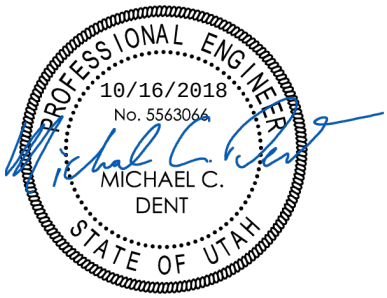
Structural Design
(801) 876-3501



Structural Calculations

C3956A
Lot 7 Whittier Est, Peterson

Prepared For:

Arnell's House Plans
592 East 2050 North
North Ogden, UT 84414

10/16/2018

10/16/2018

STRUCTURAL CALCULATIONS

For: Arnell's House Plans
Plan #: C3956A
Location: Lot 7 Whittier Est, Peterson

From: York Engineering Inc.
2329 West Spring Hollow Road
Morgan, Utah 84050
(801) 876-3501

Design Criteria 2015 IBC:

Roof Loads:

Roof Snow Load (psf):	50
Roof Dead Load (psf):	15

Floor Loads:

Floor Live Load (psf):	40
Floor Dead Load (psf):	12
Seismic Design Category:	D
Wind Speed:	115 mph for Exposure C

Material Properties:

Concrete (f_c'):	3000 psi (foundation) to 4000 psi (suspended slab)
Concrete Reinforcement:	ASTM A615 Grade 60
Site Conditions:	Dry & stable granular based, 1500 psf bearing capacity, granular based
Backfill:	KH = 35 pcf, slope not to exceed 20%, setback from slopes is min. 25'
Dimensional Lumber:	Doug Fir #2 or better
Posts and Timbers:	Doug Fir #1 or better
Steel:	ASTM Grade 50

Use straps and tie downs, and meet nailing, reinforcement and other structural requirements as noted on the drawing and within the pages of this document. These structural calculations are based on conditions and assumptions listed above. If the conditions listed herein are not met or are different, contractor shall bring a request to the attention of the York Engineering prior to construction. Prefab roof trusses to be engineered by the supplier. This engineering assumes that the building site is dry and stable, a high water table or adverse soils such as plastic clays, fills etc. could cause future flooding, settlement, site instability, or other adverse conditions. Verification of and liability for the soil bearing pressure, site stability, and all other site conditions, including site engineering as required, is the responsibility of others. These calculations and engineering are for the new building structure only and do not provide any engineering analysis of or liability/warranty for the non-structural portions of the building, or the site itself. York Engineering Inc. does not assume the role of "Registered Design Professional in Responsible Charge" on this project. The purpose of these calculations and engineering is to help reduce structural damage and loss of life due to seismic activity and/or high wind conditions.

The following general requirements shall be followed during construction:

1. Contractor to verify all dimensions, spans, & conditions and notify engineer of any errors, omissions, or discrepancies prior to construction.
2. If discrepancies are found, the more stringent specification shall be followed.
3. All 2-ply and 3-ply beams and headers to be nailed using 16d two rows @ 12" O.C.
4. Contractor shall assure that all materials are used per manufactures recommendations.
5. Site engineering and liability shall be provided by the owner/builder as required.
6. Contractor shall assure that footings are properly drained, soil is dry, footings rest on undisturbed native soil, building horizontal clearance from footings to adjacent slopes be a minimum of 25 feet, and that the intent of IRC Section R403.1.7.2 is met. If setback requirements of R403.1.7.2 cannot be met then contact engineer for further design requirements.
7. The contractor shall conform to all building codes and practices as per the 2015 IRC
8. Use balloon framing method when connecting floors in split level designs.
9. Provide solid blocking through structure down to footing for all load paths
10. Builder shall follow all recommendations found in all applicable geotechnical reports.
11. Stacking of two sill plates is permitted with 5/8" J-Bolts through both plates. Stacking more than two plates is not permitted without special engineering.
12. Minimum strength requires 2,500 PSI concrete; however, as per IRC 402.2 3,000 PSI conrete shall be used.
13. All exterior walls shall be sheathed with 7/16" APA rated structural wood panel.
14. Block all horizontal edges 1 1/2" nominal or wider.
15. Sheathing shall extend continuous from floor to top plate and be nailed at least 4" O.C. along sill plate. Nails shall be placed not less than 1/2" from edge of panel and driven flush but shall not fracture the surface of the sheathing. Extend sheathing over gable end to wall joints and over rim joist between floors and nail to rim and wall plates at 6" O.C.

Table of Contents

SNOW CALCULATION:	
County:	Morgan
Elevation:	4885
P_0	57
S	63
A_0	4.5
P_g (psf)	62
Ce	1
C_t	1
I	1
C_s	1
P_f (psf)	**50**

Plan: C3956A
Date: 10/4/18
Location: Lot 7 Whittier Est, Peterson

	PASS	PASS	PASS	PASS	PASS
LOCATION	**Back**	**Front**	**Left**	**Right**	**Interior**
	FS: 1.16	FS: 1.07	FS: 2.54	FS: 2.54	FS: 1.19
	DL+0.75LL+0.75S	DL+0.75LL+0.75S	DL+S	DL+S	DL+LL
SOIL SPECS					
Density (pcf)	125	125	125	125	125
Soil Pressure (psf)	1500	1500	1500	1500	1500
Weight (k/lft)	0.06	0.04	0.04	0.04	0.03
BUILDING LOADS					
Roof Span (ft)	36	36	10	10	4
Floor Span (ft)	46	36	4	4	48
Wall Height (ft)	18	18	18	18	18
Suspended Slab Span (ft)	0	0	0	0	0
Total Load (k/lft)	2.27	2.06	0.71	0.71	1.64
FOOTING SPECS					
Footing Width (in)	24	20	20	20	18
Footing Height (in)	10	10	10	10	10
FOUNDATION					
Height Above Grade (ft)	0.67	0.67	0.67	0.67	0.67
Wall Thickness (ft)	0.67	0.67	0.67	0.67	0.67
Weight (k/lft)	0.07	0.07	0.07	0.07	0.07
CONCRETE SPECS					
Density (pcf)	150	150	150	150	150
Strength (psi)	2500	2500	2500	2500	2500
Clear Cover Thickness (in)	3	3	3	3	3
CALCULATIONS					
Total Weight on Soil (k/lft)	2.59	2.34	0.98	0.98	1.89
Soil Load (ksf)	1.29	1.40	0.59	0.59	1.26
FOOTING SELECTION	**F-24**	**F-20**	**F-20**	**F-20**	**F-18**

Plan: C3956A
Date: 10/4/18
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LOADING SUMMARY	
Roof Live Load (psf):	50
Roof Dead Load (psf):	15
Floor Live Load (psf):	40
Floor Dead Load (psf):	12
Exterior Wall Dead Load (psf):	20
Interior Wall Dead Load (psf):	10
Suspended Slab Dead Load (psf)	75
Suspended Slab Live Load (psf):	60
SNOW LOAD PARAMETERS	
Roof Slope (x/12):	8
Roof Pitch (θ):	33.69
Total Roof Load (psf):	65.00
SEISMIC LOAD PARAMETERS	
Site Class:	D
F_a:	1.18
R:	6.5
S_S:	0.812
S_{MS}:	0.954
S_{DS}:	0.636
C_S:	0.098
Redundancy Factor, ρ :	1.30
ASD Load Combination Factor:	0.70
Factored C_S:	0.089
SHEAR DISTRIBUTION	
Base Shear Force lb:	18,542
Floor 1 Lateral Force lb:	4,475
Floor 2 Lateral Force lb:	7,564
Roof Lateral Force lb:	6,503
Diaphragm Loading (plf):	77
Diaphragm FS	**2.78**

