



DESIGN EVEREST

CONSULTING ENGINEERS

STRUCTURAL CALCULATIONS FOR:

Andres Arango

PROJECT LOCATION:

61579 Sun Terrace, Mountain Center, CA 92561

PROJECT NUMBER:

202001090

DATE:

1/27/2021

PREPARED BY:

Marcus Yan, PE



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Design Summary

The project involves a new 1-story residential house.

Gravity:

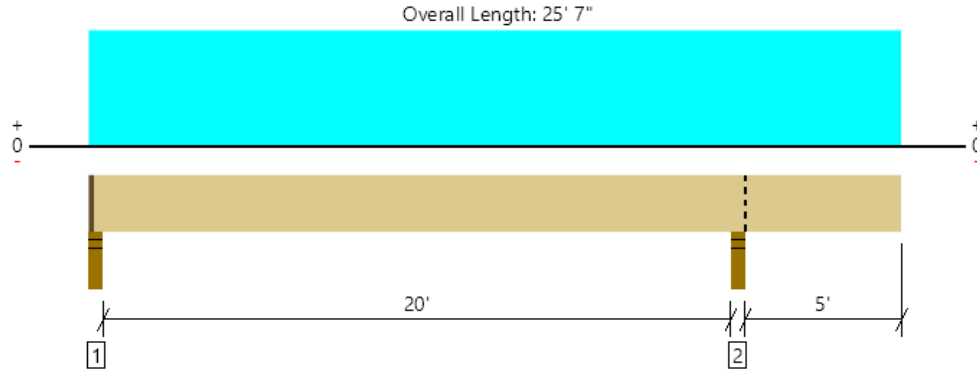
Beams and joists are analyzed using Forte.

Foundation bearing pressure has been checked.

Retaining walls have been designed using Retainpro.

Lateral: A holistic lateral analysis has been performed.

Level, JOIST 1
1 piece(s) 2 x 12 Douglas Fir-Larch No. 2 @ 24" 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)	1114 @ 20' 5 1/4"	2231 (3.50")	Passed (50%)	--	1.0 D + 1.0 Lr (All Spans)
Shear (lbs)	678 @ 19' 4 1/4"	2531	Passed (27%)	1.25	1.0 D + 1.0 Lr (All Spans)
Moment (Ft-lbs)	3257 @ 9' 10 1/4"	3411	Passed (95%)	1.25	1.0 D + 1.0 Lr (Alt Spans)
Live Load Defl. (in)	0.488 @ 10' 2 1/2"	0.674	Passed (L/497)	--	1.0 D + 1.0 Lr (Alt Spans)
Total Load Defl. (in)	0.824 @ 10' 1 7/8"	1.011	Passed (L/295)	--	1.0 D + 1.0 Lr (Alt Spans)
TJ-Pro™ Rating	N/A	N/A	N/A	--	N/A

System : Floor
Member Type : Joist
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Overhang deflection criteria: LL (2L/360) and TL (2L/240). Upward deflection on right cantilever exceeds overhang deflection criteria.
- Allowed moment does not reflect the adjustment for the beam stability factor.
- A 15% increase in the moment capacity has been added to account for repetitive member usage.
- Upward deflection on right cantilever exceeds 0.4".
- Applicable calculations are based on NDS.
- No composite action between deck and joist was considered in analysis.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Roof Live	Snow	Total	
1 - Stud wall - SPF	3.50"	2.25"	1.50"	290	400	100	790	1 1/4" Rim Board
2 - Stud wall - SPF	3.50"	3.50"	1.75"	477	637	159	1273	Blocking

- Rim Board is assumed to carry all loads applied directly above it, 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.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	2' 3" o/c	
Bottom Edge (Lu)	17' 7" o/c	

- Maximum allowable bracing intervals based on applied load.

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Roof Live (non-snow: 1.25)	Snow (1.15)	Comments
1 - Uniform (PSF)	0 to 25' 7"	24"	15.0	20.0	5.0	Default Load

Member Notes

JOIST 1

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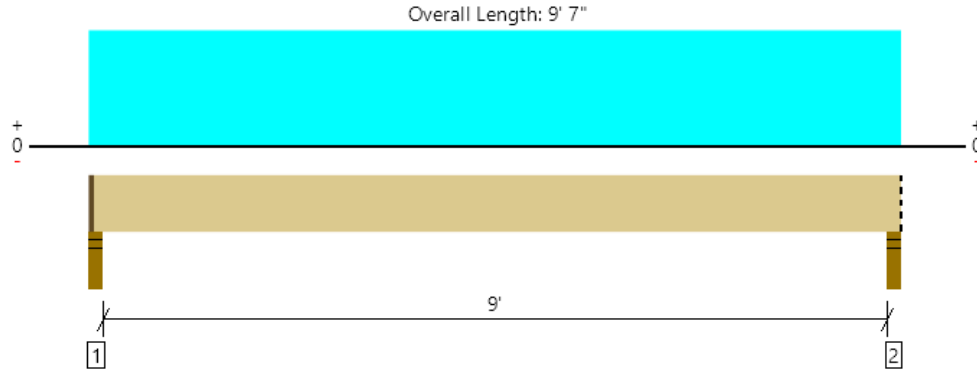
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

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Level, JOIST 2
1 piece(s) 2 x 6 Douglas Fir-Larch No. 2 @ 24" 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)	328 @ 2 1/2"	1434 (2.25")	Passed (23%)	--	1.0 D + 1.0 Lr (All Spans)
Shear (lbs)	283 @ 9"	1238	Passed (23%)	1.25	1.0 D + 1.0 Lr (All Spans)
Moment (Ft-lbs)	735 @ 4' 9 1/2"	1060	Passed (69%)	1.25	1.0 D + 1.0 Lr (All Spans)
Live Load Defl. (in)	0.191 @ 4' 9 1/2"	0.229	Passed (L/576)	--	1.0 D + 1.0 Lr (All Spans)
Total Load Defl. (in)	0.334 @ 4' 9 1/2"	0.458	Passed (L/329)	--	1.0 D + 1.0 Lr (All Spans)
TJ-Pro™ Rating	N/A	N/A	N/A	--	N/A

System : Floor
Member Type : Joist
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- A 15% increase in the moment capacity has been added to account for repetitive member usage.
- Applicable calculations are based on NDS.
- No composite action between deck and joist was considered in analysis.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Roof Live	Snow	Total	
1 - Stud wall - SPF	3.50"	2.25"	1.50"	144	192	48	384	1 1/4" Rim Board
2 - Stud wall - SPF	3.50"	3.50"	1.50"	144	192	48	384	Blocking

- Rim Board is assumed to carry all loads applied directly above it, 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.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	9' 6" o/c	
Bottom Edge (Lu)	9' 6" o/c	

- Maximum allowable bracing intervals based on applied load.

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Roof Live (non-snow: 1.25)	Snow (1.15)	Comments
1 - Uniform (PSF)	0 to 9' 7"	24"	15.0	20.0	5.0	Default Load

Member Notes

JOIST 2

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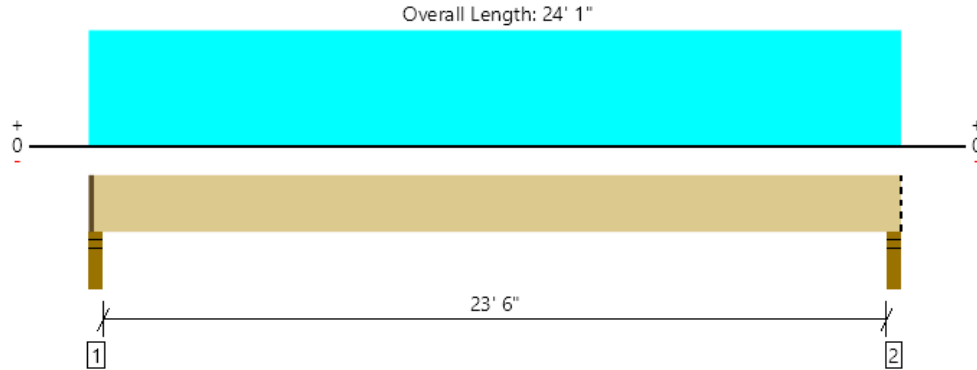
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Level, JOIST 3

1 piece(s) 2 x 12 Douglas Fir-Larch No. 2 @ 16" 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)	557 @ 2' 1/2"	1434 (2.25")	Passed (39%)	--	1.0 D + 1.0 Lr (All Spans)
Shear (lbs)	505 @ 1' 2 3/4"	2531	Passed (20%)	1.25	1.0 D + 1.0 Lr (All Spans)
Moment (Ft-lbs)	3267 @ 12' 1/2"	3411	Passed (96%)	1.25	1.0 D + 1.0 Lr (All Spans)
Live Load Defl. (in)	0.661 @ 12' 1/2"	0.789	Passed (L/430)	--	1.0 D + 1.0 Lr (All Spans)
Total Load Defl. (in)	1.157 @ 12' 1/2"	1.183	Passed (L/246)	--	1.0 D + 1.0 Lr (All Spans)
TJ-Pro™ Rating	N/A	N/A	N/A	--	N/A

System : Floor
Member Type : Joist
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- A 15% increase in the moment capacity has been added to account for repetitive member usage.
- Applicable calculations are based on NDS.
- No composite action between deck and joist was considered in analysis.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Roof Live	Snow	Total	
1 - Stud wall - SPF	3.50"	2.25"	1.50"	241	321	80	642	1 1/4" Rim Board
2 - Stud wall - SPF	3.50"	3.50"	1.50"	241	321	80	642	Blocking

- Rim Board is assumed to carry all loads applied directly above it, 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.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	2' 2" o/c	
Bottom Edge (Lu)	24' o/c	

- Maximum allowable bracing intervals based on applied load.

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Roof Live (non-snow: 1.25)	Snow (1.15)	Comments
1 - Uniform (PSF)	0 to 24' 1"	16"	15.0	20.0	5.0	Default Load

Member Notes

JOIST 3

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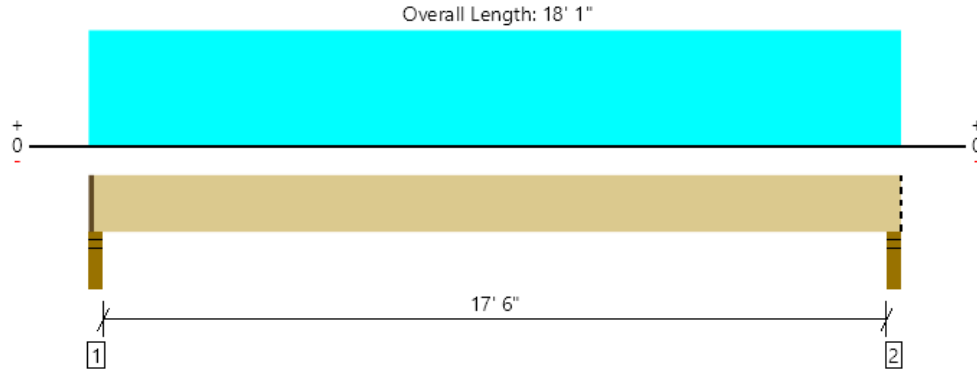
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Level, JOIST 4

1 piece(s) 2 x 10 Douglas Fir-Larch No. 2 @ 16" 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)	298 @ 2' 1/2"	1434 (2.25")	Passed (21%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	266 @ 1' 3/4"	1665	Passed (16%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	1300 @ 9' 1/2"	2029	Passed (64%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.185 @ 9' 1/2"	0.589	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.462 @ 9' 1/2"	0.883	Passed (L/459)	--	1.0 D + 1.0 L (All Spans)
TJ-Pro™ Rating	N/A	N/A	N/A	--	N/A

System : Floor
Member Type : Joist
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- A 15% increase in the moment capacity has been added to account for repetitive member usage.
- Applicable calculations are based on NDS.
- No composite action between deck and joist was considered in analysis.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Total	
1 - Stud wall - SPF	3.50"	2.25"	1.50"	181	121	302	1 1/4" Rim Board
2 - Stud wall - SPF	3.50"	3.50"	1.50"	181	121	302	Blocking

- Rim Board is assumed to carry all loads applied directly above it, 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.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	9' 6" o/c	
Bottom Edge (Lu)	18' o/c	

- Maximum allowable bracing intervals based on applied load.

