REScheck Software Version 4.6.4
Compliance Certificate

Project

Energy Code:	**Utah Energy Conservation Code**
Location:	**Huntsville, Utah**
Construction Type:	**Single-family**
Project Type:	**New Construction**
Conditioned Floor Area:	**3,754 ft2**
Glazing Area	**11%**
Climate Zone:	**5 (8065 HDD)**
Permit Date:	
Permit Number:	

Construction Site: Owner/Agent: Designer/Contractor:

Compliance: Passes using UA trade-off

Compliance: **3.6% Better Than Code**   Maximum UA: **335**   Your UA: **323**

The % Better or Worse Than Code Index reflects how close to compliance the house is based on code trade-off rules.
It DOES NOT provide an estimate of energy use or cost relative to a minimum-code home.

Envelope Assemblies

Assembly	Gross Area or Perimeter	Cavity R-Value	Cont. R-Value	U-Factor	UA
Ceiling 1: Flat Ceiling or Scissor Truss	1,877	49.0	0.0	0.026	49
Wall 1: Wood Frame, 16" o.c.	610	19.0	0.0	0.060	30
Window 1: Vinyl/Fiberglass Frame:Double Pane with Low-E	94			0.330	31
Door 1: Glass	21			0.330	7
Wall 2: Wood Frame, 16" o.c.	610	19.0	0.0	0.060	32
Window 2: Vinyl/Fiberglass Frame:Double Pane with Low-E	59			0.330	19
Door 2: Solid	21			0.350	7
Wall 3: Wood Frame, 16" o.c.	480	19.0	0.0	0.060	26
Window 3: Vinyl/Fiberglass Frame:Double Pane with Low-E	51			0.330	17
Wall 4: Wood Frame, 16" o.c.	480	19.0	0.0	0.060	26
Window 4: Vinyl/Fiberglass Frame:Double Pane with Low-E	6			0.330	2
Door 3: Solid	42			0.350	15
Floor 1: All-Wood Joist/Truss:Over Unconditioned Space	1,877	30.0	0.0	0.033	62

Compliance Statement: The proposed building design described here is consistent with the building plans, specifications, and other calculations submitted with the permit application. The proposed building has been designed to meet the Utah Energy Conservation Code requirements in RES*check* Version 4.6.4 and to comply with the mandatory requirements listed in the RES*check* Inspection Checklist.

_____   _____   _____
Name - Title   Signature   Date

RES*check* Software Version 4.6.4

Inspection Checklist

Energy Code: Utah Energy Conservation Code

Requirements: 0.0% were addressed directly in the RES*check* software

Text in the "Comments/Assumptions" column is provided by the user in the RESCheck Requirements screen. For each requirement, the user certifies that a code requirement will be met and how that is documented, or that an exception is being claimed. Where compliance is itemized in a separate table, a reference to that table is provided.

Section # & Req.ID	Pre-Inspection/Plan Review	Plans Verified Value	Field Verified Value	Complies?	Comments/Assumptions
103.1, 103.2 [PR1][1] ✪	Construction drawings and documentation demonstrate energy code compliance for the building envelope.			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
302.1, 403.6 [PR2][2] ✪	Heating and cooling equipment is sized per ACCA Manual S based on loads calculated per ACCA Manual J or other methods approved by the code official.	Heating: Btu/hr_____ Cooling: Btu/hr_____	Heating: Btu/hr_____ Cooling: Btu/hr_____	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	

Additional Comments/Assumptions:

1	High Impact (Tier 1)	2	Medium Impact (Tier 2)	3	Low Impact (Tier 3)

Section # & Req.ID	Foundation Inspection	Complies?	Comments/Assumptions
303.2.1 [FO11]² ⚓	A protective covering is installed to protect exposed exterior insulation and extends a minimum of 6 in. below grade.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
403.8 [FO12]² ⚓	Snow- and ice-melting system controls installed.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	

Additional Comments/Assumptions:

1	High Impact (Tier 1)	2	Medium Impact (Tier 2)	3	Low Impact (Tier 3)

Section # & Req.ID	Framing / Rough-In Inspection	Plans Verified Value	Field Verified Value	Complies?	Comments/Assumptions
402.1.1, 402.3.4 [FR1][1] ⊕	Door U-factor.	U-_____	U-_____	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	*See the Envelope Assemblies table for values.*
402.1.1, 402.3.1, 402.3.3, 402.3.6, 402.5 [FR2][1] ⊕	Glazing U-factor (area-weighted average).	U-_____	U-_____	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	*See the Envelope Assemblies table for values.*
303.1.3 [FR4][1] ⊕	U-factors of fenestration products are determined in accordance with the NFRC test procedure or taken from the default table.			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
402.4.3 [FR20][1] ⊕	Fenestration that is not site built is listed and labeled as meeting AAMA /WDMA/CSA 101/I.S.2/A440 or has infiltration rates per NFRC 400 that do not exceed code limits.			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
402.4.4 [FR16][2] ⊕	IC-rated recessed lighting fixtures sealed at housing/interior finish and labeled to indicate ≤2.0 cfm leakage at 75 Pa.			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
403.2.1 [FR12][1] ⊕	Supply ducts in attics are insulated to ≥R-8. All other ducts in unconditioned spaces or outside the building envelope are insulated to ≥R-6.	R-_____ R-_____	R-_____ R-_____	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
403.2.2 [FR13][1] ⊕	All joints and seams of air ducts, air handlers, and filter boxes are sealed.			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
403.3 [FR17][2] ⊕	HVAC piping conveying fluids above 105 ºF or chilled fluids below 55 ºF are insulated to ≥R-3.	R-_____	R-_____	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
403.3.1 [FR24][2]	Protection of insulation on HVAC piping.			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
403.4.2 [FR18][2] ⊕	Hot water pipes are insulated to ≥R-3.	R-_____	R-_____	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
403.5 [FR19][2] ⊕	Automatic or gravity dampers are installed on all outdoor air intakes and exhausts.			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	

Additional Comments/Assumptions:

1	High Impact (Tier 1)	2	Medium Impact (Tier 2)	3	Low Impact (Tier 3)

Section # & Req.ID	Insulation Inspection	Plans Verified Value	Field Verified Value	Complies?	Comments/Assumptions
303.1 [IN13]² ⚙	All installed insulation is labeled or the installed R-values provided.			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
402.1.1, 402.2.6 [IN1]¹ ⚙	Floor insulation R-value.	R-____ ☐ Wood ☐ Steel	R-____ ☐ Wood ☐ Steel	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	*See the Envelope Assemblies table for values.*
303.2, 402.2.7 [IN2]¹ ⚙	Floor insulation installed per manufacturer's instructions, and in substantial contact with the underside of the subfloor.			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
402.1.1, 402.2.5, 402.2.6 [IN3]¹ ⚙	Wall insulation R-value. If this is a mass wall with at least ½ of the wall insulation on the wall exterior, the exterior insulation requirement applies (FR10).	R-____ ☐ Wood ☐ Mass ☐ Steel	R-____ ☐ Wood ☐ Mass ☐ Steel	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	*See the Envelope Assemblies table for values.*
303.2 [IN4]¹ ⚙	Wall insulation is installed per manufacturer's instructions.			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	

Additional Comments/Assumptions:

1	High Impact (Tier 1)	2	Medium Impact (Tier 2)	3	Low Impact (Tier 3)

Section # & Req.ID	Final Inspection Provisions	Plans Verified Value	Field Verified Value	Complies?	Comments/Assumptions
402.1.1, 402.2.1, 402.2.2, 402.2.6 [FI1][1] ⊕	Ceiling insulation R-value.	R-____ ☐ Wood ☐ Steel	R-____ ☐ Wood ☐ Steel	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	See the Envelope Assemblies table for values.
303.1.1.1, 303.2 [FI2][1] ⊕	Ceiling insulation installed per manufacturer's instructions. Blown insulation marked every 300 ft².			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
402.2.3 [FI22][2]	Vented attics with air permeable insulation include baffle adjacent to soffit and eave vents that extends over insulation.			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
402.2.4 [FI3][1] ⊕	Attic access hatch and door insulation ≥R-value of the adjacent assembly.	R-____	R-____	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
403.2.2 [FI4][1] ⊕	Duct tightness test result of <=10 cfm/100 ft2 across the system or <=7.5 cfm/100 ft2 without air handler @ 25 Pa. For rough-in tests, verification may need to occur during Framing Inspection.	____ cfm/100 ft²	____ cfm/100 ft²	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
403.2.2.1 [FI24][1]	Air handler leakage designated by manufacturer at <=2% of design air flow.			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
403.1.1 [FI9][2] ⊕	Programmable thermostats installed on forced air furnaces.			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
403.1.2 [FI10][2] ⊕	Heat pump thermostat installed on heat pumps.			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
403.4.1 [FI11][2] ⊕	Circulating service hot water systems have automatic or accessible manual controls.			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
403.5.1 [FI25][2]	All mechanical ventilation system fans not part of tested and listed HVAC equipment meet efficacy and air flow limits.			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
401.3 [FI7][2] ⊕	Compliance certificate posted.			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
303.3 [FI18][3] ⊕	Manufacturer manuals for mechanical and water heating systems have been provided.			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	

Additional Comments/Assumptions:

1	High Impact (Tier 1)	2	Medium Impact (Tier 2)	3	Low Impact (Tier 3)

| 1 | High Impact (Tier 1) | 2 | Medium Impact (Tier 2) | 3 | Low Impact (Tier 3) |

Utah Energy Conservation Code Energy Efficiency Certificate

Insulation Rating	R-Value	
Above-Grade Wall	19.00	
Below-Grade Wall	0.00	
Floor	30.00	
Ceiling / Roof	49.00	
Ductwork (unconditioned spaces):	_____	
Glass & Door Rating	U-Factor	SHGC
Window	0.33	
Door	0.35	
Heating & Cooling Equipment	Efficiency	
Heating System:_____	_____	
Cooling System:_____	_____	
Water Heater:_____	_____	

Name: _____   Date: _____

Comments

STRUCTURAL CALCULATIONS

FOR

Black Diamond Contractors

Kustom House Plans

Plan # R1877A-18

Lot 100 - Green Hill Estates

Huntsville, Utah

3/12/2018

Karras Engineering PLLC

Pleasant View, Utah

801-786-0849

Design Criteria

Governing Code: 2015 IRC

Seismic:

	Category	D2
	S_s=	164.9*%
	F_a=	1
	R_a=	6
	I =	1

Wind:

Basic wind speed (mph 3 sec gust)		115
Exposure		C
I =		1

Roof Loads

Dead (psf)		15
Snow (psf)		65

Floor Loads

Dead (psf)		10
Live (psf)		40

Soil Bearing Pressure   (psf)   1500

Steel f_y=   60 ksi

Footing Design - Interior

Loads:

Live		Floor Load	40	(psf)		
		Tributary Width	12.0	(ft)		
					Total	480 (plf)
Floor:						
			(psf)			
Dead	Sub Total		10.0	(psf)		
	Tributary Width		2.0	(ft)		
					Total	20 (plf)
Live		Live Load	40	(psf)		
		Tributary Width	2.0	(ft)		
					Total	80 (plf)
Walls:						
		Framing	20.0			
	Sub Total		20.0	(psf)		
		Wall Height	18.0	(ft)		
					Total	360 (plf)
Footing:	Concrete Unit Weight		145	(#/ft^3)		
	Footing Width		1.5	(ft)		
	Footing Height		0.83	(ft)		
					Total	180.53 (plf)
					Total:	**1121 (plf)**

Assumed Soil Bearing Pressure	1500 (#/ft^3)
Actual Footing Width	0.7 (ft)

* Use 20" x 10" Conc. Footings W/ (2) # 4 Bars Running Continous

Footing Design - Front and Back Walls

Loads:

Roof:

		(psf)			
Dead	Plywood	3.0			
	Insulation	2.0			
	Shingles	2.0			
	Felt	1.5			
	Gypsum	2.5			
	Truss	4.0			
	Sub Total	15.0	(psf)		
	Tributary Width	20.0	(ft)		
				Total	300 (plf)
Live	Roof Snow Load	65	(psf)		
	Tributary Width	20.0	(ft)		
				Total	1300 (plf)

Floor:

		(psf)			
Dead	Sub Total	10.0	(psf)		
	Tributary Width	17.0	(ft)		
				Total	170 (plf)
Live	Live Load	40	(psf)		
	Tributary Width	17.0	(ft)		
				Total	680 (plf)

Walls:

