



Structural Calculations For:

Ogden Point Residence

3675 W. Mercer Way
Mercer Island, WA.



Prepared for: Demetriou Architects

Job #: 00641-2017-01-00

Date: November 11, 2017

Calculations Index:

L – Lateral Calculations

G – Gravity Calculations

Ret – Retaining Wall Calculations

Conc – Concrete Calculations

Criteria Sheet

Codes:

Structural: IBC 2015
 Loads: ASCE 7-10
 Wood: NDS 2012
 Steel: AISC 360-10
 Concrete: ACI 318-11
 Masonry: ACI 530-11

Location:

Address: 3675 W. Mercer Way
 Mercer Island, WA. 98040

Risk Category

Risk Category: II Table 1.5-1

Seismic Load Summary:

Analysis Procedure: Equivalent Lateral Force Procedure

Lateral System: Light Framed Shear Walls

R: 6.50		$C_d = 4$
Base Shear V = 60.0	k	$\Omega_o = 2.5$
$S_S = 1.404$		$S_1 = 0.54$
$S_{DS} = 0.94$		$S_{D1} = 0.54$
$C_s = 0.144$		$I_E = 1.0$

Wind Load Summary:

Risk Category Map II $V = 110$
 Exposure = C $K_{ZT} = 1.00$

Dead Loads:

Roof	Floor
Roofing 2.5 psf	Flooring 1.5 psf
1/2" Ply 1.6 psf	3/4" Ply 2.4 psf
Rafter/Truss 2 psf	Joist 2.4 psf
Insulation 1 psf	5/8" GWB 2.75 psf
5/8" GWB 2.75 psf	Misc. Mech 2 psf
Misc./Mech. 2 psf	1.5" Gypcrete 13 psf
11.85	24.05
Use 15 psf	Use 30 psf

Wall	Veneer
Framing 2 psf	Veneer 40 psf
1/2" Ply 1.6 psf	
Siding 2 psf	
Insulation 1 psf	
1/2" GWB 2.2 psf	
8.8	
Use 10 psf	Use 40 psf

Live Loads:

Snow 25 psf
 Floor 40 psf
 Cantilevered Deck 60 psf



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Project: Ogden Point Residence Date: 3/14/2017
Project #: _____
Design: JWJ
Sheet: CRITERIA

Seismic Design

ASCE 7-10 Seismic Analysis
Equivalent Lateral Force Procedure

Risk Category	II	I, II, or III, or IV per Table 1.5-1
Site Class	D	per soils report (D assumed, without soils report)

Ω_o	2.5	
S_s	1.404	2% in 50 yr, Latitude & Longitude lookup
S_1	0.54	2% in 50 yr, Latitude & Longitude lookup
h_n	35.5 ft	
R	6.50	Light Framed Shear Walls
I_e	1.0	Table 1.5-2
C_d	4	
T	0.29 (sec)	Eq. 12.8-7
T_o	0.12 (sec)	
T_s	0.58 (sec)	
k	1.000	
F_a	1.00	Table 11.4-1
F_v	1.50	Table 11.4-2
S_{MS}	1.40	Eq. 11.4-1
S_{M1}	0.81	Eq. 11.4-2
S_{DS}	0.94	Eq. 11.4-3
S_{D1}	0.54	Eq. 11.4-4
C_s	0.144	Eq. 12.8-2
	0.286	Eq. 12.8-3 need not exceed, $T < T_L$
	0.010	Eq. 12.8-5 or 12.8-6 minimum
C_s , design	0.144	
Bldg. Weight	416.5 k	
$V = C_s W$	60.0 k	Eq. 12.8-1, Strength Level Base Shear
$V = C_{Sasd} W$	42.0 k	Eq. 12.8-1 Allowable Stress Base Shear

$$T_a = C_t h_n^x \quad \text{Eq. 12.8-7}$$

$$S_{MS} = F_a S_s \quad \text{Eq. 11.4-1}$$

$$S_{M1} = F_v S_1 \quad \text{Eq. 11.4-2}$$

$$S_{DS} = \frac{2}{3} S_{MS} \quad \text{Eq. 11.4-3}$$

$$S_{D1} = \frac{2}{3} S_{M1} \quad \text{Eq. 11.4-4}$$

$$C_s = \frac{S_{DS}}{\left(\frac{R}{I}\right)} \quad \text{Eq. 12.8-2}$$

$$C_s = \frac{S_{D1}}{T \left(\frac{R}{I}\right)} \quad \text{Eq. 12.8-3}$$

$$C_s = 0.01 \quad \text{Eq. 12.8-5}$$

$$C_s = \frac{0.5 S_1}{\left(\frac{R}{I}\right)} \quad \text{Eq. 12.8-6}$$

Vertical Distribution							Story Shear		Diaphragm		
ASD			$\rho = 1.0$				ASD		Force (ρ not included)		
Level	hx (ft)	Wx	hx ^k (ft)	Wxhx ^k	Cvx (%)	Fx (k)	ΣV (k)	Fpx (k)	$v = Fpx/Fx$		
			0.0	0.0	0.000	0.0		0.0	0.0	0.00	
Roof	35.5	86.7	35.5	3078.4	0.364	15.3		15.3	15.3	1.00	
Upper	21.5	174.3	21.5	3747.2	0.443	18.6		33.9	22.6	1.22	
Main	10.5	155.5	10.5	1633.2	0.193	8.1		42.0	15.7	1.93	
	Σ	416.5		8458.8		42.0					

$$C_{vx} = \frac{w_x h_x^k}{\sum_{i=1}^n w_i h_i^k} \quad \text{Eq. 12.8-12}$$



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Sheet: L1

Wind Design

ASCE 7-10

Method 2 - Analytical Procedure

Exposure **C**
 $V = 110$ mpg
 $K_d = 0.85$ Table 26.6-1
 Risk Category II Fig. 26.5-1A
 $G = 0.85$ 26.9.4
 Calculate K_{zt} ? **yes**

Roof Angle = **32** degrees
 Ground to top of roof **35.5** ft
 Bottom of roof to top of roof **8** ft
 (mean roof height) $h = 31.5$ ft

Topography from Figure 6-4

Terrain = Escarpment
 Site = upwind
 $H = 282$ ft Height of topography
 $L_h = 1465$ ft Distance from $H/2$ to crest > 0
 $x =$ ft Distance from crest to site
 $z =$ ft Height from bottom of building
 $\mu = 1.5$
 $\gamma = 2.5$
 K_1 value = 0.85
 $K_1 = 0.16$
 $K_2 = 1.00$
 $K_3 = 1.00$

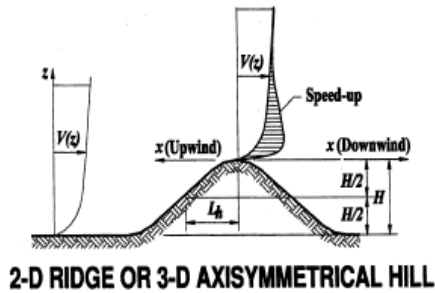
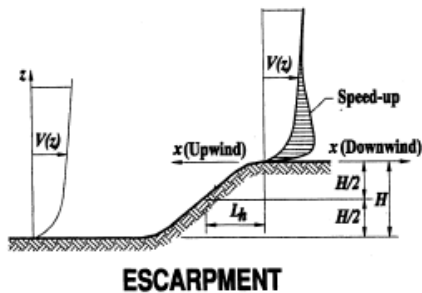
Pressure Coefficients
 from Figure 27.4-1:

Bldg Face	C_p
Windward Wall	0.8
Leeward Wall	-0.5
Windward Roof	0.4
Leeward Roof	-0.7

*Note= C_p values are conservative worst case values.

$H/L_h = 0.19 < 0.2?$ If so, $K_{zt} = 1.0$ if $H/L_h < 0.2$ per 6.5.7.1
 $K_{zt} = (1 + K_1 K_2 K_3)^2 = 1.00$

Pressures:	Ht	K_z	q_z	Strength		Allowable Stress	
				$P_{ww\ walls}$	$P_{lw\ walls}$	$P_{walls} (psf)$	$P_{walls} (psf)$
	0-15	0.85	22.38	15.22	11.64	26.86	16.11
	15-20	0.9	23.70	16.11	11.64	27.75	16.65
	20-25	0.94	24.75	16.83	11.64	28.47	17.08
	25-30	0.98	25.80	17.55	11.64	29.18	17.51
	30-40	1.04	27.38	18.62	11.64	30.26	18.15
	41-50	1.09	28.70	19.52	11.64	31.15	18.69
				$P_{ww\ roof}$	$P_{lw\ roof}$	$P_{roof} (psf)$	$P_{roof} (psf)$
				9.31	16.29	25.60	15.36



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Structural Calculations For:
MAIN HOUSE



**SEATTLE
TACOMA**

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E/W

LEVEL	P (PSF)	H (ft)	L (ft)	F _x (k)
MAIN (w/w only)	9.13 PSF	5.5'	114'	16.1 k
	16.11	4	116'	
	16.65	1.5	116'	
UPPER	16.65	3.5'	116'	20.22 k
	17.08 PSF	5'	↓	
	17.51 PSF	1.75'		
ROOF	17.51 PSF	3.25	103'	18.68 k
	18.15 PSF	1.5	103'	
	15.36 PSF	8'	72'	
	15.36 PSF	1/2 (8')	19'	

$\Sigma V_x = 55 k$

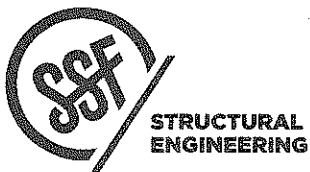
N/S

WIND CONTROLS E/W

LEVEL	P (PSF)	H (ft)	L (ft)	F _x (k)
MAIN	16.11 PSF	9.5'	68'	12.11 k
	16.65	1.5	68'	
UPPER	16.65	3.5	68'	11.85 k
	17.08	5	↓	
	17.51	1.75		
ROOF	17.51 PSF	3.25	68'	10.94 k
	18.15	1.5	52'	
	15.36 PSF	8'	46'	

$\Sigma V = 34.9 k$

SEISMIC CONTROLS N/S



OGDEN POINT
PROJECT WIND ANALYSIS

3/2/17
DATE
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N/S :

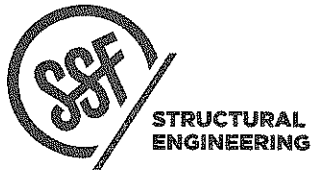
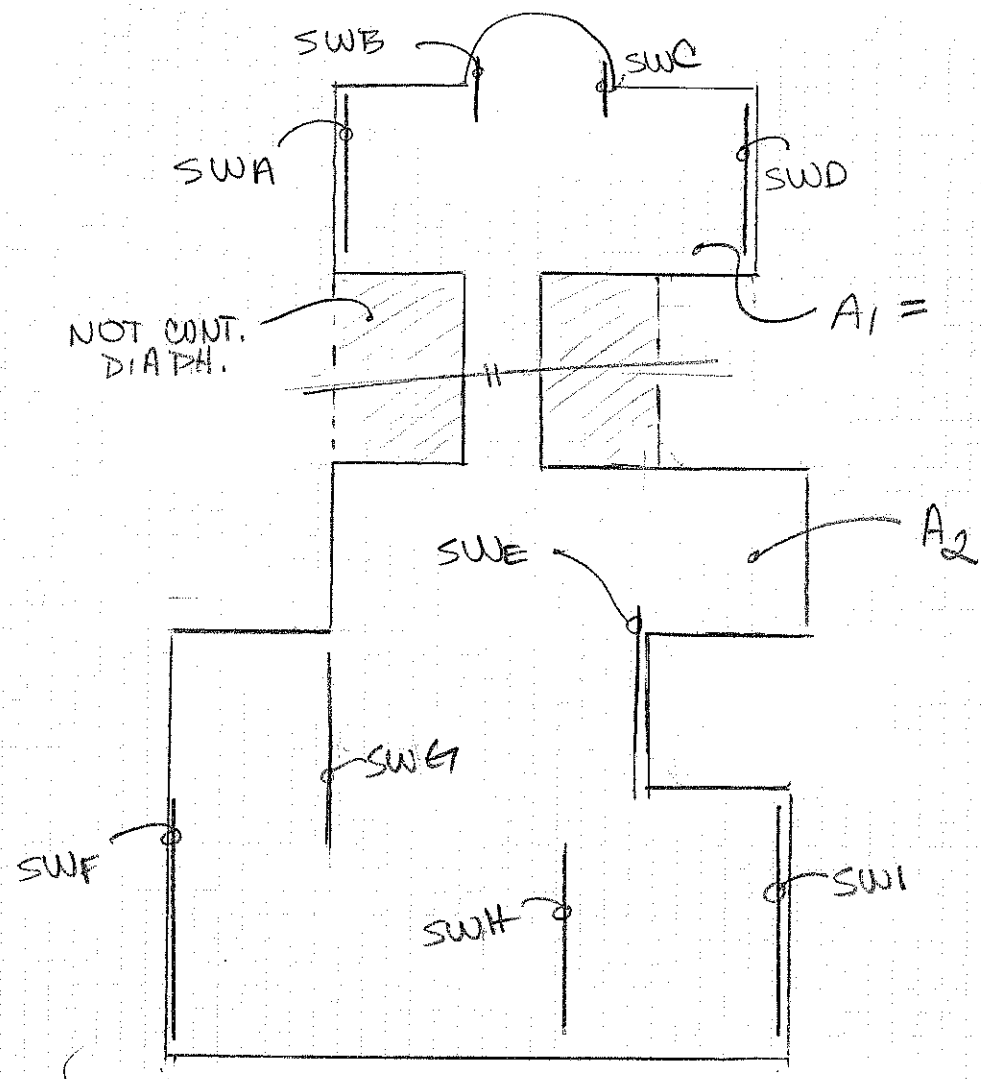
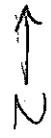
ROOF $F_x = 15.3K$ SEISMIC