DIAPHRAGM LOADING

	Avg. Length (ft)	Avg. Width (ft)	Wall Height (ft)	Dead Wgt. (psf)	Snow Wgt. (psf)	Diaphragm Weight (lb)	Wall Weight (lb)	Total Weight (lb)	Shear (lb)
Roof	79.2	46.2	---	15	10	57,222	15,869	73,090	6,503
Floor 2	62.64	37	8	12		46,569	38,441	85,009	7,564
Floor 1	79.2	46	9	12		21,456	28,842	50,298	4,475

SEISMIC FORCE DISTRIBUTION

	H_X (ft)	W_X (kip)	$H_X \times W_X$	% Force	Total Shear (kip)	F_X	V_X
Roof	27.67	73.09	2,022	61%	11.23	11.23	11.23
Floor 2	11.50	85.01	1,190	36%	17.84	6.61	17.84
Floor 1	2.50	50.30	126	4%	18.54	0.70	18.54
TOTALS	0.01	208.40	3,338	18,542	---	---	18.54

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	Seismic (kips)	Wind (kips)		Shear Wall Allowable Loads (plf)		
	total	left/right	front/back		seismic	wind
2nd Floor	11.2 kips	16.7	9.5	SW-1	350	490
1st Floor	6.6 kips	11.6	6.1	SW-2	450	630
Basement	0.7 kips	7.6	4.0	SW-3	585	819

Location	**Bonus Rm**	**Bonus Rm**	**Loft**	**Loft/Laundry**	**Bedroom**	**Open**	**Bedroom**	**Back**	**Left (Mstr)**	**Right**
	Front side	Front side	Front side	Front/Back mi	Front side	Front side	Front side	Back side	Left side	Right side
Floor	2	2	2	2	2	2	2	2	2	2
Lines up w/	none	none	none	none	none	none	none	none	none	none
Width	**12**	**12**	**12**	**16**	**12**	**10.5**	**13.5**	**54**	**22**	**34**
Depth	**12**	**22.5**	**12**	**45**	**40**	**34.5**	**34**	**34**	**54**	**54**
Area (sqft)	72	135	72	462.5	240	181.125	229.5	880	1144.4328	1144.4328
Force (lb)	353	663	353	2270	1178	889	1126	4319	5616	5616
Adj. Force	356	667	356	2286	1186	895	1135	4350	5616	5616
% of floor	3%	6%	3%	20%	11%	8%	10%	39%	50%	50%
Flr. Diaphragm	81	152	81	521	270	204	258	991	1279	1279
Transferred Sourc	none	none	none	none	none	none	2-front-Open	none	none	none
Transfered Forces	**0**	**0**	**0**	**0**	**0**	**0**	**895**	**0**	**0**	**0**
Forces from Upper	0	0	0	0	0	0	0	0	0	0
Total Seismic	**356**	**667**	**356**	**2286**	**1186**	**895**	**2030**	**4350**	**5616**	**5616**
Wind (lb)	298	558	298	1913	992	749	949	3639	8339	8339
Adj. Force	300	562	300	1927	1000	755	956	3666	8339	8339
% of total	3%	6%	3%	20%	11%	8%	10%	39%	50%	50%
Total Wind	**300**	**562**	**300**	**1927**	**1000**	**755**	**1711**	**3666**	**8339**	**8339**
Shear Wall	**Transfer**	**4.5**	**Transfer**	**16**	**5.54**	**Transferred**	**6.16**	**16.33**	**22**	**32**
Aspect Ratio	thru	1	thru	1	1	to	1	1	1	1
PSW Adj. C_o	sheathing	0.76	sheathing	1	0.75	Bedroom	0.75	1	1	1
Seis Load (plf)		148		143	214		330	266	255	176
Wind Load (plf)		125.0		120.4	180.5		277.7	224.5	379.1	260.6
Shear Wall	**SW-1**	**SW-1**	**SW-1**	**SW-1**	**SW-1**		**SW-2**	**SW-1**	**SW-1**	**SW-1**
Uplift										
% Force on pier	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Wall Length (ft)	Transfer	12	Transfer	16	12	Transferred	13.5	16.33	22	34
Wall Height (ft)	8	8	8	8	8	8	8	8	8	8
Floor Span (ft)	0	0	0	0	0	0	0	0	0	0
Roof Span (ft)	0	0	0	0	0	0	0	35	4	4
Wall Load (plf)	160	160	160	160	160	160	160	160	160	160
Total DL (plf)	96	96	96	96	96	96	96	253.5	114	114
Seis.Uplift (lbs)	**-**	**0**	**-**	**375**	**287**	**-**	**740**	**61**	**788**	**0**
Wind Uplift (lbs)	**-**	**0**	**-**	**195**	**121**	**-**	**488**	**0**	**1779**	**24**
							cs16x32		MST37	

Location	**Garages**	**Garage Mid**	**Dining**	**Entry/Living**	**Back**	**Garage**	**Mid**	**Garage**	**Right**
	Front side	Front/Back mi	Front side	Front side	Back side	Left side	Left/Right mi	Right side	Right side
Floor	1	1	1	1	1	1	1	1	1
Lines up w/	1-front-Bonus	1-mid-Loft/Laun	front-Bedroo	front-Bedroo	2-back-Back	none	Left-Left (Ms	none	2-right-Right
Width	**36**	**18.5**	**12**	**23.5**	**72**	**47**	**23.5**	**22**	**33.5**
Depth	**23**	**46.5**	**39**	**33.5**	**40**	**18.5**	**72**	**35.5**	**53.5**
Area (sqft)	636	430.125	234	753.625	1600	620	1026	390.5	1430
Force (lb)	1149	777	423	1362	2891	1120	1854	706	2584
Adj. Force	1151	778	423	1364	2895	1182	1957	745	2727
% of floor	17%	12%	6%	21%	44%	18%	30%	11%	41%
Flr. Diaphragm	262	177	96	311	659	0	446	0	621
Transferred Sourc	none	none	none	none	none	none	none	none	none
Transfered Forces	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Forces from Upper	1379	2286	1186	1186	4350	0	5616	0	5616
Total Seismic	**2530**	**3065**	**1610**	**2550**	**7245**	**1182**	**7756**	**745**	**8599**
Wind (lb)	1064	720	392	1261	2677	1974	3266	1243	4552
Adj. Force	1066	721	392	1263	2681	2083	3448	1312	4805
% of total	17%	12%	6%	21%	44%	18%	30%	11%	41%
Total Wind	**2228**	**2647**	**1392**	**2263**	**6347**	**2083**	**11787**	**1312**	**13145**
Shear Wall	**9**	**14**	**4**	**7.5**	**36**	**40**	**23.5**	**8**	**21**
Aspect Ratio	0.83	1	1	1	0.9	1	1	1	1
PSW Adj. C_o	1	1	0.86	0.83	0.7	0.9	1	1	1
Seis Load (plf)	281	219	402	340	201	30	330	93	409
Wind Load (plf)	247.6	189.1	348.0	301.7	176.3	52.1	501.6	164.0	625.9
Shear Wall	**SW-1**	**SW-1**	**SW-3**	**SW-2**	**SW-1**	**SW-1**	**SW-2**	**SW-1**	**SW-2**
Uplift									
% Force on pier	33%	100%	100%	100%	100%	100%	100%	100%	100%
Wall Length (ft)	3	14	12	23.5	72	47	23.5	8	21
Wall Height (ft)	10	9	9	9	9	9	9	9	9
Floor Span (ft)	0	18	0	0	0	0	4	0	4
Roof Span (ft)	0	0	0	0	0	0	4	0	4
Wall Load (plf)	200	180	180	180	180	180	180	180	180
Total DL (plf)	120	172.8	108	108	108	108	140.4	108	140.4
Seis.Uplift (lbs)	**2603**	**761**	**650**	**0**	**0**	**0**	**1321**	**406**	**2211**
Wind Uplift (lbs)	**2271**	**492**	**460**	**0**	**0**	**0**	**2864**	**1044**	**4159**
	STHD10	LSTHD8	LSTHD8				STHD10	LSTHD8	STHD14

