Iridium AE
P: (801) 974-5101
F: (801) 974-5102
A: 635 W 5300 S STE 203
MURRAY, UT 84123

IRIDIUM REP: ALG
DATE: 8/2/2017
PROJECT #: 17-244
CLIENT: UPWALL DESIGN ARCH

PROJECT NAME: HOLLIS RESIDENCE
PROJECT LOCATION: 8452 E SPRING PARK
WEBER COUNTY, UT

DESIGN CRITERIA

1 GOVERNING CODE:	2015 IBC		
2 ROOF LOADING			
2.1 ROOF DEAD LOAD	15	PSF	
2.2 ROOF LIVE LOAD	20	PSF	
2.3 ROOF SNOW LOAD			
GROUND SNOW LOAD, P_g	243	PSF	
FLAT ROOF SNOW LOAD, P_f	170	PSF	
SNOW EXPOSURE FACTOR, C_s	1.0		
THERMAL FACTOR, C_t	1.0		
IMPORTANCE FACTOR, I	1.0		
3 FLOOR LOADING			
3.1 FLOOR DEAD LOAD W/ 1-1/2" L.W. CON	24	PSF	
3.2 FLOOR LIVE LOAD	40	PSF	
4 DECK LOADING			
4.1 DECK DEAD W/ 4" L.W. CONC	42	PSF	
4.2 DECK LIVE LOAD	60	PSF	
5 WALL WEIGHTS			
5.1 EXTERIOR WALL DEAD LOAD	17	PSF	
6 SEISMIC PARAMETERS			
6.1 SEISMIC RISK CATEGORY	II		
6.2 SEISMIC DESIGN CATEGORY	D0		
6.3 IMPORTANCE FACTOR, I	1.0		
6.4 SNOW USED AS SEISMIC WT., W_S	34.0	PSF	
6.5 ANALYSIS PROCEDURE USED	EQUIV. LATERAL FORCE		
6.6 SPECTRAL RESPONSE ACCELERATIONS			
SHORT PERIOD, S_s	0.863		
ONE-SEC PERIOD, S_1	0.288		
SHORT PERIOD SITE COEF., F_a	1.00		
LONG PERIOD SITE COEF., F_v	1.50		
SHORT PERIOD ACCEL., S_{DS}	0.664		
ONE SEC PERIOD ACCEL., S_{D1}	0.351		
6.7 SEISMIC FORCE RESISTING SYSTEM	LIGHT-FRAME (WOOD)		
RESPONSE MOD. COEF., R	6.5		
DEFLECTION AMP. FACTOR, C_d	4.0		
OVERSTRENGTH FACTOR, Ω_0	3.0		
DESIGN BASE SHEAR, V	0.102 *W (FROM ASCE 12.8-2)		
7 WIND PARAMETERS			
7.1 ULTIMATE DESIGN WIND SPEED, V_{ult}	115	MPH	
7.2 WIND RISK CATEGORY	II		
7.3 WIND EXPOSURE	C		
7.4 INTERNAL PRESSURE COEFFICIENT	0.18		
7.5 COMPONENTS & CLADDING PRESSUR	16	PSF	
8 SOILS CRITERIA			
8.1 SOIL BEARING PRESSURE	2,500	PSF	
8.2 SOIL SITE CLASS	D		
8.3 FROST DEPTH	40	INCHES	
8.4 GEOTECH STUDY USED	YES	IGES Project No. 02347-001	

UTAH SNOW LOAD CALCULATION
COUNTY: WEBER
A = 8.6
P_o = 43
S = 63
A_o = 4.5

PLAN REVIEW ACCEPTANCE
FOR COMPLIANCE WITH THE APPLICABLE CONSTRUCTION CODES IDENTIFIED BELOW.

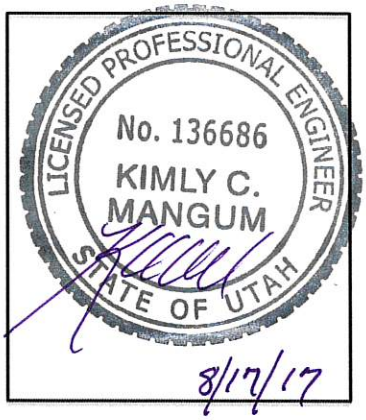
- ☐ BUILDING
- ☒ STRUCTURAL
- ☐ MECHANICAL
- ☐ PLUMBING
- ☐ ELECTRICAL
- ☐ ENERGY
- ☐ ACCESSIBILITY
- ☐ FIRE

PLAN REVIEW ACCEPTANCE OF DOCUMENTS DOES NOT AUTHORIZE CONSTRUCTION TO PROCEED IN VIOLATION OF ANY FEDERAL, STATE, OR LOCAL REGULATIONS.

BY: MEM DATE: 10/11/17

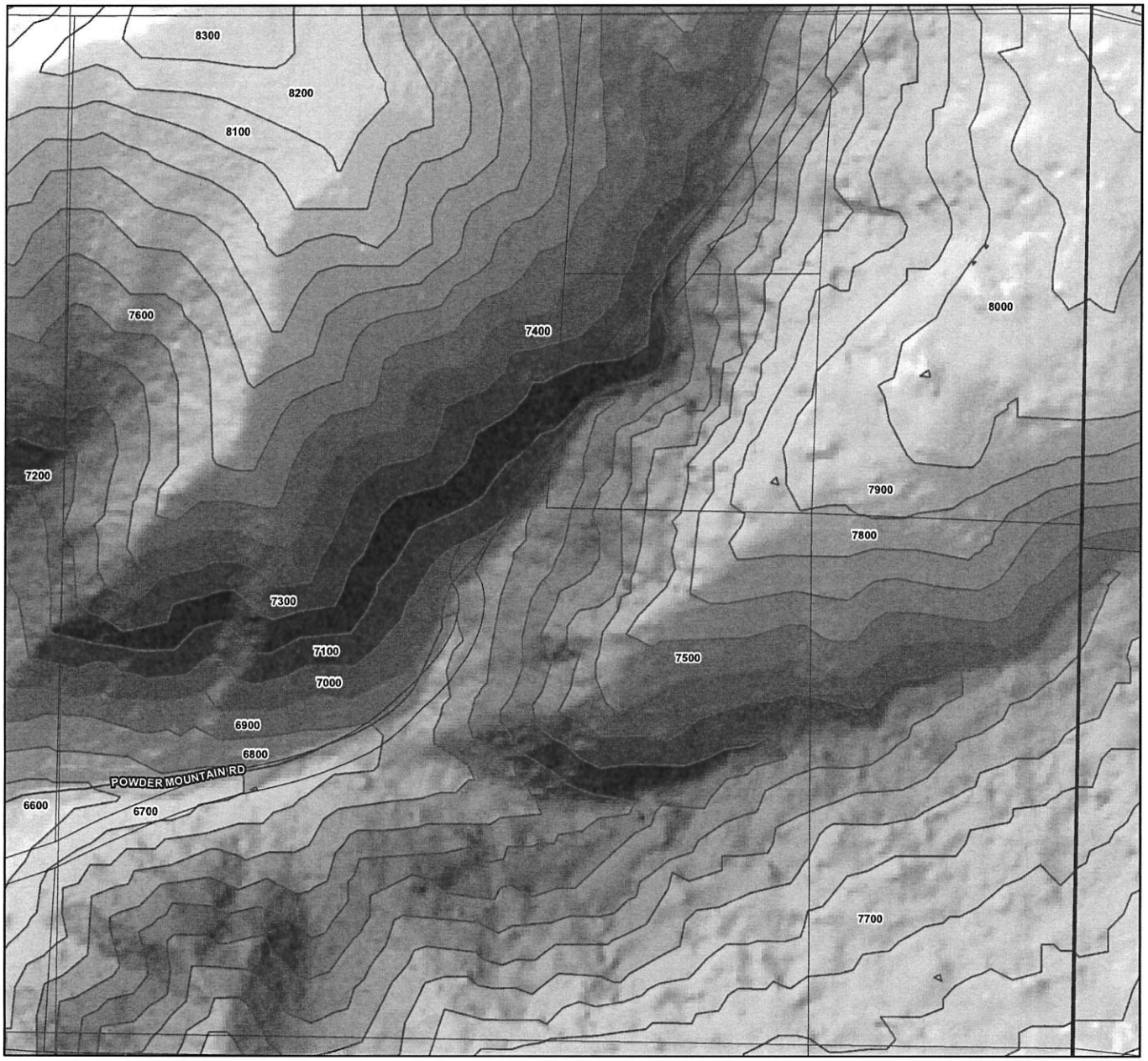
WEST COAST CODE CONSULTANTS, INC.

THIS SHEET MUST BE WET STAMPED, INITIALED AND DATED TO BE VALID FOR OBTAINING A BUILDING PERMIT. REGISTERING (REUSE) OF THESE CALCULATIONS, DESIGN OR ASSOCIATED PLANS IS PROHIBITED.



THIS ENGINEERING CALCULATION PACKET AND STAMP VALID FOR 180 DAYS FROM THE DATE ON THE STAMP. AFTER THIS 180 DAY PERIOD, ADDITIONAL REVIEW AND NEWLY SIGNED WET STAMP WILL BE REQUIRED.

PROJECT NUMBER
17-244



Weber County Snow Loads

Section 12

7N, 1E

0 250 500 1,000 Feet

0 50 100 200 Meters

weber county
planning commission

NAD 1983
UTM Zone 12N
Transverse Mercator
1:6,300

Map by Justin Morris
Weber County Planning
jmorris@co.weber.ut.us
801-399-8791
1/10/2008

This is not an official map but for reference use only. The data was compiled from the best sources available, so various errors from the sources may be inherent on the map. All boundaries and features therein should be treated as such. For official boundary information, the pertinent County department or Municipality should be contacted. This map is a representation of ground features and is not a legal document of their locations. The scale represented is approximate, nonexistent or has been changed, so this is NOT a Survey or Engineering grade map and should by no means be used as such. This map is not intended for all uses. Weber County is not responsible or liable for any derivative or misuses of this map.

Legend

- Roads
- Township & Range
- Section
- Parcels

Elevation

- 4600 and less
- 4700
- 4800
- 4900
- 5000
- 5100
- 5200
- 5300
- 5400
- 5500
- 5600
- 5700
- 5800
- 5900
- 6000
- 6100
- 6200
- 6300
- 6400
- 6500
- 6600
- 6700
- 6800
- 6900
- 7000
- 7100
- 7200
- 7300
- 7400
- 7500
- 7600
- 7700
- 7800
- 7900
- 8000
- 8100
- 8200 and greater

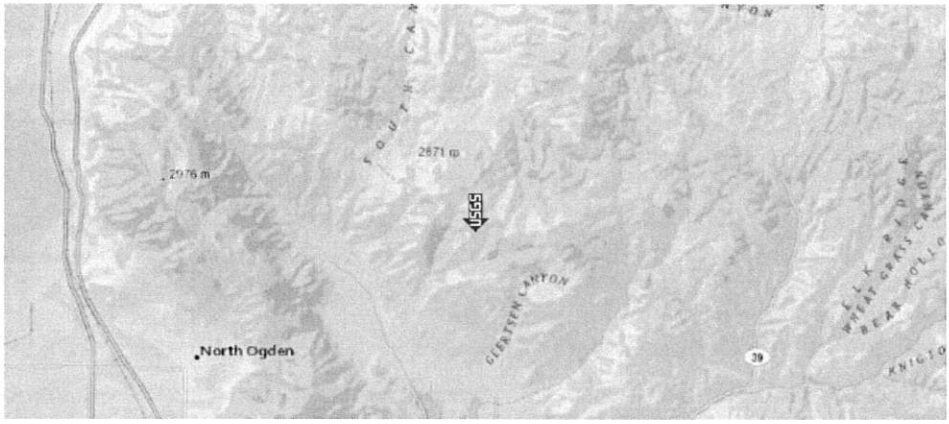
Elevation (ft)	Ground Snow Load (psf)	Roof Snow (Sheltered) (psf)	Roof Snow (Other) (psf)
< 4600	43	38	30
4600	45	41	32
4700	47	42	33
4800	50	45	35
4900	53	48	37
5000	57	51	40
5100	62	56	43
5200	66	59	46
5300	71	64	50
5400	76	68	53
5500	82	74	57
5600	87	78	61
5700	93	84	65
5800	98	88	69
5900	104	94	73
6000	110	99	77
6100	115	104	81
6200	121	110	85
6300	127	114	89
6400	133	120	93
6500	139	125	97
6600	145	131	102
6700	151	136	106
6800	157	141	110
6900	163	147	114
7000	169	152	118
7100	175	158	123
7200	182	164	127
7300	188	169	132
7400	194	175	136
7500	200	180	140
7600	206	185	144
7700	212	191	148
7800	218	196	153
7900	225	203	158
8200	243	219	170

USGS Design Maps Summary Report

View Detailed Report Print

User-Specified Input

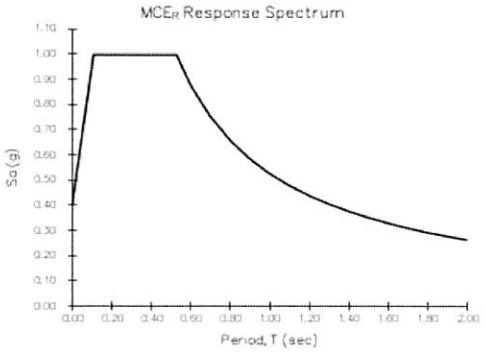
Building Code Reference Document	ASCE 7-10 Standard (which utilizes USGS hazard data available in 2008)
Site Coordinates	41.38°N, 111.79°W
Site Soil Classification	Site Class D – "Stiff Soil"
Risk Category	I/II/III

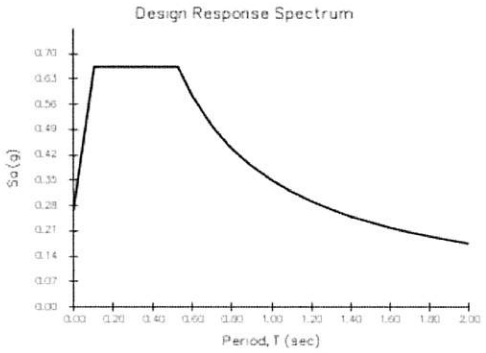


USGS-Provided Output

S_S =	0.863 g	S_{MS} =	0.997 g	S_{DS} =	0.664 g
S_1 =	0.288 g	S_{M1} =	0.526 g	S_{D1} =	0.351 g

For information on how the SS and S1 values above have been calculated from probabilistic (risk-targeted) and deterministic ground motions in the direction of maximum horizontal response, please return to the application and select the "2009 NEHRP" building code reference document.





STRUCTURAL MEMBERS DESIGN VALUES

	F_b (PSI)	F_v (PSI)	$F_{c\perp}$ (PSI)	E (PSI)
SELECT STRUCTURAL	1,350	180	625	1.90E+06
SPF#1	900	125	425	1.30E+06
DF#1 & BTR	1,150	180	625	1.80E+06
DF#2	850	180	625	1.60E+06
DF#2 ROUND	850	180	625	1.60E+06
LVL (1.9E)	2,600	285	750	1.90E+06
PSL (2.0E)	2,900	290	750	2.00E+06
GLB	2,400	265	650	1.80E+06
ASTM A-992 STEEL	33,000	20,000	N/A	2.90E+07

DEAD LOADS

ROOF		
SHINGLES	6.00	PSF
SHEATHING (7/16")	1.70	PSF
INSULATION (.1 X 12)	1.20	PSF
JOISTS, TRUSSES & BEAMS	3.00	PSF
SHT ROCK (5/8")	2.75	PSF
MISC	0.00	PSF
TOTAL	14.65	PSF
USE	**15**	**PSF**

FLOOR		
HARDWOOD/CARPET	4.00	PSF
SHEATHING (3/4")	2.20	PSF
JOISTS & BEAMS	3.00	PSF
SHT ROCK (5/8")	2.75	PSF
1-1/2" L.W. CONC	12.00	PSF
TOTAL	23.95	PSF
USE	**24**	**PSF**

DECK		
1-1/2" SOFTWOOD DECKING	4.60	PSF
JOISTS & BEAMS	5.00	PSF
4" L.W. CONC	32.00	PSF
TOTAL	41.60	PSF
USE	**42**	**PSF**

EXTERIOR WALLS		
SHT ROCK (5/8")	2.75	PSF
INSULATION (.1 X 5.5)	0.55	PSF
STUDS	1.70	PSF
SHEATHING (7/16")	1.40	PSF
SIDING OR STUCCO	10.00	PSF
TOTAL	16.40	PSF
USE	**17**	**PSF**

FLOOR BEAMS

SIMPLE SPAN BEAM

LOCATION: DECK

FB - 20

DURATION INCREASE = 1.00

BEAM SPAN (FT) = 14.5

VENEER (Y/N): NO

TRIBUTARY LOADING

	SPAN (FT)	CANT. (FT)	W_{TL} (PLF)	W_{LL} (PLF)
ROOF	0.0	0.0	0	0
FLOOR	0.0	0.0	0	0
FLOOR	0.0	0.0	0	0
DECK	15.0	0.0	765	450
OTHER	0.0	0.0	0	0
		TOTAL	**765**	**450**

DESIGN LOADS

FLAT ROOF SNOW LOAD	TL	185	PSF
	LL	170	PSF
FLOOR LOAD	TL	64	PSF
	LL	40	PSF
DECK LOAD	TL	102	PSF
	LL	60	PSF
OTHER LOAD	TL	125	PSF
	LL	50	PSF

POINT LOAD

FROM RB

TL = 0 LBS

LL = 0 LBS

LOCATION (a) = 7.3 FT

b = L-a = 7.3 FT (a > b)

EQUIV. UNIFORM TL = 0 PLF

EQUIV. UNIFORM LL = 0 PLF

REACTIONS

LIGHT SIDE (TL) = 5546 LBS

(LL) = 3263 LBS

(DL) = 2284 LBS

HEAVY SIDE (TL) = 5546 LBS

(LL) = 3263 LBS

(DL) = 2284 LBS

Rrt/wTL = 7.3 FT

x' = 7.3 FT

MAXIMUM MOMENT

M_{MAX} = 20,105 FT-LBS

δ CRITERIA:

L δ_{MAX}: L/ 360

L δ_{MAX}: L/ 480

BEAM SUPPORT

LIGHT SIDE: NA POST

HEIGHT (FT): 8

SPOT FOOTING: NR

HEAVY SIDE: 4X4X1/4 HSS COL.

HEIGHT (FT): 8

SPOT FOOTING: NR

MAX SUPPORT LOAD

63810 LBS

STRUCTURAL COMPOSITE LUMBER

TYPE: LVL (1.9E)

DEPTH (d)est. = 11 7/8 IN.

WIDTH (b)est. = 1 3/4 IN.

OF MEMBERS = 4

Fb = 2,600 PSI

Fv = 285 PSI

E = 1.90E+06 PSI

CF = 1.00

A = 83.13 IN(2)

S = 164.52 IN(3)

I = 976.83 IN(4)

δ_{MAX} @ 7.3 FT. (FROM LIGHT SIDE)

TL δ_{MAX} = 0.41 IN. L/ 424

LL δ_{MAX} = 0.24 IN. L/ 722

$A_{REQ.}$ = 25.21 IN(2)

$S_{REQ.}$ = 92.79 IN(3)

I_{REQ}(TL) = 552.36 IN(4)

I_{REQ}(LL) = 487.38 IN(4)

$BRG_{REQ.}$ = 3 IN.