ROOF DIAPHRAGM

$A_1 = 1242.54^2$ $F_{A1} = 4.97K$

$A_2 = 2584.54^2$ $F_{A2} = 10.33K$

$\Sigma A = 3827.4^2$



OGDEN POINT
 PROJECT UAT DESIGN

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 PROJ. # JWJ
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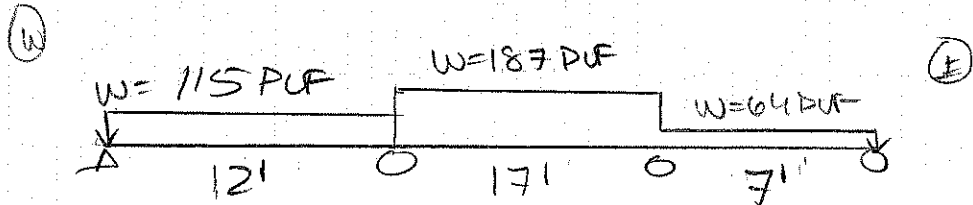
N/S :

ROOF

NORTH A₁ PORTION

F_{A1} = 4.97k ⇒ $\frac{4.97k}{1242.5} = 4 \text{ PSF}$

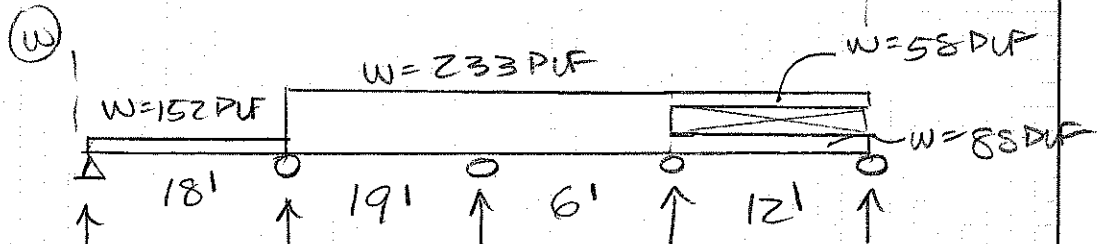
H=9.5'



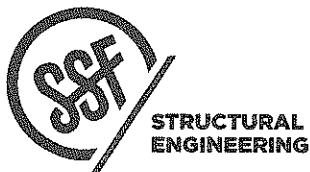
LOAD (K)	.69k	2.3k	1.81k	.22k
LENGTH (ft)	10'	6.5'	8.5'	8'
SHEAR (PSF)	69 ⇒ 94 PSF	354 ⇒ 611 PSF	213 ⇒ 337 PSF	28 PSF
WALL	W6	2W3	W4	W6
OT (lb)	556 lb	3285 lb	1938 lb	0
HD	CS16	(2)CS16	(2)CS16	N/A

SOUTH PORTION

F_{A2} = 10.33k ⇒ $\frac{10.33k}{2584.5 \text{ ft}^2} = 4 \text{ PSF}$



L (K)	1.37k	3.6k	2.9k	1.92k	.53k
L (ft)	15.5'	13'	13.5'	5.5'	26.5'
V (PSF)	88 PSF ⇒ 139 PSF	277 PSF	215 PSF	350 ⇒ 603	26 PSF
WALL	W6	W4	W6	2W3	W6
OT (lb)	751 lb	1560	1657 lb	3098 lb	0
HD	CS16	CS16	CS16	(2)CS16	N/A



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PROJ. # JWL

DESIGN L6

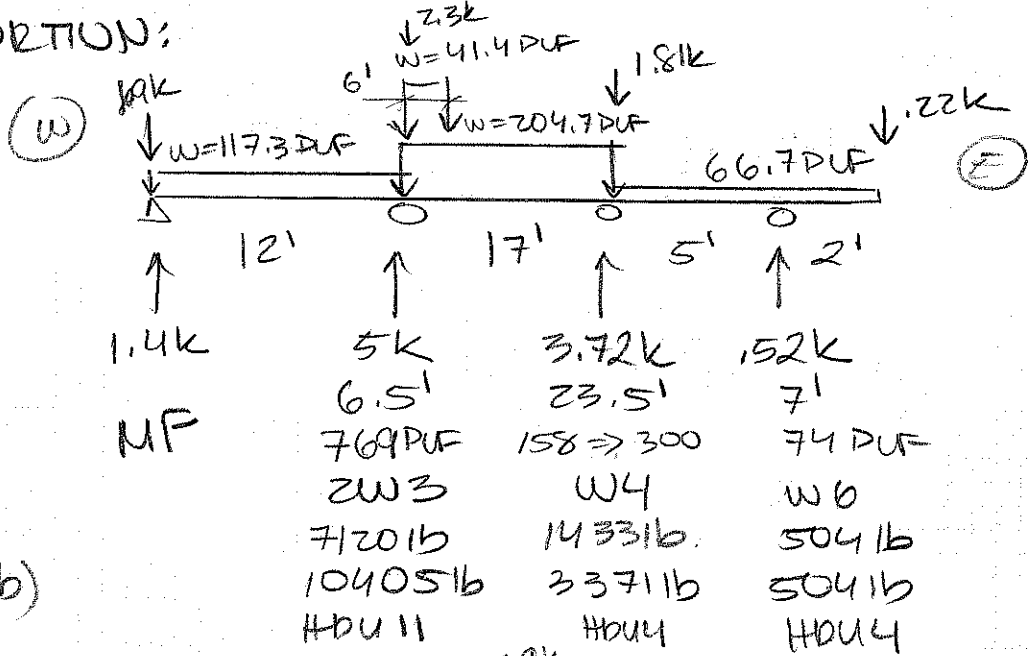
SHEET

N/S UPPER
SIMILAR DIAPHRAGM

$F_x = 18.6k \Rightarrow \frac{18.6k}{4052 H^2} = 4.6 \text{ PSF}$

NORTH PORTION:

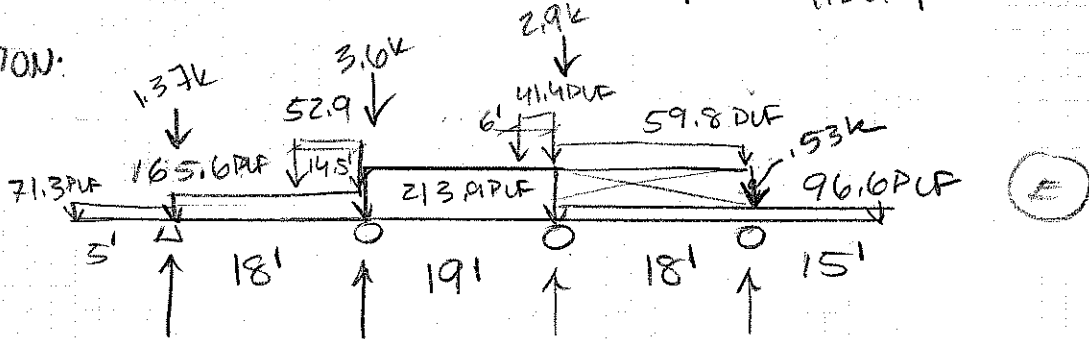
H=9.5'



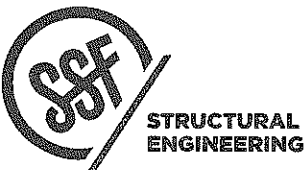
LLK)	1.4k	5k	3.72k	1.52k
LLH)		6.5'	23.5'	7'
V (DUF)		769 DUF	158 ⇒ 300	74 DUF
WALL		2W3	W4	W6
OT (lb)		7120 lb	14331 lb	5041 lb
OT TOTAL (lb)		10405 lb	33711 lb	5041 lb
HD		HDU11	HDU4	HDU4

SOUTH PORTION:

H=9.5'



LLK)	3.51k	7.6k	6.26k	2.85k
LLH)	9'	16'	13.5'	12.5'
V (DUF)	390 ⇒ 417 DUF	475 ⇒ 752	464 DUF	228 DUF
WALL	W3	2W3	W3	W6
OT (lb)	3577 lb	4427 lb	3051 lb	854 lb
OT TOTAL (lb)	4328 lb	4427 lb	4708 lb	854 lb
HD	(3)CS16	(3)CS16	(3)CS16	HDU4



PROJECT _____

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 PROJ. # JWW
 DESIGN L7
 SHEET _____

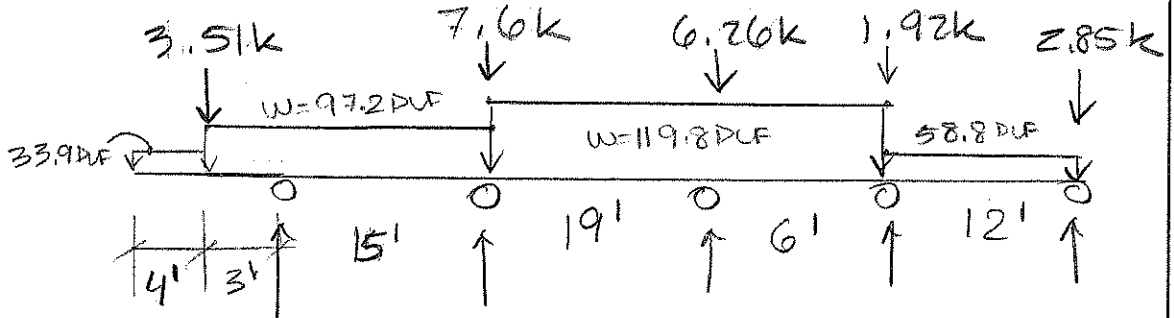
N/S MAIN

$$F_x = 8.1k \Rightarrow \frac{8.1k}{3577ft^2} = 2.26 \text{ PSF}$$

NORTH PORTION \Rightarrow (N) CONC WALLS

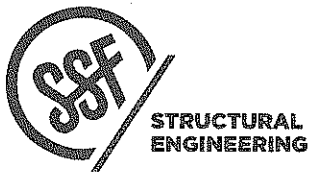
SOUTHERN PORTION:

$$A_{\text{south}} = 2431.34^2 \Rightarrow F_{A2} = 5.51k$$



H = 9.5'

LL(k)	4.67k	9.5k	7.76k	2.63k	3.2k
L(H)	7.75'		20'		
V(DUF)	603 \Rightarrow 763		388 DUF		
WALL	2W3	CONC WALL	W3	CONC WALL	CONC WALL
OT (lb)	5622 lb		3116 lb		
OT TOTAL (lb)	9950 lb		7826 lb		
H/D	HDU11		HDU8		



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PROJECT
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3/2/17

DATE

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JUL

DESIGN

L8

SHEET

E/W DESIGN

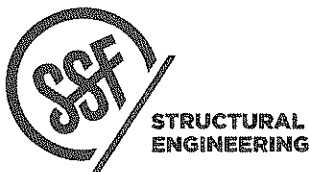
ROOF $F_x = 18.7K$ (WIND) $W = 183.3$ PUF

H=9.5'	(N)	(A)	(C)	(D)	(E)	(F)	(G)	(H)	(I)
LOAD (K)	2.1K	3.4K	2.9K	2.8K	2.4K	3.1K	1.9K		
LENGTH (H)	23'	14'	18'	13'	13'	21'	20.5'		
SHEAR PUF	POSS	358 PUF	184 PUF	93.1 PUF	178 PUF	159.7 PUF	94 PUF		
WALL	W1	W3	W6	W6	W6	W4	W6		
OT STRAPS		3130lb	1292lb	0	1306lb	1425	665lb		
HD		(2)CS16	CS16	N/A	CS16	CS16	CS16		

UPPER $F_x = 20.22K \Rightarrow W_{ww} = 12.13K \Rightarrow 104.6$ PUF
 $W_{ew} = 8.1K \Rightarrow 69.9$ PUF
 $E = 174.5$ PUF

WW FROM WEST SIDE

H=9.5'	(N)								
LOAD (K)	3.1K	2K	5.15K	5.78K	3.22K	5.16K	6.1K	6.2K	
LENGTH (H)	5'	6'	7.5'	12.5'	5.75'	13.5'	17.75'	22'	
V (PUF)	720 PUF	330 PUF	687 PUF	462 PUF	560 PUF	382 PUF	343.5 PUF	281 PUF	
WALL	W3	W4	W3	W2	W2	W3	W2	W4	
OT (lb)	6698lb	2964	6.3K	3.25K	5.16K	3.2K	3.2K	2.5K	
OT TOTAL (lb)	6698lb	2964lb	9.4K	4.54K	5.16K	4.6K	4.6K	3.14K	
HD	HBU8	HBU4 (2)CS16	HBU11	(3)CS16	(3)CS14	HBU5	HBU5	HBU4	
WW FROM EAST SIDE									
SW @ 42 E:									
V = 1.24K + 1.62K = 2.86K									
L = 13' $r = 220$ PUF W6									
OT = 1720 HBU4									