	Framing	20.0			
	Sub Total	20.0	(psf)		
	Wall Height	27.0	(ft)		
				Total	540 (plf)

Foundation:	Concrete Unit Weight	145	(#/ft^3)		
	Wall Width	0.67	(ft)		
	Wall Height	4	(ft)		
				Total	388.6 (plf)
Footing:	Concrete Unit Weight	145	(#/ft^3)		
	Footing Width	2.5	(ft)		
	Footing Height	0.83	(ft)		
				Total	300.88 (plf)
Soil:	Soil Unit Weight	110	(#/ft^3)		
	Contributing Width	0.67	(ft)		
	Contributing Height	1	(ft)		
				Total	73.7 (plf)
				Total:	**3753 (plf)**

Assumed Soil Bearing Pressure	1500	(#/ft^3)
Actual Footing Width	2.5	(ft)

* Use 30" x 12" Conc. Footings W/ (3) # 4 Bars Running Continous

Footing Design - Sides

Loads:

Roof:

			(psf)			
Dead		Plywood	3.0			
		Insulation	2.0			
		Shingles	2.0			
		Felt	1.5			
		Gypsum	2.5			
		Truss	4.0			
	Sub Total		15.0	(psf)		
		Tributary Width	6.0	(ft)		
					Total	90 (plf)
Live		Roof Snow Load	65	(psf)		
		Tributary Width	6.0	(ft)		
					Total	390 (plf)

Floor:

			(psf)			
Dead	Sub Total		10.0	(psf)		
		Tributary Width	4.0	(ft)		
					Total	40 (plf)
Live		Live Load	40	(psf)		
		Tributary Width	4.0	(ft)		
					Total	160 (plf)

Walls:

		Framing	20.0			
		Siding	10.0			
	Sub Total		30.0	(psf)		
		Wall Height	27.0	(ft)		
					Total	810 (plf)
Foundation:	Concrete Unit Weight		145	(#/ft^3)		
	Wall Width		0.67	(ft)		
	Wall Height		4	(ft)		
					Total	388.6 (plf)
Footing:	Concrete Unit Weight		145	(#/ft^3)		
	Footing Width		2	(ft)		
	Footing Height		0.83	(ft)		
					Total	240.70 (plf)
Soil:	Soil Unit Weight		110	(#/ft^3)		
	Contributing Width		0.67	(ft)		
	Contributing Height		2.5	(ft)		
					Total	184.25 (plf)
					Total:	**2304 (plf)**

Assumed Soil Bearing Pressure   1500 (#/ft^3)

Actual Footing Width   1.5 (ft)

* Use 24" x 10" Conc. Footings W/ (2) # 4 Bars Running Continous

Shearwall & Connection Requirements

Connections			
Wall	Top Plate		Sill Plate
	Uplift	Shear	Shear
Transverse (lb)	13058	8402	10068
Longitudinal (lb)	27964	7679	7679

Roof Diaphragm Connection			
Wall	Uplift (@24" O.C)		Shear (@24" O.C.)
Transverse (plf)		293	221
Longitudinal (plf)		132	124
Simpson H1	490	OK	415 OK

Anchor Bolt Spacing				
Wall	O.C. Spacing (in)		Plate Strength	
	1/2"	5/8"	Doogie Fir (lb/bolt)	
Transverse (plf)	56	81	1/2"	620
1/2 @ 32" O.C.	OK		5/8"	890
5/8" @ 32" O.C.		OK		
Longitudinal (plf)	120	172		
1/2 @ 32" O.C.	OK			
5/8" @ 32" O.C.		OK		

Wall Shear									
Transverse Walls	Shearwall Length (ft)	Tributary Ln (ft)		Wind Shear (plf)			Seismic Shear (plf)		
		Roof	Floor	Roof	Floor	Base	Roof	Floor	Base
Wall A	17	31	0	296	0	296	247	0	247
Wall B	33	31	0	153	0	153	127	0	127
Wall C	0	0	0						
Wall D	0	0	0						
Longitudinal Walls									
Wall 1	16	19	0	98	0	98	263	0	263
Wall 2	19	19	0	83	0	83	221	0	221
Wall 3	0	0	0						
Wall 4	0	0	0						

Controlling Shear		
Transverse Walls	Design Shear (plf)	Nailing Schedule
Wall A	296	8d w/4 in Edge, 12 in Field
Wall B	153	8d w/ 6 in Edge, 12 in Field
Wall C	0	8d w/ 6 in Edge, 12 in Field
Wall D	0	8d w/ 6 in Edge, 12 in Field
Longitudinal Walls		
Wall 1	263	8d w/4 in Edge, 12 in Field
Wall 2	221	8d w/ 6 in Edge, 12 in Field
Wall 3	0	8d w/ 6 in Edge, 12 in Field
Wall 4	0	8d w/ 6 in Edge, 12 in Field

Holdown Requirements

Gross Moment			
Transverse Walls	Shear (plf)	Length (ft)	Moment (plf-lbs)
Wall A	296	14	4146
Wall B	153	14	2136
Wall C	0	14	0
Wall D	0	14	0
Longitudinal Walls			
Wall 1	263	14	3676
Wall 2	221	14	3095
Wall 3	0	14	0
Wall 4	0	14	0

Resistive Moment				
Transverse Walls	Roof Dead (plf)	Roof Snow (plf)	Floor (plf)	Wall (plf)	Total (plf)
Wall A	50	27	10	280	367
Wall B	50	27	10	280	367
Wall C	0	27	10	280	317
Wall D	0	27	10	280	317
Longitudinal Walls				
Wall 1	319	171	190	280	960
Wall 2	319	171	190	280	960
Wall 3	0	0	0	280	280
Wall 4	0	0	0	280	280

Holdown Requirements				
	Shear Wall Length (ft)				
Transverse Walls	4	8	12	16	20
Wall A	3705	3264	2823	2382	1941
Wall B	1695	1254	813	372	-69
Wall C					
Wall D					
Longitudinal Walls					
Wall 1	2524	1372	220	-932	-2084
Wall 2	1944	792	-360	-1512	-2664
Wall 3					
Wall 4					

Wind Analysis

Pressures for 115 mph Wind*

Member vs Roof Angle	Horizontal (psf)				Vertical (psf)			
	End		Interior		Roof End		Roof Interior	
	Wall	Roof	Wall	Roof	Wind	Lee	Wind	Lee
Transverse 20	22.4	-5.9	15.0	-3.3	-19.4	-13.5	-13.5	-10.2
Transverse 30 to 45	18.1	12.5	14.5	10.0	7.1	-11.1	6.0	-9.5
Transverse Interpolation	19.6	6.2	14.7	5.4	-2.0	-11.9	-0.7	-9.7
Longitudinal	16.1	0.0	10.7	0.0	-19.4	-11.1	-13.5	-8.6

* for a mean roof height of 30ft in Exposure B.

Roof Details

Type	Gable
Pitch	6/12
Angle (deg)	26.6
Roof Height (ft)	9.5
Mean Roof Height (ft)	18.8

Exposure C Factors

Ht	Table Value
15	1.21
20	1.29
25	1.35
30	1.4

Design Factor

Bld Height	23.5
Roof	1.00
Wall	1.00

Diaphragm Dimensions

Member	Transverse (ft)	Longitudinal (ft)	Height (ft)	Trib Length (ft)
Roof	38	62	14	7
Floor	0	0	0	0

Tributary Wall Distances

	End	Interior
Transverse (ft)	6.2	49.6
Longitudinal (ft)	3.8	30.4

Walls	Horizontal					
	End			Interior		
	R Wall	F Wall	Roof	R Wall	F Wall	Roof
Transverse (lb)	1703	0	725	5091	0	2548.986
Longitudinal (lb)	858	0	0	2279	0	0

Walls	Vertical			
	Roof End		Roof Interior	
	Wind	Lee	Wind	Lee
Transverse (lb)	-478.95	-2806.1	-622	-9150
Longitudinal (lb)	-4571.6	-2612.3	-12705	-8074

Totals

Walls	Horizontal		Vertical	
	Shear (lbs)	Shear (plf)	Uplift(lbs)	Uplift (plf)
Transverse (lb)	10068	265	-13058	-344
Longitudinal (lb)	3137	51	-27964	-451

Seismic Analysis

Seismic Coefficient

Ss (%g)	103.10%	.2 sec Spectral Response
Fa	1.09	Table 1615.1.2 (2)
Ra	6	Table 1617.6
Ie	1.0	Table 1604.5
Sms=FaSs	1.12379	(Eq. 16-16)
Sds=(2/3)Sms	0.75	(Eq. 16-18)
S.D. Category	D2	
Response Coefficient	0.151	(Eq. 16-49)

Diaphraghm Dimensions

Member	Transverse (ft)	Longitudinal (ft)	Height (ft)
Roof	38	62	14
Floor	0	0	0

Base Shear

Transverse						
Diaphraghm	Diaphragm (lb)	Wall Trib (ft)	Wall (lb)	Total (lb)	Shear (lb)***	Shear (plf)
Roof*	60751	7.0	17360	78111	8402	221
Floor**	0	0.0	0	0	0	0
Total				78111	8402	221
Longitudinal						
Diaphraghm						
Roof*	60751	7.00	10640	71391	7679	124
Floor**	0	0	0	0	0	0
Total				71391	7679	124

*This value includes 20% of snow load over 30 psf.

**This value includes 10 psf for partition load.

***This value divided by 1.4

Design Check Calculation Sheet
WoodWorks Sizer 10.42

Loads:

Load	Type	Distribution	Pat-tern	Location [ft] Start End	Magnitude Start End	Unit
Load4	Snow	Full UDL			400.0	plf
Load3	Dead	Full UDL			90.0	plf
Load5	Dead	Full UDL			180.0	plf
Self-weight	Dead	Full UDL			16.1	plf

Maximum Reactions (lbs), Bearing Capacities (lbs) and Bearing Lengths (in) :

|--------------------------------- 16'-2.1" ---------------------------------|

0'   16'
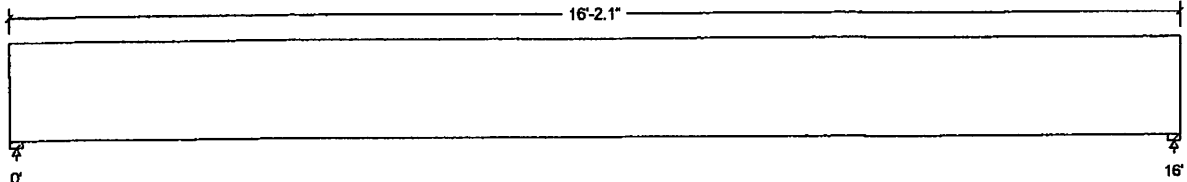
Unfactored:			
Dead	2289		2289
Snow	3200		3200
Factored:			
Total	5489		5489
Bearing:			
Capacity			
Beam	5489		5489
Anal/Des			
Beam	1.00		1.00
Load comb	#2		#2
Length	2.09		2.09
Min req'd	2.09		2.09
Cb	1.00		1.00
Cb min	1.00		1.00

LVL n-ply, 1.8E, 2600Fb, 1-3/4"x16", 2-ply (3-1/2"x16")
Supports: All - Non-wood
Total length: 16'-2.1"; volume = 6.3 cu.ft.;
Lateral support: top= at supports, bottom= at supports;

Analysis vs. Allowable Stress and Deflection using NDS 2012 :

Criterion	Analysis Value	Design Value	Unit	Analysis/Design
Shear	fv = 121	Fv' = 328	psi	fv/Fv' = 0.37
Bending(+)	fb = 1764	Fb' = 2118	psi	fb/Fb' = 0.83
Live Defl'n	0.27 = L/699	0.53 = L/360	in	0.51
Total Defl'n	0.57 = L/337	1.07 = L/180	in	0.53

Additional Data:

FACTORS:

	F/E(psi)	CD	CM	Ct	CL	CV	Cfu	Cr	Cfrt	Ci	Cn	LC#
Fv'	285	1.15	-	1.00	-	-	-	-	1.00	-	1.00	2
Fb'+	2600	1.15	-	1.00	0.708	0.96	-	1.00	1.00	-	-	2
Fcp'	750	-	-	1.00	-	-	-	-	1.00	-	-	-
E'	1.8 million	-	1.00	-	-	-	-	1.00	-	-	2	
Eminy'	0.93 million	-	1.00	-	-	-	-	1.00	-	-	2	

CRITICAL LOAD COMBINATIONS:
Shear   : LC #2 = D+S, V =   5489, V design =   4514 lbs
Bending(+): LC #2 = D+S, M = 21956 lbs-ft
Deflection: LC #2 = D+S (live)
          LC #2 = D+S (total)
D=dead L=live S=snow W=wind I=impact Lr=roof live Lc=concentrated E=earthquake
All LC's are listed in the Analysis output
Load combinations: ICC-IBC
CALCULATIONS:
Deflection: EI =   1075e06 lb-in2/ply
"Live" deflection = Deflection from all non-dead loads (live, wind, snow...)
Total Deflection = 1.50(Dead Load Deflection) + Live Load Deflection.
Lateral stability (+): Lu = 16' Le = 30'-0.94" RB =   21.71

Design Notes:
1. WoodWorks analysis and design are in accordance with the ICC International Building Code (IBC 2012), the National Design Specification (NDS 2012), and NDS Design Supplement.
2. Please verify that the default deflection limits are appropriate for your application.
3. SCL-BEAMS (Structural Composite Lumber): the attached SCL selection is for preliminary design only. For final member design contact your local SCL manufacturer.
4. Size factors vary from one manufacturer to another for SCL materials. They can be changed in the database editor.
5. BUILT-UP SCL-BEAMS: contact manufacturer for connection details when loads are not applied equally to all plys.