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LEFT AND RIGHT LOADING

Wind Loading Calculations using Main Windforce-Resisting System (MWFRS)
Longitudinal Direction
Table 27.5-1 Steps to Determine MWFRS Loads Enclosed Simple Diaphram Buildings

Risk Category	**II**	Table 1.5-1
Wind speed	**115**	Figure 26.5-1 A-B or C
Exposure Category	**C**	Section 26.7
L/B upper floor	0.58	
L/B main floor	0.58	
Roof Height	11.33	
Mean roof Height	27.7	
Truss Span	**34**	
Roof Slope	8 /12	
Roof Angle (deg)	27.60	Sine = 0.4633
Lower Truss Span	**34**	
Lower roof Slope	**8** /12	
Lower roof Angle (deg)	27.60	Sine = 0.4633
Load combination factor	0.6	(ASCE 7-10 2.4.1)
Upper floor, p_h	28.5	Table 27.6-1
Upper floor, p_o	28.4	Table 27.6-1
Main floor, p_h	28.4	
Main floor, p_o	28.3	
Basement floor, p_h	28.3	
Basement floor, p_o	27.6	

				Relative positioning	
Upper Floor (psf)					
Net Pressure	17.1	Windward	10.6	Left	9.2
		Leeward	6.5	Right	9.2
Main Floor (psf)					
Net Pressure	17.0	Windward	10.5	Left	9.2
		Leeward	6.5	Right	9.2
Basement Floor (psf)					
Net Pressure	16.8	Windward	10.3	Left	9.2
		Leeward	6.4	Right	9.2

Roof (psf)	Zone 1	Zone 2	Exposure Adj. Factor	1.000
Load Case 1	-6.6	-11.5		
Load Case 2	8.2	-5.5		

Lower Roof (psf)		
Load Case 1	-6.0	-10.4
Load Case 2	7.4	-5.0

Roof Load

Roof Height	Length	Area (ft^2)	Horizontal Force (lbs)
11.33	72.00	816.0	11149

Lower Roof Load

Low Roof Height	Upper Length	Lower length	Low Roof Length(ft)	Area (ft^2)	Horizontal Force (lbs)
11.3	72	72	0	0.0	0.0

Wall Load	**Basement**	(height) 2.5	**1st floor**	(height) 10	**2nd floor**	(height) 9
	ft^2	force (lbs)	ft^2	force (lbs)	ft^2	force (lbs)
Windward	180	1856.7	720	7576.9	648	6848.6
Leeward	180	1160.0	720	4660.4	648	4210.7

2nd Floor Diaphragm Shear	
Total Shear (lbs)	16679
Right Wall Length	0
Left Wall Length	0

1st Floor Diaphragm Shear	
Total Shear (lbs)	28327
Right Wall Length	0
Left Wall Length	0

Basement Diaphragm Shear	
Total Shear (lbs)	35954
Right Wall Length	0
Left Wall Length	0

Base Wind Shear 37462

Hurricane Ties		**Factors of Safety**	
Uplift	(lbs)	H1	H2.5
Roof (per truss)	1.2	**491.60**	**504.20**
Low roof (per truss)	-	**-**	**-**
Lateral	(lbs)	H1	H2.5
Roof (per truss)	4.9	**161.15**	**84.17**
Low roof (per truss)	0.0	**-**	**-**

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FRONT AND BACK LOADING

Wind Loading Calculations using Main Windforce-Resisting System (MWFRS)
Transverse Direction
Table 27.5-1 Steps to Determine MWFRS Loads Enclosed Simple Diaphram Buildings

Risk Category	**II**	Table 1.5-1
Wind speed	**115**	Figure 26.5-1 A-B or C
Exposure Category	**C**	Section 26.7
L/B upper floor	1.71	
L/B main floor	1.71	
Roof Height	11.33	
Mean roof Height	28.7	
Truss Span	**34**	
Roof Slope	8 /12	
Roof Angle (deg)	27.60	Sine = 0.4633
Lower Truss Span	**34**	
Lower roof Slope	**8** /12	
Lower roof Angle (deg)	27.60	Sine = 0.4633
Load combination factor	0.6	(ASCE 7-10 2.4.1)
Upper floor, p_h	25.7	Table 27.6-1
Upper floor, p_o	25.6	Table 27.6-1
Main floor, p_h	25.6	
Main floor, p_o	25.4	
Basement floor, p_h	25.4	
Basement floor, p_o	24.9	

Upper Floor (psf)				Relative positioning		
Net Pressure	15.4	Windward	10.7	Left	7.2	
		Leeward	4.7	Right	7.2	
Main Floor (psf)						
Net Pressure	15.3	Windward	10.7	Left	7.2	
		Leeward	4.6	Right	7.2	
Basement Floor (psf)						
Net Pressure	15.1	Windward	10.5	Left	7.1	
		Leeward	4.6	Right	7.1	

Roof (psf)	Zone 1	Zone 2	Exposure Adj. Factor	1.000
Load Case 1	-6.6	-11.6		
Load Case 2	8.2	-5.5		
Lower Roof (psf)				
Load Case 1	-6.0	-10.4		
Load Case 2	7.4	-5.0		

Roof Load

Roof Height	Length	Area (ft^2)	Horizontal Force (lbs)
11.33	42.00	476	6556

Lower Roof Load

Lower Roof Height	Upper Length	Lower length	Low Roof Length(ft)	Area (ft^2)	Horizontal Force (lbs)
11.3	42	42	0	0	0.0

Wall Load	**Basement**	(height) 2.5	**1st floor**	(height) 10	**2nd floor**	(height) 9
	ft^2	force (lbs)	ft^2	force (lbs)	ft^2	force (lbs)
Windward	105	1102.0	420	4484.4	378	4059.6
Leeward	105	482.9	420	1943.4	378	1758.4

2nd Floor Diaphragm Shear	
Total Shear (lbs)	9465
Front Wall Length	0
Back Wall Length	0
1st Floor Diaphragm Shear	
Total Shear (lbs)	15588
Front Wall Length	0
Back Wall Length	0
Basement Diaphragm Shear	
Total Shear (lbs)	19594
Front Wall Length	0
Back Wall Length	0
Base Wind Shear	20387

Hurricane Ties		**Factors of Safety**	
Uplift	(lbs)	H1	H2.5
Roof (per truss)	3.7	**156.42**	**160.43**
Low roof (per truss)	-	**-**	**-**
Lateral	(lbs)	H1	H2.5
Roof (per truss)	156.1	**5.03**	**2.63**
Low roof (per truss)	0.0	**-**	**-**