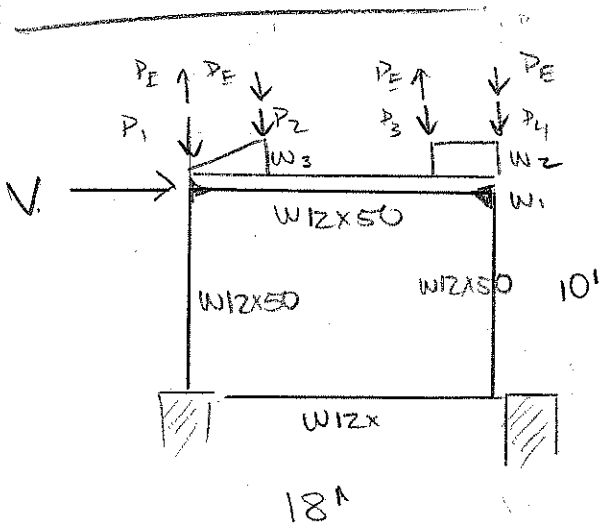


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DATE 3/3/17
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MOMENT FRAME

$$R=3.5 \quad \Omega=2.5 \quad \alpha=3$$



$$U = 1.4k \left(\frac{6.5}{3.5} \right) \left(\frac{1}{.7} \right) = 3.71 k -$$

$$W_1 = W_{DL} = 20 \text{ PLF} -$$

$$W_{LL} = 27 \text{ PLF} -$$

$$W_2 = W_{DL} = 199 \text{ PLF} - (15' - 18')$$

$$W_{LL} = 331 \text{ PLF} -$$

$$W_3 = W_{DL} = 38 \text{ PLF} - (0 - 3')$$

$$W_{LL} = 63 \text{ PLF} - (0 - 3')$$

$$P_3 = P_{DL} = 1.24 k -$$

$$P_{LL} = 2 k -$$

$$P_1 = P_{DL} = 100 \text{ lb} -$$

$$P_{LL} = 167 \text{ lb} -$$

$$P_4 = P_{DL} = 1.43 k -$$

$$P_{LL} = 2.4 k -$$

$$P_2 = P_{DL} = 1.3 k -$$

$$P_{LL} = 2.2 k -$$

$$P_{EQ} = \Omega (1.7k) \left(\frac{6.5}{3.5} \right) \left(\frac{1}{.7} \right) = \Omega (4.5k) = 11.3k -$$

DRIFT

$$\delta = \frac{C_d \delta}{I} = \frac{3 (.265'')}{1.0} = .798''$$

$$< .02 h_s = 2.4'' \quad \text{OK} \checkmark$$

BM W12x50 L_b = 18'

$$P = 2.7k \quad \phi P = 270k$$

$$M = 38.4 k-ft \quad \phi M = 204k-ft$$

$$V = 14 \quad \phi V = 135k$$

$$\text{Interaction} = .2 < 1 \quad \text{OK} \checkmark$$

COL W12x50 L_b = 10'

$$P = 17.84k \quad \phi P = 500k$$

$$M = 27 k-ft \quad \phi M = 252 k-ft$$

$$V = 2.7k \quad \phi V = 135k$$

$$\text{Interaction} = .1 < 1 \quad \text{OK} \checkmark$$



STRUCTURAL
ENGINEERING

OP
PROJECT

3/8/17
DATE

PROJ. #
JWS

DESIGN
L18

SHEET

ULI

COL 1:

	w/Ω	w/o Ω
MAX T	-7.1k	-1.72k
MAX C	15.3k	9.94k
V	1.9k	

COL 2

	w/Ω	w/o Ω
MAX T	-5.8k	-1.44k
MAX C	20.6k	15.3k
V	1.9k	

$$TENSION = (.9 - .2S_{Ds})D + .2Q$$

$$COMP = (.12 + .2S_{Ds})D + L + .2E$$

$$S_{Ds} = .94 \quad .2S_{Ds} = .188$$



STRUCTURAL
ENGINEERING

OP
PROJECT _____

DATE 3/8/17
 PROJ. # JWJ
 DESIGN L19
 SHEET

Project: Frame

Joanna Klimczak, SWENSON SAY FAGET

March 14, 2017

H:\Users\rhenry\PROJECTS\2016\OGDEN POINT\Analysis\MF\

Steel Beam Report: BmX001

Member Details

Member Properties

Length	18.00000 ft
Shape	W12x50
Material	ASTM A992 Grade 50
Weight	0.89562 K
Framing	Beam
Beta	0 deg

Connections

Start	End
Node N002	N004
Location (0, 10, 0 ft)	(18, 10, 0 ft)
Support Fix Z Only	Fix Z Only

Analysis Results (First Order)

Load Combinations: ASCE 7-10 LRFD

Extreme Forces

Axial	-2.65444 K	1.2D+E+.5L+Lpa+.2S »+X+30%+Z
My	0.00000 K-ft	-NA-
Mz	38.34480 K-ft	1.2D+E+.5L+Lpa+.2S »+X+30%+Z
Vy	-13.98594 K	1.2D+E+.5L+Lpa+.2S »+X+30%+Z
Vz	0.00000 K	-NA-
Torsion	0.00000 K-ft	-NA-

Extreme Deflections (all cases)

Total Dy	-0.05892 in	1.2D+E+.5L+Lpa+.2S »+X+30%+Z
Total Dz	0.00000 in	-NA-
Beam Dy	-0.05804 in	1.2D+E+.5L+Lpa+.2S »+X+30%+Z
Beam Dz	0.00000 in	-NA-

Steel Design per AISC LRFD (2010)

Controlling Design Checks

Type	Case	Demand	Capacity	Unity	Status	Reference
Combined Check	1.2D+E+.5L+Lpa+.2S »+X+30%+Z	-NA-	-NA-	0.15	OK	H1-1b
Axial Check	1.2D+E+.5L+Lpa+.2S »+X+30%+Z	2.65444 K	271.24788 K	0.01	OK	E3-2FB
Strong Flexure Check	1.2D+E+.5L+Lpa+.2S »+X+30%+Z	38.34480 K-ft	269.62501 K-ft	0.14	OK	F2-1
Strong Shear Check	1.2D+E+.5L+Lpa+.2S »+X+30%+Z	-13.98594 K	135.42000 K	0.10	OK	G2-1

Project: Frame

Joanna Klimczak, SWENSON SAY FAGET

March 14, 2017

H:\Users\rhenry\PROJECTS\2016\OGDEN POINT\Analysis\MF\

Steel Column Report: COL001

Member Details

Member Properties

Length	10.00000 ft
Shape	W12x50
Material	ASTM A992 Grade 50
Weight	0.49757 K
Framing	Column
Beta	0 deg

Connections

Start	End
Node N001	N002
Location (0, 0, 0 ft)	(0, 10, 0 ft)
Support Pinned	Fix Z Only

Analysis Results (First Order)

Load Combinations: ASCE 7-10 LRFD

Extreme Forces

Axial	-7.52842 K	1.2D+1.6L+.2Di+.5S
My	0.00000 K-ft	-NA-
Mz	18.57514 K-ft	E+X
Vy	1.85751 K	E+X
Vz	0.00000 K	-NA-
Torsion	0.00000 K-ft	-NA-

Extreme Drift (all cases)

Drift Dy	0.26745 in	E+X
Drift Dz	0.00000 in	-NA-

Steel Design per AISC LRFD (2010)

Controlling Design Checks

Type	Case	Demand	Capacity	Unity	Status	Reference
Combined Check	.9D+E »+X+30%+Z	-NA-	-NA-	0.06	OK	H1-1b
Axial Check	1.2D+1.6L+.2Di+.5S	7.52842 K	500.01776 K	0.02	OK	E3-2FB
Strong Flexure Check	.9D+E »+X+30%+Z	15.71812 K-ft	269.62501 K-ft	0.06	OK	F2-1
Strong Shear Check	.9D+E »+X+30%+Z	1.57181 K	135.42000 K	0.01	OK	G2-1

STRONG BACKS

COMPONENTS + CLADDING

$$P = 24.9 \text{ PSF} (16) = 15 \text{ PSF (AU)}$$

@ STAIR

BI BEAM @ ROOF

$$W_{\text{ROOF}} = 120 \text{ PLF} \quad L \rightarrow$$

$$W_{\text{WIND}} = 120 \text{ PLF}$$

$$M_{\text{R}} = .96 \text{ K-FT} \quad f_{\text{b}} = 61 \text{ PSI}$$

$$M_{\text{W}} = .96 \text{ K-FT} \quad f_{\text{b}} = 313 \text{ PSI}$$

$$\Sigma = 374 \text{ PSI}$$

$$V_{\text{R}} = .48 \text{ K}$$

$$V_{\text{W}} = .48 \text{ K}$$

$$f_{\text{v}} = 7 \text{ PSI}$$

$$f_{\text{v}} = 11 \text{ PSI}$$

$$\Sigma = 18 \text{ PSI}$$

@ WEST ELEV.

BTWN D-E

PSL 5'1/4 x 5'1/4 #10

$$P = 650 \text{ LB}$$

$$W = 83 \text{ PLF}$$

$$M = 1038 \text{ LB-FT}$$

$$\text{INTERACTION} = .14 \quad \checkmark$$

STL COL

HSS 5x5x1/4

$$P = .15 \text{ K} \quad P_{\text{R}} = 46.3 \text{ K}$$

$$M = 2.6 \text{ K-FT} \quad M_{\text{R}} = 17.5 \text{ K-FT}$$

$$H = 18.5$$

$$\text{Interaction} = .15$$



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STRONGBACKS

PROJECT

3/8/17

DATE

PROJ. #

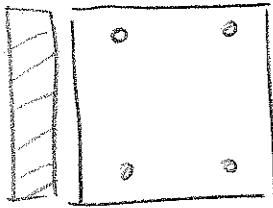
DESIGN

SHEET

JWJ

L20

CONC TBM W/ VENEER @ GARAGE



12"

16"

$$W_u = 1.4(199.5 \text{ PUF} + 40 \text{ PUF})$$

$$= 335.3 \text{ PUF}$$

$$M = 20,296 \text{ -ft} \quad \phi M_n = 25,266 \text{ -ft}$$

(2) #5 T + B

$$V_u = 3.7 \text{ k} \quad \frac{\phi V_c}{2} = 6.3 \text{ k} \quad \checkmark$$

NO TIES

OOD CONN. BACK TO DIAPHRAGM

$$F_p = 1.4 S_{ps} W I_e = 90.1 \text{ PUF (LIFT)}$$

$$S_{ps} = .94$$

$$\Rightarrow 126 \text{ lb @ 2' (AU)}$$

HGAIDUT @ EA TRUSS

$$F_1 = 840 \text{ lb OK} \quad \checkmark$$



STRUCTURAL
ENGINEERING

OGDEN POINT

PROJECT

3/13/17

DATE

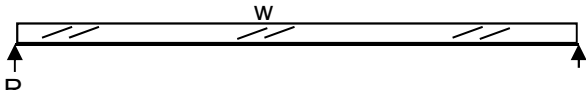
PROJ. #

DESIGN

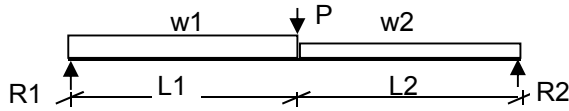
SHEET

221

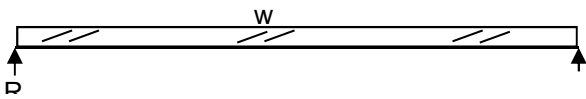
Beam	B1	LVL	3 1/2 x 18
w=	140 plf	R=	700 lbs
L=	10 ft	M=	1,750 ft-lbs
b=	3.50 in	Fb=	111 psi
d=	18.00 in	Fv=	12 psi
E=	2000 ksi	Δ =	0.01 in
Cv=	1.00 \leq 1.0	I/	12960



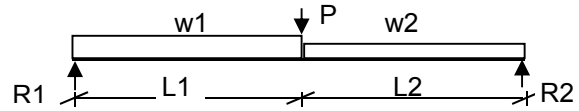
Beam	B2	LVL	3 1/2 x 18
w1=	140 plf	R1 =	3,465 lbs
w2=	530 plf	R2 =	3,315 lbs
L1=	2 ft	M =	10,320 lb-ft
L2=	10 ft	Fb =	655 psi
X=	6.0 ft	Fv =	78 psi
P=	1,200 lbs	Δ =	0.08 in
b=	3.50 in	I/	1,806
d=	18.00 in	Cv=	1.00
E=	2,000 ksi		



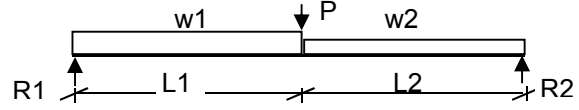
Beam	B3	LVL	3 1/2 x 18
w=	530 plf	R=	2,385 lbs
L=	9 ft	M=	5,366 ft-lbs
b=	3.50 in	Fb=	341 psi
d=	18.00 in	Fv=	38 psi
E=	2000 ksi	Δ =	0.02 in
Cv=	1.00 \leq 1.0	I/	4696



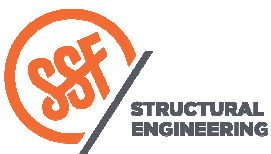
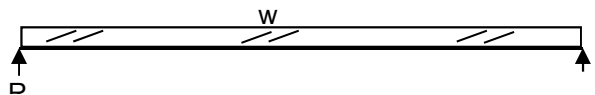
Beam	B4	LVL	3 1/2 x 18
w1=	360 plf	R1 =	2,109 lbs
w2=	200 plf	R2 =	1,291 lbs
L1=	3 ft	M =	4,147 lb-ft
L2=	6 ft	Fb =	263 psi
X=	4.3 ft	Fv =	37 psi
P=	1,300 lbs	Δ =	0.01 in
b=	3.50 in	I/	6,996
d=	18.00 in	Cv=	1.00
E=	2,000 ksi		



