward	0.000 in
Ratio	9999	Ratio	9999
	LC:		LC:

Wood Beam Design : RB-12

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10

BEAM Size : **3.125x15, GLB, Fully Braced**
Using Allowable Stress Design with IBC 2015 Load Combinations, Major Axis Bending

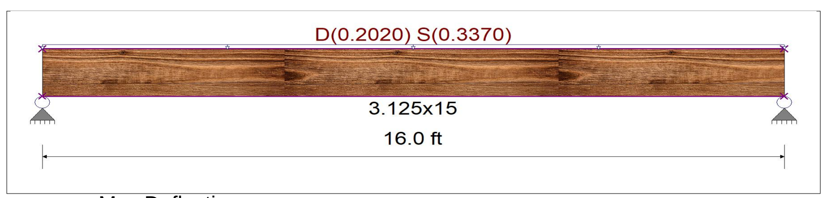
Wood Species : DF/DF — Wood Grade : 24F - V4

Fb - Tension	2400 psi	Fc - Prll	1650 psi	Fv	265 psi	Ebend- xx	1800 ksi	Density	31.21 pcf
Fb - Compr	1850 psi	Fc - Perp	650 psi	Ft	1100 psi	Eminbend - xx	950 ksi		

Applied Loads

Unif Load: D = 0.2020, S = 0.3370 k/ft, Trib= 1.0 ft

Design Summary



Max fb/Fb Ratio = **0.640** : 1
fb : Actual : 1,766.20 psi at 8.000 ft in Span # 1
Fb : Allowable : 2,760.00 psi
Load Comb : +D+S+H

Max fv/FvRatio = **0.453** : 1
fv : Actual : 137.98 psi at 0.000 ft in Span # 1
Fv : Allowable : 304.75 psi
Load Comb : +D+S+H

Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	1.62			2.70			
Right Support	1.62			2.70			

Max Deflections

Transient Downward	0.316 in	Total Downward	0.505 in
Ratio	608	Ratio	380
	LC: S Only		LC: +D+S+H
Transient Upward	0.000 in	Total Upward	0.000 in
Ratio	9999	Ratio	9999
	LC:		LC:

Permit Number: 20-01497

Multiple Simple Beam

Description : Floor Beams

Wood Beam Design : FB-1

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10

BEAM Size : **4x8, Sawn, Fully Braced**
Using Allowable Stress Design with IBC 2015 Load Combinations, Major Axis Bending

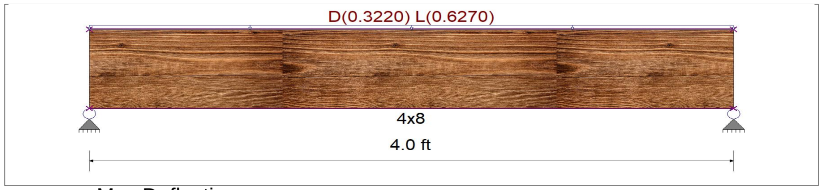
Wood Species : Hem Fir   Wood Grade : No.2

Fb - Tension	850.0 psi	Fc - Prll	1,300.0 psi	Fv	150.0 psi	Ebend- xx	1,300.0 ksi	Density	27.70 pcf
Fb - Compr	850.0 psi	Fc - Perp	405.0 psi	Ft	525.0 psi	Eminbend - xx	470.0 ksi		

Applied Loads

Unif Load: D = 0.3220, L = 0.6270 k/ft, Trib= 1.0 ft

Design Summary



Max fb/Fb Ratio = **0.672** : 1
fb : Actual : 742.82 psi at 2.000 ft in Span # 1
Fb : Allowable : 1,105.00 psi
Load Comb : +D+L+H

Max fv/FvRatio = **0.748** : 1
fv : Actual : 112.20 psi at 0.000 ft in Span # 1
Fv : Allowable : 150.00 psi
Load Comb : +D+L+H

Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	0.64	1.25					
Right Support	0.64	1.25					

Max Deflections

Transient Downward	0.025 in	Total Downward	0.038 in
Ratio	1910	Ratio	1262
	LC: L Only		LC: +D+L+H
Transient Upward	0.000 in	Total Upward	0.000 in
Ratio	9999	Ratio	9999
	LC:		LC:

Wood Beam Design : FB-2

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10

BEAM Size : **4x10, Sawn, Fully Braced**
Using Allowable Stress Design with IBC 2015 Load Combinations, Major Axis Bending

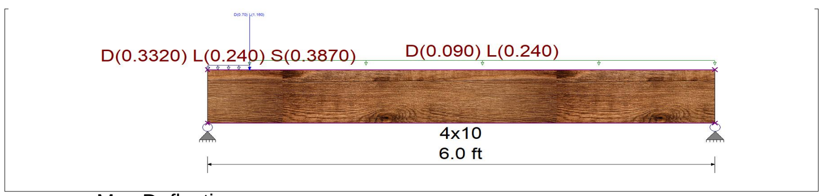
Wood Species : Hem Fir   Wood Grade : No.2

Fb - Tension	850.0 psi	Fc - Prll	1,300.0 psi	Fv	150.0 psi	Ebend- xx	1,300.0 ksi	Density	27.70 pcf
Fb - Compr	850.0 psi	Fc - Perp	405.0 psi	Ft	525.0 psi	Eminbend - xx	470.0 ksi		

Applied Loads

Unif Load: D = 0.3320, L = 0.240, S = 0.3870 k/ft, 0.0 ft to 0.50 ft, Trib= 1.0 ft
Unif Load: D = 0.090, L = 0.240 k/ft, 0.50 to 6.0 ft, Trib= 1.0 ft
Point: D = 0.70, L = 1.160 k @ 0.50 ft

Design Summary



Max fb/Fb Ratio = **0.472** : 1
fb : Actual : 481.80 psi at 2.520 ft in Span # 1
Fb : Allowable : 1,020.00 psi
Load Comb : +D+L+H

Max fv/FvRatio = **0.868** : 1
fv : Actual : 130.24 psi at 0.000 ft in Span # 1
Fv : Allowable : 150.00 psi
Load Comb : +D+L+H

Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	1.03	1.78		0.19			
Right Support	0.33	0.82		0.01			

Max Deflections

Transient Downward	0.031 in	Total Downward	0.045 in
Ratio	2323	Ratio	1609
	LC: L Only		LC: +D+L+H
Transient Upward	0.000 in	Total Upward	0.000 in
Ratio	9999	Ratio	9999
	LC:		LC:

Permit Number: 20-01497

Beyler Consulting
5920 100th St SW, Suite 25
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(253) 984-2900

Multiple Simple Beam

.9\19.00402 CH1986 Wheeler\5Structural Engineering\Engineering Files\Gravity\Beams.ec6 .
Software copyright ENERCALC, INC. 1983-2019, Build:12.19.8.31 .
Lic. # : KW-06011448 **Beyler Consulting, LLC**

Wood Beam Design : FB-3

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10

BEAM Size : **3.5x11.875, TimberStrand LSL, Fully Braced**
Using Allowable Stress Design with IBC 2015 Load Combinations, Major Axis Bending

Wood Species : Trus Joist   Wood Grade : TimberStrand LSL 1.3E - Beam/Col

Fb - Tension	1,700.0 psi	Fc - Prll	1,835.0 psi	Fv	425.0 psi	Ebend- xx	1,300.0 ksi	Density	45.010 pcf
Fb - Compr	1,700.0 psi	Fc - Perp	710.0 psi	Ft	1,075.0 psi	Eminbend - xx	660.75 ksi		

__Applied Loads__

Unif Load: D = 0.0650, L = 0.1730 k/ft, Trib= 1.0 ft

__Design Summary__

Max fb/Fb Ratio = **0.125** : 1
fb : Actual : 212.66 psi at 3.500 ft in Span # 1
Fb : Allowable : 1,700.00 psi
Load Comb : +D+L+H

Max fv/FvRatio = **0.071** : 1
fv : Actual : 30.06 psi at 0.000 ft in Span # 1
Fv : Allowable : 425.00 psi
Load Comb : +D+L+H

Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	0.23	0.61					
Right Support	0.23	0.61					

Max Deflections

Transient Downward	0.015 in	Total Downward	0.020 in
Ratio	5676	Ratio	4126
	LC: L Only		LC: +D+L+H
Transient Upward	0.000 in	Total Upward	0.000 in
Ratio	9999	Ratio	9999
	LC:		LC:

Wood Beam Design : FB-4

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10

BEAM Size : **5.25x11.875, Parallam PSL, Fully Braced**
Using Allowable Stress Design with IBC 2015 Load Combinations, Major Axis Bending

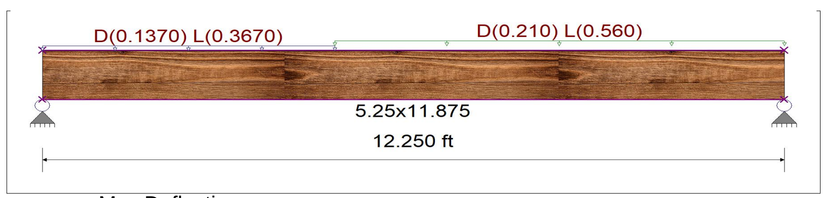
Wood Species : Trus Joist   Wood Grade : Parallam PSL 2.0E

Fb - Tension	2,900.0 psi	Fc - Prll	2,900.0 psi	Fv	290.0 psi	Ebend- xx	2,000.0 ksi	Density	45.070 pcf
Fb - Compr	2,900.0 psi	Fc - Perp	625.0 psi	Ft	2,025.0 psi	Eminbend - xx	1,016.54 ksi		

__Applied Loads__

Unif Load: D = 0.1370, L = 0.3670 k/ft, 0.0 ft to 4.830 ft, Trib= 1.0 ft
Unif Load: D = 0.210, L = 0.560 k/ft, 4.830 to 12.250 ft, Trib= 1.0 ft

__Design Summary__



Max fb/Fb Ratio = **0.434** : 1
fb : Actual : 1,257.86 psi at 6.452 ft in Span # 1
Fb : Allowable : 2,900.00 psi
Load Comb : +D+L+H

Max fv/FvRatio = **0.370** : 1
fv : Actual : 107.38 psi at 12.250 ft in Span # 1
Fv : Allowable : 290.00 psi
Load Comb : +D+L+H

Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	1.00	2.68					
Right Support	1.22	3.25					

Max Deflections

Transient Downward	0.172 in	Total Downward	0.237 in
Ratio	853	Ratio	620
	LC: L Only		LC: +D+L+H
Transient Upward	0.000 in	Total Upward	0.000 in
Ratio	9999	Ratio	9999
	LC:		LC:

Wood Beam Design : FB-5

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10

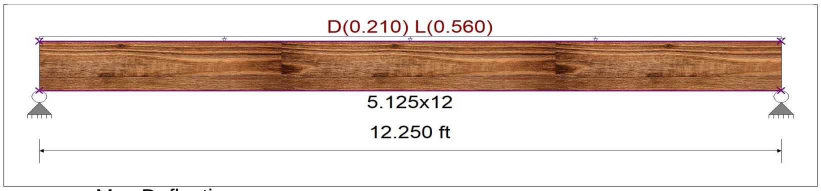
BEAM Size : **5.125x12, GLB, Fully Braced**
Using Allowable Stress Design with IBC 2015 Load Combinations, Major Axis Bending
Wood Species : Trus Joist   Wood Grade : Parallam PSL 2.0E

Fb - Tension	2,900.0 psi	Fc - Prll	2,900.0 psi	Fv	290.0 psi	Ebend- xx	2,000.0 ksi	Density	45.070 pcf
Fb - Compr	2,900.0 psi	Fc - Perp	625.0 psi	Ft	2,025.0 psi	Eminbend - xx	1,016.54 ksi		

Applied Loads

Unif Load: D = 0.210, L = 0.560 k/ft, Trib= 1.0 ft

Design Summary



Max fb/Fb Ratio = **0.486** : 1
fb : Actual : 1,409.12 psi at 6.125 ft in Span # 1
Fb : Allowable : 2,900.00 psi
Load Comb : +D+L+H

Max fv/FvRatio = **0.397** : 1
fv : Actual : 115.03 psi at 0.000 ft in Span # 1
Fv : Allowable : 290.00 psi
Load Comb : +D+L+H

Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	1.29	3.43					
Right Support	1.29	3.43					

Max Deflections

Transient Downward	0.193 in		Total Downward	0.266 in
Ratio	760		Ratio	553
	LC: L Only			LC: +D+L+H
Transient Upward	0.000 in		Total Upward	0.000 in
Ratio	9999		Ratio	9999
	LC:			LC:

Wood Beam Design : FB-6

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10

BEAM Size : **4x8, Sawn, Fully Braced**
Using Allowable Stress Design with IBC 2015 Load Combinations, Major Axis Bending
Wood Species : Hem Fir   Wood Grade : No.2

Fb - Tension	850.0 psi	Fc - Prll	1,300.0 psi	Fv	150.0 psi	Ebend- xx	1,300.0 ksi	Density	27.70 pcf
Fb - Compr	850.0 psi	Fc - Perp	405.0 psi	Ft	525.0 psi	Eminbend - xx	470.0 ksi		

Applied Loads

Unif Load: D = 0.0470, L = 0.0880 k/ft, Trib= 1.0 ft

Design Summary

Max fb/Fb Ratio = **0.043** : 1
fb : Actual : 47.08 psi at 1.335 ft in Span # 1
Fb : Allowable : 1,105.00 psi
Load Comb : +D+L+H

Max fv/FvRatio = **0.071** : 1
fv : Actual : 10.65 psi at 0.000 ft in Span # 1
Fv : Allowable : 150.00 psi
Load Comb : +D+L+H

Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	0.06	0.12					
Right Support	0.06	0.12					

Max Deflections

Transient Downward	0.001 in		Total Downward	0.001 in
Ratio	9999		Ratio	9999
	LC: L Only			LC: +D+L+H
Transient Upward	0.000 in		Total Upward	0.000 in
Ratio	9999		Ratio	9999
	LC:			LC:

Multiple Simple Beam

Wood Beam Design : FB-7

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10

BEAM Size : **4x8, Sawn, Fully Braced**
Using Allowable Stress Design with IBC 2015 Load Combinations, Major Axis Bending

Wood Species : Hem Fir   Wood Grade : No.2

Fb - Tension	850.0 psi	Fc - Prll	1,300.0 psi	Fv	150.0 psi	Ebend- xx	1,300.0 ksi	Density	27.70 pcf
Fb - Compr	850.0 psi	Fc - Perp	405.0 psi	Ft	525.0 psi	Eminbend - xx	470.0 ksi		

Applied Loads

Unif Load: D = 0.0470, L = 0.0880 k/ft, Trib= 1.0 ft

Design Summary

Max fb/Fb Ratio = **0.043** : 1
fb : Actual : 47.08 psi at 1.335 ft in Span # 1
Fb : Allowable : 1,105.00 psi
Load Comb : +D+L+H

Max fv/FvRatio = **0.071** : 1
fv : Actual : 10.65 psi at 0.000 ft in Span # 1
Fv : Allowable : 150.00 psi
Load Comb : +D+L+H

Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	0.06	0.12					
Right Support	0.06	0.12					

Max Deflections

Transient Downward	0.001 in		Total Downward	0.001 in
Ratio	9999		Ratio	9999
	LC: L Only			LC: +D+L+H
Transient Upward	0.000 in		Total Upward	0.000 in
Ratio	9999		Ratio	9999
	LC:			LC:

Wood Beam Design : FB-8

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10

BEAM Size : **4x8, Sawn, Fully Braced**
Using Allowable Stress Design with IBC 2015 Load Combinations, Major Axis Bending

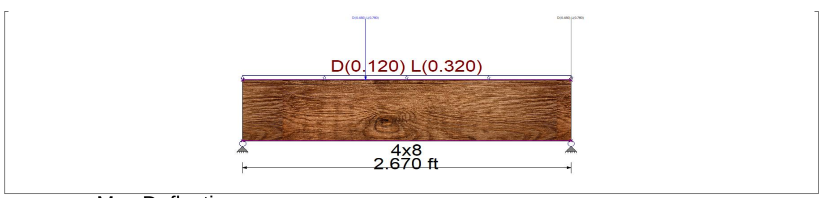
Wood Species : Hem Fir   Wood Grade : No.2

Fb - Tension	850.0 psi	Fc - Prll	1,300.0 psi	Fv	150.0 psi	Ebend- xx	1,300.0 ksi	Density	26.840 pcf
Fb - Compr	850.0 psi	Fc - Perp	405.0 psi	Ft	525.0 psi	Eminbend - xx	470.0 ksi		

Applied Loads

Unif Load: D = 0.120, L = 0.320 k/ft, Trib= 1.0 ft
Point: D = 0.450, L = 0.760 k @ 1.0 ft
Point: D = 0.450, L = 0.760 k @ 2.670 ft

Design Summary



Max fb/Fb Ratio = **0.398** : 1
fb : Actual : 439.32 psi at 1.006 ft in Span # 1
Fb : Allowable : 1,105.00 psi
Load Comb : +D+L+H

Max fv/FvRatio = **0.887** : 1
fv : Actual : 133.04 psi at 2.670 ft in Span # 1
Fv : Allowable : 150.00 psi
Load Comb : +D+L+H

Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	0.44	0.90					
Right Support	0.78	1.47					

Max Deflections

Transient Downward	0.006 in		Total Downward	0.009 in
Ratio	5459		Ratio	3643
	LC: L Only			LC: +D+L+H
Transient Upward	0.000 in		Total Upward	0.000 in
Ratio	9999		Ratio	9999
	LC:			LC:

Permit Number: 20-01497

Beyler Consulting
5920 100th St SW, Suite 25
Lakewood, WA 98499
(253) 984-2900

Multiple Simple Beam

Wood Beam Design : FB-9

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10

BEAM Size : **4x8, Sawn, Fully Braced**
Using Allowable Stress Design with IBC 2015 Load Combinations, Major Axis Bending

Wood Species :	Hem Fir				Wood Grade :	No.2			
Fb - Tension	850.0 psi	Fc - Prll	1,300.0 psi	Fv	150.0 psi	Ebend- xx	1,300.0 ksi	Density	26.840 pcf
Fb - Compr	850.0 psi	Fc - Perp	405.0 psi	Ft	525.0 psi	Eminbend - xx	470.0 ksi		

Applied Loads

Unif Load: D = 0.0470, L = 0.0270, S = 0.0620 k/ft, 0.0 ft to 2.0 ft, Trib= 1.0 ft
Unif Load: D = 0.090, L = 0.240 k/ft, 2.0 to 6.0 ft, Trib= 1.0 ft
Point: D = 0.070, S = 0.120 k @ 2.0 ft

Design Summary

Max fb/Fb Ratio = **0.462** : 1
fb : Actual : 510.67 psi at 3.180 ft in Span # 1
Fb : Allowable : 1,105.00 psi
Load Comb : +D+L+H

Max fv/FvRatio = **0.366** : 1
fv : Actual : 54.86 psi at 6.000 ft in Span # 1
Fv : Allowable : 150.00 psi
Load Comb : +D+L+H

Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	0.25	0.37		0.18			
Right Support	0.28	0.65		0.06			

Max Deflections

Transient Downward	0.038 in		Total Downward	0.057 in
Ratio	1891		Ratio	1255
	LC: L Only			LC: +D+L+H
Transient Upward	0.000 in		Total Upward	0.000 in
Ratio	9999		Ratio	9999
	LC:			LC:

Wood Beam Design : FB-10

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10

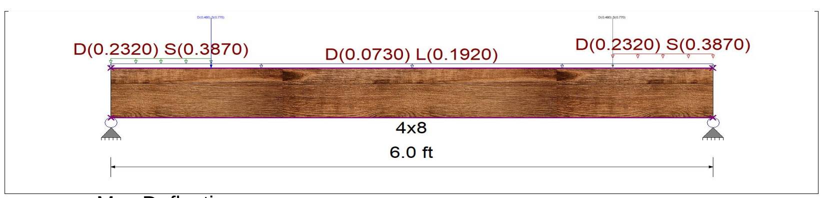
BEAM Size : **4x8, Sawn, Fully Braced**
Using Allowable Stress Design with IBC 2015 Load Combinations, Major Axis Bending

Wood Species :	Hem Fir				Wood Grade :	No.2			
Fb - Tension	850.0 psi	Fc - Prll	1,300.0 psi	Fv	150.0 psi	Ebend- xx	1,300.0 ksi	Density	26.840 pcf
Fb - Compr	850.0 psi	Fc - Perp	405.0 psi	Ft	525.0 psi	Eminbend - xx	470.0 ksi		

Applied Loads

Unif Load: D = 0.0730, L = 0.1920 k/ft, Trib= 1.0 ft
Unif Load: D = 0.2320, S = 0.3870 k/ft, 0.0 to 1.0 ft, Trib= 1.0 ft
Unif Load: D = 0.2320, S = 0.3870 k/ft, 5.0 to 6.0 ft, Trib= 1.0 ft
Point: D = 0.460, S = 0.770 k @ 1.0 ft
Point: D = 0.460, S = 0.770 k @ 5.0 ft

Design Summary



Max fb/Fb Ratio = **0.701** : 1
fb : Actual : 890.42 psi at 3.000 ft in Span # 1
Fb : Allowable : 1,270.75 psi
Load Comb : +D+0.750L+0.750S+H

Max fv/FvRatio = **0.758** : 1
fv : Actual : 130.68 psi at 0.000 ft in Span # 1
Fv : Allowable : 172.50 psi
Load Comb : +D+0.750L+0.750S+H

Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	0.91	0.58		1.16			
Right Support	0.91	0.58		1.16			

Max Deflections

Transient Downward	0.050 in		Total Downward	0.112 in
Ratio	1428		Ratio	642
	LC: S Only			.C: +D+0.750L+0.750S+H
Transient Upward	0.000 in		Total Upward	0.000 in
Ratio	9999		Ratio	9999
	LC:			LC:

Permit Number: 20-01497

Multiple Simple Beam

Wood Beam Design : FB-11

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10

BEAM Size : **4x8, Sawn, Fully Braced**
Using Allowable Stress Design with IBC 2015 Load Combinations, Major Axis Bending

Wood Species : Hem Fir — Wood Grade : No.2

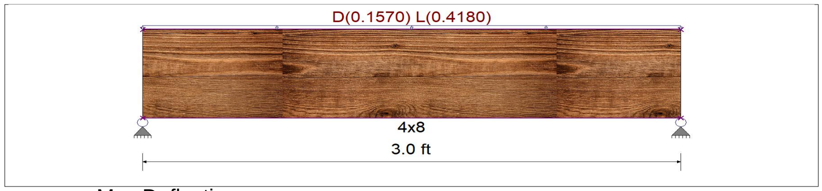
Fb - Tension	850.0 psi	Fc - Prll	1,300.0 psi	Fv	150.0 psi	Ebend- xx	1,300.0 ksi
Fb - Compr	850.0 psi	Fc - Perp	405.0 psi	Ft	525.0 psi	Eminbend - xx	470.0 ksi

Density 26.840 pcf

Applied Loads

Unif Load: D = 0.1570, L = 0.4180 k/ft, Trib= 1.0 ft

Design Summary



Max fb/Fb Ratio = **0.229** : 1
fb : Actual : 253.17 psi at 1.500 ft in Span # 1
Fb : Allowable : 1,105.00 psi
Load Comb : +D+L+H

Max fv/FvRatio = **0.340** : 1
fv : Actual : 50.99 psi at 0.000 ft in Span # 1
Fv : Allowable : 150.00 psi
Load Comb : +D+L+H

Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	0.24	0.63					
Right Support	0.24	0.63					

Max Deflections

Transient Downward	0.005 in	Total Downward	0.007 in
Ratio	6791	Ratio	4937
	LC: L Only		LC: +D+L+H
Transient Upward	0.000 in	Total Upward	0.000 in
Ratio	9999	Ratio	9999
	LC:		LC:

Wood Beam Design : FB-12

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10

BEAM Size : **3.125x9, GLB, Fully Braced**
Using Allowable Stress Design with IBC 2015 Load Combinations, Major Axis Bending

Wood Species : DF/DF — Wood Grade : 24F - V4

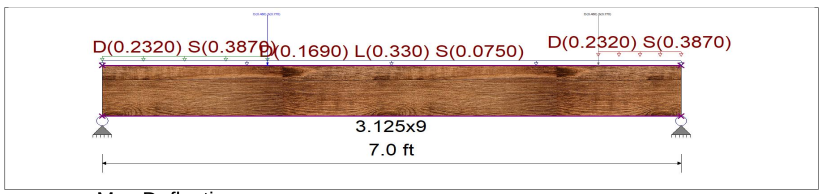
Fb - Tension	2400 psi	Fc - Prll	1650 psi	Fv	265 psi	Ebend- xx	1800 ksi
Fb - Compr	1850 psi	Fc - Perp	650 psi	Ft	1100 psi	Eminbend - xx	950 ksi

Density 31.21 pcf

Applied Loads

Unif Load: D = 0.1690, L = 0.330, S = 0.0750 k/ft, Trib= 1.0 ft
Unif Load: D = 0.2320, S = 0.3870 k/ft, 0.0 to 2.0 ft, Trib= 1.0 ft
Unif Load: D = 0.2320, S = 0.3870 k/ft, 6.0 to 7.0 ft, Trib= 1.0 ft
Point: D = 0.460, S = 0.770 k @ 2.0 ft
Point: D = 0.460, S = 0.770 k @ 6.0 ft

Design Summary



Max fb/Fb Ratio = **0.533** : 1
fb : Actual : 1,472.34 psi at 2.940 ft in Span # 1
Fb : Allowable : 2,760.00 psi
Load Comb : +D+0.750L+0.750S+H

Max fv/FvRatio = **0.608** : 1
fv : Actual : 185.41 psi at 0.000 ft in Span # 1
Fv : Allowable : 304.75 psi
Load Comb : +D+0.750L+0.750S+H

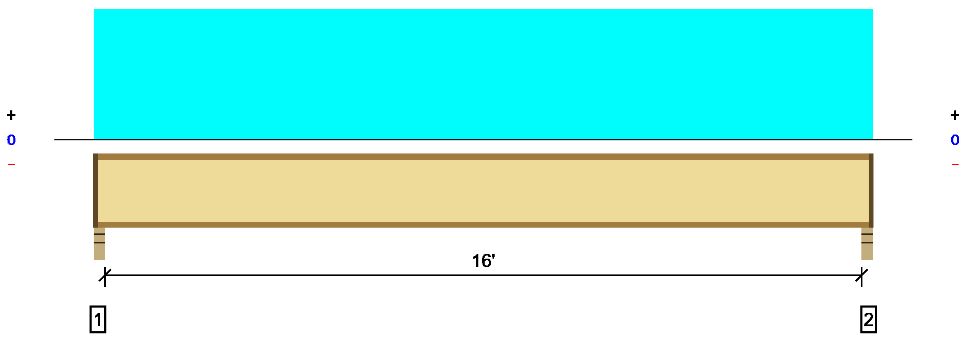
Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	1.40	1.16		1.61			
Right Support	1.40	1.16		1.61			

Max Deflections

Transient Downward	0.059 in	Total Downward	0.139 in
Ratio	1414	Ratio	603
	LC: S Only		.C: +D+0.750L+0.750S+H
Transient Upward	0.000 in	Total Upward	0.000 in
Ratio	9999	Ratio	9999
	LC:		LC:

1 piece(s) 11 7/8" TJI® 110 @ 16" OC

Overall Length: 16' 6"



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)	565 @ 2"	910 (1.75")	Passed (62%)	1.00	1.0 D + 1.0 L (All Spans)
Shear (lbs)	555 @ 3"	1560	Passed (36%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	2265 @ 8' 3"	3160	Passed (72%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.275 @ 8' 3"	0.404	Passed (L/704)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.358 @ 8' 3"	0.808	Passed (L/542)	--	1.0 D + 1.0 L (All Spans)
TJ-Pro™ Rating	43	40	Passed	--	--

System : Floor
Member Type : Joist
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Top Edge Bracing (Lu): Top compression edge must be braced at 3' 8" o/c unless detailed otherwise.
- Bottom Edge Bracing (Lu): Bottom compression edge must be braced at 16' 4" o/c unless detailed otherwise.
- A structural analysis of the deck has not been performed.
- Deflection analysis is based on composite action with a single layer of 23/32" Weyerhaeuser Edge™ Panel (24" Span Rating) that is glued and nailed down.
- Additional considerations for the TJ-Pro™ Rating include: None

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Total	
1 - Stud wall - HF	3.00"	1.75"	1.75"	132	440	572	1 1/4" Rim Board
2 - Stud wall - HF	3.00"	1.75"	1.75"	132	440	572	1 1/4" Rim Board

- Rim Board is assumed to carry all loads applied directly above it, bypassing the member being designed.