Design Check Calculation Sheet
WoodWorks Sizer 10.42

Loads:

Load	Type	Distribution	Pat-tern	Location [ft] Start End	Magnitude Start End	Unit
Load1	Dead	Full UDL			60.0	plf
Load2	Dead	Full UDL			180.0	plf
Load3	Snow	Full UDL			400.0	plf
Self-weight	Dead	Full UDL			12.0	plf

Maximum Reactions (lbs), Bearing Capacities (lbs) and Bearing Lengths (in) :

9'-1.1"

0'   9'
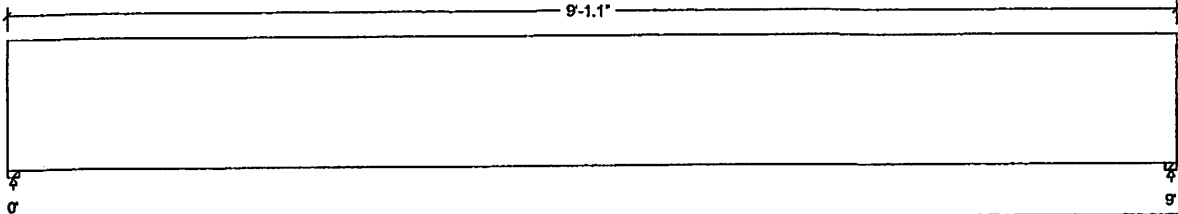
Unfactored:			
Dead	1134		1134
Snow	1800		1800
Factored:			
Total	2934		2934
Bearing:			
Capacity Beam	2934		2934
Anal/Des			
Beam	1.00		1.00
Load comb	#2		#2
Length	1.12		1.12
Min req'd	1.12		1.12
Cb	1.00		1.00
Cb min	1.00		1.00

LVL n-ply, 1.8E, 2600Fb, 1-3/4"x11-7/8", 2-ply (3-1/2"x11-7/8")
Supports: All - Non-wood
Total length: 9'-1.1"; volume = 2.6 cu.ft.;
Lateral support: top= at supports, bottom= at supports;

Analysis vs. Allowable Stress and Deflection using NDS 2012 :

Criterion	Analysis Value	Design Value	Unit	Analysis/Design
Shear	fv = 82	Fv' = 328	psi	fv/Fv' = 0.25
Bending(+)	fb = 963	Fb' = 2839	psi	fb/Fb' = 0.34
Live Defl'n	0.07 = <L/999	0.30 = L/360	in	0.22
Total Defl'n	0.13 = L/826	0.60 = L/180	in	0.22

Additional Data:
FACTORS:	F/E (psi)	CD	CM	Ct	CL	CV	Cfu	Cr	Cfrt	Ci	Cn	LC#
Fv'	285	1.15	-	1.00	-	-	-	-	1.00	-	1.00	2
Fb'+	2600	1.15	-	1.00	0.949	1.00	-	1.00	1.00	-	-	2
Fcp'	750	-	-	1.00	-	-	-	-	1.00	-	-	-
E'	1.8 million	-	-	1.00	-	-	-	-	1.00	-	-	2
Emin y'	0.93 million	-	-	1.00	-	-	-	-	1.00	-	-	2

CRITICAL LOAD COMBINATIONS:
Shear   : LC #2 = D+S, V =   2934, V design =   2258 lbs
Bending(+): LC #2 = D+S, M =   6601 lbs-ft
Deflection: LC #2 = D+S (live)
            LC #2 = D+S (total)
D=dead L=live S=snow W=wind I=impact Lr=roof live Lc=concentrated E=earthquake
All LC's are listed in the Analysis output
Load combinations: ICC-IBC
CALCULATIONS:
Deflection: EI =   440e06 lb-in2/ply
"Live" deflection = Deflection from all non-dead loads (live, wind, snow...)
Total Deflection = 1.50(Dead Load Deflection) + Live Load Deflection.
Lateral stability (+): Lu = 9' Le = 17'-7.69" RB =   14.32

Design Notes:
1. WoodWorks analysis and design are in accordance with the ICC International Building Code (IBC 2012), the National Design Specification (NDS 2012), and NDS Design Supplement.
2. Please verify that the default deflection limits are appropriate for your application.
3. SCL-BEAMS (Structural Composite Lumber): the attached SCL selection is for preliminary design only. For final member design contact your local SCL manufacturer.
4. Size factors vary from one manufacturer to another for SCL materials. They can be changed in the database editor.
5. BUILT-UP SCL-BEAMS: contact manufacturer for connection details when loads are not applied equally to all plys.

Design Check Calculation Sheet
WoodWorks Sizer 10.42

Loads:

Load	Type	Distribution	Pat-tern	Location [ft] Start End	Magnitude Start End	Unit
Load2	Snow	Full UDL			1240.0	plf
Load3	Dead	Full UDL			285.0	plf
Self-weight	Dead	Full UDL			9.6	plf

Maximum Reactions (lbs), Bearing Capacities (lbs) and Bearing Lengths (in) :

5'-1.5"

0'   5'

Unfactored:			
Dead	736		736
Snow	3100		3100
Factored:			
Total	3836		3836
Bearing:			
Capacity			
Beam	3836		3836
Anal/Des			
Beam	1.00		1.00
Load comb	#2		#2
Length	1.46		1.46
Min req'd	1.46		1.46
Cb	1.00		1.00
Cb min	1.00		1.00

LVL n-ply, 1.8E, 2600Fb, 1-3/4"x9-1/2", 2-ply (3-1/2"x9-1/2")
Supports: All - Non-wood
Total length: 5'-1.5"; volume = 1.2 cu.ft.;
Lateral support: top= full, bottom= at supports;

Analysis vs. Allowable Stress and Deflection using NDS 2012 :

Criterion	Analysis Value	Design Value	Unit	Analysis/Design
Shear	fv = 114	Fv' = 328	psi	fv/Fv' = 0.35
Bending(+)	fb = 1093	Fb' = 3086	psi	fb/Fb' = 0.35
Live Defl'n	0.04 = <L/999	0.17 = L/360	in	0.23
Total Defl'n	0.05 = <L/999	0.33 = L/180	in	0.16

Additional Data:

FACTORS:	F/E(psi)	CD	CM	Ct	CL	CV	Cfu	Cr	Cfrt	Ci	Cn	LC#
Fv'	285	1.15	-	1.00	-	-	-	-	1.00	-	1.00	2
Fb'+	2600	1.15	-	1.00	1.000	1.03	-	1.00	1.00	-	-	2
Fcp'	750	-	-	1.00	-	-	-	-	1.00	-	-	-
E'	1.8 million	-	1.00	-	-	-	-	1.00	-	-	2	
Eminy'	0.93 million	-	1.00	-	-	-	-	1.00	-	-	2	

CRITICAL LOAD COMBINATIONS:
Shear   : LC #2 = D+S, V = 3836, V design = 2528 lbs
Bending(+): LC #2 = D+S, M = 4796 lbs-ft
Deflection: LC #2 = D+S (live)
            LC #2 = D+S (total)
D=dead L=live S=snow W=wind I=impact Lr=roof live Lc=concentrated E=earthquake
All LC's are listed in the Analysis output
Load combinations: ICC-IBC
CALCULATIONS:
Deflection: EI = 225e06 lb-in2/ply
"Live" deflection = Deflection from all non-dead loads (live, wind, snow...)
Total Deflection = 1.50(Dead Load Deflection) + Live Load Deflection.

Design Notes:
1. WoodWorks analysis and design are in accordance with the ICC International Building Code (IBC 2012), the National Design Specification (NDS 2012), and NDS Design Supplement.
2. Please verify that the default deflection limits are appropriate for your application.
3. SCL-BEAMS (Structural Composite Lumber): the attached SCL selection is for preliminary design only. For final member design contact your local SCL manufacturer.
4. Size factors vary from one manufacturer to another for SCL materials. They can be changed in the database editor.
5. BUILT-UP SCL-BEAMS: contact manufacturer for connection details when loads are not applied equally to all plys.

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Design Check Calculation Sheet
WoodWorks Sizer 10.42

Loads:

Load	Type	Distribution	Pattern	Location [ft] Start End	Magnitude Start End	Unit
Load2	Snow	Full UDL			1240.0	plf
Load3	Dead	Full UDL			285.0	plf
Self-weight	Dead	Full UDL			6.6	plf

Maximum Reactions (lbs), Bearing Capacities (lbs) and Bearing Lengths (in) :

4'-1.6"

0'   4'
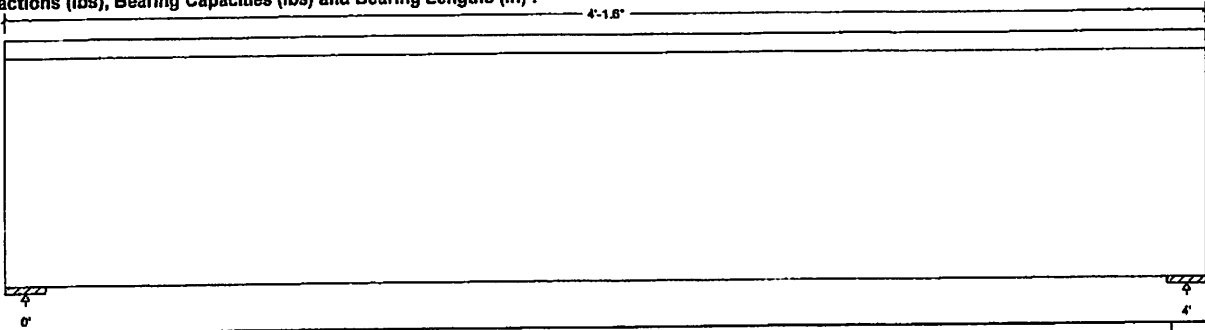
Unfactored:			
Dead	583		583
Snow	2480		2480
Factored:			
Total	3063		3063
Bearing:			
Capacity			
Beam	3063		3063
Anal/Des			
Beam	1.00		1.00
Load comb	#2		#2
Length	1.63		1.63
Min req'd	1.63		1.63
Cb	1.00		1.00
Cb min	1.00		1.00

Lumber n-ply, D.Fir-L, No.2, 2x10, 2-ply (3"x9-1/4")
Supports: All - Non-wood
Total length: 4'-1.6"; volume = 0.8 cu.ft.;
Lateral support: top= full, bottom= at supports;

Analysis vs. Allowable Stress and Deflection using NDS 2012 :

Criterion	Analysis Value	Design Value	Unit	Analysis/Design
Shear	fv = 96	Fv' = 207	psi	fv/Fv' = 0.46
Bending(+)	fb = 859	Fb' = 1138	psi	fb/Fb' = 0.75
Live Defl'n	0.02 = <L/999	0.13 = L/360	in	0.17
Total Defl'n	0.03 = <L/999	0.27 = L/180	in	0.11

Additional Data:

FACTORS:	F/E(psi)	CD	CM	Ct	CL	CF	Cfu	Cr	Cfrt	Ci	Cn	LCI
Fv'	180	1.15	1.00	1.00	-	-	-	-	1.00	1.00	1.00	2
Fb'+	900	1.15	1.00	1.00	1.000	1.100	1.00	1.00	1.00	1.00	-	2
Fcp'	625	-	1.00	1.00	-	-	-	-	1.00	1.00	-	-
E'	1.6 million		1.00	1.00	-	-	-	-	1.00	1.00	-	2
Emin'	0.58 million		1.00	1.00	-	-	-	-	1.00	1.00	-	2

CRITICAL LOAD COMBINATIONS:
Shear   : LC #2 = D+S, V = 3063, V design = 1778 lbs
Bending(+): LC #2 = D+S, M = 3063 lbs-ft
Deflection: LC #2 = D+S (live)
            LC #2 = D+S (total)
D=dead L=live S=snow W=wind I=impact Lr=roof live Lc=concentrated E=earthquake
All LC's are listed in the Analysis output
Load combinations: ICC-IBC
CALCULATIONS:
Deflection: EI = 158e06 lb-in2/ply
"Live" deflection = Deflection from all non-dead loads (live, wind, snow...)
Total Deflection = 1.50(Dead Load Deflection) + Live Load Deflection.