-20 **USE** **(4) 1-3/4" X 11-7/8" LVL(S)** **RE**

SAFETY FACTOR = 1.77

BEAM WITH MULTIPLE POINT LOADS

LOCATION: DECK -- SEE STRUCALC

FB - 19

-19 **USE** W12X190

BEAM WITH MULTIPLE POINT LOADS

LOCATION: DECK -- SEE STRUCALC

FB - 18

-18 **USE** W10X88

BEAM WITH MULTIPLE POINT LOADS

LOCATION: DECK -- SEE STRUCALC

FB - 17

-17 **USE** (2) 1-3/4" X 11-7/8" LVL(S)

BEAM WITH MULTIPLE POINT LOADS

LOCATION: MSTR SUITE -- SEE STRUCALC

FB - 16

-16 **USE** W10X39

Project: 17-244 HOLLIS CALCS

Location: FB19
Multi-Loaded Multi-Span Beam
[2015 International Building Code(AISC 14th Ed ASD)
A992-50 W12x190 x 30.0 FT
Section Adequate By: 22.7%
Controlling Factor: Deflection

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DEFLECTIONS	Center	
Live Load	0.81	IN L/442
Dead Load	0.21	in
Total Load	1.02	IN L/352

Live Load Deflection Criteria: L/360 Total Load Deflection Criteria: L/240

REACTIONS	A		B	
Live Load	21575	lb	24658	lb
Dead Load	6694	lb	7244	lb
Total Load	28269	lb	31902	lb
Bearing Length	2.33	in	2.33	in

BEAM DATA	Center	
Span Length	30	ft
Unbraced Length-Top	0	ft
Unbraced Length-Bottom	30	ft

STEEL PROPERTIES
W12x190 - A992-50

Properties:

Yield Stress:	Fy =	50	ksi
Modulus of Elasticity:	E =	29000	ksi
Depth:	d =	14.4	in
Web Thickness:	tw =	1.06	in
Flange Width:	bf =	12.7	in
Flange Thickness:	tf =	1.74	in
Distance to Web Toe of Fillet:	k =	2.33	in
Moment of Inertia About X-X Axis:	Ix =	1890	in4
Section Modulus About X-X Axis:	Sx =	263	in3
Plastic Section Modulus About X-X Axis:	Zx =	311	in3

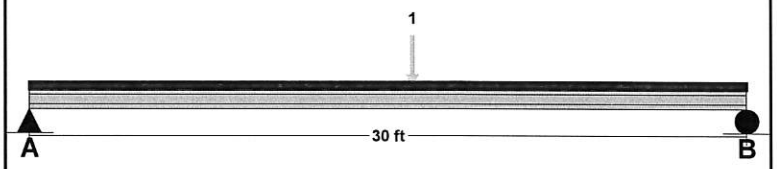
Design Properties per AISC 14th Edition Steel Manual:

Flange Buckling Ratio:	FBR =	3.65	
Allowable Flange Buckling Ratio:	AFBR =	9.15	
Web Buckling Ratio:	WBR =	9.19	
Allowable Web Buckling Ratio:	AWBR =	90.55	
Controlling Unbraced Length:	Lb =	0	ft
Limiting Unbraced Length - for lateral-torsional buckling:	Lp =	11.48	ft
Nominal Flexural Strength w/ safety factor:	Mn =	775948	ft-lb
Controlling Equation:	F2-1		
Web height to thickness ratio:	h/tw =	9.19	
Limiting height to thickness ratio for eqn. G2-2:	h/tw-limit =	53.95	
Cv Factor:	Cv =	1	
Controlling Equation:	G2-2		
Nominal Shear Strength w/ safety factor:	Vn =	305280	lb

Controlling Moment: 425473 ft-lb
15.9 Ft from left support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s) 2
Controlling Shear: -31901 lb
At right support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s

Comparisons with required sections:	Req'd	Provided
Moment of Inertia (deflection):	1540.15 in4	1890 in4
Moment:	425473 ft-lb	775948 ft-lb
Shear:	-31901 lb	305280 lb

LOADING DIAGRAM



UNIFORM LOADS	Center	
Uniform Live Load	0	plf
Uniform Dead Load	0	plf
Beam Self Weight	190	plf
Total Uniform Load	190	plf

POINT LOADS - CENTER SPAN

Load Number	One *
Live Load	46233 lb
Dead Load	8238 lb
Location	16 ft

* Load obtained from Load Tracker. See Summary Report for details.

Project: 17-244 HOLLIS CALCS

Location: FB18
Multi-Loaded Multi-Span Beam
[2015 International Building Code(AISC 14th Ed ASD)]
A992-50 W10x88 x 17.5 FT (3 + 14.5)
Section Adequate By: 4.6%
Controlling Factor: Deflection

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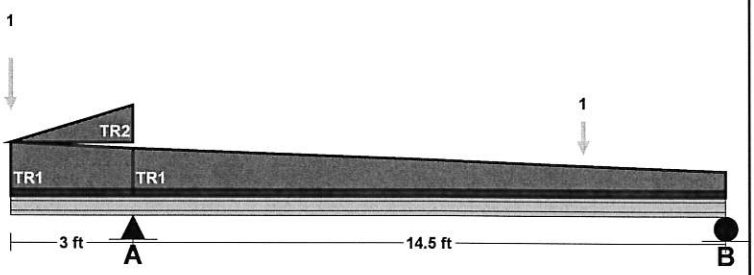
DEFLECTIONS	Left		Center	
Live Load	0.19	IN 2L/376	-0.15	IN L/1180
Dead Load	0.01	in	0.01	in
Total Load	0.20	IN 2L/358	-0.14	IN L/1212

Live Load Deflection Criteria: L/360 Total Load Deflection Criteria: L/240

REACTIONS	A		B	
Live Load	46233	lb	15412	lb
Dead Load	8238	lb	2436	lb
Total Load	54471	lb	17848	lb
Uplift (1.5 F.S)	0	**lb**	**-5136**	**lb**
Bearing Length	1.49	in	1.49	in

BEAM DATA	Left		Center	
Span Length	3	ft	14.5	ft
Unbraced Length-Top	0	ft	0	ft
Unbraced Length-Bottom	3	ft	14.5	ft

LOADING DIAGRAM



STEEL PROPERTIES
W10x88 - A992-50

UNIFORM LOADS	Left		Center	
Uniform Live Load	0	plf	0	plf
Uniform Dead Load	0	plf	0	plf
Beam Self Weight	88	plf	88	plf
Total Uniform Load	88	plf	88	plf

Properties:

Yield Stress:	Fy =	50	ksi
Modulus of Elasticity:	E =	29000	ksi
Depth:	d =	10.8	in
Web Thickness:	tw =	0.61	in
Flange Width:	bf =	10.3	in
Flange Thickness:	tf =	0.99	in
Distance to Web Toe of Fillet:	k =	1.49	in
Moment of Inertia About X-X Axis:	Ix =	534	in4
Section Modulus About X-X Axis:	Sx =	98.5	in3
Plastic Section Modulus About X-X Axis:	Zx =	113	in3
Design Properties per AISC 14th Edition Steel Manual:			
Flange Buckling Ratio:	FBR =	5.2	
Allowable Flange Buckling Ratio:	AFBR =	9.15	
Web Buckling Ratio:	WBR =	12.93	
Allowable Web Buckling Ratio:	AWBR =	90.55	
Controlling Unbraced Length:	Lb =	14.5	ft
Limiting Unbraced Length -			
for lateral-torsional buckling:	Lp =	9.29	ft
for Eqn. F2-2:	Lr =	51.13	ft
Nominal Flexural Strength w/ safety factor:	Mn =	268251	ft-lb
Controlling Equation:	F2-2		
Web height to thickness ratio:	h/tw =	12.93	
Limiting height to thickness ratio for eqn. G2-2:	h/tw-limit =	53.95	
Cv Factor:	Cv =	1	
Controlling Equation:	G2-2		
Nominal Shear Strength w/ safety factor:	Vn =	130680	lb

POINT LOADS - LEFT SPAN	
Load Number	One *
Live Load	32092 lb
Dead Load	4013 lb
Location	0 ft
CENTER SPAN	
Load Number	One *
Live Load	18850 lb
Dead Load	2719 lb
Location	11 ft

* Load obtained from Load Tracker. See Summary Report for details.

TRAPEZOIDAL LOADS - LEFT SPAN		
Load Number	One	Two
Left Live Load	320 plf	0 plf
Left Dead Load	192 plf	0 plf
Right Live Load	280 plf	240 plf
Right Dead Load	168 plf	168 plf
Load Start	0 ft	0 ft
Load End	3 ft	3 ft
Load Length	3 ft	3 ft
CENTER SPAN		
Load Number	One	
Left Live Load	280 plf	
Left Dead Load	168 plf	
Right Live Load	90 plf	
Right Dead Load	54 plf	
Load Start	0 ft	
Load End	14.5 ft	
Load Length	14.5 ft	

Controlling Moment: -111531 ft-lb
Over left support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s) 1, 2
Controlling Shear: -38421 lb
At right support of span 1 (Left Span)
Created by combining all dead loads and live loads on span(s

Comparisons with required sections:	Req'd	Provided
Moment of Inertia (deflection):	510.59 in4	534 in4
Moment:	-111531 ft-lb	268251 ft-lb
Shear:	-38421 lb	130680 lb

Project: 17-244 HOLLIS CALCS

Location: FB17 - CHECK
Multi-Loaded Multi-Span Beam
[2015 International Building Code(2012 NDS)]
(2) 1.75 IN x 11.875 IN x 15.0 FT
1.9E Microllam - iLevel Trus Joist
Section Adequate By: 14.3%
Controlling Factor: Deflection

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CAUTIONS
* Laminations are to be fully connected to provide uniform transfer of loads to all members

DEFLECTIONS	Center	
Live Load	0.44	IN L/411
Dead Load	0.02	in
Total Load	0.45	IN L/397

Live Load Deflection Criteria: L/360 Total Load Deflection Criteria: L/240

REACTIONS	A	B
Live Load	1618 lb	3121 lb
Dead Load	97 lb	97 lb
Total Load	1715 lb	3218 lb
Bearing Length	0.65 in	1.23 in

BEAM DATA	Center
Span Length	15 ft
Unbraced Length-Top	0 ft
Unbraced Length-Bottom	15 ft
Live Load Duration Factor	1.00
Notch Depth	0.00

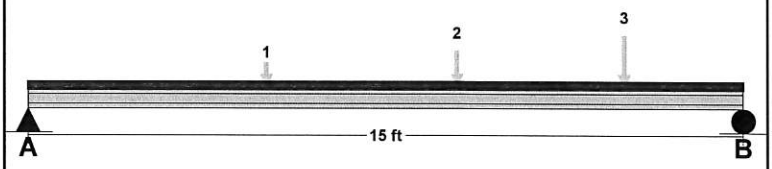
MATERIAL PROPERTIES
1.9E Microllam - iLevel Trus Joist

	Base Values	Adjusted
Bending Stress:	Fb = 2600 psi	Fb' = 2604 psi
	Cd=1.00 CF=1.00	
Shear Stress:	Fv = 285 psi	Fv' = 285 psi
	Cd=1.00	
Modulus of Elasticity:	E = 1900 ksi	E' = 1900 ksi
Comp. ⊥ to Grain:	Fc - ⊥ = 750 psi	Fc - ⊥' = 750 psi

Controlling Moment: 11116 ft-lb
9.0 Ft from left support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s) 2
Controlling Shear: -3218 lb
At right support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s) 2

Comparisons with required sections:	Req'd	Provided
Section Modulus:	51.23 in3	82.26 in3
Area (Shear):	16.94 in2	41.56 in2
Moment of Inertia (deflection):	427.47 in4	488.41 in4
Moment:	11116 ft-lb	17848 ft-lb
Shear:	-3218 lb	7897 lb

LOADING DIAGRAM



UNIFORM LOADS	Center
Uniform Live Load	0 plf
Uniform Dead Load	0 plf
Beam Self Weight	13 plf
Total Uniform Load	13 plf

POINT LOADS - CENTER SPAN

Load Number	One	Two	Three
Live Load	948 lb	1516.2 lb	2274.3 lb
Dead Load	0 lb	0 lb	0 lb
Location	5 ft	9 ft	12.5 ft

Project: 17-244 HOLLIS CALCS

Location: FB17 - CHECK 2
Multi-Loaded Multi-Span Beam
[2015 International Building Code(2012 NDS)]
(2) 1.75 IN x 11.875 IN x 13.5 FT
1.9E Microllam - iLevel Trus Joist
Section Adequate By: 83.7%
Controlling Factor: Deflection

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CAUTIONS
* Laminations are to be fully connected to provide uniform transfer of loads to all members

DEFLECTIONS	Center	
Live Load	0.25	IN L/661
Dead Load	0.05	in
Total Load	0.30	IN L/544

Live Load Deflection Criteria: L/360 Total Load Deflection Criteria: L/240

REACTIONS	A		B	
Live Load	2734	lb	1367	lb
Dead Load	560	lb	324	lb
Total Load	3294	lb	1691	lb
Bearing Length	1.25	in	0.64	in

BEAM DATA	Center	
Span Length	13.5	ft
Unbraced Length-Top	0	ft
Unbraced Length-Bottom	13.5	ft
Live Load Duration Factor	1.00	
Notch Depth	0.00	

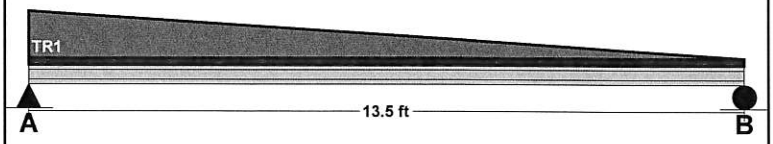
MATERIAL PROPERTIES
1.9E Microllam - iLevel Trus Joist

	Base Values		Adjusted	
Bending Stress:	Fb = 2600	psi	Fb' = 2604	psi
	Cd=1.00 CF=1.00			
Shear Stress:	Fv = 285	psi	Fv' = 285	psi
	Cd=1.00			
Modulus of Elasticity:	E = 1900	ksi	E' = 1900	ksi
Comp. ⊥ to Grain:	Fc - ⊥ = 750	psi	Fc - ⊥' = 750	psi

Controlling Moment: 8618 ft-lb
5.81 Ft from left support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s) 2
Controlling Shear: 3294 lb
At left support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s) 2

Comparisons with required sections:	Req'd	Provided
Section Modulus:	39.72 in3	82.26 in3
Area (Shear):	17.34 in2	41.56 in2
Moment of Inertia (deflection):	265.94 in4	488.41 in4
Moment:	8618 ft-lb	17848 ft-lb
Shear:	3294 lb	7897 lb

LOADING DIAGRAM



UNIFORM LOADS	Center	
Uniform Live Load	0	plf
Uniform Dead Load	0	plf
Beam Self Weight	13	plf
Total Uniform Load	13	plf

TRAPEZOIDAL LOADS - CENTER SPAN

Load Number	One	
Left Live Load	607.5	plf
Left Dead Load	105	plf
Right Live Load	0	plf
Right Dead Load	0	plf
Load Start	0	ft
Load End	13.5	ft
Load Length	13.5	ft

Project: 17-244 HOLLIS CALCS

Location: FB-16
Multi-Loaded Multi-Span Beam
[2015 International Building Code(AISC 14th Ed ASD)]
A992-50 W10x39 x 16.0 FT
Section Adequate By: 28.0%
Controlling Factor: Deflection

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DEFLECTIONS	Center	
Live Load	0.31	IN L/614
Dead Load	0.04	in
Total Load	0.35	IN L/544

Live Load Deflection Criteria: L/480 Total Load Deflection Criteria: L/360

REACTIONS	A		B	
Live Load	14314	lb	14314	lb
Dead Load	1664	lb	1664	lb
Total Load	15978	lb	15978	lb
Bearing Length	1.03	in	1.03	in

BEAM DATA	Center	
Span Length	16	ft
Unbraced Length-Top	0	ft
Unbraced Length-Bottom	16	ft

STEEL PROPERTIES
W10x39 - A992-50

Properties:

Yield Stress:	Fy =	50	ksi
Modulus of Elasticity:	E =	29000	ksi
Depth:	d =	9.92	in
Web Thickness:	tw =	0.32	in
Flange Width:	bf =	7.99	in
Flange Thickness:	tf =	0.53	in
Distance to Web Toe of Fillet:	k =	1.03	in
Moment of Inertia About X-X Axis:	Ix =	209	in4
Section Modulus About X-X Axis:	Sx =	42.1	in3
Plastic Section Modulus About X-X Axis:	Zx =	46.8	in3

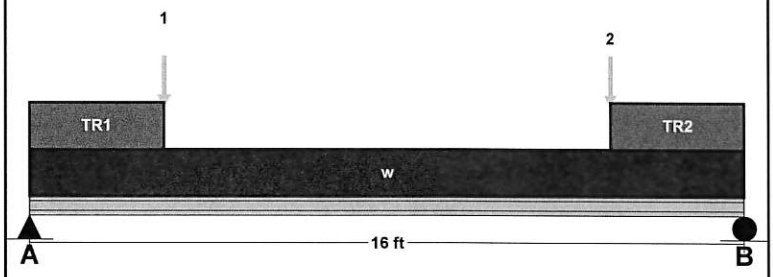
Design Properties per AISC 14th Edition Steel Manual:

Flange Buckling Ratio:	FBR =	7.54	
Allowable Flange Buckling Ratio:	AFBR =	9.15	
Web Buckling Ratio:	WBR =	24.95	
Allowable Web Buckling Ratio:	AWBR =	90.55	
Controlling Unbraced Length:	Lb =	0	ft
Limiting Unbraced Length - for lateral-torsional buckling:	Lp =	6.99	ft
Nominal Flexural Strength w/ safety factor:	Mn =	116767	ft-lb
Controlling Equation:	F2-1		
Web height to thickness ratio:	h/tw =	24.95	
Limiting height to thickness ratio for eqn. G2-2:	h/tw-limit =	53.95	
Cv Factor:	Cv =	1	
Controlling Equation:	G2-2		
Nominal Shear Strength w/ safety factor:	Vn =	62496	lb

Controlling Moment: 40807 ft-lb
8.0 Ft from left support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s) 2
Controlling Shear: 15978 lb
At left support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s

Comparisons with required sections:	Req'd	Provided
Moment of Inertia (deflection):	163.27 in4	209 in4
Moment:	40807 ft-lb	116767 ft-lb
Shear:	15978 lb	62496 lb

LOADING DIAGRAM



UNIFORM LOADS	Center	
Uniform Live Load	40	plf
Uniform Dead Load	24	plf
Beam Self Weight	39	plf
Total Uniform Load	103	plf

POINT LOADS - CENTER SPAN		
Load Number	One	Two
Live Load	9107 lb	9107 lb
Dead Load	755 lb	755 lb
Location	3 ft	13 ft

TRAPEZOIDAL LOADS - CENTER SPAN		
Load Number	One	Two
Left Live Load	1629 plf	1629 plf
Left Dead Load	135 plf	135 plf
Right Live Load	1629 plf	1629 plf
Right Dead Load	135 plf	135 plf
Load Start	0 ft	13 ft
Load End	3 ft	16 ft
Load Length	3 ft	3 ft

SIMPLE SPAN BEAM

LOCATION: GARAGE HDR

FB - 15

DURATION INCREASE = 1.00

BEAM SPAN (FT) = 18.5

VENEER (Y/N): NO

TRIBUTARY LOADING

	SPAN (FT)	CANT. (FT)	W_{TL} (PLF)	W_{LL} (PLF)
ROOF	0.0	0.0	0	0
FLOOR	11.0	0.0	352	220
FLOOR	0.0	0.0	0	0
DECK	0.0	0.0	0	0
OTHER	0.0	0.0	0	0
		TOTAL	**352**	**220**

DESIGN LOADS

FLAT ROOF SNOW LOAD	TL	185	PSF
	LL	170	PSF
FLOOR LOAD	TL	64	PSF
	LL	40	PSF
DECK LOAD	TL	285	PSF
	LL	243	PSF
OTHER LOAD	TL	125	PSF
	LL	50	PSF

POINT LOAD

FROM RB

TL = 0 LBS

LL = 0 LBS

LOCATION (a) = 9.3 FT

b = L-a = 9.3 FT (a > b)

EQUIV. UNIFORM TL = 0 PLF

EQUIV. UNIFORM LL = 0 PLF

REACTIONS

LIGHT SIDE (TL) = 3256 LBS

(LL) = 2035 LBS

(DL) = 1221 LBS

HEAVY SIDE (TL) = 3256 LBS

(LL) = 2035 LBS

(DL) = 1221 LBS

Rrt/wTL = 9.3 FT

x' = 9.3 FT

MAXIMUM MOMENT

M_{MAX} = 15,059 FT-LBS

δ CRITERIA:

L δ_{MAX}: L/ 360

L δ_{MAX}: L/ 480

BEAM SUPPORT

LIGHT SIDE: 3 2X6 STUDS

HEIGHT (FT): 10

SPOT FOOTING: N

HEAVY SIDE: 3 2X6 STUDS

HEIGHT (FT): 10

SPOT FOOTING: N

MAX SUPPORT LOAD

7860 LBS

7860 LBS

STEEL BEAM

DEPTH = 10.10 IN.

WIDTH = 4.01 IN.