Loads	Location (Side)	Spacing	Dead (0.90)	Floor Live (1.00)	Comments
1 - Uniform (PSF)	0 to 16' 6"	16"	12.0	40.0	Residential - Living Areas

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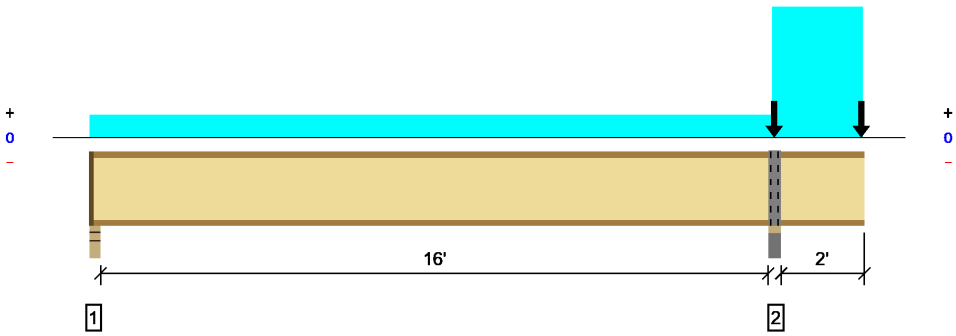
The product application, input design loads, dimensions and support information have been provided by Forte Software Operator

SUSTAINABLE FORESTRY INITIATIVE

Forte Software Operator	Job Notes

1 piece(s) 11 7/8" TJI® 110 @ 16" OC

Overall Length: 18' 6 1/2"



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)	2074 @ 16' 4 3/4"	2225 (3.50")	Passed (93%)	1.15	1.0 D + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	1508 @ 16' 6 1/2"	1794	Passed (84%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	-2501 @ 16' 4 3/4"	3634	Passed (69%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.279 @ 8' 3 3/8"	0.406	Passed (L/697)	--	1.0 D + 1.0 L (Alt Spans)
Total Load Defl. (in)	0.181 @ 18' 6 1/2"	0.215	Passed (2L/284)	--	1.0 D + 1.0 S (All Spans)
TJ-Pro™ Rating	43	40	Passed	--	--

System : Floor
Member Type : Joist
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Overhang deflection criteria: LL (2L/480) and TL (2L/240).
- Top Edge Bracing (Lu): Top compression edge must be braced at 4' 3" o/c unless detailed otherwise.
- Bottom Edge Bracing (Lu): Bottom compression edge must be braced at 3' 6" o/c unless detailed otherwise.
- A structural analysis of the deck has not been performed.
- Deflection analysis is based on composite action with a single layer of 23/32" Weyerhaeuser Edge™ Panel (24" Span Rating) that is glued and nailed down.
- Additional considerations for the TJ-Pro™ Rating include: None

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Total	
1 - Stud wall - HF	3.00"	1.75"	1.75"	65	442/-6	-86	507/-92	1 1/4" Rim Board
2 - Plate on concrete - HF	3.50"	3.50"	3.50"	1723	617	2214	4554	Blocking, Squash Blocks

- Rim Board is assumed to carry all loads applied directly above it, bypassing the member being designed.
- Squash Blocks are assumed to carry all loads applied directly above them, bypassing the member being designed.
- Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

Loads	Location (Side)	Spacing	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
1 - Uniform (PSF)	0 to 18' 6 1/2"	16"	12.0	40.0	-	Residential - Living Areas
2 - Point (lb)	16' 4"	N/A	790	-	1310	
3 - Point (lb)	18' 5"	N/A	330	-	550	
4 - Uniform (PLF)	16' 4" to 18' 6"	N/A	173.0	27.0	125.0	

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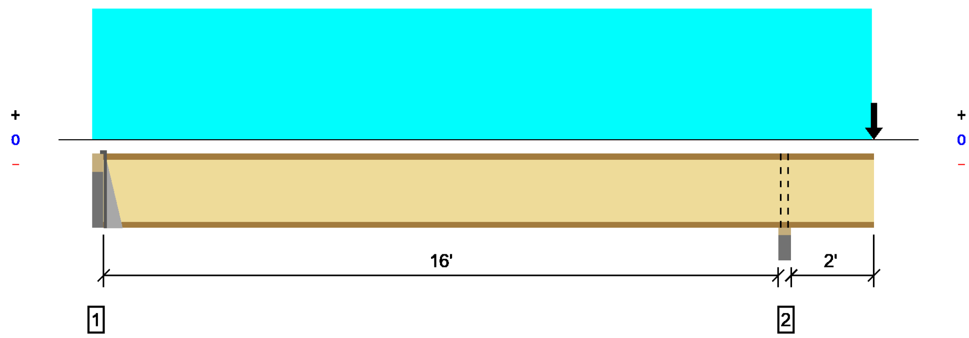
SUSTAINABLE FORESTRY INITIATIVE

Forte Software Operator	Job Notes

Permit Number: 20-01497

1 piece(s) 11 7/8" TJI® 110 @ 16" OC

Overall Length: 18' 6 1/2"



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)	540 @ 3"	910 (1.75")	Passed (59%)	1.00	1.0 D + 1.0 L (Alt Spans)
Shear (lbs)	540 @ 3"	1560	Passed (35%)	1.00	1.0 D + 1.0 L (Alt Spans)
Moment (Ft-lbs)	2101 @ 8' 7/16"	3160	Passed (66%)	1.00	1.0 D + 1.0 L (Alt Spans)
Live Load Defl. (in)	0.274 @ 8' 3 7/8"	0.404	Passed (L/707)	--	1.0 D + 1.0 L (Alt Spans)
Total Load Defl. (in)	0.329 @ 8' 2 11/16"	0.807	Passed (L/588)	--	1.0 D + 1.0 L (Alt Spans)
TJ-Pro™ Rating	43	40	Passed	--	--

System : Floor
Member Type : Joist
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Overhang deflection criteria: LL (2L/480) and TL (2L/240).
- Top Edge Bracing (Lu): Top compression edge must be braced at 3' 10" o/c unless detailed otherwise.
- Bottom Edge Bracing (Lu): Bottom compression edge must be braced at 7' 4" o/c unless detailed otherwise.
- A structural analysis of the deck has not been performed.
- Deflection analysis is based on composite action with a single layer of 23/32" Weyerhaeuser Edge™ Panel (24" Span Rating) that is glued and nailed down.
- Additional considerations for the TJ-Pro™ Rating include: None

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Total	
1 - Hanger on Single 2X HF plate	3.00"	Hanger[1]	1.75" / - [2]	113	444	-10	557/-10	See note [1]
2 - Plate on concrete - HF	3.50"	3.50"	3.50"	316	553	82	951	Blocking

- Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.
- At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger
- [1] See Connector grid below for additional information and/or requirements.
- [2] Required Bearing Length / Required Bearing Length with Web Stiffeners

Connector: Simpson Strong-Tie Connectors						
Support	Model	Seat Length	Top Nails	Face Nails	Member Nails	Accessories
1 - Top Mount Hanger	Connector not found	N/A	N/A	N/A	N/A	

Loads	Location (Side)	Spacing	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
1 - Uniform (PSF)	0 to 18' 6 1/2"	16"	12.0	40.0	-	Residential - Living Areas
2 - Point (lb)	18' 6 1/2"	N/A	133	-	72	

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SUSTAINABLE FORESTRY INITIATIVE

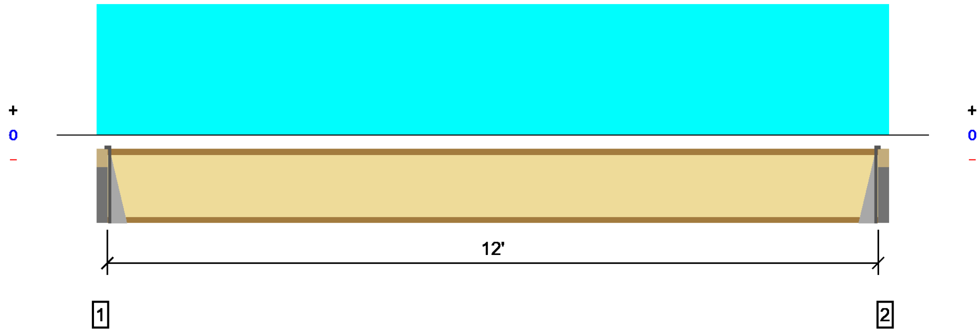
Forte Software Operator	Job Notes

Permit Number: 20-01497

MEMBER REPORT *Level, FJ4*

1 piece(s) 9 1/2" TJI® 110 @ 19.2" OC

Overall Length: 12' 6"



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)	499 @ 3"	910 (1.75")	Passed (55%)	1.00	1.0 D + 1.0 L (All Spans)
Shear (lbs)	499 @ 3"	1220	Passed (41%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	1498 @ 6' 3"	2500	Passed (60%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.170 @ 6' 3"	0.300	Passed (L/845)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.222 @ 6' 3"	0.600	Passed (L/650)	--	1.0 D + 1.0 L (All Spans)
TJ-Pro™ Rating	45	40	Passed	--	--

System : Floor
Member Type : Joist
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Top Edge Bracing (Lu): Top compression edge must be braced at 4' 1" o/c unless detailed otherwise.
- Bottom Edge Bracing (Lu): Bottom compression edge must be braced at 12' o/c unless detailed otherwise.
- A structural analysis of the deck has not been performed.
- Deflection analysis is based on composite action with a single layer of 23/32" Weyerhaeuser Edge™ Panel (24" Span Rating) that is glued and nailed down.
- Additional considerations for the TJ-Pro™ Rating include: None

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Total	
1 - Hanger on N/ HF plate	3.00"	Hanger[1]	1.75" / - [2]	120	400	520	See note [1]
2 - Hanger on N/ HF plate	3.00"	Hanger[1]	1.75" / - [2]	120	400	520	See note [1]

- At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger
- [1] See Connector grid below for additional information and/or requirements.
- [2] Required Bearing Length / Required Bearing Length with Web Stiffeners

Connector: Simpson Strong-Tie Connectors

Support	Model	Seat Length	Top Nails	Face Nails	Member Nails	Accessories
1 - Top Mount Hanger	Connector not found	N/A	N/A	N/A	N/A	
2 - Top Mount Hanger	Connector not found	N/A	N/A	N/A	N/A	

Loads	Location (Side)	Spacing	Dead (0.90)	Floor Live (1.00)	Comments
1 - Uniform (PSF)	0 to 12' 6"	19.2"	12.0	40.0	Residential - Living Areas

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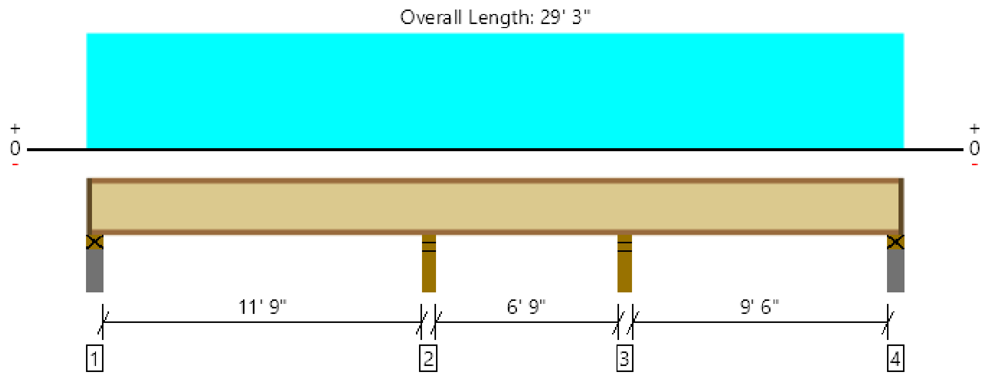
SUSTAINABLE FORESTRY INITIATIVE

Forte Software Operator	Job Notes

Permit Number: 20-01497

Level, FJ5

1 piece(s) 9 1/2" TJI® 110 @ 19.2" OC



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)	1079 @ 12' 2 3/4"	1935 (3.50")	Passed (56%)	1.00	1.0 D + 1.0 L (Adj Spans)
Shear (lbs)	577 @ 12' 1"	1342	Passed (43%)	1.00	1.0 D + 1.0 L (Adj Spans)
Moment (Ft-lbs)	-1169 @ 12' 2 3/4"	2500	Passed (47%)	1.00	1.0 D + 1.0 L (Adj Spans)
Live Load Defl. (in)	0.120 @ 5' 10 1/4"	0.399	Passed (L/999+)	--	1.0 D + 1.0 L (Alt Spans)
Total Load Defl. (in)	0.161 @ 5' 9 7/8"	0.599	Passed (L/891)	--	1.0 D + 1.0 L (Alt Spans)
TJ-Pro™ Rating	47	40	Passed	--	--

System : Floor
Member Type : Joist
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Top Edge Bracing (Lu): Top compression edge must be braced at 4' 8" o/c unless detailed otherwise.
- Bottom Edge Bracing (Lu): Bottom compression edge must be braced at 4' 7" o/c unless detailed otherwise.
- A structural analysis of the deck has not been performed.
- Deflection analysis is based on composite action with a single layer of 23/32" Weyerhaeuser Edge™ Panel (24" Span Rating) that is glued and nailed down.
- Additional considerations for the TJ-Pro™ Rating include: None.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Total	
1 - Plate on concrete - HF	4.00"	2.75"	1.75"	125	344/-3	469/-3	1 1/4" Rim Board
2 - Stud wall - SPF	3.50"	3.50"	3.50"	271	808	1079	None
3 - Stud wall - SPF	3.50"	3.50"	3.50"	200	678	878	None
4 - Plate on concrete - HF	4.00"	2.75"	1.75"	106	297/-8	403/-8	1 1/4" Rim Board

- Rim Board is assumed to carry all loads applied directly above it, bypassing the member being designed.

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Floor Live (1.00)	Comments
1 - Uniform (PSF)	0 to 29' 3"	19.2"	15.0	40.0	Default Load

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Weyerhaeuser

SUSTAINABLE FORESTRY INITIATIVE

ForteWEB Software Operator	Job Notes
Amanda Lange Beyler Consulting alange@beylerconsulting.com	

Permit Number: 20-01497

UPPER LEVEL

BEYLER CONSULTING
5920 100th Street, Suite 25, Lakewood, WA 98499
(253) 984-2900
beylerconsulting.com
Plan. Design. Manage.

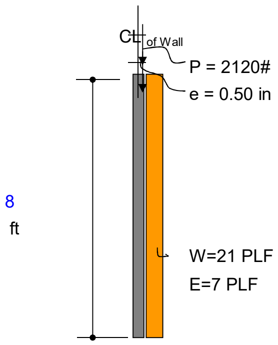
Page#:

DESIGNED: AEL

PROJECT:

STUD WALL DESIGN

2x6 Stud Capacity — 2015 NDS/2015 IBC



AXIAL LOADS P	
P_{DL} (#/ft) =	596
P_{SL} (#/ft) =	994
P_{LL} (#/ft) =	0
P_{TOT} (#/ft) =	1590
e (IN) =	0.5
TRIB. (IN) =	16

LATERAL LOADS W	
W (PSF) =	15.80
E (PSF) =	5.00
TRIB. (IN) =	16

DESIGN VALUES		
F_b (psi) =	675	Hem Fir
F_v (psi) =	150	Stud Grade
F_c (psi) =	800	Bending X-X axis
$F_{c\perp}$ (psi) =	405	405
E (psi) =	1.20E+06	Incised, No
E_{min} (psi) =	4.40E+05	Wet Use, No
C_r =	1	Repetive, No
L_u (in) =	48	Full Bracing, Yes
c =	0.8	(Sawn Lumber)
K_e =	1	(Appendix G)
C_b =	1.00	(Bearing Area Factor)

Bearing wall Fire rated ? No

Fire Retardant FirePRO? No

Header Bearing Area (in^2) = 5.25 — 405 = $F_{c\perp}$ (psi

I

Use: (1) 2" X 6" @ 16" O.C. OK

MEMBER SIZE			SECTION PROPERTIES	
QUANITY	1		A =	8.25 in^2
b =	1.5 in		S =	7.56 in^3
d =	5.5 in		I =	20.80 in^4

	(Eq. 16-9)	(Eq. 16-10)	(Eq. 16-11)	(Eq. 16-12)	(Eq. 16-13)	
LOAD CASES	DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W	DL+0.75(LL+SL+W)	
L_u (ft) =	8	8	8	8	8	
$V_{applied}$ (#) =	4	11	9	88	73	
$M_{applied}$ (ft-#) =	17	44	37	190	172	
$P_{applied}$ (#) =	795	2120	1789	795	1789	
C_D =	1	1.15	1.15	1.6	1.6	
BENDING STESS CALCS		F_{bE} (psi)= 17476		C_{bF} = 1		(Table 4a Bending)
F_b* (psi)=	675	776	776	1080	1080	(Eq 3.7-1)
C_L =	1	1	1	1	1	(Eq 3.7-1)
F'_b (psi)=	675	776	776	1080	1080	(Table 4.3.1)
AXIAL STESS CALCS		F_{cE} = 1187		C_{cF} = 1		(Table 4a Compression)
L_e/d =	17.45	17.45	17.45	17.45	17.45	(3.7.1.4) <50 Le = (Ke)L
F_c* (psi)=	800	920	920	1280	1280	(Eq 3.7-1)
C_P =	0.807335714	0.771048404	0.771048404	0.664398931	0.664398931	(Eq 3.7-1)
F'c (psi)=	646	709	709	850	850	(Table 4.3.1)
ALLOWABLES	DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W	DL+0.75(LL+SL+W)	
V_{allow} (#) =	825	949	949	1320	1320	V_{allow} = A * F_v * C_D / 1.5
M_{allow} (ft - #) =	425	489	489	681	681	M_{allow} = S*F_b*C_D*C_F*C_L*C_r
P_{allow} (#) =	5328	5852	5852	7016	7016	P_{allow} = A * F_c * C_D * C_F * C_P
$(f_c/F_c')^2 + f_b/(F_b(1-(f_c/F_{cE}))$ =	0.06	0.25	0.19	0.32	0.37	(Eq 3.9-3)
$(f_c/F_{cE}) + (f_b/F_{bE})^2$ =	0.08	0.22	0.18	0.08	0.18	(Eq 3.9-4)
$P_{c\perp allow}$ on PL (#) =	3341	3341	3341	3341	3341	$P_{c\perp allow}$ =A * Fc * C_b
$P_{c\perp allow}$ on Beam (#) =	2126	2126	2126	2126	2126	$P_{c\perp allow}$ =A * Fc
Deflection L/	NA	NA	NA	L/1234	L/1645	L/(I * E / 15 * L *$M_{applied}$)
240	0.00	0.00	0.00	0.08	0.06	(1.0) x W — Table 1604.3(f)
CHECKS	DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W	DL+0.75(LL+SL+W)	Actual △
SHEAR V	OK	OK	OK	OK	OK	
$V_{applied}/V_{allow}$	0.5%	1.2%	1.0%	6.7%	5.5%	
MOMENT M	OK	OK	OK	OK	OK	
$M_{applied}/M_{allow}$	3.9%	9.0%	7.6%	28.0%	25.3%	
AXIAL P	OK	OK	OK	OK	OK	
$P_{applied}/P_{allow}$	14.9%	36.2%	30.6%	11.3%	25.5%	
$(f_c/F_c')^2 + f_b/(F_b(1-(f_c/F_{cE}))$	OK	OK	OK	OK	OK	
$(f_c/F_c')^2 + f_b/(F_b(1-(f_c/F_{cE}))$	6.5%	24.6%	18.7%	31.7%	37.5%	
$(f_c/F_{cE}) + (f_b/F_{bE})^2$	OK	OK	OK	OK	OK	
$(f_c/F_{cE}) + (f_b/F_{bE})^2$	8.1%	21.6%	18.3%	8.1%	18.3%	
AXIAL $P_{\perp}$ on PL	OK	OK	OK	OK	OK	
$P_{c^applied}/P_{c\perp allow}$	23.8%	63.4%	53.5%	23.8%	53.5%	
AXIAL $P_{\perp}$ on Beam	OK	OK	OK	OK	OK	
$P_{c^applied}/P_{c\perp allow}$	37.4%	99.7%	84.1%	37.4%	84.1%	
DEFLECTION	OK	OK	OK	OK	OK	
$D_{actual}/D_{allowed}$	0.0%	0.0%	0.0%	19.4%	14.6%	
Overall Check	OK	OK	OK	OK	OK	

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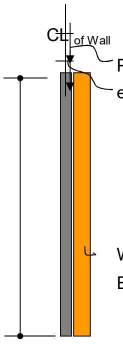
PROJECT:

STUD WALL DESIGN

Opening jamb_(1)2x6

2015 NDS/2015 IBC



AXIAL LOADS P	
P_{DL} (#/ft) =	30
P_{SL} (#/ft) =	50
P_{LL} (#/ft) =	0
P_{TOT} (#/ft) =	80
e (IN) =	0.5
TRIB. (IN) =	12

LATERAL LOADS W	
W (PSF) =	15.80
E (PSF) =	5.00
TRIB. (IN) =	64

Use: (1) 2" X 6" @ 64" O.C. OK

DESIGN VALUES			
F_b (psi) =	675	Hem Fir	
F_v (psi) =	150	Stud Grade	
F_c (psi) =	800	Bending X-X axis	
$F_{c\perp}$ (psi) =	405		405
E (psi) =	1.20E+06	Incised, No	
E_{min} (psi) =	4.40E+05	Wet Use, No	
C_r =	1	Repetive, No	
L_u (in) =	48	Full Bracing, Yes	
c =	0.8	(Sawn Lumber)	
K_e =	1	(Appendix G)	
C_b =	1.00	(Bearing Area Factor)	

Bearing wall Fire rated ? No

Fire Retardant FirePRO? No

Header Bearing Area (in^2) = 5.25 405 = $F_{c\perp}$ (psi

MEMBER SIZE		SECTION PROPERTIES	
QUANITY	1	A =	8.25 in^2
b =	1.5 in	S =	7.56 in^3
d =	5.5 in	I =	20.80 in^4

	(Eq. 16-9)	(Eq. 16-10)	(Eq. 16-11)	(Eq. 16-12)	(Eq. 16-13)	
LOAD CASES	DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W	DL+0.75(LL+SL+W)	
L_u (ft) =	8	8	8	8	8	
$V_{applied}$ (#) =	0	0	0	337	253	
$M_{applied}$ (ft-#) =	1	2	1	676	508	
$P_{applied}$ (#) =	30	80	68	30	68	
C_D =	1	1.15	1.15	1.6	1.6	
BENDING STESS CALCS		F_{bE} (psi)= 17476		C_{bF} = 1		(Table 4a Bending)
F_b* (psi)=	675	776	776	1080	1080	(Eq 3.7-1)
C_L =	1	1	1	1	1	(Eq 3.7-1)
F'_b (psi)=	675	776	776	1080	1080	(Table 4.3.1)
AXIAL STESS CALCS		F_{cE} = 1187		C_{cF} = 1		(Table 4a Compression)
L_e/d =	17.45	17.45	17.45	17.45	17.45	(3.7.1.4) <50 Le = (Ke)L
F_c* (psi)=	800	920	920	1280	1280	(Eq 3.7-1)
C_P =	0.807335714	0.771048404	0.771048404	0.664398931	0.664398931	(Eq 3.7-1)
F'c (psi)=	646	709	709	850	850	(Table 4.3.1)
ALLOWABLES	DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W	DL+0.75(LL+SL+W)	
V_{allow} (#) =	825	949	949	1320	1320	V_{allow} = A * F_v * C_D / 1.5
M_{allow} (ft - #) =	425	489	489	681	681	M_{allow} = S*F_b*C_D*$C_F$$\cdot$$C_L$*$C_r$
P_{allow} (#) =	5328	5852	5852	7016	7016	P_{allow} = A * F_c * C_D * C_F * C_P
$(f_c/F_c')^2 + f_b/(F_b(1-(f_c/F_{cE})$ =	0.00	0.00	0.00	1.00	0.75	(Eq 3.9-3)
$(f_c/F_{cE}) + (f_b/F_{bE})^2$ =	0.00	0.01	0.01	0.00	0.01	(Eq 3.9-4)
$P_{c\perp allow}$ on PL (#) =	3341	3341	3341	3341	3341	$P_{c\perp allow}$ =A * Fc * C_b
$P_{c\perp allow}$ on Beam (#) =	2126	2126	2126	2126	2126	$P_{c\perp allow}$ =A * Fc
Deflection L/	NA	NA	NA	L/308	L/411	L/(I * E / 15 * L *$M_{applied}$)
240	0.00	0.00	0.00	0.31	0.23	(1.0) x W — Table 1604.3(f)
CHECKS	DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W	DL+0.75(LL+SL+W)	Actual $\triangle$
SHEAR V	OK	OK	OK	OK	OK	
$V_{applied}/V_{allow}$	0.0%	0.0%	0.0%	25.5%	19.2%	
MOMENT M	OK	OK	OK	OK	OK	
$M_{applied}/M_{allow}$	0.1%	0.3%	0.3%	99.3%	74.7%	
AXIAL P	OK	OK	OK	OK	OK	
$P_{applied}/P_{allow}$	0.6%	1.4%	1.2%	0.4%	1.0%	
$(f_c/F_c')^2 + f_b/(F_b(1-(f_c/F_{cE})$	OK	OK	OK	OK	OK	
$(f_c/F_c')^2 + f_b/(F_b(1-(f_c/F_{cE})$	0.2%	0.4%	0.3%	99.6%	75.2%	
$(f_c/F_{cE}) + (f_b/F_{bE})^2$	OK	OK	OK	OK	OK	
$(f_c/F_{cE}) + (f_b/F_{bE})^2$	0.3%	0.8%	0.7%	0.3%	0.7%	
AXIAL $P_\perp$ on PL	OK	OK	OK	OK	OK	
$P_{c^\wedge applied}/P_{c\perp allow}$	0.9%	2.4%	2.0%	0.9%	2.0%	
AXIAL $P_\perp$ on Beam	OK	OK	OK	OK	OK	
$P_{c^\wedge applied}/P_{c\perp allow}$	1.4%	3.8%	3.2%	1.4%	3.2%	
DEFLECTION	OK	OK	OK	OK	OK	
$D_{actual}/D_{allowed}$	0.0%	0.0%	0.0%	77.8%	58.3%	
Overall Check	OK	OK	OK	OK	OK	

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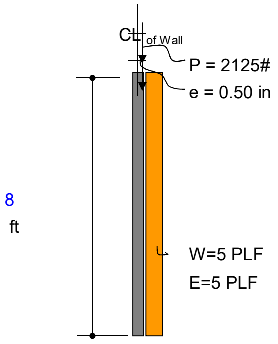
STUD WALL DESIGN

4x_Header_(1)2x6 Bearing Stud — 2015 NDS/2015 IBC



AXIAL LOADS P	
P_{DL} (#/ft) =	797
P_{SL} (#/ft) =	1328
P_{LL} (#/ft) =	0
P_{TOT} (#/ft) =	2125
e (IN) =	0.5
TRIB. (IN) =	12

LATERAL LOADS W	
W (PSF) =	5.00
E (PSF) =	5.00
TRIB. (IN) =	12

DESIGN VALUES		
F_b (psi) =	675	Hem Fir
F_v (psi) =	150	Stud Grade
F_c (psi) =	800	Bending X-X axis
$F_{c\perp}$ (psi) =	405	405
E (psi) =	1.20E+06	Incised, No
E_{min} (psi) =	4.40E+05	Wet Use, No
C_r =	1	Repetive, No
L_u (in) =	48	Full Bracing, Yes
c =	0.8	(Sawn Lumber)
K_e =	1	(Appendix G)
C_b =	1.00	(Bearing Area Factor)

Bearing wall Fire rated ? No

Fire Retardant FirePRO? No

Header Bearing Area (in²) = 5.25 — 405 = $F_{c\perp}$ (psi

Use: (1) 2" X 6" @ 12" O.C. OK

MEMBER SIZE		SECTION PROPERTIES	
QUANITY	1	A =	8.25 in²
b =	1.5 in	S =	7.56 in³
d =	5.5 in	I =	20.80 in⁴

	(Eq. 16-9)	(Eq. 16-10)	(Eq. 16-11)	(Eq. 16-12)	(Eq. 16-13)	
LOAD CASES	DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W or E	DL+0.75(LL+SL+WorE)	
L_u (ft) =	8	8	8	8	8	
$V_{applied}$ (#) =	4	11	9	24	24	
$M_{applied}$ (ft-#) =	17	44	37	58	69	
$P_{applied}$ (#) =	797	2125	1793	797	1793	
C_D =	1	1.15	1.15	1.6	1.6	
BENDING STESS CALCS		F_{bE} (psi)= 17476		C_{bF} = 1		(Table 4a Bending)
F_b* (psi)=	675	776	776	1080	1080	(Eq 3.7-1)
C_L =	1	1	1	1	1	(Eq 3.7-1)
F'_b (psi)=	675	776	776	1080	1080	(Table 4.3.1)
AXIAL STESS CALCS		F_{cE} = 1187		C_{cF} = 1		(Table 4a Compression)
L_e/d =	17.45	17.45	17.45	17.45	17.45	(3.7.1.4) <50 Le = (Ke)L
F_c* (psi)=	800	920	920	1280	1280	(Eq 3.7-1)
C_P =	0.807335714	0.771048404	0.771048404	0.664398931	0.664398931	(Eq 3.7-1)
F'c (psi)=	646	709	709	850	850	(Table 4.3.1)
ALLOWABLES	DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W or E	DL+0.75(LL+SL+WorE)	
V_{allow} (#) =	825	949	949	1320	1320	$V_{allow} = A * F_v * C_D / 1.5$
M_{allow} (ft - #) =	425	489	489	681	681	$M_{allow} = S*F_b*C_D*C_F\cdot C_L*C_r$
P_{allow} (#) =	5328	5852	5852	7016	7016	$P_{allow} = A * F_c * C_D * C_F * C_P$
$(f_c/F_c')^2 + f_b/(F_b(1-(f_c/F_{cE})$ =	0.06	0.25	0.19	0.11	0.19	(Eq 3.9-3)
$(f_c/F_{cE}) +(f_b/F_{bE})^2$ =	0.08	0.22	0.18	0.08	0.18	(Eq 3.9-4)
$P_{c\perp allow}$ on PL (#) =	3341	3341	3341	3341	3341	$P_{c\perp allow} = A * Fc * C_b$
$P_{c\perp allow}$ on Beam (#) =	2126	2126	2126	2126	2126	$P_{c\perp allow} = A * Fc$
Deflection L/	NA	NA	NA	L/5199	L/6932	$L/(I * E / 15 * L * M_{applied})$
240	0.00	0.00	0.00	0.02	0.01	(1.0) x W or E — Table 1604.3(f)
CHECKS	DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W or E	DL+0.75(LL+SL+Wor	Actual △
SHEAR V	OK	OK	OK	OK	OK	
$V_{applied}/V_{allow}$	0.5%	1.2%	1.0%	1.8%	1.8%	
MOMENT M	OK	OK	OK	OK	OK	
$M_{applied}/M_{allow}$	3.9%	9.0%	7.6%	8.5%	10.2%	
AXIAL P	OK	OK	OK	OK	OK	
$P_{applied}/P_{allow}$	15.0%	36.3%	30.6%	11.4%	25.6%	
$(f_c/F_c')^2 + f_b/(F_b(1-(f_c/F_{cE})$	OK	OK	OK	OK	OK	
$(f_c/F_c')^2 + f_b/(F_b(1-(f_c/F_{cE})$	6.5%	24.7%	18.7%	10.5%	19.0%	
$(f_c/F_{cE}) +(f_b/F_{bE})^2$	OK	OK	OK	OK	OK	
$(f_c/F_{cE}) +(f_b/F_{bE})^2$	8.1%	21.7%	18.3%	8.1%	18.3%	
AXIAL $P_{\perp}$ on PL	OK	OK	OK	OK	OK	
$P_{c^\wedge applied}/P_{c\perp allow}$	23.8%	63.6%	53.7%	23.8%	53.7%	
AXIAL $P_{\perp}$ on Beam	OK	OK	OK	OK	OK	
$P_{c^\wedge applied}/P_{c\perp allow}$	37.5%	99.9%	84.3%	37.5%	84.3%	
DEFLECTION	OK	OK	OK	OK	OK	
$D_{actual}/D_{allowed}$	0.0%	0.0%	0.0%	4.6%	3.5%	
Overall Check	OK	OK	OK	OK	OK	

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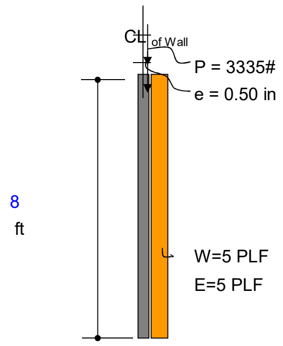
STUD WALL DESIGN

Girder Truss Support_(1)2x6 Stud — 2015 NDS/2015 IBC



AXIAL LOADS P	
P_{DL} (#/ft) =	1251
P_{SL} (#/ft) =	2084
P_{LL} (#/ft) =	0
P_{TOT} (#/ft) =	3335
e (IN) =	0.5
TRIB. (IN) =	12

LATERAL LOADS W	
W (PSF) =	5.00
E (PSF) =	5.00
TRIB. (IN) =	12

DESIGN VALUES		
F_b (psi) =	675	Hem Fir
F_v (psi) =	150	Stud Grade
F_c (psi) =	800	Bending X-X axis
$F_{c\perp}$ (psi) =	405	405
E (psi) =	1.20E+06	Incised, No
E_{min} (psi) =	4.40E+05	Wet Use, No
C_r =	1	Repetive, No
L_u (in) =	48	Full Bracing, Yes
c =	0.8	(Sawn Lumber)
K_e =	1	(Appendix G)
C_b =	1.00	(Bearing Area Factor)

I

Bearing wall Fire rated ? No

Fire Retardant FirePRO? No

Header Bearing Area (in^2) = 8.25 — 405 = $F_{c\perp}$ (psi

Use: (1) 2" X 6" @ 12" O.C. OK

MEMBER SIZE		SECTION PROPERTIES	
QUANITY	1	A =	8.25 in^2
b =	1.5 in	S =	7.56 in^3
d =	5.5 in	I =	20.80 in^4