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Floor Live (1.00)	Comments
1 - Uniform (PSF)	0 to 18' 1"	16"	15.0	10.0	Default Load

Member Notes

JOIST 4

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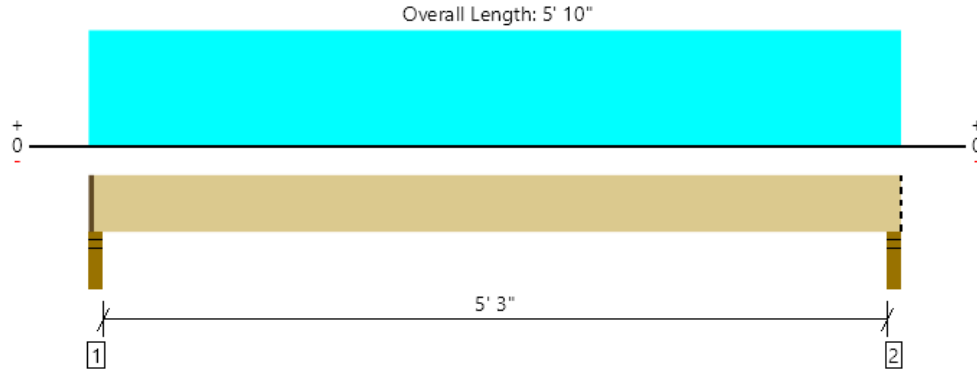
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Level, JOIST 5
1 piece(s) 2 x 6 Douglas Fir-Larch No. 2 @ 24" OC



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)	141 @ 2' 1/2"	1434 (2.25")	Passed (10%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	108 @ 9"	990	Passed (11%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	183 @ 2' 11"	848	Passed (22%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.012 @ 2' 11"	0.181	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.029 @ 2' 11"	0.271	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
TJ-Pro™ Rating	N/A	N/A	N/A	--	N/A

System : Floor
Member Type : Joist
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- A 15% increase in the moment capacity has been added to account for repetitive member usage.
- Applicable calculations are based on NDS.
- No composite action between deck and joist was considered in analysis.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Total	
1 - Stud wall - SPF	3.50"	2.25"	1.50"	87	58	145	1 1/4" Rim Board
2 - Stud wall - SPF	3.50"	3.50"	1.50"	88	58	146	Blocking

- Rim Board is assumed to carry all loads applied directly above it, 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.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	5' 9" o/c	
Bottom Edge (Lu)	5' 9" o/c	

- Maximum allowable bracing intervals based on applied load.

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Floor Live (1.00)	Comments
1 - Uniform (PSF)	0 to 5' 10"	24"	15.0	10.0	Default Load

Member Notes

JOIST 5

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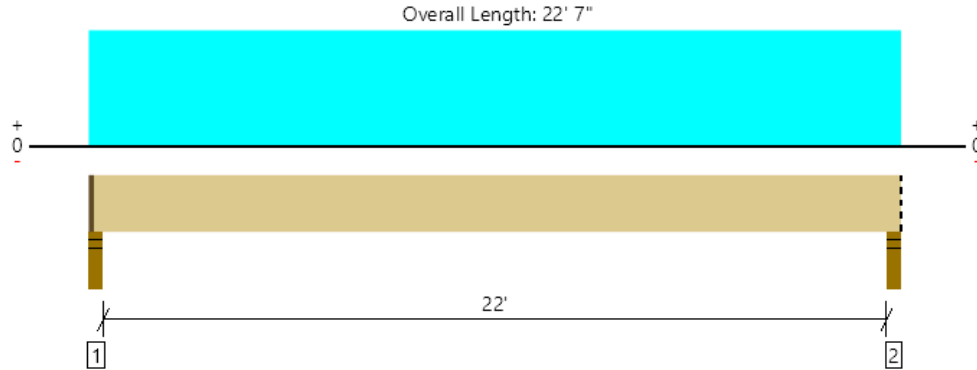
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Level, JOIST 6

1 piece(s) 2 x 12 Douglas Fir-Larch No. 2 @ 16" 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)	373 @ 2' 1/2"	1434 (2.25")	Passed (26%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	335 @ 1' 2 3/4"	2025	Passed (17%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	2047 @ 11' 3 1/2"	2729	Passed (75%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.254 @ 11' 3 1/2"	0.739	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.636 @ 11' 3 1/2"	1.108	Passed (L/418)	--	1.0 D + 1.0 L (All Spans)
TJ-Pro™ Rating	N/A	N/A	N/A	--	N/A

System : Floor
Member Type : Joist
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- A 15% increase in the moment capacity has been added to account for repetitive member usage.
- Applicable calculations are based on NDS.
- No composite action between deck and joist was considered in analysis.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Total	
1 - Stud wall - SPF	3.50"	2.25"	1.50"	226	151	377	1 1/4" Rim Board
2 - Stud wall - SPF	3.50"	3.50"	1.50"	226	151	377	Blocking

- Rim Board is assumed to carry all loads applied directly above it, 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.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	6' 4" o/c	
Bottom Edge (Lu)	22' 6" o/c	

- Maximum allowable bracing intervals based on applied load.

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Floor Live (1.00)	Comments
1 - Uniform (PSF)	0 to 22' 7"	16"	15.0	10.0	Default Load

Member Notes

JOIST 6

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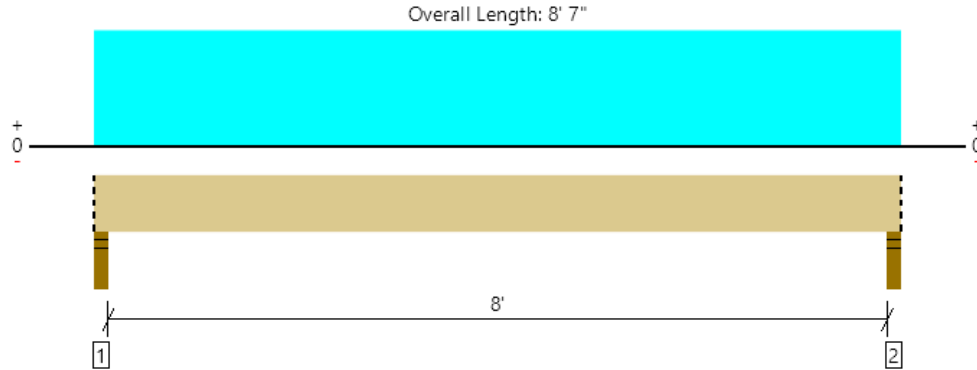
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Level, BEAM 7
1 piece(s) 6 x 10 Douglas Fir-Larch No. 1



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)	3630 @ 2"	8181 (3.50")	Passed (44%)	--	1.0 D + 1.0 Lr (All Spans)
Shear (lbs)	2713 @ 1' 1"	7402	Passed (37%)	1.25	1.0 D + 1.0 Lr (All Spans)
Moment (Ft-lbs)	7195 @ 4' 3 1/2"	11634	Passed (62%)	1.25	1.0 D + 1.0 Lr (All Spans)
Live Load Defl. (in)	0.072 @ 4' 3 1/2"	0.275	Passed (L/999+)	--	1.0 D + 1.0 Lr (All Spans)
Total Load Defl. (in)	0.156 @ 4' 3 1/2"	0.412	Passed (L/636)	--	1.0 D + 1.0 Lr (All Spans)

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

System : Floor
Member Type : Drop Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

Supports	Bearing Length			Loads to Supports (lbs)					Accessories
	Total	Available	Required	Dead	Floor Live	Roof Live	Snow	Total	
1 - Stud wall - SPF	3.50"	3.50"	1.55"	1956	429	1674	418	4477	Blocking
2 - Stud wall - SPF	3.50"	3.50"	1.55"	1956	429	1674	418	4477	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	8' 7" o/c	
Bottom Edge (Lu)	8' 7" o/c	

- Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Roof Live (non-snow: 1.25)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 8' 7"	N/A	13.2	--	--	--	
1 - Uniform (PSF)	0 to 8' 7" (Front)	15'	15.0	-	20.0	5.0	Default Load
2 - Uniform (PSF)	0 to 8' 7" (Front)	10'	15.0	10.0	-	-	
3 - Uniform (PSF)	0 to 8' 7" (Front)	4' 6"	15.0	-	20.0	5.0	

Member Notes

BEAM 7

Weyerhaeuser Notes

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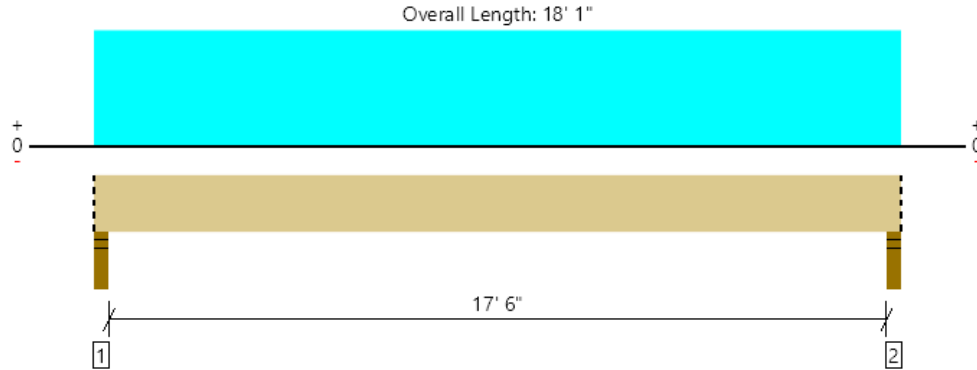
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
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Level, BEAM 8
1 piece(s) 6 x 10 Douglas Fir-Larch No. 1



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)	1544 @ 2"	8181 (3.50")	Passed (19%)	--	1.0 D + 1.0 Lr (All Spans)
Shear (lbs)	1359 @ 1' 1"	7402	Passed (18%)	1.25	1.0 D + 1.0 Lr (All Spans)
Moment (Ft-lbs)	6724 @ 9' 1/2"	11634	Passed (58%)	1.25	1.0 D + 1.0 Lr (All Spans)
Live Load Defl. (in)	0.355 @ 9' 1/2"	0.592	Passed (L/600)	--	1.0 D + 1.0 Lr (All Spans)
Total Load Defl. (in)	0.674 @ 9' 1/2"	0.887	Passed (L/316)	--	1.0 D + 1.0 Lr (All Spans)

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

System : Floor
Member Type : Drop Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Roof Live	Snow	Total	
1 - Stud wall - SPF	3.50"	3.50"	1.50"	730	814	203	1747	Blocking
2 - Stud wall - SPF	3.50"	3.50"	1.50"	730	814	203	1747	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	18' 1" o/c	
Bottom Edge (Lu)	18' 1" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Roof Live (non-snow: 1.25)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 18' 1"	N/A	13.2	--	--	
1 - Uniform (PSF)	0 to 18' 1" (Front)	4' 6"	15.0	20.0	5.0	Default Load

Member Notes

BEAM 8

Weyerhaeuser Notes

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

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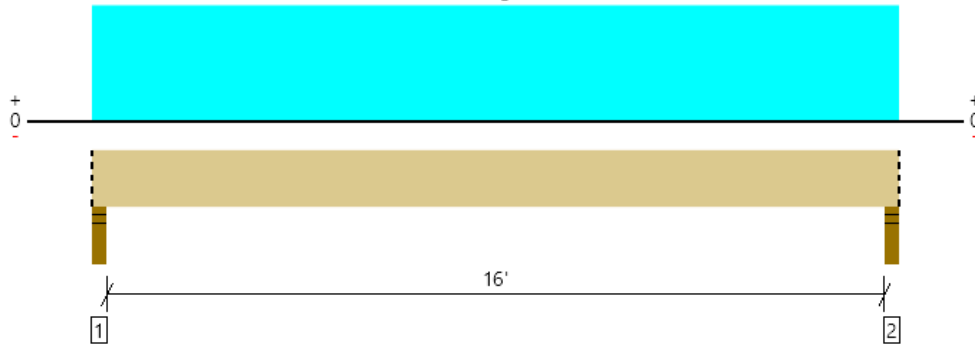


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Level, BEAM 9

1 piece(s) 3 1/2" x 13 1/2" 24F-V4 DF Glulam

Overall Length: 16' 7"



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)	4448 @ 2"	5206 (3.50")	Passed (85%)	--	1.0 D + 1.0 Lr (All Spans)
Shear (lbs)	3688 @ 1' 5"	10434	Passed (35%)	1.25	1.0 D + 1.0 Lr (All Spans)
Pos Moment (Ft-lbs)	17708 @ 8' 3 1/2"	26578	Passed (67%)	1.25	1.0 D + 1.0 Lr (All Spans)
Live Load Defl. (in)	0.364 @ 8' 3 1/2"	0.542	Passed (L/535)	--	1.0 D + 1.0 Lr (All Spans)
Total Load Defl. (in)	0.652 @ 8' 3 1/2"	0.813	Passed (L/299)	--	1.0 D + 1.0 Lr (All Spans)

System : Floor
Member Type : Drop Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Critical positive moment adjusted by a volume factor of 1.00 that was calculated using length L = 16' 3".
- The effects of positive or negative camber have not been accounted for when calculating deflection.
- The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Roof Live	Snow	Total	
1 - Stud wall - SPF	3.50"	3.50"	2.99"	1961	2488	622	5071	Blocking
2 - Stud wall - SPF	3.50"	3.50"	2.99"	1961	2488	622	5071	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	16' 7" o/c	
Bottom Edge (Lu)	16' 7" o/c	

- Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Roof Live (non-snow: 1.25)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 16' 7"	N/A	11.5	--	--	
1 - Uniform (PSF)	0 to 16' 7" (Front)	15'	15.0	20.0	5.0	Default Load