Plan: C3956A
Date: 10/4/18
Location: Lot 7 Whittier Est, Peterson

	PASS Moment: 2.67	PASS TL Deflection: 1.36
JOIST SPECIFICATION	Truss Joists	Truss Joists
Joist Type:	TJI	TJI
Joist Series:	360	360
Joist Depth (ft):	11.88	11.88
Joist Span (ft):	16	20.5
Joist Spacing (in):	16	16
LOAD PARAMETERS		
Floor Dead Load	12	12
Floor Live Load	40	40
Total Floor Load	52	52
SIMPLE SPAN JOIST		
Duration Increase	1	1
Joist Weight (plf)	3	3
Joist Loading (plf)	72	72
Max Reaction (lb)	579	741
Max Moment (ft-lb)	2315	3800
JOIST DETERMINATION		
Max Moment 100% (ft-lb)	6180	6180
Moment FS	**2.67**	**1.63**
Max Shear 100% (lb)	1705	1705
Shear FS	**2.95**	**2.30**
Bearing Required (in)	2.00	2.00
Live Load Deflection Limit	240	240
Live Load Deflection (in)	0.22	0.56
Allowable Live Load Deflection (in)	0.80	1.03
LL Deflection FS	**3.66**	**1.84**
Total Load Deflection Limit	240	240
Total Load Deflection (in)	0.30	0.75
Allowable Total Load Deflection (in)	0.80	1.03
TL Deflection FS	**2.70**	**1.36**
1 3/4" Allowable Reaction (lb)	1080	1080
3 1/2" Allowable Reaction (lb)	1505	1505
SELECTION	**11 7/8" TJI 360 @ 16" O.C.**	**11 7/8" TJI 360 @ 16" O.C.**

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Beam Page 1

RB-1	(2) 2X6's DF #2	
RB-2	(2) 2X8's DF #2	
RB-3	(2) 7 1/4" LVL	2.0E 2600 Fb
RB-4	(2) 2X10's DF #2	
RB-5	(2) 7 1/4" LVL	2.0E 2600 Fb
RB-6	(2) 2X8's DF #2	
RB-7	(2) 2X10's DF #2	
RB-8	5 1/8" x 12" GLB	24F-V4
RB-9	5 1/8" x 16 1/2" GLB	24F-V4

Beam Page 2

UFB-1	(2) 11 7/8" LVL	2.0E 2600 Fb
UFB-2	W18x86 Steel	Gr 50
UFB-2	8 3/4" x 31 1/2" GL	24F-V4
UFB-3	(2) 2X10's DF #2	
UFB-4	(2) 2X10's DF #2	
UFB-5	(3) 2X10's DF #2	
UFB-6	(2) 2X6's DF #2	
UFB-7	(2) 2X8's DF #2	
UFB-8	(2) 11 7/8" LVL	2.0E 2600 Fb
UFB-9	(3) 18" LVL	2.0E 2600 Fb
UFB-1(	(1) 11 7/8" LVL	2.0E 2600 Fb
UFB-1′	(1) 11 7/8" LVL	2.0E 2600 Fb
UFB-1ᵢ	(2) 9 1/2" LVL	2.0E 2600 Fb

Beam Page 3

MFB-1	(2) 2X10's DF #2	
MFB-2	(2) 2X8's DF #2	
MFB-3	(2) 9 1/2" LVL	2.0E 2600 Fb
MFB-4	(3) 2X10's DF #2	
MFB-5	(2) 9 1/2" LVL	2.0E 2600 Fb
MFB-6	(3) 14" LVL	2.0E 2600 Fb
MFB-6 (	W10x19 Steel	Gr 50
MFB-7	(2) 2X10's DF #2	
MFB-8	(2) 9 1/2" LVL	2.0E 2600 Fb

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	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
	(2) 2X6's DF #2	(2) 2X8's DF #2	(2) 7 1/4" LVL	(2) 2X10's DF #2	(2) 7 1/4" LVL	(2) 2X8's DF #2	(2) 2X10's DF #2	5 1/8" x 12" GLB	5 1/8" x 16 1/2" GLB
	Moment: 1.27	Moment: 1.76	Moment: 1.18	Shear: 1.35	LL Deflection: L/537	Moment: 1.7	Moment: 1.48	LL Deflection: L/466	LL Deflection: L/723
Controlling Load Case	DL+S	DL+S	DL+S	DL+S	DL+S	DL+S	DL+S	DL+S	DL+S
Name	**RB-1**	**RB-2**	**RB-3**	**RB-4**	**RB-5**	**RB-6**	**RB-7**	**RB-8**	**RB-9**
Grade	**DF #2**	**DF #2**	**LVL**	**DF #2**	**LVL**	**DF #2**	**DF #2**	**GLB**	**GLB**
LOADING PARAMETERS									
Floor Live Load (psf)	40	40	40	40	40	40	40	40	40
Floor Total Load (psf)	52	52	52	52	52	52	52	52	52
Roof Live Load (psf)	50	50	50	50	50	50	50	50	50
Roof Total Load (psf)	65	65	65	65	65	65	65	65	65
Wall Load (psf)	20	20	20	20	20	20	20	20	20
BEAM SPECIFICATIONS									
Beam Span (ft)	**6**	**6.5**	**6.25**	**4**	**9**	**4**	**4.5**	**18.5**	**23.5**
Beam Weight (plf)	3.15	4.35	7.36	5.55	7.36	4.35	5.55	14.93	20.53
BEAM SIZING									
Beam Depth (in)	**5.25**	**7.25**	**7.25**	**9.25**	**7.25**	**7.25**	**9.25**	**12**	**16.5**
Beam Width/Weight	**3**	**3**	**3.5**	**3**	**3.5**	**3**	**3**	**5.125**	**5.125**
UNIFORM LOADING									
Floor Span (ft)	0	0	0	0	0	0	0	0	0
Roof Span (ft)	4	4	36.5	36.5	12	20	14	9.5	9
Wall Height (ft)	6	6	2	2	0	2	0	0	0
Total Uniform Floor Load (plf)	0	0	0	0	0	0	0	0	0
Total Live Floor Load (plf)	0	0	0	0	0	0	0	0	0
Total Uniform Roof Load (plf)	130	130	1186.25	1186.25	390	650	455	308.75	292.5
Total Live Roof Load (plf)	100	100	912.5	912.5	300	500	350	237.5	225
Total Uniform Wall Load (plf)	120	120	40	40	0	40	0	0	0
PARTIALLY UNIFORM LOADING									
Partially Uniform Load 1	-----	-----	-----	-----	-----	-----	-----	-----	Roof
1 Span/Height (ft)	0	0	0	0	0	0	0	0	-2.5
1 Start Point (ft)	0	0	0	0	0	0	0	0	10
1 End Point (ft)	0	0	0	0	0	0	0	0	18
1 Total Partially Uniform Load (plf)	0	0	0	0	0	0	0	0	-81.25
Partially Uniform Load 2	----	----	----	----	----	----	----	----	----
2 Span/Height (ft)	0	0	0	0	0	0	0	0	0
2 Start Point (ft)	0	0	0	0	0	0	0	0	0
2 End Point (ft)	0	0	0	0	0	0	0	0	0
2 Total Partially Uniform Load (plf)	0	0	0	0	0	0	0	0	0
Partially Uniform Load 3	----	----	----	----	----	----	----	----	----
3 Span/Height (ft)	0	0	0	0	0	0	0	0	0
3 Start Point (ft)	0	0	0	0	0	0	0	0	0
3 End Point (ft)	0	0	0	0	0	0	0	0	0
3 Total Partially Uniform Load (plf)	0	0	0	0	0	0	0	0	0
POINT LOADS									
Point Load 1	----	----	----	----	----	----	Roof	----	----
1 Location (ft)	0	0	0	0	0	0	3	0	0
1 Total Load (lb)	0	0	0	0	0	0	1365	0	0
Point Load 2	----	----	----	----	----	----	----	----	----
2 Location (ft)	0	0	0	0	0	0	0	0	0
2 Total Load (lb)	0	0	0	0	0	0	0	0	0
Point Load 3	----	----	----	----	----	----	----	----	----
3 Location (ft)	0	0	0	0	0	0	0	0	0
3 Total Load (lb)	0	0	0	0	0	0	0	0	0
TAPERED LOADS									
Tapered Load Starting Point (ft)	0	0	0	0	0	0	0	0	0
Tapered Load Ending Point (ft)	0	0	0	0	0	0	0	0	0
Tapered Load at Start (plf)	0	0	0	0	0	0	0	0	0
Tapered Load at End (plf)	0	0	0	0	0	0	0	0	0
REACTIONS & MOMENT									
Duration Increase	1	1	1	1	1	1	1	1	1
Left Reaction (lb)	759	827	3855	2464	1788	1389	1491	2994	3415
Right Reaction (lb)	759	827	3855	2464	1788	1389	1946	2994	3291
Max Moment (lb-ft)	1139	1343	6023	2464	4023	1389	2388	13847	18677
Max Shear (lb)	759	827	3855	2464	1788	1389	1946	2994	3415
C_v	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
C_f	1.40	1.20	1.00	1.10	1.00	1.20	1.10	1.00	1.00
Area (in^2)	15.75	21.75	25.38	27.75	25.38	21.75	27.75	61.50	84.56
Moment of Inertia I (in^4)	36	95	111	198	111	95	198	738	1919
Maximum Bending Stress (lb-ft)	992	613	2357	691	1575	634	670	1351	964
Allowable Bending Stress (lb-ft)	1260	1080	2784	990	2784	1080	990	2400	2400
Allowable Moment (lb-ft)	1447	2365	7115	3529	7115	2365	3529	24600	46509
MOMENT FS	**1.27**	**1.76**	**1.18**	**1.43**	**1.77**	**1.70**	**1.48**	**1.78**	**2.49**
Allowable Shear Stress (psi)	180	180	285	180	285	180	180	265	265
Maximum Shear Capacity (lb)	1890	2610	4821	3330	4821	2610	3330	10865	14939
SHEAR FS	**2.49**	**3.16**	**1.25**	**1.35**	**2.70**	**1.88**	**1.71**	**3.63**	**4.37**
Bearing Required	0.41	0.44	1.47	1.31	0.68	0.74	1.04	0.90	1.03
Elastic Modulus (psi)	1,600,000	1,600,000	2,000,000	1,600,000	2,000,000	1,600,000	1,600,000	1,800,000	1,800,000
Live Load Deflection (in)	0.05	0.03	0.14	0.02	0.20	0.02	0.02	0.48	0.39
Live Load Deflection Limit	360	360	360	360	360	360	360	360	360
Allowable Live Load Deflection (in)	0.20	0.22	0.21	0.13	0.30	0.13	0.15	0.62	0.78
LIVE LOAD DEFLECTION FS	**3.93**	**8.14**	**1.46**	**7.95**	**1.49**	**6.99**	**7.62**	**1.30**	**2.01**
Total Load Deflection (in)	0.13	0.07	0.19	0.02	0.27	0.03	0.03	0.65	0.55
Total Load Deflection Limit	240	240	240	240	240	240	240	240	240
Allowable Total Load Deflection (in)	0.30	0.33	0.31	0.20	0.45	0.20	0.23	0.93	1.18
TOTAL LOAD DEFLECTION FS	**2.33**	**4.80**	**1.62**	**8.84**	**1.69**	**7.55**	**8.73**	**1.43**	**2.14**
SELECTION	DF #2 (2) 2X6's	DF #2 (2) 2X8's	LVL (2) 7 1/4"	DF #2 (2) 2X10's	LVL (2) 7 1/4"	DF #2 (2) 2X8's	DF #2 (2) 2X10's	GLB 5 1/8" x 12"	GLB 5 1/8" x 16 1/2"