	(Eq. 16-9)	(Eq. 16-10)	(Eq. 16-11)	(Eq. 16-12)	(Eq. 16-13)	
LOAD CASES	DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W or E	+0.75(LL+SL+WorE)	
L_u (ft) =	8	8	8	8	8	
$V_{applied}$ (#) =	7	17	15	27	30	
$M_{applied}$ (ft-#) =	26	69	59	68	92	
$P_{applied}$ (#) =	1251	3335	2814	1251	2814	
C_D =	1	1.15	1.15	1.6	1.6	
BENDING STESS CALCS		F_{bE} (psi)= 17476		C_{bF} = 1		(Table 4a Bending)
F_b^* (psi)=	675	776	776	1080	1080	(Eq 3.7-1)
C_L =	1	1	1	1	1	(Eq 3.7-1)
F'_b (psi)=	675	776	776	1080	1080	(Table 4.3.1)
AXIAL STESS CALCS		F_{cE} = 1187		C_{cF} = 1		(Table 4a Compression)
L_e/d =	17.45	17.45	17.45	17.45	17.45	(3.7.1.4) <50 Le = (Ke)L
F_c^* (psi)=	800	920	920	1280	1280	(Eq 3.7-1)
C_P =	0.807335714	0.771048404	0.771048404	0.664398931	0.664398931	(Eq 3.7-1)
F'c (psi)=	646	709	709	850	850	(Table 4.3.1)
ALLOWABLES	DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W or E	+0.75(LL+SL+WorE)	
V_{allow} (#) =	825	949	949	1320	1320	V_{allow} = A * F_v * C_D / 1.5
M_{allow} (ft - #) =	425	489	489	681	681	M_{allow} = S*F_b*C_D*C_F-C_L*C_r
P_{allow} (#) =	5328	5852	5852	7016	7016	P_{allow} = A * F_c * C_D * C_F * C_P
$(f_c/F_c')^2 + f_b/(F_b(1-(f_c/F_{cE})$ =	0.13	0.54	0.40	0.15	0.35	(Eq 3.9-3)
$(f_c/F_{cE}) + (f_b/F_{bE})^2$ =	0.13	0.34	0.29	0.13	0.29	(Eq 3.9-4)
$P_{c\perp allow}$ on PL (#) =	3341	3341	3341	3341	3341	$P_{c\perp allow}$ =A * Fc * C_b
$P_{c\perp allow}$ on Beam (#) =	3341	3341	3341	3341	3341	$P_{c\perp allow}$ =A * Fc
Deflection L/	NA	NA	NA	L/5199	L/6932	L/(I * E / 15 * L *$M_{applied}$)
240	0.00	0.00	0.00	0.02	0.01	(1.0) x W or E — Table 1604.3(f)
CHECKS	DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W or E	+0.75(LL+SL+Wor	Actual △
SHEAR V	OK	OK	OK	OK	OK	
$V_{applied}/V_{allow}$	0.8%	1.8%	1.5%	2.0%	2.2%	
MOMENT M	OK	OK	OK	OK	OK	
$M_{applied}/M_{allow}$	6.1%	14.2%	12.0%	10.0%	13.5%	
AXIAL P	OK	OK	OK	OK	OK	
$P_{applied}/P_{allow}$	23.5%	57.0%	48.1%	17.8%	40.1%	
$(f_c/F_c')^2 + f_b/(F_b(1-(f_c/F_{cE})$	OK	OK	OK	OK	OK	
$(f_c/F_c')^2 + f_b/(F_b(1-(f_c/F_{cE})$	12.5%	54.0%	39.9%	14.6%	35.0%	
$(f_c/F_{cE}) + (f_b/F_{bE})^2$	OK	OK	OK	OK	OK	
$(f_c/F_{cE}) + (f_b/F_{bE})^2$	12.8%	34.1%	28.7%	12.8%	28.7%	
AXIAL $P_\perp$ on PL	OK	OK	OK	OK	OK	
$P_{c^\wedge applied}/P_{c\perp allow}$	37.4%	99.8%	84.2%	37.4%	84.2%	
AXIAL $P_\perp$ on Beam	OK	OK	OK	OK	OK	
$P_{c^\wedge applied}/P_{c\perp allow}$	37.4%	99.8%	84.2%	37.4%	84.2%	
DEFLECTION	OK	OK	OK	OK	OK	
$D_{actual}/D_{allowed}$	0.0%	0.0%	0.0%	4.6%	3.5%	
Overall Check	OK	OK	OK	OK	OK	

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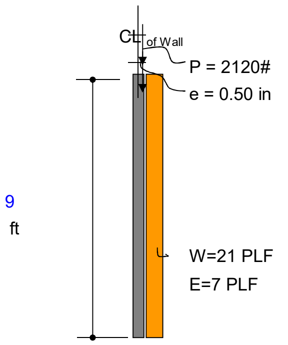
STUD WALL DESIGN

2x6 Stud Capacity — 2015 NDS/2015 IBC



AXIAL LOADS P	
P_{DL} (#/ft) =	298
P_{SL} (#/ft) =	497
P_{LL} (#/ft) =	795
P_{TOT} (#/ft) =	1590
e (IN) =	0.5
TRIB. (IN) =	16

LATERAL LOADS W	
W (PSF) =	15.80
E (PSF) =	5.00
TRIB. (IN) =	16

DESIGN VALUES		
F_b (psi) =	675	Hem Fir
F_v (psi) =	150	Stud Grade
F_c (psi) =	800	Bending X-X axis
$F_{c\perp}$ (psi) =	405	405
E (psi) =	1.20E+06	Incised, No
E_{min} (psi) =	4.40E+05	Wet Use, No
C_r =	1	Repetive, No
L_u (in) =	48	Full Bracing, Yes
c =	0.8	(Sawn Lumber)
K_e =	1	(Appendix G)
C_b =	1.00	(Bearing Area Factor)

Bearing wall Fire rated ? No

Fire Retardant FirePRO? No

Header Bearing Area (in^2) = 5.25 — 405 = $F_{c\perp}$ (psi

Use: (1) 2" X 6" @ 16" O.C. OK

MEMBER SIZE		SECTION PROPERTIES	
QUANITY	1	A =	8.25 in^2
b =	1.5 in	S =	7.56 in^3
d =	5.5 in	I =	20.80 in^4

	(Eq. 16-9)	(Eq. 16-10)	(Eq. 16-11)	(Eq. 16-12)	(Eq. 16-13)	
LOAD CASES	DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W	DL+0.75(LL+SL+W)	
L_u (ft) =	9	9	9	9	9	
$V_{applied}$ (#) =	7	5	8	97	79	
$M_{applied}$ (ft-#) =	30	22	35	226	208	
$P_{applied}$ (#) =	1458	1060	1689	398	1689	
C_D =	1	1.15	1.15	1.6	1.6	
BENDING STRESS CALCS		F_{bE} (psi)= 17476		C_{bF} = 1		(Table 4a Bending)
F_b* (psi)=	675	776	776	1080	1080	(Eq 3.7-1)
C_L =	1	1	1	1	1	(Eq 3.7-1)
F'_b (psi)=	675	776	776	1080	1080	(Table 4.3.1)
AXIAL STRESS CALCS		F_{cE} = 938		C_{cF} = 1		(Table 4a Compression)
L_e/d =	19.64	19.64	19.64	19.64	19.64	(3.7.1.4) <50 Le = (Ke)L
F_c* (psi)=	800	920	920	1280	1280	(Eq 3.7-1)
C_P =	0.742970896	0.697636299	0.697636299	0.576163928	0.576163928	(Eq 3.7-1)
F'c (psi)=	594	642	642	737	737	(Table 4.3.1)
ALLOWABLES	DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W	DL+0.75(LL+SL+W)	
V_{allow} (#) =	825	949	949	1320	1320	$V_{allow} = A * F_v * C_D / 1.5$
M_{allow} (ft - #) =	425	489	489	681	681	$M_{allow} = S*F_b*C_D*C_F*C_L*C_r$
P_{allow} (#) =	4904	5295	5295	6084	6084	$P_{allow} = A * F_c * C_D * C_F * C_P$
$(f_c/F_c')^2 + f_b/(F_b(1-(f_c/F_{cE}))$ =	0.18	0.09	0.19	0.35	0.47	(Eq 3.9-3)
$(f_c/F_{cE}) + (f_b/F_{bE})^2$ =	0.19	0.14	0.22	0.05	0.22	(Eq 3.9-4)
$P_{c\perp allow}$ on PL (#) =	3341	3341	3341	3341	3341	$P_{c\perp allow} = A * Fc * C_b$
$P_{c\perp allow}$ on Beam (#) =	2126	2126	2126	2126	2126	$P_{c\perp allow} = A * Fc$
Deflection L/	NA	NA	NA	L/867	L/1156	L/(I * E / 15 * L * $M_{applied}$)
240	0.00	0.00	0.00	0.12	0.09	(1.0) x W — Table 1604.3(f)
CHECKS	DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W	DL+0.75(LL+SL+W)	Actual △
SHEAR V	OK	OK	OK	OK	OK	
$V_{applied}/V_{allow}$	0.8%	0.5%	0.8%	7.3%	6.0%	
MOMENT M	OK	OK	OK	OK	OK	
$M_{applied}/M_{allow}$	7.1%	4.5%	7.2%	33.2%	30.6%	
AXIAL P	OK	OK	OK	OK	OK	
$P_{applied}/P_{allow}$	29.7%	20.0%	31.9%	6.5%	27.8%	
$(f_c/F_c')^2 + f_b/(F_b(1-(f_c/F_{cE}))$	OK	OK	OK	OK	OK	
$(f_c/F_c')^2 + f_b/(F_b(1-(f_c/F_{cE}))$	17.6%	9.2%	19.4%	35.4%	46.9%	
$(f_c/F_{cE}) + (f_b/F_{bE})^2$	OK	OK	OK	OK	OK	
$(f_c/F_{cE}) + (f_b/F_{bE})^2$	18.8%	13.7%	21.8%	5.1%	21.8%	
AXIAL $P_{\perp}$ on PL	OK	OK	OK	OK	OK	
$P_{c^\wedge applied}/P_{c\perp allow}$	43.6%	31.7%	50.6%	11.9%	50.6%	
AXIAL $P_{\perp}$ on Beam	OK	OK	OK	OK	OK	
$P_{c^\wedge applied}/P_{c\perp allow}$	68.5%	49.9%	79.5%	18.7%	79.5%	
DEFLECTION	OK	OK	OK	OK	OK	
$D_{actual}/D_{allowed}$	0.0%	0.0%	0.0%	27.7%	20.8%	
Overall Check	OK	OK	OK	OK	OK	

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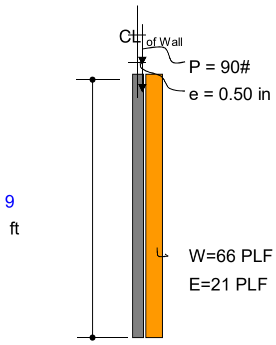
STUD WALL DESIGN

Opening jamb_(1)2x6 2015 NDS/2015 IBC



AXIAL LOADS P	
P_{DL} (#/ft) =	17
P_{SL} (#/ft) =	28
P_{LL} (#/ft) =	45
P_{TOT} (#/ft) =	90
e (IN) =	0.5
TRIB. (IN) =	12

LATERAL LOADS W	
W (PSF) =	15.80
E (PSF) =	5.00
TRIB. (IN) =	50

DESIGN VALUES		
F_b (psi) =	675	Hem Fir
F_v (psi) =	150	Stud Grade
F_c (psi) =	800	Bending X-X axis
$F_{c\perp}$ (psi) =	405	405
E (psi) =	1.20E+06	Incised, No
E_{min} (psi) =	4.40E+05	Wet Use, No
C_r =	1	Repetive, No
L_u (in) =	48	Full Bracing, Yes
c =	0.8	(Sawn Lumber)
K_e =	1	(Appendix G)
C_b =	1.00	(Bearing Area Factor)

Bearing wall Fire rated ? No

Fire Retardant FirePRO? No

Header Bearing Area (in^2) = 5.25 405 = $F_{c\perp}$ (psi

Use: (1) 2" X 6" @ 50" O.C. OK

MEMBER SIZE		SECTION PROPERTIES	
QUANITY	1	A =	8.25 in^2
b =	1.5 in	S =	7.56 in^3
d =	5.5 in	I =	20.80 in^4

	(Eq. 16-9)	(Eq. 16-10)	(Eq. 16-11)	(Eq. 16-12)	(Eq. 16-13)	
LOAD CASES	DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W	DL+0.75(LL+SL+W)	
L_u (ft) =	9	9	9	9	9	
$V_{applied}$ (#) =	0	0	0	296	223	
$M_{applied}$ (ft-#) =	1	1	1	667	503	
$P_{applied}$ (#) =	62	45	72	17	72	
C_D =	1	1.15	1.15	1.6	1.6	
BENDING STESS CALCS		F_{bE} (psi)= 17476		C_{bF} = 1		(Table 4a Bending)
F_b* (psi)=	675	776	776	1080	1080	(Eq 3.7-1)
C_L =	1	1	1	1	1	(Eq 3.7-1)
F'_b (psi)=	675	776	776	1080	1080	(Table 4.3.1)
AXIAL STESS CALCS		F_{cE} = 938		C_{cF} = 1		(Table 4a Compression)
L_e/d =	19.64	19.64	19.64	19.64	19.64	(3.7.1.4) <50 Le = (Ke)L
F_c* (psi)=	800	920	920	1280	1280	(Eq 3.7-1)
C_P =	0.742970896	0.697636299	0.697636299	0.576163928	0.576163928	(Eq 3.7-1)
F'c (psi)=	594	642	642	737	737	(Table 4.3.1)
ALLOWABLES	DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W	DL+0.75(LL+SL+W)	
V_{allow} (#) =	825	949	949	1320	1320	V_{allow} = A * F_v * C_D / 1.5
M_{allow} (ft - #) =	425	489	489	681	681	M_{allow} = S*F_b*C_D*C_F*C_L*C_r
P_{allow} (#) =	4904	5295	5295	6084	6084	P_{allow} = A * F_c * C_D * C_F * C_P
$(f_c/F_c')^2 + f_b/(F_b(1-(f_c/F_{cE})$ =	0.00	0.00	0.00	0.98	0.75	(Eq 3.9-3)
$(f_c/F_{cE}) +(f_b/F_{bE})^2$ =	0.01	0.01	0.01	0.00	0.01	(Eq 3.9-4)
$P_{c\perp allow}$ on PL (#) =	3341	3341	3341	3341	3341	$P_{c\perp allow}$ =A * Fc * C_b
$P_{c\perp allow}$ on Beam (#) =	2126	2126	2126	2126	2126	$P_{c\perp allow}$ =A * Fc
Deflection L/	NA	NA	NA	L/277	L/370	L/(I * E / 15 * L *$M_{applied}$)
240	0.00	0.00	0.00	0.39	0.29	(1.0) x W Table 1604.3(f)
CHECKS	DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W	DL+0.75(LL+SL+W)	Actual △
SHEAR V	OK	OK	OK	OK	OK	
$V_{applied}/V_{allow}$	0.0%	0.0%	0.0%	22.4%	16.9%	
MOMENT M	OK	OK	OK	OK	OK	
$M_{applied}/M_{allow}$	0.3%	0.2%	0.3%	98.1%	73.9%	
AXIAL P	OK	OK	OK	OK	OK	
$P_{applied}/P_{allow}$	1.3%	0.8%	1.4%	0.3%	1.2%	
$(f_c/F_c')^2 + f_b/(F_b(1-(f_c/F_{cE})$	OK	OK	OK	OK	OK	
$(f_c/F_c')^2 + f_b/(F_b(1-(f_c/F_{cE})$	0.3%	0.2%	0.3%	98.3%	74.6%	
$(f_c/F_{cE}) +(f_b/F_{bE})^2$	OK	OK	OK	OK	OK	
$(f_c/F_{cE}) +(f_b/F_{bE})^2$	0.8%	0.6%	0.9%	0.2%	0.9%	
AXIAL $P_\perp$ on PL	OK	OK	OK	OK	OK	
$P_{c^applied}/P_{c\perp allow}$	1.9%	1.3%	2.1%	0.5%	2.1%	
AXIAL $P_\perp$ on Beam	OK	OK	OK	OK	OK	
$P_{c^applied}/P_{c\perp allow}$	2.9%	2.1%	3.4%	0.8%	3.4%	
DEFLECTION	OK	OK	OK	OK	OK	
$D_{actual}/D_{allowed}$	0.0%	0.0%	0.0%	86.5%	64.9%	
Overall Check	OK	OK	OK	OK	OK	

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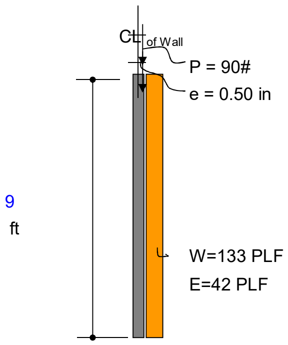
STUD WALL DESIGN

Opening jamb_(2)2x6 — 2015 NDS/2015 IBC



AXIAL LOADS P	
P_{DL} (#/ft) =	17
P_{SL} (#/ft) =	28
P_{LL} (#/ft) =	45
P_{TOT} (#/ft) =	90
e (IN) =	0.5
TRIB. (IN) =	12

LATERAL LOADS W	
W (PSF) =	15.80
E (PSF) =	5.00
TRIB. (IN) =	101

DESIGN VALUES		
F_b (psi) =	675	Hem Fir
F_v (psi) =	150	Stud Grade
F_c (psi) =	800	Bending X-X axis
$F_{c\perp}$ (psi) =	405	405
E (psi) =	1.20E+06	Incised, No
E_{min} (psi) =	4.40E+05	Wet Use, No
C_r =	1	Repetive, No
L_u (in) =	48	Full Bracing, Yes
c =	0.8	(Sawn Lumber)
K_e =	1	(Appendix G)
C_b =	1.00	(Bearing Area Factor)

Bearing wall Fire rated ? No

Fire Retardant FirePRO? No

Header Bearing Area (in^2) = 10.5 — 405 = $F_{c\perp}$ (psi)

Use: (2) 2" X 6" @ 101" O.C. OK

MEMBER SIZE		SECTION PROPERTIES	
QUANITY	2	A =	16.50 in^2
b =	1.5 in	S =	15.13 in^3
d =	5.5 in	I =	41.59 in^4

	(Eq. 16-9)	(Eq. 16-10)	(Eq. 16-11)	(Eq. 16-12)	(Eq. 16-13)	
LOAD CASES	DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W	DL+0.75(LL+SL+W)	
L_u (ft) =	9	9	9	9	9	
$V_{applied}$ (#) =	0	0	0	599	449	
$M_{applied}$ (ft-#) =	1	1	1	1347	1013	
$P_{applied}$ (#) =	62	45	72	17	72	
C_D =	1	1.15	1.15	1.6	1.6	
BENDING STESS CALCS		F_{bE} (psi)= 17476		C_{bF} = 1		(Table 4a Bending)
F_b* (psi)=	675	776	776	1080	1080	(Eq 3.7-1)
C_L =	1	1	1	1	1	(Eq 3.7-1)
F'_b (psi)=	675	776	776	1080	1080	(Table 4.3.1)
AXIAL STESS CALCS		F_{cE} = 938		C_{cF} = 1		(Table 4a Compression)
L_e/d =	19.64	19.64	19.64	19.64	19.64	(3.7.1.4) <50 Le = (Ke)L
F_c* (psi)=	800	920	920	1280	1280	(Eq 3.7-1)
C_P =	0.742970896	0.697636299	0.697636299	0.576163928	0.576163928	(Eq 3.7-1)
F'c (psi)=	594	642	642	737	737	(Table 4.3.1)
ALLOWABLES	DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W	DL+0.75(LL+SL+W)	
V_{allow} (#) =	1650	1898	1898	2640	2640	$V_{allow} = A * F_v * C_D / 1.5$
M_{allow} (ft - #) =	851	978	978	1361	1361	$M_{allow} = S*F_b*C_D*C_F \cdot C_L*C_r$
P_{allow} (#) =	19614	21180	21180	24337	24337	$P_{allow} = A * F_c * C_D * C_F * C_P$
$(f_c/F_c')^2 + f_b/(F_b(1-(f_c/F_{cE})$ =	0.00	0.00	0.00	0.99	0.75	(Eq 3.9-3)
$(f_c/F_{cE}) + (f_b/F_{bE})^2$ =	0.00	0.00	0.00	0.00	0.00	(Eq 3.9-4)
$P_{c\perp allow}$ on PL (#) =	6683	6683	6683	6683	6683	$P_{c\perp allow} = A * Fc * C_b$
$P_{c\perp allow}$ on Beam (#) =	4253	4253	4253	4253	4253	$P_{c\perp allow} = A * Fc$
Deflection L/	NA	NA	NA	L/275	L/366	$L/(I * E / 15 * L * M_{applied})$
240	0.00	0.00	0.00	0.39	0.29	(1.0) x W — Table 1604.3(f)
CHECKS	DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W	DL+0.75(LL+SL+W)	Actual △
SHEAR V	OK	OK	OK	OK	OK	
$V_{applied}/V_{allow}$	0.0%	0.0%	0.0%	22.7%	17.0%	
MOMENT M	OK	OK	OK	OK	OK	
$M_{applied}/M_{allow}$	0.2%	0.1%	0.2%	99.0%	74.4%	
AXIAL P	OK	OK	OK	OK	OK	
$P_{applied}/P_{allow}$	0.3%	0.2%	0.3%	0.1%	0.3%	
$(f_c/F_c')^2 + f_b/(F_b(1-(f_c/F_{cE})$	OK	OK	OK	OK	OK	
$(f_c/F_c')^2 + f_b/(F_b(1-(f_c/F_{cE})$	0.2%	0.1%	0.2%	99.1%	74.8%	
$(f_c/F_{cE}) + (f_b/F_{bE})^2$	OK	OK	OK	OK	OK	
$(f_c/F_{cE}) + (f_b/F_{bE})^2$	0.4%	0.3%	0.5%	0.1%	0.5%	
AXIAL $P_\perp$ on PL	OK	OK	OK	OK	OK	
$P_{c^\wedge applied}/P_{c\perp allow}$	0.9%	0.7%	1.1%	0.3%	1.1%	
AXIAL $P_\perp$ on Beam	OK	OK	OK	OK	OK	
$P_{c^\wedge applied}/P_{c\perp allow}$	1.5%	1.1%	1.7%	0.4%	1.7%	
DEFLECTION	OK	OK	OK	OK	OK	
$D_{actual}/D_{allowed}$	0.0%	0.0%	0.0%	87.4%	65.6%	
Overall Check	OK	OK	OK	OK	OK	

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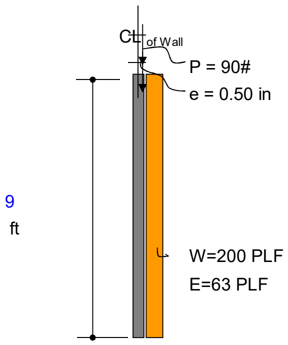
STUD WALL DESIGN

Opening jamb_(3)2x6 — 2015 NDS/2015 IBC



AXIAL LOADS P	
P_{DL} (#/ft) =	17
P_{SL} (#/ft) =	28
P_{LL} (#/ft) =	45
P_{TOT} (#/ft) =	90
e (IN) =	0.5
TRIB. (IN) =	12

LATERAL LOADS W	
W (PSF) =	15.80
E (PSF) =	5.00
TRIB. (IN) =	152

DESIGN VALUES		
F_b (psi) =	675	Hem Fir
F_v (psi) =	150	Stud Grade
F_c (psi) =	800	Bending X-X axis
$F_{c\perp}$ (psi) =	405	405
E (psi) =	1.20E+06	Incised, No
E_{min} (psi) =	4.40E+05	Wet Use, No
C_r =	1	Repetive, No
L_u (in) =	48	Full Bracing, Yes
c =	0.8	(Sawn Lumber)
K_e =	1	(Appendix G)
C_b =	1.00	(Bearing Area Factor)

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Bearing wall Fire rated ? No

Fire Retardant FirePRO? No

Header Bearing Area (in^2) = 15.75 — 405 = $F_{c\perp}$ (psi

Use: (3) 2" X 6" @ 152" O.C. OK

MEMBER SIZE		SECTION PROPERTIES	
QUANITY	3	A =	24.75 in^2
b =	1.5 in	S =	22.69 in^3
d =	5.5 in	I =	62.39 in^4

	(Eq. 16-9)	(Eq. 16-10)	(Eq. 16-11)	(Eq. 16-12)	(Eq. 16-13)			
LOAD CASES	DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W	DL+0.75(LL+SL+W)			
L_u (ft) =	9	9	9	9	9			
$V_{applied}$ (#) =	0	0	0	901	676			
$M_{applied}$ (ft-#) =	1	1	1	2027	1523			
$P_{applied}$ (#) =	62	45	72	17	72			
C_D =	1	1.15	1.15	1.6	1.6			
BENDING STESS CALCS		F_{bE} (psi)= 17476		C_{bF} = 1		(Table 4a Bending)		
F_b* (psi)=	675	776	776	1080	1080	(Eq 3.7-1)		
C_L =	1	1	1	1	1	(Eq 3.7-1)		
F'_b (psi)=	675	776	776	1080	1080	(Table 4.3.1)		
AXIAL STESS CALCS		F_{cE} = 938		C_{cF} = 1		(Table 4a Compression)		
L_e/d =	19.64	19.64	19.64	19.64	19.64	(3.7.1.4)	<50	Le = (Ke)L
F_c* (psi)=	800	920	920	1280	1280	(Eq 3.7-1)		
C_P =	0.742970896	0.697636299	0.697636299	0.576163928	0.576163928	(Eq 3.7-1)		
F'c (psi)=	594	642	642	737	737	(Table 4.3.1)		
ALLOWABLES	DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W	DL+0.75(LL+SL+W)			
V_{allow} (#) =	2475	2846	2846	3960	3960	V_{allow} = A * F_v * C_D / 1.5		
M_{allow} (ft - #) =	1276	1468	1468	2042	2042	M_{allow} = S*F_b*C_D*C_F*C_L*C_r		
P_{allow} (#) =	44132	47656	47656	54759	54759	P_{allow} = A * F_c * C_D * C_F * C_P		
$(f_c/F_c')^2 + f_b/(F_b(1-(f_c/F_{cE}))$ =	0.00	0.00	0.00	0.99	0.75	(Eq 3.9-3)		
$(f_c/F_{cE}) + (f_b/F_{bE})^2$ =	0.00	0.00	0.00	0.00	0.00	(Eq 3.9-4)		
$P_{c\perp allow}$ on PL (#) =	10024	10024	10024	10024	10024	$P_{c\perp allow}$ =A * Fc * C_b		
$P_{c\perp allow}$ on Beam (#) =	6379	6379	6379	6379	6379	$P_{c\perp allow}$ =A * Fc		
Deflection L/	NA	NA	NA	L/274	L/365	L/(I * E / 15 * L *$M_{applied}$)		
240	0.00	0.00	0.00	0.39	0.30	(1.0) x W	Table 1604.3(f)	
CHECKS	DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W	DL+0.75(LL+SL+W)	Actual △		
SHEAR V	OK	OK	OK	OK	OK			
$V_{applied}/V_{allow}$	0.0%	0.0%	0.0%	22.7%	17.1%			
MOMENT M	OK	OK	OK	OK	OK			
$M_{applied}/M_{allow}$	0.1%	0.1%	0.1%	99.3%	74.6%			
AXIAL P	OK	OK	OK	OK	OK			
$P_{applied}/P_{allow}$	0.1%	0.1%	0.2%	0.0%	0.1%			
$(f_c/F_c')^2 + f_b/(F_b(1-(f_c/F_{cE}))$	OK	OK	OK	OK	OK			
$(f_c/F_c')^2 + f_b/(F_b(1-(f_c/F_{cE}))$	0.1%	0.1%	0.1%	99.4%	74.8%			
$(f_c/F_{cE}) + (f_b/F_{bE})^2$	OK	OK	OK	OK	OK			
$(f_c/F_{cE}) + (f_b/F_{bE})^2$	0.3%	0.2%	0.3%	0.1%	0.3%			
AXIAL $P_\perp$ on PL	OK	OK	OK	OK	OK			
$P_{c^\wedge applied}/P_{c\perp allow}$	0.6%	0.4%	0.7%	0.2%	0.7%			
AXIAL $P_\perp$ on Beam	OK	OK	OK	OK	OK			
$P_{c^\wedge applied}/P_{c\perp allow}$	1.0%	0.7%	1.1%	0.3%	1.1%			
DEFLECTION	OK	OK	OK	OK	OK			
$D_{actual}/D_{allowed}$	0.0%	0.0%	0.0%	87.7%	65.8%			
Overall Check	OK	OK	OK	OK	OK			

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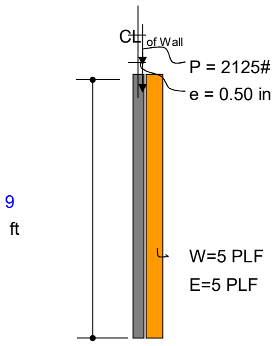
STUD WALL DESIGN

4x_Header_(1)2x6 Bearing Stud — 2015 NDS/2015 IBC



AXIAL LOADS P	
P_{DL} (#/ft) =	398
P_{SL} (#/ft) =	664
P_{LL} (#/ft) =	1063
P_{TOT} (#/ft) =	2125
e (IN) =	0.5
TRIB. (IN) =	12

LATERAL LOADS W	
W (PSF) =	5.00
E (PSF) =	5.00
TRIB. (IN) =	12

DESIGN VALUES		
F_b (psi) =	675	Hem Fir
F_v (psi) =	150	Stud Grade
F_c (psi) =	800	Bending X-X axis
$F_{c\perp}$ (psi) =	405	405
E (psi) =	1.20E+06	Incised, No
E_{min} (psi) =	4.40E+05	Wet Use, No
C_r =	1	Repetive, No
L_u (in) =	48	Full Bracing, Yes
c =	0.8	(Sawn Lumber)
K_e =	1	(Appendix G)
C_b =	1.00	(Bearing Area Factor)

Bearing wall Fire rated ? No

Fire Retardant FirePRO? No

Header Bearing Area (in^2) = 5.25 — 405 = $F_{c\perp}$ (psi

Use: (1) 2" X 6" @ 12" O.C. OK

MEMBER SIZE		SECTION PROPERTIES	
QUANITY	1	A =	8.25 in^2
b =	1.5 in	S =	7.56 in^3
d =	5.5 in	I =	20.80 in^4