Member Notes

BEAM 9

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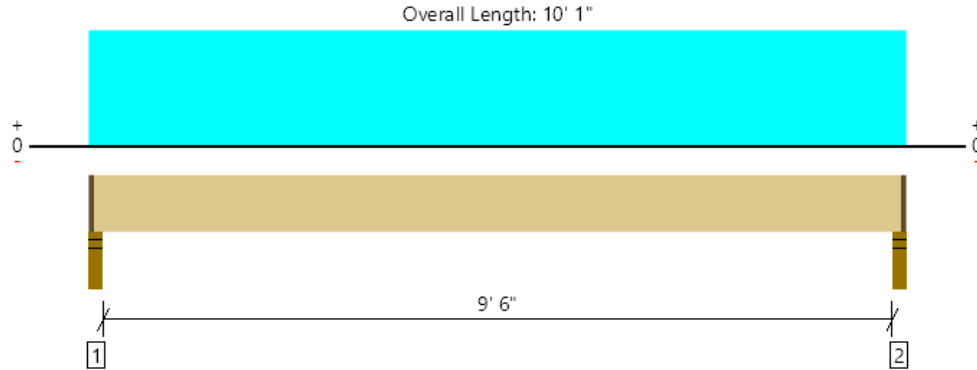
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Level, JOIST 10

1 piece(s) 2 x 8 Douglas Fir-Larch No. 2 @ 16" 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)	362 @ 2' 1/2"	1434 (2.25")	Passed (25%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	304 @ 10' 3/4"	1305	Passed (23%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	857 @ 5' 1/2"	1360	Passed (63%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.137 @ 5' 1/2"	0.242	Passed (L/844)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.189 @ 5' 1/2"	0.483	Passed (L/614)	--	1.0 D + 1.0 L (All Spans)
TJ-Pro™ Rating	N/A	N/A	N/A	--	N/A

System : Floor
Member Type : Joist
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- A 15% increase in the moment capacity has been added to account for repetitive member usage.
- Applicable calculations are based on NDS.
- No composite action between deck and joist was considered in analysis.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Total	
1 - Stud wall - SPF	3.50"	2.25"	1.50"	101	269	370	1 1/4" Rim Board
2 - Stud wall - SPF	3.50"	2.25"	1.50"	101	269	370	1 1/4" Rim Board

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	9' 11" o/c	
Bottom Edge (Lu)	9' 11" o/c	

Maximum allowable bracing intervals based on applied load.

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Floor Live (1.00)	Comments
1 - Uniform (PSF)	0 to 10' 1"	16"	15.0	40.0	Default Load

Member Notes

JOIST 10

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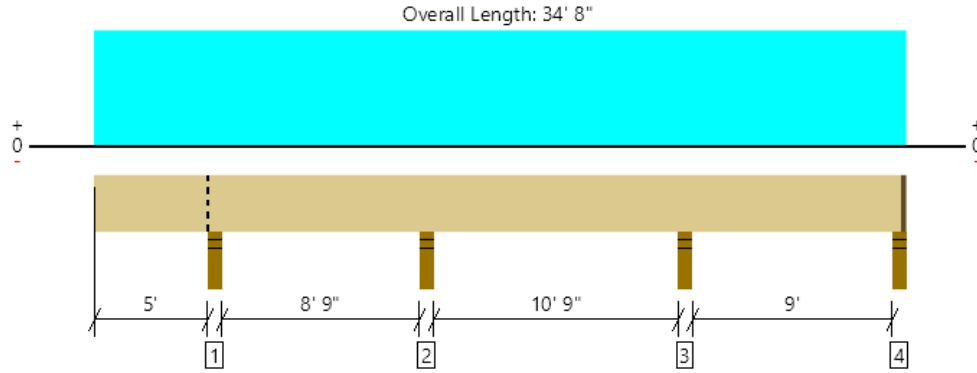
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Level, JOIST 11

1 piece(s) 2 x 10 Douglas Fir-Larch No. 2 @ 16" 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)	1233 @ 25' 2 3/4"	2231 (3.50")	Passed (55%)	--	1.0 D + 1.0 L (Adj Spans)
Shear (lbs)	546 @ 24' 3 3/4"	1665	Passed (33%)	1.00	1.0 D + 1.0 L (Adj Spans)
Moment (Ft-lbs)	-1324 @ 5' 1 3/4"	2029	Passed (65%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.279 @ 0	0.343	Passed (2L/444)	--	1.0 D + 1.0 L (Alt Spans)
Total Load Defl. (in)	0.320 @ 0	0.515	Passed (2L/386)	--	1.0 D + 1.0 L (Alt Spans)
TJ-Pro™ Rating	N/A	N/A	N/A	--	N/A

System : Floor
Member Type : Joist
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Overhang deflection criteria: LL (2L/360) and TL (2L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- A 15% increase in the moment capacity has been added to account for repetitive member usage.
- Applicable calculations are based on NDS.
- No composite action between deck and joist was considered in analysis.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Total	
1 - Stud wall - SPF	3.50"	3.50"	1.72"	207	888	1095	Blocking
2 - Stud wall - SPF	3.50"	3.50"	1.77"	179	952	1131	None
3 - Stud wall - SPF	3.50"	3.50"	1.93"	235	998	1233	None
4 - Stud wall - SPF	3.50"	2.25"	1.50"	72	352/-56	424/-56	1 1/4" Rim Board

- Rim Board is assumed to carry all loads applied directly above it, 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.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	14' 3" o/c	
Bottom Edge (Lu)	9' 3" o/c	

- Maximum allowable bracing intervals based on applied load.

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Floor Live (1.00)	Comments
1 - Uniform (PSF)	0 to 34' 8"	16"	15.0	60.0	Default Load

Member Notes

JOIST 11

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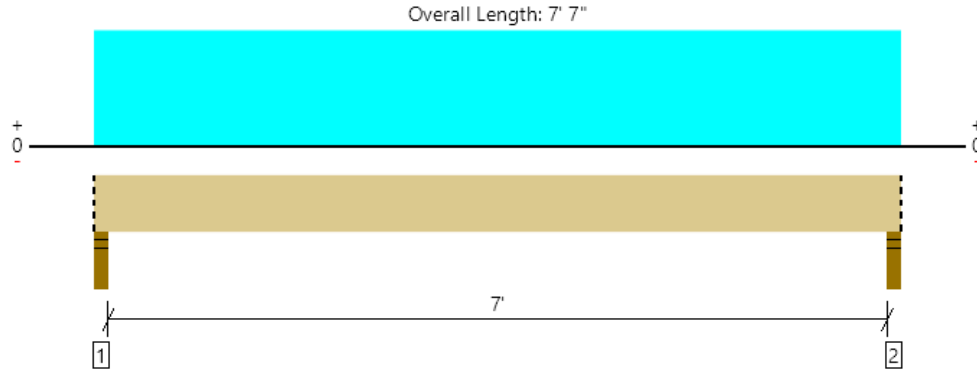
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Level, BEAM 12
1 piece(s) 4 x 10 Douglas Fir-Larch No. 1



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)	1699 @ 2"	5206 (3.50")	Passed (33%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	1223 @ 1' 3/4"	3885	Passed (31%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	2945 @ 3' 9 1/2"	4991	Passed (59%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.051 @ 3' 9 1/2"	0.242	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.071 @ 3' 9 1/2"	0.363	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)

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

System : Floor
Member Type : Drop Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Total	
1 - Stud wall - SPF	3.50"	3.50"	1.50"	486	1213	1699	Blocking
2 - Stud wall - SPF	3.50"	3.50"	1.50"	486	1213	1699	Blocking

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

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

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	0 to 7' 7"	N/A	8.2	--	
1 - Uniform (PSF)	0 to 7' 7" (Front)	8'	15.0	40.0	Default Load

Member Notes

BEAM 12

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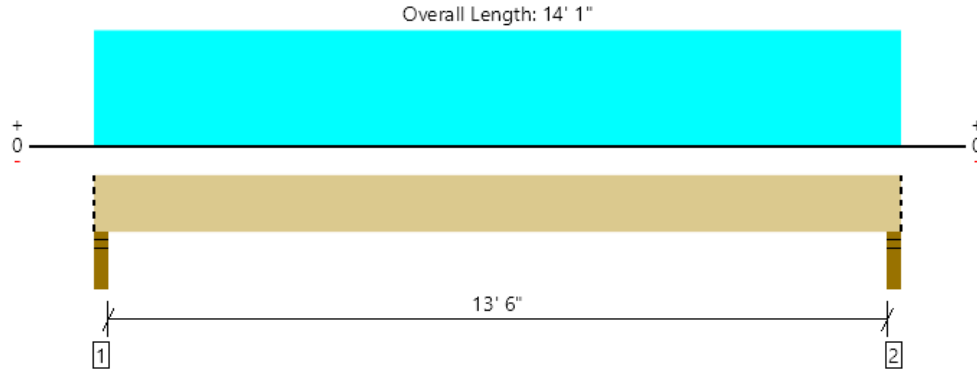
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File Name: 61579 Sun Terrace

Level, BEAM 13
1 piece(s) 6 x 10 Douglas Fir-Larch No. 1



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)	2470 @ 2"	8181 (3.50")	Passed (30%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	2090 @ 1' 1"	5922	Passed (35%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	8289 @ 7' 1/2"	9307	Passed (89%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.384 @ 7' 1/2"	0.458	Passed (L/430)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.498 @ 7' 1/2"	0.688	Passed (L/331)	--	1.0 D + 1.0 L (All Spans)

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

System : Floor
Member Type : Drop Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Total	
1 - Stud wall - SPF	3.50"	3.50"	1.50"	569	1901	2470	Blocking
2 - Stud wall - SPF	3.50"	3.50"	1.50"	569	1901	2470	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	14' 1" o/c	
Bottom Edge (Lu)	14' 1" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	0 to 14' 1"	N/A	13.2	--	
1 - Uniform (PSF)	0 to 14' 1" (Front)	4' 6"	15.0	60.0	Default Load

Member Notes

BEAM 13

Weyerhaeuser Notes

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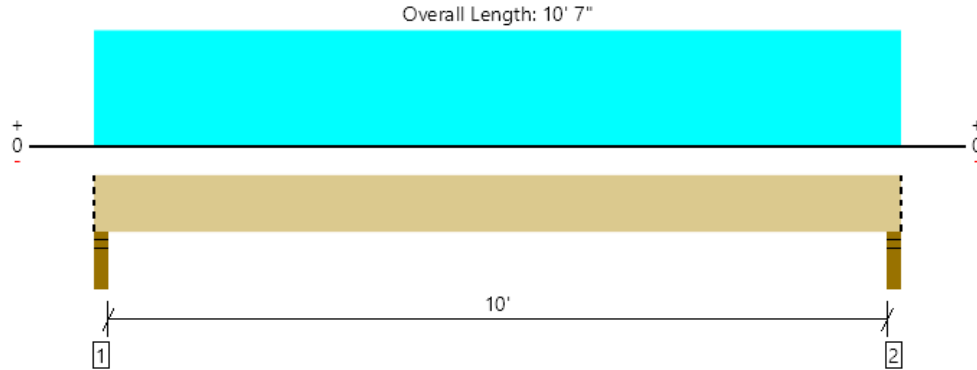
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File Name: 61579 Sun Terrace

Level, BEAM 14
1 piece(s) 6 x 12 Douglas Fir-Larch No. 1



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)	4054 @ 2"	8181 (3.50")	Passed (50%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	3096 @ 1' 3"	7168	Passed (43%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	10060 @ 5' 3 1/2"	13638	Passed (74%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.148 @ 5' 3 1/2"	0.342	Passed (L/829)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.190 @ 5' 3 1/2"	0.512	Passed (L/649)	--	1.0 D + 1.0 L (All Spans)

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

System : Floor
Member Type : Drop Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Total	
1 - Stud wall - SPF	3.50"	3.50"	1.73"	879	3175	4054	Blocking
2 - Stud wall - SPF	3.50"	3.50"	1.73"	879	3175	4054	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	10' 7" o/c	
Bottom Edge (Lu)	10' 7" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	0 to 10' 7"	N/A	16.0	--	
1 - Uniform (PSF)	0 to 10' 7" (Front)	10'	15.0	60.0	Default Load

Member Notes

BEAM 14

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

ForteWEB Software Operator	Job Notes
Marcus Yan Marcus Yan Incorporate (650) 302-0862 yan_marcus@hotmail.com	



1/27/2021 9:09:12 PM UTC
ForteWEB v3.1, Engine: V8.1.5.1, Data: V8.0.1.0
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File Name: 61579 Sun Terrace

Soil Pressure Check

1' - 4" Continuous Footing

Isolated Footing Design with Axial - no eccentricity

Pu	2380	lb
W	1.33	ft, width
L	1	ft, length
qa	3300	psf, soil bearing pressure

qu 1789.474 psf, bearing pressure demand
A_prov 1.33 ft², bearing area provided
A_req 0.721212 ft², bearing area required
DC: 0.542265 OK

2' - 0" x 2' - 0" Footing

Isolated Footing Design with Axial - no eccentricity

Pu	7125	lb
W	2	ft, width
L	2	ft, length
qa	3300	psf, soil bearing pressure

qu 1781.25 psf, bearing pressure demand
A_prov 4 ft², bearing area provided
A_req 2.159091 ft², bearing area required
DC: 0.539773 OK