Design Notes:
1. WoodWorks analysis and design are in accordance with the ICC International Building Code (IBC 2012), the National Design Specification (NDS 2012), and NDS Design Supplement.
2. Please verify that the default deflection limits are appropriate for your application.
3. Sawn lumber bending members shall be laterally supported according to the provisions of NDS Clause 4.4.1.
4. BUILT-UP BEAMS: It is assumed that each ply is a single continuous member (that is, no butt joints are present) fastened together securely at intervals not exceeding 4 times the depth and that each ply is equally top-loaded. Where beams are side-loaded, special fastening details may be required.

Design Check Calculation Sheet
WoodWorks Sizer 10.42

Loads:

Load	Type	Distribution	Pat-tern	Location (ft) Start End	Magnitude Start End	Unit
Load1	Dead	Full UDL			205.0	plf
Load2	Snow	Full UDL			880.0	plf
Self-weight	Dead	Full UDL			14.1	plf

Maximum Reactions (lbs), Bearing Capacities (lbs) and Bearing Lengths (in) :

```
|---------------------------- 12'-2.5" -----------------------------|
```

0'   12'
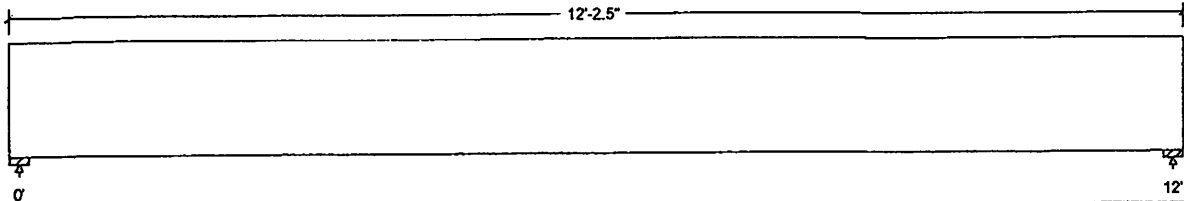
Unfactored:			
Dead	1315		1315
Snow	5280		5280
Factored:			
Total	6595		6595
Bearing:			
Capacity			
Beam	6595		6595
Anal/Des			
Beam	1.00		1.00
Load comb	#2		#2
Length	2.51		2.51
Min req'd	2.51		2.51
Cb	1.00		1.00
Cb min	1.00		1.00

LVL n-ply, 1.8E, 2600Fb, 1-3/4"x14", 2-ply (3-1/2"x14")
Supports: All - Non-wood
Total length: 12'-2.5"; volume = 4.2 cu.ft.;
Lateral support: top= at supports, bottom= at supports;

Analysis vs. Allowable Stress and Deflection using NDS 2012 :

Criterion	Analysis Value	Design Value	Unit	Analysis/Design
Shear	fv = 159	Fv' = 328	psi	fv/Fv' = 0.49
Bending(+)	fb = 2076	Fb' = 2618	psi	fb/Fb' = 0.79
Live Defl'n	0.29 = L/505	0.40 = L/360	in	0.71
Total Defl'n	0.39 = L/367	0.80 = L/180	in	0.49

Additional Data:
FACTORS:	F/E(psi)	CD	CM	Ct	CL	CV	Cfu	Cr	Cfrt	Ci	Cn	LC#
Fv'	285	1.15	-	1.00	-	-	-	-	1.00	-	1.00	2
Fb'+	2600	1.15	-	1.00	0.876	0.98	-	1.00	1.00	-	-	2
Fcp'	750	-	-	1.00	-	-	-	-	1.00	-	-	-
E'	1.8 million	-	-	1.00	-	-	-	-	1.00	-	-	2
Eminy'	0.93 million	-	-	1.00	-	-	-	-	1.00	-	-	2

CRITICAL LOAD COMBINATIONS:
Shear   : LC #2 = D+S, V =   6595, V design =   5197 lbs
Bending(+): LC #2 = D+S, M = 19784 lbs-ft
Deflection: LC #2 = D+S (live)
            LC #2 = D+S (total)
D=dead L=live S=snow W=wind I=impact Lr=roof live Lc=concentrated E=earthquake
All LC's are listed in the Analysis output
Load combinations: ICC-IBC
CALCULATIONS:
Deflection: EI =   720e06 lb-in2/ply
"Live" deflection = Deflection from all non-dead loads (live, wind, snow...)
Total Deflection = 1.50(Dead Load Deflection) + Live Load Deflection.
Lateral stability (+): Lu = 12' Le = 23'-0.75" RB =   17.78

Design Notes:
1. WoodWorks analysis and design are in accordance with the ICC International Building Code (IBC 2012), the National Design Specification (NDS 2012), and NDS Design Supplement.
2. Please verify that the default deflection limits are appropriate for your application.
3. SCL-BEAMS (Structural Composite Lumber): the attached SCL selection is for preliminary design only. For final member design contact your local SCL manufacturer.
4. Size factors vary from one manufacturer to another for SCL materials. They can be changed in the database editor.
5. BUILT-UP SCL-BEAMS: contact manufacturer for connection details when loads are not applied equally to all plys.

Design Check Calculation Sheet
WoodWorks Sizer 10.42

Loads:

Load	Type	Distribution	Pattern	Location [ft] Start	End	Magnitude Start	End	Unit
Load1	Dead	Full UDL				300.0		plf
Load4	Snow	Full UDL				1300.0		plf
Load3	Dead	Point		3.10		1800		lbs
Load5	Snow	Point		3.10		7800		lbs
Self-weight	Dead	Full UDL				10.0		plf

Maximum Reactions (lbs), Bearing Capacities (lbs) and Bearing Lengths (in) :

		6'-2.5"	

0'   6'
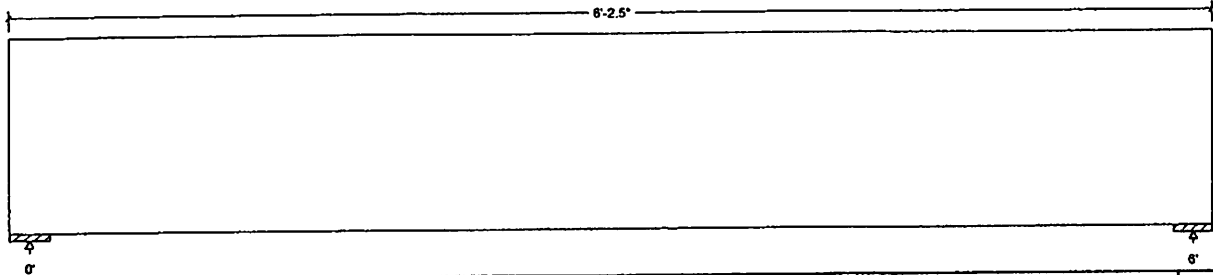
Unfactored:			
Dead	1854		1854
Snow	7800		7800
Factored:			
Total	9654		9654
Bearing:			
Capacity			
Beam	9654		9654
Anal/Des			
Beam	1.00		1.00
Load comb	#2		#2
Length	2.45		2.45
Min req'd	2.45		2.45
Cb	1.00		1.00
Cb min	1.00		1.00

LVL n-ply, 1.8E, 2600Fb, 1-3/4"x11-7/8", 3-ply (5-1/4"x11-7/8")
Supports: All - Non-wood
Total length: 6'-2.5"; volume = 2.7 cu.ft.;
Lateral support: top= at supports, bottom= at supports; Repetitive factor: applied where permitted (refer to online help);

Analysis vs. Allowable Stress and Deflection using NDS 2012 :

Criterion	Analysis Value	Design Value	Unit	Analysis/Design
Shear	fv = 190	Fv' = 328	psi	fv/Fv' = 0.58
Bending (+)	fb = 2109	Fb' = 3080	psi	fb/Fb' = 0.68
Live Defl'n	0.07 = L/963	0.20 = L/360	in	0.37
Total Defl'n	0.10 = L/711	0.40 = L/180	in	0.25

Additional Data:

FACTORS:	F/E(psi)	CD	CM	Ct	CL	CV	Cfu	Cr	Cfrt	Ci	Cn	LC#
Fv'	285	1.15	-	1.00	-	-	-	-	1.00	-	1.00	2
Fb'+	2600	1.15	-	1.00	0.989	1.00	-	1.04	1.00	-	-	2
Fcp'	750	-	-	1.00	-	-	-	-	1.00	-	-	-
E'	1.8 million	-	-	1.00	-	-	-	-	1.00	-	-	2
Eminy'	0.93 million	-	-	1.00	-	-	-	-	1.00	-	-	2

CRITICAL LOAD COMBINATIONS:
Shear   : LC #2 = D+S, V = 9654, V design = 7887 lbs
Bending(+): LC #2 = D+S, M = 21681 lbs-ft
Deflection: LC #2 = D+S (live)
            LC #2 = D+S (total)
D=dead L=live S=snow W=wind I=impact Lr=roof live Lc=concentrated E=earthquake
All LC's are listed in the Analysis output
Load combinations: ICC-IBC
CALCULATIONS:
Deflection: EI = 440e06 lb-in2/ply
"Live" deflection = Deflection from all non-dead loads (live, wind, snow...)
Total Deflection = 1.50(Dead Load Deflection) + Live Load Deflection.
Lateral stability (+): Lu = 6' Le = 12'-4.31" RB = 7.99

Design Notes:
1. WoodWorks analysis and design are in accordance with the ICC International Building Code (IBC 2012), the National Design Specification (NDS 2012), and NDS Design Supplement.
2. Please verify that the default deflection limits are appropriate for your application.
3. System factor KH may not apply to field-assembled multi-ply beams.
4. SCL-BEAMS (Structural Composite Lumber): the attached SCL selection is for preliminary design only. For final member design contact your local SCL manufacturer.
5. Size factors vary from one manufacturer to another for SCL materials. They can be changed in the database editor.
6. BUILT-UP SCL-BEAMS: contact manufacturer for connection details when loads are not applied equally to all plys.