	(Eq. 16-9)	(Eq. 16-10)	(Eq. 16-11)	(Eq. 16-12)	(Eq. 16-13)	
LOAD CASES	DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W or E	DL+0.75(LL+SL+WorE)	
L_u (ft) =	9	9	9	9	9	
$V_{applied}$ (#) =	7	5	8	24	25	
$M_{applied}$ (ft-#) =	30	22	35	60	76	
$P_{applied}$ (#) =	1461	1063	1693	398	1693	
C_D =	1	1.15	1.15	1.6	1.6	
BENDING STESS CALCS		F_{bE} (psi)= 17476		C_{bF} = 1		(Table 4a Bending)
F_b* (psi)=	675	776	776	1080	1080	(Eq 3.7-1)
C_L =	1	1	1	1	1	(Eq 3.7-1)
F'_b (psi)=	675	776	776	1080	1080	(Table 4.3.1)
AXIAL STESS CALCS		F_{cE} = 938		C_{cF} = 1		(Table 4a Compression)
L_e/d =	19.64	19.64	19.64	19.64	19.64	(3.7.1.4) <50 Le = (Ke)L
F_c* (psi)=	800	920	920	1280	1280	(Eq 3.7-1)
C_P =	0.742970896	0.697636299	0.697636299	0.576163928	0.576163928	(Eq 3.7-1)
F'c (psi)=	594	642	642	737	737	(Table 4.3.1)
ALLOWABLES	DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W or E	DL+0.75(LL+SL+WorE)	
V_{allow} (#) =	825	949	949	1320	1320	V_{allow} = A * F_v * C_D / 1.5
M_{allow} (ft - #) =	425	489	489	681	681	M_{allow} = S*F_b*C_D*C_F·C_L*C_r
P_{allow} (#) =	4904	5295	5295	6084	6084	P_{allow} = A * F_c * C_D * C_F * C_P
$(f_c/F_c')^2 + f_b/(F_b(1-(f_c/F_{cE})$ =	0.18	0.09	0.19	0.10	0.22	(Eq 3.9-3)
$(f_c/F_{cE}) + (f_b/F_{bE})^2$ =	0.19	0.14	0.22	0.05	0.22	(Eq 3.9-4)
$P_{c\perp allow}$ on PL (#) =	3341	3341	3341	3341	3341	$P_{c\perp allow}$ =A * Fc * C_b
$P_{c\perp allow}$ on Beam (#) =	2126	2126	2126	2126	2126	$P_{c\perp allow}$ =A * Fc
Deflection L/	NA	NA	NA	L/3652	L/4869	L/(I * E / 15 * L *$M_{applied}$)
240	0.00	0.00	0.00	0.03	0.02	(1.0) x W or E — Table 1604.3(f)
CHECKS	DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W or E	DL+0.75(LL+SL+Wor	Actual △
SHEAR V	OK	OK	OK	OK	OK	
$V_{applied}/V_{allow}$	0.8%	0.5%	0.8%	1.8%	1.9%	
MOMENT M	OK	OK	OK	OK	OK	
$M_{applied}/M_{allow}$	7.2%	4.5%	7.2%	8.8%	11.2%	
AXIAL P	OK	OK	OK	OK	OK	
$P_{applied}/P_{allow}$	29.8%	20.1%	32.0%	6.5%	27.8%	
$(f_c/F_c')^2 + f_b/(F_b(1-(f_c/F_{cE})$	OK	OK	OK	OK	OK	
$(f_c/F_c')^2 + f_b/(F_b(1-(f_c/F_{cE})$	17.7%	9.3%	19.5%	9.7%	22.1%	
$(f_c/F_{cE}) + (f_b/F_{bE})^2$	OK	OK	OK	OK	OK	
$(f_c/F_{cE}) + (f_b/F_{bE})^2$	18.9%	13.7%	21.9%	5.1%	21.9%	
AXIAL $P_{\perp}$ on PL	OK	OK	OK	OK	OK	
$P_{c^{\wedge}applied}/P_{c\perp allow}$	43.7%	31.8%	50.7%	11.9%	50.7%	
AXIAL $P_{\perp}$ on Beam	OK	OK	OK	OK	OK	
$P_{c^{\wedge}applied}/P_{c\perp allow}$	68.7%	50.0%	79.6%	18.7%	79.6%	
DEFLECTION	OK	OK	OK	OK	OK	
$D_{actual}/D_{allowed}$	0.0%	0.0%	0.0%	6.6%	4.9%	
Overall Check	OK	OK	OK	OK	OK	

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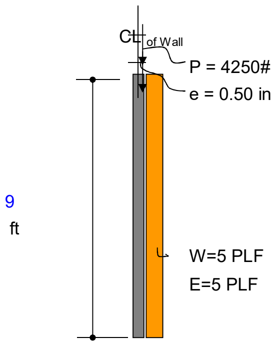
STUD WALL DESIGN

4x_Header_(2)2x6Bearing Stud — 2015 NDS/2015 IBC



AXIAL LOADS P	
P_{DL} (#/ft) =	797
P_{SL} (#/ft) =	1328
P_{LL} (#/ft) =	2125
P_{TOT} (#/ft) =	4250
e (IN) =	0.5
TRIB. (IN) =	12

LATERAL LOADS W	
W (PSF) =	5.00
E (PSF) =	5.00
TRIB. (IN) =	12

DESIGN VALUES		
F_b (psi) =	675	Hem Fir
F_v (psi) =	150	Stud Grade
F_c (psi) =	800	Bending X-X axis
$F_{c\perp}$ (psi) =	405	405
E (psi) =	1.20E+06	Incised, No
E_{min} (psi) =	4.40E+05	Wet Use, No
C_r =	1	Repetive, No
L_u (in) =	48	Full Bracing, Yes
c =	0.8	(Sawn Lumber)
K_e =	1	(Appendix G)
C_b =	1.00	(Bearing Area Factor)

Bearing wall Fire rated ? No

Fire Retardant FirePRO? No

Header Bearing Area (in^2) = 10.5 — 405 = $F_{c\perp}$ (psi

Use: (2) 2" X 6" @ 12" O.C. OK

MEMBER SIZE		SECTION PROPERTIES	
QUANITY	2	A =	16.50 in^2
b =	1.5 in	S =	15.13 in^3
d =	5.5 in	I =	41.59 in^4

	(Eq. 16-9)	(Eq. 16-10)	(Eq. 16-11)	(Eq. 16-12)	(Eq. 16-13)	
LOAD CASES	DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W or E	+0.75(LL+SL+WorE)	
L_u (ft) =	9	9	9	9	9	
$V_{applied}$ (#) =	14	10	16	26	33	
$M_{applied}$ (ft-#) =	61	44	71	68	112	
$P_{applied}$ (#) =	2922	2125	3387	797	3387	
C_D =	1	1.15	1.15	1.6	1.6	
BENDING STESS CALCS		F_{bE} (psi)= 17476		C_{bF} = 1		(Table 4a Bending)
F_b* (psi)=	675	776	776	1080	1080	(Eq 3.7-1)
C_L =	1	1	1	1	1	(Eq 3.7-1)
F'_b (psi)=	675	776	776	1080	1080	(Table 4.3.1)
AXIAL STESS CALCS		F_{cE} = 938		C_{cF} = 1		(Table 4a Compression)
L_e/d =	19.64	19.64	19.64	19.64	19.64	(3.7.1.4) <50 Le = (Ke)L
F_c* (psi)=	800	920	920	1280	1280	(Eq 3.7-1)
C_P =	0.742970896	0.697636299	0.697636299	0.576163928	0.576163928	(Eq 3.7-1)
F'c (psi)=	594	642	642	737	737	(Table 4.3.1)
ALLOWABLES	DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W or E	+0.75(LL+SL+WorE)	
V_{allow} (#) =	1650	1898	1898	2640	2640	$V_{allow} = A * F_v * C_D / 1.5$
M_{allow} (ft - #) =	851	978	978	1361	1361	$M_{allow} = S*F_b*C_D*C_F*C_L*C_r$
P_{allow} (#) =	19614	21180	21180	24337	24337	$P_{allow} = A * F_c * C_D * C_F * C_P$
$(f_c/F_c')^2 + f_b/(F_b(1-(f_c/F_{cE})$ =	0.11	0.06	0.12	0.05	0.12	(Eq 3.9-3)
$(f_c/F_{cE}) +(f_b/F_{bE})^2$ =	0.19	0.14	0.22	0.05	0.22	(Eq 3.9-4)
$P_{c\perp allow}$ on PL (#) =	6683	6683	6683	6683	6683	$P_{c\perp allow}$ =A * Fc * C_b
$P_{c\perp allow}$ on Beam (#) =	4253	4253	4253	4253	4253	$P_{c\perp allow}$ =A * Fc
Deflection L/	NA	NA	NA	L/7303	L/9738	L/(I * E / 15 * L *$M_{applied}$)
240	0.00	0.00	0.00	0.01	0.01	(1.0) x W or E — Table 1604.3(f)
CHECKS	DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W or E	+0.75(LL+SL+Wor	Actual △
SHEAR V	OK	OK	OK	OK	OK	
$V_{applied}/V_{allow}$	0.8%	0.5%	0.8%	1.0%	1.2%	
MOMENT M	OK	OK	OK	OK	OK	
$M_{applied}/M_{allow}$	7.2%	4.5%	7.2%	5.0%	8.2%	
AXIAL P	OK	OK	OK	OK	OK	
$P_{applied}/P_{allow}$	14.9%	10.0%	16.0%	3.3%	13.9%	
$(f_c/F_c')^2 + f_b/(F_b(1-(f_c/F_{cE})$	OK	OK	OK	OK	OK	
$(f_c/F_c')^2 + f_b/(F_b(1-(f_c/F_{cE})$	11.0%	6.3%	11.8%	5.4%	12.4%	
$(f_c/F_{cE}) +(f_b/F_{bE})^2$	OK	OK	OK	OK	OK	
$(f_c/F_{cE}) +(f_b/F_{bE})^2$	18.9%	13.7%	21.9%	5.1%	21.9%	
AXIAL $P_\perp$ on PL	OK	OK	OK	OK	OK	
$P_{c^\wedge applied}/P_{c\perp allow}$	43.7%	31.8%	50.7%	11.9%	50.7%	
AXIAL $P_\perp$ on Beam	OK	OK	OK	OK	OK	
$P_{c^\wedge applied}/P_{c\perp allow}$	68.7%	50.0%	79.6%	18.7%	79.6%	
DEFLECTION	OK	OK	OK	OK	OK	
$D_{actual}/D_{allowed}$	0.0%	0.0%	0.0%	3.3%	2.5%	
Overall Check	OK	OK	OK	OK	OK	

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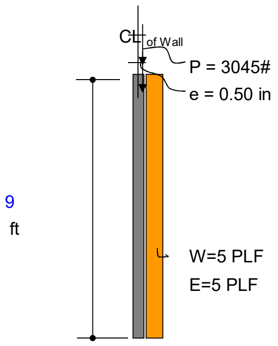
STUD WALL DESIGN

3-1/8 GLB_Header_(1)2x6 Bearing Stud — 2015 NDS/2015 IBC



AXIAL LOADS P	
P_{DL} (#/ft) =	571
P_{SL} (#/ft) =	952
P_{LL} (#/ft) =	1523
P_{TOT} (#/ft) =	3045
e (IN) =	0.5
TRIB. (IN) =	12

LATERAL LOADS W	
W (PSF) =	5.00
E (PSF) =	5.00
TRIB. (IN) =	12

DESIGN VALUES		
F_b (psi) =	675	Hem Fir
F_v (psi) =	150	Stud Grade
F_c (psi) =	800	Bending X-X axis
$F_{c\perp}$ (psi) =	405	405
E (psi) =	1.20E+06	Incised, No
E_{min} (psi) =	4.40E+05	Wet Use, No
C_r =	1	Repetive, No
L_u (in) =	48	Full Bracing, Yes
c =	0.8	(Sawn Lumber)
K_e =	1	(Appendix G)
C_b =	1.00	(Bearing Area Factor)

Bearing wall Fire rated ? No

Fire Retardant FirePRO? No

Header Bearing Area (in²) = 4.6875 — 650 = $F_{c\perp}$ (psi

Use: (1) 2" X 6" @ 12" O.C. OK

MEMBER SIZE			SECTION PROPERTIES	
QUANITY	1		A =	8.25 in²
b =	1.5 in		S =	7.56 in³
d =	5.5 in		I =	20.80 in⁴

	(Eq. 16-9)	(Eq. 16-10)	(Eq. 16-11)	(Eq. 16-12)	(Eq. 16-13)	
LOAD CASES	DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W or E	+0.75(LL+SL+WorE)	
L_u (ft) =	9	9	9	9	9	
$V_{applied}$ (#) =	10	7	11	25	28	
$M_{applied}$ (ft-#) =	44	32	51	64	93	
$P_{applied}$ (#) =	2093	1523	2426	571	2426	
C_D =	1	1.15	1.15	1.6	1.6	
BENDING STRESS CALCS		F_{bE} (psi)= 17476		C_{bF} = 1		(Table 4a Bending)
F_b* (psi)=	675	776	776	1080	1080	(Eq 3.7-1)
C_L =	1	1	1	1	1	(Eq 3.7-1)
F'_b (psi)=	675	776	776	1080	1080	(Table 4.3.1)
AXIAL STRESS CALCS		F_{cE} = 938		C_{cF} = 1		(Table 4a Compression)
L_e/d =	19.64	19.64	19.64	19.64	19.64	(3.7.1.4) <50 Le = (Ke)L
F_c* (psi)=	800	920	920	1280	1280	(Eq 3.7-1)
C_P =	0.742970896	0.697636299	0.697636299	0.576163928	0.576163928	(Eq 3.7-1)
F'c (psi)=	594	642	642	737	737	(Table 4.3.1)
ALLOWABLES	DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W or E	+0.75(LL+SL+WorE)	
V_{allow} (#) =	825	949	949	1320	1320	V_{allow} = A * F_v * C_D / 1.5
M_{allow} (ft - #) =	425	489	489	681	681	M_{allow} = S*F_b*C_D*C_F*C_L*C_r
P_{allow} (#) =	4904	5295	5295	6084	6084	P_{allow} = A * F_c * C_D * C_F * C_P
$(f_c/F_c')^2 + f_b/(F_b(1-(f_c/F_{cE})$ =	0.32	0.16	0.36	0.11	0.36	(Eq 3.9-3)
$(f_c/F_{cE}) + (f_b/F_{bE})^2$ =	0.27	0.20	0.31	0.07	0.31	(Eq 3.9-4)
$P_{c\perp allow}$ on PL (#) =	3341	3341	3341	3341	3341	$P_{c\perp allow}$ =A * Fc * C_b
$P_{c\perp allow}$ on Beam (#) =	3047	3047	3047	3047	3047	$P_{c\perp allow}$ =A * Fc
Deflection L/	NA	NA	NA	L/3652	L/4869	L/(I * E / 15 * L *$M_{applied}$)
240	0.00	0.00	0.00	0.03	0.02	(1.0) x W or E — Table 1604.3(f)
CHECKS	DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W or E	+0.75(LL+SL+Wor	Actual △
SHEAR V	OK	OK	OK	OK	OK	
$V_{applied}/V_{allow}$	1.2%	0.7%	1.2%	1.9%	2.1%	
MOMENT M	OK	OK	OK	OK	OK	
$M_{applied}/M_{allow}$	10.3%	6.5%	10.3%	9.4%	13.7%	
AXIAL P	OK	OK	OK	OK	OK	
$P_{applied}/P_{allow}$	42.7%	28.8%	45.8%	9.4%	39.9%	
$(f_c/F_c')^2 + f_b/(F_b(1-(f_c/F_{cE})$	OK	OK	OK	OK	OK	
$(f_c/F_c')^2 + f_b/(F_b(1-(f_c/F_{cE})$	32.3%	16.3%	36.1%	11.0%	35.8%	
$(f_c/F_{cE}) + (f_b/F_{bE})^2$	OK	OK	OK	OK	OK	
$(f_c/F_{cE}) + (f_b/F_{bE})^2$	27.1%	19.7%	31.4%	7.4%	31.4%	
AXIAL $P_\perp$ on PL	OK	OK	OK	OK	OK	
$P_{c^\wedge applied}/P_{c\perp allow}$	62.7%	45.6%	72.6%	17.1%	72.6%	
AXIAL $P_\perp$ on Beam	OK	OK	OK	OK	OK	
$P_{c^\wedge applied}/P_{c\perp allow}$	68.7%	50.0%	79.6%	18.7%	79.6%	
DEFLECTION	OK	OK	OK	OK	OK	
$D_{actual}/D_{allowed}$	0.0%	0.0%	0.0%	6.6%	4.9%	
Overall Check	OK	OK	OK	OK	OK	

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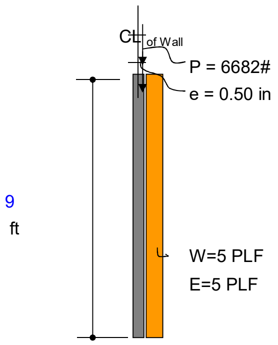
STUD WALL DESIGN

3-1/8 GLB_Header_(2)2x6 Bearing Stud — 2015 NDS/2015 IBC



AXIAL LOADS P	
P_{DL} (#/ft) =	1253
P_{SL} (#/ft) =	2088
P_{LL} (#/ft) =	3341
P_{TOT} (#/ft) =	6682
e (IN) =	0.5
TRIB. (IN) =	12

LATERAL LOADS W	
W (PSF) =	5.00
E (PSF) =	5.00
TRIB. (IN) =	12

DESIGN VALUES		
F_b (psi) =	675	Hem Fir
F_v (psi) =	150	Stud Grade
F_c (psi) =	800	Bending X-X axis
$F_{c\perp}$ (psi) =	405	405
E (psi) =	1.20E+06	Incised, No
E_{min} (psi) =	4.40E+05	Wet Use, No
C_r =	1	Repetive, No
L_u (in) =	48	Full Bracing, Yes
c =	0.8	(Sawn Lumber)
K_e =	1	(Appendix G)
C_b =	1.00	(Bearing Area Factor)

Bearing wall Fire rated ? No

Fire Retardant FirePRO? No

Header Bearing Area (in^2) = 9.375 — 650 = $F_{c\perp}$ (psi

Use: (2) 2" X 6" @ 12" O.C. OK

MEMBER SIZE		SECTION PROPERTIES	
QUANITY	2	A =	16.50 in^2
b =	1.5 in	S =	15.13 in^3
d =	5.5 in	I =	41.59 in^4

	(Eq. 16-9)	(Eq. 16-10)	(Eq. 16-11)	(Eq. 16-12)	(Eq. 16-13)			
LOAD CASES	DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W or E	+0.75(LL+SL+WorE)			
L_u (ft) =	9	9	9	9	9			
$V_{applied}$ (#) =	21	15	25	28	42			
$M_{applied}$ (ft-#) =	96	70	111	78	154			
$P_{applied}$ (#) =	4594	3341	5325	1253	5325			
C_D =	1	1.15	1.15	1.6	1.6			
BENDING STESS CALCS		F_{bE} (psi)= 17476		C_{bF} = 1		(Table 4a Bending)		
F_b* (psi)=	675	776	776	1080	1080	(Eq 3.7-1)		
C_L =	1	1	1	1	1	(Eq 3.7-1)		
F'_b (psi)=	675	776	776	1080	1080	(Table 4.3.1)		
AXIAL STESS CALCS		F_{cE} = 938		C_{cF} = 1		(Table 4a Compression)		
L_e/d =	19.64	19.64	19.64	19.64	19.64	(3.7.1.4)	<50	Le = (Ke)L
F_c* (psi)=	800	920	920	1280	1280	(Eq 3.7-1)		
C_P =	0.742970896	0.697636299	0.697636299	0.576163928	0.576163928	(Eq 3.7-1)		
F'c (psi)=	594	642	642	737	737	(Table 4.3.1)		
ALLOWABLES	DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W or E	+0.75(LL+SL+WorE)			
V_{allow} (#) =	1650	1898	1898	2640	2640	V_{allow} = A * F_v * C_D / 1.5		
M_{allow} (ft - #) =	851	978	978	1361	1361	M_{allow} = S*F_b*C_D*C_F*C_L*C_r		
P_{allow} (#) =	19614	21180	21180	24337	24337	P_{allow} = A * F_c * C_D * C_F * C_P		
$(f_c/F_c')^2 + f_b/(F_b(1-(f_c/F_{cE})$ =	0.21	0.12	0.24	0.07	0.22	(Eq 3.9-3)		
$(f_c/F_{cE}) +(f_b/F_{bE})^2$ =	0.30	0.22	0.34	0.08	0.34	(Eq 3.9-4)		
$P_{c\perp allow}$ on PL (#) =	6683	6683	6683	6683	6683	$P_{c\perp allow}$ =A * Fc * C_b		
$P_{c\perp allow}$ on Beam (#) =	6094	6094	6094	6094	6094	$P_{c\perp allow}$ =A * Fc		
Deflection L/	NA	NA	NA	L/7303	L/9738	L/(I * E / 15 * L *$M_{applied}$)		
240	0.00	0.00	0.00	0.01	0.01	(1.0) x W or E	Table 1604.3(f)	
CHECKS	DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W or E	+0.75(LL+SL+Wor	Actual △		
SHEAR V	OK	OK	OK	OK	OK			
$V_{applied}/V_{allow}$	1.3%	0.8%	1.3%	1.1%	1.6%			
MOMENT M	OK	OK	OK	OK	OK			
$M_{applied}/M_{allow}$	11.2%	7.1%	11.3%	5.7%	11.3%			
AXIAL P	OK	OK	OK	OK	OK			
$P_{applied}/P_{allow}$	23.4%	15.8%	25.1%	5.1%	21.9%			
$(f_c/F_c')^2 + f_b/(F_b(1-(f_c/F_{cE})$	OK	OK	OK	OK	OK			
$(f_c/F_c')^2 + f_b/(F_b(1-(f_c/F_{cE})$	21.5%	11.6%	23.6%	6.5%	22.0%			
$(f_c/F_{cE}) +(f_b/F_{bE})^2$	OK	OK	OK	OK	OK			
$(f_c/F_{cE}) +(f_b/F_{bE})^2$	29.7%	21.6%	34.4%	8.1%	34.4%			
AXIAL $P_{\perp}$ on PL	OK	OK	OK	OK	OK			
$P_{c^applied}/P_{c\perp allow}$	68.7%	50.0%	79.7%	18.7%	79.7%			
AXIAL $P_{\perp}$ on Beam	OK	OK	OK	OK	OK			
$P_{c^applied}/P_{c\perp allow}$	75.4%	54.8%	87.4%	20.6%	87.4%			
DEFLECTION	OK	OK	OK	OK	OK			
$D_{actual}/D_{allowed}$	0.0%	0.0%	0.0%	3.3%	2.5%			
Overall Check	OK	OK	OK	OK	OK			

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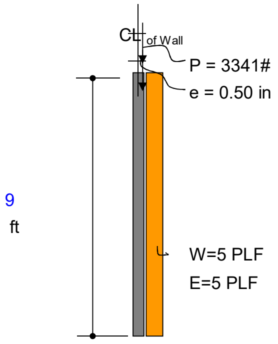
PROJECT:

STUD WALL DESIGN

5-1/8 GLB_Header_(1)2x6 Bearing Stud — 2015 NDS/2015 IBC



AXIAL LOADS P	
P_{DL} (#/ft) =	626
P_{SL} (#/ft) =	1044
P_{LL} (#/ft) =	1671
P_{TOT} (#/ft) =	3341
e (IN) =	0.5
TRIB. (IN) =	12

LATERAL LOADS W	
W (PSF) =	5.00
E (PSF) =	5.00
TRIB. (IN) =	12

DESIGN VALUES		
F_b (psi) =	675	Hem Fir
F_v (psi) =	150	Stud Grade
F_c (psi) =	800	Bending X-X axis
$F_{c\perp}$ (psi) =	405	405
E (psi) =	1.20E+06	Incised, No
E_{min} (psi) =	4.40E+05	Wet Use, No
C_r =	1	Repetive, No
L_u (in) =	48	Full Bracing, Yes
c =	0.8	(Sawn Lumber)
K_e =	1	(Appendix G)
C_b =	1.00	(Bearing Area Factor)

Use: (1) 2" X 6" @ 12" O.C. OK

Bearing wall Fire rated ? No

Fire Retardant FirePRO? No

Header Bearing Area (in^2) = 7.6875 — 650 = $F_{c\perp}$ (psi

MEMBER SIZE		SECTION PROPERTIES	
QUANITY	1	A =	8.25 in^2
b =	1.5 in	S =	7.56 in^3
d =	5.5 in	I =	20.80 in^4

	(Eq. 16-9)	(Eq. 16-10)	(Eq. 16-11)	(Eq. 16-12)	(Eq. 16-13)	
LOAD CASES	DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W or E	+0.75(LL+SL+WorE)	
L_u (ft) =	9	9	9	9	9	
$V_{applied}$ (#) =	11	8	12	25	29	
$M_{applied}$ (ft-#) =	48	35	55	65	98	
$P_{applied}$ (#) =	2297	1671	2662	626	2662	
C_D =	1	1.15	1.15	1.6	1.6	
BENDING STESS CALCS		F_{bE} (psi)= 17476		C_{bF} = 1		(Table 4a Bending)
F_b* (psi)=	675	776	776	1080	1080	(Eq 3.7-1)
C_L =	1	1	1	1	1	(Eq 3.7-1)
F'_b (psi)=	675	776	776	1080	1080	(Table 4.3.1)
AXIAL STESS CALCS		F_{cE} = 938		C_{cF} = 1		(Table 4a Compression)
L_e/d =	19.64	19.64	19.64	19.64	19.64	(3.7.1.4) <50 Le = (Ke)L
F_c* (psi)=	800	920	920	1280	1280	(Eq 3.7-1)
C_P =	0.742970896	0.697636299	0.697636299	0.576163928	0.576163928	(Eq 3.7-1)
F'c (psi)=	594	642	642	737	737	(Table 4.3.1)
ALLOWABLES	DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W or E	+0.75(LL+SL+WorE)	
V_{allow} (#) =	825	949	949	1320	1320	V_{allow} = A * F_v * C_D / 1.5
M_{allow} (ft - #) =	425	489	489	681	681	M_{allow} = S*F_b*C_D*C_F*C_L*C_r
P_{allow} (#) =	4904	5295	5295	6084	6084	P_{allow} = A * F_c * C_D * C_F * C_P
$(f_c/F_c')^2 + f_b/(F_b(1-(f_c/F_{cE}))$ =	0.38	0.19	0.43	0.11	0.41	(Eq 3.9-3)
$(f_c/F_{cE}) + (f_b/F_{bE})^2$ =	0.30	0.22	0.34	0.08	0.34	(Eq 3.9-4)
$P_{c\perp allow}$ on PL (#) =	3341	3341	3341	3341	3341	$P_{c\perp allow}$ =A * Fc * C_b
$P_{c\perp allow}$ on Beam (#) =	4997	4997	4997	4997	4997	$P_{c\perp allow}$ =A * Fc
Deflection L/	NA	NA	NA	L/3652	L/4869	L/(I * E / 15 * L *$M_{applied}$)
240	0.00	0.00	0.00	0.03	0.02	(1.0) x W or E — Table 1604.3(f)
CHECKS	DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W or E	+0.75(LL+SL+Wor	Actual △
SHEAR V	OK	OK	OK	OK	OK	
$V_{applied}/V_{allow}$	1.3%	0.8%	1.3%	1.9%	2.2%	
MOMENT M	OK	OK	OK	OK	OK	
$M_{applied}/M_{allow}$	11.2%	7.1%	11.3%	9.6%	14.5%	
AXIAL P	OK	OK	OK	OK	OK	
$P_{applied}/P_{allow}$	46.8%	31.5%	50.3%	10.3%	43.8%	
$(f_c/F_c')^2 + f_b/(F_b(1-(f_c/F_{cE}))$	OK	OK	OK	OK	OK	
$(f_c/F_c')^2 + f_b/(F_b(1-(f_c/F_{cE}))$	37.9%	19.0%	42.6%	11.5%	41.2%	
$(f_c/F_{cE}) + (f_b/F_{bE})^2$	OK	OK	OK	OK	OK	
$(f_c/F_{cE}) + (f_b/F_{bE})^2$	29.7%	21.6%	34.4%	8.1%	34.4%	
AXIAL $P_\perp$ on PL	OK	OK	OK	OK	OK	
$P_{c^\wedge applied}/P_{c\perp allow}$	68.7%	50.0%	79.7%	18.7%	79.7%	
AXIAL $P_\perp$ on Beam	OK	OK	OK	OK	OK	
$P_{c^\wedge applied}/P_{c\perp allow}$	46.0%	33.4%	53.3%	12.5%	53.3%	
DEFLECTION	OK	OK	OK	OK	OK	
$D_{actual}/D_{allowed}$	0.0%	0.0%	0.0%	6.6%	4.9%	
Overall Check	OK	OK	OK	OK	OK	

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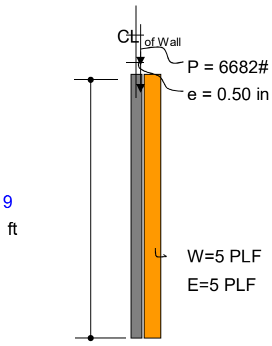
STUD WALL DESIGN

5-1/8 GLB_Header_(2)2x6 Bearing Stud — 2015 NDS/2015 IBC



AXIAL LOADS P	
P_{DL} (#/ft) =	1253
P_{SL} (#/ft) =	2088
P_{LL} (#/ft) =	3341
P_{TOT} (#/ft) =	6682
e (IN) =	0.5
TRIB. (IN) =	12

LATERAL LOADS W	
W (PSF) =	5.00
E (PSF) =	5.00
TRIB. (IN) =	12

DESIGN VALUES			
F_b (psi) =	675	Hem Fir	
F_v (psi) =	150	Stud Grade	
F_c (psi) =	800	Bending X-X axis	
$F_{c\perp}$ (psi) =	405	405	
E (psi) =	1.20E+06	Incised, No	
E_{min} (psi) =	4.40E+05	Wet Use, No	
C_r =	1	Repetive, No	
L_u (in) =	48	Full Bracing, Yes	
c =	0.8	(Sawn Lumber)	
K_e =	1	(Appendix G)	
C_b =	1.00	(Bearing Area Factor)	

Bearing wall Fire rated ? No

Fire Retardant FirePRO? No

Header Bearing Area (in^2) = 15.375 650 = $F_{c\perp}$ (psi

Use: (2) 2" X 6" @ 12" O.C. OK

MEMBER SIZE			SECTION PROPERTIES	
QUANITY	2		A =	16.50 in^2
b =	1.5 in		S =	15.13 in^3
d =	5.5 in		I =	41.59 in^4