Beam	B5	LVL	3 1/2 x 18
w1=	440 plf	R1 =	3,069 lbs
w2=	200 plf	R2 =	1,451 lbs
L1=	2 ft	M =	5,258 lb-ft
L2=	7 ft	Fb =	334 psi
X=	4.5 ft	Fv =	57 psi
P=	2,240 lbs	Δ =	0.02 in
b=	3.50 in	I/	5,234
d=	18.00 in	Cv=	1.00
E=	2,000 ksi		



Beam	B6	HF	3 x 8
w=	530 plf	R=	1,060 lbs
L=	4 ft	M=	1,060 ft-lbs
b=	3.00 in	Fb=	484 psi
d=	7.25 in	Fv=	51 psi
E=	1300 ksi	Δ =	0.02 in
Cv=	1.00 \leq 1.0	I/	1947

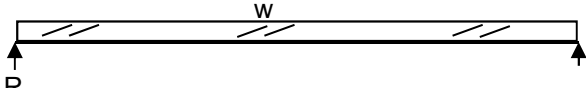


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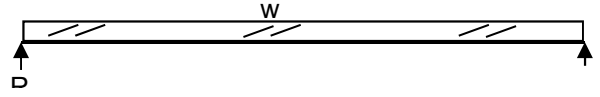
Office: 206.443.6212
Fax: 206.443.4870

Project: Ogden Point-Roof Date: 03/14/17
DL=15 psf LL=25 psf Project #: _____
Deflection= DL=L/240 LL=L/360 Design: JWJ
 Sheet: G1

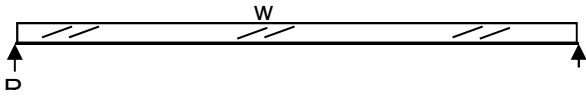
Beam	B1	HF	2	x 10
w=	93.3333333	plf	R=	327 lbs
L=	7	ft	M=	572 ft-lbs
b=	1.50	in	Fb=	321 psi
d=	9.25	in	Fv=	28 psi
E=	1300	ksi	Δ =	0.04 in
Cv=	1.00	≤ 1.0	I/	2143



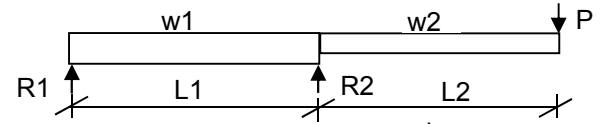
Beam	B4	DF-L	4	x 10
w=	120	plf	R=	630 lbs
L=	10.5	ft	M=	1,654 ft-lbs
b=	3.50	in	Fb=	398 psi
d=	9.25	in	Fv=	25 psi
E=	1700	ksi	Δ =	0.08 in
Cv=	1.00	≤ 1.0	I/	1507



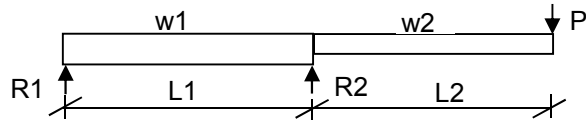
Beam	B2	HF	2	x 12
w=	70	plf	R=	315 lbs
L=	9	ft	M=	709 ft-lbs
b=	1.50	in	Fb=	269 psi
d=	11.25	in	Fv=	22 psi
E=	1300	ksi	Δ =	0.04 in
Cv=	1.00	≤ 1.0	I/	2418



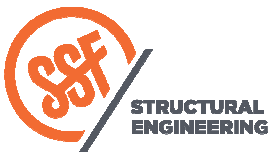
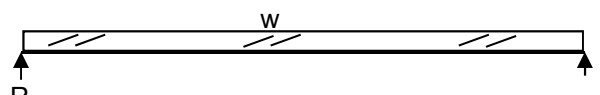
Beam	B5	LVL	3	1/2 x 18
w1=	210	plf	R1=	166 lbs
w2=	490	plf	R2=	3,784 lbs
L1=	7	ft	M+=	66 lb-ft
L2=	2	ft	M=-	3,980 lb-ft
X=	3.50	ft	Fb=	253 psi
P=	1,500	lbs	Fv=	42 psi
b=	3.50	in	Δ span=	(0.003) in
d=	18.00	in	I span/	(29,408)
E=	2,000	ksi	Δ cant=	0.01 in
Cv=	1.00		I cant/	5,384



Beam	B3	LSL	1	3/4 x 16
w1=	40	plf	R1=	266 lbs
w2=	120	plf	R2=	1,214 lbs
L1=	19	ft	M+=	887 lb-ft
L2=	6	ft	M=-	2,160 lb-ft
X=	9.50	ft	Fb=	347 psi
P=	-	lbs	Fv=	30 psi
b=	1.75	in	Δ span=	0.036 in
d=	16.00	in	I span/	6,382
E=	1,550	ksi	Δ cant=	0.06 in
Cv=	1.00		I cant/	2,343



Beam	B6	GL	5	1/8 x 12
w=	192.5	plf	R=	1,684 lbs
L=	17.5	ft	M=	7,369 ft-lbs
b=	5.13	in	Fb=	719 psi
d=	12.00	in	Fv=	36 psi
E=	1800	ksi	Δ =	0.31 in
Cv=	1.00	≤ 1.0	I/	687



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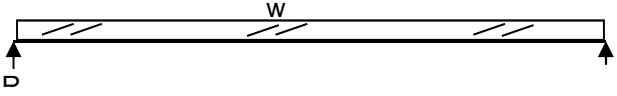
Project: Ogden Point-Upper Floor Date: 03/14/17

DL=30 psf LL=40 psf Project #: _____

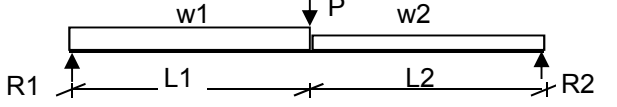
Deflection= DL=L/500 LL=L/700 Design: JWJ

Sheet: G2

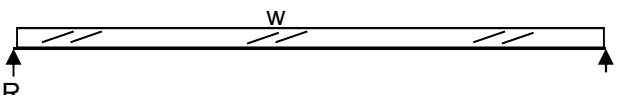
Beam	B7	HF	3	x 12
w=	240	plf	R=	660 lbs
L=	5.5	ft	M=	908 ft-lbs
b=	3.00	in	Fb=	172 psi
d=	11.25	in	Fv=	19 psi
E=	1300	ksi	Δ =	0.01 in
Cv=	1.00	≤ 1.0	I/	6181



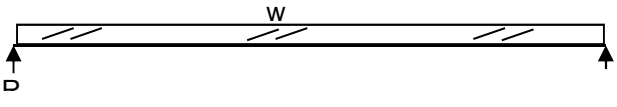
Beam	B8	DF-L	3	1/2 x 11	1/4
w1=	80	plf	R1 =	1,140	lbs
w2=	80	plf	R2 =	1,140	lbs
L1=	6	ft	M =	5,400	lb-ft
L2=	6	ft	Fb =	878	psi
X=	6.0	ft	Fv =	41	psi
P=	1,320	lbs	Δ =	0.17	in
b=	3.50	in	I/	851	
d=	11.25	in	Cv=	1.00	
E=	1,700	ksi			



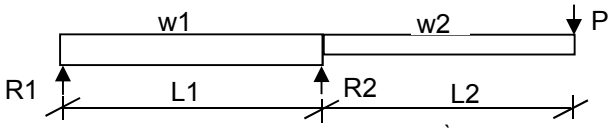
Beam	B9	LVL	3	1/2 x 18
w=	80	plf	R=	440 lbs
L=	11	ft	M=	1,210 ft-lbs
b=	3.50	in	Fb=	77 psi
d=	18.00	in	Fv=	8 psi
E=	2000	ksi	Δ =	0.01 in
Cv=	1.00	≤ 1.0	I/	17040



Beam	B10	LVL	3	1/2 x 18
w=	522.5	plf	R=	1,437 lbs
L=	5.5	ft	M=	1,976 ft-lbs
b=	3.50	in	Fb=	125 psi
d=	18.00	in	Fv=	16 psi
E=	2000	ksi	Δ =	0.00 in
Cv=	1.00	≤ 1.0	I/	20872

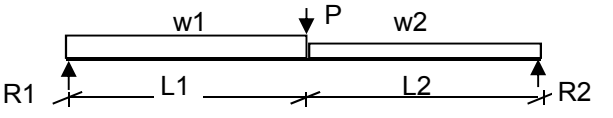


Beam	B11	PSL	1	x 1
w1=	93	plf	R1=	-327 lbs
w2=	60	plf	R2=	2,997 lbs
L1=	10	ft	M+=	- lb-ft
L2=	5	ft	M-=	7,935 lb-ft
X=	5.00	ft	Fb=	571,320 psi
P=	1,437	lbs	Fv=	2,598 psi
b=	1.00	in	Δ span=	##### in
d=	1.00	in	I span/	(0)
E=	1	ksi	Δ cant=	##### in
Cv=	1.00		I cant/	0

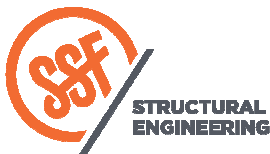


Steel Size	W10X19			
span	Δ (in)	I/	Fy=	50 ksi
	-0.023	-5180	Mn/ Ω =	31.0 k-ft
cant.	0.11	1093	Vn/ Ω =	42.3 kips

Beam	B12	PSL	1	x 1
w1=	350	plf	R1 =	3,583 lbs
w2=	575	plf	R2 =	4,739 lbs
L1=	7	ft	M =	16,507 lb-ft
L2=	5	ft	Fb =	1,188,495 psi
X=	6.0	ft	Fv =	7,036 psi
P=	2,997	lbs	Δ =	##### in
b=	1.00	in	I/	0
d=	1.00	in	Cv=	1.00
E=	1	ksi		

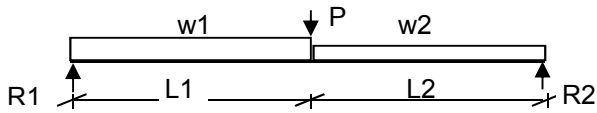


Steel Size	W10X22			
I =	118	in ⁴	Fy=	50 ksi
Δ =	0.111	in	Mn/ Ω =	44.0 k-ft
I/	1293		Vn/ Ω =	70.3 kips



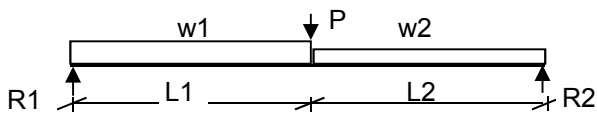
Project: Ogden Point-Upper Floor Date: 03/14/17
DL=30 psf LL=40 psf Project #: _____
Deflection= DL=L/500 LL=L/700 Design: JWJ
 Sheet: G3

Beam	B13	PSL	1	x 1
w1=	420	plf	R1 =	2,384 lbs
w2=	420	plf	R2 =	2,329 lbs
L1=	7	ft	M =	6,657 lb-ft
L2=	5	ft	Fb =	479,273 psi
X=	6.0	ft	Fv =	3,523 psi
P=	(327)	lbs	Δ=	##### in
b=	1.00	in	I /	0
d=	1.00	in	Cv=	1.00
E=	1	ksi		

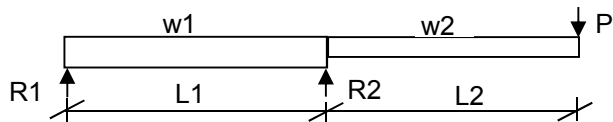


Steel Size	W10X19			
I =	96.3	in ⁴	Fy =	50 ksi
Δ =	0.063	in	Mn/Ω =	54.0 k-ft
I /	2280		Vn/Ω =	73.0 kips

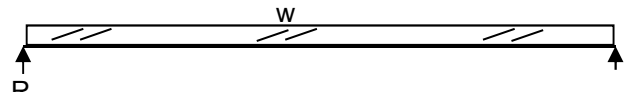
Beam	B14	GL	5 1/8	x 15
w1=	47	plf	R1 =	4,825 lbs
w2=	438	plf	R2 =	4,693 lbs
L1=	5	ft	M =	23,541 lb-ft
L2=	8	ft	Fb =	1,470 psi
X=	5.0	ft	Fv =	93 psi
P=	5,784	lbs	Δ=	0.23 in
b=	5.13	in	I /	682
d=	15.00	in	Cv=	1.00
E=	1,800	ksi		



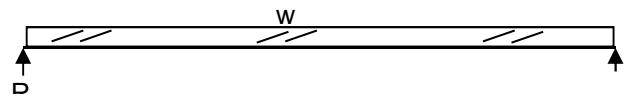
Beam	B15	LVL	3 1/2	x 18
w1=	219	plf	R1 =	1026 lbs
w2=	220	plf	R2 =	3,249 lbs
L1=	12	ft	M+ =	2,406 lb-ft
L2=	3	ft	M- =	3,438 lb-ft
X=	6.00	ft	Fb =	218 psi
P=	1,100	lbs	Fv =	31 psi
b=	3.50	in	Δspan =	0.014 in
d=	18.00	in	I span /	10,080
E=	2,000	ksi	Δcant =	0.00 in
Cv=	1.00		I cant /	65,502



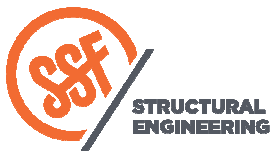
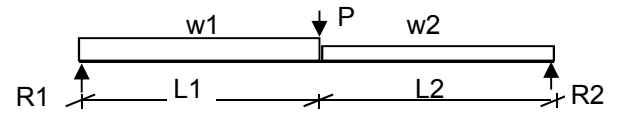
Beam	B16	DF-L	4	x 10
w=	795	plf	R=	1,988 lbs
L=	5	ft	M=	2,484 ft-lbs
b=	3.25	in	Fb=	643 psi
d=	9.25	in	Fv=	69 psi
E=	1700	ksi	Δ=	0.03 in
Cv=	1.00	≤1.0	I /	1956