Design Check Calculation Sheet
WoodWorks Sizer 10.42

Loads:

Load	Type	Distribution	Pat-tern	Location [ft] Start End	Magnitude Start End	Unit
Load1	Dead	Full UDL			130.0	plf
Load2	Live	Full UDL			520.0	plf
Self-weight	Dead	Full UDL			12.0	plf

Maximum Reactions (lbs), Bearing Capacities (lbs) and Bearing Lengths (in) :

12'-1.5"

0'   12'
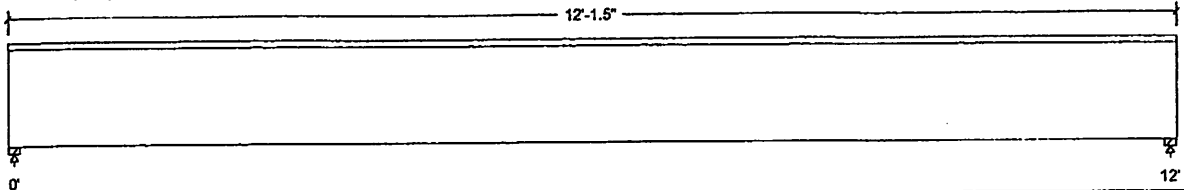
Unfactored:			
Dead	852		852
Live	3120		3120
Factored:			
Total	3972		3972
Bearing:			
Capacity			
Beam	3972		3972
Anal/Des			
Beam	1.00		1.00
Load comb	#2		#2
Length	1.51		1.51
Min req'd	1.51		1.51
Cb	1.00		1.00
Cb min	1.00		1.00

LVL n-ply, 1.8E, 2600Fb, 1-3/4"x11-7/8", 2-ply (3-1/2"x11-7/8")
Supports: All - Non-wood
Total length: 12'-1.5"; volume = 3.5 cu.ft.;
Lateral support: top= full, bottom= at supports;

Analysis vs. Allowable Stress and Deflection using NDS 2012 :

Criterion	Analysis Value	Design Value	Unit	Analysis/Design
Shear	fv = 118	Fv' = 285	psi	fv/Fv' = 0.41
Bending (+)	fb = 1738	Fb' = 2603	psi	fb/Fb' = 0.67
Live Defl'n	0.28 = L/521	0.40 = L/360	in	0.69
Total Defl'n	0.39 = L/370	0.80 = L/180	in	0.49

Additional Data:

FACTORS:	F/E (psi)	CD	CM	Ct	CL	CV	Cfu	Cr	Cfrt	Ci	Cn	LC#
Fv'	285	1.00	-	1.00	-	-	-	-	1.00	-	1.00	2
Fb'+	2600	1.00	-	1.00	1.000	1.00	-	1.00	1.00	-	-	2
Fcp'	750	-	-	1.00	-	-	-	-	1.00	-	-	-
E'	1.8 million	-	1.00	-	-	-	-	-	1.00	-	-	2
Eminy'	0.93 million	-	1.00	-	-	-	-	-	1.00	-	-	2

CRITICAL LOAD COMBINATIONS:
```
Shear      : LC #2  = D+L, V =  3972, V design =  3275 lbs
Bending(+) : LC #2  = D+L, M = 11916 lbs-ft
Deflection : LC #2  = D+L  (live)
             LC #2  = D+L  (total)
D=dead L=live S=snow W=wind I=impact Lr=roof live Lc=concentrated E=earthquake
All LC's are listed in the Analysis output
Load combinations: ICC-IBC
```
CALCULATIONS:
```
Deflection:  EI =    440e06 lb-in2/ply
"Live" deflection = Deflection from all non-dead loads (live, wind, snow...)
Total Deflection = 1.50(Dead Load Deflection) + Live Load Deflection.
```

Design Notes:
1. WoodWorks analysis and design are in accordance with the ICC International Building Code (IBC 2012), the National Design Specification (NDS 2012), and NDS Design Supplement.
2. Please verify that the default deflection limits are appropriate for your application.
3. SCL-BEAMS (Structural Composite Lumber): the attached SCL selection is for preliminary design only. For final member design contact your local SCL manufacturer.
4. Size factors vary from one manufacturer to another for SCL materials. They can be changed in the database editor.
5. BUILT-UP SCL-BEAMS: contact manufacturer for connection details when loads are not applied equally to all plys.

Design Check Calculation Sheet
WoodWorks Sizer 10.42

Loads:

Load	Type	Distribution	Pat-tern	Location (ft) Start	End	Magnitude Start	End	Unit
Load1	Dead	Full UDL				60.0		plf
Load2	Live	Full UDL				240.0		plf
Load3	Snow	Full UDL				400.0		plf
Load4	Dead	Full UDL				40.0		plf
Load5	Dead	Full UDL				90.0		plf
Self-weight	Dead	Full UDL				12.0		plf

Maximum Reactions (lbs), Bearing Capacities (lbs) and Bearing Lengths (in) :

8'-1"

0'   8'
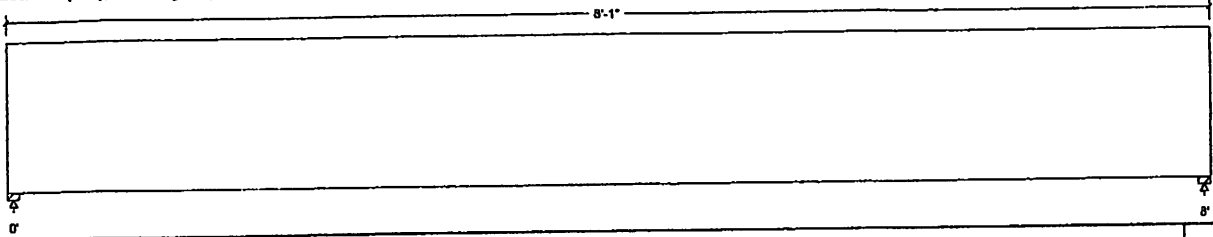
Unfactored:			808
Dead	808		960
Live	960		1600
Snow	1600		
Factored:			2728
Total	2728		
Bearing:			
Capacity			2728
Beam	2728		
Anal/Des			1.00
Beam	1.00		#3
Load comb	#3		1.04
Length	1.04		1.04
Min req'd	1.04		1.00
Cb	1.00		1.00
Cb min	1.00		

LVL n-ply, 1.8E, 2600Fb, 1-3/4"x11-7/8", 2-ply (3-1/2"x11-7/8")
Supports: All - Non-wood
Total length: 8'-1.0"; volume = 2.3 cu.ft.;
Lateral support: top= at supports, bottom= at supports;

Analysis vs. Allowable Stress and Deflection using NDS 2012 :

Criterion	Analysis Value	Design Value	Unit	Analysis/Design
Shear	fv = 73	Fv' = 328	psi	fv/Fv' = 0.22
Bending(+)	fb = 796	Fb' = 2863	psi	fb/Fb' = 0.28
Live Defl'n	0.05 = <L/999	0.27 = L/360	in	0.19
Total Defl'n	0.08 = <L/999	0.53 = L/180	in	0.15

Additional Data:

FACTORS:	F/E(psi)	CD	CM	Ct	CL	CV	Cfu	Cr	Cfrt	Ci	Cn	LC#
Fv'	285	1.15	-	1.00	-	-	-	-	1.00	-	1.00	3
Fb'+	2600	1.15	-	1.00	0.957	1.00	-	1.00	1.00	-	-	3
Fcp'	750	-	-	1.00	-	-	-	-	1.00	-	-	-
E'	1.8 million	-	-	1.00	-	-	-	-	1.00	-	-	3
Eminy'	0.93 million	-	-	1.00	-	-	-	-	1.00	-	-	3

CRITICAL LOAD COMBINATIONS:
Shear   : LC #3 = D+.75(L+S), V =   2728, V design =   2024 lbs
Bending(+): LC #3 = D+.75(L+S), M =   5456 lbs-ft
Deflection: LC #3 = D+.75(L+S) (live)
            LC #3 = D+.75(L+S) (total)
D=dead L=live S=snow W=wind I=impact Lr=roof live Lc=concentrated E=earthquake
All LC's are listed in the Analysis output
Load combinations: ICC-IBC
CALCULATIONS:
Deflection: EI =   440e06 lb-in2/ply
"Live" deflection = Deflection from all non-dead loads (live, wind, snow...)
Total Deflection = 1.50(Dead Load Deflection) + Live Load Deflection.
Lateral stability (+): Lu = 8' Le = 16'-0.13" RB =   13.65

Design Notes:
1. WoodWorks analysis and design are in accordance with the ICC International Building Code (IBC 2012), the National Design Specification (NDS 2012), and NDS Design Supplement.
2. Please verify that the default deflection limits are appropriate for your application.
3. SCL-BEAMS (Structural Composite Lumber): the attached SCL selection is for preliminary design only. For final member design contact your local SCL manufacturer.
4. Size factors vary from one manufacturer to another for SCL materials. They can be changed in the database editor.
5. BUILT-UP SCL-BEAMS: contact manufacturer for connection details when loads are not applied equally to all plys.

Design Check Calculation Sheet
WoodWorks Sizer 10.42

Loads:

Load	Type	Distribution	Pat-tern	Location [ft] Start	End	Magnitude Start	End	Unit
Load1	Dead	Full UDL				200.0		plf
Load2	Live	Full UDL				800.0		plf
Load3	Snow	Full UDL				1300.0		plf
Load4	Dead	Full UDL				40.0		plf
Load5	Dead	Full UDL				300.0		plf
Self-weight	Dead	Full UDL				9.6		plf

Maximum Reactions (lbs), Bearing Capacities (lbs) and Bearing Lengths (in) :

5'-2"

0'   5'
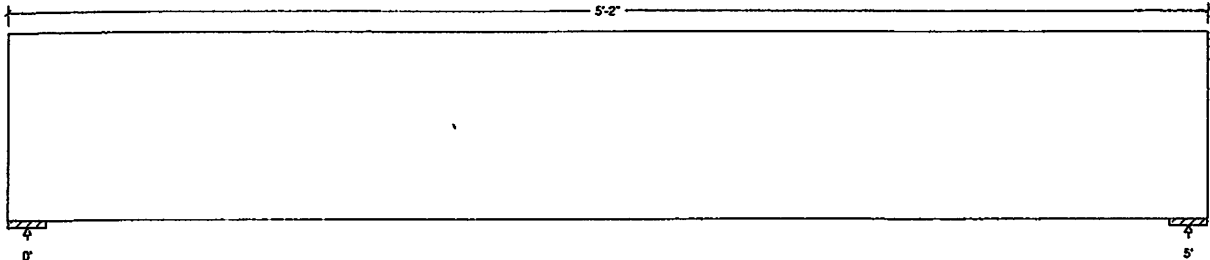
Unfactored:			
Dead	1374		1374
Live	2000		2000
Snow	3250		3250
Factored:			
Total	5311		5311
Bearing:			
Capacity			
Beam	5311		5311
Anal/Des			
Beam	1.00		1.00
Load comb	#3		#3
Length	2.02		2.02
Min req'd	2.02		2.02
Cb	1.00		1.00
Cb min	1.00		1.00

LVL n-ply, 1.8E, 2600Fb, 1-3/4"x9-1/2", 2-ply (3-1/2"x9-1/2")
Supports: All - Non-wood
Total length: 5'-2"; volume = 1.2 cu.ft.;
Lateral support: top= at supports, bottom= at supports;

Analysis vs. Allowable Stress and Deflection using NDS 2012 :

Criterion	Analysis Value	Design	Value	Unit	Analysis/Design
Shear	fv = 156	Fv' = 328		psi	fv/Fv' = 0.47
Bending(+)	fb = 1513	Fb' = 3032		psi	fb/Fb' = 0.50
Live Defl'n	0.05 = <L/999	0.17 = L/360		in	0.30
Total Defl'n	0.07 = L/800	0.33 = L/180		in	0.22

Additional Data:

FACTORS:	F/E(psi)	CD	CM	Ct	CL	CV	Cfu	Cr	Cfrt	Ci	Cn	LC#
Fv'	285	1.15	-	1.00	-	-	-	-	1.00	-	1.00	3
Fb'+	2600	1.15	-	1.00	0.983	1.03	-	1.00	1.00	-	-	3
Fcp'	750	-	-	1.00	-	-	-	-	1.00	-	-	-
E'	1.8 million	-	1.00	-	-	-	-	1.00	-	-	3	
Emin'	0.93 million	-	1.00	-	-	-	-	1.00	-	-	3	

CRITICAL LOAD COMBINATIONS:
Shear   : LC #3 = D+.75(L+S), V = 5311, V design = 3450 lbs
Bending(+): LC #3 = D+.75(L+S), M = 6639 lbs-ft
Deflection: LC #3 = D+.75(L+S) (live)
            LC #3 = D+.75(L+S) (total)
D=dead L=live S=snow W=wind I=impact Lr=roof live Lc=concentrated E=earthquake
All LC's are listed in the Analysis output
Load combinations: ICC-IBC
CALCULATIONS:
Deflection: EI = 225e06 lb-in2/ply
"Live" deflection = Deflection from all non-dead loads (live, wind, snow...)
Total Deflection = 1.50(Dead Load Deflection) + Live Load Deflection.
Lateral stability (+): Lu = 5' Le = 10'-3.63" RB = 9.79

Design Notes:
1. WoodWorks analysis and design are in accordance with the ICC International Building Code (IBC 2012), the National Design Specification (NDS 2012), and NDS Design Supplement.
2. Please verify that the default deflection limits are appropriate for your application.
3. SCL-BEAMS (Structural Composite Lumber): the attached SCL selection is for preliminary design only. For final member design contact your local SCL manufacturer.
4. Size factors vary from one manufacturer to another for SCL materials. They can be changed in the database editor.
5. BUILT-UP SCL-BEAMS: contact manufacturer for connection details when loads are not applied equally to all plys.