	(Eq. 16-9)	(Eq. 16-10)	(Eq. 16-11)	(Eq. 16-12)	(Eq. 16-13)	
LOAD CASES	DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W or E	+0.75(LL+SL+WorE)	
L_u (ft) =	9	9	9	9	9	
$V_{applied}$ (#) =	21	15	25	28	42	
$M_{applied}$ (ft-#) =	96	70	111	78	154	
$P_{applied}$ (#) =	4594	3341	5325	1253	5325	
C_D =	1	1.15	1.15	1.6	1.6	
BENDING STESS CALCS		F_{bE} (psi)= 17476		C_{bF} = 1		(Table 4a Bending)
F_b* (psi)=	675	776	776	1080	1080	(Eq 3.7-1)
C_L =	1	1	1	1	1	(Eq 3.7-1)
F'_b (psi)=	675	776	776	1080	1080	(Table 4.3.1)
AXIAL STESS CALCS		F_{cE} = 938		C_{cF} = 1		(Table 4a Compression)
L_e/d =	19.64	19.64	19.64	19.64	19.64	(3.7.1.4) <50 Le = (Ke)L
F_c* (psi)=	800	920	920	1280	1280	(Eq 3.7-1)
C_P =	0.742970896	0.697636299	0.697636299	0.576163928	0.576163928	(Eq 3.7-1)
F'c (psi)=	594	642	642	737	737	(Table 4.3.1)
ALLOWABLES	DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W or E	+0.75(LL+SL+WorE)	
V_{allow} (#) =	1650	1898	1898	2640	2640	V_{allow} = A * F_v * C_D / 1.5
M_{allow} (ft - #) =	851	978	978	1361	1361	M_{allow} = S*F_b*C_D*C_F·C_L*C_r
P_{allow} (#) =	19614	21180	21180	24337	24337	P_{allow} = A * F_c * C_D * C_F * C_P
$(f_c/F_c')^2 + f_b/(F_b(1-(f_c/F_{cE})$ =	0.21	0.12	0.24	0.07	0.22	(Eq 3.9-3)
$(f_c/F_{cE}) +(f_b/F_{bE})^2$ =	0.30	0.22	0.34	0.08	0.34	(Eq 3.9-4)
$P_{c\perp allow}$ on PL (#) =	6683	6683	6683	6683	6683	$P_{c\perp allow}$ =A * Fc * C_b
$P_{c\perp allow}$ on Beam (#) =	9994	9994	9994	9994	9994	$P_{c\perp allow}$ =A * Fc
Deflection L/	NA	NA	NA	L/7303	L/9738	L/(I * E / 15 * L *$M_{applied}$)
240	0.00	0.00	0.00	0.01	0.01	(1.0) x W or E — Table 1604.3(f)
CHECKS	DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W or E	+0.75(LL+SL+Wor	Actual △
SHEAR V	OK	OK	OK	OK	OK	
$V_{applied}/V_{allow}$	1.3%	0.8%	1.3%	1.1%	1.6%	
MOMENT M	OK	OK	OK	OK	OK	
$M_{applied}/M_{allow}$	11.2%	7.1%	11.3%	5.7%	11.3%	
AXIAL P	OK	OK	OK	OK	OK	
$P_{applied}/P_{allow}$	23.4%	15.8%	25.1%	5.1%	21.9%	
$(f_c/F_c')^2 + f_b/(F_b(1-(f_c/F_{cE})$	OK	OK	OK	OK	OK	
$(f_c/F_c')^2 + f_b/(F_b(1-(f_c/F_{cE})$	21.5%	11.6%	23.6%	6.5%	22.0%	
$(f_c/F_{cE}) +(f_b/F_{bE})^2$	OK	OK	OK	OK	OK	
$(f_c/F_{cE}) +(f_b/F_{bE})^2$	29.7%	21.6%	34.4%	8.1%	34.4%	
AXIAL $P_\perp$ on PL	OK	OK	OK	OK	OK	
$P_{c^\wedge applied}/P_{c\perp allow}$	68.7%	50.0%	79.7%	18.7%	79.7%	
AXIAL $P_\perp$ on Beam	OK	OK	OK	OK	OK	
$P_{c^\wedge applied}/P_{c\perp allow}$	46.0%	33.4%	53.3%	12.5%	53.3%	
DEFLECTION	OK	OK	OK	OK	OK	
$D_{actual}/D_{allowed}$	0.0%	0.0%	0.0%	3.3%	2.5%	
Overall Check	OK	OK	OK	OK	OK	

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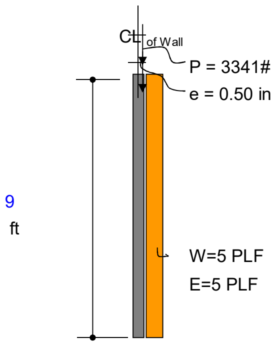
STUD WALL DESIGN

5-1/4 PSL_Header_(1)2x6 Bearing Stud — 2015 NDS/2015 IBC



AXIAL LOADS P	
P_{DL} (#/ft) =	626
P_{SL} (#/ft) =	1044
P_{LL} (#/ft) =	1671
P_{TOT} (#/ft) =	3341
e (IN) =	0.5
TRIB. (IN) =	12

LATERAL LOADS W	
W (PSF) =	5.00
E (PSF) =	5.00
TRIB. (IN) =	12

DESIGN VALUES		
F_b (psi) =	675	Hem Fir
F_v (psi) =	150	Stud Grade
F_c (psi) =	800	Bending X-X axis
$F_{c\perp}$ (psi) =	405	405
E (psi) =	1.20E+06	Incised, No
E_{min} (psi) =	4.40E+05	Wet Use, No
C_r =	1	Repetive, No
L_u (in) =	48	Full Bracing, Yes
c =	0.8	(Sawn Lumber)
K_e =	1	(Appendix G)
C_b =	1.00	(Bearing Area Factor)

I

Bearing wall Fire rated ? No

Fire Retardant FirePRO? No

Header Bearing Area (in²) = 7.875 — 650 = $F_{c\perp}$ (psi

Use: (1) 2" X 6" @ 12" O.C. OK

MEMBER SIZE		SECTION PROPERTIES	
QUANITY	1	A =	8.25 in²
b =	1.5 in	S =	7.56 in³
d =	5.5 in	I =	20.80 in⁴

	(Eq. 16-9)	(Eq. 16-10)	(Eq. 16-11)	(Eq. 16-12)	(Eq. 16-13)	
LOAD CASES	DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W or E	+0.75(LL+SL+WorE)	
L_u (ft) =	9	9	9	9	9	
$V_{applied}$ (#) =	11	8	12	25	29	
$M_{applied}$ (ft-#) =	48	35	55	65	98	
$P_{applied}$ (#) =	2297	1671	2662	626	2662	
C_D =	1	1.15	1.15	1.6	1.6	
BENDING STESS CALCS		F_{bE} (psi)= 17476		C_{bF} = 1		(Table 4a Bending)
F_b* (psi)=	675	776	776	1080	1080	(Eq 3.7-1)
C_L =	1	1	1	1	1	(Eq 3.7-1)
F'_b (psi)=	675	776	776	1080	1080	(Table 4.3.1)
AXIAL STESS CALCS		F_{cE} = 938		C_{cF} = 1		(Table 4a Compression)
L_e/d =	19.64	19.64	19.64	19.64	19.64	(3.7.1.4) <50 Le = (Ke)L
F_c* (psi)=	800	920	920	1280	1280	(Eq 3.7-1)
C_P =	0.742970896	0.697636299	0.697636299	0.576163928	0.576163928	(Eq 3.7-1)
F'c (psi)=	594	642	642	737	737	(Table 4.3.1)
ALLOWABLES	DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W or E	+0.75(LL+SL+WorE)	
V_{allow} (#) =	825	949	949	1320	1320	V_{allow} = A * F_v * C_D / 1.5
M_{allow} (ft - #) =	425	489	489	681	681	M_{allow} = S*F_b*C_D*C_F·C_L*C_r
P_{allow} (#) =	4904	5295	5295	6084	6084	P_{allow} = A * F_c * C_D * C_F * C_P
$(f_c/F_c')^2 + f_b/(F_b(1-(f_c/F_{cE})$ =	0.38	0.19	0.43	0.11	0.41	(Eq 3.9-3)
$(f_c/F_{cE}) + (f_b/F_{bE})^2$ =	0.30	0.22	0.34	0.08	0.34	(Eq 3.9-4)
$P_{c\perp allow}$ on PL (#) =	3341	3341	3341	3341	3341	$P_{c\perp allow}$ =A * Fc * C_b
$P_{c\perp allow}$ on Beam (#) =	5119	5119	5119	5119	5119	$P_{c\perp allow}$ =A * Fc
Deflection L/	NA	NA	NA	L/3652	L/4869	L/(I * E / 15 * L *$M_{applied}$)
240	0.00	0.00	0.00	0.03	0.02	(1.0) x W or E — Table 1604.3(f)
CHECKS	DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W or E	+0.75(LL+SL+Wor	Actual △
SHEAR V	OK	OK	OK	OK	OK	
$V_{applied}/V_{allow}$	1.3%	0.8%	1.3%	1.9%	2.2%	
MOMENT M	OK	OK	OK	OK	OK	
$M_{applied}/M_{allow}$	11.2%	7.1%	11.3%	9.6%	14.5%	
AXIAL P	OK	OK	OK	OK	OK	
$P_{applied}/P_{allow}$	46.8%	31.5%	50.3%	10.3%	43.8%	
$(f_c/F_c')^2 + f_b/(F_b(1-(f_c/F_{cE})$	OK	OK	OK	OK	OK	
$(f_c/F_c')^2 + f_b/(F_b(1-(f_c/F_{cE})$	37.9%	19.0%	42.6%	11.5%	41.2%	
$(f_c/F_{cE}) + (f_b/F_{bE})^2$	OK	OK	OK	OK	OK	
$(f_c/F_{cE}) + (f_b/F_{bE})^2$	29.7%	21.6%	34.4%	8.1%	34.4%	
AXIAL $P_\perp$ on PL	OK	OK	OK	OK	OK	
$P_{c\wedge applied}/P_{c\perp allow}$	68.7%	50.0%	79.7%	18.7%	79.7%	
AXIAL $P_\perp$ on Beam	OK	OK	OK	OK	OK	
$P_{c\wedge applied}/P_{c\perp allow}$	44.9%	32.6%	52.0%	12.2%	52.0%	
DEFLECTION	OK	OK	OK	OK	OK	
$D_{actual}/D_{allowed}$	0.0%	0.0%	0.0%	6.6%	4.9%	
Overall Check	OK	OK	OK	OK	OK	

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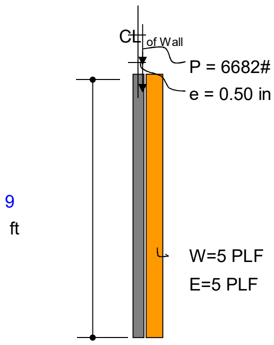
STUD WALL DESIGN

5-1/4 PSL_Header_(2)2x6 Bearing Stud — 2015 NDS/2015 IBC



AXIAL LOADS P	
P_{DL} (#/ft) =	1253
P_{SL} (#/ft) =	2088
P_{LL} (#/ft) =	3341
P_{TOT} (#/ft) =	6682
e (IN) =	0.5
TRIB. (IN) =	12

LATERAL LOADS W	
W (PSF) =	5.00
E (PSF) =	5.00
TRIB. (IN) =	12

DESIGN VALUES		
F_b (psi) =	675	Hem Fir
F_v (psi) =	150	Stud Grade
F_c (psi) =	800	Bending X-X axis
$F_{c\perp}$ (psi) =	405	405
E (psi) =	1.20E+06	Incised, No
E_{min} (psi) =	4.40E+05	Wet Use, No
C_r =	1	Repetive, No
L_u (in) =	48	Full Bracing, Yes
c =	0.8	(Sawn Lumber)
K_e =	1	(Appendix G)
C_b =	1.00	(Bearing Area Factor)

Bearing wall Fire rated ? No

Fire Retardant FirePRO? No

Header Bearing Area (in²) = 15.75 — 650 = $F_{c\perp}$ (psi

Use: (2) 2" X 6" @ 12" O.C. OK

MEMBER SIZE		SECTION PROPERTIES	
QUANITY	2	A =	16.50 in²
b =	1.5 in	S =	15.13 in³
d =	5.5 in	I =	41.59 in⁴

	(Eq. 16-9)	(Eq. 16-10)	(Eq. 16-11)	(Eq. 16-12)	(Eq. 16-13)	
LOAD CASES	DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W or E	+0.75(LL+SL+WorE)	
L_u (ft) =	9	9	9	9	9	
$V_{applied}$ (#) =	21	15	25	28	42	
$M_{applied}$ (ft-#) =	96	70	111	78	154	
$P_{applied}$ (#) =	4594	3341	5325	1253	5325	
C_D =	1	1.15	1.15	1.6	1.6	
BENDING STESS CALCS		F_{bE} (psi)= 17476		C_{bF} = 1		(Table 4a Bending)
F_b* (psi)=	675	776	776	1080	1080	(Eq 3.7-1)
C_L =	1	1	1	1	1	(Eq 3.7-1)
F'_b (psi)=	675	776	776	1080	1080	(Table 4.3.1)
AXIAL STESS CALCS		F_{cE} = 938		C_{cF} = 1		(Table 4a Compression)
L_e/d =	19.64	19.64	19.64	19.64	19.64	(3.7.1.4) <50 Le = (Ke)L
F_c* (psi)=	800	920	920	1280	1280	(Eq 3.7-1)
C_P =	0.742970896	0.697636299	0.697636299	0.576163928	0.576163928	(Eq 3.7-1)
F'c (psi)=	594	642	642	737	737	(Table 4.3.1)
ALLOWABLES	DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W or E	+0.75(LL+SL+WorE)	
V_{allow} (#) =	1650	1898	1898	2640	2640	V_{allow} = A * F_v * C_D / 1.5
M_{allow} (ft - #) =	851	978	978	1361	1361	M_{allow} = S*F_b*C_D*C_F*C_L*C_r
P_{allow} (#) =	19614	21180	21180	24337	24337	P_{allow} = A * F_c * C_D * C_F * C_P
$(f_c/F_c')^2 + f_b/(F_b(1-(f_c/F_{cE})$ =	0.21	0.12	0.24	0.07	0.22	(Eq 3.9-3)
$(f_c/F_{cE}) + (f_b/F_{bE})^2$ =	0.30	0.22	0.34	0.08	0.34	(Eq 3.9-4)
$P_{c\perp allow}$ on PL (#) =	6683	6683	6683	6683	6683	$P_{c\perp allow}$ =A * Fc * C_b
$P_{c\perp allow}$ on Beam (#) =	10238	10238	10238	10238	10238	$P_{c\perp allow}$ =A * Fc
Deflection L/	NA	NA	NA	L/7303	L/9738	L/(I * E / 15 * L *$M_{applied}$)
240	0.00	0.00	0.00	0.01	0.01	(1.0) x W or E — Table 1604.3(f)
CHECKS	DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W or E	+0.75(LL+SL+Wor	Actual △
SHEAR V	OK	OK	OK	OK	OK	
$V_{applied}/V_{allow}$	1.3%	0.8%	1.3%	1.1%	1.6%	
MOMENT M	OK	OK	OK	OK	OK	
$M_{applied}/M_{allow}$	11.2%	7.1%	11.3%	5.7%	11.3%	
AXIAL P	OK	OK	OK	OK	OK	
$P_{applied}/P_{allow}$	23.4%	15.8%	25.1%	5.1%	21.9%	
$(f_c/F_c')^2 + f_b/(F_b(1-(f_c/F_{cE})$	OK	OK	OK	OK	OK	
$(f_c/F_c')^2 + f_b/(F_b(1-(f_c/F_{cE})$	21.5%	11.6%	23.6%	6.5%	22.0%	
$(f_c/F_{cE}) + (f_b/F_{bE})^2$	OK	OK	OK	OK	OK	
$(f_c/F_{cE}) + (f_b/F_{bE})^2$	29.7%	21.6%	34.4%	8.1%	34.4%	
AXIAL $P_\perp$ on PL	OK	OK	OK	OK	OK	
$P_{c^\wedge applied}/P_{c\perp allow}$	68.7%	50.0%	79.7%	18.7%	79.7%	
AXIAL $P_\perp$ on Beam	OK	OK	OK	OK	OK	
$P_{c^\wedge applied}/P_{c\perp allow}$	44.9%	32.6%	52.0%	12.2%	52.0%	
DEFLECTION	OK	OK	OK	OK	OK	
$D_{actual}/D_{allowed}$	0.0%	0.0%	0.0%	3.3%	2.5%	
Overall Check	OK	OK	OK	OK	OK	

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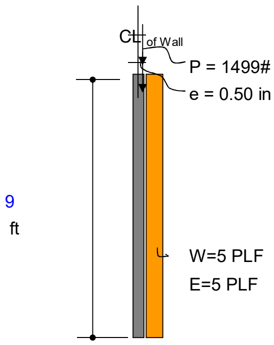
STUD WALL DESIGN

4x_Header_(1)2x4 Bearing Stud — 2015 NDS/2015 IBC



AXIAL LOADS P	
P_{DL} (#/ft) =	281
P_{SL} (#/ft) =	468
P_{LL} (#/ft) =	750
P_{TOT} (#/ft) =	1499
e (IN) =	0.5
TRIB. (IN) =	12

LATERAL LOADS W	
W (PSF) =	5.00
E (PSF) =	5.00
TRIB. (IN) =	12

Use: (1) 2" X 4" @ 12" O.C. OK

DESIGN VALUES		
F_b (psi) =	675	Hem Fir
F_v (psi) =	150	Stud Grade
F_c (psi) =	800	Bending X-X axis
$F_{c\perp}$ (psi) =	405	405
E (psi) =	1.20E+06	Incised, No
E_{min} (psi) =	4.40E+05	Wet Use, No
C_r =	1	Repetive, No
L_u (in) =	48	Full Bracing, Yes
c =	0.8	(Sawn Lumber)
K_e =	1	(Appendix G)
C_b =	1.00	(Bearing Area Factor)

Bearing wall Fire rated ? No

Fire Retardant FirePRO? No

Header Bearing Area (in^2) = 5.25 — 405 = $F_{c\perp}$ (psi

I

MEMBER SIZE		SECTION PROPERTIES	
QUANITY	1	A =	5.25 in^2
b =	1.5 in	S =	3.06 in^3
d =	3.5 in	I =	5.36 in^4

	(Eq. 16-9)	(Eq. 16-10)	(Eq. 16-11)	(Eq. 16-12)	(Eq. 16-13)	
LOAD CASES	DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W or E	+0.75(LL+SL+WorE)	
L_u (ft) =	9	9	9	9	9	
$V_{applied}$ (#) =	5	3	6	24	22	
$M_{applied}$ (ft-#) =	21	16	25	59	71	
$P_{applied}$ (#) =	1031	750	1195	281	1195	
C_D =	1	1.15	1.15	1.6	1.6	
BENDING STESS CALCS		F_{bE} (psi)= 27462		C_{bF} = 1.1		(Table 4a Bending)
F_b* (psi)=	743	854	854	1188	1188	(Eq 3.7-1)
C_L =	1	1	1	1	1	(Eq 3.7-1)
F'_b (psi)=	743	854	854	1188	1188	(Table 4.3.1)
AXIAL STESS CALCS		F_{cE} = 380		C_{cF} = 1.05		(Table 4a Compression)
L_e/d =	30.86	30.86	30.86	30.86	30.86	(3.7.1.4) <50 Le = (Ke)L
F_c* (psi)=	840	966	966	1344	1344	(Eq 3.7-1)
C_P =	0.399165939	0.354330435	0.354330435	0.263733097	0.263733097	(Eq 3.7-1)
F'c (psi)=	335	342	342	354	354	(Table 4.3.1)
ALLOWABLES	DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W or E	+0.75(LL+SL+WorE)	
V_{allow} (#) =	525	604	604	840	840	V_{allow} = A * F_v * C_D / 1.5
M_{allow} (ft - #) =	189	218	218	303	303	M_{allow} = S*F_b*C_D*$C_F$$C_L$*$C_r$
P_{allow} (#) =	1760	1797	1797	1861	1861	P_{allow} = A * F_c * C_D * C_F * C_P
$(f_c/F_c')^2 + f_b/(F_b(1-(f_c/F_{cE})$ =	0.58	0.29	0.73	0.25	1.00	(Eq 3.9-3)
$(f_c/F_{cE}) + (f_b/F_{bE})^2$ =	0.52	0.38	0.60	0.14	0.60	(Eq 3.9-4)
$P_{c\perp allow}$ on PL (#) =	2126	2126	2126	2126	2126	$P_{c\perp allow}$ =A * Fc * C_b
$P_{c\perp allow}$ on Beam (#) =	2126	2126	2126	2126	2126	$P_{c\perp allow}$ =A * Fc
Deflection L/	NA	NA	NA	L/941	L/1255	L/(I * E / 15 * L *$M_{applied}$)
240	0.00	0.00	0.00	0.11	0.09	(1.0) x W or E — Table 1604.3(f)
CHECKS	DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W or E	+0.75(LL+SL+Wor	Actual △
SHEAR V	OK	OK	OK	OK	OK	
$V_{applied}/V_{allow}$	0.9%	0.6%	0.9%	2.8%	2.7%	
MOMENT M	OK	OK	OK	OK	OK	
$M_{applied}/M_{allow}$	11.3%	7.2%	11.4%	19.5%	23.6%	
AXIAL P	OK	OK	OK	OK	OK	
$P_{applied}/P_{allow}$	58.5%	41.7%	66.5%	15.1%	64.2%	
$(f_c/F_c')^2 + f_b/(F_b(1-(f_c/F_{cE})$	OK	OK	OK	OK	OK	
$(f_c/F_c')^2 + f_b/(F_b(1-(f_c/F_{cE})$	57.7%	28.9%	72.7%	25.0%	99.9%	
$(f_c/F_{cE}) + (f_b/F_{bE})^2$	OK	OK	OK	OK	OK	
$(f_c/F_{cE}) + (f_b/F_{bE})^2$	51.7%	37.6%	59.9%	14.1%	59.9%	
AXIAL $P_\perp$ on PL	OK	OK	OK	OK	OK	
$P_{c^{\wedge}applied}/P_{c\perp allow}$	48.5%	35.2%	56.2%	13.2%	56.2%	
AXIAL $P_\perp$ on Beam	OK	OK	OK	OK	OK	
$P_{c^{\wedge}applied}/P_{c\perp allow}$	48.5%	35.2%	56.2%	13.2%	56.2%	
DEFLECTION	OK	OK	OK	OK	OK	
$D_{actual}/D_{allowed}$	0.0%	0.0%	0.0%	25.5%	19.1%	
Overall Check	OK	OK	OK	OK	OK	

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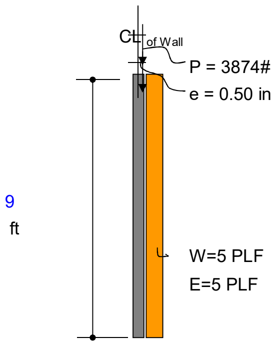
STUD WALL DESIGN

4x_Header_(2)2x4 Bearing Stud — 2015 NDS/2015 IBC



AXIAL LOADS P	
P_{DL} (#/ft) =	726
P_{SL} (#/ft) =	1211
P_{LL} (#/ft) =	1937
P_{TOT} (#/ft) =	3874
e (IN) =	0.5
TRIB. (IN) =	12

LATERAL LOADS W	
W (PSF) =	5.00
E (PSF) =	5.00
TRIB. (IN) =	12

DESIGN VALUES		
F_b (psi) =	675	Hem Fir
F_v (psi) =	150	Stud Grade
F_c (psi) =	800	Bending X-X axis
$F_{c\perp}$ (psi) =	405	405
E (psi) =	1.20E+06	Incised, No
E_{min} (psi) =	4.40E+05	Wet Use, No
C_r =	1	Repetive, No
L_u (in) =	48	Full Bracing, Yes
c =	0.8	(Sawn Lumber)
K_e =	1	(Appendix G)
C_b =	1.00	(Bearing Area Factor)

Bearing wall Fire rated ? No
Fire Retardant FirePRO? No
Header Bearing Area (in^2) = 10.5 — 405 = $F_{c\perp}$ (psi

Use: (2) 2" X 4" @ 12" O.C. OK

MEMBER SIZE		SECTION PROPERTIES	
QUANITY	2	A =	10.50 in^2
b =	1.5 in	S =	6.13 in^3
d =	3.5 in	I =	10.72 in^4

	(Eq. 16-9)	(Eq. 16-10)	(Eq. 16-11)	(Eq. 16-12)	(Eq. 16-13)	
LOAD CASES	DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W or E	L+0.75(LL+SL+WorE)	
L_u (ft) =	9	9	9	9	9	
$V_{applied}$ (#) =	12	9	14	26	31	
$M_{applied}$ (ft-#) =	55	40	64	69	113	
$P_{applied}$ (#) =	2663	1937	3087	726	3087	
C_D =	1	1.15	1.15	1.6	1.6	
BENDING STESS CALCS		F_{bE} (psi)= 27462		C_{bF} = 1.1		(Table 4a Bending)
F_b* (psi)=	743	854	854	1188	1188	(Eq 3.7-1)
C_L =	1	1	1	1	1	(Eq 3.7-1)
F'_b (psi)=	743	854	854	1188	1188	(Table 4.3.1)
AXIAL STESS CALCS		F_{cE} = 380		C_{cF} = 1.05		(Table 4a Compression)
L_e/d =	30.86	30.86	30.86	30.86	30.86	(3.7.1.4) <50 Le = (Ke)L
F_c* (psi)=	840	966	966	1344	1344	(Eq 3.7-1)
C_P =	0.399165939	0.354330435	0.354330435	0.263733097	0.263733097	(Eq 3.7-1)
F'c (psi)=	335	342	342	354	354	(Table 4.3.1)
ALLOWABLES	DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W or E	L+0.75(LL+SL+WorE)	
V_{allow} (#) =	1050	1208	1208	1680	1680	$V_{allow} = A * F_v * C_D / 1.5$
M_{allow} (ft - #) =	379	436	436	606	606	$M_{allow} = S*F_b*C_D*C_F \cdot C_L*C_r$
P_{allow} (#) =	7041	7188	7188	7444	7444	$P_{allow} = A * F_c * C_D * C_F * C_P$
$(f_c/F_c')^2 + f_b/(F_b(1-(f_c/F_{cE})$ =	0.58	0.25	0.84	0.15	1.00	(Eq 3.9-3)
$(f_c/F_{cE}) +(f_b/F_{bE})^2$ =	0.67	0.49	0.77	0.18	0.77	(Eq 3.9-4)
$P_{c\perp allow}$ on PL (#) =	4253	4253	4253	4253	4253	$P_{c\perp allow}$ =A * Fc * C_b
$P_{c\perp allow}$ on Beam (#) =	4253	4253	4253	4253	4253	$P_{c\perp allow}$ =A * Fc
Deflection L/	NA	NA	NA	L/1882	L/2509	L/(I * E / 15 * L *$M_{applied}$)
240	0.00	0.00	0.00	0.06	0.04	(1.0) x W or E — Table 1604.3(f)
CHECKS	DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W or E	L+0.75(LL+SL+Wor	Actual △
SHEAR V	OK	OK	OK	OK	OK	
$V_{applied}/V_{allow}$	1.2%	0.7%	1.2%	1.5%	1.9%	
MOMENT M	OK	OK	OK	OK	OK	
$M_{applied}/M_{allow}$	14.6%	9.3%	14.8%	11.4%	18.7%	
AXIAL P	OK	OK	OK	OK	OK	
$P_{applied}/P_{allow}$	37.8%	26.9%	42.9%	9.8%	41.5%	
$(f_c/F_c')^2 + f_b/(F_b(1-(f_c/F_{cE})$	OK	OK	OK	OK	OK	
$(f_c/F_c')^2 + f_b/(F_b(1-(f_c/F_{cE})$	58.4%	25.3%	83.7%	14.9%	99.9%	
$(f_c/F_{cE}) +(f_b/F_{bE})^2$	OK	OK	OK	OK	OK	
$(f_c/F_{cE}) +(f_b/F_{bE})^2$	66.8%	48.6%	77.4%	18.2%	77.4%	
AXIAL $P_{\perp}$ on PL	OK	OK	OK	OK	OK	
$P_{c^\wedge applied}/P_{c\perp allow}$	62.6%	45.5%	72.6%	17.1%	72.6%	
AXIAL $P_{\perp}$ on Beam	OK	OK	OK	OK	OK	
$P_{c^\wedge applied}/P_{c\perp allow}$	62.6%	45.5%	72.6%	17.1%	72.6%	
DEFLECTION	OK	OK	OK	OK	OK	
$D_{actual}/D_{allowed}$	0.0%	0.0%	0.0%	12.8%	9.6%	
Overall Check	OK	OK	OK	OK	OK	

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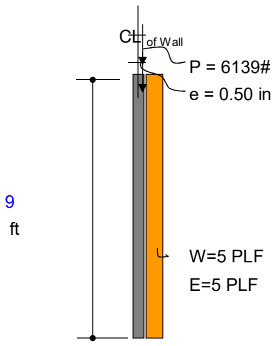
STUD WALL DESIGN

4x_Header_(3)2x4 Bearing Stud — 2015 NDS/2015 IBC



AXIAL LOADS P	
P_{DL} (#/ft) =	1151
P_{SL} (#/ft) =	1918
P_{LL} (#/ft) =	3070
P_{TOT} (#/ft) =	6139
e (IN) =	0.5
TRIB. (IN) =	12

LATERAL LOADS W	
W (PSF) =	5.00
E (PSF) =	5.00
TRIB. (IN) =	12

DESIGN VALUES		
F_b (psi) =	675	Hem Fir
F_v (psi) =	150	Stud Grade
F_c (psi) =	800	Bending X-X axis
$F_{c\perp}$ (psi) =	405	405
E (psi) =	1.20E+06	Incised, No
E_{min} (psi) =	4.40E+05	Wet Use, No
C_r =	1	Repetive, No
L_u (in) =	48	Full Bracing, Yes
c =	0.8	(Sawn Lumber)
K_e =	1	(Appendix G)
C_b =	1.00	(Bearing Area Factor)

Bearing wall Fire rated ? No

Fire Retardant FirePRO? No

Header Bearing Area (in^2) = 15.75 — 405 = $F_{c\perp}$ (psi

Use: (3) 2" X 4" @ 12" O.C. OK

MEMBER SIZE		SECTION PROPERTIES	
QUANITY	3	A =	15.75 in^2
b =	1.5 in	S =	9.19 in^3
d =	3.5 in	I =	16.08 in^4

	(Eq. 16-9)	(Eq. 16-10)	(Eq. 16-11)	(Eq. 16-12)	(Eq. 16-13)	
LOAD CASES	DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W or E	DL+0.75(LL+SL+WorE)	
L_u (ft) =	9	9	9	9	9	
$V_{applied}$ (#) =	20	14	23	28	40	
$M_{applied}$ (ft-#) =	88	64	102	78	152	
$P_{applied}$ (#) =	4221	3070	4892	1151	4892	
C_D =	1	1.15	1.15	1.6	1.6	
BENDING STESS CALCS		F_{bE} (psi)= 27462		C_{bF} = 1.1		(Table 4a Bending)
F_b* (psi)=	743	854	854	1188	1188	(Eq 3.7-1)
C_L =	1	1	1	1	1	(Eq 3.7-1)
F'_b (psi)=	743	854	854	1188	1188	(Table 4.3.1)
AXIAL STESS CALCS		F_{cE} = 380		C_{cF} = 1.05		(Table 4a Compression)
L_e/d =	30.86	30.86	30.86	30.86	30.86	(3.7.1.4) <50 Le = (Ke)L
F_c* (psi)=	840	966	966	1344	1344	(Eq 3.7-1)
C_P =	0.399165939	0.354330435	0.354330435	0.263733097	0.263733097	(Eq 3.7-1)
F'c (psi)=	335	342	342	354	354	(Table 4.3.1)
ALLOWABLES	DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W or E	DL+0.75(LL+SL+WorE)	
V_{allow} (#) =	1575	1811	1811	2520	2520	V_{allow} = A * F_v * C_D / 1.5
M_{allow} (ft - #) =	568	654	654	910	910	M_{allow} = S*F_b*C_D*C_F*C_L*C_r
P_{allow} (#) =	15843	16173	16173	16748	16748	P_{allow} = A * F_c * C_D * C_F * C_P
$(f_c/F_c')^2 + f_b/(F_b(1-(f_c/F_{cE}))$ =	0.60	0.24	0.95	0.11	1.00	(Eq 3.9-3)
$(f_c/F_{cE}) + (f_b/F_{bE})^2$ =	0.71	0.51	0.82	0.19	0.82	(Eq 3.9-4)
$P_{c\perp allow}$ on PL (#) =	6379	6379	6379	6379	6379	$P_{c\perp allow}$ =A * Fc * C_b
$P_{c\perp allow}$ on Beam (#) =	6379	6379	6379	6379	6379	$P_{c\perp allow}$ =A * Fc
Deflection L/	NA	NA	NA	L/2823	L/3764	L/(I * E / 15 * L *$M_{applied}$)
240	0.00	0.00	0.00	0.04	0.03	(1.0) x W or E — Table 1604.3(f)
CHECKS	DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W or E	DL+0.75(LL+SL+WorE)	Actual △
SHEAR V	OK	OK	OK	OK	OK	
$V_{applied}/V_{allow}$	1.2%	0.8%	1.3%	1.1%	1.6%	
MOMENT M	OK	OK	OK	OK	OK	
$M_{applied}/M_{allow}$	15.5%	9.8%	15.6%	8.6%	16.7%	
AXIAL P	OK	OK	OK	OK	OK	
$P_{applied}/P_{allow}$	26.6%	19.0%	30.2%	6.9%	29.2%	
$(f_c/F_c')^2 + f_b/(F_b(1-(f_c/F_{cE}))$	OK	OK	OK	OK	OK	
$(f_c/F_c')^2 + f_b/(F_b(1-(f_c/F_{cE}))$	59.6%	23.7%	94.7%	11.1%	99.9%	
$(f_c/F_{cE}) + (f_b/F_{bE})^2$	OK	OK	OK	OK	OK	
$(f_c/F_{cE}) + (f_b/F_{bE})^2$	70.5%	51.3%	81.8%	19.2%	81.8%	
AXIAL $P_{\perp}$ on PL	OK	OK	OK	OK	OK	
$P_{c^\wedge applied}/P_{c\perp allow}$	66.2%	48.1%	76.7%	18.0%	76.7%	
AXIAL $P_{\perp}$ on Beam	OK	OK	OK	OK	OK	
$P_{c^\wedge applied}/P_{c\perp allow}$	66.2%	48.1%	76.7%	18.0%	76.7%	
DEFLECTION	OK	OK	OK	OK	OK	
$D_{actual}/D_{allowed}$	0.0%	0.0%	0.0%	8.5%	6.4%	
Overall Check	OK	OK	OK	OK	OK	