Beam	B17	LVL	3 1/2	x 18
w=	612.5	plf	R=	3,063 lbs
L=	10	ft	M=	7,656 ft-lbs
b=	3.50	in	Fb=	486 psi
d=	18.00	in	Fv=	51 psi
E=	2000	ksi	Δ=	0.04 in
Cv=	1.00	≤1.0	I /	2962



Beam	B18	LVL	3 1/2	x 18
w1=	583	plf	R1 =	5,064 lbs
w2=	93	plf	R2 =	1,059 lbs
L1=	1	ft	M =	5,688 lb-ft
L2=	17	ft	Fb =	361 psi
X=	8.8	ft	Fv =	100 psi
P=	4,000	lbs	Δ=	0.10 in
b=	3.50	in	I /	2,121
d=	18.00	in	Cv=	1.00
E=	2,000	ksi		



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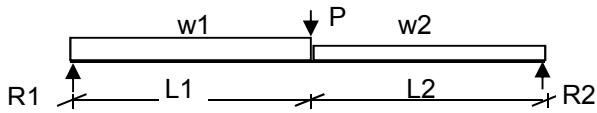
Project: Ogden Point-Upper Floor Date: 03/14/17

DL=30 psf LL=40 psf Project #: _____

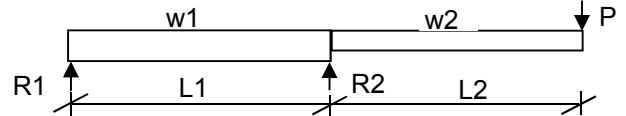
Deflection= DL=L/500 LL=L/700 Design: JWJ

Sheet: G4

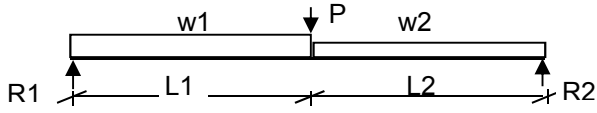
Beam	B19	LVL	3 1/2 x 18
w1=	583 plf	R1 =	4,667 lbs
w2=	93 plf	R2 =	3,811 lbs
L1=	13 ft	M =	18,628 lb-ft
L2=	4 ft	Fb =	1,183 psi
X=	8.0 ft	Fv =	90 psi
P=	860 lbs	Δ =	0.25 in
b=	3.50 in	I /	762
d=	18.00 in	Cv =	1.00
E=	2,000 ksi		



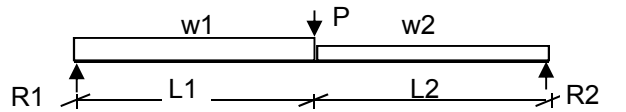
Beam	B22	LVL	3 1/2 x 18
w1=	93 plf	R1 =	502 lbs
w2=	47 plf	R2 =	3,392 lbs
L1=	18 ft	M =	1,350 lb-ft
L2=	3 ft	M =	5,506 lb-ft
X=	8.75 ft	Fb =	350 psi
P=	2,144 lbs	Fv =	52 psi
b=	3.50 in	Δspan =	0.004 in
d=	18.00 in	I span /	48,104
E=	2,000 ksi	Δcant =	0.02 in
Cv =	1.00	I cant /	2,984



Beam	B20	PSL	1 x 1
w1=	1,155 plf	R1 =	9,462 lbs
w2=	1,155 plf	R2 =	14,643 lbs
L1=	8.0 ft	M =	38,733 lb-ft
L2=	3.0 ft	Fb =	2,788,756 psi
X=	5.5 ft	Fv =	21,821 psi
P=	11,400 lbs	Δ =	##### in
b=	1.00 in	I /	0
d=	1.00 in	Cv =	1.00
E=	1 ksi		

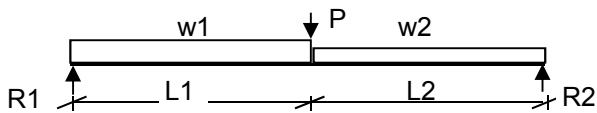


Beam	B23	HF	4 x 10
w1=	613 plf	R1 =	1,191 lbs
w2=	613 plf	R2 =	4,119 lbs
L1=	1.25 ft	M =	1,011 lb-ft
L2=	0.25 ft	Fb =	243 psi
X=	0.75 ft	Fv =	169 psi
P=	4,392 lbs	Δ =	0.00 in
b=	3.50 in	I /	16,534
d=	9.25 in	Cv =	1.00
E=	1,300 ksi		

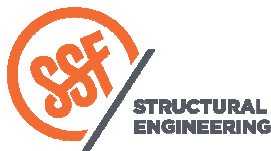
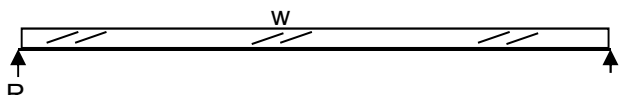


Steel Size	W10X26		
I =	144 in ⁴	Fy =	50 ksi
Δ =	0.188 in	Mn/Ω =	78.1 k-ft
I /	704	Vn/Ω =	76.2 kips

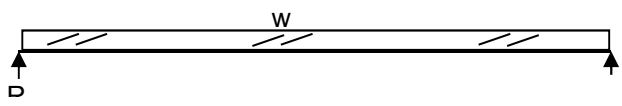
Beam	B21	LVL	3 1/2 x 18
w1=	138 plf	R1 =	1,025 lbs
w2=	138 plf	R2 =	2,144 lbs
L1=	13 ft	M =	3,785 lb-ft
L2=	1 ft	Fb =	240 psi
X=	6.8 ft	Fv =	46 psi
P=	1,313 lbs	Δ =	0.04 in
b=	3.50 in	I /	4,292
d=	18.00 in	Cv =	1.00
E=	2,000 ksi		



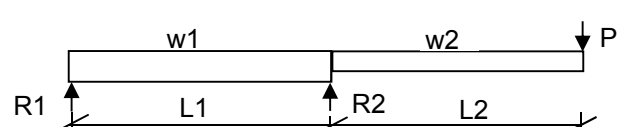
Beam	B24	GL	5 1/8 x 12
w=	405 plf	R=	3,038 lbs
L=	15 ft	M=	11,391 ft-lbs
b=	5.13 in	Fb=	1,111 psi
d=	12.00 in	Fv=	64 psi
E=	1800 ksi	Δ=	0.35 in
Cv=	1.00 ≤1.0	I /	518



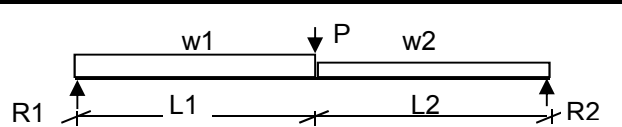
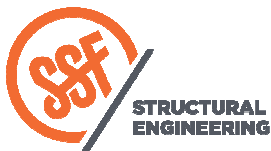
Beam	B25	LVL	3 1/2 x 18
w=	505 plf	R=	4,040 lbs
L=	16 ft	M=	16,160 ft-lbs
b=	3.50 in	Fb=	1,026 psi
d=	18.00 in	Fv=	78 psi
E=	2000 ksi	Δ =	0.22 in
Cv=	1.00 \leq 1.0	I/	877



Beam	B26	LVL	5 1/4 x 18
w1=	560 plf	R1=	-1906 lbs
w2=	560 plf	R2=	13,446 lbs
L1=	6.50 ft	M+=	- lb-ft
L2=	3.50 ft	M-=	24,220 lb-ft
X=	3.25 ft	Fb=	1,025 psi
P=	5,940 lbs	Fv=	112 psi
b=	5.25 in	Δ_{span} =	(0.017) in
d=	18.00 in	I span/	(4,522)
E=	2,000 ksi	Δ_{cant} =	0.09 in
Cv=	1.00	I cant/	967



Beam	B27	DF-L	3 1/2 x 9 1/4
w1=	995 plf	R1 =	2,640 lbs
w2=	995 plf	R2 =	2,640 lbs
L1=	2 ft	M =	3,290 lb-ft
L2=	2 ft	Fb =	791 psi
X=	2.0 ft	Fv =	87 psi
P=	1,300 lbs	Δ =	0.02 in
b=	3.50 in	I/	2,159
d=	9.25 in	Cv=	1.00
E=	1,700 ksi		

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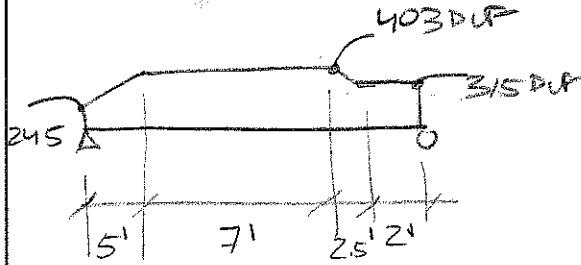
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Project: Ogden Point-Upper Floor Date: 03/14/17
DL=30 psf LL=40 psf Project #: _____
Deflection= DL=L/500 LL=L/700 Design: JWJ
 Sheet: G6

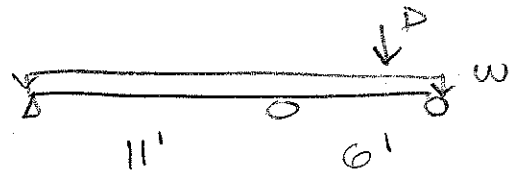
UPPER FLOOR

28 W8X18



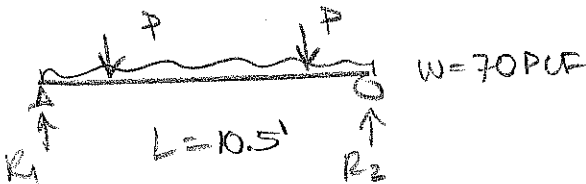
$R_1 = 2.94k$ $R_2 = 2.9k$
 $M = 13.12k-ft$ $M/R = 42.4k-k$
 $V = 2.9k$ $V/R = 31k$
 $\Delta = .355"$ 4.557

31, B1



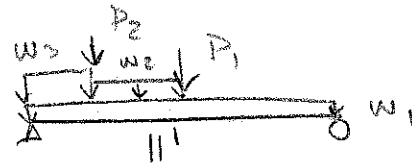
$W = 665 DUF$
 $P = 4.8k @ 16'$
 $R_1 = 2.9k$ $R_2 = 8.16k$ $R_3 = 4.6k$
 $M = 8.4k-ft$ $f_b = 533 psi$
 $V = 4.6k$ $f_v = 109 psi$
 $\Delta = .033$ $4/4024$

29 GUB 5'8" X 12



$P = 2.9k @ 2', 8.5'$
 $M = 6.8k-ft$ $f_b = 110 psi$
 $V = 3.3k$ $w = 80.5 psi$
 $\Delta = .113"$ $4/1111$

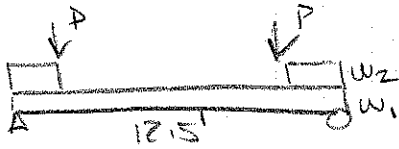
32, 4X12



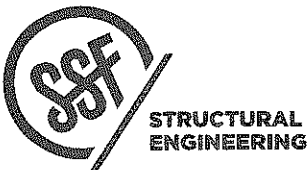
$W_1 = 40 DUF$
 $W_2 = 80 DUF$
 $W_3 = 240 DUF$
 $P_1 = 1.14k @ 7'$
 $P_2 = .66k @ 3'$
 $R_1 = 1.9k$ $R_2 = 1.4k$

$M = 5.18k-ft$ $f_b = 842 psi$
 $V = 1.9k$ $f_v = 72 psi$
 $\Delta = .16$ $4/823$

30 W10X22



$W_1 = 1290 DUF$
 $W_2 = 140 DUF$
 $P = 700 lb$ $L_b = 12.5'$
 $M = 26.2k-ft$ $M/R = 44k-ft$
 $V = 8.94k$ $V/R = 49k$
 $\Delta = .217"$ $4/692$

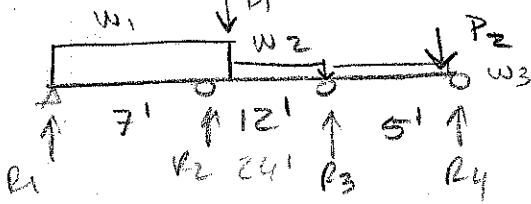


OGDEN PT
 PROJECT GRAVITY
 UPPER

3/7/17
 DATE
 PROJ. JWW
 DESIGN 67
 SHEET

UPPER FLOOR

33.6 LB 5'18" x 12



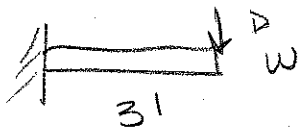
$w_1 = 980 \text{ DUF}$
 $w_2 = 607 \text{ DUF}$
 $w_3 = 47 \text{ DUF}$

$P_1 = 2.33 \text{ k @ } 9'$
 $P_2 = 1.44 \text{ k @ } 23.5'$

$R_1 = 2.03 \text{ k}$ $R_2 = 11.4 \text{ k}$
 $R_3 = 5.3 \text{ k}$ $R_4 = 1.16 \text{ k}$