Fb = 33,000 PSI

Fv = 20,000 PSI

E = 2.90E+07 PSI

A = 4.99 IN(2)

S = 16.20 IN(3)

I = 81.90 IN(4)

δ_{MAX} @ 9.3 FT. (FROM LIGHT SIDE)

TL δ_{MAX} = 0.39 IN. L 568

LL δ_{MAX} = 0.24 IN. L 909

$A_{REQ.}$ = 0.24 IN(2)

$S_{REQ.}$ = 5.48 IN(3)

I_{REQ}(TL) = 34.58 IN(4)

I_{REQ}(LL) = 32.42 IN(4)

-15 USE **W10X17**

SAFETY FACTOR = 2.37

BEAM WITH MULTIPLE POINT LOADS

LOCATION: GARAGE -- SEE STRUCALC

FB - 14

-14 USE **W12X136**

Project: 17-244 HOLLIS CALCS

Location: FB-14
Multi-Loaded Multi-Span Beam
[2015 International Building Code(AISC 14th Ed ASD)]
A992-50 W12x136 x 22.0 FT
Section Adequate By: 18.7%
Controlling Factor: Deflection

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DEFLECTIONS	Center	
Live Load	0.46	IN L/570
Dead Load	0.09	in
Total Load	0.55	IN L/478

Live Load Deflection Criteria: L/480 Total Load Deflection Criteria: L/360

REACTIONS	A		B	
Live Load	18942	lb	31558	lb
Dead Load	4416	lb	6523	lb
Total Load	23358	lb	38081	lb
Bearing Length	1.85	in	1.85	in

BEAM DATA	Center	
Span Length	22	ft
Unbraced Length-Top	0	ft
Unbraced Length-Bottom	22	ft

STEEL PROPERTIES
W12x136 - A992-50

Properties:

Yield Stress:	Fy =	50	ksi
Modulus of Elasticity:	E =	29000	ksi
Depth:	d =	13.4	in
Web Thickness:	tw =	0.79	in
Flange Width:	bf =	12.4	in
Flange Thickness:	tf =	1.25	in
Distance to Web Toe of Fillet:	k =	1.85	in
Moment of Inertia About X-X Axis:	Ix =	1240	in4
Section Modulus About X-X Axis:	Sx =	186	in3
Plastic Section Modulus About X-X Axis:	Zx =	214	in3

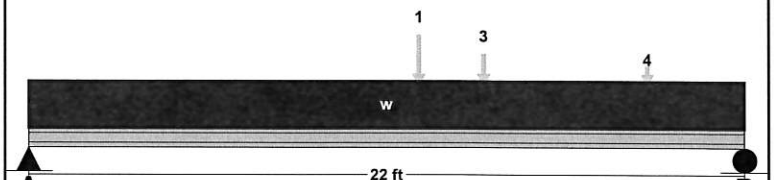
Design Properties per AISC 14th Edition Steel Manual:

Flange Buckling Ratio:	FBR =	4.96	
Allowable Flange Buckling Ratio:	AFBR =	9.15	
Web Buckling Ratio:	WBR =	12.28	
Allowable Web Buckling Ratio:	AWBR =	90.55	
Controlling Unbraced Length:	Lb =	0	ft
Limiting Unbraced Length - for lateral-torsional buckling:	Lp =	11.16	ft
Nominal Flexural Strength w/ safety factor:	Mn =	533932	ft-lb
Controlling Equation:	F2-1		
Web height to thickness ratio:	h/tw =	12.28	
Limiting height to thickness ratio for eqn. G2-2:	h/tw-limit =	53.95	
Cv Factor:	Cv =	1	
Controlling Equation:	G2-2		
Nominal Shear Strength w/ safety factor:	Vn =	211720	lb

Controlling Moment: 265036 ft-lb
12.1 Ft from left support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s) 2
Controlling Shear: -38081 lb
At right support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s

Comparisons with required sections:	Req'd	Provided
Moment of Inertia (deflection):	1044.68 in4	1240 in4
Moment:	265036 ft-lb	533932 ft-lb
Shear:	-38081 lb	211720 lb

LOADING DIAGRAM



UNIFORM LOADS	Center	
Uniform Live Load	40	plf
Uniform Dead Load	24	plf
Beam Self Weight	136	plf
Total Uniform Load	200	plf

POINT LOADS - CENTER SPAN

Load Number	One	Three	Four
Live Load	25415 lb	16055 lb	8150 lb
Dead Load	4157 lb	1417 lb	1845 lb
Location	12 ft	14 ft	19 ft

SIMPLE SPAN BEAM

LOCATION: GARAGE

FB - 13

DURATION INCREASE = 1.00

BEAM SPAN (FT) = 10.0

VENEER (Y/N): NO

TRIBUTARY LOADING

	SPAN (FT)	CANT. (FT)	W_{TL} (PLF)	W_{LL} (PLF)
ROOF	14.0	0.0	1295	1190
FLOOR	22.0	0.0	704	440
FLOOR	0.0	0.0	0	0
DECK	0.0	0.0	0	0
OTHER	0.0	0.0	0	0
		TOTAL	**1999**	**1630**

DESIGN LOADS

FLAT ROOF SNOW LOAD	TL	185	PSF
	LL	170	PSF
FLOOR LOAD	TL	64	PSF
	LL	40	PSF
DECK LOAD	TL	102	PSF
	LL	60	PSF
OTHER LOAD	TL	125	PSF
	LL	50	PSF

POINT LOAD

FROM RB

TL = 0 LBS

LL = 0 LBS

LOCATION (a) = 5.0 FT

b = L-a = 5.0 FT (a > b)

EQUIV. UNIFORM TL = 0 PLF

EQUIV. UNIFORM LL = 0 PLF

REACTIONS

LIGHT SIDE (TL) = 9995 LBS

(LL) = 8150 LBS

(DL) = 1845 LBS

HEAVY SIDE (TL) = 9995 LBS

(LL) = 8150 LBS

(DL) = 1845 LBS

Rrt/wTL = 5.0 FT

x' = 5.0 FT

MAXIMUM MOMENT

M_{MAX} = 24,988 FT-LBS

δ CRITERIA:

L δ_{MAX}: L/ 360

L δ_{MAX}: L/ 480

BEAM SUPPORT

LIGHT SIDE: NA POST

HEIGHT (FT): 8

SPOT FOOTING: NR

HEAVY SIDE: NA POST

HEIGHT (FT): 8

SPOT FOOTING: NR

MAX SUPPORT LOAD

STRUCTURAL COMPOSITE LUMBER

TYPE: LVL (1.9E)

DEPTH (d)est. = 11 7/8 IN.

WIDTH (b)est. = 1 3/4 IN.

OF MEMBERS = 4

Fb = 2,600 PSI

Fv = 285 PSI

E = 1.90E+06 PSI

CF = 1.00

A = 83.13 IN(2)

S = 164.52 IN(3)

I = 976.83 IN(4)

δ_{MAX} @ 5.0 FT. (FROM LIGHT SIDE)

TL δ_{MAX} = 0.24 IN. L/ 495

LL δ_{MAX} = 0.20 IN. L/ 607

$A_{REQ.}$ = 42.19 IN(2)

$S_{REQ.}$ = 115.33 IN(3)

I_{REQ}(TL) = 473.45 IN(4)

I_{REQ}(LL) = 579.08 IN(4)

$BRG_{REQ.}$ = 3 IN.

-13 USE **(4) 1-3/4" X 11-7/8" LVL(S)**

SAFETY FACTOR = 1.43

SIMPLE SPAN BEAM

LOCATION: GARAGE

FB - 12

DURATION INCREASE = 1.00

BEAM SPAN (FT) = 17.0

VENEER (Y/N): NO

TRIBUTARY LOADING

	SPAN (FT)	CANT. (FT)	W_{TL} (PLF)	W_{LL} (PLF)
ROOF	30.0	0.0	2775	2550
FLOOR	22.0	0.0	704	440
FLOOR	0.0	0.0	0	0
DECK	0.0	0.0	0	0
OTHER	0.0	0.0	0	0
		TOTAL	**3479**	**2990**

DESIGN LOADS

FLAT ROOF SNOW LOAD	TL	185	PSF
	LL	170	PSF
FLOOR LOAD	TL	64	PSF
	LL	40	PSF
DECK LOAD	TL	102	PSF
	LL	60	PSF
OTHER LOAD	TL	125	PSF
	LL	50	PSF

POINT LOAD

FROM RB

TL = 0 LBS

LL = 0 LBS

LOCATION (a) = 8.5 FT

b = L-a = 8.5 FT (a > b)

EQUIV. UNIFORM TL = 0 PLF

EQUIV. UNIFORM LL = 0 PLF

REACTIONS

LIGHT SIDE (TL) = 29572 LBS

(LL) = 25415 LBS

(DL) = 4157 LBS

HEAVY SIDE (TL) = 29572 LBS

(LL) = 25415 LBS

(DL) = 4157 LBS

Rrt/wTL = 8.5 FT

x' = 8.5 FT

MAXIMUM MOMENT

M_{MAX} = 125,679 FT-LBS

δ CRITERIA:

L δ_{MAX}: L/ 360

L δ_{MAX}: L/ 480

BEAM SUPPORT

LIGHT SIDE: NA POST

HEIGHT (FT): 10

SPOT FOOTING: Y 3.45 FT. SQR

HEAVY SIDE: NA POST

HEIGHT (FT): 10

SPOT FOOTING: Y 3.45 FT. SQR

MAX SUPPORT LOAD

STEEL BEAM

DEPTH = 10.80 IN.

WIDTH = 10.30 IN.

Fb = 33,000 PSI

Fv = 20,000 PSI

E = 2.90E+07 PSI

A = 25.90 IN(2)

S = 98.50 IN(3)

I = 534.00 IN(4)

δ_{MAX} @ 8.5 FT. (FROM LIGHT SIDE)

TL δ_{MAX} = 0.42 IN. L 483

LL δ_{MAX} = 0.36 IN. L 562

$A_{REQ.}$ = 2.22 IN(2)

$S_{REQ.}$ = 45.70 IN(3)

I_{REQ}(TL) = 265.23 IN(4)

I_{REQ}(LL) = 341.92 IN(4)

-12 **USE** W10X88

SAFETY FACTOR = 1.56

BEAM WITH MULTIPLE POINT LOADS

LOCATION: DECK -- SEE STRUCALC

FB - 11

-11 **USE** W12X136

Project: 17-244 HOLLIS CALCS

Location: FB11
Multi-Loaded Multi-Span Beam
[2015 International Building Code(AISC 14th Ed ASD)]
A992-50 W12x136 x 19.0 FT (5 + 14)
Section Adequate By: 20.4%
Controlling Factor: Deflection

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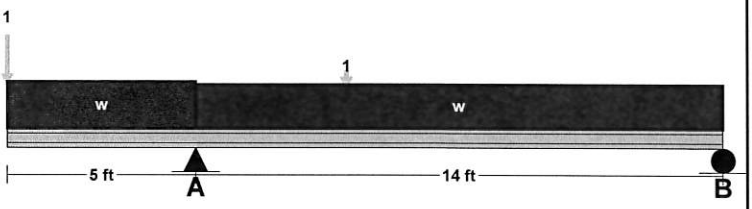
DEFLECTIONS	Left		Center	
Live Load	0.28	IN 2L/434	-0.11	IN L/1516
Dead Load	0.06	in	-0.02	in
Total Load	0.34	IN 2L/352	-0.13	IN L/1305

Live Load Deflection Criteria: L/360 Total Load Deflection Criteria: L/240

REACTIONS	A		B	
Live Load	73349	lb	14748	lb
Dead Load	20890	lb	-206	lb
Total Load	94239	lb	14542	lb
Uplift (1.5 F.S)	0	**lb**	**-13308**	**lb**
Bearing Length	1.85	in	1.85	in

BEAM DATA	Left		Center	
Span Length	5	ft	14	ft
Unbraced Length-Top	0	ft	0	ft
Unbraced Length-Bottom	5	ft	14	ft

LOADING DIAGRAM



UNIFORM LOADS	Left		Center	
Uniform Live Load	1820	plf	1701	plf
Uniform Dead Load	294	plf	294	plf
Beam Self Weight	136	plf	136	plf
Total Uniform Load	2250	plf	2131	plf

POINT LOADS - LEFT SPAN

Load Number	One *	Two *
Live Load	5855 lb	26282 lb
Dead Load	657 lb	9310 lb
Location	0 ft	0 ft

CENTER SPAN

Load Number	One
Live Load	9943 lb
Dead Load	2547 lb
Location	4 ft

* Load obtained from Load Tracker. See Summary Report for details.

STEEL PROPERTIES
W12x136 - A992-50

Properties:

Yield Stress:	Fy =	50	ksi
Modulus of Elasticity:	E =	29000	ksi
Depth:	d =	13.4	in
Web Thickness:	tw =	0.79	in
Flange Width:	bf =	12.4	in
Flange Thickness:	tf =	1.25	in
Distance to Web Toe of Fillet:	k =	1.85	in
Moment of Inertia About X-X Axis:	Ix =	1240	in4
Section Modulus About X-X Axis:	Sx =	186	in3
Plastic Section Modulus About X-X Axis:	Zx =	214	in3
Design Properties per AISC 14th Edition Steel Manual:			
Flange Buckling Ratio:	FBR =	4.96	
Allowable Flange Buckling Ratio:	AFBR =	9.15	
Web Buckling Ratio:	WBR =	12.28	
Allowable Web Buckling Ratio:	AWBR =	90.55	
Controlling Unbraced Length:	Lb =	14	ft
Limiting Unbraced Length -			
for lateral-torsional buckling:	Lp =	11.16	ft
for Eqn. F2-2:	Lr =	63.17	ft
Nominal Flexural Strength w/ safety factor:	Mn =	522521	ft-lb
Controlling Equation:	F2-2		
Web height to thickness ratio:	h/tw =	12.28	
Limiting height to thickness ratio for eqn. G2-2:	h/tw-limit =	53.95	
Cv Factor:	Cv =	1	
Controlling Equation:	G2-2		
Nominal Shear Strength w/ safety factor:	Vn =	211720	lb

Controlling Moment: -238645 ft-lb
Over left support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s) 1, 2
Controlling Shear: -53354 lb
At right support of span 1 (Left Span)
Created by combining all dead loads and live loads on span(s

Comparisons with required sections:	Req'd	Provided
Moment of Inertia (deflection):	1029.87 in4	1240 in4
Moment:	-238645 ft-lb	522521 ft-lb
Shear:	-53354 lb	211720 lb

BEAM WITH POINT LOAD

LOCATION: BEDROOM 1

FB - 10

DURATION INCREASE = 1.00

BEAM SPAN (FT) = 13.0

VENEER (Y/N): NO

TRIBUTARY LOADING

	SPAN (FT)	CANT. (FT)	W_{TL} (PLF)	W_{LL} (PLF)
ROOF	0.0	0.0	0	0
FLOOR	0.0	0.0	0	0
FLOOR	0.0	0.0	0	0
DECK	14.0	0.0	714	420
OTHER	0.0	0.0	0	0
		TOTAL	**714**	**420**

DESIGN LOADS

FLAT ROOF SNOW LOAD	TL	185	PSF
	LL	170	PSF
FLOOR LOAD	TL	64	PSF
	LL	40	PSF
DECK LOAD	TL	102	PSF
	LL	60	PSF
OTHER LOAD	TL	125	PSF
	LL	50	PSF

POINT LOAD

FROM B10, 14, FB4

TL = 34013 LBS

LL = 31255 LBS

LOCATION (a) = 10.0 FT

b = L-a = 3.0 FT (a > b)

EQUIV. UNIFORM TL = 3716 PLF

EQUIV. UNIFORM LL = 3414 PLF

REACTIONS

LIGHT SIDE (TL) = 12490 LBS

(LL) = 9943 LBS

(DL) = 2547 LBS

HEAVY SIDE (TL) = 30805 LBS

(LL) = 26772 LBS

(DL) = 4032 LBS

Rrt/wTL = 17.5 FT

x' = 10.0 FT

MAXIMUM MOMENT

M_{MAX} = 89,202 FT-LBS

δ CRITERIA:

L δ_{MAX}: L/ 360

L δ_{MAX}: L/ 480

BEAM SUPPORT

LIGHT SIDE: 6X6 POST

HEIGHT (FT): 10

SPOT FOOTING: Y 2.25 FT. SQR

HEAVY SIDE: 4X4X1/4 HSS COL

HEIGHT (FT): 10

SPOT FOOTING: Y 3.52 FT. SQR

MAX SUPPORT LOAD

18760 LBS

54840 LBS

STEEL BEAM - W/POINT LOAD

DEPTH = 10.10 IN.

WIDTH = 8.02 IN.

Fb = 33,000 PSI

Fv = 20,000 PSI

E = 2.90E+07 PSI

A = 13.30 IN(2)

S = 49.10 IN(3)

I = 248.00 IN(4)

δ_{MAX} @ 7.1 FT. (FROM LIGHT SIDE)

TL δ_{MAX} = 0.08 IN. L 1915

LL δ_{MAX} = 0.04 IN. L 3535

$A_{REQ.}$ = 2.31 IN(2)

$S_{REQ.}$ = 32.44 IN(3)

I_{REQ}(TL) = 117.76 IN(4)

I_{REQ}(LL) = 150.24 IN(4)

-10 **USE** **W10X45**

SAFETY FACTOR = 1.51

SIMPLE SPAN BEAM

LOCATION: BEDROOM 2

FB - 9

DURATION INCREASE = 1.00

BEAM SPAN (FT) = 10.0

VENEER (Y/N): NO

TRIBUTARY LOADING

	SPAN (FT)	CANT. (FT)	W_{TL} (PLF)	W_{LL} (PLF)
ROOF	0.0	0.0	0	0
FLOOR	14.0	0.0	448	280
FLOOR	0.0	0.0	0	0
DECK	4.0	0.0	204	120
OTHER	0.0	0.0	0	0
		TOTAL	**652**	**400**

DESIGN LOADS

FLAT ROOF SNOW LOAD	TL	185	PSF
	LL	170	PSF
FLOOR LOAD	TL	64	PSF
	LL	40	PSF
DECK LOAD	TL	102	PSF
	LL	60	PSF
OTHER LOAD	TL	125	PSF
	LL	50	PSF

POINT LOAD

FROM

TL = 0 LBS

LL = 0 LBS

LOCATION (a) = 5.0 FT

b = L-a = 5.0 FT (a > b)

EQUIV. UNIFORM TL = 0 PLF

EQUIV. UNIFORM LL = 0 PLF

REACTIONS

LIGHT SIDE (TL) = 3260 LBS

(LL) = 2000 LBS

(DL) = 1260 LBS

HEAVY SIDE (TL) = 3260 LBS

(LL) = 2000 LBS

(DL) = 1260 LBS

Rrt/wTL = 5.0 FT

x' = 5.0 FT

MAXIMUM MOMENT

M_{MAX} = 8,150 FT-LBS

δ CRITERIA:

L δ_{MAX}: L/ 360

L δ_{MAX}: L/ 480

BEAM SUPPORT

LIGHT SIDE: 2 2X6 STUDS

HEIGHT (FT): 8

SPOT FOOTING: N

HEAVY SIDE: 2 2X6 STUDS

HEIGHT (FT): 8

SPOT FOOTING: N

MAX SUPPORT LOAD

3800 LBS

3800 LBS

STRUCTURAL COMPOSITE LUMBER

TYPE: LVL (1.9E)

DEPTH (d)est. = 9 1/2 IN.

WIDTH (b)est. = 1 3/4 IN.

OF MEMBERS = 3

Fb = 2,600 PSI

Fv = 285 PSI

E = 1.90E+06 PSI

CF = 1.00

A = 49.88 IN(2)

S = 78.97 IN(3)

I = 375.10 IN(4)

δ_{MAX} @ 5.0 FT. (FROM LIGHT SIDE)

TL δ_{MAX} = 0.21 IN. L/ 583

LL δ_{MAX} = 0.13 IN. L/ 950

$A_{REQ.}$ = 14.44 IN(2)

$S_{REQ.}$ = 37.62 IN(3)

I_{REQ}(TL) = 154.42 IN(4)

I_{REQ}(LL) = 142.11 IN(4)

$BRG_{REQ.}$ = 3 IN.

3 -9 **USE** **(3) 1-3/4" X 9-1/2" LVL(S)**

SAFETY FACTOR = 2.10

BEAM WITH POINT LOAD

LOCATION: FAMILY ROOM

FB - 8

DURATION INCREASE = 1.00

BEAM SPAN (FT) = 21.5

VENEER (Y/N): NO

TRIBUTARY LOADING

	SPAN (FT)	CANT. (FT)	W_{TL} (PLF)	W_{LL} (PLF)
ROOF	0.0	0.0	0	0
FLOOR	2.7	0.0	86	54
FLOOR	0.0	0.0	0	0
DECK	0.0	0.0	0	0
OTHER	0.0	0.0	0	0
		TOTAL	**86**	**54**

DESIGN LOADS

FLAT ROOF SNOW LOAD	TL	185	PSF
	LL	170	PSF
FLOOR LOAD	TL	64	PSF
	LL	40	PSF
DECK LOAD	TL	102	PSF
	LL	60	PSF
OTHER LOAD	TL	125	PSF
	LL	50	PSF

POINT LOAD

FROM FB6

TL = 35726 LBS

LL = 29466 LBS

LOCATION (a) = 17.0 FT

b = L-a = 4.5 FT (a > b)

EQUIV. UNIFORM TL = 2200 PLF

EQUIV. UNIFORM LL = 1815 PLF

REACTIONS

LIGHT SIDE (TL) = 8406 LBS

(LL) = 6748 LBS

(DL) = 1659 LBS

HEAVY SIDE (TL) = 29177 LBS

(LL) = 23879 LBS

(DL) = 5298 LBS

Rrt/wTL = 97.3 FT

x' = 17.0 FT

MAXIMUM MOMENT

M_{MAX} = 130,423 FT-LBS

δ CRITERIA:

L δ_{MAX}: L/ 360

L δ_{MAX}: L/ 480

BEAM SUPPORT

LIGHT SIDE: NA POST

HEIGHT (FT): 8

SPOT FOOTING: NR

HEAVY SIDE: NA POST

HEIGHT (FT): 8

SPOT FOOTING: NR

MAX SUPPORT LOAD

STEEL BEAM - W/POINT LOAD

DEPTH = 10.80 IN.

WIDTH = 10.30 IN.