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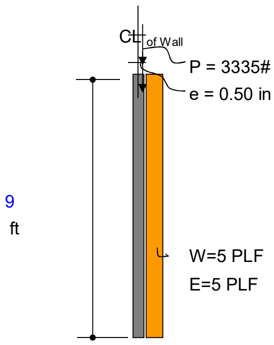
DESIGNED: AEL

PROJECT:

STUD WALL DESIGN

Girder Truss Support_(1)2x6 Stud — 2015 NDS/2015 IBC



AXIAL LOADS P	
P_{DL} (#/ft) =	625
P_{SL} (#/ft) =	1042
P_{LL} (#/ft) =	1668
P_{TOT} (#/ft) =	3335
e (IN) =	0.5
TRIB. (IN) =	12

LATERAL LOADS W	
W (PSF) =	5.00
E (PSF) =	5.00
TRIB. (IN) =	12

DESIGN VALUES		
F_b (psi) =	675	Hem Fir
F_v (psi) =	150	Stud Grade
F_c (psi) =	800	Bending X-X axis
$F_{c\perp}$ (psi) =	405	405
E (psi) =	1.20E+06	Incised, No
E_{min} (psi) =	4.40E+05	Wet Use, No
C_r =	1	Repetive, No
L_u (in) =	48	Full Bracing, Yes
c =	0.8	(Sawn Lumber)
K_e =	1	(Appendix G)
C_b =	1.00	(Bearing Area Factor)

Bearing wall Fire rated ? No

Fire Retardant FirePRO? No

Header Bearing Area (in^2) = 8.25 — 405 = $F_{c\perp}$ (psi

Use: (1) 2" X 6" @ 12" O.C. OK

MEMBER SIZE		SECTION PROPERTIES	
QUANITY	1	A =	8.25 in^2
b =	1.5 in	S =	7.56 in^3
d =	5.5 in	I =	20.80 in^4

	(Eq. 16-9)	(Eq. 16-10)	(Eq. 16-11)	(Eq. 16-12)	(Eq. 16-13)	
LOAD CASES	DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W or E	+0.75(LL+SL+WorE)	
L_u (ft) =	9	9	9	9	9	
$V_{applied}$ (#) =	11	8	12	25	29	
$M_{applied}$ (ft-#) =	48	35	55	65	98	
$P_{applied}$ (#) =	2293	1668	2658	625	2658	
C_D =	1	1.15	1.15	1.6	1.6	
BENDING STESS CALCS		F_{bE} (psi)= 17476		C_{bF} = 1		(Table 4a Bending)
F_b* (psi)=	675	776	776	1080	1080	(Eq 3.7-1)
C_L =	1	1	1	1	1	(Eq 3.7-1)
F'$_b$ (psi)=	675	776	776	1080	1080	(Table 4.3.1)
AXIAL STESS CALCS		F_{cE} = 938		C_{cF} = 1		(Table 4a Compression)
L_e/d =	19.64	19.64	19.64	19.64	19.64	(3.7.1.4) <50 Le = (Ke)L
F_c* (psi)=	800	920	920	1280	1280	(Eq 3.7-1)
C_P =	0.742970896	0.697636299	0.697636299	0.576163928	0.576163928	(Eq 3.7-1)
F'c (psi)=	594	642	642	737	737	(Table 4.3.1)
ALLOWABLES	DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W or E	+0.75(LL+SL+WorE)	
V_{allow} (#) =	825	949	949	1320	1320	V_{allow} = A * F_v * C_D / 1.5
M_{allow} (ft - #) =	425	489	489	681	681	M_{allow} = S*F_b*C_D*C_F*C_L*C_r
P_{allow} (#) =	4904	5295	5295	6084	6084	P_{allow} = A * F_c * C_D * C_F * C_P
$(f_c/F_c')^2 + f_b/(F_b(1-(f_c/F_{cE})$ =	0.38	0.19	0.42	0.11	0.41	(Eq 3.9-3)
$(f_c/F_{cE}) + (f_b/F_{bE})^2$ =	0.30	0.22	0.34	0.08	0.34	(Eq 3.9-4)
$P_{c\perp allow}$ on PL (#) =	3341	3341	3341	3341	3341	$P_{c\perp allow}$ =A * Fc * C_b
$P_{c\perp allow}$ on Beam (#) =	3341	3341	3341	3341	3341	$P_{c\perp allow}$ =A * Fc
Deflection L/	NA	NA	NA	L/3652	L/4869	L/(I * E / 15 * L *$M_{applied}$)
240	0.00	0.00	0.00	0.03	0.02	(1.0) x W or E — Table 1604.3(f)
CHECKS	DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W or E	+0.75(LL+SL+Wor	Actual △
SHEAR V	OK	OK	OK	OK	OK	
$V_{applied}/V_{allow}$	1.3%	0.8%	1.3%	1.9%	2.2%	
MOMENT M	OK	OK	OK	OK	OK	
$M_{applied}/M_{allow}$	11.2%	7.1%	11.3%	9.6%	14.4%	
AXIAL P	OK	OK	OK	OK	OK	
$P_{applied}/P_{allow}$	46.8%	31.5%	50.2%	10.3%	43.7%	
$(f_c/F_c')^2 + f_b/(F_b(1-(f_c/F_{cE})$	OK	OK	OK	OK	OK	
$(f_c/F_c')^2 + f_b/(F_b(1-(f_c/F_{cE})$	37.8%	19.0%	42.4%	11.5%	41.1%	
$(f_c/F_{cE}) + (f_b/F_{bE})^2$	OK	OK	OK	OK	OK	
$(f_c/F_{cE}) + (f_b/F_{bE})^2$	29.6%	21.5%	34.3%	8.1%	34.3%	
AXIAL $P_\perp$ on PL	OK	OK	OK	OK	OK	
$P_{c\wedge applied}/P_{c\perp allow}$	68.6%	49.9%	79.5%	18.7%	79.5%	
AXIAL $P_\perp$ on Beam	OK	OK	OK	OK	OK	
$P_{c\wedge applied}/P_{c\perp allow}$	68.6%	49.9%	79.5%	18.7%	79.5%	
DEFLECTION	OK	OK	OK	OK	OK	
$D_{actual}/D_{allowed}$	0.0%	0.0%	0.0%	6.6%	4.9%	
Overall Check	OK	OK	OK	OK	OK	

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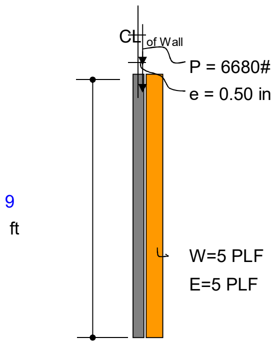
DESIGNED: AEL

PROJECT:

STUD WALL DESIGN

Girder Truss Support_(2)2x6 Stud — 2015 NDS/2015 IBC



AXIAL LOADS P	
P_{DL} (#/ft) =	1253
P_{SL} (#/ft) =	2088
P_{LL} (#/ft) =	3340
P_{TOT} (#/ft) =	6680
e (IN) =	0.5
TRIB. (IN) =	12

LATERAL LOADS W	
W (PSF) =	5.00
E (PSF) =	5.00
TRIB. (IN) =	12

DESIGN VALUES		
F_b (psi) =	675	Hem Fir
F_v (psi) =	150	Stud Grade
F_c (psi) =	800	Bending X-X axis
$F_{c\perp}$ (psi) =	405	405
E (psi) =	1.20E+06	Incised, No
E_{min} (psi) =	4.40E+05	Wet Use, No
C_r =	1	Repetive, No
L_u (in) =	48	Full Bracing, Yes
c =	0.8	(Sawn Lumber)
K_e =	1	(Appendix G)
C_b =	1.00	(Bearing Area Factor)

Bearing wall Fire rated ? No

Fire Retardant FirePRO? No

Header Bearing Area (in^2) = 16.5   405 = $F_{c\perp}$ (psi

Use: (2) 2" X 6" @ 12" O.C. OK

MEMBER SIZE		SECTION PROPERTIES	
QUANITY	2	A =	16.50 in^2
b =	1.5 in	S =	15.13 in^3
d =	5.5 in	I =	41.59 in^4

	(Eq. 16-9)	(Eq. 16-10)	(Eq. 16-11)	(Eq. 16-12)	(Eq. 16-13)	
LOAD CASES	DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W or E	DL+0.75(LL+SL+WorE)	
L_u (ft) =	9	9	9	9	9	
$V_{applied}$ (#) =	21	15	25	28	42	
$M_{applied}$ (ft-#) =	96	70	111	78	154	
$P_{applied}$ (#) =	4593	3340	5323	1253	5323	
C_D =	1	1.15	1.15	1.6	1.6	
BENDING STESS CALCS		F_{bE} (psi)= 17476		C_{bF} = 1		(Table 4a Bending)
F_b* (psi)=	675	776	776	1080	1080	(Eq 3.7-1)
C_L =	1	1	1	1	1	(Eq 3.7-1)
F'_b (psi)=	675	776	776	1080	1080	(Table 4.3.1)
AXIAL STESS CALCS		F_{cE} = 938		C_{cF} = 1		(Table 4a Compression)
L_e/d =	19.64	19.64	19.64	19.64	19.64	(3.7.1.4) <50 Le = (Ke)L
F_c* (psi)=	800	920	920	1280	1280	(Eq 3.7-1)
C_P =	0.742970896	0.697636299	0.697636299	0.576163928	0.576163928	(Eq 3.7-1)
F'c (psi)=	594	642	642	737	737	(Table 4.3.1)
ALLOWABLES	DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W or E	DL+0.75(LL+SL+WorE)	
V_{allow} (#) =	1650	1898	1898	2640	2640	$V_{allow} = A * F_v * C_D / 1.5$
M_{allow} (ft - #) =	851	978	978	1361	1361	$M_{allow} = S*F_b*C_D*C_F \cdot C_L*C_r$
P_{allow} (#) =	19614	21180	21180	24337	24337	$P_{allow} = A * F_c * C_D * C_F * C_P$
$(f_c/F_c')^2 + f_b/(F_b(1-(f_c/F_{cE})$ =	0.21	0.12	0.24	0.07	0.22	(Eq 3.9-3)
$(f_c/F_{cE}) +(f_b/F_{bE})^2$ =	0.30	0.22	0.34	0.08	0.34	(Eq 3.9-4)
$P_{c\perp allow}$ on PL (#) =	6683	6683	6683	6683	6683	$P_{c\perp allow} = A * Fc * C_b$
$P_{c\perp allow}$ on Beam (#) =	6683	6683	6683	6683	6683	$P_{c\perp allow} = A * Fc$
Deflection L/	NA	NA	NA	L/7303	L/9738	L/(I * E / 15 * L *$M_{applied}$)
240	0.00	0.00	0.00	0.01	0.01	(1.0) x W or E Table 1604.3(f)
CHECKS	DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W or E	DL+0.75(LL+SL+Wor	Actual △
SHEAR V	OK	OK	OK	OK	OK	
$V_{applied}/V_{allow}$	1.3%	0.8%	1.3%	1.1%	1.6%	
MOMENT M	OK	OK	OK	OK	OK	
$M_{applied}/M_{allow}$	11.2%	7.1%	11.3%	5.7%	11.3%	
AXIAL P	OK	OK	OK	OK	OK	
$P_{applied}/P_{allow}$	23.4%	15.8%	25.1%	5.1%	21.9%	
$(f_c/F_c')^2 + f_b/(F_b(1-(f_c/F_{cE})$	OK	OK	OK	OK	OK	
$(f_c/F_c')^2 + f_b/(F_b(1-(f_c/F_{cE})$	21.5%	11.6%	23.6%	6.5%	22.0%	
$(f_c/F_{cE}) +(f_b/F_{bE})^2$	OK	OK	OK	OK	OK	
$(f_c/F_{cE}) +(f_b/F_{bE})^2$	29.7%	21.6%	34.4%	8.1%	34.4%	
AXIAL $P_{\perp}$ on PL	OK	OK	OK	OK	OK	
$P_{c^applied}/P_{c\perp allow}$	68.7%	50.0%	79.7%	18.7%	79.7%	
AXIAL $P_{\perp}$ on Beam	OK	OK	OK	OK	OK	
$P_{c^applied}/P_{c\perp allow}$	68.7%	50.0%	79.7%	18.7%	79.7%	
DEFLECTION	OK	OK	OK	OK	OK	
$D_{actual}/D_{allowed}$	0.0%	0.0%	0.0%	3.3%	2.5%	
Overall Check	OK	OK	OK	OK	OK	

Permit Number: 20-01497

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JOB # OLYMAC 1910 SHEET ___ OF ___

DESIGNED ________ DATE ________

CHECKED ________ DATE ________

FTG CHECKS

FB-4

$P = 3690\#$

$A = B^2 = \dfrac{3690\#}{1500\,psf} = 2.46\,sf$

$B = 1.57\,ft \Rightarrow \boxed{F2.0}$

FB-4 + FB-5

$P = 4460\# + 4720\# = 9180\#$

$A = B^2 = \dfrac{9180\#}{1500\,psf} = 6.12\,sf$

$B = 2.47\,ft \Rightarrow \boxed{F3.0}$

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LATERAL DESIGN

By: AEL

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Job # 1910
Designed: AEL
Date: 12/2/19

Project: Olympic

WIND ANALYSIS:

IBC 2015 / ASCE 7-10

Risk Category II — I, II, III or IV Figure 26.5-1A — I_W= 1.00 (ASCE Table 1.5-2)

110 Typical

Basic Wind Speed, V=	110	mph Section 26.5.1	**Exposure Category:**	B	Section 26.7.2
Mean Roof Height, h=	21.00	feet		Alpha =	7
Parapet Height above roof, p=	-	feet		Z_g =	1200
Building Width, B=	59.00	feet			
Building Length, L=	28.00	feet	Enclosed Building		
Natural Period =	0.2066	sec	GCpi =+/-	0.18	Table 26.11-1
Natural Frequency =	4.8403	Hz	>= 1 Hz Therefore, Rigid Structure per Section 26.9		
G =	0.8500	gust effect factor defined in section 26.9			
$K_z = 2.01\,(z/z_g)^{2/alpha}$		(ASCE 7-10 **Table 27.3-1**) Section 27.3.1			
$K_{zt} = (1 + K_1 K_2 K_3)^2$ =	1.00	(ASCE 7-10 **Eq. 26.8-1**) Section 26.8.2			
K_d =	0.85	(ASCE 7-10 **Table 26-1**) Section 26.6			
I =	1.00	(ASCE 7-10 **Table 1.5-2**)			

Windward: P = qGCp - qi(GCpi) (ASCE 7-10) **(Eq. 27.4-1)**

C_p = 0.8 (windward) Figure 27.4-1

h	Table 27.3-1 Sec. 27.3.1	Eq. 27.3-1 Sec. 27.3.2	Eq. 27.4-1a External	Eq. 27.4-1b Internal	Eq. 27.4-1 Total	Eq. 27.4-1 Total
feet	K_z	q_z (psf)	q_zGC_p	$- q_i(GC_{pi})$	q G Cp + qi	q G Cp - qi(GCpi)
15	0.57	15.13	10.29	3.00	13.29	7.29
20	0.62	16.43	11.17	3.00	14.17	8.17
21	0.63	16.66	11.33	3.00	14.33	8.33
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
21	$q=q_h=q_i$=	16.66	11.33	3.00	14.33	8.33
0	$q=q_p$=	0.00	-	-	-	Parapet

Totals

Windward + Leeward		h
Along B	Along L	feet
17.4 (10.4)	14.5 (8.7)	15
18.3 (11.0)	15.3 (9.2)	20
18.4 (11.0)	15.5 (9.3)	21
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
18.4 (11.0)	15.5 (9.3)	21
0.0 (0.0)	0.0 (0.0)	Parapet

( ) values are ASD = ULT x 0.6

Leeward: P = qGCp - qi(GCpi) (ASCE 7-10) **(Eq.27.4-1)**

Figure 27.4-1
C_p = -0.294643 (Leeward along L)
C_p = -0.50 (Leeward along B)

q_h (psf)	External q_hGC_p	Internal $- q_i(GC_{pi})$	Total q G Cp - qi(	Total q G Cp + qi(GCpi)	
16.66	-4.17	3.00	-1.17	-7.17	Along L
16.66	-7.08	3.00	-4.08	-10.08	Along B

Parapet: $P_p = q_p\, GC_{pn}$ (ASCE 7-10) **(Eq. 27.4-4)**

Section 27.4.5
GC_{pn} = 1.5 (Windward Parapet)
GC_{pn} = -1.0 (Leeward Parapet)

q_p(psf)	Windward q_pGC_{pn}	Leeward q_pGC_{pn}
0.00	0.00	0.00

Walls: $P = q_h\,[(GC_p)-(GC_{pi})]$ (ASCE 7-10) **(Eq. 30.4-1)** $h \leq 60$ ft

Table 26.11-1
GC_{pi} = 0.18 (Windward)
GC_{pi} = -0.18 (Leeward)
q_h(psf) = 16.66

Area (ft^2)	GC_p(4&5)	Windward	GC_p(4)	Leeward	GC_p(5)	Leeward
10	1.00	19.7 (11.8)	-1.10	-21.3 (-12.8)	-1.40	-26.3 (-15.8)
25	0.93	18.5 (11.1)	-1.03	-20.2 (-12.1)	-1.26	-24.0 (-14.4)
50	0.88	17.6 (10.6)	-0.98	-19.3 (-11.6)	-1.16	-22.3 (-13.4)
200	0.77	15.9 (9.5)	-0.87	-17.5 (-10.5)	-0.94	-18.7 (-11.2)

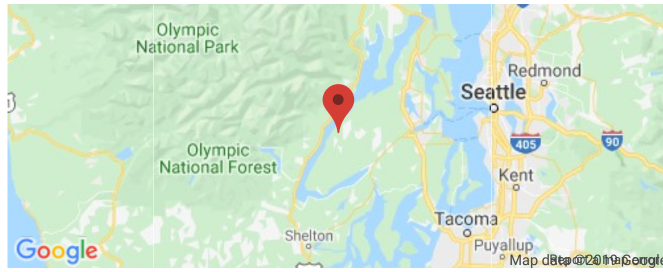
( ) values are ASD = ULT x 0.6

Permit Number: 20-01497

ATC Hazards by Location

Search Information

Coordinates:	47.52551481, -122.97963172
Elevation:	ft
Timestamp:	2019-12-02T15:41:21.673Z
Hazard Type:	Wind



ASCE 7-16

MRI 10-Year	67 mph
MRI 25-Year	73 mph
MRI 50-Year	78 mph
MRI 100-Year	82 mph
Risk Category I	92 mph
Risk Category II	97 mph
Risk Category III	104 mph
Risk Category IV	108 mph

ASCE 7-10

MRI 10-Year	72 mph
MRI 25-Year	79 mph
MRI 50-Year	85 mph
MRI 100-Year	91 mph
Risk Category I	100 mph
Risk Category II	110 mph
Risk Category III-IV	115 mph

ASCE 7-05

ASCE 7-05 Wind Speed	85 mph

The results indicated here DO NOT reflect any state or local amendments to the values or any delineation lines made during the building code adoption process. Users should confirm any output obtained from this tool with the local Authority Having Jurisdiction before proceeding with design.

Disclaimer

Hazard loads are interpolated from data provided in ASCE 7 and rounded up to the nearest whole integer. Per ASCE 7, islands and coastal areas outside the last contour should use the last wind speed contour of the coastal area – in some cases, this website will extrapolate past the last wind speed contour and therefore, provide a wind speed that is slightly higher. NOTE: For queries near wind-borne debris region boundaries, the resulting determination is sensitive to rounding which may affect whether or not it is considered to be within a wind-borne debris region.

Mountainous terrain, gorges, ocean promontories, and special wind regions shall be examined for unusual wind conditions.

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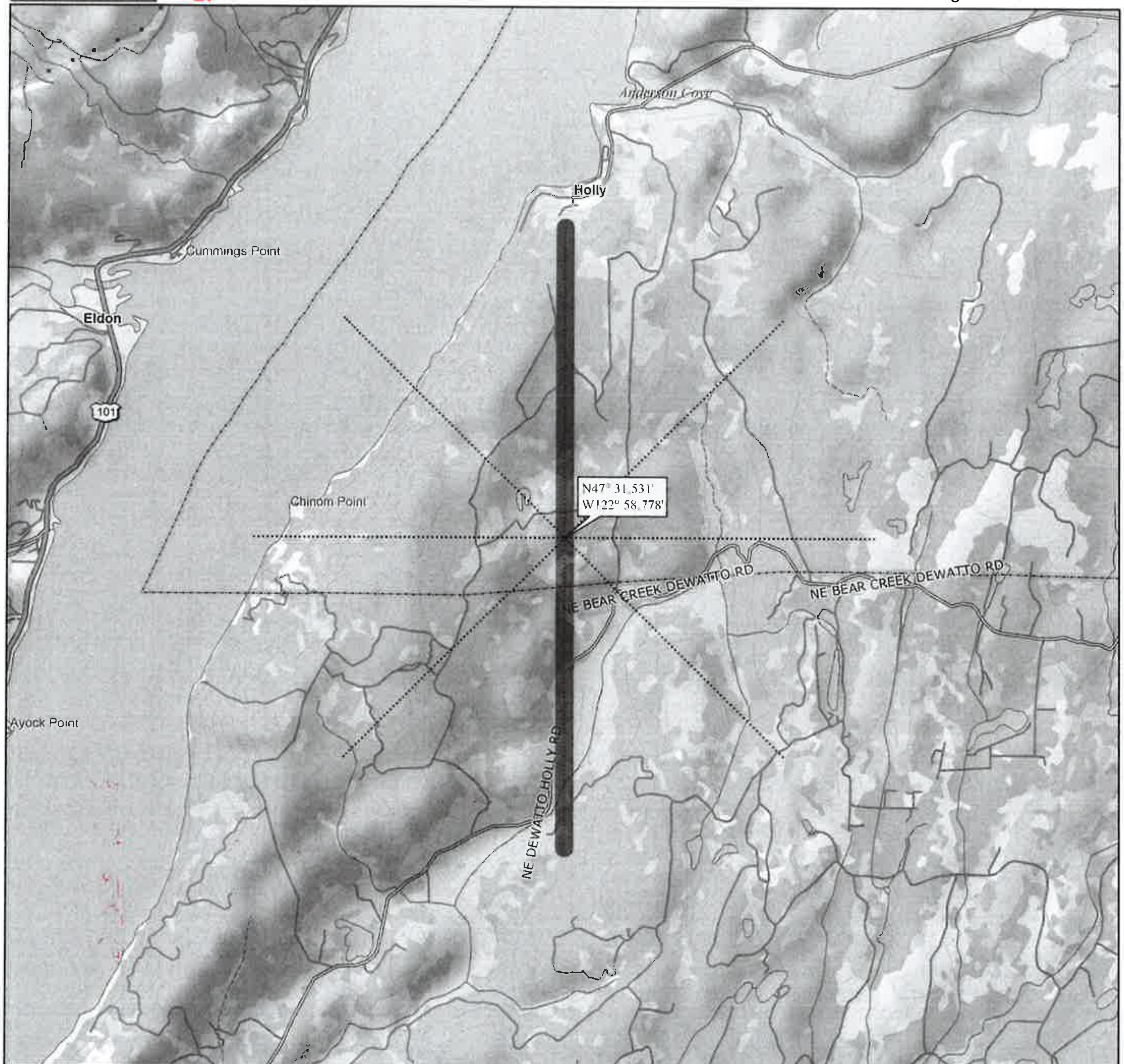
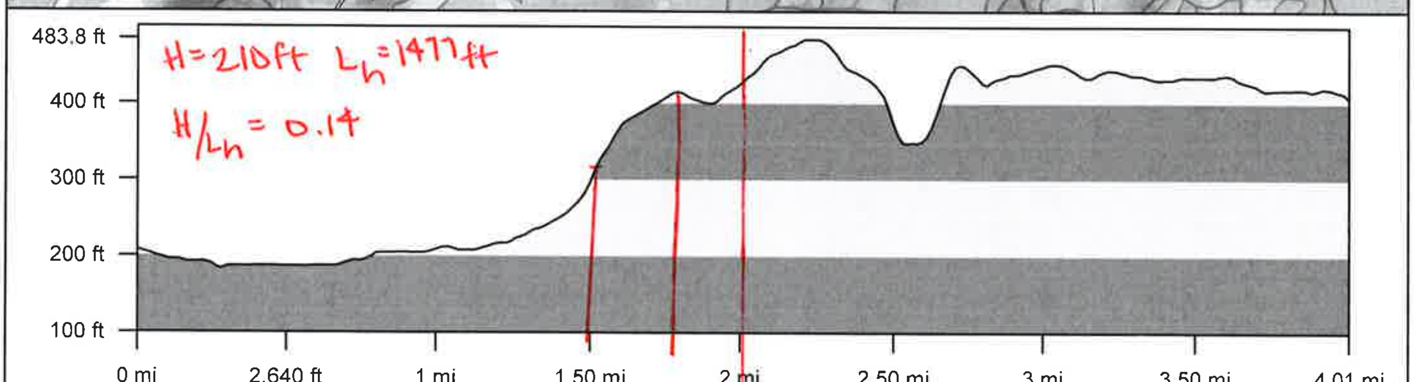
DELORME K_{zt} 1





Lin Dist: 4.0 mi	Terr Dist: 4.0 mi	Elev Gain: 197.9 ft	Avg Grade: 3
Climb Elev: 474.1 ft	Desc Elev: 276.2 ft	Max. Elev: 483.8 ft	Min. Elev: 183.5 ft
Climb Dist: 2.3 mi	Desc Dist: 1.7 mi		

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TN
MN (15.3°E)

Scale 1 : 62,500
1" = 5,208.3 ft
Data Zoom 11-6

Permit Number: 20-01497

K_{ZT} Check 1

26.8 TOPOGRAPHIC EFFECTS

26.8.1 Wind Speed-Up over Hills, Ridges, and Escarpments

Wind speed-up effects at isolated hills, ridges, and escarpments constituting abrupt changes in the general topography, located in any exposure category, shall be included in the determination of the wind loads when buildings and other site conditions and locations of structures meet all of the following conditions:

Y N

☒ ☐ 1. The hill, ridge, or escarpment is isolated and unobstructed upwind by other similar topographic features of comparable height for 100 times the height of the topographic feature (100*H*) or 2 mi (3.22 km), whichever is less. This distance shall be measured horizontally from the point at which the height *H* of the hill, ridge, or escarpment is determined.

☒ ☐ 2. The hill, ridge, or escarpment protrudes above the height of upwind terrain features within a 2-mi (3.22-km) radius in any quadrant by a factor of two or more.

☒ ☐ 3. The structure is located as shown in Fig. 26.8-1 in the upper one-half of a hill or ridge or near the crest of an escarpment.

☐ ☒ 4. $H/L_h \geq 0.2$.

☐ ☐ 5. *H* is greater than or equal to 15 ft (4.5 m) for Exposure C and D and 60 ft (18 m) for Exposure B.