1' - 6" x 1' - 6" Footing

Isolated Footing Design with Axial - no eccentricity

Pu	4600	lb
W	1.5	ft, width
L	1.5	ft, length
qa	3300	psf, soil bearing pressure

qu 2044.444 psf, bearing pressure demand
A_prov 2.25 ft², bearing area provided
A_req 1.393939 ft², bearing area required
DC: 0.619529 OK

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Cantilevered Retaining Wall

Code: IBC 2018,ACI 318-14,TMS 402-16

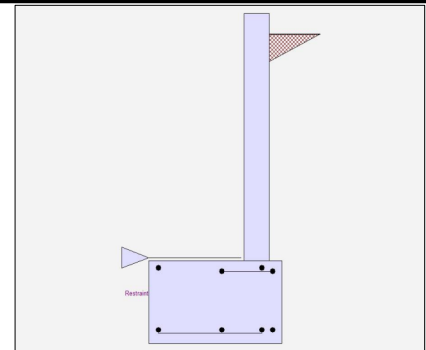
Criteria

Retained Height = 5.50 ft
Wall height above soil = 0.50 ft
Slope Behind Wall = 0.00
Height of Soil over Toe = 0.00 in
Water height over heel = 0.0 ft

Soil Data

Allow Soil Bearing = 3,300.0 psf
Equivalent Fluid Pressure Method
Active Heel Pressure = 40.0 psf/ft

Passive Pressure = 150.0 psf/ft
Soil Density, Heel = 110.00 pcf
Soil Density, Toe = 110.00 pcf
Footings||Soil Friction = 0.250
Soil height to ignore for passive pressure = 12.00 in



Surcharge Loads

Surcharge Over Heel = 0.0 psf
Used To Resist Sliding & Overturning
Surcharge Over Toe = 60.0 psf
Used for Sliding & Overturning

Lateral Load Applied to Stem

Lateral Load = 0.0 #/ft
...Height to Top = 0.00 ft
...Height to Bottom = 0.00 ft
Load Type = Wind (W)
(Service Level)
Wind on Exposed Stem = 0.0 psf
(Service Level)

Adjacent Footing Load

Adjacent Footing Load = 0.0 lbs
Footing Width = 0.00 ft
Eccentricity = 0.00 in
Wall to Ftg CL Dist = 0.00 ft
Footing Type = Line Load
Base Above/Below Soil = 0.0 ft
at Back of Wall
Poisson's Ratio = 0.300

Axial Load Applied to Stem

Axial Dead Load = 0.0 lbs
Axial Live Load = 0.0 lbs
Axial Load Eccentricity = 0.0 in

Design Summary

Wall Stability Ratios

Overturning = 1.56 OK
Slab Resists All Sliding !

Total Bearing Load = 2,002 lbs
...resultant ecc. = 11.50 in

Soil Pressure @ Toe = 1,686 psf OK
Soil Pressure @ Heel = 0 psf OK
Allowable = 3,300 psf
Soil Pressure Less Than Allowable

ACI Factored @ Toe = 2,360 psf
ACI Factored @ Heel = 0 psf
Footing Shear @ Toe = 4.5 psi OK
Footing Shear @ Heel = 1.4 psi OK
Allowable = 82.2 psi

Sliding Calcs

Lateral Sliding Force = 1,125.0 lbs

Stem Construction

	2nd	Bottom
Design Height Above Ftg	ft = 6.00	Stem OK 0.00
Wall Material Above "Ht"	= Concrete	Concrete
Design Method	= LRFD	LRFD
Thickness	= 8.00	8.00
Rebar Size	= # 5	# 6
Rebar Spacing	= 12.00	8.00
Rebar Placed at	= Edge	Edge

Design Data

fb/FB + fa/Fa = -0.001 0.122

Total Force @ Section

Service Level lbs =
Strength Level lbs = 968.0

Moment....Actual

Service Level ft-# =
Strength Level ft-# = 1,774.7
Moment.....Allowable ft-# = 8,206.3 14,393.2

Shear.....Actual

Service Level psi =
Strength Level psi = 14.3
Shear.....Allowable psi = 82.2 75.0

Anet (Masonry) in2 =
Rebar Depth 'd' in = 6.19 5.63

Masonry Data

f'm psi =
F_s psi =
Solid Grouting =
Modular Ratio 'n' =
Wall Weight psf = 100.0 100.0
Short Term Factor =
Equiv. Solid Thick. =
Masonry Block Type = Medium Weight
Masonry Design Method = ASD

Concrete Data

f_c psi = 3,000.0 2,500.0
F_y psi = 60,000.0 60,000.0

Vertical component of active lateral soil pressure IS
NOT considered in the calculation of soil bearing

Load Factors

Building Code IBC 2018,ACI
Dead Load 1.200
Live Load 1.600
Earth, H 1.600
Wind, W 1.000
Seismic, E 1.000

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Cantilevered Retaining Wall

Code: IBC 2018,ACI 318-14,TMS 402-16

Concrete Stem Rebar Area Details

2nd Stem	Vertical Reinforcing	Horizontal Reinforcing
As (based on applied moment) :	0 in2/ft	
(4/3) * As :	0 in2/ft	Min Stem T&S Reinf Area 0.000 in2
200bd/fy : 200(12)(6.1875)/60000 :	0.2475 in2/ft	Min Stem T&S Reinf Area per ft of stem Height : 0.000 in2/ft
0.0018bh : 0.0018(12)(8) :	0.1728 in2/ft	Horizontal Reinforcing Options :
	=====	One layer of : Two layers of :
Required Area :	0.1728 in2/ft	#4@ 0.00 in #4@ 0.00 in
Provided Area :	0.31 in2/ft	#5@ 0.00 in #5@ 0.00 in
Maximum Area :	1.0059 in2/ft	#6@ 0.00 in #6@ 0.00 in

Bottom Stem	Vertical Reinforcing	Horizontal Reinforcing
As (based on applied moment) :	0.0743 in2/ft	
(4/3) * As :	0.0991 in2/ft	Min Stem T&S Reinf Area 1.152 in2
200bd/fy : 200(12)(5.625)/60000 :	0.225 in2/ft	Min Stem T&S Reinf Area per ft of stem Height : 0.192 in2/ft
0.0018bh : 0.0018(12)(8) :	0.1728 in2/ft	Horizontal Reinforcing Options :
	=====	One layer of : Two layers of :
Required Area :	0.1728 in2/ft	#4@ 12.50 in #4@ 25.00 in
Provided Area :	0.66 in2/ft	#5@ 19.38 in #5@ 38.75 in
Maximum Area :	0.762 in2/ft	#6@ 27.50 in #6@ 55.00 in

Footing Data

Toe Width	=	2.50 ft
Heel Width	=	1.00
Total Footing Width	=	3.50
Footing Thickness	=	24.00 in
Key Width	=	0.00 in
Key Depth	=	0.00 in
Key Distance from Toe	=	0.00 ft
f'c =	3,000 psi	Fy = 60,000 psi
Footing Concrete Density	=	150.00 pcf
Min. As %	=	0.0018
Cover @ Top	3.00	@ Btm.= 3.00 in

Footing Design Results

	Toe	Heel
Factored Pressure	= 2,360	0 psf
Mu' : Upward	= 57,447	0 ft-#
Mu' : Downward	= 17,100	724 ft-#
Mu: Design	= 1,077	16 ft-#
Actual 1-Way Shear	= 4.53	1.37 psi
Allow 1-Way Shear	= 43.82	43.82 psi
Toe Reinforcing	= # 4 @ 12.00 in	
Heel Reinforcing	= # 4 @ 18.00 in	
Key Reinforcing	= # 5 @ 12.00 in	
Footing Torsion, Tu	=	0.00 ft-lbs
Footing Allow. Torsion, phi Tu	=	0.00 ft-lbs

If torsion exceeds allowable, provide
supplemental design for footing torsion.

Other Acceptable Sizes & Spacings

Toe: Not req'd: $\mu < \phi * 5 * \lambda * \sqrt{f'c} * S_m$
Heel: Not req'd: $\mu < \phi * 5 * \lambda * \sqrt{f'c} * S_m$
Key: No key defined

Min footing T&S reinf Area	1.81	in2
Min footing T&S reinf Area per foot	0.52	in2 /ft
If one layer of horizontal bars:	If two layers of horizontal bars:	
#4@ 4.63 in	#4@ 9.26 in	
#5@ 7.18 in	#5@ 14.35 in	
#6@ 10.19 in	#6@ 20.37 in	

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Cantilevered Retaining Wall

Code: IBC 2018,ACI 318-14,TMS 402-16

Summary of Overturning & Resisting Forces & Moments

Item	OVERTURNING.....				RESISTING.....		
	Force lbs	Distance ft	Moment ft-#		Force lbs	Distance ft	Moment ft-#
HL Act Pres (ab water tbl)	1,125.0	2.50	2,812.5	Soil Over HL (ab. water tbl)	201.7	3.33	672.2
HL Act Pres (be water tbl)				Soil Over HL (bel. water tbl)		3.33	672.2
Hydrostatic Force				Watre Table			
Buoyant Force =				Sloped Soil Over Heel =			
Surcharge over Heel =				Surcharge Over Heel =			
Surcharge Over Toe =				Adjacent Footing Load =			
Adjacent Footing Load =				Axial Dead Load on Stem =			
Added Lateral Load =				* Axial Live Load on Stem =			
Load @ Stem Above Soil =				Soil Over Toe =			
				Surcharge Over Toe =	150.0	1.25	187.5
				Stem Weight(s) =	600.0	2.83	1,700.0
				Earth @ Stem Transitions =			
				Footing Weight =	1,050.0	1.75	1,837.5
				Key Weight =			
				Vert. Component =			
Total	= 1,125.0	O.T.M. =	2,812.5	Total =	2,001.7 lbs	R.M. =	4,397.2
Resisting/Overturning Ratio	= 1.56			* Axial live load NOT included in total displayed, or used for overturning resistance, but is included for soil pressure calculation.			
Vertical Loads used for Soil Pressure =		2,001.7	lbs				

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Sliding Resistance.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Overturning Resistance.

Tilt

Horizontal Deflection at Top of Wall due to settlement of soil

(Deflection due to wall bending not considered)

Soil Spring Reaction Modulus 250.0 pci

Horizontal Defl @ Top of Wall (approximate only) 0.000 in

The above calculation is not valid if the heel soil bearing pressure exceeds that of the toe, because the wall would then tend to rotate into the retained soil.

Lateral Analysis

Building Geometry

Building Height	Height (ft)
Height from Ground Floor to Level 2	18

Projected Area (N-S Direction)	Area (sq ft)
Area from Ground Floor to Level 2	1593

Projected Area (E-W Direction)	Area (sq ft)
Area from Ground Floor to Level 2	1143

Building Footprint	Area (sq ft)
Roof	3,850
Ground Floor	4875

Building Gravity Loads

Roof Loading	Roof		Loading (psf)
	Roofing:	(3) 15 & (1) 90 Comp.	2.20
	Sheathing:	5/8" DF Plywood	1.80
	Rafters:	2x12	
		at 16" o.c.	3.17
	Miscellaneous:		1.50
	Roof DL:		9.00
	Roof LL (Unreduced):	Ordinary,Flat,Pitched,Curved Roofs	20.00
	Min. Roof Pitch:	3 :12	
	Live Load (Reducible):		20.00
	Ceiling:		
	Joists	5/8" DF Plywood	1.80
		2x12	3.17
		at 16" o.c.	
	Insulation	2" Rigid Insulation	1.50
	Miscellaneous:		1.00
	Ceiling DL:		7.47
	Ceiling LL:		10.00
	Total Roof + Ceiling DL:		16.47
	Total (DL+LL):		46.47

Floors	Finish:	Carpet & Pad	Loading (psf)
	Subfloor:	3/4" DF Plywood	1.00
	Joists:	2x10	2.30
		at 16" o.c.	
	Superimposed DL:		2.61
	Miscellaneous:		3.00
	Floor DL:		2.00
	Floor LL:	Basic Residential	11.00
			40.00
	Total (DL+LL):		51.00

Walls	Studs:	2x6	Int. walls (psf)	Ext. walls (psf)
		at 16" o.c.		
	Plates:		1.55	1.55
			0.52	0.52
	Sheathing:	5/8" DF Plywood		1.80
	Board + Finishes:	Gupsum Board + Finishes	4.40	6.60
	Siding:	Vinyl Siding		3.00
	Miscellaneous:		1.53	2.53
		Total Wall self weight, W _{sw} :	8.00	16.00

Building Wind Loads (1 of 3)