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	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
	(2) 11 7/8" LVL	W18x86 Steel	8 3/4" x 31 1/2" GLB	(2) 2X10's DF #2	(2) 2X10's DF #2	(3) 2X10's DF #2	(2) 2X6's DF #2	(2) 2X8's DF #2	(2) 11 7/8" LVL	(3) 18" LVL	(1) 11 7/8" LVL	(1) 11 7/8" LVL	(2) 9 1/2" LVL
	Moment: 1.35	TL Deflection: L/571	Moment: 2.03	Moment: 1.11	Moment: 1.31	Moment: 1.59	Shear: 1.63	Moment: 1.03	Shear: 1.8	Moment: 1.05	Shear: 2.19	Shear: 1.47	Moment: 1.36
Controlling Load Case	DL+S	DL+LL	DL+LL	DL+LL	DL+S	DL+0.75LL+0.75S	DL+0.75LL+0.75S	DL+0.75LL+0.75S	DL+S	DL+0.75LL+0.75S	DL+S	DL+S	DL+S
Name	**UFB-1**	**UFB-2**	**UFB-2 OPT**	**UFB-3**	**UFB-4**	**UFB-5**	**UFB-6**	**UFB-7**	**UFB-8**	**UFB-9**	**UFB-10**	**UFB-11**	**UFB-12**
Grade	**LVL**	**Steel**	**GLB**	**DF #2**	**DF #2**	**DF #2**	**DF #2**	**DF #2**	**LVL**	**LVL**	**LVL**	**LVL**	**LVL**
LOADING PARAMETERS													
Floor Live Load (psf)	40	30	30	40	40	40	40	40	30	40	40	40	40
Floor Total Load (psf)	52	42	42	52	52	52	52	52	42	52	52	52	52
Roof Live Load (psf)	50	50	50	50	50	50	50	50	50	50	50	50	50
Roof Total Load (psf)	65	65	65	65	65	65	65	65	65	65	65	65	65
Wall Load (psf)	20	20	20	20	20	20	20	20	20	20	20	20	20
BEAM SPECIFICATIONS													
Beam Span (ft)	**13**	**35**	**35**	**6.25**	**6.5**	**6**	**3**	**6**	**9**	**18**	**5**	**6**	**9**
Beam Weight (plf)	12.06	86.00	66.92	5.55	5.55	8.33	3.15	4.35	12.06	27.41	6.03	6.03	9.64
BEAM SIZING													
Beam Depth (in)	**11.88**	**18**	**31.5**	**9.25**	**9.25**	**9.25**	**5.25**	**7.25**	**11.88**	**18**	**11.88**	**11.88**	**9.5**
Beam Width/Weight	**3.5**	**86**	**8.75**	**3**	**3**	**4.5**	**3**	**3**	**3.5**	**5.25**	**1.75**	**1.75**	**3.5**
UNIFORM LOADING													
Floor Span (ft)	2	23	23	18	0	17	15.5	5.5	13	13	0	0	0
Roof Span (ft)	0	0	0	0	10	10	10	8	26	26	22	15	26
Wall Height (ft)	0	0	0	9	9	9	9	9	2	2	0	0	0
Total Uniform Floor Load (plf)	12	483	483	468	0	357	325.5	115.5	78	273	0	0	0
Total Live Floor Load (plf)	0	345	345	360	0	255	232.5	82.5	0	195	0	0	0
Total Uniform Roof Load (plf)	0	0	0	0	325	262.5	262.5	210	845	682.5	715	487.5	845
Total Live Roof Load (plf)	0	0	0	0	250	187.5	187.5	150	650	487.5	550	375	650
Total Uniform Wall Load (plf)	0	0	0	180	180	180	180	180	40	40	0	0	0
PARTIALLY UNIFORM LOADING													
Partially Uniform Load 1	Roof	Roof	Roof	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
1 Span/Height (ft)	14.5	12	12	0	0	0	0	0	0	0	0	0	0
1 Start Point (ft)	2	11.5	11.5	0	0	0	0	0	0	0	0	0	0
1 End Point (ft)	13	23.5	23.5	0	0	0	0	0	0	0	0	0	0
1 Total Partially Uniform Load (plf)	471.25	90	90	0	0	0	0	0	0	0	0	0	0
Partially Uniform Load 2	Wall	Floor	Floor	----	----	----	----	----	----	----	----	----	----
2 Span/Height (ft)	8	1.75	1.75	0	0	0	0	0	0	0	0	0	0
2 Start Point (ft)	2	0	0	0	0	0	0	0	0	0	0	0	0
2 End Point (ft)	13	18	18	0	0	0	0	0	0	0	0	0	0
2 Total Partially Uniform Load (plf)	160	36.75	36.75	0	0	0	0	0	0	0	0	0	0
Partially Uniform Load 3	----	----	----	----	----	----	----	----	----	----	----	----	----
3 Span/Height (ft)	0	0	0	0	0	0	0	0	0	0	0	0	0
3 Start Point (ft)	0	0	0	0	0	0	0	0	0	0	0	0	0
3 End Point (ft)	0	0	0	0	0	0	0	0	0	0	0	0	0
3 Total Partially Uniform Load (plf)	0	0	0	0	0	0	0	0	0	0	0	0	0
POINT LOADS													
Point Load 1	----	Floor	Floor	----	----	----	----	----	----	Floor	----	Floor	----
1 Location (ft)	0	11.5	11.5	0	0	0	0	0	0	9	0	2	0
1 Total Load (lb)	0	4162	4162	0	0	0	0	0	0	3094	0	1803	0
Point Load 2	----	Floor	Floor	----	----	----	----	----	----	----	----	----	----
2 Location (ft)	0	23.5	23.5	0	0	0	0	0	0	0	0	0	0
2 Total Load (lb)	0	4162	4162	0	0	0	0	0	0	0	0	0	0
Point Load 3	----	----	----	----	----	----	----	----	----	----	----	----	----
3 Location (ft)	0	0	0	0	0	0	0	0	0	0	0	0	0
3 Total Load (lb)	0	0	0	0	0	0	0	0	0	0	0	0	0
TAPERED LOADS													
Tapered Load Starting Point (ft)	0	0	0	0	0	0	0	0	0	0	0	0	0
Tapered Load Ending Point (ft)	0	0	0	0	0	0	0	0	0	0	0	0	0
Tapered Load at Start (plf)	0	0	0	0	0	0	0	0	0	0	0	0	0
Tapered Load at End (plf)	0	0	0	0	0	0	0	0	0	0	0	0	0
REACTIONS & MOMENT													
Duration Increase	1	1	1	1	1	1	1	1	1	1	1	1	1
Left Reaction (lb)	3094	15151	14817	2042	1659	2423	1157	1530	4388	10753	1803	2682	3846
Right Reaction (lb)	4162	14830	14496	2042	1659	2423	1157	1530	4388	10753	1803	2081	3846
Max Moment (lb-ft)	13219	145606	142685	3191	2696	3635	868	2294	9872	55351	2253	4287	8653
Max Shear (lb)	4162	15151	14817	2042	1659	2423	1157	1530	4388	10753	1803	2682	3846
C_v	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
C_r	1.00	1.00	1.00	1.10	1.10	1.20	1.40	1.20	1.00	1.00	1.00	1.00	1.00
Area (in^2)	41.58	---	275.63	27.75	27.75	41.63	15.75	21.75	41.58	94.50	20.79	20.79	33.25
Moment of Inertia I (in^4)	489	1530	22791	198	198	297	36	95	489	2552	245	245	250
Maximum Bending Stress (lb-ft)	1927	10278	1183	895	756	680	755	1048	1439	2343	657	1250	1972
Allowable Bending Stress (lb-ft)	2604	775000	2400	990	990	1080	1260	1080	2604	2461	2604	2604	2684
Allowable Moment (lb-ft)	17862	464072	289406	3529	3529	5775	1447	2365	17862	58130	8931	8931	11775
MOMENT FS	**1.35**	**3.19**	**2.03**	**1.11**	**1.31**	**1.59**	**1.67**	**1.03**	**1.81**	**1.05**	**3.96**	**2.08**	**1.36**
Allowable Shear Stress (psi)	285	---	265	180	180	180	180	180	285	285	285	285	285
Maximum Shear Capacity (lb)	7900	270000	48694	3330	3330	4995	1890	2610	7900	17955	3950	3950	6318
SHEAR FS	**1.90**	**17.82**	**3.29**	**1.63**	**2.01**	**2.06**	**1.63**	**1.71**	**1.80**	**1.67**	**2.19**	**1.47**	**1.64**
Bearing Required	1.59	---	2.61	1.09	0.88	0.86	0.62	0.82	1.67	2.73	1.37	2.04	1.47
Elastic Modulus (psi)	2,000,000	29,000,000	1,800,000	1,600,000	1,600,000	1,600,000	1,600,000	1,600,000	2,000,000	2,000,000	2,000,000	2,000,000	2,000,000
Live Load Deflection (in)	0.23	0.45	0.49	0.04	0.03	0.03	0.01	0.04	0.10	0.42	0.02	0.04	0.19
Live Load Deflection Limit	360	360	360	360	360	360	360	360	360	360	360	360	360
Allowable Live Load Deflection (in)	0.43	1.17	1.17	0.21	0.22	0.20	0.10	0.20	0.30	0.60	0.17	0.20	0.30
LIVE LOAD DEFLECTION FS	**1.91**	**2.58**	**2.38**	**5.28**	**6.77**	**7.29**	**7.49**	**4.45**	**3.03**	**1.44**	**10.43**	**4.80**	**1.55**
Total Load Deflection (in)	0.41	0.74	0.78	0.07	0.07	0.05	0.02	0.10	0.15	0.61	0.02	0.05	0.25
Total Load Deflection Limit	240	240	240	240	240	240	240	240	240	240	240	240	240
Allowable Total Load Deflection (in)	0.65	1.75	1.75	0.31	0.33	0.30	0.15	0.30	0.45	0.90	0.25	0.30	0.45
TOTAL LOAD DEFLECTION FS	**1.58**	**2.38**	**2.24**	**4.37**	**4.97**	**5.99**	**6.12**	**3.05**	**3.03**	**1.48**	**11.94**	**5.51**	**1.77**
SELECTION	LVL	Steel	GLB	DF #2	DF #2	DF #2	DF #2	DF #2	LVL	LVL	LVL	LVL	LVL
	(2) 11 7/8"	W18x86	8 3/4" x 31 1/2"	(2) 2X10's	(2) 2X10's	(3) 2X10's	(2) 2X6's	(2) 2X8's	(2) 11 7/8"	(3) 18"	(1) 11 7/8"	(1) 11 7/8"	(2) 9 1/2"