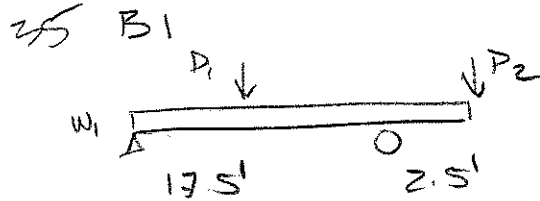
$M = 9.8 \text{ k-ft}$ $f_b = 950 \text{ psi}$
 $V = 6.6 \text{ k}$ $w = 161 \text{ psi}$
 $\Delta = .087$ $\text{y } 1665$

34.1
 W 12 x 26



$P = 1.1 \text{ k}$
 $w = 220 \text{ DUF}$

$M = 4.3 \text{ k-ft}$ $M_{1/2} = 92.9 \text{ k-ft}$
 $V = 1.8 \text{ k}$ $V_{1/2} = 56.1 \text{ k}$
 $\Delta = .00411$ $\text{y } 18000$



$w = 93 \text{ DUF}$
 $P_1 = .3 \text{ k}$
 $P_2 = 1 \text{ k}$

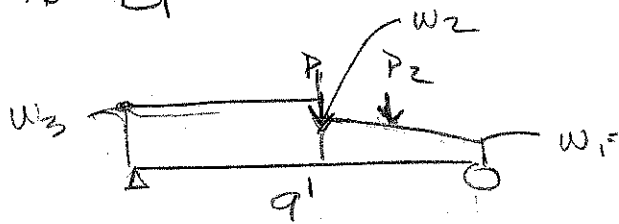
$R_1 = 2.5 \text{ k}$ $R_2 = 3.3 \text{ k}$

$M = 15 \text{ k-ft}$ $f_b = 952 \text{ psi}$
 $V = 2.5 \text{ k}$ $w = 59.5 \text{ psi}$

$\Delta_{\text{cant}} = \text{---}$ 24 ---
 (PL ONLY ON BACKSPAN)

$\Delta_{12} = .187''$ $\text{y } 1123$

36 BI



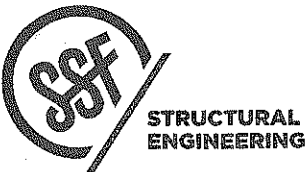
$w_1 = 1173 \text{ DUF}$ $w_2 = 1673 \text{ DUF}$
 $w_3 = 1413 \text{ DUF}$

$P_1 = 1.3 \text{ k @ } 3'$

$P_2 = 4.64 \text{ k @ } 7'$

$R_1 = 8.75 \text{ k}$ $R_2 = 10 \text{ k}$

$M = 20.8 \text{ k-ft}$ $f_b = 1322$
 $V = 10 \text{ k}$ $w = 238 \text{ psi}$
 $\Delta = .092$ $\text{y } 1175$



OGDEN P.T.
 PROJECT

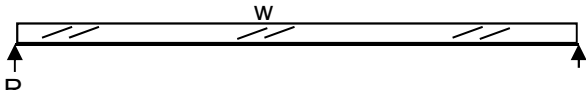
3/7/17
 DATE

PROJ. # JWS

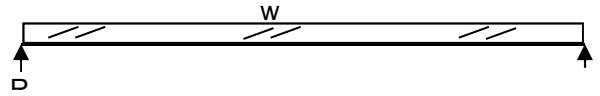
DESIGN 68

SHEET

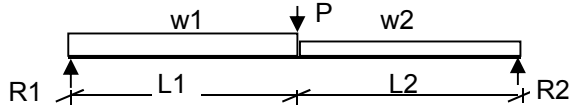
Beam	B1	LVL	3 1/2 x 18
w=	980 plf	R=	3,185 lbs
L=	6.5 ft	M=	5,176 ft-lbs
b=	3.50 in	Fb=	329 psi
d=	18.00 in	Fv=	41 psi
E=	2000 ksi	Δ=	0.01 in
Cv=	1.00 ≤1.0	I/	6742



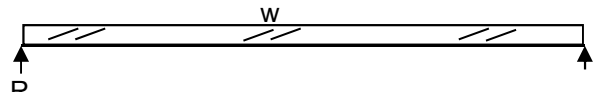
Beam	B4	GL	5 1/8 x 12
w=	385 plf	R=	2,888 lbs
L=	15 ft	M=	10,828 ft-lbs
b=	5.13 in	Fb=	1,056 psi
d=	12.00 in	Fv=	61 psi
E=	1800 ksi	Δ=	0.33 in
Cv=	1.00 ≤1.0	I/	545



Beam	B2	PSL	1 x 1
w1=	980 plf	R1 =	15,389 lbs
w2=	980 plf	R2 =	11,271 lbs
L1=	5 ft	M =	64,694 lb-ft
L2=	12 ft	Fb =	4,657,976 psi
X=	8.5 ft	Fv =	22,961 psi
P=	10,000 lbs	Δ=	##### in
b=	1.00 in	I/	0
d=	1.00 in	Cv=	1.00
E=	1 ksi		

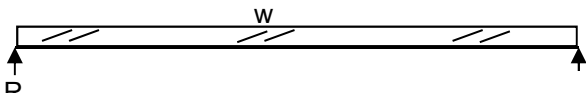


Beam	B5	LVL	3 1/2 x 18
w=	146.666667 plf	R=	1,283 lbs
L=	17.5 ft	M=	5,615 ft-lbs
b=	3.50 in	Fb=	356 psi
d=	18.00 in	Fv=	25 psi
E=	2000 ksi	Δ=	0.09 in
Cv=	1.00 ≤1.0	I/	2308

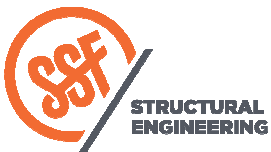
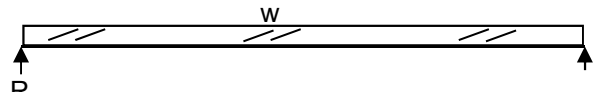


Steel Size	W10X49		
I =	272 in ⁴	Fy=	50 ksi
Δ =	0.408 in	Mn/Ω =	150.7 k-ft
I/	499	Vn/Ω =	95.0 kips

Beam	B3	LVL	3 1/2 x 18
w=	385 plf	R=	1,925 lbs
L=	10 ft	M=	4,813 ft-lbs
b=	3.50 in	Fb=	306 psi
d=	18.00 in	Fv=	32 psi
E=	2000 ksi	Δ=	0.03 in
Cv=	1.00 ≤1.0	I/	4713



Beam	B6	LVL	3 1/2 x 18
w=	720 plf	R=	1,800 lbs
L=	5 ft	M=	2,250 ft-lbs
b=	3.50 in	Fb=	143 psi
d=	18.00 in	Fv=	17 psi
E=	2000 ksi	Δ=	0.00 in
Cv=	1.00 ≤1.0	I/	20160



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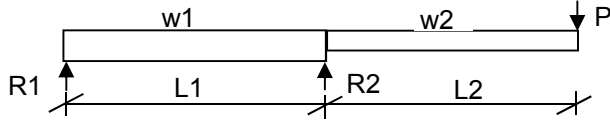
Project: Ogden Point-Main Floor Date: 03/14/17

DL=30 psf LL=40 psf Project #: _____

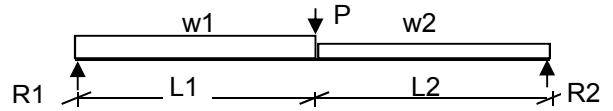
Deflection= DL=L/500 LL=L/700 Design: JWJ

Sheet: G9

Beam	B7	LVL	3 1/2 x 18
w1=	47	plf	R1= 5 lbs
w2=	47	plf	R2= 615 lbs
L1=	6	ft	M+= 0 lb-ft
L2=	3	ft	M-= 810 lb-ft
X=	3.00	ft	Fb= 51 psi
P=	200	lbs	Fv= 6 psi
b=	3.50	in	Δ_{span} = (0.001) in
d=	18.00	in	I_{span} / (136,957)
E=	2,000	ksi	Δ_{cant} = 0.00 in
Cv=	1.00		I_{cant} / 24,138

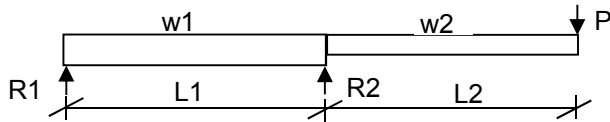


Beam	B10	PSL	1 x 1
w1=	713	plf	R1 = 23,360 lbs
w2=	713	plf	R2 = 4,722 lbs
L1=	1	ft	M = 14,957 lb-ft
L2=	10	ft	Fb = 1,076,934 psi
X=	5.3	ft	Fv = 34,950 psi
P=	20,600	lbs	Δ = ##### in
b=	1.00	in	I / 0
d=	1.00	in	Cv= 1.00
E=	1	ksi	

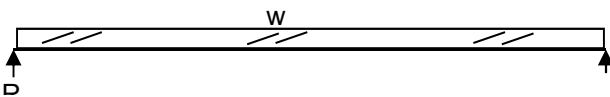


Steel Size	W12X50		
I =	391	in ⁴	Fy= 50 ksi
Δ =	0.028	in	Mn/ Ω = 179.4 k-ft
I /	4505		Vn/ Ω = 126.9 kips

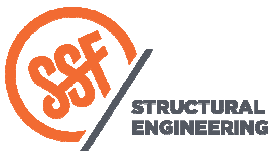
Beam	B8	LVL	5 1/4 x 18
w1=	255	plf	R1= -418 lbs
w2=	1,290	plf	R2= 8,228 lbs
L1=	8	ft	M+= - lb-ft
L2=	3	ft	M-= 11,505 lb-ft
X=	4.00	ft	Fb= 487 psi
P=	1,900	lbs	Fv= 61 psi
b=	5.25	in	Δ_{span} = (0.011) in
d=	18.00	in	I_{span} / (8,745)
E=	2,000	ksi	Δ_{cant} = 0.04 in
Cv=	1.00		I_{cant} / 2,008



Beam	B9	PSL	1 x 1
w=	617.5	plf	R= 5,712 lbs
L=	18.5	ft	M= 26,417 ft-lbs
b=	1.00	in	Fb= 1,902,054 psi
d=	1.00	in	Fv= 8,491 psi
E=	1	ksi	Δ = ##### in
Cv=	1.00	≤ 1.0	I / 0



Steel Size	W12X35		
I =	285	in ⁴	Fy= 50 ksi
Δ =	0.20	in	Mn/ Ω = 127.7 k-ft
I /	1127		Vn/ Ω = 61.8 kips



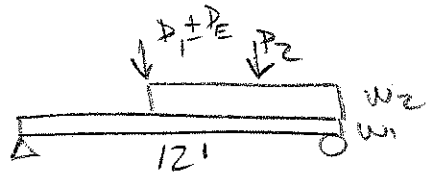
Project: Ogden Point-Main Floor Date: 03/14/17

DL=30 psf LL=40 psf Project #:

Deflection= DL=L/500 LL=L/700 Design: JWJ

Sheet: G10

11. B2

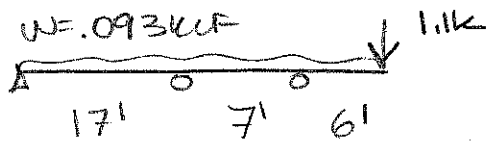


$P_1 = 6.6k @ 5'$
 $P_2 = 4.7k @ 10.5'$
 $P_E = \Omega(515) = 12.8k$
 $w_1 = 560 \text{ DUF}$
 $w_2 = 665 \text{ DUF}$

$R_1 = 9.2k$ $R_2 = 13.5k$
 $M = 39k\text{-ft}$ $f_b = 1657 \text{ psi}$
 $M_{w/EC} = 76.1k\text{-ft}$ $f_b = 3221 \text{ psi}$
 $V = 13.5k$ $w = 214 \text{ psi}$
 $V_{w/EC} = 18.9k$ $w = 300 \text{ psi} < 464 \text{ psi}$
 $\Delta = .188"$ $4/766$

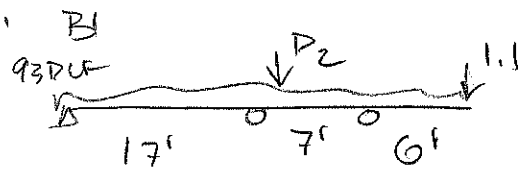
UPUFT $\rightarrow 650 \text{ lb}$ HMC w/
 tight screws

12. B1



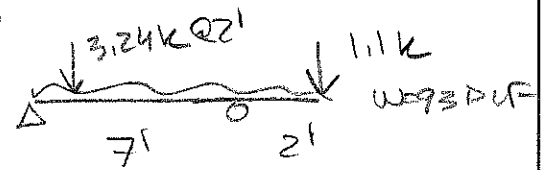
$R_1 = .7k$ $R_2 = 1.2k$ $R_3 = 3k$
 $M = 8k\text{-ft}$ $f_b = 508 \text{ psi}$
 $V = 1.7k$ $w = 41 \text{ psi}$
 $\Delta = .107"$ $24/1345$

13. B1



$P_2 = 3.24k @ 19'$
 $R_1 = 1k$ $R_2 = 2.7k$ $R_3 = 3.7k$
 $M = 8k\text{-ft}$ $f_b = 508 \text{ psi}$
 $V = 2k$ $w = 47 \text{ psi}$
 $D = .091"$ $24/1582$

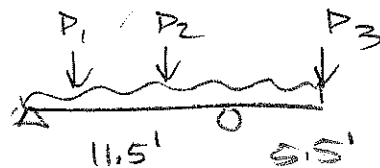
14. B1



$R_1 = 2.3k$ $R_2 = 2.9k$
 $M = 4k\text{-ft}$ $f_b = 254 \text{ psi}$
 $V = 2.3k$ $w = 58 \text{ psi}$
 $\Delta = \text{---}$

15.