Wind Direction =	Normal	(Normal or Parallel to building ridge)
Risk Category =	II	(Table 1.5-1)
Wind Speed, V =	110	mph (Wind Map, Figure 26.5.1A)
Exposure Category =	B	(Sect. 26.7.3)
Ridge Height, hr =	20.00	ft. (hr >= he)
Eave Height, he =	13.00	ft. (he <= hr)
Building Lenth, L=	88.50	ft. (Normal to Building Ridge)
Building Width, B =	63.50	ft. (Parallel to Building Ridge)
Roof Type =	Gable	(Gable or Monoslope)
Topo. Factor, Kzt =	1.00	(Sect. 26.8.2 & Figure 26.8-1)
Direct. Factor, Kd =	0.85	(Table 26.6-1)
Partial Enclosed/Enclosed? (Y/N)	Y	(Sect. 28.6-1 & Figure 26.11-1)
Damping Ratio, b =	0.030	(Suggested Range = 0.010-0.070)
Period Coef., Ct =	0.0200	(Suggested Range = 0.020-0.035, See Table 12.8-2)
(Assume: T = Ct*h ^{3/4} , and f = 1/T)		

Resulting Parameters and Coefficients:

Roof Angle, θ =	14.04	deg.
Mean Roof Ht., h =	16.50	
Windward Wall Cp =	0.80	(Fig. 27.4-1)
Leeward Wall Cp =	-0.42	(Fig. 27.4-1)
Side Walls Cp =	-0.70	(Fig. 27.4-1)
Windward Roof Cp =	-0.54	(Fig. 27.4-1) (Condition #1)
Windward Roof Cp =	-0.03	(Fig. 27.4-1) (Condition #2)
Leeward Roof Cp =	-0.46	(Fig. 27.4-1) (Fig. 6-6)
+GCpi Coef. =	0.18	(Figure 26.11-1) (positive internal pressure)
-GCpi Coef. =	-0.18	(Figure 26.11-1) (negative internal pressure)

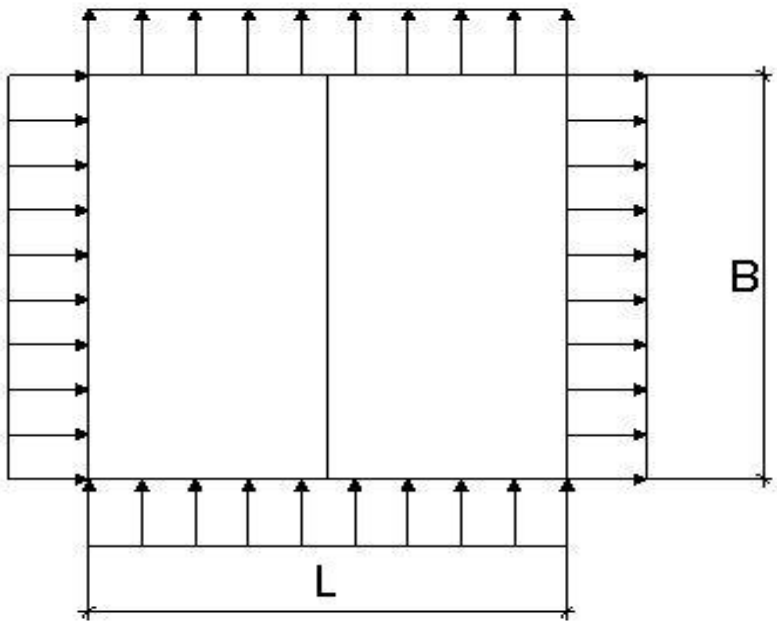
If z <= 15 then: Kz = 2.01*(15/zg)^(2/a) , If z > 15 then: Kz = 2.01*(z/zg)^(2/a) (Table 27.3-1, Case 2a)

zg =	1200	(Table 26.9-1)
a =	7.00	
Kh =	0.59	(Kh = Kz evaluated at z = h)
Iw =	1.00	(Table 1.5-2)

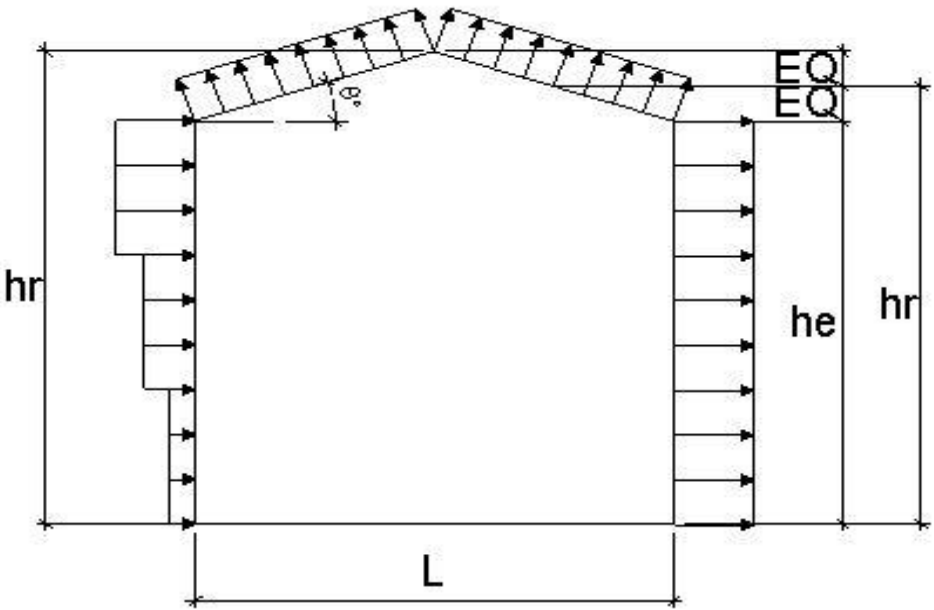
Velocity Pressure: qz = 0.00256*Kz*Kzt*Kd*V^2 (Sect. 27.3.2, Eq. 27.3-1)

freq., f =	6.107	hz. (f < 1, Flexible structure)
qh =	15.55	psf qh = 0.00256*Kh*Kzt*Kd*V^2 (qz evaluated at z = h)
Ratio h/B =	0.186	
Gust Factor, G =	0.860	(Sect. 26.9.1)

ASCE 7-10 WIND: Directional Procedure for buildings of all heights in Ch 27



PLAN VIEW



ELEVATION VIEW

Design Net External Wind Pressures (Sect. 27.4):
p = qz*G*Cp - qi*(+/-GCpi) for windward wall (psf), where: qi=qh (Eq. 27.4-1, Sect. 27.4.1)
p = qh*G*Cp - qi*(+/-GCpi) for leeward wall, sidewalls, and roof (psf), where: qi = qh (Sect. 27.4.1)

Building Wind Loads (2 of 3)

Normal to Ridge Wind Load Tabulation for MWFRS - Buildings of Any Height						
Surface	z (ft.)	Kz	qz (psf)	Cp	p = Net Design Press. (psf)	
					(w/ +GCpi)	(w/ -GCpi)
Windward Wall	0	0.57	15.13	0.80	7.61	13.21
	15.00	0.57	15.13	0.80	7.61	13.21
	20.00	0.62	16.43	0.80	8.50	14.10
For z = he:	13.00	0.57	15.13	0.80	7.61	13.21
For z = h:	16.50	0.59	15.55	0.80	7.90	13.50
Leeward Wall	All	-	-	-0.42	-8.43	-2.83
Side Walls	All	-	-	-0.70	-12.16	-6.56
Roof (windward) cond.	-	-	-	-0.54	-10.00	-4.40
Roof (windward) cond.	-	-	-	-0.03	-3.26	2.34
	-	-	-			
Roof (leeward)	-	-	-	-0.46	-8.97	-3.37
	-	-	-			

Notes: 1. (+) and (-) signs signify wind pressures acting toward & away from respective surfaces.

2. Per Code Section 27.4.7, the minimum wind load for MWFRS shall not be less than 16 psf for enclosed or partially enclosed buildings multiplied by the wall area of the building and 8 psf multiplied by the roof area of the building projected onto a vertical plane normal to the assumed wind direction

3. References : a. ASCE 7-02, "Minimum Design Loads for Buildings and Other Structures".

b. "Guide to the Use of the Wind Load Provisions of ASCE 7-02"

Determination of Gust Effect Factor, G :

Is Building Flexible? $f \geq 1$ Hz.

1: Simplified Method for Rigid Building

G = N.A.

Parameters Used in Both Item #2 and Item #3 Calculations (from Table 6-2):

$a^{\wedge} =$	0.143	
$b^{\wedge} =$	0.84	
$a(\text{bar}) =$	0.250	
$b(\text{bar}) =$	0.45	
$c =$	0.30	
$l =$	320	ft.
$e(\text{bar}) =$	0.333	
$z(\text{min}) =$	30	ft.

Calculated Parameters Used in Both Rigid and/or Flexible Building Calculations:

z(bar) =	30.00	= 0.6*h, but not < z(min), ft.
lz(bar) =	0.305	= c*(33/z(bar))^(1/6), Eq. 26.9-7
Lz(bar) =	309.99	= l*(z(bar)/33)^(e(bar)), Eq. 26.9-9
gq =	3.4	(3.4, per Sect. 26.9.4)
gv =	3.4	(3.4, per Sect. 26.9.4)
gr =	4.601	= (2*(LN(3600*f)))^(1/2)+0.577/(2*LN(3600*f))^(1/2),Eq. 26.9-11
Q =	0.888	= (1/(1+0.63*((B+h)/Lz(bar))^0.63))^(1/2), Eq. 26.9-8

Building Wind Loads (3 of 3)

2: Calculation of G for Rigid Building

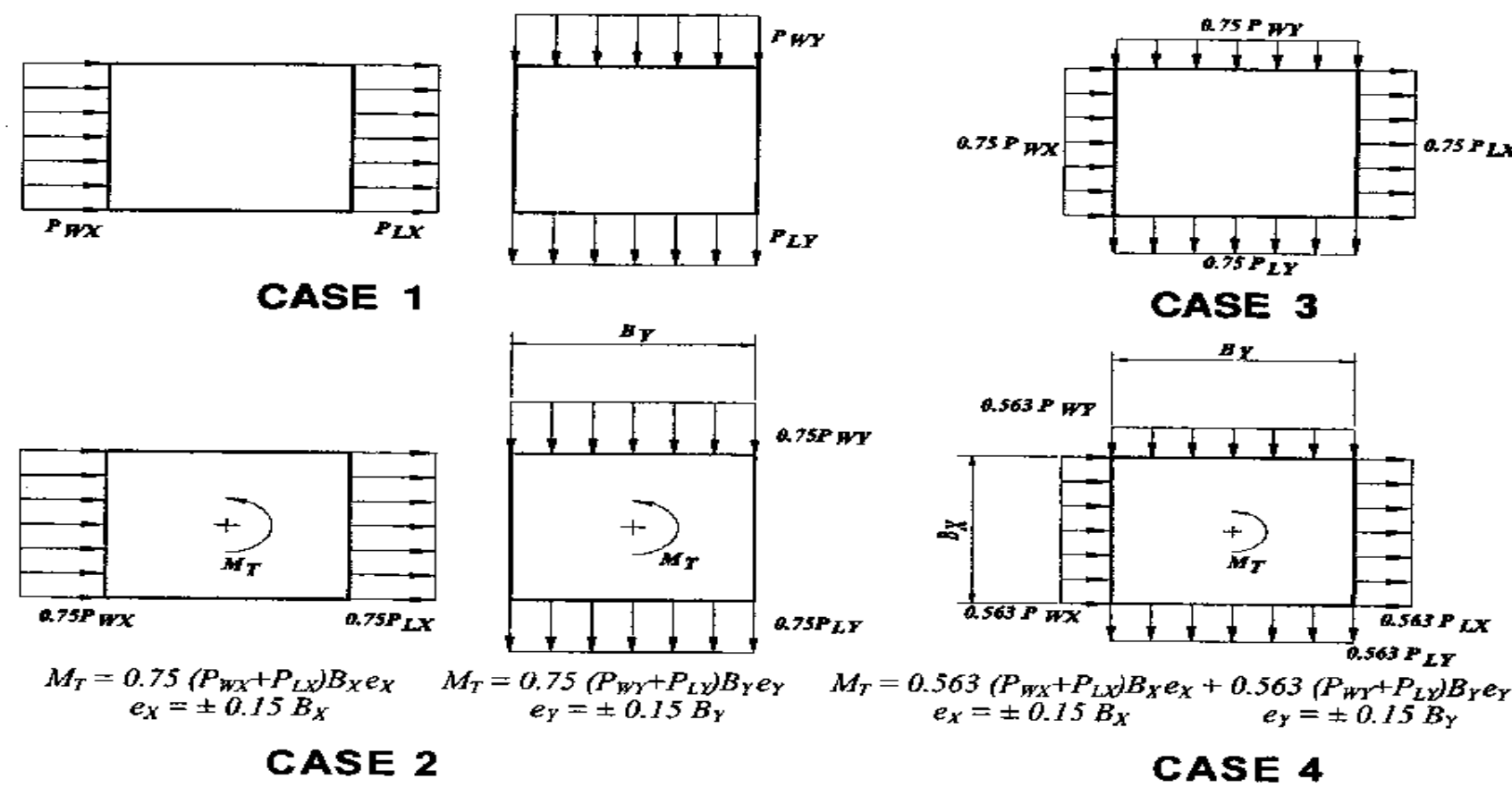
G = = 0.925*((1+1.7*gq*Iz(bar)*Q)/(1+1.7*gv*Iz(bar))) , Eq. 27.9-6