Fb = 33,000 PSI

Fv = 20,000 PSI

E = 2.90E+07 PSI

A = 25.90 IN(2)

S = 98.50 IN(3)

I = 534.00 IN(4)

δ_{MAX} @ 12.1 FT. (FROM LIGHT SIDE)

TL δ_{MAX} = 0.03 IN. L 9340

LL δ_{MAX} = 0.02 IN. L 15165

$A_{REQ.}$ = 2.19 IN(2)

$S_{REQ.}$ = 47.43 IN(3)

I_{REQ}(TL) = 260.40 IN(4)

I_{REQ}(LL) = 318.16 IN(4)

} -8 USE W10X88

SAFETY FACTOR = 1.68

SIMPLE SPAN BEAM

LOCATION: FAMILY ROOM

FB - 7

DURATION INCREASE = 1.00

BEAM SPAN (FT) = 17.0

VENEER (Y/N): NO

TRIBUTARY LOADING

	SPAN (FT)	CANT. (FT)	W_{TL} (PLF)	W_{LL} (PLF)
ROOF	0.0	0.0	0	0
FLOOR	22.0	0.0	704	440
FLOOR	0.0	0.0	0	0
DECK	0.0	0.0	0	0
OTHER	0.0	0.0	0	0
		TOTAL	**704**	**440**

DESIGN LOADS

FLAT ROOF SNOW LOAD	TL	185	PSF
	LL	170	PSF
FLOOR LOAD	TL	64	PSF
	LL	40	PSF
DECK LOAD	TL	102	PSF
	LL	60	PSF
OTHER LOAD	TL	125	PSF
	LL	50	PSF

POINT LOAD

FROM RB

TL = 0 LBS

LL = 0 LBS

LOCATION (a) = 8.5 FT

b = L-a = 8.5 FT (a > b)

EQUIV. UNIFORM TL = 0 PLF

EQUIV. UNIFORM LL = 0 PLF

REACTIONS

LIGHT SIDE (TL) = 5984 LBS

(LL) = 3740 LBS

(DL) = 2244 LBS

HEAVY SIDE (TL) = 5984 LBS

(LL) = 3740 LBS

(DL) = 2244 LBS

Rrt/wTL = 8.5 FT

x' = 8.5 FT

MAXIMUM MOMENT

M_{MAX} = 25,432 FT-LBS

δ CRITERIA:

L δ_{MAX}: L/ 360

L δ_{MAX}: L/ 480

BEAM SUPPORT

LIGHT SIDE: 4 2X6 STUDS

HEIGHT (FT): 10

SPOT FOOTING: Y 1.57 FT. SQR

HEAVY SIDE: 4 2X6 STUDS

HEIGHT (FT): 10

SPOT FOOTING: Y 1.57 FT. SQR

MAX SUPPORT LOAD

16100 LBS

16100 LBS

STEEL BEAM

DEPTH = 10.20 IN.

WIDTH = 4.02 IN.

Fb = 33,000 PSI

Fv = 20,000 PSI

E = 2.90E+07 PSI

A = 5.62 IN(2)

S = 18.80 IN(3)

I = 96.30 IN(4)

δ_{MAX} @ 8.5 FT. (FROM LIGHT SIDE)

TL δ_{MAX} = 0.47 IN. L 431

LL δ_{MAX} = 0.30 IN. L 689

$A_{REQ.}$ = 0.45 IN(2)

$S_{REQ.}$ = 9.25 IN(3)

I_{REQ}(TL) = 53.67 IN(4)

I_{REQ}(LL) = 50.32 IN(4)

3 -7 **USE** W10X19

SAFETY FACTOR = 1.79

BEAM WITH MULTIPLE POINT LOADS

LOCATION: FAMILY ROOM -- SEE STRUCALC

FB - 6

3 -6 **USE** W12X72

BEAM WITH MULTIPLE POINT LOADS

LOCATION: MUD ROOM -- SEE STRUCALC

FB - 5

3 -5 **USE** W10X30

Project: 17-244 HOLLIS CALCS

Location: FB-6
Multi-Loaded Multi-Span Beam
[2015 International Building Code(AISC 14th Ed ASD)]
A992-50 W12x72 x 21.5 FT
Section Adequate By: 13.1%
Controlling Factor: Deflection

StruCalc Version 10.0.1.5 8/17/2017 9:21:02 AM

DEFLECTIONS	Center	
Live Load	0.48	IN L/543
Dead Load	0.13	in
Total Load	0.61	IN L/425

Live Load Deflection Criteria: L/480 Total Load Deflection Criteria: L/360

REACTIONS	A		B	
Live Load	11223	lb	29466	lb
Dead Load	4572	lb	5830	lb
Total Load	15795	lb	35296	lb
Bearing Length	1.27	in	1.27	in

BEAM DATA	Center	
Span Length	21.5	ft
Unbraced Length-Top	0	ft
Unbraced Length-Bottom	21.5	ft

STEEL PROPERTIES
W12x72 - A992-50

Properties:

Yield Stress:	Fy =	50	ksi
Modulus of Elasticity:	E =	29000	ksi
Depth:	d =	12.3	in
Web Thickness:	tw =	0.43	in
Flange Width:	bf =	12	in
Flange Thickness:	tf =	0.67	in
Distance to Web Toe of Fillet:	k =	1.27	in
Moment of Inertia About X-X Axis:	Ix =	597	in4
Section Modulus About X-X Axis:	Sx =	97.4	in3
Plastic Section Modulus About X-X Axis:	Zx =	108	in3

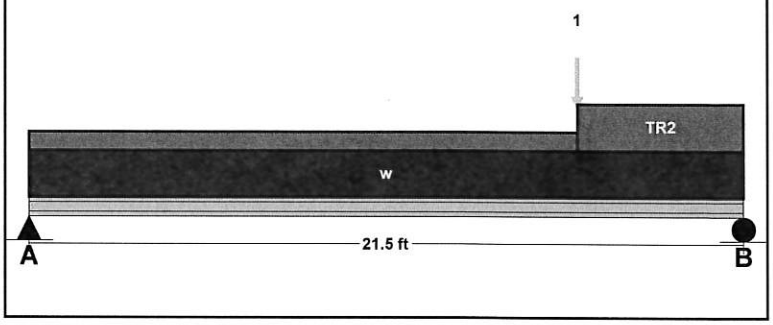
Design Properties per AISC 14th Edition Steel Manual:

Flange Buckling Ratio:	FBR =	8.96	
Allowable Flange Buckling Ratio:	AFBR =	9.15	
Web Buckling Ratio:	WBR =	22.7	
Allowable Web Buckling Ratio:	AWBR =	90.55	
Controlling Unbraced Length:	Lb =	0	ft
Limiting Unbraced Length - for lateral-torsional buckling:	Lp =	10.74	ft
Nominal Flexural Strength w/ safety factor:	Mn =	269461	ft-lb
Controlling Equation:	F2-1		
Web height to thickness ratio:	h/tw =	22.7	
Limiting height to thickness ratio for eqn. G2-2:	h/tw-limit =	53.95	
Cv Factor:	Cv =	1	
Controlling Equation:	G2-2		
Nominal Shear Strength w/ safety factor:	Vn =	105780	lb

Controlling Moment: 137404 ft-lb
16.34 Ft from left support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s) 2
Controlling Shear: -35296 lb
22.0 Ft from left support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s

Comparisons with required sections:	Req'd	Provided
Moment of Inertia (deflection):	527.83 in4	597 in4
Moment:	137404 ft-lb	269461 ft-lb
Shear:	-35296 lb	105780 lb

LOADING DIAGRAM



UNIFORM LOADS	Center	
Uniform Live Load	340	plf
Uniform Dead Load	204	plf
Beam Self Weight	72	plf
Total Uniform Load	616	plf

POINT LOADS - CENTER SPAN	
Load Number	One
Live Load	18934 lb
Dead Load	1671 lb
Location	16.5 ft

TRAPEZOIDAL LOADS - CENTER SPAN		
Load Number	One	Two
Left Live Load	180 plf	2295 plf
Left Dead Load	108 plf	203 plf
Right Live Load	180 plf	2295 plf
Right Dead Load	108 plf	203 plf
Load Start	0 ft	16.5 ft
Load End	16.5 ft	21.5 ft
Load Length	16.5 ft	5 ft

Project: 17-244 HOLLIS CALCS

Location: FB-5
Multi-Loaded Multi-Span Beam
[2015 International Building Code(AISC 14th Ed ASD)]
A992-50 W10x30 x 12.0 FT
Section Adequate By: 30.4%
Controlling Factor: Deflection

StruCalc Version 10.0.1.5 8/17/2017 9:21:01 AM

DEFLECTIONS	Center	
Live Load	0.23	IN L/626
Dead Load	0.03	in
Total Load	0.26	IN L/553

Live Load Deflection Criteria: L/480 Total Load Deflection Criteria: L/360

REACTIONS	A		B	
Live Load	7862	lb	17008	lb
Dead Load	1551	lb	2008	lb
Total Load	9413	lb	19016	lb
Bearing Length	0.81	in	0.81	in

BEAM DATA	Center	
Span Length	12	ft
Unbraced Length-Top	0	ft
Unbraced Length-Bottom	12	ft

STEEL PROPERTIES
W10x30 - A992-50

Properties:

Yield Stress:	Fy =	50	ksi
Modulus of Elasticity:	E =	29000	ksi
Depth:	d =	10.5	in
Web Thickness:	tw =	0.3	in
Flange Width:	bf =	5.81	in
Flange Thickness:	tf =	0.51	in
Distance to Web Toe of Fillet:	k =	0.81	in
Moment of Inertia About X-X Axis:	Ix =	170	in4
Section Modulus About X-X Axis:	Sx =	32.4	in3
Plastic Section Modulus About X-X Axis:	Zx =	36.6	in3

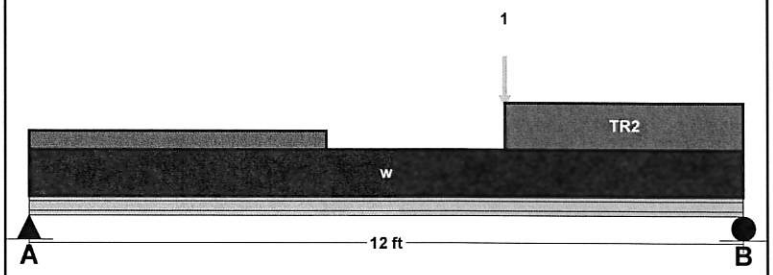
Design Properties per AISC 14th Edition Steel Manual:

Flange Buckling Ratio:	FBR =	5.7	
Allowable Flange Buckling Ratio:	AFBR =	9.15	
Web Buckling Ratio:	WBR =	29.6	
Allowable Web Buckling Ratio:	AWBR =	90.55	
Controlling Unbraced Length:	Lb =	0	ft
Limiting Unbraced Length - for lateral-torsional buckling:	Lp =	4.84	ft
Nominal Flexural Strength w/ safety factor:	Mn =	91317	ft-lb
Controlling Equation:	F2-1		
Web height to thickness ratio:	h/tw =	29.6	
Limiting height to thickness ratio for eqn. G2-2:	h/tw-limit =	53.95	
Cv Factor:	Cv =	1	
Controlling Equation:	G2-2		
Nominal Shear Strength w/ safety factor:	Vn =	63000	lb

Controlling Moment: 59979 ft-lb
8.04 Ft from left support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s) 2
Controlling Shear: -19015 lb
At right support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s

Comparisons with required sections:	Req'd	Provided
Moment of Inertia (deflection):	130.39 in4	170 in4
Moment:	59979 ft-lb	91317 ft-lb
Shear:	-19015 lb	63000 lb

LOADING DIAGRAM



UNIFORM LOADS	Center	
Uniform Live Load	100	plf
Uniform Dead Load	60	plf
Beam Self Weight	30	plf
Total Uniform Load	190	plf

POINT LOADS - CENTER SPAN	
Load Number	One
Live Load	16154 lb
Dead Load	1339 lb
Location	8 ft

TRAPEZOIDAL LOADS - CENTER SPAN		
Load Number	One	Two
Left Live Load	200 plf	1629 plf
Left Dead Load	120 plf	135 plf
Right Live Load	200 plf	1629 plf
Right Dead Load	120 plf	135 plf
Load Start	0 ft	8 ft
Load End	5 ft	12 ft
Load Length	5 ft	4 ft

SIMPLE SPAN BEAM

LOCATION: TYPICAL FLUSH BEAM

FB - 4

DURATION INCREASE = 1.00

BEAM SPAN (FT) = 10.0

VENEER (Y/N): NO

TRIBUTARY LOADING

	SPAN (FT)	CANT. (FT)	W_{TL} (PLF)	W_{LL} (PLF)
ROOF	16.0	0.0	1480	1360
FLOOR	1.3	0.0	42	26
FLOOR	0.0	0.0	0	0
DECK	0.0	0.0	0	0
OTHER	0.0	0.0	0	0
		TOTAL	**1522**	**1386**

DESIGN LOADS

FLAT ROOF SNOW LOAD	TL	185	PSF
	LL	170	PSF
FLOOR LOAD	TL	64	PSF
	LL	40	PSF
DECK LOAD	TL	102	PSF
	LL	60	PSF
OTHER LOAD	TL	125	PSF
	LL	50	PSF

POINT LOAD

FROM RB

TL = 0 LBS

LL = 0 LBS

LOCATION (a) = 5.0 FT

b = L-a = 5.0 FT (a > b)

EQUIV. UNIFORM TL = 0 PLF

EQUIV. UNIFORM LL = 0 PLF

REACTIONS

LIGHT SIDE (TL) = 7608 LBS

(LL) = 6930 LBS

(DL) = 678 LBS

HEAVY SIDE (TL) = 7608 LBS

(LL) = 6930 LBS

(DL) = 678 LBS

Rrt/wTL = 5.0 FT

x' = 5.0 FT

MAXIMUM MOMENT

M_{MAX} = 19,020 FT-LBS

δ CRITERIA:

L δ_{MAX}: L/ 360

L δ_{MAX}: L/ 480

BEAM SUPPORT

LIGHT SIDE: 4 2X6 STUDS

HEIGHT (FT): 10

SPOT FOOTING: Y 1.76 FT. SQR

HEAVY SIDE: 4 2X6 STUDS

HEIGHT (FT): 10

SPOT FOOTING: Y 1.76 FT. SQR

MAX SUPPORT LOAD

16100 LBS

16100 LBS

STRUCTURAL COMPOSITE LUMBER

TYPE: LVL (1.9E)

DEPTH (d)est. = 11 7/8 IN.

WIDTH (b)est. = 1 3/4 IN.

OF MEMBERS = 3

Fb = 2,600 PSI

Fv = 285 PSI

E = 1.90E+06 PSI

CF = 1.00

A = 62.34 IN(2)

S = 123.39 IN(3)

I = 732.62 IN(4)

δ_{MAX} @ 5.0 FT. (FROM LIGHT SIDE)

TL δ_{MAX} = 0.25 IN. L/ 488

LL δ_{MAX} = 0.22 IN. L/ 536

$A_{REQ.}$ = 32.12 IN(2)

$S_{REQ.}$ = 87.78 IN(3)

I_{REQ}(TL) = 360.38 IN(4)

I_{REQ}(LL) = 492.39 IN(4)

$BRG_{REQ.}$ = 3 IN.

3 -4 USE (3) 1-3/4" X 11-7/8" LVL(S)

SAFETY FACTOR = 1.41

SIMPLE SPAN BEAM

LOCATION: STAIRS

FB - 3

DURATION INCREASE = 1.00

BEAM SPAN (FT) = 5.0

DESIGN LOADS

FLAT ROOF SNOW LOAD	TL	185	PSF
	LL	170	PSF
FLOOR LOAD	TL	64	PSF
	LL	40	PSF
DECK LOAD	TL	102	PSF
	LL	60	PSF
OTHER LOAD	TL	125	PSF
	LL	50	PSF

TRIBUTARY LOADING

	SPAN (FT)	CANT. (FT)	W_{TL} (PLF)	W_{LL} (PLF)
ROOF	0.0	0.0	0	0
FLOOR	1.3	0.0	42	26
FLOOR	0.0	0.0	0	0
DECK	0.0	0.0	0	0
OTHER	0.0	0.0	0	0
		TOTAL	**42**	**26**

POINT LOAD

FROM	RB	
TL =	0	LBS
LL =	0	LBS
LOCATION (a) =	2.5	FT
b = L-a =	2.5	FT (a > b)
EQUIV. UNIFORM TL =	0	PLF
EQUIV. UNIFORM LL =	0	PLF

REACTIONS

LIGHT SIDE (TL) =	104	LBS
(LL) =	65	LBS
(DL) =	39	LBS
HEAVY SIDE (TL) =	104	LBS
(LL) =	65	LBS
(DL) =	39	LBS
Rrt/wTL =	2.5	FT
x' =	2.5	FT

MAXIMUM MOMENT

M_{MAX} = 130 FT-LBS

δ CRITERIA:

L δ_{MAX}: L/ 360

L δ_{MAX}: L/ 480

BEAM SUPPORT

MAX SUPPORT LOAD

LIGHT SIDE:	2	2X6	STUDS	3800 LBS
HEIGHT (FT):	8			
SPOT FOOTING:	N			
HEAVY SIDE:	2	2X6	STUDS	3800 LBS
HEIGHT (FT):	8			
SPOT FOOTING:	N			

STRUCTURAL COMPOSITE LUMBER

TYPE: LVL (1.9E)

DEPTH (d)est. =	11 7/8 IN.	Fb =	2,600 PSI	δ_{MAX} @	2.5 FT. (FROM LIGHT SIDE)
WIDTH (b)est. =	1 3/4 IN.	Fv =	285 PSI	TL δ_{MAX} =	0.00 IN. L/ 47589
# OF MEMBERS =	1	E =	1.90E+06 PSI	LL δ_{MAX} =	0.00 IN. L/ 76142
		CF =	1.00		
		A =	20.78 IN(2)	$A_{REQ.}$ =	0.33 IN(2)
		S =	41.13 IN(3)	$S_{REQ.}$ =	0.60 IN(3)
		I =	244.21 IN(4)	I_{REQ}(TL) =	1.23 IN(4)
				I_{REQ}(LL) =	1.15 IN(4)
				$BRG_{REQ.}$ =	3 IN.

3 -3 **USE** **(1) 1-3/4" X 11-7/8" LVL(S)**

SAFETY FACTOR = 62.84

SIMPLE SPAN BEAM

LOCATION: ENTRY HEADERS

FB - 2

DURATION INCREASE = 1.00

BEAM SPAN (FT) = 7.5

DESIGN LOADS

FLAT ROOF SNOW LOAD	TL	185	PSF
	LL	170	PSF
FLOOR LOAD	TL	64	PSF
	LL	40	PSF
DECK LOAD	TL	102	PSF
	LL	60	PSF
OTHER LOAD	TL	125	PSF
	LL	50	PSF

TRIBUTARY LOADING

	SPAN (FT)	CANT. (FT)	W_{TL} (PLF)	W_{LL} (PLF)
ROOF	0.0	0.0	0	0
FLOOR	1.3	0.0	42	26
FLOOR	0.0	0.0	0	0
DECK	13.0	0.0	663	390
OTHER	0.0	0.0	0	0
		TOTAL	**705**	**416**

POINT LOAD

FROM	RB	
TL =	0	LBS
LL =	0	LBS
LOCATION (a) =	3.8	FT
b = L-a =	3.8	FT (a > b)
EQUIV. UNIFORM TL =	0	PLF
EQUIV. UNIFORM LL =	0	PLF

REACTIONS

LIGHT SIDE (TL) =	2642	LBS
(LL) =	1560	LBS
(DL) =	1082	LBS
HEAVY SIDE (TL) =	2642	LBS
(LL) =	1560	LBS
(DL) =	1082	LBS
Rrt/wTL =	3.8	FT
x' =	3.8	FT

MAXIMUM MOMENT

M_{MAX} = 4,954 FT-LBS

δ CRITERIA:

L δ_{MAX}: L/ 360

L δ_{MAX}: L/ 480

BEAM SUPPORT

MAX SUPPORT LOAD

LIGHT SIDE: 2	2X6	STUDS	3800	LBS
HEIGHT (FT): 8				
SPOT FOOTING: N				
HEAVY SIDE: 2	2X6	STUDS	3800	LBS
HEIGHT (FT): 8				
SPOT FOOTING: N				

STRUCTURAL COMPOSITE LUMBER

TYPE: LVL (1.9E)

DEPTH (d)est. =	9 1/2 IN.	Fb =	2,600	PSI	δ_{MAX}@	3.8	FT. (FROM LIGHT SIDE)
WIDTH (b)est. =	1 3/4 IN.	Fv =	285	PSI	TL δ_{MAX} =	0.11	IN. L/ 852
# OF MEMBERS =	2	E =	1.90E+06	PSI	LL δ_{MAX} =	0.06	IN. L/ 1444
		CF =	1.00				
		A =	33.25	IN(2)	$A_{REQ.}$ =	10.97	IN(2)
		S =	52.65	IN(3)	$S_{REQ.}$ =	22.87	IN(3)
		I =	250.07	IN(4)	I_{REQ}(TL) =	70.40	IN(4)
					I_{REQ}(LL) =	62.35	IN(4)
					$BRG_{REQ.}$ =	3	IN.

3 -2 USE (2) 1-3/4" X 9-1/2" LVL(S)

SAFETY FACTOR = 2.30

SIMPLE SPAN BEAM

LOCATION: TYPICAL HEADER

FB - 1

DURATION INCREASE = 1.00

BEAM SPAN (FT) = 3.5

TRIBUTARY LOADING

	SPAN (FT)	CANT. (FT)	W_{TL} (PLF)	W_{LL} (PLF)
ROOF	0.0	0.0	0	0
FLOOR	26.0	0.0	832	520
FLOOR	0.0	0.0	0	0
DECK	0.0	0.0	0	0
OTHER	0.0	0.0	0	0
		TOTAL	**832**	**520**

DESIGN LOADS

FLAT ROOF SNOW LOAD	TL	185	PSF
	LL	170	PSF
FLOOR LOAD	TL	64	PSF
	LL	40	PSF
DECK LOAD	TL	102	PSF
	LL	60	PSF
OTHER LOAD	TL	125	PSF
	LL	50	PSF

POINT LOAD

FROM RB

TL = 0 LBS

LL = 0 LBS

LOCATION (a) = 1.8 FT

b = L-a = 1.8 FT (a > b)

EQUIV. UNIFORM TL = 0 PLF

EQUIV. UNIFORM LL = 0 PLF

REACTIONS

LIGHT SIDE (TL) = 1456 LBS

(LL) = 910 LBS

(DL) = 546 LBS

HEAVY SIDE (TL) = 1456 LBS

(LL) = 910 LBS

(DL) = 546 LBS

Rrt/wTL = 1.8 FT

x' = 1.8 FT

MAXIMUM MOMENT

M_{MAX} = 1,274 FT-LBS

δ CRITERIA:

L δ_{MAX}: L/ 360

L δ_{MAX}: L/ 480

BEAM SUPPORT — **MAX SUPPORT LOAD**

LIGHT SIDE: 2 2X6 STUDS 3800 LBS

HEIGHT (FT): 8

SPOT FOOTING: N

HEAVY SIDE: 2 2X6 STUDS 3800 LBS

HEIGHT (FT): 8

SPOT FOOTING: N

DIMENSIONAL LUMBER

TYPE: DF#2

DEPTH (d)est. = 9 1/4 IN.