GLB 5'8x12 DROPPED



$w = 455 \text{ DUF}$
 $P_1 = 3k @ 3'$
 $P_2 = 3.7k @ 7'$
 $P_3 = 1.62k$
 $R_1 = 5.4k$ $R_2 = 9.7k$
 $M = 15k\text{-ft}$ $f_b = 1463 \text{ psi}$
 $V = 6.6k$ $w = 161 \text{ psi}$
 $\Delta_{\text{CANT}} = .179"$ $24/737$

(GL on 42k)

3/7/17

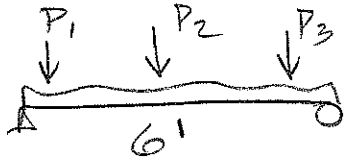


STRUCTURAL ENGINEERING

PROJECT OD. MAIN

DATE _____
 PROJ # JWJ
 DESIGN G11
 SHEET _____

10' PSL S1/4 X .11718



W = 840 DUF

P1 = 6.74k @ .25'

P2 = 1.2k @ 2'

P3 = 1.1k @ 5'

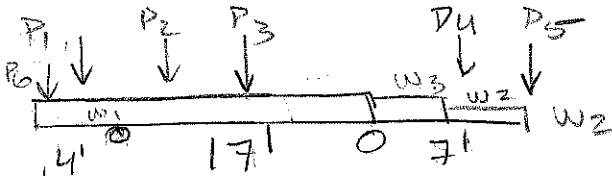
R1 = 9.96k R2 = 4.12k

M = 6.52k-ft Mmax = 631 psi

V = 9.96k W = 240 psi ✓

Δ = .029" 42449

12' W16 X 36



W1 = 1155 DUF

W3 = 595 DUF

W2 = 1290 DUF

P1 = 13.8k @ 2' P4 = 2k @ 1.25'

P2 = 13k @ 9'

P3 = 32k @ 15'

P4 = 10k @ 25.5'

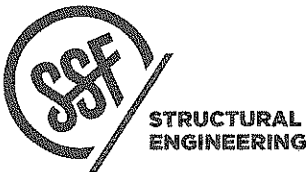
P5 = 1.9k @ 28'

R1 = 39.3k R2 = 51.2k

M = 93k-ft M/2 = 160k-ft

V = 33k V/2 = 94k

Δ = .252" 4809

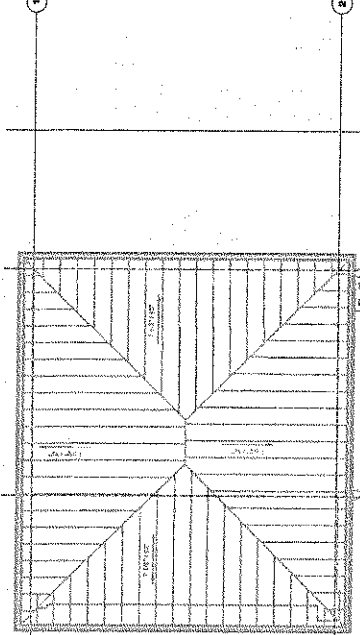
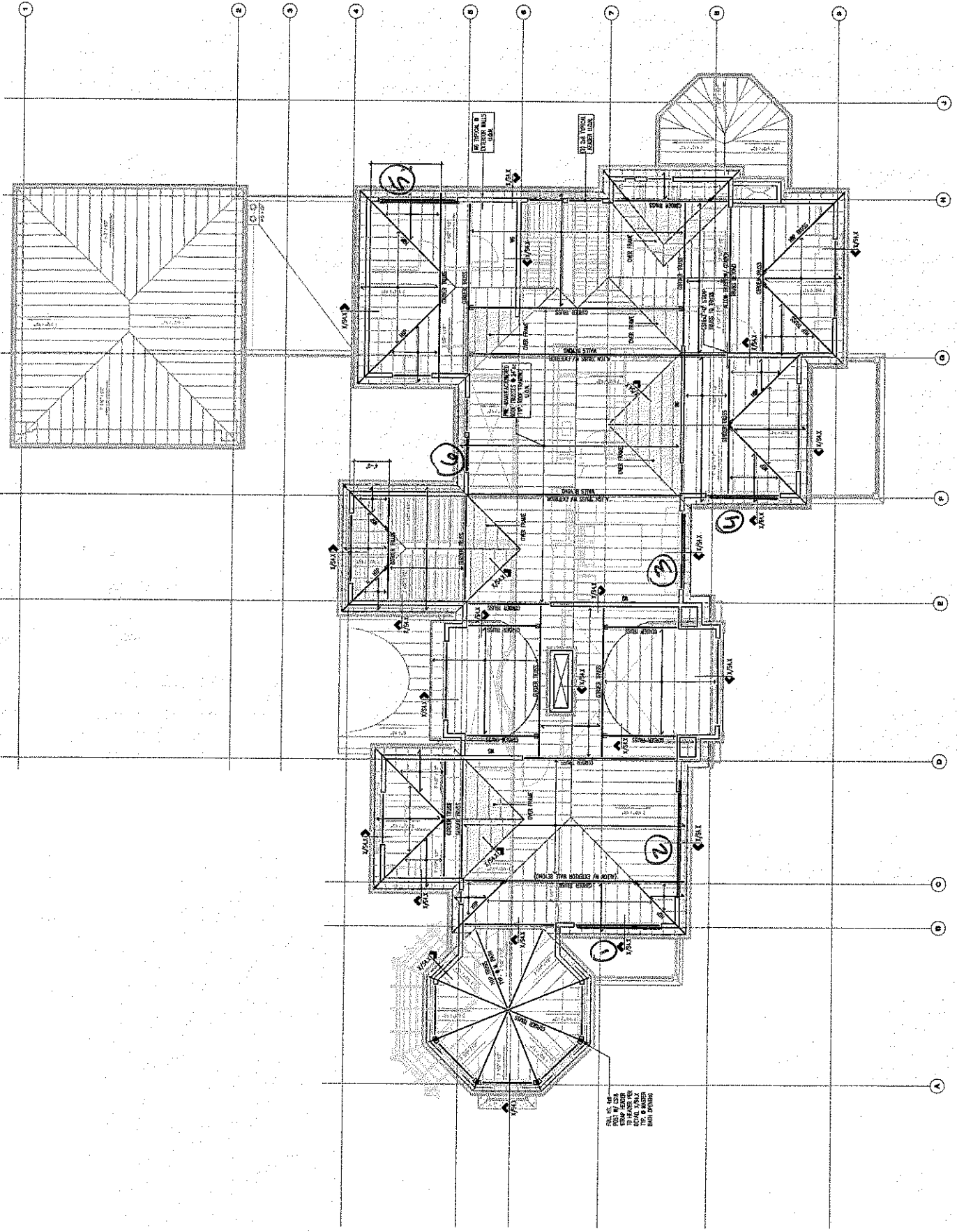


OP
PROJECT MAIN

3/9/17
DATE
PROJ. # JWS
DESIGN GIZ
SHEET

ROOF GRAVITY KEY

Plan Notes: Legend High Roof Framing Plan Scale: 1/4" = 1'-0"



Project: Oyster Point Residence
 3025 W. Morris Bay
 Newport, Rhode Island 02840

Architect: Danielson Architects
 5555 Lincoln Drive, Suite 20
 Newport, Rhode Island 02840
 PH: 401-824-1371

DATE: 08/11/2017
 DRAWN BY: [Name]
 CHECKED BY: [Name]

PRELIMINARY
 High Roof Framing Plan
 Scale: 1/4" = 1'-0" U.S.
 Project No: 08/11-2017-01

\$2.4

616



PROJECT:	UPPER FLOOR FRAMING
DATE:	08/11/2011
SCALE:	1/4" = 1'-0"
DESIGNER:	DJG
CHECKER:	
DATE:	
PROJECT:	
DATE:	
PROJECT:	
DATE:	
PROJECT:	
DATE:	

Client Name:
Ogilvy & Mather
Residence
3005 W. Manor Way
Hempstead, NY 11549

Architect:
Demichou Architects
100 West 10th Street, Suite 20
New York, NY 10011
PH: 432-627-1272

PRELIMINARY

Upper Floor Framing Plan

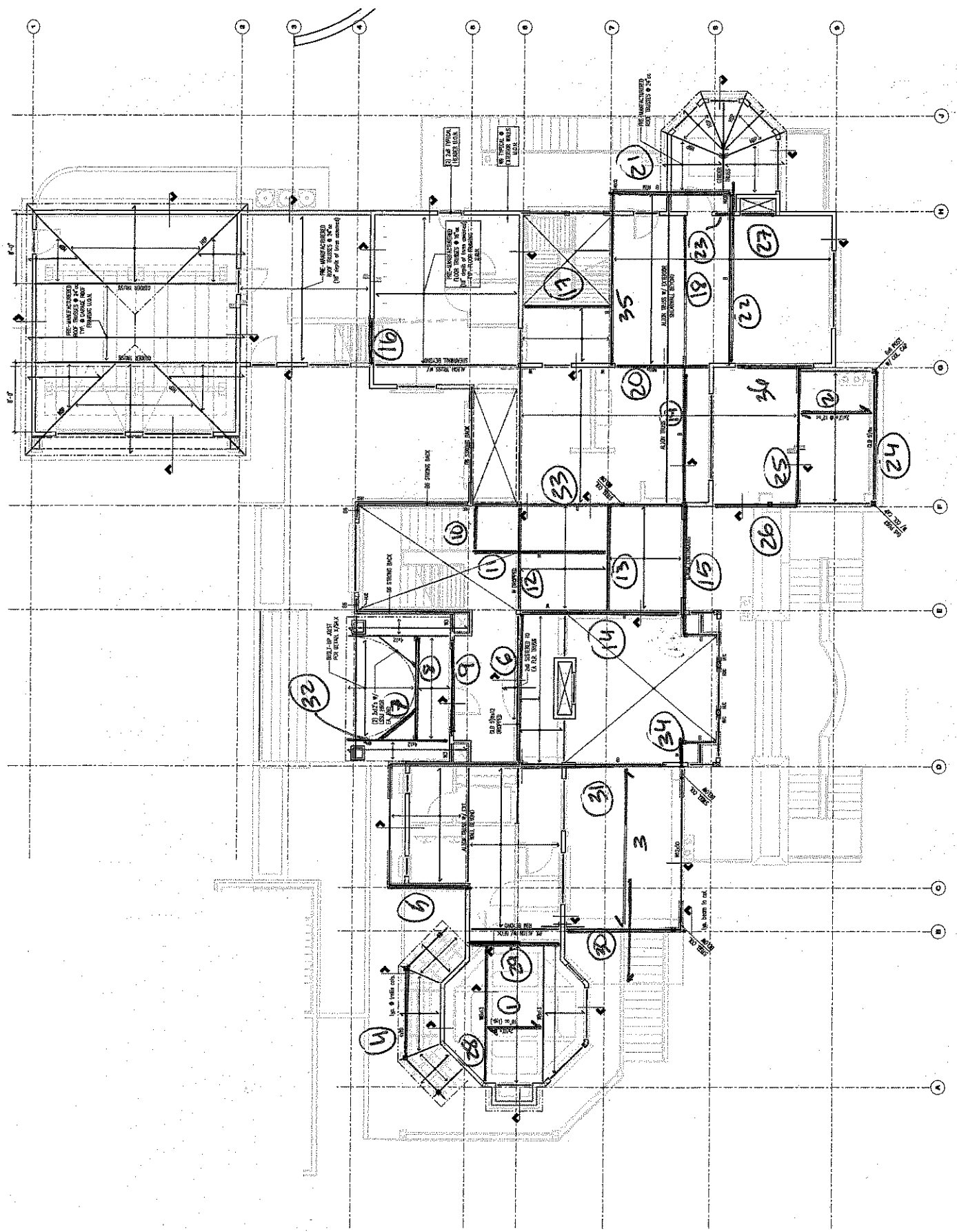
Scale: 1/4" = 1'-0"

S2.3

G17

UPPER FLOOR GRAVITY KEY

Plan Notes
Legend
Upper Floor Framing Plan
Scale: 1/4" = 1'-0"



BUILT UP PLYWOOD JOISTS

ACX (2) 3/4 x 12" @ 16" o.c L=12'

$w = 53.3 \text{ PLF}$

$M = 960 \text{ lb-ft} < 538 \text{ lb-ft} (1.15)(1.84) = 1138 \text{ lb-ft}$

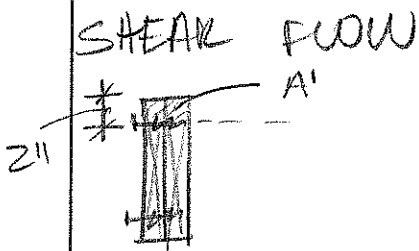
$V = 320 \text{ lb}$ $f_b = 117.6 \text{ psi} < 190 \text{ psi}$ OK ✓