3: Calculation of Gf for Flexible Building

b =	0.030	Damping Ratio
Ct =	0.020	Period Coefficient
T =	0.164	= Ct*h^(3/4) , sec. (Period)
f =	6.107	= 1/T , Hz. (Natural Frequency)
V(fps) =	161.33	= V(mph)*(88/60) , ft./sec.
V(bar,zbar) =	70.89	= b(bar)*(z(bar)/33)^(a(bar))*V*(88/60) , ft./sec. , Eq. 26.9-16
N1 =	26.707	= f*Lz(bar)/(V(bar,zbar)) , Eq. 26.9-14
Rn =	0.017	= 7.47*N1/(1+10.3*N1)^(5/3) , Eq. 26.9-13
hh =	6.539	= 4.6*f*h/(V(bar,zbar))
Rh =	0.141	= (1/hh)-1/(2*hh^2)*(1-e^(-2*hh)) for hh > 0, or = 1 for hh = 0 ,Eq. 26.9-15
hB =	25.165	= 4.6*f*B/(V(bar,zbar))
RB =	0.039	= (1/hB)-1/(2*hB^2)*(1-e^(-2*hB)) for hB > 0, or = 1 for hB = 0,Eq. 26.9-15
hL =	117.417	= 15.4*f*L/(V(bar,zbar))
RL =	0.008	= (1/hL)-1/(2*hL^2)*(1-e^(-2*hL)) for hL > 0, or = 1 for hL = 0,Eq. 26.9-15
R =	0.041	= ((1/b)*Rn*Rh*RB*(0.53+0.47*RL))^(1/2) , Eq. 26.9-12
Gf =	0.860	= 0.925*(1+1.7*Iz(bar)*(gq^2*Q^2+gr^2*R^2)^(1/2))/(1+1.7*gv*Iz(bar)) , Eq. 26.9-12
Use: G =	0.860	

Horizontal Pressure:	16.00 psf
Uplift Pressure:	15.00 psf (Conservative)

Figure 6-9 - Design Wind Load Cases of MWFRS for Buildings of All Heights



Case 1: Full design wind pressure acting on the projected area perpendicular to each principal axis of the structure, considered separately along each principal axis.

Case 2: Three quarters of the design wind pressure acting on the projected area perpendicular to each principal axis of the structure in conjunction with a torsional moment as shown, considered separately for each principal axis.

Case 3: Wind pressure as defined in Case 1, but considered to act simultaneously at 75% of the specified value.

Case 4: Wind pressure as defined in Case 2, but considered to act simultaneously at 75% of the specified value.

- Notes:**
1. Design wind pressures for windward (Pw) and leeward (PL) faces shall be determined in accordance with the provisions of Section 27.4.1 and 27.4.2 as applicable for buildings of all heights.
 2. Above diagrams show plan views of building.
 3. Notation:
 - Pwx, Pwy = Windward face pressure acting in the X, Y principal axis, respectively.
 - Plx, PLY = Leeward face pressure acting in the X, Y principal axis, respectively.
 - e (ex, ey) = Eccentricity for the X, Y principal axis of the structure, respectively.
 - MT = Torsional moment per unit height acting about a vertical axis of the building.

Building Seismic Loads

IBC2006 (1613), ASCE 7-05 CHAPTER 11, 12, 13 SEISMIC DESIGN CRITERIA

S_s =	= 1.500g	Response Spectral Acc. (0.2 sec)
S_1 =	= 0.600g	Response Spectral Acc.(1.0 sec)
Soil Site Class:	D	
Site Coefficient F_a =	1.000	
Site Coefficient F_v =	1.500	
S_{MS} =	1.500	Max Considered Earthquake Acceleration ($F_a \cdot S_s$)
S_{M1} =	0.900	Max Considered Earthquake Acceleration ($F_v \cdot S_1$)
S_{DS} =	1.000	Acceleration @ 5% Damped ($2/3(S_{MS})$)
S_{D1} =	0.600	Acceleration @ 5% Damped ($2/3(S_{M1})$)
Building Occupancy Category	2	
Seismic Design Category:	D	
Design Category Consideration:	Flexible Diaphragm	

12.8 Equivalent lateral force procedure	A. Bearing Wall Systems	
Seismic Force Resisting Systems	Light frame shear walls sheathed with wood structural panels rated for shear resistance	
C_t =	0.02	ASCE 7-10 Table-12.8-2
x =	0.75	
Building ht. H_n =	18	
C_u =	1.4	ASCE 7-10 Table-12.8-1
$T_u \leq$	0.245	Upper Limit Period $C_u \cdot T_a$
T_a =	0.175	Approximate Fundamental Period , $C_t(h_n)^x$
$0.8T_s$ =	0.480	$0.8(S_{D1}/S_{DS})$
T =	0.175	Fundamental Period
T_L =	12	(12.8-7)

Level	Level Height (ft)	Diaph. Area (ft ²) /Wall Length (ft)	Effective Seismic Weight per 12.7.2 (lbs)	w_x	$w_x h_x^k$	C_{vx}	F_x (lbs)	Level Shear (lbs)	Diaphragm Design Force F_{px} (lbs)	Percent of Total Shear (%)	M_x (lbs-ft)
Roof	10	3,850	42,350	73,750	737500	1.000	24427	24,427	24427	100	0
1st Floor Int. Walls		205	16,400								
1st Floor Ext. Walls		290	46,400								
1st Floor	0	4875	53,625	85,025	0	0.000	0	24,427	13081	100	439685
Total			158,775	158,775		OK		OK			
Total Seismic W =			158,775 lbs								
$\Sigma w_i h_i^k$ =			737500								
V= $C_s \cdot W$ =			24427 lbs								

Is structure Regular & $\leq$ 5 stories ?	No	ASCE 7-10 12.8.1.3
Response Spectral Acc.(0.2 sec) S_s =	= 1.500g	
F_a =	1.000	
@ 5% Damped Design S_{DS} = $\frac{2}{3}(F_a \cdot S_s)$		1.000 g

R =	6.5	ASCE 7-10 T-12.2-1
Over Strength Factor Ω_o =	2.5	ASCE 7-10 T-12.2-1
Redundancy Factor ρ =	1.3	ASCE 7-10 12.3.4
Deflection Amplification Factor C_d =	4	ASCE 7-10 T-12.2-1
Seismic Importance factor I_e =	1	ASCE 7-10 T-1.5-2

C_s =	0.154	$S_{DS}/(R/I)$	(12.8-2)
Check: C_s =	0.528	$S_{D1}/(R/I) \cdot T$	For $T \leq T_L$, (12.8-3)
C_s =	36.26	$S_{D1} T_L / (T^2 (R/I))$	For $T > T_L$ (12.8-4)
need not exceed, C_s =	0.528		
C_s =	0.01	$0.044 S_{DS} I_e$	(12.8-5)
C_s =	0.0462	$0.5 S_1 (R/I)$	For $S_1 > 0.60$ (12.8-6)
shall not be less than, C_s =	0.0462		

C_s =	0.154	
Governing Seismic Base Shear:	0.154 x DL	$C_s W$

Seismic Vertical Distribution:	T=	0.175
	k=	1

Wood Design Schedules

PLYWOOD SHEAR WALL SCHEDULE										Sole Plate	Simpson A35
Plywood Callout	Plywood Thickness	Plywood Grade	Common Nail Size	Edge Nailing (in o.c.)	Field Nailing	Unsupported Panel Edges	Panel Edge Studs Required	Allowable Shear lbs/ft	Nailing 16d Face	Roof Shear Conn. Spacing	
7	1/2"	APA 24/0	10d	6	12" o.c.	Blocked	2x	310	8 1/2" o.c.	1'-4" o.c.	
8	1/2"	APA 24/0	10d	4	12" o.c.	Blocked	2x	460	5 1/2" o.c	10" o.c.	
9	1/2"	APA 24/0	10d	3	12" o.c.	Blocked	3x	600	4 1/2" o.c.	9" o.c.	
10	1/2"	APA 24/0	10d	2	12" o.c.	Blocked	3x	770	3 1/2" o.c.	6" o.c.	

Floor To Floor Strap Schedule			3 1/2" Stud
Callout	Simpson Designation	Capacity in lbs	
37	MST37	2465	
48	MST48	3960	
37	(2) MST37	4930	
60	MST60	5240	
8	HDU8-SDS2.5	5980	
48	(2) MST48	7920	
11	HDU11-SDS2.5	9535	
60	(2) MST60	9860	

ANCHOR BOLT SCHEDULE			
Bolt Diameter	Bolt Spacing	Sill Plate Thickness	All. Shear lbs/ft
5/8"	4'-0"	2x	293
5/8"	3'-0"	3x	390
5/8"	2'-0"	3x	585
5/8"	1'-6"	3x	780
5/8"	1'-0"	3x	1170
All anchor bolts shall be ASTM A-307 material with a minimum embedment of 7" and include a 3" x 3" x 1/4" pl. washer.			

Floor To Foundation					
Type	Simpson Designation	Min. Member Thickness (in)	Allowable Load (lbs)	Stud Required	Anchor Bolt
					Not Req'd
2	HDU2-SDS2.5		3075	2-2x or 4x	SSTB 20
4	HDU4-SDS2.5		4565	2-2x or 4x	SSTB 24
5	HDU5-SDS2.5		5645	2-2x or 4x	SSTB 24
8	HDU8-SDS2.5		5980	2-2x or 4x	SSTB 34
11	HDU11-SDS2.5		9535	3-2x or 6x	1" x 36"
14	HDU14-SDS2.5		10770	4x6	1" x 36"
DBL.11	(2)HDU11-SDS2.5		19070	3-2x or 6x	(2) 1" x 36"

Collector Strap Schedule	
2	SIMPSON CS16 STRAP w/ (20) 10d NAILS, END LENGTH 11"
3	SIMPSON CS14 STRAP w/ (26) 10d NAILS, END LENGTH 15"
4	SIMPSON CMSTC16 STRAP w/ (50) 16d NAILS, END LENGTH 20"
5	SIMPSON CMST14 STRAP w/ (66) 10d NAILS, END LENGTH 30"
6	SIMPSON CMST12 STRAP w/ (86) 10d NAILS, END LENGTH 39"

Shear Wall Design

The gravity loads prevent the shear wall from overturning or toppling over by creating a resisting moment that opposes the overturning moment. The magnitude of this resisting moment is the summation of moments about the same point that the overturning occurs. The applied loads in the overturning analysis are to be in accordance with the code-required load combinations, which are shown below for reference:

ASCE 7-10 Basic Load Combinations

1	D	ASCE 2.4.1.1
2	D + L	ASCE 2.4.1.2
3	D + (Lr or S or R)	ASCE 2.4.1.3
4	D + 0.75L + 0.75(Lr or S or R)	ASCE 2.4.1.4
5	D+(0.6W or 0.7E)	ASCE 2.4.1.5
6a	D + 0.75L + 0.75(0.6W) + 0.75(Lr or S or R)	ASCE 2.4.1.6a
6b	D + 0.75L + 0.75(0.7E) + 0.75S	ASCE 2.4.1.6b
7	0.6D + 0.6W	ASCE 2.4.1.7
8	0.6D + 0.7E	ASCE 2.4.1.8

$E_v = 0.2S_{DS}D$

(ASCE 7-10 EQ. 12.4-4)

$E_m = \rho Q_E$

(ASCE 7-10 EQ. 12.4-7)

$E_m = E_h + E_v$

(ASCE 7-10 EQ. 12.4-5) For use with combination 5 and 6

$E_m = E_h - E_v$

(ASCE 7-10 EQ. 12.4-5) For use with combination 8

$E_m = \Omega_0 Q_E$

(ASCE 7-10 EQ. 12.4-7)

$E_m = E_{mh} + E_v$

(ASCE 7-10 EQ. 12.4-5) For use with combination 5 and 6

$E_m = E_{mh} - E_v$

(ASCE 7-10 EQ. 12.4-5) For use with combination 8

Where fluid loads F are present, they shall be included in combinations 1 through 6 and 8 with the same factor as that used for dead load D.

Where load H is is present, it shall be included as follows:

1. Where the effect of H adds to the primary variable load effect, include H with a load factor of 1.0;
2. Where the effect of H resists the primary variable load effect, include H with a load factor of 0.6 where the load is permanent or a load factor of 0 for all other conditions.