Design Check Calculation Sheet
WoodWorks Sizer 10.42

Loads:

Load	Type	Distribution	Pat-tern	Location [ft] Start End	Magnitude Start End	Unit
Load1	Dead	Full UDL			130.0	plf
Load2	Live	Full UDL			520.0	plf

Maximum Reactions (lbs), Bearing Capacities (lbs) and Bearing Lengths (in) :

12'-2"

0'   12'-1"
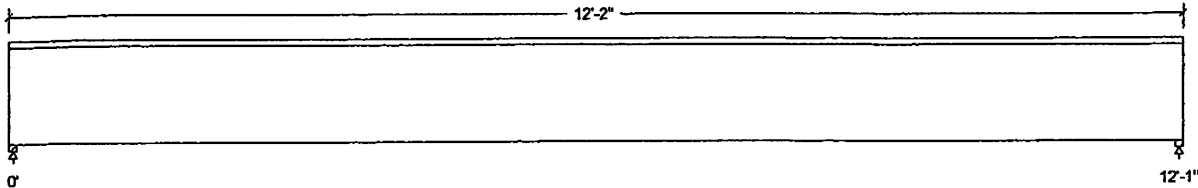
Unfactored:			
Dead	785		785
Live	3142		3142
Factored:			
Total	3927		3927
Bearing:			
Capacity			
Beam	3927		3927
Anal/Des			
Beam	1.00		1.00
Load comb	#2		#2
Length	1.00		1.00
Min req'd	1.00		1.00
Cb	1.00		1.00
Cb min	1.00		1.00

LVL n-ply, 1.8E, 2600Fb, 1-3/4"x11-7/8", 3-ply (5-1/4"x11-7/8")
Supports: All - Non-wood
Total length: 12'-2.0"; volume = 5.3 cu.ft.;
Lateral support: top= full, bottom= at supports; Repetitive factor: applied where permitted (refer to online help);

Analysis vs. Allowable Stress and Deflection using NDS 2012 :

Criterion	Analysis Value	Design Value	Unit	Analysis/Design
Shear	fv = 78	Fv' = 285	psi	fv/Fv' = 0.27
Bending(+)	fb = 1154	Fb' = 2707	psi	fb/Fb' = 0.43
Live Defl'n	0.19 = L/766	0.40 = L/360	in	0.47
Total Defl'n	0.26 = L/557	0.60 = L/240	in	0.43

Additional Data:

FACTORS:	F/E(psi)	CD	CM	Ct	CL	CV	Cfu	Cr	Cfrt	Ci	Cn	LC#
Fv'	285	1.00	-	1.00	-	-	-	-	1.00	-	1.00	2
Fb'+	2600	1.00	-	1.00	1.000	1.00	-	1.04	1.00	-	-	2
Fcp'	750	-	-	1.00	-	-	-	-	1.00	-	-	-
E'	1.8 million	-	-	1.00	-	-	-	-	1.00	-	-	2
Emin'	0.93 million	-	-	1.00	-	-	-	-	1.00	-	-	2

CRITICAL LOAD COMBINATIONS:
Shear   : LC #2 = D+L, V =   3927, V design =   3257 lbs
Bending(+): LC #2 = D+L, M =   11863 lbs-ft
Deflection: LC #2 = D+L (live)
            LC #2 = D+L (total)
D=dead L=live S=snow W=wind I=impact Lr=roof live Lc=concentrated E=earthquake
All LC's are listed in the Analysis output
Load combinations: ASCE 7-10 / IBC 2012
CALCULATIONS:
Deflection: EI =   440e06 lb-in2/ply
"Live" deflection = Deflection from all non-dead loads (live, wind, snow...)
Total Deflection = 1.50(Dead Load Deflection) + Live Load Deflection.

Design Notes:
1. WoodWorks analysis and design are in accordance with the ICC International Building Code (IBC 2012), the National Design Specification (NDS 2012), and NDS Design Supplement.
2. Please verify that the default deflection limits are appropriate for your application.
3. System factor KH may not apply to field-assembled multi-ply beams.
4. SCL-BEAMS (Structural Composite Lumber): the attached SCL selection is for preliminary design only. For final member design contact your local SCL manufacturer.
5. Size factors vary from one manufacturer to another for SCL materials. They can be changed in the database editor.
6. BUILT-UP SCL-BEAMS: contact manufacturer for connection details when loads are not applied equally to all plys.

Design Check Calculation Sheet
WoodWorks Sizer 10.42

Loads:

Load	Type	Distribution	Pat-tern	Location [ft] Start End	Magnitude Start End	Unit
Load1	Dead	Full UDL			140.0	plf
Load2	Live	Full UDL			455.0	plf
Self-weight	Dead	Full UDL			8.2	plf

Maximum Reactions (lbs), Bearing Capacities (lbs) and Bearing Lengths (in) :

12'-8.2"
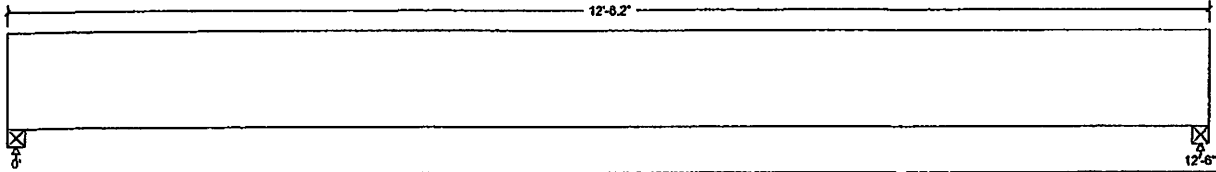
Unfactored:			
Dead	939		939
Live	2885		2885
Factored:			
Total	3824		3824
Bearing:			
Capacity			
Beam	3824		3824
Support	5292		5292
Anal/Des			
Beam	1.00		1.00
Support	0.72		0.72
Load comb	#2		#2
Length	2.19		2.19
Min req'd	2.19		2.19
Cb	1.00		1.00
Cb min	1.00		1.00
Cb support	1.11		1.11
Fcp sup	625		625

Glulam-Bal., West Species, 24F-1.7E WS, 3-1/2"x12"
8 laminations, 3-1/2" maximum width,
Supports: All - Timber-soft Beam, D.Fir-L No.2
Total length: 12'-8.2"; volume = 3.7 cu.ft;
Lateral support: top= at supports, bottom= at supports;

Analysis vs. Allowable Stress and Deflection using NDS 2012 :

Criterion	Analysis Value	Design Value	Unit	Analysis/Design
Shear	fv = 111	Fv' = 210	psi	fv/Fv' = 0.53
Bending(+)	fb = 1603	Fb' = 2139	psi	fb/Fb' = 0.79
Live Defl'n	0.29 = L/514	0.42 = L/360	in	0.70
Total Defl'n	0.43 = L/345	0.63 = L/240	in	0.69

Additional Data:

FACTORS:	F/E(psi)	CD	CM	Ct	CL	CV	Cfu	Cr	Cfrt	Notes	Cn*Cvr	LC#
Fv'	210	1.00	1.00	1.00	-	-	-	-	1.00	1.00	1.00	2
Fb'+	2400	1.00	1.00	1.00	0.891	1.000	1.00	1.00	1.00	1.00	-	2
Fcp'	500	-	1.00	1.00	-	-	-	-	1.00	-	-	-
E'	1.7 million	1.00	1.00	-	-	-	-	-	1.00	-	-	2
Eminy'	0.69 million	1.00	1.00	-	-	-	-	-	1.00	-	-	2

CRITICAL LOAD COMBINATIONS:
Shear   : LC #2 = D+L, V =   3770, V design =   3112 lbs
Bending(+): LC #2 = D+L, M =   11781 lbs-ft
Deflection: LC #2 = D+L (live)
            LC #2 = D+L (total)
D=dead L=live S=snow W=wind I=impact Lr=roof live Lc=concentrated E=earthquake
All LC's are listed in the Analysis output
Load combinations: ASCE 7-10 / IBC 2012
CALCULATIONS:
Deflection: EI =   857e06 lb-in2
"Live" deflection = Deflection from all non-dead loads (live, wind, snow...)
Total Deflection = 1.50(Dead Load Deflection) + Live Load Deflection.
Lateral stability (+): Lu = 12'-6.00" Le = 23'-4.50" RB =   16.58

Design Notes:
1. WoodWorks analysis and design are in accordance with the ICC International Building Code (IBC 2012), the National Design Specification (NDS 2012), and NDS Design Supplement.
2. Please verify that the default deflection limits are appropriate for your application.
3. Glulam design values are for materials conforming to ANSI 117-2010 and manufactured in accordance with ANSI A190.1-2007
4. GLULAM: bxd = actual breadth x actual depth.
5. Glulam Beams shall be laterally supported according to the provisions of NDS Clause 3.3.3.
6. GLULAM: bearing length based on smaller of Fcp(tension). Fcp(comp'n).

WoodWorks®
SOFTWARE FOR WOOD DESIGN

Design Check Calculation Sheet
WoodWorks Sizer 10.42

Loads:

Load	Type	Distribution	Pat-tern	Location [ft] Start	End	Magnitude Start	End	Unit
Load1	Dead	Full UDL				160.0		plf
Load2	Live	Full UDL				640.0		plf
Self-weight	Dead	Full UDL				9.6		plf

Maximum Reactions (lbs), Bearing Capacities (lbs) and Bearing Lengths (in) :

— 6'-1" —
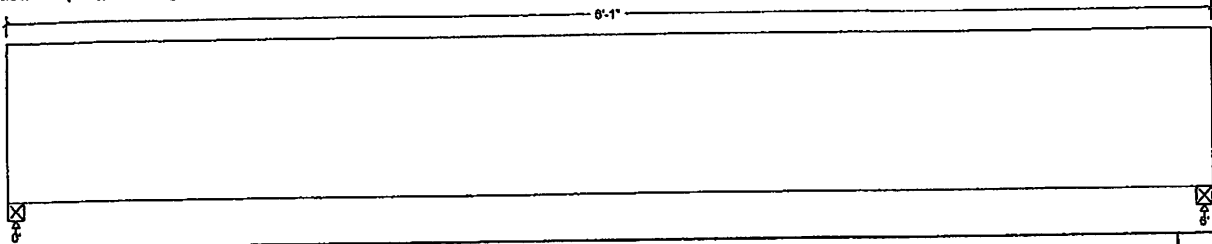
Unfactored:			516
Dead	516		1947
Live	1947		
Factored:			2463
Total	2463		
Bearing:			
Capacity			2669
Beam	2669		2463
Support	2463		
Anal/Des			0.92
Beam	0.92		1.00
Support	1.00		82
Load comb	82		1.02
Length	1.02		1.02**
Min req'd	1.02**		1.00
Cb	1.00		1.00
Cb min	1.00		1.11
Cb support	1.11		625
Fcp sup	625		

**Minimum bearing length governed by the required width of the supporting member.

LVL n-ply, 1.8E, 2600Fb, 1-3/4"x9-1/2", 2-ply (3-1/2"x9-1/2")
Supports: All - Timber-soft Beam, D.Fir-L No.2
Total length: 6'-1.0"; volume = 1.4 cu.ft.;
Lateral support: top= at supports, bottom= at supports;

Analysis vs. Allowable Stress and Deflection using NDS 2012 :

Criterion	Analysis Value	Design Value	Unit	Analysis/Design
Shear	fv = 79	Fv' = 285	psi	fv/Fv' = 0.28
Bending (+)	fb = 830	Fb' = 2635	psi	fb/Fb' = 0.32
Live Defl'n	0.04 = <L/999	0.20 = L/360	in	0.21
Total Defl'n	0.06 = <L/999	0.30 = L/240	in	0.19

Additional Data:

FACTORS:	F/E(psi)	CD	CM	Ct	CL	CV	Cfu	Cr	Cfrt	Ci	Cn	LC#
Fv'	285	1.00	-	1.00	-	-	-	-	1.00	-	1.00	2
Fb'+	2600	1.00	-	1.00	0.982	1.03	-	1.00	1.00	-	-	2
Fcp'	750	-	-	1.00	-	-	-	-	1.00	-	-	-
E'	1.8 million	-	-	1.00	-	-	-	-	1.00	-	-	2
Eminy'	0.93 million	-	-	1.00	-	-	-	-	1.00	-	-	2

CRITICAL LOAD COMBINATIONS:
Shear   : LC #2 = D+L, V =   2429, V design =   1754 lbs
Bending(+): LC #2 = D+L, M =   3643 lbs-ft
Deflection: LC #2 = D+L (live)
            LC #2 = D+L (total)
D=dead L=live S=snow W=wind I=impact Lr=roof live Lc=concentrated E=earthquake
All LC's are listed in the Analysis output
Load combinations: ASCE 7-10 / IBC 2012
CALCULATIONS:
Deflection: EI =   225e06 lb-in2/ply
"Live" deflection = Deflection from all non-dead loads (live, wind, snow_)
Total Deflection = 1.50(Dead Load Deflection) + Live Load Deflection.
Lateral stability (+): Lu = 6' Le = 12'-1.88" RB =   10.64

Design Notes:

1. WoodWorks analysis and design are in accordance with the ICC International Building Code (IBC 2012), the National Design Specification (NDS 2012), and NDS Design Supplement.
2. Please verify that the default deflection limits are appropriate for your application.
3. SCL-BEAMS (Structural Composite Lumber): the attached SCL selection is for preliminary design only. For final member design contact your local SCL manufacturer.
4. Size factors vary from one manufacturer to another for SCL materials. They can be changed in the database editor.
5. BUILT-UP SCL-BEAMS: contact manufacturer for connection details when loads are not applied equally to all plys.
6. FIRE RATING: Joists, wall studs, and multi-ply members are not rated for fire endurance.