26.8.2 Topographic Factor

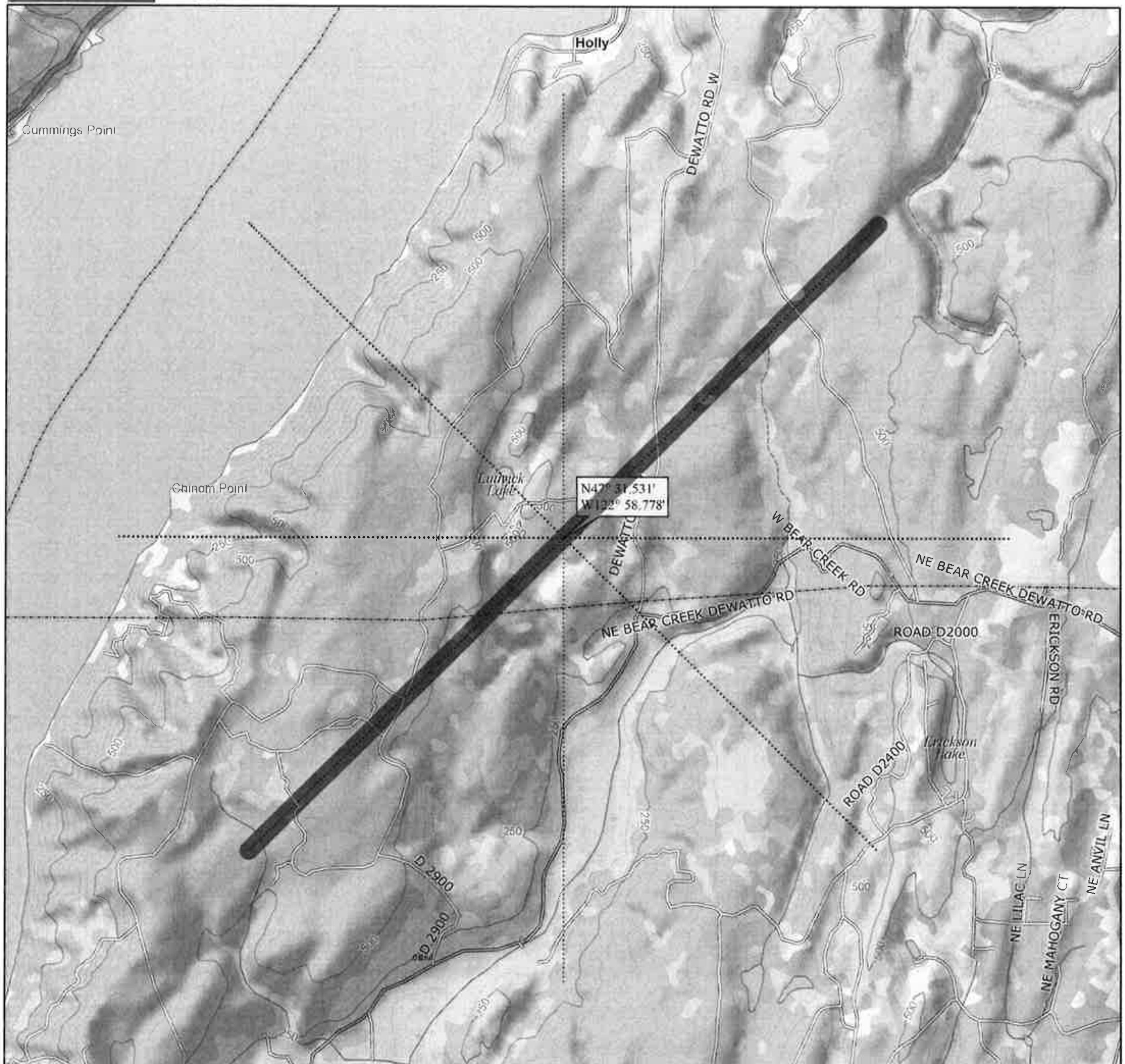
The wind speed-up effect shall be included in the calculation of design wind loads by using the factor K_{zt}:

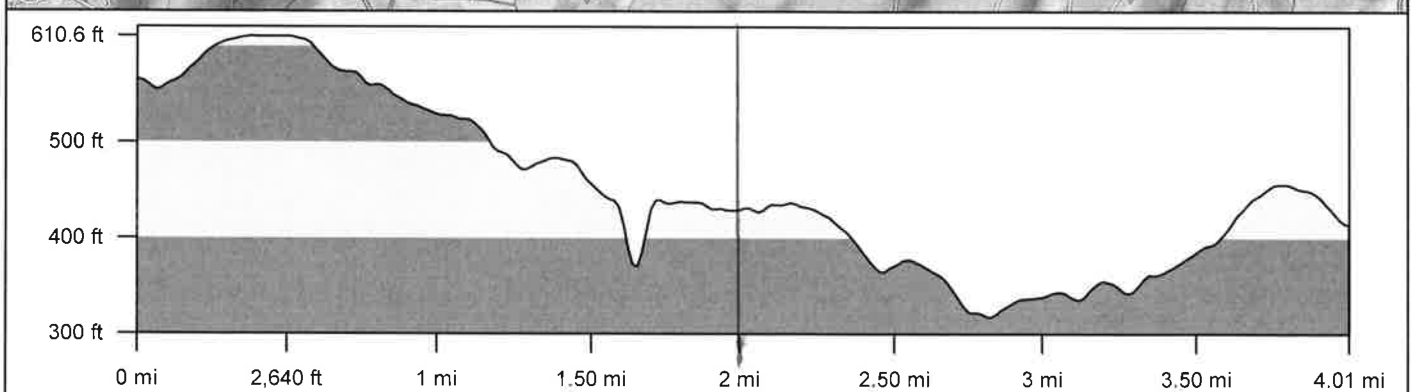
$$K_{zt} = (1 + K_1K_2K_3)^2 \qquad (26.8\text{-}1)$$

where K_1, K_2, and K_3 are given in Fig. 26.8-1.

If site conditions and locations of buildings and other structures do not meet all the conditions specified in Section 26.8.1 then $K_{zt} = 1.0$.

Permit Number: 20-01497





Lin Dist: 4.0 mi	Terr Dist: 4.0 mi	Elev Gain: -151.4 ft	Avg Grade: 3
Climb Elev: 327.5 ft	Desc Elev: 478.9 ft	Max. Elev: 610.6 ft	Min. Elev: 317.6 ft
Climb Dist: 1.7 mi	Desc Dist: 2.3 mi		

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TN
MN (15.3°E)

Scale 1 : 43,750
1" = 3,645.8 ft Data Zoom 12-2

Permit Number: 20-01497

K_{ZT} Check 2

26.8 TOPOGRAPHIC EFFECTS

26.8.1 Wind Speed-Up over Hills, Ridges, and Escarpments

Wind speed-up effects at isolated hills, ridges, and escarpments constituting abrupt changes in the general topography, located in any exposure category, shall be included in the determination of the wind loads when buildings and other site conditions and locations of structures meet all of the following conditions:

Y	N	
☐	☒	1. The hill, ridge, or escarpment is isolated and unobstructed upwind by other similar topographic features of comparable height for 100 times the height of the topographic feature (100H) or 2 mi (3.22 km), whichever is less. This distance shall be measured horizontally from the point at which the height H of the hill, ridge, or escarpment is determined.
☐	☐	2. The hill, ridge, or escarpment protrudes above the height of upwind terrain features within a 2-mi (3.22-km) radius in any quadrant by a factor of two or more.
☐	☐	3. The structure is located as shown in Fig. 26.8-1 in the upper one-half of a hill or ridge or near the crest of an escarpment.
☐	☐	4. $H/L_h \geq 0.2$.
☐	☐	5. H is greater than or equal to 15 ft (4.5 m) for Exposure C and D and 60 ft (18 m) for Exposure B.

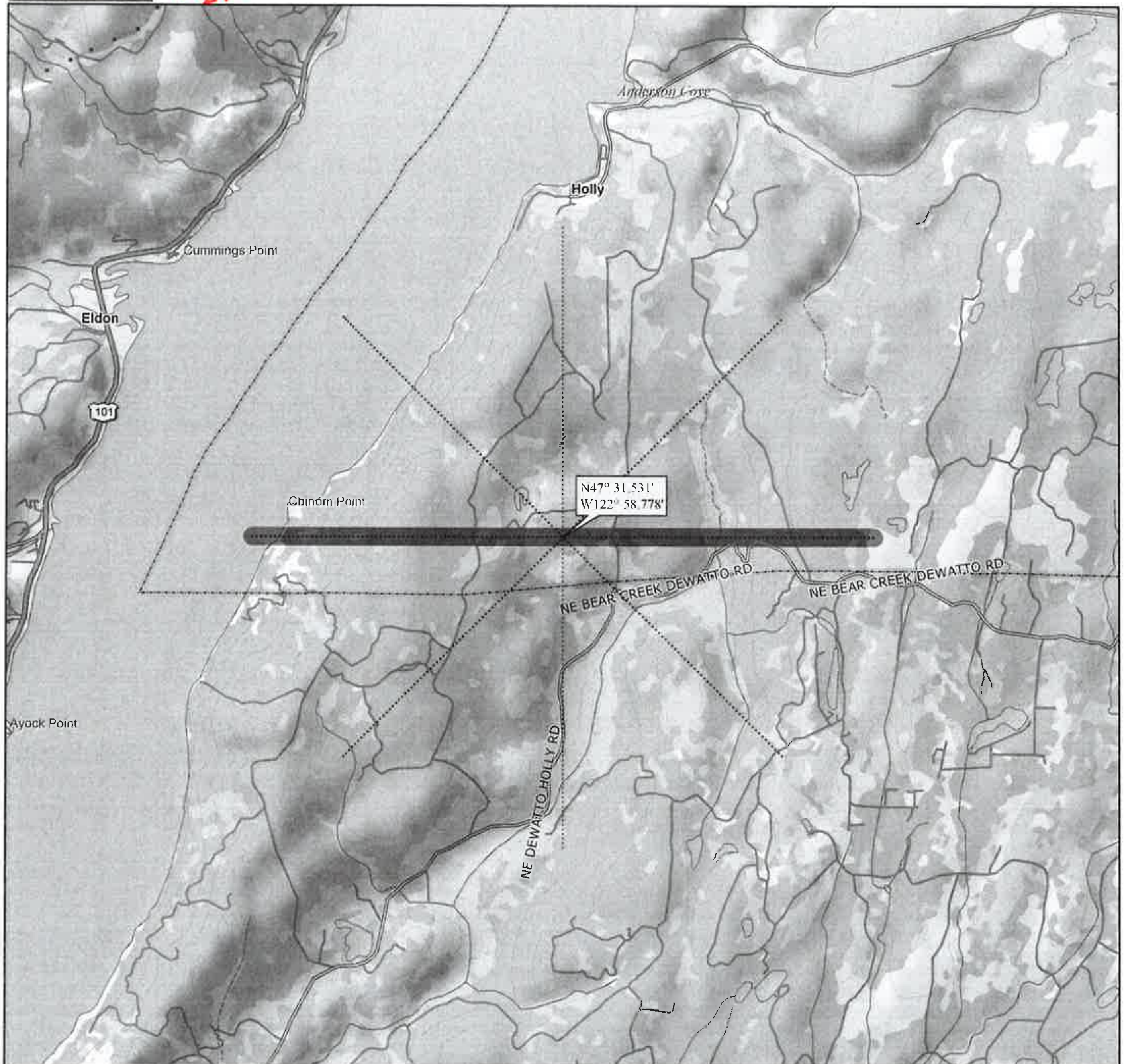
26.8.2 Topographic Factor

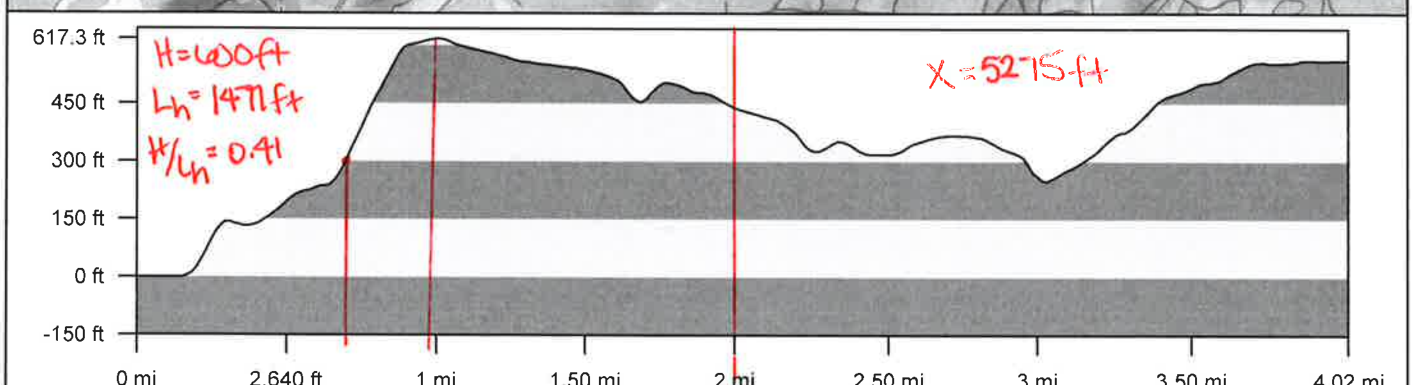
The wind speed-up effect shall be included in the calculation of design wind loads by using the factor K_{zt}:

$$K_{zt} = (1 + K_1 K_2 K_3)^2 \qquad (26.8\text{-}1)$$

where K_1, K_2, and K_3 are given in Fig. 26.8-1.

If site conditions and locations of buildings and other structures do not meet all the conditions specified in Section 26.8.1 then $K_{zt} = 1.0$.





Lin Dist: 4.0 mi	Terr Dist: 4.0 mi	Elev Gain: 561.0 ft	Avg Grade: 7
Climb Elev: 1,071.0 ft	Desc Elev: 510.0 ft	Max. Elev: 617.3 ft	Min. Elev: -0.2 ft
Climb Dist: 2.1 mi	Desc Dist: 1.9 mi		

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Kzt = 1.0

TN

MN (15.3°E)

Scale 1 : 62,500

1" = 5,208.3 ft

Data Zoom 11-6

Permit Number: 20-01497

K_{ZT} Check 3

26.8 TOPOGRAPHIC EFFECTS

26.8.1 Wind Speed-Up over Hills, Ridges, and Escarpments

Wind speed-up effects at isolated hills, ridges, and escarpments constituting abrupt changes in the general topography, located in any exposure category, shall be included in the determination of the wind loads when buildings and other site conditions and locations of structures meet all of the following conditions:

Y	N	
☒	☐	1. The hill, ridge, or escarpment is isolated and unobstructed upwind by other similar topographic features of comparable height for 100 times the height of the topographic feature (100*H*) or 2 mi (3.22 km), whichever is less. This distance shall be measured horizontally from the point at which the height *H* of the hill, ridge, or escarpment is determined.
☒	☐	2. The hill, ridge, or escarpment protrudes above the height of upwind terrain features within a 2-mi (3.22-km) radius in any quadrant by a factor of two or more.
☒	☐	3. The structure is located as shown in Fig. 26.8-1 in the upper one-half of a hill or ridge or near the crest of an escarpment.
☒	☐	4. $H/L_h \geq 0.2$.
☒	☐	5. *H* is greater than or equal to 15 ft (4.5 m) for Exposure C and D and 60 ft (18 m) for Exposure B.

26.8.2 Topographic Factor

The wind speed-up effect shall be included in the calculation of design wind loads by using the factor K_{zt}:

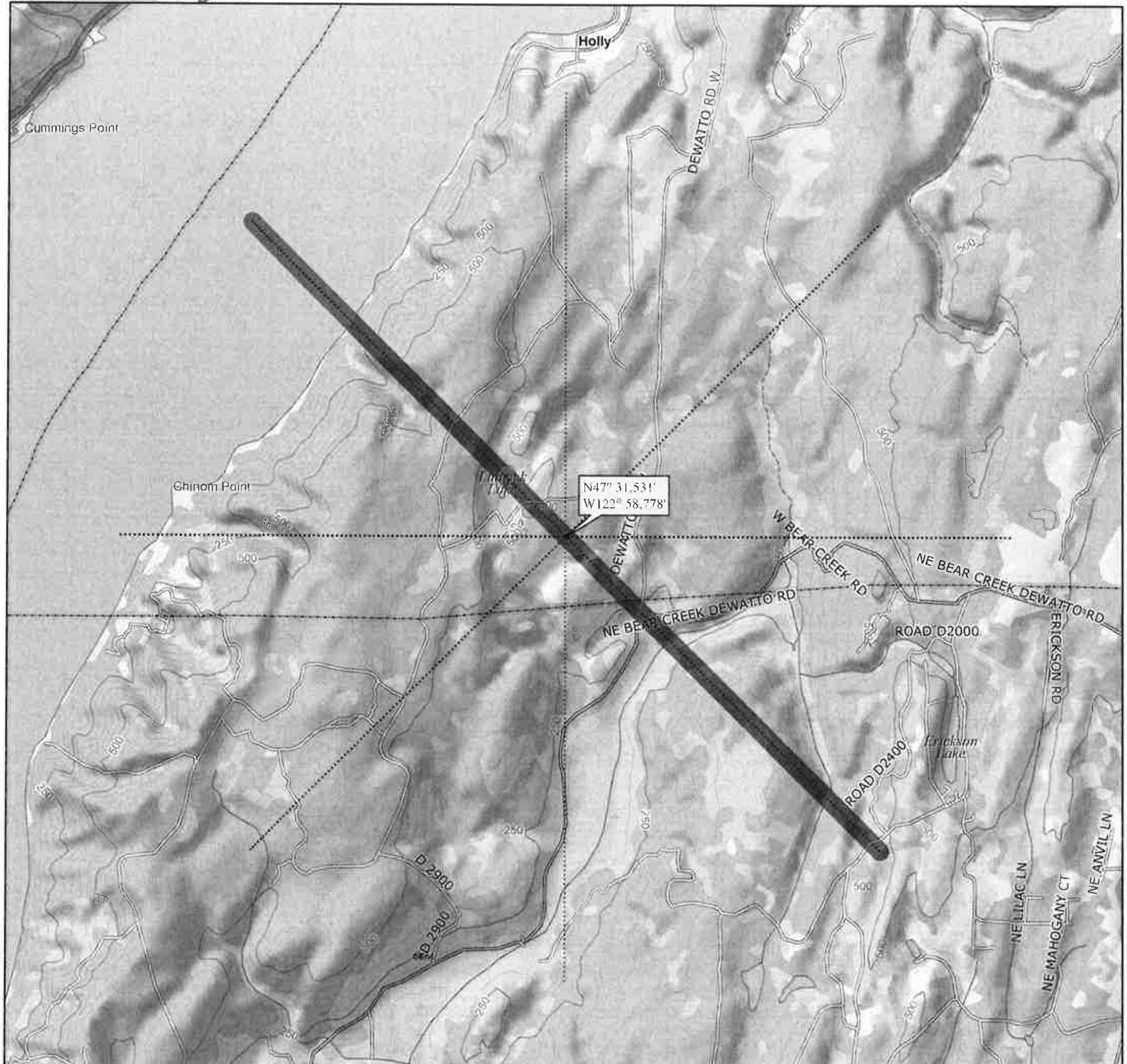
$$K_{zt} = (1 + K_1 K_2 K_3)^2 \qquad (26.8\text{-}1)$$

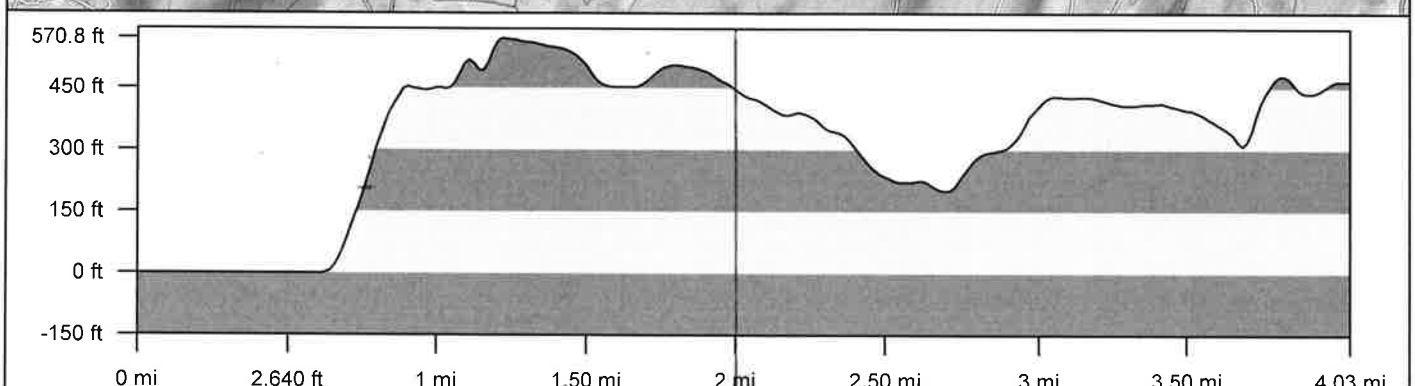
where K_1, K_2, and K_3 are given in Fig. 26.8-1.

If site conditions and locations of buildings and other structures do not meet all the conditions specified in Section 26.8.1 then $K_{zt} = 1.0$.

TOO FAR UPWIND

$K_{zt} = 1.0$





Lin Dist: 4.0 mi	Terr Dist: 4.0 mi	Elev Gain: 466.1 ft	Avg Grade: 8
Climb Elev: 1,107.2 ft	Desc Elev: 641.1 ft	Max. Elev: 570.8 ft	Min. Elev: -0.6 ft
Climb Dist: 1.5 mi	Desc Dist: 2.0 mi		

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TN
MN (15.3°E)

Scale 1 : 43,750
1" = 3,645.8 ft Data Zoom 12-2

K_{ZT} Check A

26.8 TOPOGRAPHIC EFFECTS

26.8.1 Wind Speed-Up over Hills, Ridges, and Escarpments

Wind speed-up effects at isolated hills, ridges, and escarpments constituting abrupt changes in the general topography, located in any exposure category, shall be included in the determination of the wind loads when buildings and other site conditions and locations of structures meet all of the following conditions:

Y N

☐ ☒ 1. The hill, ridge, or escarpment is isolated and unobstructed upwind by other similar topographic features of comparable height for 100 times the height of the topographic feature (100H) or 2 mi (3.22 km), whichever is less. This distance shall be measured horizontally from the point at which the height H of the hill, ridge, or escarpment is determined.

☐ ☐ 2. The hill, ridge, or escarpment protrudes above the height of upwind terrain features within a 2-mi (3.22-km) radius in any quadrant by a factor of two or more.

☐ ☐ 3. The structure is located as shown in Fig. 26.8-1 in the upper one-half of a hill or ridge or near the crest of an escarpment.

☐ ☐ 4. $H/L_h \geq 0.2$.

☐ ☐ 5. H is greater than or equal to 15 ft (4.5 m) for Exposure C and D and 60 ft (18 m) for Exposure B.

26.8.2 Topographic Factor

The wind speed-up effect shall be included in the calculation of design wind loads by using the factor K_{zt}:

$$K_{zt} = (1 + K_1 K_2 K_3)^2 \qquad (26.8\text{-}1)$$

where K_1, K_2, and K_3 are given in Fig. 26.8-1.

If site conditions and locations of buildings and other structures do not meet all the conditions specified in Section 26.8.1 then $K_{zt} = 1.0$.

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Job # 1910 (1903)	***Sheet:***		
Designed: AEL	***Date:*** 12/2/19		
Checked:	***Date:***		

Project: Olympic

SEISMIC ANALYSIS:

IBC 2015 / ASCE 7-10

Site Class:

Site Class: D (IBC 1613.3.2, ASCE Table 20.3-1)

Site Location:

Latitude: 47.5255 Longitude: -122.9796

Site Coefficients: (USGS Open-File Report 01-437)

$S_S =$ 1.42 $F_a =$ 1.00

$S_1 =$ 0.585 $F_V =$ 1.50

$S_{MS} = F_a * S_S =$ 1.42 (IBC Eq.16-37)

$S_{M1} = F_V * S_1 =$ 0.877 (IBC Eq.16-38)

Spectral Response Parameters:

$S_{DS} = 2/3 * S_{MS} =$ 0.9467 (IBC Eq.16-39)

$S_{D1} = 2/3 * S_{M1} =$ 0.5847 (IBC Eq.16-40)

Structure Period:

$T_a = C_t * (h_n)^x =$ 0.1674 (ASCE Eq. 12.8-7)

$h_n =$ 17 Ft.

$C_t =$ 0.02 (ASCE Table 12.8-2)

$x =$ 0.75 (ASCE Table 12.8-2)

$C_u =$ 1.4 (ASCE Table 12.8-1)

$T_{(MAX)} = C_u * T_a =$ 0.2344 (ASCE 12.8.2)

Seismic Use Group:

Risk Category: I or II | I or II, III, IV (ASCE7 11.5.1) I = 1.00 (ASCE Table 1.5-2)

Seismic Design Category:

Seismic Design Category: D (IBC 1613.3.5, ASCE 11.6)

Seismic Design Category(S_{DS}): D IBC Table 1613.3.5(1), ASCE Table 11.6-1 Short Period (S_{DS})

Seismic Design Category(S_{D1}): D IBC Table 1613.3.5(2), ASCE Table 11.6-2 1 Second Period (S_{D1})

Seismic Response Coefficients

$\mathbf{C_S = S_{DS}/(R/I_E) =}$ 0.1456 (ASCE Eg 12.8-2)

$R =$ 6.50 (ASCE 7 Table 12.2-1) wood shear wall

$I_E =$ 1.00 (ASCE Table 1.5-2)

CS(Max) = 0.5372

$S_{D1} / ((R / I_E) * Ta) =$ 0.5372 (ASCE Eq 12.8-3) for T <= T_L OK $T_L =$ 4

$S_{D1}*T_L / ((R / I_E) * Ta\text{^}2) =$ 12.8328 (ASCE Eq 12.8-4) for T <= T_L OK ASCE Section 12.8 & 11.4.5

CS(Min) = 0.04 (ASCE fig. 22-12 thru 22-16)

$0.044\ S_{DS}\ I >= .01 =$ 0.04 (ASCE Eq 12.8-5)

Not Required S1<=0.6g (ASCE Eq 12.8-6)

$V = C_S * W =$ 0.1456 W (Ultimate Strength)

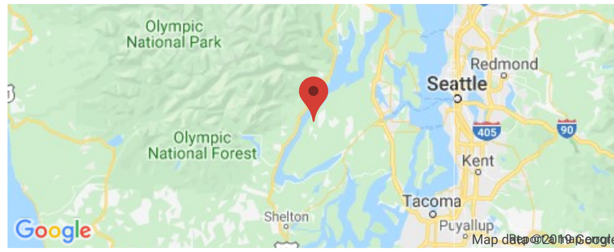
$V_a = C_S/1.4 * W =$ 0.1040 W (Allowable Stress)

Permit Number: 20-01497

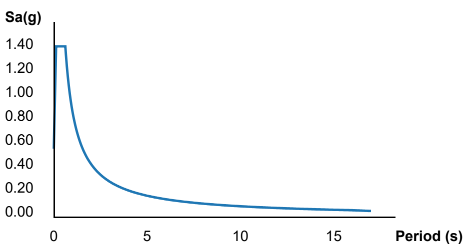
Hazards by Location

Search Information

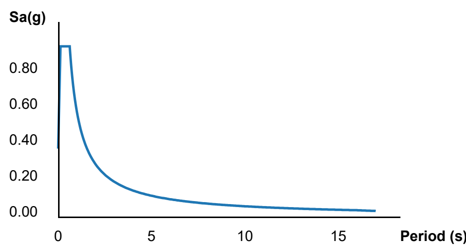
Coordinates:	47.52551481, -122.97963172
Elevation:	ft
Timestamp:	2019-12-02T15:44:18.688Z
Hazard Type:	Seismic
Reference Document:	ASCE7-10
Risk Category:	II
Site Class:	D



MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	1.42	MCE$_R$ ground motion (period=0.2s)
S_1	0.585	MCE$_R$ ground motion (period=1.0s)
S_{MS}	1.42	Site-modified spectral acceleration value
S_{M1}	0.877	Site-modified spectral acceleration value
S_{DS}	0.947	Numeric seismic design value at 0.2s SA
S_{D1}	0.585	Numeric seismic design value at 1.0s SA

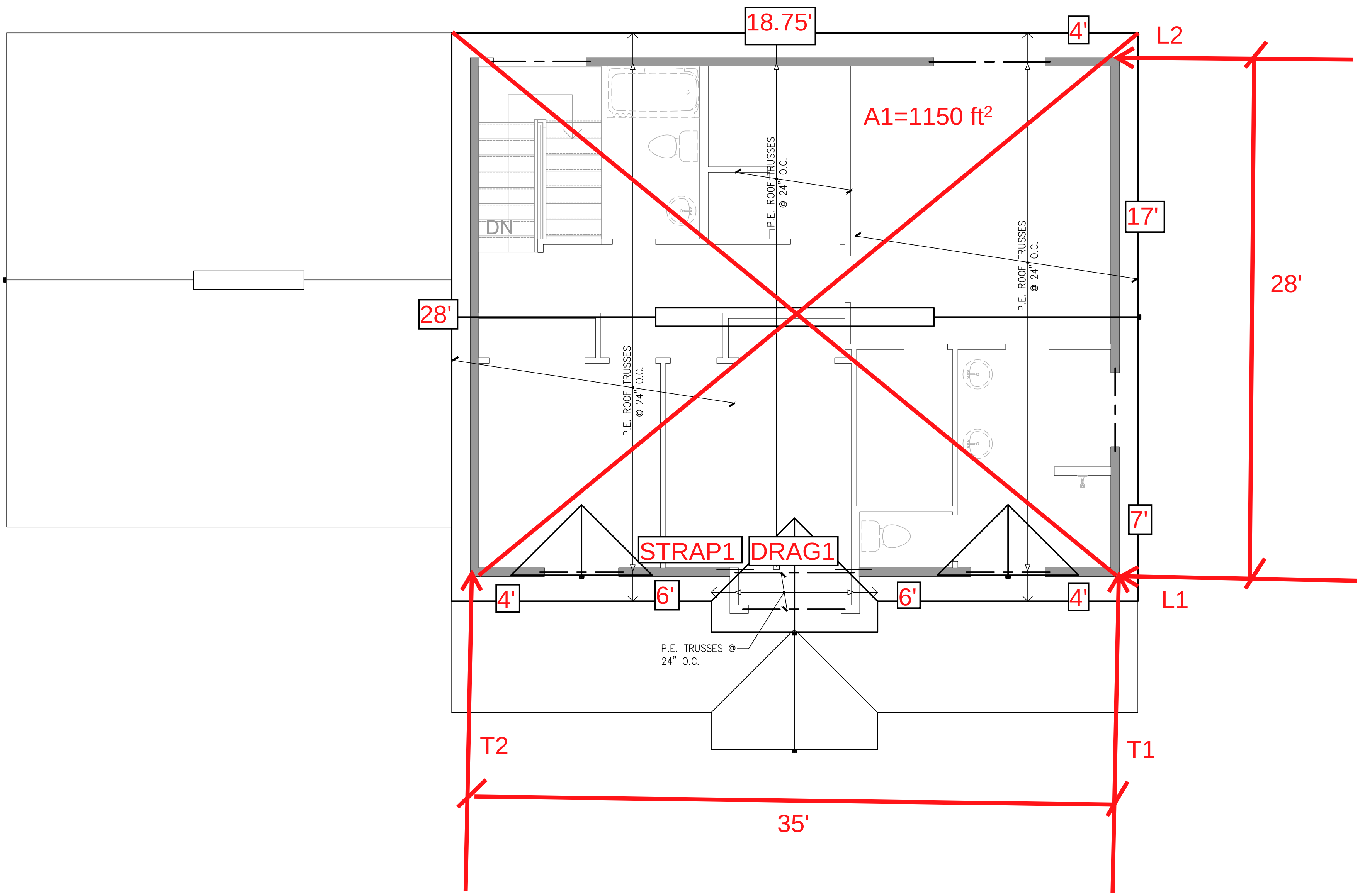
Additional Information

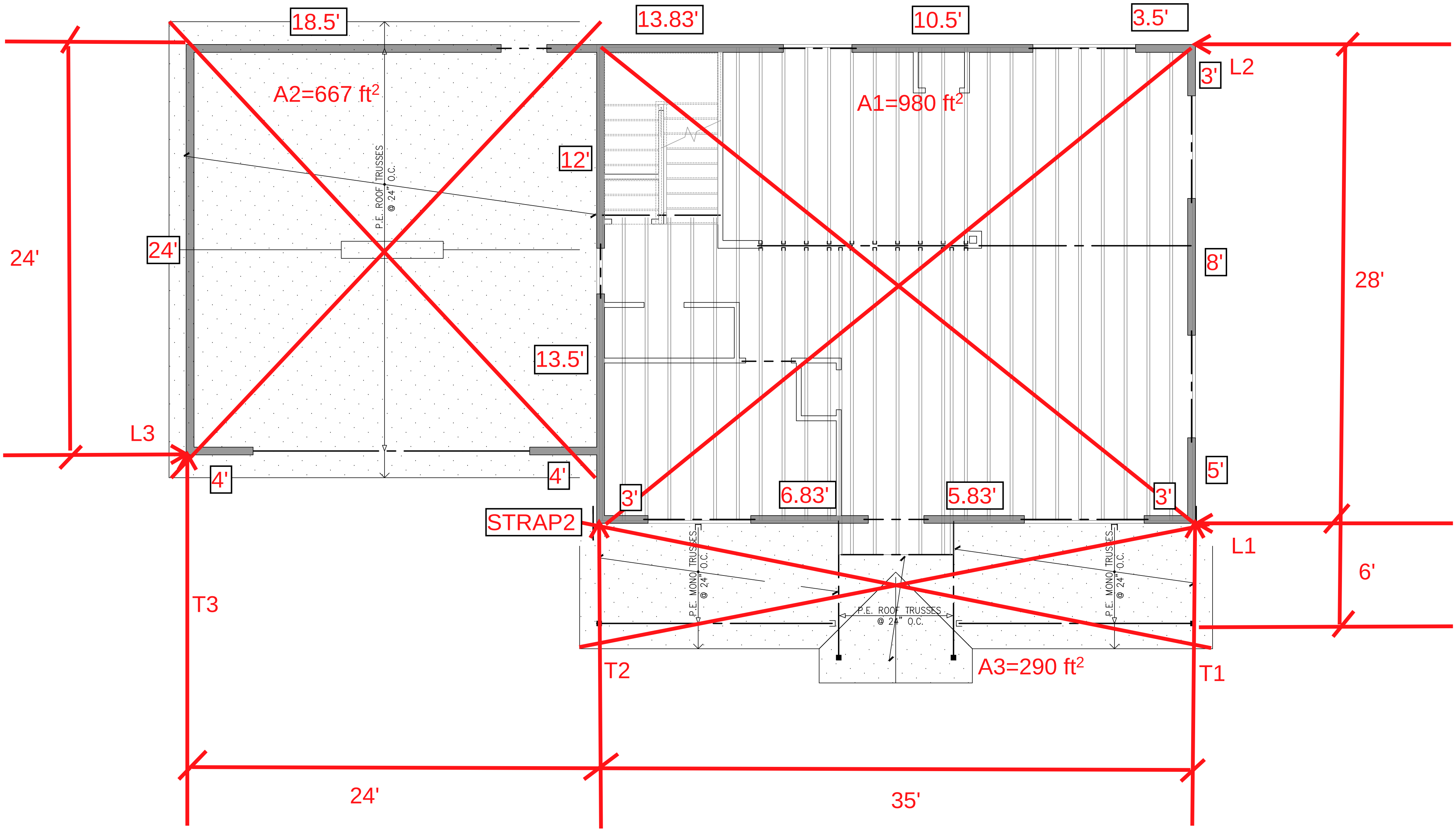
Name	Value	Description
SDC	D	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	1.5	Site amplification factor at 1.0s
CR_S	0.979	Coefficient of risk (0.2s)
CR_1	0.935	Coefficient of risk (1.0s)
PGA	0.526	MCE$_G$ peak ground acceleration
F_{PGA}	1	Site amplification factor at PGA
PGA_M	0.526	Site modified peak ground acceleration
T_L	16	Long-period transition period (s)
SsRT	1.42	Probabilistic risk-targeted ground motion (0.2s)
SsUH	1.45	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	1.5	Factored deterministic acceleration value (0.2s)
S1RT	0.585	Probabilistic risk-targeted ground motion (1.0s)
S1UH	0.626	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	0.6	Factored deterministic acceleration value (1.0s)
PGAd	0.526	Factored deterministic acceleration value (PGA)