WIDTH (b)est. = 3 IN.

CF = 1.1

Fb = 850 PSI

Fv = 180 PSI

E = 1.60E+06 PSI

A = 27.75 IN(2)

S = 42.78 IN(3)

I = 197.86 IN(4)

δ_{MAX} @ 1.8 FT. (FROM LIGHT SIDE)

TL δ_{MAX} = 0.01 IN. L/ 4733

LL δ_{MAX} = 0.01 IN. L/ 7573

$A_{REQ.}$ = 6.79 IN(2)

$S_{REQ.}$ = 16.35 IN(3)

I_{REQ}(TL) = 10.03 IN(4)

I_{REQ}(LL) = 9.41 IN(4)

$BRG_{REQ.}$ = 3 IN.

3 -1 **USE** **(2) - 2 X 10 (S)**

SAFETY FACTOR = 2.62

BEAM WITH MULTIPLE POINT LOADS

LOCATION: COVERED DECK -- SEE STRUCALC

RB - 14

-14 USE **W12X65**

SIMPLE SPAN BEAM

LOCATION: DINING

RB - 13

DURATION INCREASE = 1.00

BEAM SPAN (FT) = 6.5

TRIBUTARY LOADING

	SPAN (FT)	CANT. (FT)	W_{TL} (PLF)	W_{LL} (PLF)
ROOF	21.0	0.0	1943	1785
FLOOR	0.0	0.0	0	0
FLOOR	0.0	0.0	0	0
DECK	0.0	0.0	0	0
OTHER	0.0	0.0	0	0
		TOTAL	**1943**	**1785**

6

DESIGN LOADS

FLAT ROOF SNOW LOAD	TL	185	PSF
	LL	170	PSF
FLOOR LOAD	TL	64	PSF
	LL	40	PSF
DECK LOAD	TL	102	PSF
	LL	60	PSF
OTHER LOAD	TL	125	PSF
	LL	50	PSF

POINT LOAD

FROM

TL = 0 LBS

LL = 0 LBS

LOCATION (a) = 3.8 FT

b = L-a = 2.7 FT (a > b)

EQUIV. UNIFORM TL = 0 PLF

EQUIV. UNIFORM LL = 0 PLF

REACTIONS

LIGHT SIDE (TL) = 6313 LBS

(LL) = 5801 LBS

(DL) = 512 LBS

HEAVY SIDE (TL) = 6313 LBS

(LL) = 5801 LBS

(DL) = 512 LBS

Rrt/wTL = 3.3 FT

x^1 = 3.3 FT

MAXIMUM MOMENT

M_{MAX} = 10,259 FT-LBS

δ CRITERIA:

L δ_{MAX}: L/ 240

L δ_{MAX}: L/ 360

BEAM SUPPORT

LIGHT SIDE: 4X6 POST

HEIGHT (FT): 9

SPOT FOOTING: N

HEAVY SIDE: 4X6 POST

HEIGHT (FT): 9

SPOT FOOTING: N

MAX SUPPORT LOAD

8510 LBS

8510 LBS

STRUCTURAL COMPOSITE LUMBER

TYPE: LVL (1.9E)

DEPTH (d)est. = 14 IN.

WIDTH (b)est. = 1 3/4 IN.

OF MEMBERS = 2

Fb = 2,600 PSI

Fv = 285 PSI

E = 1.90E+06 PSI

CF = 0.98

A = 49.00 IN(2)

S = 114.33 IN(3)

I = 800.33 IN(4)

δ_{MAX} @ 3.3 FT. (FROM LIGHT SIDE)

TL δ_{MAX} = 0.05 IN. L/ 1520

LL δ_{MAX} = 0.05 IN. L/ 1654

$A_{REQ.}$ = 21.26 IN(2)

$S_{REQ.}$ = 48.26 IN(3)

I_{REQ}(TL) = 126.35 IN(4)

I_{REQ}(LL) = 174.15 IN(4)

$BRG_{REQ.}$ = 3 IN.

-13 USE **(2) 1-3/4" X 14" LVL(S)**

SAFETY FACTOR = 2.31

Project: 17-244 HOLLIS CALCS

Location: RB14
Multi-Loaded Multi-Span Beam
[2015 International Building Code(AISC 14th Ed ASD)]
A992-50 W12x65 x 24.0 FT
Section Adequate By: 13.5%
Controlling Factor: Deflection

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DEFLECTIONS	Center	
Live Load	0.70	IN L/409
Dead Load	0.09	in
Total Load	0.80	IN L/361

Live Load Deflection Criteria: L/360 Total Load Deflection Criteria: L/240

REACTIONS	A		B	
Live Load	18850	lb	15129	lb
Dead Load	2443	lb	2115	lb
Total Load	21293	lb	17244	lb
Bearing Length	1.20	in	1.20	in

BEAM DATA	Center	
Span Length	24	ft
Unbraced Length-Top	0	ft
Unbraced Length-Bottom	24	ft

STEEL PROPERTIES
W12x65 - A992-50

Properties:

Yield Stress:	Fy =	50	ksi
Modulus of Elasticity:	E =	29000	ksi
Depth:	d =	12.1	in
Web Thickness:	tw =	0.39	in
Flange Width:	bf =	12	in
Flange Thickness:	tf =	0.61	in
Distance to Web Toe of Fillet:	k =	1.2	in
Moment of Inertia About X-X Axis:	Ix =	533	in4
Section Modulus About X-X Axis:	Sx =	87.9	in3
Plastic Section Modulus About X-X Axis:	Zx =	96.8	in3

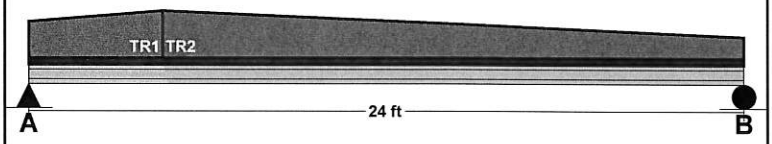
Design Properties per AISC 14th Edition Steel Manual:

Flange Buckling Ratio:	FBR =	9.92	
Allowable Flange Buckling Ratio:	AFBR =	9.15	
Web Buckling Ratio:	WBR =	24.87	
Allowable Web Buckling Ratio:	AWBR =	90.55	
Controlling Unbraced Length:	Lb =	0	ft
Limiting Unbraced Length - for lateral-torsional buckling:	Lp =	10.67	ft
Nominal Flexural Strength w/ safety factor:	Mn =	237004	ft-lb
Controlling Equation:	F3-1		
Web height to thickness ratio:	h/tw =	24.87	
Limiting height to thickness ratio for eqn. G2-2:	h/tw-limit =	53.95	
Cv Factor:	Cv =	1	
Controlling Equation:	G2-2		
Nominal Shear Strength w/ safety factor:	Vn =	94380	lb

Controlling Moment: 119720 ft-lb
11.28 Ft from left support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s) 2
Controlling Shear: 21293 lb
At left support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s

Comparisons with required sections:	Req'd	Provided
Moment of Inertia (deflection):	469.6 in4	533 in4
Moment:	119720 ft-lb	237004 ft-lb
Shear:	21293 lb	94380 lb

LOADING DIAGRAM



UNIFORM LOADS	Center	
Uniform Live Load	0	plf
Uniform Dead Load	0	plf
Beam Self Weight	65	plf
Total Uniform Load	65	plf

TRAPEZOIDAL LOADS - CENTER SPAN

Load Number	One	Two
Left Live Load	1445 plf	1870 plf
Left Dead Load	127.5 plf	165 plf
Right Live Load	1870 plf	850 plf
Right Dead Load	165 plf	75 plf
Load Start	0 ft	4.5 ft
Load End	4.5 ft	24 ft
Load Length	4.5 ft	19.5 ft

BEAM WITH POINT LOAD

LOCATION: DINING

RB - 12

DURATION INCREASE = 1.00

BEAM SPAN (FT) = 21.5

VENEER (Y/N): NO

TRIBUTARY LOADING

	SPAN (FT)	CANT. (FT)	W_{TL} (PLF)	W_{LL} (PLF)
ROOF	2.7	0.0	250	230
FLOOR	0.0	0.0	0	0
FLOOR	0.0	0.0	0	0
DECK	0.0	0.0	0	0
OTHER	0.0	0.0	0	0
		TOTAL	**250**	**230**

DESIGN LOADS

FLAT ROOF SNOW LOAD	TL	185	PSF
	LL	170	PSF
FLOOR LOAD	TL	64	PSF
	LL	40	PSF
DECK LOAD	TL	102	PSF
	LL	60	PSF
OTHER LOAD	TL	125	PSF
	LL	50	PSF

POINT LOAD

FROM RB7, 13

TL = 26918 LBS

LL = 24735 LBS

LOCATION (a) = 17 FT

b = L-a = 4.3 FT (a > b)

EQUIV. UNIFORM TL = 1603 PLF

EQUIV. UNIFORM LL = 1473 PLF

REACTIONS

LIGHT SIDE (TL) = 8068 LBS

(LL) = 7414 LBS

(DL) = 654 LBS

HEAVY SIDE (TL) = 24219 LBS

(LL) = 22255 LBS

(DL) = 1964 LBS

Rrt/wTL = 32.3 FT

x' = 17.2 FT

MAXIMUM MOMENT

M_{MAX} = 101,832 FT-LBS

δ CRITERIA:

L δ_{MAX}: L/ 240

L δ_{MAX}: L/ 360

BEAM SUPPORT

LIGHT SIDE: 4X4X1/4 HSS COL

HEIGHT (FT): 11

SPOT FOOTING: N

HEAVY SIDE: 4X4X1/4 HSS COL

HEIGHT (FT): 11

SPOT FOOTING: N

MAX SUPPORT LOAD

50190 LBS

50190 LBS

STEEL BEAM - W/POINT LOAD

DEPTH = 12.10 IN.

WIDTH = 8.05 IN.

Fb = 33,000 PSI

Fv = 20,000 PSI

E = 2.90E+07 PSI

A = 13.10 IN(2)

S = 57.70 IN(3)

I = 348.00 IN(4)

δ_{MAX} @ 11.9 FT. (FROM LIGHT SIDE)

TL δ_{MAX} = 0.14 IN. L 1807

LL δ_{MAX} = 0.13 IN. L 1966

$A_{REQ.}$ = 1.82 IN(2)

$S_{REQ.}$ = 37.03 IN(3)

I_{REQ}(TL) = 217.46 IN(4)

I_{REQ}(LL) = 299.74 IN(4)

-12 USE **W12X45**

SAFETY FACTOR = 1.16

BEAM WITH MULTIPLE POINT LOADS

LOCATION: REAR PATIO -- SEE STRUCALC

RB - 11

-11 USE **W12X136**

BEAM WITH MULTIPLE POINT LOADS

LOCATION: COVERED DECK -- SEE STRUCALC

RB - 10

-10 USE **W10X88**

Project: 17-244 HOLLIS CALCS

Location: RB-11
Multi-Loaded Multi-Span Beam
[2015 International Building Code(AISC 14th Ed ASD)]
A992-50 W12x136 x 53.0 FT (13 + 27 + 13)
Section Adequate By: 44.1%
Controlling Factor: Deflection

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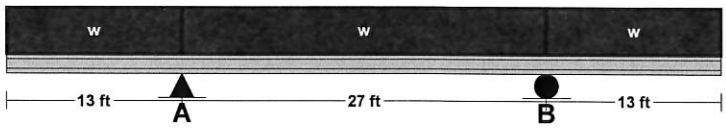
DEFLECTIONS	Left		Center		Right	
Live Load	0.60	IN 2L/518	-0.25	IN L/1288	0.60	IN 2L/518
Dead Load	0.07	in	-0.01	in	0.07	in
Total Load	0.67	IN 2L/462	-0.26	IN L/1251	0.67	IN 2L/462

Live Load Deflection Criteria: L/360 Total Load Deflection Criteria: L/240

REACTIONS	A		B	
Live Load	20148	lb	20148	lb
Dead Load	5194	lb	5194	lb
Total Load	25342	lb	25342	lb
Bearing Length	1.85	in	1.85	in

BEAM DATA	Left		Center		Right	
Span Length	13	ft	27	ft	13	ft
Unbraced Length-Top	0	ft	0	ft	0	ft
Unbraced Length-Bottom	13	ft	27	ft	13	ft

LOADING DIAGRAM



UNIFORM LOADS	Left		Center		Right	
Uniform Live Load	680	plf	680	plf	680	plf
Uniform Dead Load	60	plf	60	plf	60	plf
Beam Self Weight	136	plf	136	plf	136	plf
Total Uniform Load	876	plf	876	plf	876	plf

STEEL PROPERTIES
W12x136 - A992-50

Properties:

Yield Stress:	Fy =	50	ksi
Modulus of Elasticity:	E =	29000	ksi
Depth:	d =	13.4	in
Web Thickness:	tw =	0.79	in
Flange Width:	bf =	12.4	in
Flange Thickness:	tf =	1.25	in
Distance to Web Toe of Fillet:	k =	1.85	in
Moment of Inertia About X-X Axis:	Ix =	1240	in4
Section Modulus About X-X Axis:	Sx =	186	in3
Plastic Section Modulus About X-X Axis:	Zx =	214	in3

Design Properties per AISC 14th Edition Steel Manual:

Flange Buckling Ratio:	FBR =	4.96	
Allowable Flange Buckling Ratio:	AFBR =	9.15	
Web Buckling Ratio:	WBR =	12.28	
Allowable Web Buckling Ratio:	AWBR =	90.55	
Controlling Unbraced Length:	Lb =	27	ft
Limiting Unbraced Length -			
for lateral-torsional buckling:	Lp =	11.16	ft
for Eqn. F2-2:	Lr =	63.17	ft
Nominal Flexural Strength w/ safety factor:	Mn =	470255	ft-lb
Controlling Equation:	F2-2		
Web height to thickness ratio:	h/tw =	12.28	
Limiting height to thickness ratio for eqn. G2-2:	h/tw-limit =	53.95	
Cv Factor:	Cv =	1	
Controlling Equation:	G2-2		
Nominal Shear Strength w/ safety factor:	Vn =	211720	lb

Controlling Moment: -74022 ft-lb
Over left support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s) 1, 2, 3
Controlling Shear: 13954 lb
At left support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s

Comparisons with required sections:	Req'd	Provided
Moment of Inertia (deflection):	860.24 in4	1240 in4
Moment:	-74022 ft-lb	470255 ft-lb
Shear:	13954 lb	211720 lb

Project: 17-244 HOLLIS CALCS

Location: RB10
Multi-Loaded Multi-Span Beam
[2015 International Building Code(AISC 14th Ed ASD)]
A992-50 W10x88 x 28.5 FT
Section Adequate By: 16.3%
Controlling Factor: Deflection

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DEFLECTIONS	Center	
Live Load	0.82	IN L/419
Dead Load	0.13	in
Total Load	0.95	IN L/360

Live Load Deflection Criteria: L/360 Total Load Deflection Criteria: L/240

REACTIONS	A		B	
Live Load	16160	lb	8080	lb
Dead Load	2252	lb	1753	lb
Total Load	18412	lb	9833	lb
Bearing Length	1.49	in	1.49	in

BEAM DATA	Center	
Span Length	28.5	ft
Unbraced Length-Top	0	ft
Unbraced Length-Bottom	28.5	ft

STEEL PROPERTIES
W10x88 - A992-50

Properties:

Yield Stress:	Fy =	50	ksi
Modulus of Elasticity:	E =	29000	ksi
Depth:	d =	10.8	in
Web Thickness:	tw =	0.61	in
Flange Width:	bf =	10.3	in
Flange Thickness:	tf =	0.99	in
Distance to Web Toe of Fillet:	k =	1.49	in
Moment of Inertia About X-X Axis:	Ix =	534	in4
Section Modulus About X-X Axis:	Sx =	98.5	in3
Plastic Section Modulus About X-X Axis:	Zx =	113	in3

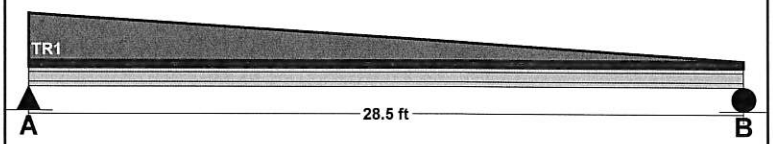
Design Properties per AISC 14th Edition Steel Manual:

Flange Buckling Ratio:	FBR =	5.2	
Allowable Flange Buckling Ratio:	AFBR =	9.15	
Web Buckling Ratio:	WBR =	12.93	
Allowable Web Buckling Ratio:	AWBR =	90.55	
Controlling Unbraced Length:	Lb =	0	ft
Limiting Unbraced Length - for lateral-torsional buckling:	Lp =	9.29	ft
Nominal Flexural Strength w/ safety factor:	Mn =	281936	ft-lb
Controlling Equation:	F2-1		
Web height to thickness ratio:	h/tw =	12.93	
Limiting height to thickness ratio for eqn. G2-2:	h/tw-limit =	53.95	
Cv Factor:	Cv =	1	
Controlling Equation:	G2-2		
Nominal Shear Strength w/ safety factor:	Vn =	130680	lb

Controlling Moment: 102840 ft-lb
12.26 Ft from left support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s) 2
Controlling Shear: 18411 lb
At left support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s

Comparisons with required sections:	Req'd	Provided
Moment of Inertia (deflection):	459.02 in4	534 in4
Moment:	102840 ft-lb	281936 ft-lb
Shear:	18411 lb	130680 lb

LOADING DIAGRAM



UNIFORM LOADS	Center	
Uniform Live Load	0	plf
Uniform Dead Load	0	plf
Beam Self Weight	88	plf
Total Uniform Load	88	plf

TRAPEZOIDAL LOADS - CENTER SPAN		
Load Number	One	
Left Live Load	1701	plf
Left Dead Load	105	plf
Right Live Load	0	plf
Right Dead Load	0	plf
Load Start	0	ft
Load End	28.5	ft
Load Length	28.5	ft

BEAM WITH POINT LOAD

LOCATION: DECK

RB - 9

DURATION INCREASE = 1.00

BEAM SPAN (FT) = 12.3

VENEER (Y/N): NO

TRIBUTARY LOADING

	SPAN (FT)	CANT. (FT)	W_{TL} (PLF)	W_{LL} (PLF)
ROOF	24.0	0.0	2220	2040
FLOOR	0.0	0.0	0	0
FLOOR	0.0	0.0	0	0
DECK	0.0	0.0	0	0
OTHER	0.0	0.0	0	0
		TOTAL	**2220**	**2040**

DESIGN LOADS

FLAT ROOF SNOW LOAD	TL	185	PSF
	LL	170	PSF
FLOOR LOAD	TL	64	PSF
	LL	40	PSF
DECK LOAD	TL	102	PSF
	LL	60	PSF
OTHER LOAD	TL	125	PSF
	LL	50	PSF

POINT LOAD

FROM RB13

TL = 6313 LBS

LL = 5801 LBS

LOCATION (a) = 7.0 FT

b = L-a = 5.3 FT (a > b)

EQUIV. UNIFORM TL = 1007 PLF

EQUIV. UNIFORM LL = 925 PLF

REACTIONS

LIGHT SIDE (TL) = 16373 LBS

(LL) = 15046 LBS

(DL) = 1328 LBS

HEAVY SIDE (TL) = 17246 LBS

(LL) = 15848 LBS

(DL) = 1398 LBS

Rrt/wTL = 7.4 FT

x' = 7.0 FT

MAXIMUM MOMENT

M_{MAX} = 60,223 FT-LBS

δ CRITERIA:

L δ_{MAX}: L/ 240

L δ_{MAX}: L/ 360

BEAM SUPPORT

MAX SUPPORT LOAD

LIGHT SIDE: 4 2X6 STUDS 18140 LBS

HEIGHT (FT): 9

SPOT FOOTING: Y 2.57 FT. SQR

HEAVY SIDE: 4 2X6 STUDS 18140 LBS

HEIGHT (FT): 9

SPOT FOOTING: Y 2.64 FT. SQR

STEEL BEAM - W/POINT LOAD

DEPTH = 10.30 IN.

WIDTH = 5.77 IN.