Design Check Calculation Sheet
WoodWorks Sizer 10.42

Loads:

Load	Type	Distribution	Pat-tern	Location [ft] Start End	Magnitude Start End	Unit
Load1	Dead	Full UDL			120.0	plf
Load2	Live	Full UDL			480.0	plf
Self-weight	Dead	Full UDL			5.2	plf

Maximum Reactions (lbs), Bearing Capacities (lbs) and Bearing Lengths (in) :

4'-0.7"
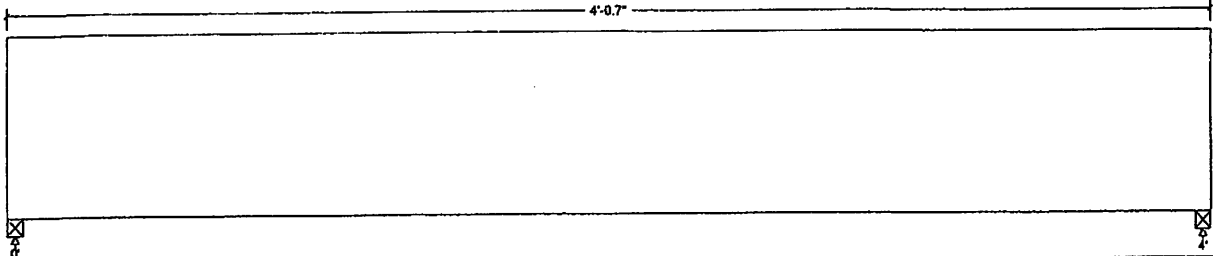
Unfactored:			
Dead	254		254
Live	973		973
Factored:			
Total	1227		1227
Bearing:			
Capacity			
Beam	1227		1227
Support	1380		1380
Anal/Des			
Beam	1.00		1.00
Support	0.89		0.89
Load comb	#2		#2
Length	0.65		0.65
Min req'd	0.65		0.65
Cb	1.00		1.00
Cb min	1.00		1.00
Cb support	1.13		1.13
Fcp sup	625		625

Lumber n-ply, D.Fir-L, No.2, 2x8, 2-ply (3"x7-1/4")
Supports: All - Timber-soft Beam, D.Fir-L No.2
Total length: 4'-0.7"; volume = 0.6 cu.ft.;
Lateral support: top= at supports, bottom= at supports;

Analysis vs. Allowable Stress and Deflection using NDS 2012 :

Criterion	Analysis Value	Design Value	Unit	Analysis/Design
Shear	fv = 57	Fv' = 180	psi	fv/Fv' = 0.32
Bending(+)	fb = 553	Fb' = 1072	psi	fb/Fb' = 0.52
Live Defl'n	0.02 = <L/999	0.13 = L/360	in	0.14
Total Defl'n	0.03 = <L/999	0.20 = L/240	in	0.13

Additional Data:

FACTORS:	F/E(psi)	CD	CM	Ct	CL	CF	Cfu	Cr	Cfrt	Ci	Cn	LC#
Fv'	180	1.00	1.00	1.00	-	-	-	-	1.00	1.00	1.00	2
Fb'+	900	1.00	1.00	1.00	0.993	1.200	1.00	1.00	1.00	1.00	-	2
Fcp'	625	-	1.00	1.00	-	-	-	-	1.00	1.00	-	-
E'	1.6 million	1.00	1.00	-	-	-	-	-	1.00	1.00	-	2
Emin'	0.58 million	1.00	1.00	-	-	-	-	-	1.00	1.00	-	2

CRITICAL LOAD COMBINATIONS:
Shear   : LC #2 = D+L, V =   1210, V design =   826 lbs
Bending(+): LC #2 = D+L, M =   1210 lbs-ft
Deflection: LC #2 = D+L (live)
            LC #2 = D+L (total)
D=dead L=live S=snow W=wind I=impact Lr=roof live Lc=concentrated E=earthquake
All LC's are listed in the Analysis output
Load combinations: ASCE 7-10 / IBC 2012
CALCULATIONS:
Deflection: EI =   76.2e06 lb-in2/ply
"Live" deflection = Deflection from all non-dead loads (live, wind, snow...)
Total Deflection = 1.50(Dead Load Deflection) + Live Load Deflection.
Lateral stability (+): Lu = 4' Le = 8'-2.88" RB =   8.92

Design Notes:
1. WoodWorks analysis and design are in accordance with the ICC International Building Code (IBC 2012), the National Design Specification (NDS 2012), and NDS Design Supplement.
2. Please verify that the default deflection limits are appropriate for your application.
3. Sawn lumber bending members shall be laterally supported according to the provisions of NDS Clause 4.4.1.
4. BUILT-UP BEAMS: It is assumed that each ply is a single continuous member (that is, no butt joints are present) fastened together securely at intervals not exceeding 4 times the depth and that each ply is equally top-loaded. Where beams are side-loaded, special fastening details may be required.
5. FIRE RATING: Joists, wall studs, and multi-ply members are not rated for fire endurance.

General Footing

Description :   --None--

Code References

Calculations per
Load Combinations Used : IBC 2015

General Information

Material Properties
f'c : Concrete 28 day strength	=	3.0	ksi
fy : Rebar Yield	=	60.0	ksi
Ec : Concrete Elastic Modulus	=	3,122.0	ksi
Concrete Density	=	145.0	pcf
φ Values Flexure	=	0.90	
Shear	=	0.750	

Analysis Settings
Min Steel % Bending Reinf.	=	
Min Allow % Temp Reinf.	=	0.00180
Min. Overturning Safety Factor	=	1.0 : 1
Min. Sliding Safety Factor	=	1.0 : 1
Add Ftg Wt for Soil Pressure	:	Yes
Use ftg wt for stability, moments & shears	:	Yes
Add Pedestal Wt for Soil Pressure	:	No
Use Pedestal wt for stability, mom & shear	:	No

Soil Design Values
Allowable Soil Bearing	=	1.50	ksf
Increase Bearing By Footing Weight	=	No	
Soil Passive Resistance (for Sliding)	=	250.0	pcf
Soil/Concrete Friction Coeff.	=	0.30	

Increases based on footing Depth
Footing base depth below soil surface	=	3.0	ft
Allow press. increase per foot of depth	=	0.0	ksf
when footing base is below	=	0.0	ft

Increases based on footing plan dimension
Allowable pressure increase per foot of depth
when max. length or width is greater than	=	0.0	ksf
	=	0.0	ft

Dimensions

Width parallel to X-X Axis	=	3.0	ft
Length parallel to Z-Z Axis	=	3	ft
Footing Thickness	=	12.0	in

Pedestal dimensions...
px : parallel to X-X Axis	=	0.0	in
pz : parallel to Z-Z Axis	=	0.0	in
Height	=	0.0	in

Rebar Centerline to Edge of Concrete...
at Bottom of footing	=	3.0	in

Reinforcing

Bars parallel to X-X Axis
Number of Bars	=		4
Reinforcing Bar Size	=	#	4

Bars parallel to Z-Z Axis
Number of Bars	=		4
Reinforcing Bar Size	=	#	4

Bandwidth Distribution Check (ACI 15.4.4.2)
Direction Requiring Closer Separation	n/a
# Bars required within zone	n/a
# Bars required on each side of zone	n/a

Applied Loads

		D	Lr	L	S	W	E	H
P : Column Load	=	2.40	0.0	2.0	5.40	0.0	0.0	0.0 k
OB : Overburden	=	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ksf
M-xx	=	0.0	0.0	0.0	0.0	0.0	0.0	0.0 k-ft
M-zz	=	0.0	0.0	0.0	0.0	0.0	0.0	0.0 k-ft
V-x	=	0.0	0.0	0.0	0.0	0.0	0.0	0.0 k
V-z	=	0.0	0.0	0.0	0.0	0.0	0.0	0.0 k

General Footing

Lic.# : KW-06005759
Description :   --None--

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.8320	Soil Bearing	1.248 ksf	1.50 ksf	+D+0.750L+0.750S+0.5250E+H about Z-
PASS	n/a	Overturning - X-X	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Overturning - Z-Z	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Sliding - X-X	0.0 k	0.0 k	No Sliding
PASS	n/a	Sliding - Z-Z	0.0 k	0.0 k	No Sliding
PASS	n/a	Uplift	0.0 k	0.0 k	No Uplift
PASS	0.1492	Z Flexure (+X)	1.565 k-ft/ft	10.486 k-ft/ft	+1.20D+0.50L+1.60S+1.60H
PASS	0.1492	Z Flexure (-X)	1.565 k-ft/ft	10.486 k-ft/ft	+1.20D+0.50L+1.60S+1.60H
PASS	0.1492	X Flexure (+Z)	1.565 k-ft/ft	10.486 k-ft/ft	+1.20D+0.50L+1.60S+1.60H
PASS	0.1492	X Flexure (-Z)	1.565 k-ft/ft	10.486 k-ft/ft	+1.20D+0.50L+1.60S+1.60H
PASS	0.1176	1-way Shear (+X)	9.660 psi	82.158 psi	+1.20D+0.50L+1.60S+1.60H
PASS	0.1176	1-way Shear (-X)	9.660 psi	82.158 psi	+1.20D+0.50L+1.60S+1.60H
PASS	0.1176	1-way Shear (+Z)	9.660 psi	82.158 psi	+1.20D+0.50L+1.60S+1.60H
PASS	0.1176	1-way Shear (-Z)	9.660 psi	82.158 psi	+1.20D+0.50L+1.60S+1.60H
PASS	0.2205	2-way Punching	36.227 psi	164.317 psi	+1.20D+0.50L+1.60S+1.60H

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc (in)	Zecc (in)	Actual Soil Bearing Stress @ Location Bottom, -Z	Top, +Z	Left, -X	Right, +X	Actual / Allow Ratio
X-X, +D+H	1.50	n/a	0.0	0.6317	0.6317	n/a	n/a	0.421
X-X, +D+L+H	1.50	n/a	0.0	0.8539	0.8539	n/a	n/a	0.569
X-X, +D+Lr+H	1.50	n/a	0.0	0.6317	0.6317	n/a	n/a	0.421
X-X, +D+S+H	1.50	n/a	0.0	1.232	1.232	n/a	n/a	0.821
X-X, +D+0.750Lr+0.750L+H	1.50	n/a	0.0	0.7983	0.7983	n/a	n/a	0.532
X-X, +D+0.750L+0.750S+H	1.50	n/a	0.0	1.248	1.248	n/a	n/a	0.832
X-X, +D+0.60W+H	1.50	n/a	0.0	0.6317	0.6317	n/a	n/a	0.421
X-X, +D+0.70E+H	1.50	n/a	0.0	0.6317	0.6317	n/a	n/a	0.421
X-X, +D+0.750Lr+0.750L+0.450W+H	1.50	n/a	0.0	0.7983	0.7983	n/a	n/a	0.532
X-X, +D+0.750L+0.750S+0.450W+H	1.50	n/a	0.0	1.248	1.248	n/a	n/a	0.832
X-X, +D+0.750L+0.750S+0.5250E+H	1.50	n/a	0.0	1.248	1.248	n/a	n/a	0.832
X-X, +0.60D+0.60W+0.60H	1.50	n/a	0.0	0.3790	0.3790	n/a	n/a	0.253
X-X, +0.60D+0.70E+0.60H	1.50	n/a	0.0	0.3790	0.3790	n/a	n/a	0.253
Z-Z, +D+H	1.50	0.0	n/a	n/a	n/a	0.6317	0.6317	0.421
Z-Z, +D+L+H	1.50	0.0	n/a	n/a	n/a	0.8539	0.8539	0.569
Z-Z, +D+Lr+H	1.50	0.0	n/a	n/a	n/a	0.6317	0.6317	0.421
Z-Z, +D+S+H	1.50	0.0	n/a	n/a	n/a	1.232	1.232	0.821
Z-Z, +D+0.750Lr+0.750L+H	1.50	0.0	n/a	n/a	n/a	0.7983	0.7983	0.532
Z-Z, +D+0.750L+0.750S+H	1.50	0.0	n/a	n/a	n/a	1.248	1.248	0.832
Z-Z, +D+0.60W+H	1.50	0.0	n/a	n/a	n/a	0.6317	0.6317	0.421
Z-Z, +D+0.70E+H	1.50	0.0	n/a	n/a	n/a	0.6317	0.6317	0.421
Z-Z, +D+0.750Lr+0.750L+0.450W+H	1.50	0.0	n/a	n/a	n/a	0.7983	0.7983	0.532
Z-Z, +D+0.750L+0.750S+0.450W+H	1.50	0.0	n/a	n/a	n/a	1.248	1.248	0.832
Z-Z, +D+0.750L+0.750S+0.5250E+H	1.50	0.0	n/a	n/a	n/a	1.248	1.248	0.832
Z-Z, +0.60D+0.60W+0.60H	1.50	0.0	n/a	n/a	n/a	0.3790	0.3790	0.253
Z-Z, +0.60D+0.70E+0.60H	1.50	0.0	n/a	n/a	n/a	0.3790	0.3790	0.253