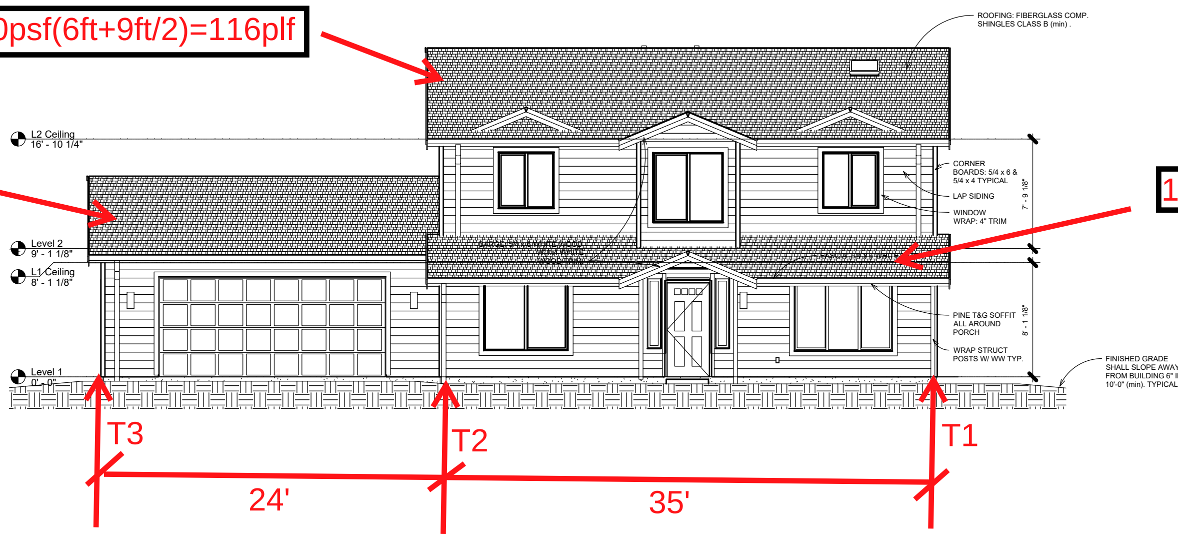
The results indicated here DO NOT reflect any state or local amendments to the values or any delineation lines made during the building code adoption process. Users should confirm any output obtained from this tool with the local Authority Having Jurisdiction before proceeding with design.

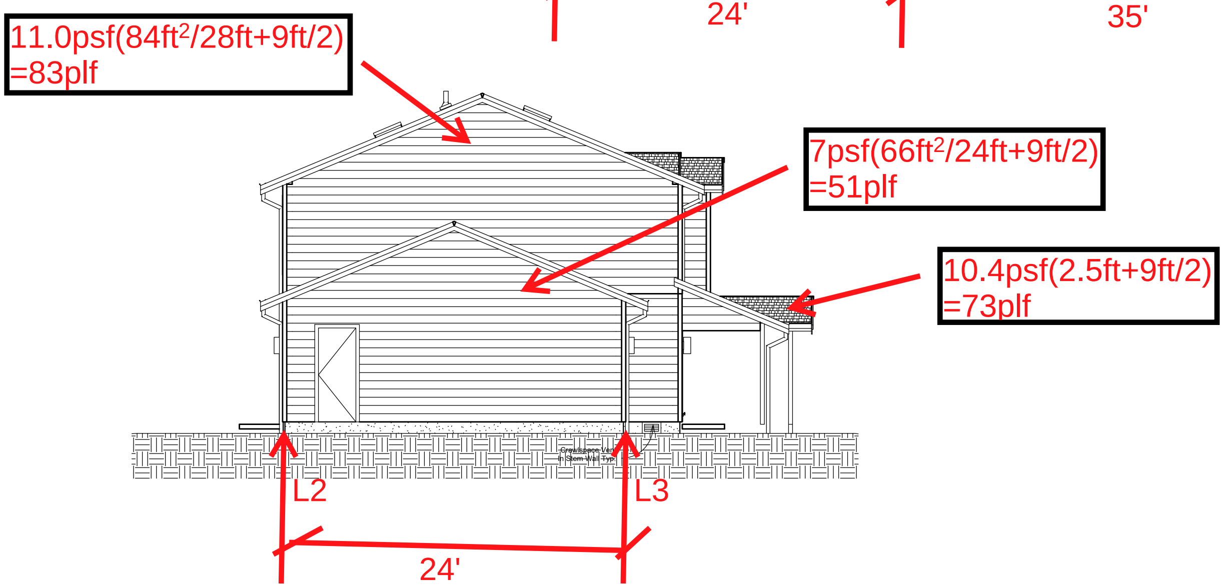
Disclaimer

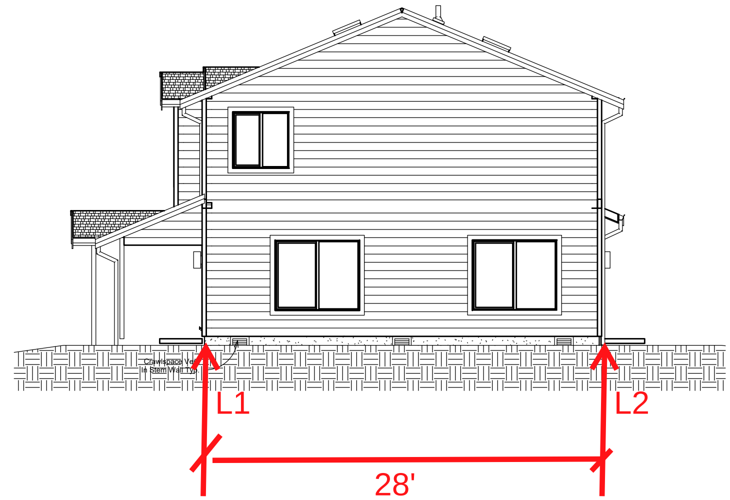
Permit Number: **20-01497**


18.75'
4'
L2
A1=1150 ft²
17'
28'
28'
DN
P.E. ROOF TRUSSES @ 24" O.C.
P.E. ROOF TRUSSES @ 24" O.C.
P.E. ROOF TRUSSES @ 24" O.C.
7'
STRAP1
DRAG1
4'
6'
6'
4'
L1
P.E. TRUSSES @ 24" O.C.
T2
T1
35'


18.5'
13.83'
10.5'
3.5'
A2=667 ft2
A1=980 ft2
L2
3'
12'
24'
24'
8'
28'
13.5'
L3
4'
4'
3'
6.83'
5.83'
3'
5'
STRAP2
L1
6'
T3
P.E. ROOF TRUSSES @ 24" O.C.
P.E. MONO TRUSSES @ 24" O.C.
A3=290 ft2
T2
T1
24'
35'


11.0psf(6ft+9ft/2)=116plf
10.4psf(5.5ft+9ft/2)
=104plf
10.4psf(8ft/2+9ft/2)=89plf
ROOFING: FIBERGLASS COMP.
SHINGLES CLASS B (min).
L2 Ceiling
16' - 10 1/4"
Level 2
9' - 1 1/8"
L1 Ceiling
8' - 1 1/8"
Level 1
0' - 0"
CORNER
BOARDS: 5/4 x 6 &
5/4 x 4 TYPICAL
LAP SIDING
WINDOW
WRAP: 4" TRIM
7' - 9 1/8"
8' - 1 1/8"
PINE T&G SOFFIT
ALL AROUND
PORCH
WRAP STRUCT
POSTS W/ WW TYP.
FINISHED GRADE
SHALL SLOPE AWAY
FROM BUILDING 6" IN
10'-0" (min). TYPICAL
T3
T2
T1
24'
35'


11.0psf(84ft²/28ft+9ft/2)
=83plf
7psf(66ft²/24ft+9ft/2)
=51plf
10.4psf(2.5ft+9ft/2)
=73plf
L2
L3
24'


L1
L2
28'

2 Story *Olympic*	*1910*	**Seismic Weights(ROOF)**								
A1	DL(PSF)	∑Area (ft^2)		W(kips)		∑Total W (kips)				
Roof:	15.0	1150.0		17.3						
				0.0						
		∑L(ft)	H/2(ft)	W(kips)			Va=Cs/1.4*W	/ L(ft) =	PLF	
Walls:	12.0	112.0	4.0	5.4		Cs/1.4=	0.1040			"L"
Below				0.0		**22.626**	***2.35***	28.00	***84***	
	12.0	122.5	4.0	5.9						
Below				0.0		**23.130**	***2.41***	35.00	***69***	"T"

2 Story *Olympic*	*1910*	**Seismic Weights(FLOOR)**								
A1	DL(PSF)	∑Area (ft^2)		W(kips)		∑Total W (kips)				
Floor:	15.0	980.0		14.7						
				0.0						
		∑L(ft)	H/2(ft)	W(kips)			Va=Cs/1.4*W	/ L(ft) =	PLF	
Walls:	12.0	84.0	8.5	8.6		Cs/1.4=	0.1040			"L"
Below				0.0		**23.268**	***2.42***	28.00	***86***	
	12.0	87.5	8.5	8.9						
Below				0.0		**23.625**	***2.46***	35.00	***70***	"T"

A2	DL(PSF)	∑Area (ft^2)		W(kips)		∑Total W (kips)				
Floor:	15.0	667.0		10.0						
				0.0						
		∑L(ft)	H/2(ft)	W(kips)						
Walls:	12.0	48.0	4.5	2.6						"L"
Below				0.0		**12.6**	***1.31***	24.00	***55***	
	12.0	48.0	4.5	2.6						
Below				0.0		**12.6**	***1.31***	24.00	***55***	"T"

A3	DL(PSF)	∑Area (ft^2)		W(kips)		∑Total W (kips)				
Floor:	15.0	290.0		4.4						
				0.0						
		∑L(ft)	H/2(ft)	W(kips)						
Walls:	12.0	0.0	4.5	0.0						"L"
Below				0.0		**4.4**	***0.45***	6.00	***75***	
	12.0	35.0	4.5	1.9						
Below				0.0		**6.2**	***0.65***	35.00	***19***	"T"

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Job # 1910 **Sheet:**
Designed: AEL **Date:** 8/21/19
Checked: **Date:**

Project: Olympic

(A1) VERTICAL DISTRIBUTION:

Wall Direction (↑↓)

Level	W (lb)	C_s	V (lb)	h (ft)	Wh (lb-ft)	C_{vx}	F_x	PLF
Roof	22626	0.1040	2353	17	384642	0.647487	3.090	110
2nd Floor	23268	0.1040	2420	9	209412	0.352513	1.683	60
		Σ	4773	Σ	594054			

Wall Direction (←→)

Level	W (lb)	C_s	V (lb)	h (ft)	Wh (lb-ft)	C_{vx}	F_x	PLF
Roof	23130	0.1040	2406	17	393210	0.649038	3.156	90
2nd Floor	23625	0.1040	2457	9	212625	0.350962	1.707	49
		Σ	4863	Σ	605835			

Permit Number: 20-01497

L1												
Level	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Vw Each	**Vw Total(k)**
Roof	83	14.00									1162	**1.16**
L1												
Level	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Vs Each	**Vs Total (k)**
Roof	110	14.00									1540.000	**1.54**

L2												
Level	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Vw Each	**Vw Total(k)**
Roof	83	14.00									1162	**1.16**
L2												
Level	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Vs Each	**Vs Total (k)**
Roof	110	14.00									1540	**1.54**

T1													
Level	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Vw Each	**Vw Total(k)**
Roof	116	17.50									2030	**2.03**
T1												
Level	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Vs Each	**Vs Total (k)**
Roof	90	17.50									1575	**1.58**

T2												
Level	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Vw Each	**Vw Total(k)**
Roof	116	17.50									2030	**2.03**
T2												
Level	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Vs Each	**Vs Total (k)**
Roof	90	17.50									1575	**1.58**

L1												
Level	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Vw Each	**Vw Total(k)**
Floor	89	14.00	73	6.00							1684	**1.68**

L1												
Level	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Vs Each	**Vs Total (k)**
Floor	60	14.00	75	6.00							1290.000	**1.29**

L2												
Level	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Vw Each	**Vw Total(k)**
Floor	89	14.00									1246	**1.25**

L2												
Level	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Vs Each	**Vs Total (k)**
Floor	60	14.00	55	12.00							1500	**1.50**

L3												
Level	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Vw Each	**Vw Total(k)**
Floor	51	12.00									612	**0.61**

L3												
Level	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Vs Each	**Vs Total (k)**
Floor	55	12.00									660	**0.66**

T1												
Level	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Vw Each	**Vw Total(k)**
Floor	89	17.50									1558	**1.56**
T1												
Level	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Vs Each	**Vs Total (k)**
Floor	49	17.50	19	17.50							1190	**1.19**

T2												
Level	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Vw Each	**Vw Total(k)**
Floor	89	17.50	104	12.00							2806	**2.81**
T2												
Level	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Vs Each	**Vs Total (k)**
Floor	49	17.50	19	17.50	55	12.00					1850	**1.85**

T3												
Level	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Vw Each	**Vw Total(k)**
Floor	104	12.00									1248	**1.25**
T3												
Level	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Vs Each	**Vs Total (k)**
Floor	55	12.00									660	**0.66**

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Job # 1910

Designed: AEL ***Date:*** 12/3/19

Checked: ***Date:***

Project: Olympic

L1

0.5 (ft) holdown dist from end

Roof:			Wind (ASD):		1.16 kips		58 #/ft												58 #/ft	
W1			Seismic (ASD):		1.54 kips		77 #/ft												77 #/ft	
	4 ft		6 ft		6 ft		4 ft		0 ft		0 ft		0 ft		0 ft		0 ft		8 ft 20	Actual
Distribution L	4 ft		6 ft		6 ft		4 ft		0 ft		0 ft		0 ft		0 ft		0 ft		20	Distribu
h/b_s =	2	W1	1.333	W1	1.333	W1	2	W1												
DL w (plf) =	312		312		312		312		0		0		0		0		0			
$0.6M_R$ (#-ft) =	1497		3369		3369		1497		0		0		0		0		0			
	W	E	W	E	W	E	W	E	W	E	W	E	W	E	W	E	W	E		
PLF	58	77	58	77	58	77	58	77	0	0	0	0	0	0	0	0	0	0		
M_{ot} (#-ft) =	1856	2464	2784	3696	2784	3696	1856	2464	0	0	0	0	0	0	0	0	0	0		
F (#) =	102	276	-106	59	-106	59	102	276	0	0	0	0	0	0	0	0	0	0		
Holdown	1000	-	1000	-	1000	-	1000	-	1000	-	1000	-	1000	-	1000	-	1000	-		
	No Holdown OK		No Holdown OK		No Holdown OK		No Holdown OK		No Holdown OK		No Holdown OK		No Holdown OK		No Holdown OK		No Holdown OK			

2nd Floor			Wind (ASD):		1.68 kips		152 #/ft												170 #/ft	
W1			Seismic (ASD):		1.29 kips		152 #/ft												170 #/ft	
	3 ft		6.83 ft		5.83 ft		3 ft		0 ft		0 ft		0 ft		0 ft		0 ft		9 ft 18.66	Actual
Distribution L	2 ft		6.83 ft		5.83 ft		2 ft		0 ft		0 ft		0 ft		0 ft		0 ft		16.66	Distribu
h/b_s =	3	W1	1.318	W1	1.544	W1	3	W1												
DL w (plf) =	208		208		255		255		0		0		0		0		0			
$0.6M_R$ (#-ft) =	560		2904		2600		689		0		0		0		0		0			
	W	E	W	E	W	E	W	E	W	E	W	E	W	E	W	E	W	E		
PLF	114	113	170	170	170	170	114	113	0	0	0	0	0	0	0	0	0	0		
M_{ot} (#-ft) =	3068	3058	10479	10442	8944	8913	3068	3058	0	0	0	0	0	0	0	0	0	0		
F (#) =	1003	1275	1197	1250	1190	1244	952	1224	0	0	0	0	0	0	0	0	0	0		
Holdown	2640	ST1	2640	ST1	2640	ST1	2640	ST1	1000	-	1000	-	1000	-	1000	-	1000	-		
1.05	STHD10 OK		STHD10 OK		STHD10 OK		STHD10 OK		No Holdown OK		No Holdown OK		No Holdown OK		No Holdown OK		No Holdown OK			

Permit Number: 20-01497

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Job # 1910

Designed: AEL ***Date:*** 12/3/19

Checked: ***Date:***

Project: Olympic

L2

0.5 (ft) holdown dist from end

Roof:			Wind (ASD):		1.16 kips		51 #/ft												51 #/ft	
W1			Seismic (ASD):		1.54 kips		68 #/ft												68 #/ft	
	18.75 ft		4 ft		0 ft		0 ft		0 ft		0 ft		0 ft		0 ft		0 ft		8 ft 22.75	Actual
Distribution L	18.75 ft		4 ft		0 ft		0 ft		0 ft		0 ft		0 ft		0 ft		0 ft		22.75	Distribu
h/b_s =	0.427	W1	2	W1																
DL w (plf) =	312		312		0		0		0		0		0		0		0			
$0.6M_R$ (#-ft) =	32900		1497		0		0		0		0		0		0		0			
	W	E	W	E	W	E	W	E	W	E	W	E	W	E	W	E	W	E		
PLF	51	68	51	68	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
M_{ot} (#-ft) =	7648	10154	1632	2166	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
F (#) =	-1384	-1246	38	191	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Holdown	1000	-	1000	-	1000	-	1000	-	1000	-	1000	-	1000	-	1000	-	1000	-		
	No Holdown OK		No Holdown OK		No Holdown OK		No Holdown OK		No Holdown OK		No Holdown OK		No Holdown OK		No Holdown OK		No Holdown OK			

2nd Floor			Wind (ASD):		1.25 kips		52 #/ft												53 #/ft	
W1			Seismic (ASD):		1.5 kips		66 #/ft												67 #/ft	
	18.5 ft		13.83 ft		10.5 ft		3.5 ft		0 ft		0 ft		0 ft		0 ft		0 ft		9 ft 46.33	Actual
Distribution L	18.5 ft		13.83 ft		10.5 ft		2.722 ft		0 ft		0 ft		0 ft		0 ft		0 ft		45.552	Distribu
h/b_s =	0.486	W1	0.651	W1	0.857	W1	2.571	W1												
DL w (plf) =	292		90		180		180		0		0		0		0		0			
$0.6M_R$ (#-ft) =	29975		5164		5954		662		0		0		0		0		0			
	W	E	W	E	W	E	W	E	W	E	W	E	W	E	W	E	W	E		
PLF	53	67	53	67	53	67	41	52	0	0	0	0	0	0	0	0	0	0		
M_{ot} (#-ft) =	8809	11112	6585	8307	5000	6307	1296	1635	0	0	0	0	0	0	0	0	0	0		
F (#) =	-1176	-2294	107	427	-95	35	212	325	0	0	0	0	0	0	0	0	0	0		
Holdown	1000	-	1000	-	1000	-	1000	-	1000	-	1000	-	1000	-	1000	-	1000	-		
1.05	No Holdown OK		No Holdown OK		No Holdown OK		No Holdown OK		No Holdown OK		No Holdown OK		No Holdown OK		No Holdown OK		No Holdown OK			

Job # 1910

Designed: AEL **Date:** 12/3/19

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Project: Olympic

L3

0.5 (ft) holdown dist from end

Roof:			Wind (ASD):		0.61 kips		76 #/ft												86 #/ft	
W1			Seismic (ASD):		0.66 kips		83 #/ft												93 #/ft	
																			9 ft	
	4 ft		4 ft		0 ft		0 ft		0 ft		0 ft		0 ft		0 ft		0 ft		8	Actual
Distribution L	3.556 ft		3.556 ft		0 ft		0 ft		0 ft		0 ft		0 ft		0 ft		0 ft		7.1111	Distribu
h/b_s =	2.25	W1	2.25	W1																
DL w (plf) =	322		322		0		0		0		0		0		0		0			
$0.6M_R$ (#-ft) =	1545		1545		0		0		0		0		0		0		0			
	W	E	W	E	W	E	W	E	W	E	W	E	W	E	W	E	W	E		
PLF	76	83	76	83	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
M_{ot} (#-ft) =	2745	2970	2745	2970	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
F (#) =	343	407	343	407	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Holdown	1000	-	1000	-	1000	-	1000	-	1000	-	1000	-	1000	-	1000	-	1000	-		
1.05	No Holdown OK		No Holdown OK		No Holdown OK		No Holdown OK		No Holdown OK		No Holdown OK		No Holdown OK		No Holdown OK		No Holdown OK			

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Job # 1910

Designed: AEL ***Date:*** 12/3/19

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Project: Olympic

T1

0.5 (ft) holdown dist from end

Roof: W1 — Wind (ASD): 2.03 kips 85 #/ft … 85 #/ft; Seismic (ASD): 1.58 kips 66 #/ft … 66 #/ft

	17 ft	7 ft	0 ft	0 ft	0 ft	0 ft	0 ft	0 ft	0 ft	8 ft 24	Actual
Distribution L	17 ft	7 ft	0 ft	0 ft	0 ft	0 ft	0 ft	0 ft	0 ft	24	Distribu
h/b_s =	0.471 W1	1.143 W1									
DL w (plf) =	117	117	0	0	0	0	0	0	0		
$0.6M_R$ (#-ft) =	10139	1719	0	0	0	0	0	0	0		
	W E	W E	W E	W E	W E	W E	W E	W E	W E		
PLF	85 66	85 66	0 0	0 0	0 0	0 0	0 0	0 0	0 0		
M_{ot} (#-ft) =	11503 8953	4737 3687	0 0	0 0	0 0	0 0	0 0	0 0	0 0		
F (#) =	83 -72	464 303	0 0	0 0	0 0	0 0	0 0	0 0	0 0		
Holdown	1000 -	1000 -	1000 -	1000 -	1000 -	1000 -	1000 -	1000 -	1000 -		
	No Holdown OK	No Holdown OK	No Holdown OK	No Holdown OK	No Holdown OK	No Holdown OK	No Holdown OK	No Holdown OK	No Holdown OK		

2nd Floor W1 — Wind (ASD): 1.56 kips 224 #/ft … 239 #/ft; Seismic (ASD): 1.19 kips 173 #/ft … 185 #/ft

	3 ft	8 ft	5 ft	0 ft	0 ft	0 ft	0 ft	0 ft	0 ft	9 ft 16	Actual
Distribution L	2 ft	8 ft	5 ft	0 ft	0 ft	0 ft	0 ft	0 ft	0 ft	15	Distribu
h/b_s =	3 W1	1.125 W1	1.8 W1								
DL w (plf) =	100	100	100	0	0	0	0	0	0		
$0.6M_R$ (#-ft) =	270	1920	750	0	0	0	0	0	0		
	W E	W E	W E	W E	W E	W E	W E	W E	W E		
PLF	160 123	239 185	239 185	0 0	0 0	0 0	0 0	0 0	0 0		
M_{ot} (#-ft) =	4308 3324	17232 13296	10770 8310	0 0	0 0	0 0	0 0	0 0	0 0		
F (#) =	1698 1150	2124 1820	2227 1680	0 0	0 0	0 0	0 0	0 0	0 0		
Holdown	2640 ST1	2640 ST1	2640 ST1	1000 -	1000 -	1000 -	1000 -	1000 -	1000 -		
1.05	STHD10 OK	STHD10 OK	STHD10 OK	No Holdown OK	No Holdown OK	No Holdown OK	No Holdown OK	No Holdown OK	No Holdown OK		

Permit Number: 20-01497

Job #	1910
Designed: AEL	***Date:*** 12/3/19
Checked:	***Date:***

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T2

0.5 (ft) holdown dist from end

Roof:	Wind (ASD): 2.03 kips	73 #/ft																73 #/ft		
W1	Seismic (ASD): 1.58 kips	56 #/ft																56 #/ft		
	28 ft		0 ft		0 ft		0 ft		0 ft		0 ft		0 ft		0 ft		0 ft		8 ft 28	Actual
Distribution L	28 ft		0 ft		0 ft		0 ft		0 ft		0 ft		0 ft		0 ft		0 ft		28	Distribu
h/b_s =	0.286	W1																		
DL w (plf) =	117		0		0		0		0		0		0		0		0			
$0.6M_R$ (#-ft) =	27505		0		0		0		0		0		0		0		0			
	W	E	W	E	W	E	W	E	W	E	W	E	W	E	W	E	W	E		
PLF	73	56	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
M_{ot} (#-ft) =	16240	12640	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
F (#) =	-410	-541	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Holdown	1000	-	1000	-	1000	-	1000	-	1000	-	1000	-	1000	-	1000	-	1000	-		
	No Holdown OK		No Holdown OK		No Holdown OK		No Holdown OK		No Holdown OK		No Holdown OK		No Holdown OK		No Holdown OK		No Holdown OK			

2nd Floor	Wind (ASD): 2.81 kips	190 #/ft																190 #/ft		
W1	Seismic (ASD): 1.85 kips	135 #/ft																135 #/ft		
	12 ft		13.5 ft		0 ft		0 ft		0 ft		0 ft		0 ft		0 ft		0 ft		9 ft 25.5	Actual
Distribution L	12 ft		13.5 ft		0 ft		0 ft		0 ft		0 ft		0 ft		0 ft		0 ft		25.5	Distribu
h/b_s =	0.75	W1	0.667	W1																
DL w (plf) =	100		100		0		0		0		0		0		0		0			
$0.6M_R$ (#-ft) =	4320		5468		0		0		0		0		0		0		0			
	W	E	W	E	W	E	W	E	W	E	W	E	W	E	W	E	W	E		
PLF	190	135	190	135	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
M_{ot} (#-ft) =	20499	14527	23061	16343	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
F (#) =	997	347	944	837	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Holdown	1000	-	1000	-	1000	-	1000	-	1000	-	1000	-	1000	-	1000	-	1000	-		
1.05	No Holdown OK		No Holdown OK		No Holdown OK		No Holdown OK		No Holdown OK		No Holdown OK		No Holdown OK		No Holdown OK		No Holdown OK			

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Job # 1910

Designed: AEL **Date:** 12/3/19

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Project: Olympic

T3

0.5 (ft) holdown dist from end

Roof: W1	Wind (ASD):	1.25 kips	52 #/ft																52 #/ft	
	Seismic (ASD):	0.66 kips	28 #/ft																28 #/ft	
																			9 ft	
	24 ft		0 ft		0 ft		0 ft		0 ft		0 ft		0 ft		0 ft		0 ft		24	Actual
Distribution L	24 ft		0 ft		0 ft		0 ft		0 ft		0 ft		0 ft		0 ft		0 ft		24	Distribu
h/b_s =	0.375	W1																		
DL w (plf) =	127		0		0		0		0		0		0		0		0			
$0.6M_R$ (#-ft) =	21936		0		0		0		0		0		0		0		0			
	W	E	W	E	W	E	W	E	W	E	W	E	W	E	W	E	W	E		
PLF	52	28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
M_{ot} (#-ft) =	11250	5940	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
F (#) =	-455	-681	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Holdown	1000	-	1000	-	1000	-	1000	-	1000	-	1000	-	1000	-	1000	-	1000	-		
1.05	No Holdown OK		No Holdown OK		No Holdown OK		No Holdown OK		No Holdown OK		No Holdown OK		No Holdown OK		No Holdown OK		No Holdown OK			

Permit Number: 20-01497

BEYLER CONSULTING

DRAG STRAP CALCULATIONS

STRAP1

CHORD FORCE

Diaphragm Width (l) : 35 ft | Diaphragm Depth (D) : 28 ft | Wind Load: 116 plf

M = $\frac{wl^2}{8}$ = 17.8 kft

F = $\frac{M}{D}$ = 0.634 kips

SHEAR TRANSFER

Shearwall Length 1:	4 ft	Shear Force 1	77 plf
Shearwall Length 2:	6 ft	Shear Force 2	77 plf

F = ∑Shearwall LengthXShear Force = 0.77 kips

STRAP2

CHORD FORCE

Diaphragm Width (l) : 6 ft | Diaphragm Depth (D) : 35 ft | Wind Load: 73 plf

M = $\frac{wl^2}{8}$ = 0.3 kft

F = $\frac{M}{D}$ = 0.009 kips

SHEAR TRANSFER

Shearwall Length 1:	6 ft	Shear Force 1	46 plf
Shearwall Length 2:	ft	Shear Force 2	plf
Shearwall Length 3:	ft	Shear Force 3	plf

F = ∑Shearwall LengthXShear Force = 0.276 kips

DRAG1

CHORD FORCE

Diaphragm Width (l) : 35 ft | Diaphragm Depth (D) : 28 ft | Wind Load: 116 plf

M = $\frac{wl^2}{8}$ = 17.8 kft

F = $\frac{M}{D}$ = 0.634 kips

SHEAR TRANSFER

Shearwall Length 1:	20 ft	Shear Force 1	77 plf
Shearwall Length 2:	ft	Shear Force 2	plf

F = ∑Shearwall LengthXShear Force = 1.54 kips

Truss Length: 7 ft | Chord Length: 35 ft

F = 0.308 kips

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