Fb = 33,000 PSI

Fv = 20,000 PSI

E = 2.90E+07 PSI

A = 7.61 IN(2)

S = 27.90 IN(3)

I = 144.00 IN(4)

δ_{MAX} @ 6.3 FT. (FROM LIGHT SIDE)

TL δ_{MAX} = 0.28 IN. L 529

LL δ_{MAX} = 0.26 IN. L 576

$A_{REQ.}$ = 1.29 IN(2)

$S_{REQ.}$ = 21.90 IN(3)

I_{REQ}(TL) = 87.22 IN(4)

I_{REQ}(LL) = 120.23 IN(4)

3 -9 **USE** **W10X26**

SAFETY FACTOR = 1.20

BEAM WITH POINT LOAD

LOCATION: DECK

RB - 8

DURATION INCREASE = 1.00

BEAM SPAN (FT) = 7.5

DESIGN LOADS

FLAT ROOF SNOW LOAD	TL	185	PSF
	LL	170	PSF
FLOOR LOAD	TL	64	PSF
	LL	40	PSF
DECK LOAD	TL	102	PSF
	LL	60	PSF
OTHER LOAD	TL	125	PSF
	LL	50	PSF

TRIBUTARY LOADING

	SPAN (FT)	CANT. (FT)	W_{TL} (PLF)	W_{LL} (PLF)
ROOF	20.0	0.0	1850	1700
FLOOR	0.0	0.0	0	0
FLOOR	0.0	0.0	0	0
DECK	0.0	0.0	0	0
OTHER	0.0	0.0	0	0
		TOTAL	**1850**	**1700**

POINT LOAD

FROM	RB-6	
TL =	16511	LBS
LL =	15173	LBS
LOCATION (a) =	4.5	FT
b = L-a =	3.0	FT (a > b)
EQUIV. UNIFORM TL =	4227	PLF
EQUIV. UNIFORM LL =	3884	PLF

REACTIONS

LIGHT SIDE (TL) =	13542	LBS
(LL) =	12444	LBS
(DL) =	1098	LBS
HEAVY SIDE (TL) =	16844	LBS
(LL) =	15479	LBS
(DL) =	1366	LBS
Rrt/wTL =	7.3	FT
x' =	4.5	FT

MAXIMUM MOMENT

M_{MAX} = 42,208 FT-LBS

δ CRITERIA:

L δ_{MAX}: L/ 240

L δ_{MAX}: L/ 360

BEAM SUPPORT

MAX SUPPORT LOAD

LIGHT SIDE: 4	2X6	STUDS	20140	LBS
HEIGHT (FT): 8				
SPOT FOOTING: N				
HEAVY SIDE: 4	2X6	STUDS	20140	LBS
HEIGHT (FT): 8				
SPOT FOOTING: N				

STEEL BEAM - W/POINT LOAD

				δ_{MAX} @	3.9 FT. (FROM LIGHT SIDE)
DEPTH =	10.20 IN.	Fb =	33,000 PSI	TL δ_{MAX} =	0.08 IN. L 1125
WIDTH =	4.02 IN.	Fv =	20,000 PSI	LL δ_{MAX} =	0.07 IN. L 1224
		E =	2.90E+07 PSI		
		A =	5.62 IN(2)	$A_{REQ.}$ =	1.26 IN(2)
		S =	18.80 IN(3)	$S_{REQ.}$ =	15.35 IN(3)
		I =	96.30 IN(4)	I_{REQ}(TL) =	33.98 IN(4)
				I_{REQ}(LL) =	46.83 IN(4)

3 -8 **USE** **W10X19**

SAFETY FACTOR = 1.22

SIMPLE SPAN BEAM

LOCATION: NEAR STAIRS

RB - 7

DURATION INCREASE = 1.00

BEAM SPAN (FT) = 16.5

VENEER (Y/N): NO

TRIBUTARY LOADING

	SPAN (FT)	CANT. (FT)	W_{TL} (PLF)	W_{LL} (PLF)
ROOF	27.0	0.0	2498	2295
FLOOR	0.0	0.0	0	0
FLOOR	0.0	0.0	0	0
DECK	0.0	0.0	0	0
OTHER	0.0	0.0	0	0
		TOTAL	**2498**	**2295**

DESIGN LOADS

FLAT ROOF SNOW LOAD	TL	185	PSF
	LL	170	PSF
FLOOR LOAD	TL	64	PSF
	LL	40	PSF
DECK LOAD	TL	102	PSF
	LL	60	PSF
OTHER LOAD	TL	125	PSF
	LL	50	PSF

POINT LOAD

FROM RB

TL = 0 LBS

LL = 0 LBS

LOCATION (a) = 8.3 FT

b = L-a = 8.3 FT (a > b)

EQUIV. UNIFORM TL = 0 PLF

EQUIV. UNIFORM LL = 0 PLF

REACTIONS

LIGHT SIDE (TL) = 20604 LBS

(LL) = 18934 LBS

(DL) = 1671 LBS

HEAVY SIDE (TL) = 20604 LBS

(LL) = 18934 LBS

(DL) = 1671 LBS

Rrt/wTL = 8.3 FT

x' = 8.3 FT

MAXIMUM MOMENT

M_{MAX} = 84,993 FT-LBS

δ CRITERIA:

L δ_{MAX}: L/ 240

L δ_{MAX}: L/ 360

BEAM SUPPORT

LIGHT SIDE: 6X8 POST

HEIGHT (FT): 11

SPOT FOOTING: N

HEAVY SIDE: 6X8 POST

HEIGHT (FT): 11

SPOT FOOTING: N

MAX SUPPORT LOAD

23020 LBS

23020 LBS

STEEL BEAM

DEPTH = 12.50 IN.

WIDTH = 6.56 IN.

Fb = 33,000 PSI

Fv = 20,000 PSI

E = 2.90E+07 PSI

A = 10.30 IN(2)

S = 45.60 IN(3)

I = 285.00 IN(4)

δ_{MAX} @ 8.3 FT. (FROM LIGHT SIDE)

TL δ_{MAX} = 0.50 IN. L 393

LL δ_{MAX} = 0.46 IN. L 428

$A_{REQ.}$ = 1.55 IN(2)

$S_{REQ.}$ = 30.91 IN(3)

I_{REQ}(TL) = 174.09 IN(4)

I_{REQ}(LL) = 239.96 IN(4)

B -7 USE **W12X35**

SAFETY FACTOR = 1.19

SIMPLE SPAN BEAM

LOCATION: NEAR STAIRS

RB - 6

DURATION INCREASE = 1.00

BEAM SPAN (FT) = 17.0

VENEER (Y/N): NO

TRIBUTARY LOADING

	SPAN (FT)	CANT. (FT)	W_{TL} (PLF)	W_{LL} (PLF)
ROOF	21.0	0.0	1943	1785
FLOOR	0.0	0.0	0	0
FLOOR	0.0	0.0	0	0
DECK	0.0	0.0	0	0
OTHER	0.0	0.0	0	0
		TOTAL	**1943**	**1785**

DESIGN LOADS

FLAT ROOF SNOW LOAD	TL	185	PSF
	LL	170	PSF
FLOOR LOAD	TL	64	PSF
	LL	40	PSF
DECK LOAD	TL	102	PSF
	LL	60	PSF
OTHER LOAD	TL	125	PSF
	LL	50	PSF

POINT LOAD

FROM RB

TL = 0 LBS

LL = 0 LBS

LOCATION (a) = 8.5 FT

b = L-a = 8.5 FT (a > b)

EQUIV. UNIFORM TL = 0 PLF

EQUIV. UNIFORM LL = 0 PLF

REACTIONS

LIGHT SIDE (TL) = 16511 LBS

(LL) = 15173 LBS

(DL) = 1339 LBS

HEAVY SIDE (TL) = 16511 LBS

(LL) = 15173 LBS

(DL) = 1339 LBS

Rrt/wTL = 8.5 FT

x' = 8.5 FT

MAXIMUM MOMENT

M_{MAX} = 70,173 FT-LBS

δ CRITERIA:

L δ_{MAX}: L/ 240

L δ_{MAX}: L/ 360

BEAM SUPPORT

LIGHT SIDE: 6X8 POST

HEIGHT (FT): 11

SPOT FOOTING: N

HEAVY SIDE: 6X8 POST

HEIGHT (FT): 11

SPOT FOOTING: N

MAX SUPPORT LOAD

23020 LBS

23020 LBS

STEEL BEAM

DEPTH = 12.50 IN.

WIDTH = 6.56 IN.

Fb = 33,000 PSI

Fv = 20,000 PSI

E = 2.90E+07 PSI

A = 10.30 IN(2)

S = 45.60 IN(3)

I = 285.00 IN(4)

δ_{MAX} @ 8.5 FT. (FROM LIGHT SIDE)

TL δ_{MAX} = 0.44 IN. L 462

LL δ_{MAX} = 0.41 IN. L 503

$A_{REQ.}$ = 1.24 IN(2)

$S_{REQ.}$ = 25.52 IN(3)

I_{REQ}(TL) = 148.09 IN(4)

I_{REQ}(LL) = 204.12 IN(4)

3 -6 **USE** **W12X35**

SAFETY FACTOR = 1.40

BEAM WITH POINT LOAD

LOCATION: MSTR SUITE

RB - 5

DURATION INCREASE = 1.00

BEAM SPAN (FT) = 7.0

DESIGN LOADS

FLAT ROOF SNOW LOAD	TL	185	PSF
	LL	170	PSF
FLOOR LOAD	TL	64	PSF
	LL	40	PSF
DECK LOAD	TL	102	PSF
	LL	60	PSF
OTHER LOAD	TL	125	PSF
	LL	50	PSF

TRIBUTARY LOADING

	SPAN (FT)	CANT. (FT)	W_{TL} (PLF)	W_{LL} (PLF)
ROOF	13.0	0.0	1203	1105
FLOOR	0.0	0.0	0	0
FLOOR	0.0	0.0	0	0
DECK	0.0	0.0	0	0
OTHER	0.0	0.0	0	0
		TOTAL	**1203**	**1105**

POINT LOAD

FROM RB-4

TL = 7805 LBS

LL = 7172 LBS

LOCATION (a) = 3.8 FT

b = L-a = 3.2 FT (a > b)

EQUIV. UNIFORM TL = 2214 PLF

EQUIV. UNIFORM LL = 2034 PLF

REACTIONS

LIGHT SIDE (TL) =	7777	LBS
(LL) =	7146	LBS
(DL) =	631	LBS
HEAVY SIDE (TL) =	8446	LBS
(LL) =	7761	LBS
(DL) =	685	LBS
Rrt/wTL =	6.5	FT
x' =	3.8	FT

MAXIMUM MOMENT

M_{MAX} = 20,869 FT-LBS

δ CRITERIA:

L δ_{MAX}: L/ 240

L δ_{MAX}: L/ 360

BEAM SUPPORT

LIGHT SIDE:	4X6	POST	
HEIGHT (FT):	9		
SPOT FOOTING:	N		
HEAVY SIDE:	4X6	POST	
HEIGHT (FT):	9		
SPOT FOOTING:	N		

MAX SUPPORT LOAD

8510 LBS

8510 LBS

STRUCTURAL COMPOSITE LUMBER - W/ PT. LOAD

TYPE: LVL (1.9E)

DEPTH (d)est. = 11 7/8 IN.

WIDTH (b)est. = 1 3/4 IN.

OF MEMBERS = 3

Fb =	2,600	PSI
Fv =	285	PSI
E =	1.90E+06	PSI
CF =	1.00	
A =	62.34	IN(2)
S =	123.39	IN(3)
I =	732.62	IN(4)

δ_{MAX} @	3.5	FT. (FROM LIGHT SIDE)
TL δ_{MAX} =	0.12	IN. L/ 729
LL δ_{MAX} =	0.10	IN. L/ 821
$A_{REQ.}$ =	34.60	IN(2)
$S_{REQ.}$ =	96.13	IN(3)
I_{REQ}(TL) =	241.20	IN(4)
I_{REQ}(LL) =	332.47	IN(4)
$BRG_{REQ.}$ =	3	IN.

3 -5 **USE** **(3) 1-3/4" X 11-7/8" LVL(S)**

SAFETY FACTOR = 1.28

SIMPLE SPAN BEAM

LOCATION: MSTR SUITE

RB - 4

DURATION INCREASE = 1.00

BEAM SPAN (FT) = 13.5

VENEER (Y/N): NO

TRIBUTARY LOADING

	SPAN (FT)	CANT. (FT)	W_{TL} (PLF)	W_{LL} (PLF)
ROOF	12.5	0.0	1156	1063
FLOOR	0.0	0.0	0	0
FLOOR	0.0	0.0	0	0
DECK	0.0	0.0	0	0
OTHER	0.0	0.0	0	0
		TOTAL	**1156**	**1063**

DESIGN LOADS

FLAT ROOF SNOW LOAD	TL	185	PSF
	LL	170	PSF
FLOOR LOAD	TL	64	PSF
	LL	40	PSF
DECK LOAD	TL	102	PSF
	LL	60	PSF
OTHER LOAD	TL	125	PSF
	LL	50	PSF

POINT LOAD

FROM RB

TL = 0 LBS

LL = 0 LBS

LOCATION (a) = 6.8 FT

b = L-a = 6.8 FT (a > b)

EQUIV. UNIFORM TL = 0 PLF

EQUIV. UNIFORM LL = 0 PLF

REACTIONS

LIGHT SIDE (TL) = 7805 LBS

(LL) = 7172 LBS

(DL) = 633 LBS

HEAVY SIDE (TL) = 7805 LBS

(LL) = 7172 LBS

(DL) = 633 LBS

Rrt/wTL = 6.8 FT

x' = 6.8 FT

MAXIMUM MOMENT

M_{MAX} = 26,341 FT-LBS

δ CRITERIA:

L δ_{MAX}: L/ 240

L δ_{MAX}: L/ 360

BEAM SUPPORT

LIGHT SIDE: 4 2X6 STUDS

HEIGHT (FT): 11

SPOT FOOTING: N

HEAVY SIDE: NA 2X6 STUDS

HEIGHT (FT): 11

SPOT FOOTING: N

MAX SUPPORT LOAD

14160 LBS

STRUCTURAL COMPOSITE LUMBER

TYPE: LVL (1.9E)

DEPTH (d)est. = 14 IN.

WIDTH (b)est. = 1 3/4 IN.

OF MEMBERS = 3

Fb = 2,600 PSI

Fv = 285 PSI

E = 1.90E+06 PSI

CF = 0.98

A = 73.50 IN(2)

S = 171.50 IN(3)

I = 1200.50 IN(4)

δ_{MAX} @ 6.8 FT. (FROM LIGHT SIDE)

TL δ_{MAX} = 0.38 IN. L/ 428

LL δ_{MAX} = 0.35 IN. L/ 465

$A_{REQ.}$ = 33.91 IN(2)

$S_{REQ.}$ = 123.90 IN(3)

I_{REQ}(TL) = 673.77 IN(4)

I_{REQ}(LL) = 928.71 IN(4)

$BRG_{REQ.}$ = 3 IN.

USE **(3) 1-3/4" X 14" LVL(S)**

SAFETY FACTOR = 1.29

SIMPLE SPAN BEAM

LOCATION: WIDER HEADER

RB - 3

DURATION INCREASE = 1.00

BEAM SPAN (FT) = 11.0

VENEER (Y/N): NO

TRIBUTARY LOADING

	SPAN (FT)	CANT. (FT)	W_{TL} (PLF)	W_{LL} (PLF)
ROOF	19.0	0.0	1758	1615
FLOOR	0.0	0.0	0	0
FLOOR	0.0	0.0	0	0
DECK	0.0	0.0	0	0
OTHER	0.0	0.0	0	0
		TOTAL	**1758**	**1615**

DESIGN LOADS

FLAT ROOF SNOW LOAD	TL	185	PSF
	LL	170	PSF
FLOOR LOAD	TL	64	PSF
	LL	40	PSF
DECK LOAD	TL	102	PSF
	LL	60	PSF
OTHER LOAD	TL	125	PSF
	LL	50	PSF

POINT LOAD

FROM

TL = 0 LBS

LL = 0 LBS

LOCATION (a) = 8.5 FT

b = L-a = 2.5 FT (a > b)

EQUIV. UNIFORM TL = 0 PLF

EQUIV. UNIFORM LL = 0 PLF

REACTIONS

LIGHT SIDE (TL) = 9666 LBS

(LL) = 8883 LBS

(DL) = 784 LBS

HEAVY SIDE (TL) = 9666 LBS

(LL) = 8883 LBS

(DL) = 784 LBS

Rrt/wTL = 5.5 FT

x' = 5.5 FT

MAXIMUM MOMENT

M_{MAX} = 26,582 FT-LBS

δ CRITERIA:

L δ_{MAX}: L/ 240

L δ_{MAX}: L/ 360

BEAM SUPPORT

LIGHT SIDE: 3 2X6 STUDS

HEIGHT (FT): 8

SPOT FOOTING: N

HEAVY SIDE: 3 2X6 STUDS

HEIGHT (FT): 8

SPOT FOOTING: N

MAX SUPPORT LOAD

11100 LBS

11100 LBS

STRUCTURAL COMPOSITE LUMBER

TYPE: LVL (1.9E)

DEPTH (d)est. = 14 IN.

WIDTH (b)est. = 1 3/4 IN.

OF MEMBERS = 3

Fb = 2,600 PSI

Fv = 285 PSI

E = 1.90E+06 PSI

CF = 0.98

A = 73.50 IN(2)

S = 171.50 IN(3)

I = 1200.50 IN(4)

δ_{MAX} @ 5.5 FT. (FROM LIGHT SIDE)

TL δ_{MAX} = 0.25 IN. L/ 520

LL δ_{MAX} = 0.23 IN. L/ 566

$A_{REQ.}$ = 40.00 IN(2)

$S_{REQ.}$ = 125.04 IN(3)

I_{REQ}(TL) = 554.03 IN(4)

I_{REQ}(LL) = 763.66 IN(4)

$BRG_{REQ.}$ = 3 IN.

3 -3 USE (3) 1-3/4" X 14" LVL(S)

SAFETY FACTOR = 1.37

SIMPLE SPAN BEAM

LOCATION: WIDE HEADER

RB - 2

DURATION INCREASE = 1.00

BEAM SPAN (FT) = 5.5

TRIBUTARY LOADING

	SPAN (FT)	CANT. (FT)	W_{TL} (PLF)	W_{LL} (PLF)
ROOF	14.0	0.0	1295	1190
FLOOR	0.0	0.0	0	0
FLOOR	0.0	0.0	0	0
DECK	0.0	0.0	0	0
OTHER	0.0	0.0	0	0
		TOTAL	**1295**	**1190**

DESIGN LOADS

FLAT ROOF SNOW LOAD	TL	185	PSF
	LL	170	PSF
FLOOR LOAD	TL	64	PSF
	LL	40	PSF
DECK LOAD	TL	102	PSF
	LL	60	PSF
OTHER LOAD	TL	125	PSF
	LL	50	PSF

POINT LOAD

FROM

TL = 0 LBS

LL = 0 LBS

LOCATION (a) = 2.8 FT

b = L-a = 2.8 FT (a > b)

EQUIV. UNIFORM TL = 0 PLF

EQUIV. UNIFORM LL = 0 PLF

REACTIONS

LIGHT SIDE (TL) = 3561 LBS

(LL) = 3273 LBS

(DL) = 289 LBS

HEAVY SIDE (TL) = 3561 LBS

(LL) = 3273 LBS

(DL) = 289 LBS

Rrt/wTL = 2.8 FT

x' = 2.8 FT

MAXIMUM MOMENT

M_{MAX} = 4,897 FT-LBS

δ CRITERIA:

L δ_{MAX}: L/ 240

L δ_{MAX}: L/ 360

BEAM SUPPORT

LIGHT SIDE: 3 2X4 STUDS

HEIGHT (FT): 8

SPOT FOOTING: N

HEAVY SIDE: 3 2X4 STUDS

HEIGHT (FT): 8

SPOT FOOTING: N

MAX SUPPORT LOAD

7160 LBS

7160 LBS

STRUCTURAL COMPOSITE LUMBER

TYPE: LVL (1.9E)

DEPTH (d)est. = 9 1/2 IN.

WIDTH (b)est. = 1 3/4 IN.

OF MEMBERS = 2

Fb = 2,600 PSI

Fv = 285 PSI

E = 1.90E+06 PSI

CF = 1.00

A = 33.25 IN(2)

S = 52.65 IN(3)

I = 250.07 IN(4)

δ_{MAX} @ 2.8 FT. (FROM LIGHT SIDE)

TL δ_{MAX} = 0.06 IN. L/ 1176

LL δ_{MAX} = 0.05 IN. L/ 1280

$A_{REQ.}$ = 13.32 IN(2)

$S_{REQ.}$ = 22.56 IN(3)

I_{REQ}(TL) = 51.03 IN(4)

I_{REQ}(LL) = 70.34 IN(4)

$BRG_{REQ.}$ = 3 IN.

3 -2 USE (2) 1-3/4" X 9-1/2" LVL(S)

SAFETY FACTOR = 2.33

SIMPLE SPAN BEAM

LOCATION: TYPICAL HEADER

RB - 1

DURATION INCREASE = 1.00

BEAM SPAN (FT) = 3.5

TRIBUTARY LOADING

	SPAN (FT)	CANT. (FT)	W_{TL} (PLF)	W_{LL} (PLF)
ROOF	19.0	0.0	1758	1615
FLOOR	0.0	0.0	0	0
FLOOR	0.0	0.0	0	0
DECK	0.0	0.0	0	0
OTHER	0.0	0.0	0	0
		TOTAL	**1758**	**1615**

DESIGN LOADS

FLAT ROOF SNOW LOAD	TL	185	PSF
	LL	170	PSF
FLOOR LOAD	TL	64	PSF
	LL	40	PSF
DECK LOAD	TL	102	PSF
	LL	60	PSF
OTHER LOAD	TL	125	PSF
	LL	50	PSF

POINT LOAD

FROM RB

TL = 0 LBS

LL = 0 LBS

LOCATION (a) = 1.8 FT

b = L-a = 1.8 FT (a > b)

EQUIV. UNIFORM TL = 0 PLF

EQUIV. UNIFORM LL = 0 PLF

REACTIONS

LIGHT SIDE (TL) = 3076 LBS

(LL) = 2826 LBS

(DL) = 249 LBS

HEAVY SIDE (TL) = 3076 LBS

(LL) = 2826 LBS

(DL) = 249 LBS

Rrt/wTL = 1.8 FT

x' = 1.8 FT

MAXIMUM MOMENT

M_{MAX} = 2,691 FT-LBS

δ CRITERIA:

L δ_{MAX}: L/ 240

L δ_{MAX}: L/ 360

BEAM SUPPORT

MAX SUPPORT LOAD

LIGHT SIDE: 2 2X6 STUDS 3800 LBS

HEIGHT (FT): 8

SPOT FOOTING: N

HEAVY SIDE: 2 2X6 STUDS 3800 LBS

HEIGHT (FT): 8

SPOT FOOTING: N

DIMENSIONAL LUMBER

TYPE: DF#2

DEPTH (d)est. = 9 1/4 IN.