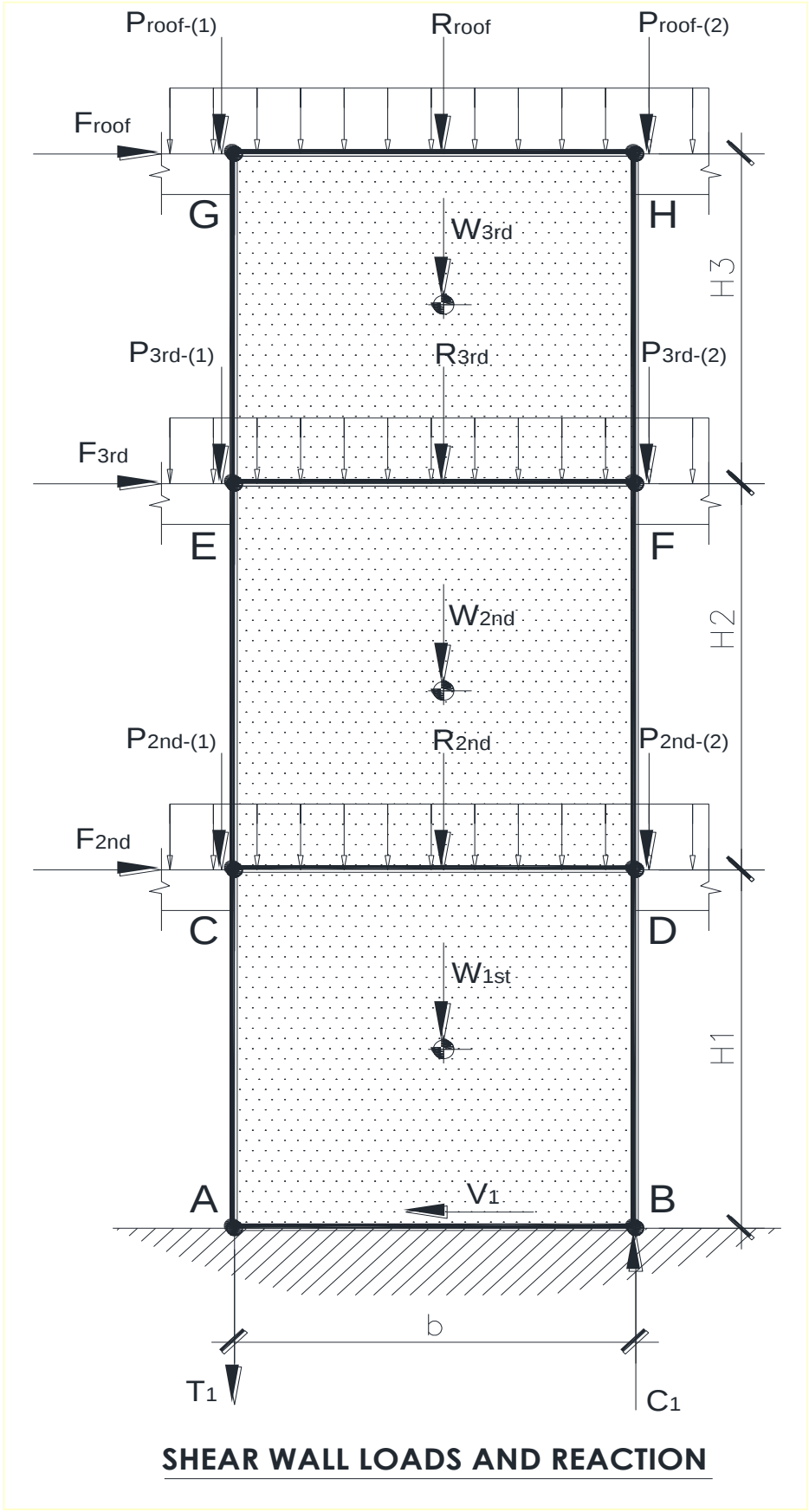
ASCE 7-10 Seismic Load Combinations w/ Redundency Factor

5	$(1.0 + 0.14S_{DS})D + 0.7\rho Q_E$	ASCE 12.4.2.3.5
6	$(1.0 + 0.105S_{DS})D + 0.525\rho Q_E + 0.75L + 0.75(L_r \text{ or } S \text{ or } R)$	ASCE 12.4.2.3.6
8	$(0.6 - 0.14S_{DS})D + 0.7\rho Q_E$	ASCE 12.4.2.3.8

ASCE 7-10 Seismic Load Combinations w/ Overstrength Factor

5	$(1.0 + 0.14S_{DS})D + 0.7\Omega_0 Q_E$	ASCE 12.4.2.3.5
6	$(1.0 + 0.105S_{DS})D + 0.525\Omega_0 Q_E + 0.75L + 0.75(L_r \text{ or } S \text{ or } R)$	ASCE 12.4.2.3.6
8	$(0.6 - 0.14S_{DS})D + 0.7\Omega_0 Q_E$	ASCE 12.4.2.3.8

For lateral analysis combinations 1 through 4 are eliminated as no lateral factors are included. For seismic analysis, seismic load combinations from ASCE 7-10 12.4.2.3 shall apply where H=0 and F=0. It can be seen by inspection that combinations 5 or 6 will produce the worst-case compression chord force, and the combinations 7 or 8 will produce the worst-case tension chord forces. Since these combinations all include either wind or seismic loads, the load duration factor for the member designs will be CD =1.6.



Shear Wall Design Level 1, East-West Direction

Table 1 of 4

E-W	A _s , Trib. Area seismic (ft ²)	Seismic Tributary Percent (%)	V _s , Seismic Load, not adjusted for H/b (lbs)	A _w , E-W wind Trib. Area (ft ²)	Wind Tributary Percent (%)	V _w , Wind Load (lbs)	b, Wall length (ft) *	Total Wall Length (ft)	Wall Height H (ft)	Wall Type	Wall Tributary Width (ft)
GRID 2-1	385	0.10	2,443	114.30	0.10	1,829	6.00	6.00	10.0	Ext. Wall	15.00
GRID 3-1	154	0.04	977	45.72	0.04	732	3.50	3.50	10.0	Ext. Wall	5.00
GRID 4-1	1,540	0.40	9,771	457.20	0.40	7,315	9.25	27.25	10.0	Ext. Wall	14.00
GRID 4-2							9.00		10.0	Ext. Wall	15.00
GRID 4-3							9.00		10.0	Int. Wall	15.00
GRID 5-1	578	0.15	3,664	171.45	0.15	2,743	8.50	8.50	10.0	Int. Wall	10.00
GRID 6-1	578	0.15	3,664	171.45	0.15	2,743	7.75	7.75	10.0	Ext. Wall	13.00
GRID 7-1	616	0.16	3,908	182.88	0.16	2,926	6.00	12.00	10.0	Ext. Wall	12.00
GRID 7-2							6.00		10.0	Ext. Wall	12.00
Total	3,850	1.00 OK	24,427 OK	1143.00	1 OK	18,288					

Shear Wall Design Level 1, East-West Direction

Table 2 of 4

E-W	W _D , Level Uniform Dead Load (lbs/ft)	W _L , Level Uniform Live Load (lbs/ft)	Check: H/b <3.5	V _w , Wind Load per wall segment (lbs)	V _s , Seismic Load per wall segment (lbs)	Check: H/b >2 for seismic, multiply allowable unit shears by 2b/H	W, Wall self weight= b*H*W _{sw} , (lb)	Co, Perforated SW Shear Capacity Adjustment Factor	v=(V/b)/Co (lbs/ft) (Factored Unit shear capacity, 0.7V _s or 0.6V _w)	Shear Wall Type, from Plywood Schedule	Shear Wall Overrides	Shear Wall Type Capacity (plf)
GRID 2-1	165	600	Yes, OK	1829	2,443	No	960	1	285	7	8	460
GRID 3-1	55	200	Yes, OK	732	977	Yes	560	1	195	7	8	460
GRID 4-1	154	560	Yes, OK	2483	3,317	No	1,480	1	251	7	8	460
GRID 4-2	165	600	Yes, OK	2416	3,227	No	1,440	1	251	7	8	460
GRID 4-3	165	600	Yes, OK	2416	3,227	No	720	1	251	7	8	460
GRID 5-1	110	400	Yes, OK	2743	3,664	No	680	1	302	7	8	460
GRID 6-1	143	520	Yes, OK	2743	3,664	No	1,240	1	331	8	8	460
GRID 7-1	132	480	Yes, OK	1463	1,954	No	960	1	228	7	7	310
GRID 7-2	132	480	SSW	1463	1,954	No	960	1	228	7	7	310

Shear Wall Design Level 1, East-West Direction

Table 3 of 4

E-W	v, Unit Shear (w/ H/b adjustment) (lbs/ft)	Unit Shear D/C Ratio	$R_{Dead} = W_D * b;$ (lbs)	$R_{Live} = W_L * b;$ (lbs)	ρ Value or Ω_0 Override	Chord Forces: Tension Case, Wind load (LC7: 0.6D+0.6W)	Chord Forces: Tension Case, Seismic Load (LC 8: (0.6- 0.14S _{ds})D+0.7pQ _e + H) *	Chord Forces: Compression Case, Wind Load (LC 5: D+0.6W)	Chord Forces: Comp. Case, Wind Load (LC 6a: D+0.75L+0.75(0.6 W)	Chord Forces: Comp. Case, Seismic Load (LC 5: (1.0+0.14S _{ds})D+ H+F+0.7pQ _e) *	Chord Forces: Comp. Case, Seismic Load (LC 6b: (1.0+0.10S _{ds})D+H+ F+0.525pQ _e +0.75L) *	Governing Factored Uplift Force; (lbs)
GRID 2-1	284.98	0.62	3,872	6,953	1.3	667	2,814	3,765	5,915	5912	7,525	2,814
GRID 3-1	279.16	0.61	4,891	11,440	1.3	-213	1,416	3,699	7,676	5328	8,897	1,416
GRID 4-1	250.99	0.55	2,905	5,180	1.3	739	2,595	3,063	4,603	4918	5,994	2,595
GRID 4-2	250.99	0.55	2,925	5,400	1.3	733	2,590	3,073	4,696	4930	6,088	2,590
GRID 4-3	250.99	0.55	2,205	5,400	1.3	949	2,756	2,713	4,336	4520	5,690	2,756
GRID 5-1	301.74	0.66	2,270	5,780	1.3	1,256	3,401	3,071	4,755	5216	6,363	3,401
GRID 6-1	330.95	0.72	2,645	5,110	1.3	1,330	3,694	3,446	4,832	5810	6,604	3,694
GRID 7-1	227.98	0.74	1,802	3,060	1.3	923	2,549	2,364	3,146	3991	4,366	2,549
GRID 7-2	227.98	0.74	1,763	2,920	1.3	934	2,558	2,345	3,074	3969	4,292	2,558

Shear Wall Design Level 1, East-West Direction

Table 4 of 4

E-W	Governing Factored, Compression Load (lb)	Unfactored Comp/Tens. Load (lb)	Floor to Floor Strap Symbol, from strap schedule	Floor to Floor Strap Call Out, from strap schedule	Override Floor to Floor Strap Call Out?	Select Chord Size	Maximum Chord Capacity	Chord Size code check?	Floor To Foundation Hold Down Designation	Hold Down Call Out	Floor To Foundation anchor bolt, from anchor bolt schedule	Anchor Bolts Call Out
GRID 2-1	7,525	4071	48	MST48	MST48	(3) 2x6	11,598	OK	HDU2-SDS2.5	2	SSTB 20	1
GRID 3-1	8,897	2792	37	MST37	MST37	(3) 2x6	11,598	OK	HDU2-SDS2.5	2	SSTB 20	1
GRID 4-1	5,994	3586	48	MST48	MST48	(2) 2x6	7,732	OK	HDU2-SDS2.5	2	SSTB 20	1
GRID 4-2	6,088	3586	48	MST48	MST48	(2) 2x6	7,732	OK	HDU2-SDS2.5	2	SSTB 20	1
GRID 4-3	5,690	3586	48	MST48	MST48	(2) 2x6	7,732	OK	HDU2-SDS2.5	2	SSTB 20	1
GRID 5-1	6,363	4311	48	MST48	MST48	(2) 2x6	7,732	OK	HDU4-SDS2.5	4	SSTB 24	2
GRID 6-1	6,604	4728	48	MST48	MST48	(2) 2x6	7,732	OK	HDU4-SDS2.5	4	SSTB 24	2
GRID 7-1	4,366	3257	48	MST48	MST48	(2) 2x8	18,438	OK	HDU2-SDS2.5	2	SSTB 20	1
GRID 7-2	4,292	3257	48	MST48	MST48	(2) 2x6	7,732	OK	HDU2-SDS2.5	2	SSTB 20	1