Overturning Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
Footing Has NO Overturning				All units k

Sliding Stability

Force Application Axis Load Combination...	Sliding Force	Resisting Force	Stability Ratio	Status
Footing Has NO Sliding				

General Footing

Description :   --None--

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.40D+1.60H	0.420	+Z	Bottom	0.2592	Min Temp %	0.2667	10.486	OK
X-X, +1.40D+1.60H	0.420	-Z	Bottom	0.2592	Min Temp %	0.2667	10.486	OK
X-X, +1.20D+0.50Lr+1.60L+1.60H	0.760	+Z	Bottom	0.2592	Min Temp %	0.2667	10.486	OK
X-X, +1.20D+0.50Lr+1.60L+1.60H	0.760	-Z	Bottom	0.2592	Min Temp %	0.2667	10.486	OK
X-X, +1.20D+1.60L+0.50S+1.60H	1.098	+Z	Bottom	0.2592	Min Temp %	0.2667	10.486	OK
X-X, +1.20D+1.60L+0.50S+1.60H	1.098	-Z	Bottom	0.2592	Min Temp %	0.2667	10.486	OK
X-X, +1.20D+1.60Lr+0.50L+1.60H	0.4850	+Z	Bottom	0.2592	Min Temp %	0.2667	10.486	OK
X-X, +1.20D+1.60Lr+0.50L+1.60H	0.4850	-Z	Bottom	0.2592	Min Temp %	0.2667	10.486	OK
X-X, +1.20D+1.60Lr+0.50W+1.60H	0.360	+Z	Bottom	0.2592	Min Temp %	0.2667	10.486	OK
X-X, +1.20D+1.60Lr+0.50W+1.60H	0.360	-Z	Bottom	0.2592	Min Temp %	0.2667	10.486	OK
X-X, +1.20D+0.50L+1.60S+1.60H	1.565	+Z	Bottom	0.2592	Min Temp %	0.2667	10.486	OK
X-X, +1.20D+0.50L+1.60S+1.60H	1.565	-Z	Bottom	0.2592	Min Temp %	0.2667	10.486	OK
X-X, +1.20D+1.60S+0.50W+1.60H	1.440	+Z	Bottom	0.2592	Min Temp %	0.2667	10.486	OK
X-X, +1.20D+1.60S+0.50W+1.60H	1.440	-Z	Bottom	0.2592	Min Temp %	0.2667	10.486	OK
X-X, +1.20D+0.50Lr+0.50L+W+1.60H	0.4850	+Z	Bottom	0.2592	Min Temp %	0.2667	10.486	OK
X-X, +1.20D+0.50Lr+0.50L+W+1.60H	0.4850	-Z	Bottom	0.2592	Min Temp %	0.2667	10.486	OK
X-X, +1.20D+0.50L+0.50S+W+1.60H	0.8225	+Z	Bottom	0.2592	Min Temp %	0.2667	10.486	OK
X-X, +1.20D+0.50L+0.50S+W+1.60H	0.8225	-Z	Bottom	0.2592	Min Temp %	0.2667	10.486	OK
X-X, +1.20D+0.50L+0.70S+E+1.60H	0.9575	+Z	Bottom	0.2592	Min Temp %	0.2667	10.486	OK
X-X, +1.20D+0.50L+0.70S+E+1.60H	0.9575	-Z	Bottom	0.2592	Min Temp %	0.2667	10.486	OK
X-X, +0.90D+W+0.90H	0.270	+Z	Bottom	0.2592	Min Temp %	0.2667	10.486	OK
X-X, +0.90D+W+0.90H	0.270	-Z	Bottom	0.2592	Min Temp %	0.2667	10.486	OK
X-X, +0.90D+E+0.90H	0.270	+Z	Bottom	0.2592	Min Temp %	0.2667	10.486	OK
X-X, +0.90D+E+0.90H	0.270	-Z	Bottom	0.2592	Min Temp %	0.2667	10.486	OK
Z-Z, +1.40D+1.60H	0.420	-X	Bottom	0.2592	Min Temp %	0.2667	10.486	OK
Z-Z, +1.40D+1.60H	0.420	+X	Bottom	0.2592	Min Temp %	0.2667	10.486	OK
Z-Z, +1.20D+0.50Lr+1.60L+1.60H	0.760	-X	Bottom	0.2592	Min Temp %	0.2667	10.486	OK
Z-Z, +1.20D+0.50Lr+1.60L+1.60H	0.760	+X	Bottom	0.2592	Min Temp %	0.2667	10.486	OK
Z-Z, +1.20D+1.60L+0.50S+1.60H	1.098	-X	Bottom	0.2592	Min Temp %	0.2667	10.486	OK
Z-Z, +1.20D+1.60L+0.50S+1.60H	1.098	+X	Bottom	0.2592	Min Temp %	0.2667	10.486	OK
Z-Z, +1.20D+1.60Lr+0.50L+1.60H	0.4850	-X	Bottom	0.2592	Min Temp %	0.2667	10.486	OK
Z-Z, +1.20D+1.60Lr+0.50L+1.60H	0.4850	+X	Bottom	0.2592	Min Temp %	0.2667	10.486	OK
Z-Z, +1.20D+1.60Lr+0.50W+1.60H	0.360	-X	Bottom	0.2592	Min Temp %	0.2667	10.486	OK
Z-Z, +1.20D+1.60Lr+0.50W+1.60H	0.360	+X	Bottom	0.2592	Min Temp %	0.2667	10.486	OK
Z-Z, +1.20D+0.50L+1.60S+1.60H	1.565	-X	Bottom	0.2592	Min Temp %	0.2667	10.486	OK
Z-Z, +1.20D+0.50L+1.60S+1.60H	1.565	+X	Bottom	0.2592	Min Temp %	0.2667	10.486	OK
Z-Z, +1.20D+1.60S+0.50W+1.60H	1.440	-X	Bottom	0.2592	Min Temp %	0.2667	10.486	OK
Z-Z, +1.20D+1.60S+0.50W+1.60H	1.440	+X	Bottom	0.2592	Min Temp %	0.2667	10.486	OK
Z-Z, +1.20D+0.50Lr+0.50L+W+1.60H	0.4850	-X	Bottom	0.2592	Min Temp %	0.2667	10.486	OK
Z-Z, +1.20D+0.50Lr+0.50L+W+1.60H	0.4850	+X	Bottom	0.2592	Min Temp %	0.2667	10.486	OK
Z-Z, +1.20D+0.50L+0.50S+W+1.60H	0.8225	-X	Bottom	0.2592	Min Temp %	0.2667	10.486	OK
Z-Z, +1.20D+0.50L+0.50S+W+1.60H	0.8225	+X	Bottom	0.2592	Min Temp %	0.2667	10.486	OK
Z-Z, +1.20D+0.50L+0.70S+E+1.60H	0.9575	-X	Bottom	0.2592	Min Temp %	0.2667	10.486	OK
Z-Z, +1.20D+0.50L+0.70S+E+1.60H	0.9575	+X	Bottom	0.2592	Min Temp %	0.2667	10.486	OK
Z-Z, +0.90D+W+0.90H	0.270	-X	Bottom	0.2592	Min Temp %	0.2667	10.486	OK
Z-Z, +0.90D+W+0.90H	0.270	+X	Bottom	0.2592	Min Temp %	0.2667	10.486	OK
Z-Z, +0.90D+E+0.90H	0.270	-X	Bottom	0.2592	Min Temp %	0.2667	10.486	OK
Z-Z, +0.90D+E+0.90H	0.270	+X	Bottom	0.2592	Min Temp %	0.2667	10.486	OK

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D+1.60H	2.59 psi	2.59 psi	2.59 psi	2.59 psi	2.59 psi	82.16 psi	0.03	0.00
+1.20D+0.50Lr+1.60L+1.60H	4.69 psi	4.69 psi	4.69 psi	4.69 psi	4.69 psi	82.16 psi	0.06	0.00
+1.20D+1.60L+0.50S+1.60H	6.78 psi	6.78 psi	6.78 psi	6.78 psi	6.78 psi	82.16 psi	0.08	0.00
+1.20D+1.60Lr+0.50L+1.60H	2.99 psi	2.99 psi	2.99 psi	2.99 psi	2.99 psi	82.16 psi	0.04	0.00
+1.20D+1.60Lr+0.50W+1.60H	2.22 psi	2.22 psi	2.22 psi	2.22 psi	2.22 psi	82.16 psi	0.03	0.00
+1.20D+0.50L+1.60S+1.60H	9.66 psi	9.66 psi	9.66 psi	9.66 psi	9.66 psi	82.16 psi	0.12	0.00
+1.20D+1.60S+0.50W+1.60H	8.89 psi	8.89 psi	8.89 psi	8.89 psi	8.89 psi	82.16 psi	0.11	0.00
+1.20D+0.50Lr+0.50L+W+1.60H	2.99 psi	2.99 psi	2.99 psi	2.99 psi	2.99 psi	82.16 psi	0.04	0.00
+1.20D+0.50L+0.50S+W+1.60H	5.08 psi	5.08 psi	5.08 psi	5.08 psi	5.08 psi	82.16 psi	0.06	0.00
+1.20D+0.50L+0.70S+E+1.60H	5.91 psi	5.91 psi	5.91 psi	5.91 psi	5.91 psi	82.16 psi	0.07	0.00
+0.90D+W+0.90H	1.67 psi	1.67 psi	1.67 psi	1.67 psi	1.67 psi	82.16 psi	0.02	0.00

Title Block Line 6

General Footing

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ENERCALC, INC. 1983-2017, Build:10.17.12.10, Ver:10.17.12.10

Lic. # : KW-06006759
Licensee : Kustom House Plans

Description :   --None--

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+0.90D+E+0.90H	1.67 psi	1.67 psi	1.67 psi	1.67 psi	1.67 psi	82.16 psi	0.02	0.00
							All units k	

Two-Way "Punching" Shear

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D+1.60H	9.72 psi	164.32 psi	0.05917	OK
+1.20D+0.50Lr+1.60L+1.60H	17.59 psi	164.32 psi	0.1071	OK
+1.20D+1.60L+0.50S+1.60H	25.41 psi	164.32 psi	0.1546	OK
+1.20D+1.60Lr+0.50L+1.60H	11.23 psi	164.32 psi	0.06832	OK
+1.20D+1.60Lr+0.50W+1.60H	8.33 psi	164.32 psi	0.05072	OK
+1.20D+0.50L+1.60S+1.60H	36.23 psi	164.32 psi	0.2205	OK
+1.20D+1.60S+0.50W+1.60H	33.33 psi	164.32 psi	0.2029	OK
+1.20D+0.50Lr+0.50L+W+1.60H	11.23 psi	164.32 psi	0.06832	OK
+1.20D+0.50L+0.50S+W+1.60H	19.04 psi	164.32 psi	0.1159	OK
+1.20D+0.50L+0.70S+E+1.60H	22.16 psi	164.32 psi	0.1349	OK
+0.90D+W+0.90H	6.25 psi	164.32 psi	0.03804	OK
+0.90D+E+0.90H	6.25 psi	164.32 psi	0.03804	OK