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	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
	(2) 2X10's DF #2	(2) 2X8's DF #2	(2) 9 1/2" LVL	(3) 2X10's DF #2	(2) 9 1/2" LVL	(3) 14" LVL	W10x19 Steel	(2) 2X10's DF #2	(2) 9 1/2" LVL
	Moment: 1.05	Shear: 1.27	Moment: 1.21	Shear: 1.45	Moment: 1.7	LL Deflection: L/561	LL Deflection: L/653	Moment: 1.4	Shear: 1.28
Controlling Load Case	DL+S	DL+LL	DL+0.75LL+0.75S	DL+0.75LL+0.75S	DL+LL	DL+LL	DL+LL	DL+LL	DL+LL
Name	**MFB-1**	**MFB-2**	**MFB-3**	**MFB-4**	**MFB-5**	**MFB-6**	**MFB-6 OPT**	**MFB-7**	**MFB-8**
Grade	**DF #2**	**DF #2**	**LVL**	**DF #2**	**LVL**	**LVL**	**Steel**	**DF #2**	**LVL**
LOADING PARAMETERS									
Floor Live Load (psf)	40	40	40	40	40	40	40	40	40
Floor Total Load (psf)	52	52	52	52	52	52	52	52	52
Roof Live Load (psf)	50	50	50	50	50	50	50	50	50
Roof Total Load (psf)	65	65	65	65	65	65	65	65	65
Wall Load (psf)	20	20	20	20	20	20	20	20	20
BEAM SPECIFICATIONS									
Beam Span (ft)	**9**	**3**	**8**	**4**	**9**	**17**	**17**	**4.5**	**6**
Beam Weight (plf)	5.55	4.35	9.64	8.33	9.64	21.32	19.00	5.55	9.64
BEAM SIZING									
Beam Depth (in)	**9.25**	**7.25**	**9.5**	**9.25**	**9.5**	**14**	**10**	**9.25**	**9.5**
Beam Width/Weight	**3**	**3**	**3.5**	**4.5**	**3.5**	**5.25**	**19**	**3**	**3.5**
UNIFORM LOADING									
Floor Span (ft)	0	42	16.5	27	26	23	23	38	63
Roof Span (ft)	10	10	25	36	0	0	0	0	0
Wall Height (ft)	0	10	10	10	0	0	0	0	0
Total Uniform Floor Load (plf)	0	1092	346.5	567	676	598	598	988	1638
Total Live Floor Load (plf)	0	840	247.5	405	520	460	460	760	1260
Total Uniform Roof Load (plf)	325	75	656.25	945	0	0	0	0	0
Total Live Roof Load (plf)	250	0	468.75	675	0	0	0	0	0
Total Uniform Wall Load (plf)	0	200	200	200	0	0	0	0	0
PARTIALLY UNIFORM LOADING									
Partially Uniform Load 1	-----	-----	-----	-----	-----	-----	-----	-----	-----
1 Span/Height (ft)	0	0	0	0	0	0	0	0	0
1 Start Point (ft)	0	0	0	0	0	0	0	0	0
1 End Point (ft)	0	0	0	0	0	0	0	0	0
1 Total Partially Uniform Load (plf)	0	0	0	0	0	0	0	0	0
Partially Uniform Load 2	----	----	----	----	----	----	----	----	----
2 Span/Height (ft)	0	0	0	0	0	0	0	0	0
2 Start Point (ft)	0	0	0	0	0	0	0	0	0
2 End Point (ft)	0	0	0	0	0	0	0	0	0
2 Total Partially Uniform Load (plf)	0	0	0	0	0	0	0	0	0
Partially Uniform Load 3	----	----	----	----	----	----	----	----	----
3 Span/Height (ft)	0	0	0	0	0	0	0	0	0
3 Start Point (ft)	0	0	0	0	0	0	0	0	0
3 End Point (ft)	0	0	0	0	0	0	0	0	0
3 Total Partially Uniform Load (plf)	0	0	0	0	0	0	0	0	0
POINT LOADS									
Point Load 1	----	----	----	----	----	----	----	----	----
1 Location (ft)	0	0	0	0	0	0	0	0	0
1 Total Load (lb)	0	0	0	0	0	0	0	0	0
Point Load 2	----	----	----	----	----	----	----	----	----
2 Location (ft)	0	0	0	0	0	0	0	0	0
2 Total Load (lb)	0	0	0	0	0	0	0	0	0
Point Load 3	----	----	----	----	----	----	----	----	----
3 Location (ft)	0	0	0	0	0	0	0	0	0
3 Total Load (lb)	0	0	0	0	0	0	0	0	0
TAPERED LOADS									
Tapered Load Starting Point (ft)	0	0	0	0	0	0	0	0	0
Tapered Load Ending Point (ft)	0	0	0	0	0	0	0	0	0
Tapered Load at Start (plf)	0	0	0	0	0	0	0	0	0
Tapered Load at End (plf)	0	0	0	0	0	0	0	0	0
REACTIONS & MOMENT									
Duration Increase	1	1	1	1	1	1	1	1	1
Left Reaction (lb)	1487	2057	4850	3441	3085	5264	5245	2235	4943
Right Reaction (lb)	1487	2057	4850	3441	3085	5264	5245	2235	4943
Max Moment (lb-ft)	3347	1543	9699	3441	6942	22373	22289	2514	7414
Max Shear (lb)	1487	2057	4850	3441	3085	5264	5245	2235	4943
C_v	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
C_f	1.10	1.20	1.00	1.20	1.00	1.00	1.00	1.10	1.00
Area (in^2)	27.75	21.75	33.25	41.63	33.25	73.50	---	27.75	33.25
Moment of Inertia I (in^4)	198	95	250	297	250	1201	96	198	250
Maximum Bending Stress (lb-ft)	939	704	2211	643	1582	1565	13887	705	1690
Allowable Bending Stress (lb-ft)	990	1080	2684	1080	2684	2546	90000	990	2684
Allowable Moment (lb-ft)	3529	2365	11775	5775	11775	36387	53892	3529	11775
MOMENT FS	**1.05**	**1.53**	**1.21**	**1.68**	**1.70**	**1.63**	**2.42**	**1.40**	**1.59**
Allowable Shear Stress (psi)	180	180	285	180	285	285	---	180	285
Maximum Shear Capacity (lb)	3330	2610	6318	4995	6318	13965	75000	3330	6318
SHEAR FS	**2.24**	**1.27**	**1.30**	**1.45**	**2.05**	**2.65**	**14.30**	**1.49**	**1.28**
Bearing Required	0.79	1.10	1.85	1.22	1.18	1.34	---	1.19	1.88
Elastic Modulus (psi)	1,600,000	1,600,000	2,000,000	1,600,000	2,000,000	2,000,000	29,000,000	1,600,000	2,000,000
Live Load Deflection (in)	0.12	0.01	0.13	0.01	0.16	0.36	0.31	0.02	0.07
Live Load Deflection Limit	360	360	360	360	360	360	360	360	360
Allowable Live Load Deflection (in)	0.30	0.10	0.27	0.13	0.30	0.57	0.57	0.15	0.20
LIVE LOAD DEFLECTION FS	**2.55**	**9.86**	**2.00**	**10.08**	**1.94**	**1.56**	**1.81**	**6.71**	**2.70**
Total Load Deflection (in)	0.16	0.02	0.23	0.02	0.20	0.49	0.42	0.03	0.10
Total Load Deflection Limit	240	240	240	240	240	240	240	240	240
Allowable Total Load Deflection (in)	0.45	0.15	0.40	0.20	0.45	0.85	0.85	0.23	0.30
TOTAL LOAD DEFLECTION FS	**2.89**	**9.06**	**1.77**	**9.49**	**2.20**	**1.74**	**2.03**	**7.70**	**3.09**
SELECTION	DF #2 (2) 2X10's	DF #2 (2) 2X8's	LVL (2) 9 1/2"	DF #2 (3) 2X10's	LVL (2) 9 1/2"	LVL (3) 14"	Steel W10x19	DF #2 (2) 2X10's	LVL (2) 9 1/2"