WIDTH (b)est. = 4 1/2 IN.

CF = 1.1

Fb = 850 PSI

Fv = 180 PSI

E = 1.60E+06 PSI

A = 41.63 IN(2)

S = 64.17 IN(3)

I = 296.79 IN(4)

δ_{MAX} @ 1.8 FT. (FROM LIGHT SIDE)

TL δ_{MAX} = 0.01 IN. L/ 3361

LL δ_{MAX} = 0.01 IN. L/ 3658

$A_{REQ.}$ = 14.31 IN(2)

$S_{REQ.}$ = 34.47 IN(3)

I_{REQ}(TL) = 21.19 IN(4)

I_{REQ}(LL) = 29.21 IN(4)

$BRG_{REQ.}$ = 3 IN.

3 -1 **USE** **(3) - 2 X 10 (S)**

SAFETY FACTOR = 1.86

JOISTS

BCI SIMPLE SPAN WEB JOIST

LOCATION: TYPICAL JOIST

RJ - 1

ROOF LOAD

				DL =	15 PSF
DURATION INCREASE (D) =	1.00			LL =	170 PSF
JOIST SPACING =	24.0	IN.		TL =	185 PSF
JOIST SPAN (L) =	13.50	FT (MAX)			
LOADING (w) =	370	PLF(TL)			
	340	PLF(LL)			
REACTION = wTL*L/2 =	2498				
wLL*L/2 =	2295				
MAXIMUM MOMENT (M) = wL^2/8 =	8,429	FT LBS			
MAXIMUM SHEAR (V) = w(L/2-d) =	2,066	LBS			
Δ (TL) = (5w(TL)L^4]/384 *	9.40E+08	+			
w(TL)L^2/	8.00E+06	=	0.39	IN.	
Δ (LL) = (5w(LL)L^4]/384 *	9.40E+08	=	=> L/ 418		
w(LL)L^2/	8.00E+06	=	0.36	IN.	
		=	=> L/ 446		

	MAXIMUM ALLOWABLE		SAFETY FACTOR
M =	11390	FT LBS	1.35
V =	2350	LBS	1.14
		DEFLECTION =	1.24

USE **14 IN. BCI ® 90 2.0 @ 24.0 IN. O.C.**

CHECK HANGERS SAFETY FACTOR = 1.14

Project: 17-244 HOLLIS CALCS

Location: RFTR1
Roof Rafter
[2015 International Building Code(2012 NDS)]
SERIES 90s 2.0 / 14 - Boise Cascade x 17.0 FT @ 16 O.C.
Section Adequate By: 6.3%
Controlling Factor: Deflection

StruCalc Version 10.0.1.5 8/17/2017 9:20:58 AM

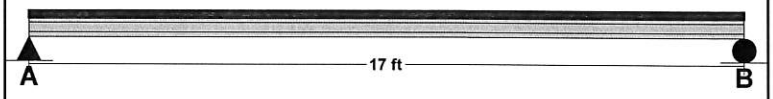
DEFLECTIONS	Center	
Live Load	0.53	IN L/383
Dead Load	0.05	in
Total Load	0.58	IN L/352

Live Load Deflection Criteria: L/360 Total Load Deflection Criteria: L/240

REACTIONS	A		B	
Live Load	1927	lb	1927	lb
Dead Load	170	lb	170	lb
Total Load	2097	lb	2097	lb
Bearing Length	1.75	in	3.50	in
Web Stiffeners	Yes		Yes	

SUPPORT LOADS	A		B	
Live Load	1445	plf	1445	plf
Dead Load	128	plf	128	plf
Total Load	1573	plf	1573	plf

LOADING DIAGRAM



I-JOIST PROPERTIES

SERIES 90s 2.0 / 14 - Boise Cascade

	Base Values		Adjusted	
Moment Cap:	Mcap = 11390	ft-lb	Mcap' = 13099	ft-lb
	Cd = 1.15			
Shear Stress:	Vcap = 2350	lb	Vcap' = 2703	lb
	Cd = 1.15			
Reaction A:	Rcap = 1950	lb	Rcap' = 2243	lb
Reaction B:	Rcap = 1950	lb	Rcap' = 2243	lb
E.I.:	EI = 980	lb-in2	EI' = 980	lb-in2

Controlling Moment: 8911 ft-lb
8.5 Ft from left support of span 3 (Right Span)
Created by combining all dead loads and live loads on span(s) 2
Controlling Shear: -2097 lb
At right support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s) 2

Comparisons with required sections:	Req'd	Provided
E.I.:	922 in2-lb E6	980 in2-lb xE6
Moment:	8911 ft-lb	13099 ft-lb
Shear:	-2097 lb	2703 lb

RAFTER DATA	Interior
Span Length	17 ft
Rafter Pitch	0 :12

Roof sheathing applied to top of joists-top of rafters fully braced.
Sheathing/sheetrock applied to bottom of joists-bottom of rafters fully braced.
Roof Duration Factor 1.15

RAFTER LOADING

Uniform Roof Loading

Roof Live Load:	LL =	170	psf
Roof Dead Load:	DL =	15	psf

Slope Adjusted Spans And Loads

Interior Span:	L-adj =	17	ft
Eave Span:	L-Eave-adj =	0	ft
Interior Live Load:	wL-adj =	227	plf
Eave Live Load:	wL-Eave-adj =	NaN	plf
Interior Dead Load:	wD-adj =	20	plf
Eave Dead Load:	wD-Eave-adj =	NaN	plf
Interior Total Load:	wT-adj =	247	plf
Eave Total Load:	wT-Eave-adj =	NaN	plf

Project: 17-244 HOLLIS CALCS

Location: RFTR2
Roof Rafter
[2015 International Building Code(2012 NDS)]
1.75 IN x 14.0 IN x 19.0 FT @ 8 O.C.
1.9E Microllam - iLevel Trus Joist
Section Adequate By: 44.9%
Controlling Factor: Deflection

StruCalc Version 10.0.1.5 8/17/2017 9:20:58 AM

DEFLECTIONS	Center	
Live Load	0.44	IN L/522
Dead Load	0.04	in
Total Load	0.48	IN L/479

Live Load Deflection Criteria: L/360 Total Load Deflection Criteria: L/240

REACTIONS	A	B
Live Load	1077 lb	1077 lb
Dead Load	95 lb	95 lb
Total Load	1172 lb	1172 lb
Bearing Length	0.89 in	0.89 in

SUPPORT LOADS	A	B
Live Load	1616 plf	1616 plf
Dead Load	143 plf	143 plf
Total Load	1758 plf	1758 plf

MATERIAL PROPERTIES

1.9E Microllam - iLevel Trus Joist

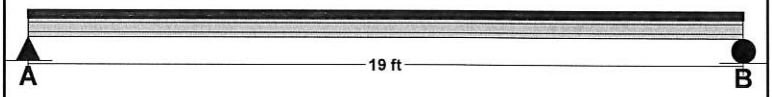
	Base Values	Adjusted
Bending Stress:	Fb = 2600 psi	Fb' = 2928 psi
	Cd=1.15 CF=0.98	
Shear Stress:	Fv = 285 psi	Fv' = 328 psi
	Cd=1.15	
Modulus of Elasticity:	E = 1900 ksi	E' = 1900 ksi
Comp. ⊥ to Grain:	Fc - ⊥ = 750 psi	Fc - ⊥' = 750 psi

Controlling Moment: 5565 ft-lb
9.5 Ft from left support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s) 2

Controlling Shear: -1172 lb
At right support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s) 2

Comparisons with required sections:	Req'd	Provided
Section Modulus:	22.81 in3	57.17 in3
Area (Shear):	5.36 in2	24.5 in2
Moment of Inertia (deflection):	276.12 in4	400.17 in4
Moment:	5565 ft-lb	13948 ft-lb
Shear:	-1172 lb	5353 lb

LOADING DIAGRAM



RAFTER DATA	Interior
Span Length	19 ft
Rafter Pitch	0 :12

Roof sheathing applied to top of joists-top of rafters fully braced.
Sheathing/sheetrock applied to bottom of joists-bottom of rafters fully braced.

Roof Duration Factor	1.15
Peak Notch Depth	0.00
Base Notch Depth	0.00

RAFTER LOADING

Uniform Roof Loading

Roof Live Load:	LL =	170 psf
Roof Dead Load:	DL =	15 psf

Slope Adjusted Spans And Loads

Interior Span:	L-adj =	19 ft
Eave Span:	L-Eave-adj =	0 ft
Interior Live Load:	wL-adj =	113 plf
Eave Live Load:	wL-Eave-adj =	NaN plf
Interior Dead Load:	wD-adj =	10 plf
Eave Dead Load:	wD-Eave-adj =	NaN plf
Interior Total Load:	wT-adj =	123 plf
Eave Total Load:	wT-Eave-adj =	NaN plf

Project: 17-244 HOLLIS CALCS

Location: RFTR3
Roof Rafter
[2015 International Building Code(2012 NDS)]
1.75 IN x 14.0 IN x 21.0 FT @ 8 O.C.
1.9E Microllam - iLevel Trus Joist
Section Adequate By: 7.3%
Controlling Factor: Deflection

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DEFLECTIONS	Center	
Live Load	0.65	IN L/386
Dead Load	0.06	in
Total Load	0.71	IN L/355

Live Load Deflection Criteria: L/360 Total Load Deflection Criteria: L/240

REACTIONS	A	B
Live Load	1190 lb	1190 lb
Dead Load	105 lb	105 lb
Total Load	1295 lb	1295 lb
Bearing Length	0.99 in	0.99 in

SUPPORT LOADS	A	B
Live Load	1785 plf	1785 plf
Dead Load	158 plf	158 plf
Total Load	1943 plf	1943 plf

MATERIAL PROPERTIES

1.9E Microllam - iLevel Trus Joist

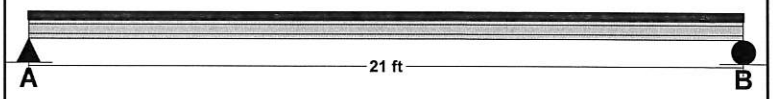
	Base Values	Adjusted
Bending Stress:	Fb = 2600 psi	Fb' = 2928 psi
	Cd=1.15 CF=0.98	
Shear Stress:	Fv = 285 psi	Fv' = 328 psi
	Cd=1.15	
Modulus of Elasticity:	E = 1900 ksi	E' = 1900 ksi
Comp. ⊥ to Grain:	Fc - ⊥ = 750 psi	Fc - ⊥' = 750 psi

Controlling Moment: 6799 ft-lb
10.5 Ft from left support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s) 2

Controlling Shear: -1295 lb
At right support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s) 2

Comparisons with required sections:	Req'd	Provided
Section Modulus:	27.86 in3	57.17 in3
Area (Shear):	5.93 in2	24.5 in2
Moment of Inertia (deflection):	372.82 in4	400.17 in4
Moment:	6799 ft-lb	13948 ft-lb
Shear:	-1295 lb	5353 lb

LOADING DIAGRAM



RAFTER DATA	Interior
Span Length	21 ft
Rafter Pitch	0 :12

Roof sheathing applied to top of joists-top of rafters fully braced.
Sheathing/sheetrock applied to bottom of joists-bottom of rafters fully braced.

Roof Duration Factor	1.15
Peak Notch Depth	0.00
Base Notch Depth	0.00

RAFTER LOADING

Uniform Roof Loading

Roof Live Load:	LL =	170	psf
Roof Dead Load:	DL =	15	psf

Slope Adjusted Spans And Loads

Interior Span:	L-adj =	21	ft
Eave Span:	L-Eave-adj =	0	ft
Interior Live Load:	wL-adj =	113	plf
Eave Live Load:	wL-Eave-adj =	NaN	plf
Interior Dead Load:	wD-adj =	10	plf
Eave Dead Load:	wD-Eave-adj =	NaN	plf
Interior Total Load:	wT-adj =	123	plf
Eave Total Load:	wT-Eave-adj =	NaN	plf

Project: 17-244 HOLLIS CALCS

Location: RFTR4
Roof Rafter
[2015 International Building Code(2012 NDS)]
SERIES 90s 2.0 / 14 - Boise Cascade x 11.5 FT @ 24 O.C.
Section Adequate By: 5.4%
Controlling Factor: End Reaction

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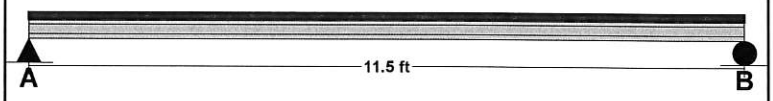
DEFLECTIONS	Center	
Live Load	0.20	IN L/677
Dead Load	0.02	in
Total Load	0.22	IN L/622

Live Load Deflection Criteria: L/360 Total Load Deflection Criteria: L/240

REACTIONS	A		B	
Live Load	1955	lb	1955	lb
Dead Load	173	lb	173	lb
Total Load	2128	lb	2128	lb
Bearing Length	1.75	in	3.50	in
Web Stiffeners	Yes		Yes	

SUPPORT LOADS	A		B	
Live Load	978	plf	978	plf
Dead Load	87	plf	87	plf
Total Load	1064	plf	1064	plf

LOADING DIAGRAM



I-JOIST PROPERTIES

SERIES 90s 2.0 / 14 - Boise Cascade

	Base Values		Adjusted	
Moment Cap:	Mcap = 11390	ft-lb	Mcap' = 13099	ft-lb
	Cd = 1.15			
Shear Stress:	Vcap = 2350	lb	Vcap' = 2703	lb
	Cd = 1.15			
Reaction A:	Rcap = 1950	lb	Rcap' = 2243	lb
Reaction B:	Rcap = 1950	lb	Rcap' = 2243	lb
E.I.:	EI = 980	lb-in2	EI' = 980	lb-in2

Controlling Moment: 6117 ft-lb
5.75 Ft from left support of span 3 (Right Span)
Created by combining all dead loads and live loads on span(s) 2

Controlling Shear: -2128 lb
12.0 Ft from left support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s) 2

Comparisons with required sections:	Req'd	Provided
E.I.:	521 in2-lb E6	980 in2-lb xE6
Moment:	6117 ft-lb	13099 ft-lb
Shear:	-2128 lb	2703 lb

RAFTER DATA	Interior
Span Length	11.5 ft
Rafter Pitch	0 :12

Roof sheathing applied to top of joists-top of rafters fully braced.
Sheathing/sheetrock applied to bottom of joists-bottom of rafters fully braced.
Roof Duration Factor 1.15

RAFTER LOADING

Uniform Roof Loading

Roof Live Load:	LL =	170	psf
Roof Dead Load:	DL =	15	psf

Slope Adjusted Spans And Loads

Interior Span:	L-adj =	11.5	ft
Eave Span:	L-Eave-adj =	0	ft
Interior Live Load:	wL-adj =	340	plf
Eave Live Load:	wL-Eave-adj =	NaN	plf
Interior Dead Load:	wD-adj =	30	plf
Eave Dead Load:	wD-Eave-adj =	NaN	plf
Interior Total Load:	wT-adj =	370	plf
Eave Total Load:	wT-Eave-adj =	NaN	plf

Project: 17-244 HOLLIS CALCS

Location: RFTR5
Roof Rafter
[2015 International Building Code(AISC 14th Ed ASD)]
HSS 4 x 4 x 3/16 x 8.5 FT ASTM A500-GR.B-46 @ 24 O.C.
Section Adequate By: 27.8%
Controlling Factor: Deflection

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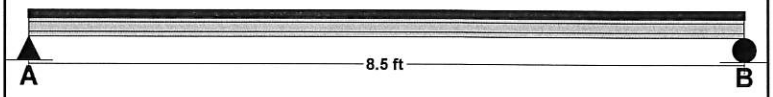
DEFLECTIONS	Center	
Live Load	0.22	IN L/460
Dead Load	0.02	in
Total Load	0.24	IN L/423

Live Load Deflection Criteria: L/360 Total Load Deflection Criteria: L/240

REACTIONS	A		B	
Live Load	1445	lb	1445	lb
Dead Load	128	lb	128	lb
Total Load	1573	lb	1573	lb
Bearing Length	0.35	in	0.35	in

SUPPORT LOADS	A		B	
Live Load	723	plf	723	plf
Dead Load	64	plf	64	plf
Total Load	787	plf	787	plf

LOADING DIAGRAM



STEEL PROPERTIES
HSS 4 x 4 x 3/16 - A500-GR.B-46

Properties:

Steel Yield Strength:	Fy =	46	ksi
Modulus of Elasticity:	E =	29000	ksi
Tube Steel Section (X Axis):	dx =	4	in
Tube Steel Section (Y Axis):	dy =	4	in
Tube Steel Wall Thickness:	t =	0.174	in
Area:	A =	2.58	in2
Moment of Inertia (X Axis):	Ix =	6.21	in4
Section Modulus (X Axis):	Sx =	3.1	in3
Plastic Section Modulus (X Axis):	Zx =	3.67	in3
Plastic Section Modulus (Y Axis):	Zy =	3.67	in3

Design Properties per AISC 14th Edition Steel Manual:

Flange Buckling Ratio:	FBR =	19.99	
Allowable Flange Buckling Ratio:	AFBR =	28.12	
Allowable Flange Buckling Ratio non-compact:	AFBR_NC =	35.15	
Web Buckling Ratio:	WBR =	19.99	
Allowable Web Buckling Ratio for Eqn. F7-5:	AWBR =	60.76	
Nominal Flexural Strength w/ Safety Factor:	Mn =	8424	ft-lb
Controlling Equation:	F7-1		

RAFTER DATA Interior
Span Length 8.5 ft
Rafter Pitch 0 :12
Roof sheathing applied to top of joists-top of rafters fully braced.
Sheathing/sheetrock applied to bottom of joists-bottom of rafters fully braced.