Diaphragm Design, East-West Direction

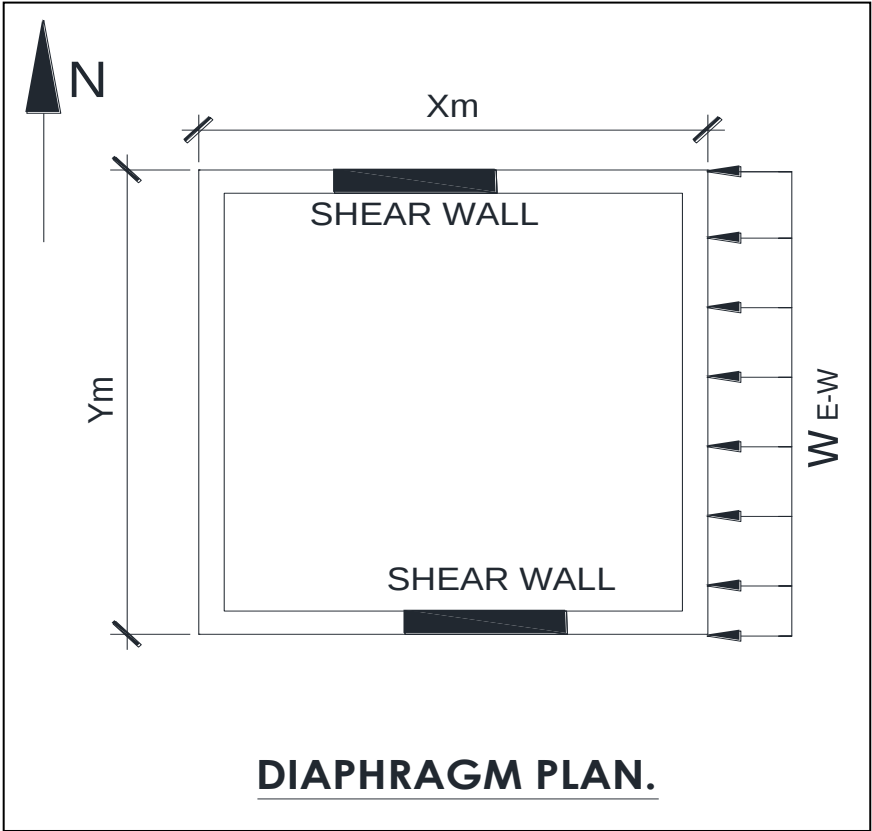


Table 1 of 3

	Xm (W), (ft)	Ym (L), (ft)	Do horizontal irregularities exist? (YES, NO)	Diaphragm L/W Ratio Limits Check?	Trib. Area seismic, ft2	W _{E-W} - SEISMIC, LB/FT	E-W wind projected Area (ft ²)	W _{E-W} - WIND, LB/FT	V _{E-W} , (lbs)	M _{E-W} , lb-ft
Roof	88.50	63.50	Yes	OK	5,619.75	561.50	571.50	144.00	22,284.61	283,014.55

Table 2 of 3

	Max. unit shear, (lbs/ft)	Top plate force (lbs)	Allowable shear, (lbs/ft)	Diaphragm Shear Check?	Select Top plate size	Maximum Chord Capacity	Top plate Size code check?	A _{chord}	$\Delta b = \frac{5vL^3}{8EAW}$, (in)	Ga, apparent diaphragm shear stiffness (kips/in)
Roof	251.80	3197.90	500	OK	(2) 2x6	7,590	OK	16.50	0.04	10

Table 3 of 3

$\Delta v = 0.25vL/1000G_a$ (in)	Nail spacing	Min. Nail Size	Load per nail (lbs/fastener) NDS T-C4.2.2D	en (in) NDS T-C4.2.2D	T = M/W (lb)	n = T/capacity of nails NDS T-11N	$\Delta c = \frac{2(T \text{ or } C)}{Y_n}$	$\Sigma \Delta c = \Sigma x \Delta c / 2W$	Δs (in)	Deflection D/C Ratio ($\Delta a = 0.02 * H$)
0.40	6	8d	220	0.045	3197.90	21.00	0.003	0.00	0.44	#DIV/0!

Shear Wall Design Level 1, North-South Direction

Table 1 of 4

N-S	A _s , Trib. Area seismic (ft ²)	Seismic Tributary Percent (%)	V _s , Seismic Load, not adjusted for H/b (lbs)	A _w , E-W wind Trib. Area (ft ²)	Wind Tributary Percent (%)	V _w , Wind Load (lbs)	b, Wall length (ft)	Total Wall Length (ft)	Wall Height H (ft)	Wall Type	Wall Tributary Width (ft)
GRID B-1	578	0.15	3,664	238.95	0.15	3,823	8.00	8.0	18.0	Ext. Wall	10.0
GRID C-1	1,348	0.35	8,549	557.55	0.35	8,921	12.75	12.8	18.0	Int. Wall	24.0
GRID D-1	1,155	0.30	7,328	477.90	0.30	7,646	15.50	15.5	18.0	Int. Wall	25.0
GRID E-1	193	0.05	1,221	79.65	0.05	1,274	6.5	6.5	18.0	Ext. Wall	9.0
GRID F-1	193	0.05	1,221	79.65	0.05	1,274	6.0	6.0	18.0	Ext. Wall	9.0
GRID G-1	385	0.10	2,443	159.30	0.10	2,549	6.5	6.5	18.0	Ext. Wall	14.0
Total	3,850.00	1	24,427	1593.00	1	25,488					
		OK	OK		OK						

Shear Wall Design Level 1, North-South Direction

Table 2 of 4

N-S	W _D , Level Uniform Dead Load (lbs/ft)	W _L , Level Uniform Live Load (lbs/ft)	Check: H/b <3.5	V _w , Wind Load per wall segment (lbs)	V _s , Seismic Load per wall segment (lbs)	Check: H/b >2 for seismic, multiply allowable unit shears by 2b/H	W, Wall self weight=b*H*W _{sw} , (lb)	Co, Perforated SW Shear Capacity Adjustment Factor	v=(V/b)/Co (lbs/ft) (Factored Unit shear capacity, 0.7V _s or 0.6V _w)	Shear Wall Type, from Plywood Schedule	Shear Wall Overrides	Shear Wall Type Capacity (plf)
GRID B-1	110	400	Yes, OK	3,823	3,664	No	2,304	1	321	8	8	460
GRID C-1	264	960	Yes, OK	8,921	8,549	No	1,836	1	469	8	10	770
GRID D-1	275	1,000	Yes, OK	7,646	7,328	No	4,464	1	331	8	8	460
GRID E-1	99	360	Yes, OK	1,274	1,221	No	1,872	1	132	7	7	310
GRID F-1	99	360	Yes, OK	1,274	1,221	No	1,728	1	142	7	7	310
GRID G-1	154	560	Yes, OK	2,549	2,443	No	1,872	1	263	7	8	460

Shear Wall Design Level 1, North-South Direction

Table 3 of 4

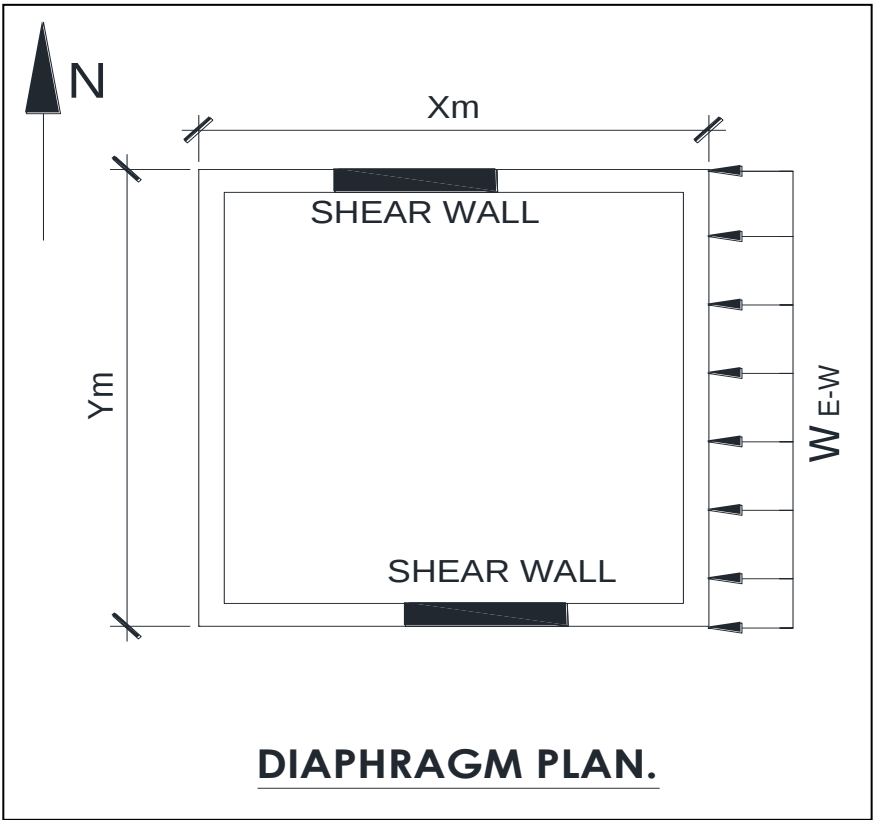
N-S	v, Unit Shear (w/ H/b adjustment) (lbs/ft)	Unit Shear D/C Ratio	$R_{Dead} = W_D * b;$ (lbs)	$R_{Live} = W_L * b;$ (lbs)	ρ Value or Ω_o Override	Chord Forces: Tension Case, Wind load (LC7: 0.6D+0.6W)	Chord Forces: Tension Case, Seismic Load (LC 8: (0.6- 0.14Sds)D+0.7pQe+ H) *	Chord Forces: Compression Case, Wind Load (LC 5: D+0.6W)	Chord Forces: Comp. Case, Wind Load (LC 6a: D+0.75L+0.75(0.6 W)	Chord Forces: Comp. Case, Seismic Load (LC 5: (1.0+0.14Sds)D+ H+F+0.7pQe) *	Chord Forces: Comp. Case, Seismic Load (LC 6b: (1.0+0.10Sds)D+H+ F+0.525pQe+0.75L)	Governing Factored Uplift Force; (lbs)
GRID B-1	321	0.70	5,404	8,420	1.3	3,540	6,259	7,863	9,730	10582	11,770	6,259
GRID C-1	469	0.61	8,172	23,040	1.3	5,105	9,104	11,642	18,393	15642	21,393	9,104
GRID D-1	331	0.72	11,339	25,000	1.3	1,926	5,136	10,997	19,040	14207	21,448	5,136
GRID E-1	132	0.42	2,763	3,240	1.3	1,289	2,442	3,499	4,185	4653	5,050	2,442
GRID F-1	142	0.46	3,920	7,970	1.3	1,118	2,433	4,254	6,669	5569	7,655	2,433
GRID G-1	263	0.57	4,028	7,840	1.3	3,027	5,229	6,249	8,130	8452	9,782	5,229

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N-S	Governing Factored, Compression Load (lb)	Unfactored Comp/Tens. Load (lb)	Floor to Floor Strap Symbol, from strap schedule	Floor to Floor Strap Call Out, from strap schedule	Override Floor to Floor Strap Call Out?	Select Chord Size	Maximum Chord Capacity	Chord Size code check?	Floor To Foundation Hold Down Designation	Hold Down Call Out	Floor To Foundation anchor bolt, from anchor bolt schedule	Anchor Bolts Call Out
GRID B-1	11,770	8602	(2) 48	(2) MST48	(2) MST48	(4) 2x6	15,464	OK	HDU11-SDS2.5	11	1" x 36"	2
GRID C-1	21,393	12594	11	HDU11-SDS2.5	HDU11-SDS2.5	(4) 2x6	15,464	OK	HDU11-SDS2.5	11	1" x 36"	3
GRID D-1	21,448	8880	60	MST60	MST60	(4) 2x6	15,464	OK	HDU5-SDS2.5	5	SSTB 24	2
GRID E-1	5,050	3529	37	MST37	MST37	(3) 2x6	11,598	OK	HDU2-SDS2.5	2	SSTB 20	1
GRID F-1	7,655	3823	37	MST37	MST37	(3) 2x6	11,598	OK	HDU2-SDS2.5	2	SSTB 20	1
GRID G-1	9,782	7058	60	MST60	MST60	(3) 2x6	11,598	OK	HDU5-SDS2.5	5	SSTB 24	1

Diaphragm Design, North-South Direction



	Xm(L), (ft)	Ym(W), (ft)	Do horizontal irregularities exist? (YES, NO)	Diaphragm L/W Ratio Limits Check?	Trib. Area seismic, ft2	W _{N-S- SEISMIC} , LB/FT	N-S wind projected Area (ft ²)	W _{N-S- WIND} , LB/FT	V _{N-S} , (lbs)	M _{N-S} , lb-ft
Roof	63.50	88.50	No	OK	5,619.75	402.89	796.50	144.00	17,827.69	394,437.61

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	Max. unit shear, (lbs/ft)	Top plate force (lbs)	Allowable shear, (lbs/ft)	Diaphragm Shear Check?	Select Top plate size	Maximum Chord Capacity	Top plate Size code check?	A _{chord}	Δb= 5vL ³ /8EAW, (in)	Ga, apparent diaphragm shear stiffness (kips/in)
Roof	280.75	6211.62	500	OK	(2) 2x6	7,590	OK	16.50	0.10	10

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Δv=0.25vL/1000Ga (in)	Nail spacing	Min. Nail Size	Load per nail (lbs/fastener) NDS T-C4.2.2D	en (in) NDS T-C4.2.2D	T = M/W (lb)	n = T/capacity of nails NDS T-11N	Δc = 2(T or C)/Y _n	ΣΔc= ΣxΔc/2W	Δsum (in)	Deflection D/C Ratio (Δa =0.02*H)
0.62	6	8d	220	0.045	6211.62	41.00	0.003	0.00	0.73	#DIV/0!