Plan: C3956A
Date: 10/4/18
Location: Lot 7 Whittier Est, Peterson

	PASS 6x6 POST FS: 2.75				
Location:	**DECK** MFB-1 RB-5	---	---	---	---
COLUMN DIMENSIONS:					
Total Column Length (ft):	9	9	9	9	9
X-Unbraced Length (ft):	9	9	9	9	9
Y-Unbraced Length (ft):	9	0	0	0	0
MATERIAL SPECS:					
Material:	Doug Fir #2	Doug Fir #2	Doug Fir #2	Doug Fir #2	Doug Fir #2
Depth-x (in):	5.5	5.5	5.5	5.5	5.5
Width-y (in):	5.5	1.5	1.5	1.5	1.5
# Members	1	2	2	2	2
Area (in^2):	30.25	16.50	16.50	16.50	16.50
Axial Load:	6,551	10	10	10	10
MATERIAL PROPERTIES:					
F_c	700	1,350	1,350	1,350	1,350
E	1,300,000	1,600,000	1,600,000	1,600,000	1,600,000
E_{min}	470,000	580,000	580,000	580,000	580,000
Lex/dx	19.64	19.64	19.64	19.64	19.64
Ley/dy	19.64	0.00	0.00	0.00	0.00
FACTORS:					
Cd	1	1	1	1	1
Cf	1.1	1.1	1.1	1.1	1.1
Ke	1	1	1	1	1
Fc*	770	1,485	1,485	1,485	1,485
Fce	1,002	1,236	1,236	1,236	1,236
Cp	0.77	0.62	0.62	0.62	0.62
F'c	596	928	928	928	928
Allowable Load (lbs)	**18,014**	**15,306**	**15,306**	**15,306**	**15,306**