RAFTER LOADING

Uniform Roof Loading

Roof Live Load:	LL =	170	psf
Roof Dead Load:	DL =	15	psf

Slope Adjusted Spans And Loads

Interior Span:	L-adj =	8.5	ft
Eave Span:	L-Eave-adj =	0	ft
Interior Live Load:	wL-adj =	340	plf
Eave Live Load:	wL-Eave-adj =	NaN	plf
Interior Dead Load:	wD-adj =	30	plf
Eave Dead Load:	wD-Eave-adj =	NaN	plf
Interior Total Load:	wT-adj =	370	plf
Eave Total Load:	wT-Eave-adj =	NaN	plf

Controlling Moment: 3342 ft-lb
4.25 Ft from left support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s) 2
Controlling Shear: 1573 lb
At left support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s

Comparisons with required sections:	Req'd	Provided
Moment of Inertia (deflection):	4.86 in4	6.21 in4
Moment:	3342 ft-lb	8424 ft-lb
Shear:	1573 lb	22270 lb

FOOTINGS

	LOCATION	DEAD LOAD	LIVE LOAD	TOTAL LOAD	FOOTING SIZE
CONT FTGS	INTERIOR BEARING WALL	**ROOF** WIDTH FT x SPAN FT @ LOAD PSF = 0 PLF	LOAD PSF @ 170 = 0 PLF	0 PLF	
		FLOOR WIDTH FT x SPAN FT @ LOAD PSF = 264 PLF	LOAD PSF @ 40 = 440 PLF	704 PLF	874 PLF 2,500 PSF
		WALL WIDTH FT x HEIGHT FT @ LOAD PLF = 170 PLF		170 PLF	= 0.3 FT
	USE AS MINIMUM FOOTING	**FOUNDATION** THICK IN. x HEIGHT FT @ LOAD PCF = 0 PLF		0 PLF	**USE:** **1'-4" X CONT**
		434 PLF	440 PLF	874 PLF	

	LOCATION	DEAD LOAD	LIVE LOAD	TOTAL LOAD	FOOTING SIZE
CONT FTGS	INTERIOR BEARING WALL STAIRS	**ROOF** WIDTH FT x SPAN FT @ LOAD PSF = 203 PLF	LOAD PSF @ 170 = 2295 PLF	2498 PLF	
		FLOOR WIDTH FT x SPAN FT @ LOAD PSF = 204 PLF	LOAD PSF @ 40 = 340 PLF	544 PLF	3,212 PLF 2,500 PSF
		WALL WIDTH FT x HEIGHT FT @ LOAD PLF = 170 PLF		170 PLF	= 1.3 FT
	USE AS MINIMUM FOOTING	**FOUNDATION** THICK IN. x HEIGHT FT @ LOAD PCF = 0 PLF		0 PLF	**USE:** **1'-4" X CONT**
		577 PLF	2,635 PLF	3,212 PLF	
CONT FTGS	EXTERIOR BEARING WALL	**ROOF** WIDTH FT x SPAN FT @ LOAD PSF = 135 PLF	LOAD PSF @ 170 = 1530 PLF	1665 PLF	
		FLOOR WIDTH FT x SPAN FT @ LOAD PSF = 192 PLF	LOAD PSF @ 40 = 320 PLF	512 PLF	3,447 PLF 2,500 PSF
		WALL WIDTH FT x HEIGHT FT @ LOAD PLF = 270 PLF		270 PLF	= 1.4 FT
	USE AS MINIMUM FOOTING	**FOUNDATION** THICK IN. x HEIGHT FT @ LOAD PCF = 1000 PLF		1000 PLF	**USE:** **1'-8" X CONT**
		1,597 PLF	1,850 PLF	3,447 PLF	

LATERAL DESIGN

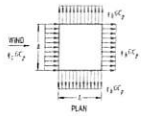
LATERAL RESISTING SYSTEM :

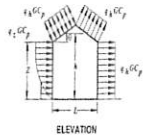
LIGHT-FRAME (WOOD)

WIND DESIGN CRITERIA

MWFRS DIRECTIONAL PROCEDURE (ASCE 7-10, CHAP 27)

BASIC WIND SPEED:	115	MPH FIG 26.5-1A
WIND RISK CATEGORY:	II	
EXPOSURE CATEGORY:	C	
INT. PRESSURE COEF., GC_{pi}:	0.18	TBL 26.11-1
DIRECTION FACTOR, K_d:	0.85	TBL 26.6-1
TOPOGRAPHIC FACTOR, K_{zt}:	1.0	26.8.2
GUST-EFFECT FACTOR, G:	0.85	26.9.1
WINDWARD WALL C_p:	0.8	TBL 27.4-1
α:	10	
z_g:	900	





SEISMIC DESIGN CRITERIA

EQUIVALENT LATERAL FORCE PROCEDURE (ASCE 7-10, 12.8)

SEISMIC RISK CATEGORY:	II
SEISMIC DESIGN CATEGORY:	D0
IMPORTANCE FACTOR, I:	1.0
SHORT PERIOD ACCEL., S_{DS}:	0.863
ONE SEC PERIOD ACCEL., S_{D1}:	0.288
RESPONSE MOD. COEF., R:	6.5
DEFLECTION AMP. FACTOR, C_d:	4.0
OVERSTRENGTH FACTOR, Ω_0:	3.0
DESIGN BASE SHEAR, V:	0.102 *W

	DL (PSF)	LL (PSF)
ROOF LOAD	15	34
FLOOR LOAD	24	0
WALL LOAD	17	0

1-STORY ANALYSIS
ZONE 1

WIND FORCES

WIDTH, L =	26	FT	h/L =	0.54	
DEPTH, B =	55	FT	VELOCITY PRESSURE COEF., K_z:	0.85	TBL 27.3-1
h =	14	FT	VELOCITY PRESSURE COEF., K_h:	0.85	TBL 27.3-1
z =	14	FT	WIND VELOCITY PRESSURE, q_z:	24	PSF EQ. 27.3-1
C_{p1} =	-0.3	FROM FIG. 27.4-1	WIND VELOCITY PRESSURE, q_h:	24	PSF EQ. 27.3-1
C_{p2} =	0.2	FROM FIG. 27.4-1	ROOF WIND PRESSURE, p_1:	-10.6	PSF
ROOF SLOPE	0	/12	ROOF WIND PRESSURE, p_2:	8.6	PSF
ROOF SLOPE	0	DEGREES	ROOF DESIGN WIND PRESSURE, p_R:	0.0	PSF EQ. 27.4-1
			WALL DESIGN WIND PRESSURE, p_F:	21.0	PSF EQ. 27.4-1

	AREA	DESIGN PRESSURE	LOAD (LBS)
ROOF	0.0	0.0	0
WALL	182.0	21.0	3824
		TOTAL	3824

ROOF DIAPHRAGM

DIAPHRAGM LOAD =	3824	LBS
SHEAR LENGTH =	55.0	FT
DIAPHRAGM SHEAR =	70	PLF

SEISMIC FORCES

	AREA (SF)	WEIGHTS (PSF)	ZONE WEIGHT (LBS)
ROOF	1870.0	49	91630
| WALL	364.0	17	6188
|| WALL	385.0	17	6545
		TOTAL	104363
		SHEAR LOAD	10661 LBS

ROOF DIAPHRAGM

DIAPHRAGM LOAD =	9992	LBS
SHEAR LENGTH =	55.0	FT
DIAPHRAGM SHEAR =	182	PLF

SHEAR WALL LOADS

WIND SHEAR LOAD = TOTAL LOAD/1.4
2731 LBS

SEISMIC SHEAR LOAD
10661 LBS

SEISMIC GOVERNS

SW HEIGHT	12	FT
MAX LOAD	10661	LBS
	0	LBS RESISTED BY PANELS/P.F.
HEAR LOAD	10661	LBS RESISTED BY SW

WALL LENGTH	TRIB. SPAN	UNIFORM DL (PLF)	PT LOAD (LBS)	NET OVERTURN (FT-LB)	UPLIFT (LBS):	HOLDOWN REQUIRED	S.W. CAPACITY REQUIRED	SHEAR WALL
7.5	4.0	264	660	23696	3160	HD-4	401	SW-3
11.5	4.0	264	660	30262	2632	HD-4	401	SW-3
4.8	4.0	264	660	16876	3516	HD-5	501	SW-3
2.8	4.0	264	660	10584	3780	HD-5	859	SW-5

TOTAL LENGTH = 26.6 FT
OVERALL WALL SHEAR = **401 PLF**

1-STORY ANALYSIS
ZONE 2

WIND FORCES

WIDTH, L =	32	FT	h/L =	0.81	
DEPTH, B =	64	FT	VELOCITY PRESSURE COEF., K_z:	0.95	TBL 27.3-1
h =	26	FT	VELOCITY PRESSURE COEF., K_h:	0.95	TBL 27.3-1
z =	26	FT	WIND VELOCITY PRESSURE, q_z:	27	PSF EQ. 27.3-1
C_{p1} =	-0.3	FROM FIG. 27.4-1	WIND VELOCITY PRESSURE, q_h:	27	PSF EQ. 27.3-1
C_{p2} =	0.2	FROM FIG. 27.4-1	ROOF WIND PRESSURE, p_1:	-11.9	PSF
ROOF SLOPE	0	/12	ROOF WIND PRESSURE, p_2:	9.6	PSF
ROOF SLOPE	0	DEGREES	ROOF DESIGN WIND PRESSURE, p_R:	0.0	PSF EQ. 27.4-1
			WALL DESIGN WIND PRESSURE, p_W:	23.6	PSF EQ. 27.4-1

	AREA	DESIGN PRESSURE	LOAD (LBS)
ROOF	0.0	0.0	0
WALL	224.0	23.6	5284
		TOTAL	5284

ROOF DIAPHRAGM

DIAPHRAGM LOAD =	5284	LBS
SHEAR LENGTH =	64.0	FT
DIAPHRAGM SHEAR =	83	PLF

SEISMIC FORCES

	AREA (SF)	WEIGHTS (PSF)	ZONE WEIGHT (LBS)
ROOF	2276.0	49	111524
⊥ WALL	448.0	17	7616
∥ WALL	448.0	17	7616
		TOTAL	126756
		SHEAR LOAD	12949 LBS

ROOF DIAPHRAGM

DIAPHRAGM LOAD =	12171	LBS
SHEAR LENGTH =	64.0	FT
DIAPHRAGM SHEAR =	190	PLF

SHEAR WALL LOADS

WIND SHEAR LOAD = TOTAL LOAD/1.4
3774 LBS

SEISMIC SHEAR LOAD
12949 LBS

SEISMIC GOVERNS

SW HEIGHT 12 FT
MAX LOAD 12949 LBS
0 LBS RESISTED BY PANELS/P.F.
HEAR LOAD 12949 LBS RESISTED BY SW

WALL LENGTH	TRIB. SPAN	UNIFORM DL (PLF)	PT LOAD (LBS)	NET OVERTURN (FT-LB)	UPLIFT (LBS):	HOLDOWN REQUIRED	S.W. CAPACITY REQUIRED	SHEAR WALL
30.7	9.0	339	848	-77601	-2528	NOT REQ'D	294	SW-2
9.4	9.0	339	848	10177	1083	HD-2	294	SW-2
2.0	6.0	294	735	4989	2494	HD-4	881	SW-6
2.0	1.0	219	548	5514	2757	HD-4	881	SW-6

TOTAL LENGTH = 44.1 FT
OVERALL WALL SHEAR = **294 PLF**

2-STORY ANALYSIS
ZONE 3

WIND FORCES

WIDTH, L =	27	FT	h/L =	0.96	
DEPTH, B =	79	FT	VELOCITY PRESS. COEF., K_{z2}:	0.95	TBL 27.3-1
h =	26	FT	VELOCITY PRESS. COEF., K_{z1}:	0.85	TBL 27.3-1
z_2 =	26	FT GROUND TO ROOF EAVE	VELOCITY PRESS. COEF., K_h:	0.95	TBL 27.3-1
z_1 =	12	FT GROUND TO UPPER FLR	VELOCITY PRESS., q_{z2}:	27	PSF EQ. 27.3-1
C_{p1} =	-0.2	FROM FIG. 27.4-1	VELOCITY PRESS., q_{z1}:	24	PSF EQ. 27.3-1
C_{p2} =	0.2	FROM FIG. 27.4-1	VELOCITY PRESS., q_h:	27	PSF EQ. 27.3-1
ROOF SLOPE	0	/12	ROOF PRESS., p_1:	-9.6	PSF
ROOF SLOPE	0	DEGREES	ROOF PRESS., p_2:	9.6	PSF
			ROOF DESIGN PRESS., p_R:	0.0	PSF EQ. 27.4-1
			UPPER WALL DESIGN PRESS., p_{F2}:	23.6	PSF EQ. 27.4-1
			MAIN WALL DESIGN PRESS., p_{F1}:	21.5	PSF EQ. 27.4-1

	AREA	DESIGN PRESSURE	LOAD (LBS)
ROOF	0.0	0.0	0
UPPER WALL	189.0	23.6	4458
MAIN WALL	351.0	21.5	7564
		TOTAL	12022
UPPER SHEAR WALL LOAD			4458
MAIN SHEAR WALL LOAD			12022

ROOF DIAPHRAGM

DIAPHRAGM LOAD =	4458	LBS
SHEAR LENGTH =	79.0	FT
DIAPHRAGM SHEAR =	56	PLF

FLOOR DIAPHRAGM

DIAPHRAGM LOAD =	7564	LBS
SHEAR LENGTH =	79.0	FT
DIAPHRAGM SHEAR =	96	PLF

SEISMIC FORCES

	AREA (SF)	WEIGHTS (PSF)	ZONE WEIGHT (LBS)
ROOF	1850.0	49	90650
⊥ WALL	378.0	17	6426
∥ WALL	553.0	17	9401
FLOOR	1850.0	24	44400
⊥ WALL	180.0	17	3060
∥ WALL	336.0	17	5712
		TOTAL	159649
UPPER SHEAR WALL LOAD			10877 LBS
MAIN SHEAR WALL LOAD			16309 LBS

ROOF DIAPHRAGM

DIAPHRAGM LOAD =	9917	LBS
SHEAR LENGTH =	79.0	FT
DIAPHRAGM SHEAR =	126	PLF

FLOOR DIAPHRAGM

DIAPHRAGM LOAD =	4848	LBS
SHEAR LENGTH =	79.0	FT
DIAPHRAGM SHEAR =	61	PLF

UPPER SHEAR WALL LOADS

WIND SHEAR LOAD = TOTAL LOAD/1.4 — 3184 LBS

SEISMIC SHEAR LOAD — 10877 LBS — **SEISMIC GOVERNS**

SW HEIGHT 12 FT
HEAR LOAD 10877 LBS
0 LBS RESISTED BY PANELS/P.F.
HEAR LOAD 10877 LBS RESISTED BY SW

WALL LENGTH	TRIB. SPAN	UNIFORM DL (PLF)	PT LOAD (LBS)	NET OVERTURN (FT-LB)	UPLIFT (LBS):	STRAP TIE REQUIRED	CAPACITY REQUIRED	SHEAR WALL
3.8	1.0	219	548	16834	4430	ST-3	710	SW-5
3.5	9.0	339	848	13835	3953	ST-3	771	SW-5
5.1	13.0	399	998	17231	3379	ST-3	529	SW-4
3.5	9.0	339	848	13835	3953	ST-3	771	SW-5
3.3	9.0	339	848	13156	3987	ST-3	817	SW-5
5.0	8.5	332	829	18680	3736	ST-3	539	SW-4

TOTAL LENGTH = 24.2 FT
OVERALL WALL SHEAR = **449 PLF**

MAIN SHEAR WALL LOADS

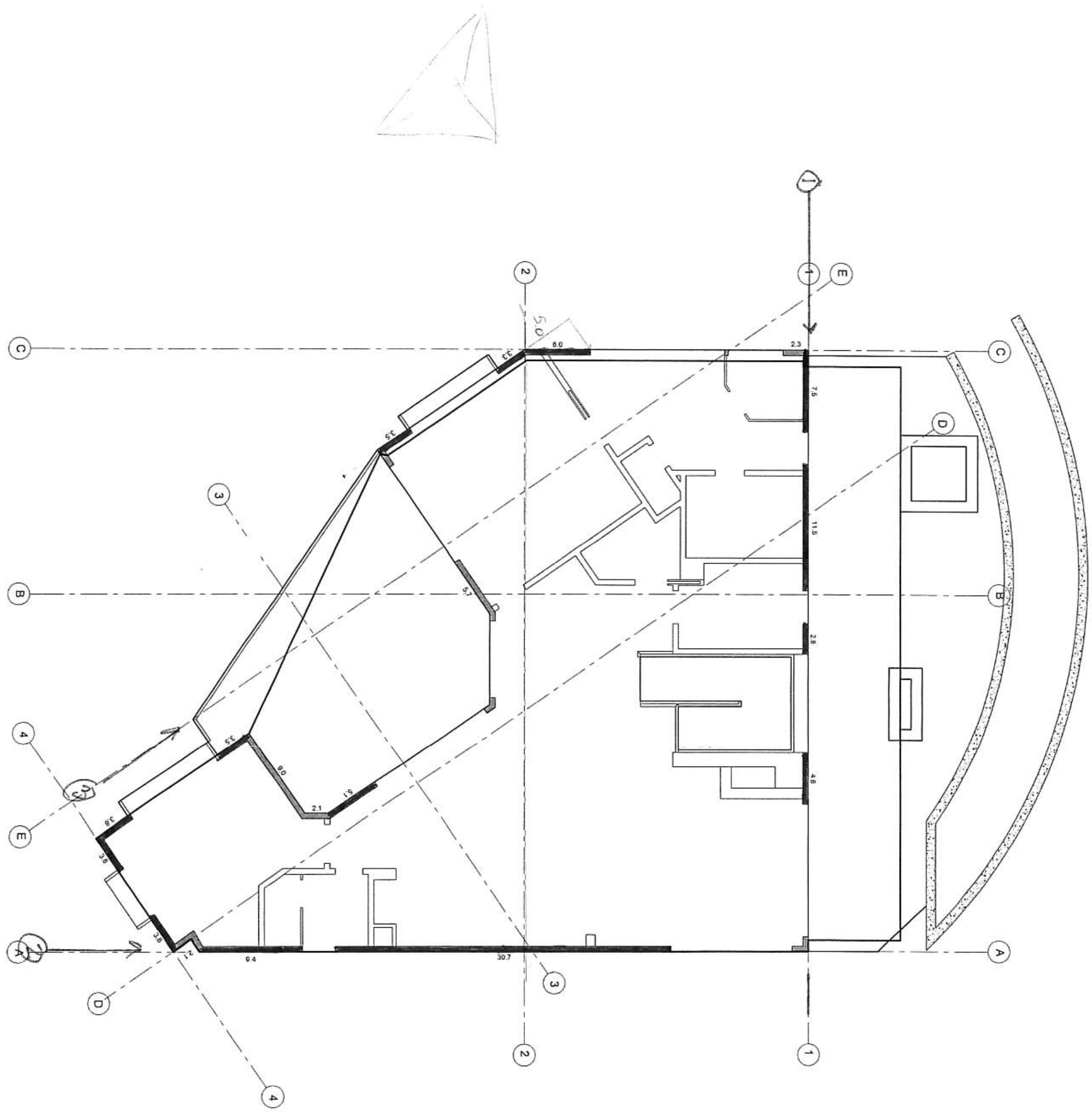
WIND SHEAR LOAD = TOTAL LOAD/1.4 — 8587 LBS

SEISMIC SHEAR LOAD — 16309 LBS — **SEISMIC GOVERNS**

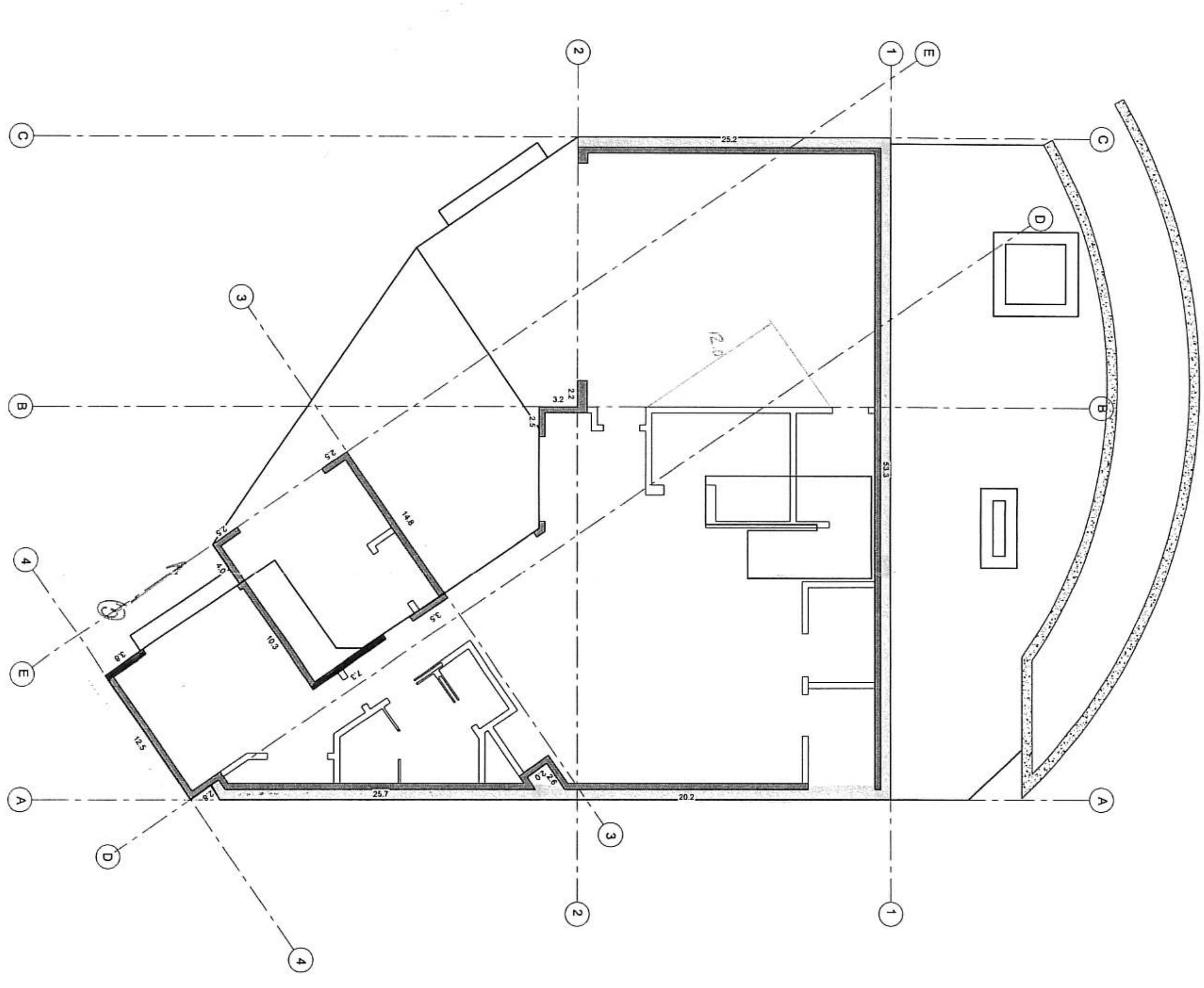
SW HEIGHT 12 FT
MAX LOAD 16309 LBS
0 LBS RESISTED BY PANELS/P.F.
HEAR LOAD 16309 LBS RESISTED BY SW

WALL LENGTH	TRIB. SPAN	FORCE ABOVE	UNIFORM DL (PF)	PT LOAD EACH SIDE (LBS)	NET OVERTURN (FT-LB)	UPLIFT FORCE	HOLDOWN REQUIRED	S.W. CAPACITY REQUIRED	SHEAR WALL
3.8	1.0		219	548	28532	7508	HD-7	1115	SW-6
7.3	10.0		354	885	45953	6295	HD-6	706	SW-5
12.0	5.0		279	698	73207	6101	HD-6	706	SW-5

TOTAL LENGTH = 23.1 FT
OVERALL WALL SHEAR = **706 PLF**



A
B
C
D
E
1
2
3
4
6.0
2.3
7.6
11.5
2.8
4.6
30.7
9.4
5.1
2.1


A
B
C
D
E
1
2
3
4
25.2
53.3
20.2
25.7
14.8
10.3
12.5