Location:	--- ---	---	---	---	---
COLUMN DIMENSIONS:					
Total Column Length (ft):	9	9	9	9	9
X-Unbraced Length (ft):	9	9	9	9	9
Y-Unbraced Length (ft):	0	0	0	0	0
MATERIAL SPECS:					
Material:	Doug Fir #2	Doug Fir #2	Doug Fir #2	Doug Fir #2	Doug Fir #2
Depth-x (in):	5.5	5.5	5.5	5.5	5.5
Width-y (in):	1.5	1.5	1.5	1.5	1.5
# Members	2	2	2	2	2
Area (in^2):	16.50	16.50	16.50	16.50	16.50
Axial Load:	10	10	10	10	10
MATERIAL PROPERTIES:					
F_c	1,350	1,350	1,350	1,350	1,350
E	1,600,000	1,600,000	1,600,000	1,600,000	1,600,000
E_{min}	580,000	580,000	580,000	580,000	580,000
Lex/dx	19.64	19.64	19.64	19.64	19.64
Ley/dy	0.00	0.00	0.00	0.00	0.00
FACTORS:					
Cd	1	1	1	1	1
Cf	1.1	1.1	1.1	1.1	1.1
Ke	1	1	1	1	1
Fc*	1,485	1,485	1,485	1,485	1,485
Fce	1,236	1,236	1,236	1,236	1,236
Cp	0.62	0.62	0.62	0.62	0.62
F'c	928	928	928	928	928
Allowable Load (lbs)	**15,306**	**15,306**	**15,306**	**15,306**	**15,306**

Plan: C3956A
Date: 10/4/18
Location: Lot 7 Whittier Est, Peterson

	PASS Pipe3STD FS: 1.67		
Location:	**UFB-2**	**---**	**---**
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COLUMN DIMENSIONS:			
X-Unbraced Length (ft):	10	10	10
Y-Unbraced Length (ft):	10	10	10
MATERIAL SPECS:			
Column Shape	STD_Pipe	STD_Pipe	STD_Pipe
Member	Pipe3STD	Pipe3STD	Pipe3STD
r_x (in.)	1.17	1.17	1.17
r_y (in.)	1.17	1.17	1.17
A_g (in^2)	2.07	2.07	2.07
Axial Load:	15,151	10	10
MATERIAL PROPERTIES:			
Fy (ksi)	35	35	35
E (ksi)	29,000	29,000	29,000
KL/r_x	102.56	102.56	102.56
KL/r_y	102.56	102.56	102.56
FACTORS:			
K	1	1	1
F_e (ksi)	27.21	27.21	27.21
F_{cr} (ksi)	20.43	20.43	20.43
Allowable Load (lbs)	**25,322**	**25,322**	**25,322**

---	**---**
---	---
10	10
10	10
STD_Pipe	STD_Pipe
Pipe3STD	Pipe3STD
1.17	1.17
1.17	1.17
2.07	2.07
10	10
35	35
29,000	29,000
102.56	102.56
102.56	102.56
1	1
27.21	27.21
20.43	20.43
25,322	**25,322**

Plan: C3956A
Date: 10/4/18
Location: Lot 7 Whittier Est, Peterson

	PASS FS: 1.43	PASS FS: 2.24	PASS FS: 1.14		
INPUT					
Location:	DECK	UFB-11	MFB-6	---	---
Callout	S-30	S-24	S-24	S-24	S-24
Column Width (in)	3.5	3.5	3.5	3.5	3.5
Load (lb)	6,551	2,682	5,264	10	10
SPECS					
Soil Bearing Pressure (psf)	1500	1500	1500	1500	1500
Footing Width/Diameter (in)	30	24	24	24	24
Footing Length/Diameter (in)	30	24	24	24	24
Footing Depth (in)	10	10	10	10	10
CALCULATIONS					
Area Required (ft^2)	4.37	1.79	3.51	0.01	0.01
Area Provided (ft^2)	6.25	4.00	4.00	4.00	4.00
FLEXURE					
M_u (lb-ft/ft)	963.37	368.82	723.83	1.38	1.38
ΦMn (lb-ft/ft)	5413.24	6700.37	6700.37	6700.37	6700.37
ONE WAY SHEAR					
V_u (kip)	0.92	0.34	0.66	0.00	0.00
ΦV_c (kip)	6.16	6.16	6.16	6.16	6.16
PUNCHING SHEAR					
V_u (kip)	8.8	3.4	6.6	0.0	0.0
ΦV_c (kip)	40.1	40.1	40.1	40.1	40.1
SELECTION	**S-30 30" Square by 10" Deep Concrete Footing with (3) #4 Bars Each Way**	**S-24 24" Square by 10" Deep Concrete Footing with (3) #4 Bars Each Way**	**S-24 24" Square by 10" Deep Concrete Footing with (3) #4 Bars Each Way**	**S-24 24" Square by 10" Deep Concrete Footing with (3) #4 Bars Each Way**	**S-24 24" Square by 10" Deep Concrete Footing with (3) #4 Bars Each Way**

INPUT					
Location:	---	---	---	---	---
Callout	S-24	S-24	S-24	S-24	S-24
Column Width (in)	3.5	3.5	3.5	3.5	3.5
Load (lb)	10	10	10	10	10
SPECS					
Soil Bearing Pressure (psf)	1500	1500	1500	1500	1500
Footing Width/Diameter (in)	24	24	24	24	24
Footing Length/Diameter (in)	24	24	24	24	24
Footing Depth (in)	10	10	10	10	10
CALCULATIONS					
Area Required (ft^2)	0.01	0.01	0.01	0.01	0.01
Area Provided (ft^2)	4.00	4.00	4.00	4.00	4.00
FLEXURE					
M_u (lb-ft/ft)	1.38	1.38	1.38	1.38	1.38
ΦMn (lb-ft/ft)	6700.37	6700.37	6700.37	6700.37	6700.37
ONE WAY SHEAR					
V_u (kip)	0.00	0.00	0.00	0.00	0.00
ΦV_c (kip)	6.16	6.16	6.16	6.16	6.16
PUNCHING SHEAR					
V_u (kip)	0.0	0.0	0.0	0.0	0.0
ΦV_c (kip)	40.1	40.1	40.1	40.1	40.1
SELECTION	**S-24 24" Square by 10" Deep Concrete Footing with (3) #4 Bars Each Way**	**S-24 24" Square by 10" Deep Concrete Footing with (3) #4 Bars Each Way**	**S-24 24" Square by 10" Deep Concrete Footing with (3) #4 Bars Each Way**	**S-24 24" Square by 10" Deep Concrete Footing with (3) #4 Bars Each Way**	**S-24 24" Square by 10" Deep Concrete Footing with (3) #4 Bars Each Way**