$t_{11} = \frac{4.29}{12} = .351"$ $h = 12 - 3/8 = 11.625"$

$I = 2 \left(\frac{.351 (11.625)^3}{12} \right) = 91.9 \text{ in}^4$

$\Delta = .150 (1.38) = .207"$ $L/694$

$\frac{\text{SPAN}}{\text{DEPTH}} = \frac{12}{1} = 12 : 1.38$

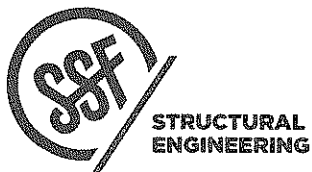


$q = \frac{VQ}{I} = 22 \text{ lb/in}$

$V = 320 \text{ lb}$
 $I = 216 \text{ in}^4$
 $A' = 2" (1.5") = 3"$
 $y' = 5"$

8d INTO PLY
 (70lb) 1.15
 = 80.5

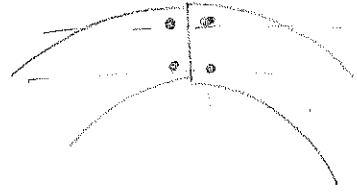
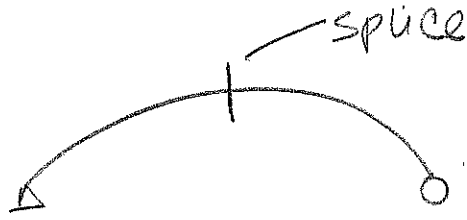
8d @ 3 1/2"



PROJECT _____

DATE _____
 PROJ. # _____
 DESIGN JWJ
620
 SHEET _____

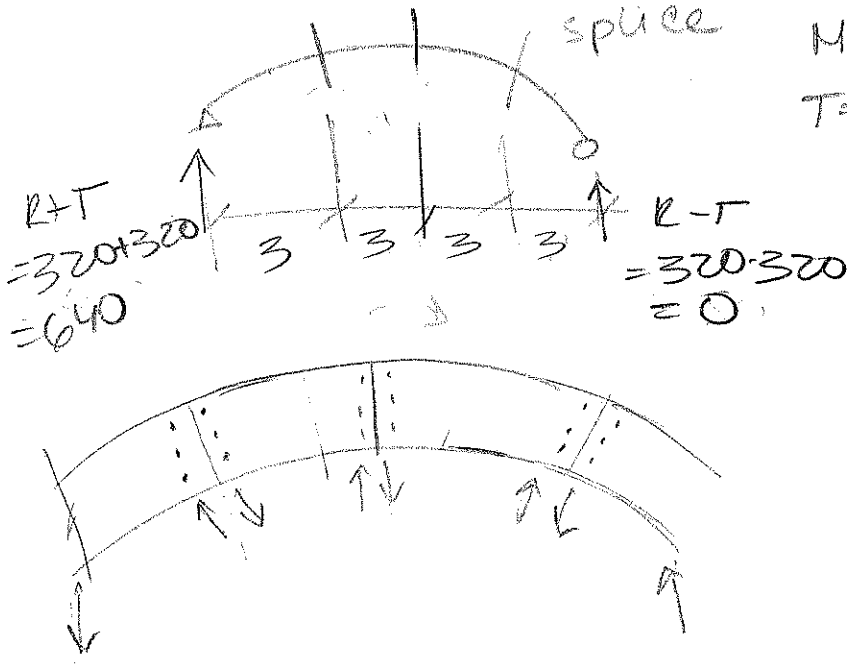
FRONT PIECE:



$$M = 959.4 \text{ lb-ft}$$

$$T = C = \frac{M}{10''/12} = 1156$$

BACK PIECE



$$M = 959.4 \text{ lb-ft}$$

$$T = C = \frac{959.4}{3} = 319.8 \text{ lb}$$

$$Z_{200} = 115 (111 \text{ lb}) = 127.65$$

(3) #10 SCREWS

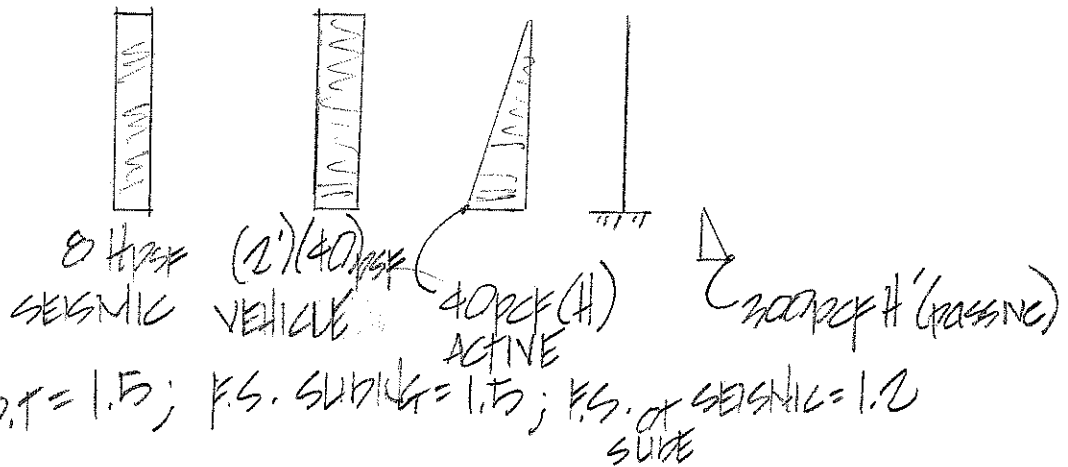


STRUCTURAL
ENGINEERING

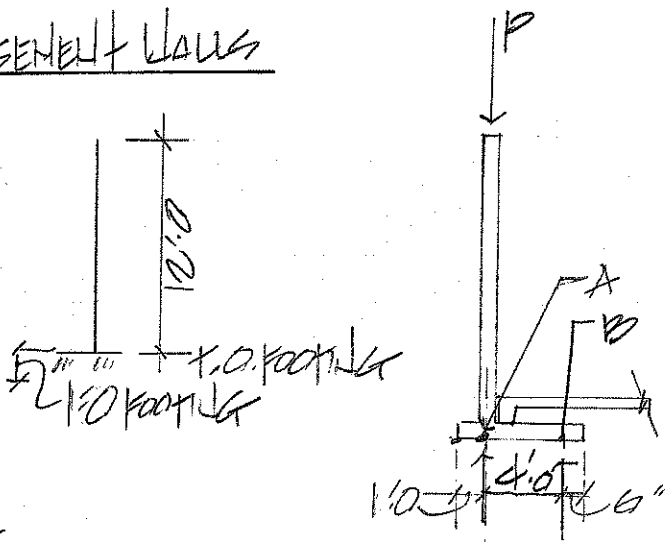
PROJECT _____

DATE _____
 PROJ. # 200
 DESIGN 521
 SHEET _____

RETAINING WALLS



BASEMENT WALLS



WTG. / FT. = P

WALL	12" x 13'-0"	= 1.95
FTG	12" x 5 1/2'	= .825
SLAB	(.075 kcf) (3')	= .225
ROOF	DL = 12' (.015)	= .180
U.	LL = 12' (.025)	= 0.3
FUR	DL = 9.5' (.03)	= .285
	LL = 9.5' (.04)	= .380
M.FUR	DL = 9.5' (.03)	= .285
	9.5' (.04)	= .380

- O.T.

$K_{PASSIVE} = 3.30k$; $H = 4.29'$

$M_{OT} = 14.5k'$

$E_{ND A} = 0$;

$-14.5k' - .825k' (1.75) - .285 (75)$

$+R_B (4') = 0$; $R_B = 4.03k/ft.$

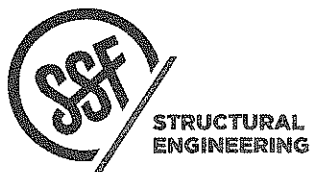
PILE CAPACITY = 20k

SPACING OF PILES = $20k / 4.03k/ft.$; $S = 5'-0"$

$S.W./F.S. = 1.5$; $S = 3.33'$
 MAX OT

$E_{VW} = 1.00k/ft$

$E_{VBL} = 3.75k/ft$



PROJECT cupel point

DATE _____

PROJ. # 204

DESIGN RET.1

SHEET _____

DATE 2/20/17

PROJ. # 204

DESIGN RET.1

SHEET _____

RETAINING WALLS CONT'D
 BASEMENT WALLS (CONT'D)

END B=0; (INCLUDE LIVE LOADS)
 $-14.5k' + .825k/f(2.25') + .345(3.25') + (1.95 + 1.81k)4'$
 $-R_A(4'0) ; R_A = .880k/f$

MAX DIST. BET PILES:
 $20k/f / .880k/f = 22'0$

CONC. DESIGN:

FTG.
 END A=0;

$(1.6)(-14.5k') - .825k/f(1.75')(1.0) - (.225)(.75')(1.2)$
 $- (.120)(.75')(1.6) + R_B(4') - 8(12')(6')$

$R_B = 6.90k/f$; CHECK SHEAR: ^{SEISMIC} PUNCHING - $V_U = 6.9k(3.33')$
 $V_U = 22.97k$

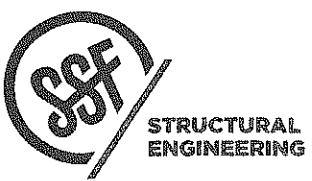
$M_U = (22.97)(3'1/2)$
 $M_U = 80.4k'$; $M_U/f.l. = 24.1k'$

$d = 9"$; TRYS #7S @ 9"OC
 $A_s = 0.6$; $a = 1.88$
 $a/h = .941$

12" dp #4: $d = 9"$; BRG. $k = 4"$
 $b_o = (4" + 4" + 9")2 + (2)(8 + 4)$
 $b_o = 78"$
 $V_c = 4b_o d \sqrt{f_c}$
 $V_c = 140.4k$
 $\phi V_c = 105k$

$M_U/f.l. = 18.1k' < \phi M_U = 21.75k'$

$a/d = .2088 < .25 \left(\frac{87,000}{87,000 + 60,000} \right)$ TENSION-CONTROLLED.



PROJECT OGDEN POINT

DATE 2/20/07

PROJ. # R04

DESIGN RET.2

SHEET

BASEMENT WALL CONT'D:

WALL DESIGN

$$M_u \text{ WALL} = (1.6)(-14.5k') - \frac{8(12) \text{ psf}(6')}{1000}$$

$$M_u \text{ WALL} = 23.8k' / \text{FT.}$$

$$d = 12" - 1.5" \quad d = 10.5"$$

TRY # 7'S $\varnothing 12" \text{ @ } 12"$; $a = 1.41$; $a/d = .71$

$$\frac{M_u}{\text{FT.}} = 29.37k' \quad \phi M_u = 26.43k' > 23.8k'$$

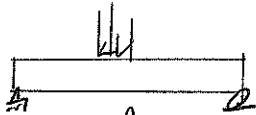
RETAINING WALL & BASEMENT:

WALL: 12" CONC. WALL W/ # 7'S $\varnothing 12" \text{ @ } 12"$ VERT.
 $\varnothing 4$ 'S $\varnothing 16" \text{ @ } 12"$ EXT. FACE & # 4'S $\varnothing 16" \text{ @ } 12"$ VERT & # 16" @ 12" I.F.

12" dx 5'-6" CONC. FOOTING W/ # 7'S $\varnothing 9" \text{ @ } 12"$
 BOTT. & (5) # 5'S LONG.

HORIZONTAL BUTTRESSED BASEMENT WALL

Max span = 12'-0"



$$W_u = (1.6)(.04(7') + .04(9')) + \frac{(12')(8) \text{ psf}}{1000}$$

$$W_u = .608k / \text{FT}$$

$$M_u = W_u l^2 / 2 \quad M_u = 7.3k' \quad d = 12" - 1.5" \quad b = 16" \quad .3H = 4'-0"$$

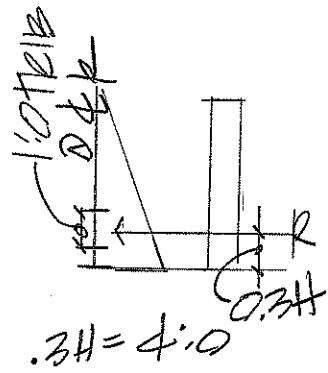
$$d = 10.5"$$

TRY # 5'S $\varnothing 16" \text{ @ } 12"$;

$$a = .54 \quad a/d = .273 \quad M_u = 15.85k'; \quad \frac{\phi M_u}{16" \text{ @ } 12"} = 14.26k'$$

$$M_u \varnothing 16" \text{ @ } 12" = 9.71k' < 14.26k'$$

$$A_{SREQ'D} \text{ FLEX} = \frac{200k \cdot ft}{60,000} \quad A_{SREQ'D} = .50 \text{ in}^2$$



STRUCTURAL ENGINEERING

OGDEN POINT

PROJECT

2.7.2017

DATE

PROJ. #

K24

DESIGN

RET.3

SHEET

- Horizontal buttressed walls cont'd
 approx. 1.33 ASD req'd flex?

approx. $1.33 = .333 \text{ in}^2$ $d = .411$; $d/2 = .206$

$M_{1D} = 12k'$ $\phi M_{1D} = 10.8k' > M_{u @ 1.33'}$
 @ $1/2 \text{ span}$.

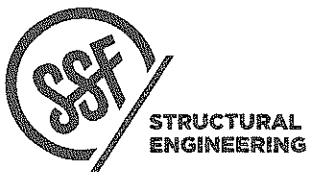
① BUTTRESSED WALLS ($l < 12'0$) PROVIDE
 12" CONC. WALLS W/ # 5'S @ 16" O/C HE. I.F.
 # 4'S @ 16" O/C EXT FACE HE.
 # 4'S @ 18" O/C VERT E.F.

PILES @ HE. BUTTRESSED WALLS:

MAX SPACING = $\frac{20k/PILE}{4.32k/f}$ = 4.63 ft.

① HE. BUTTRESSED WALLS PROVIDE
 PILES < 4' 8" SPACING

W		
	↓	
WALL:	12" x 13'0	= 1.95 k/f
VENEER:	40pxf (6")	= .260 k/f
SLAB:	(80pxf) (6")	= .578
ROOF:	DL + LL	= .210
FLOORS:	(2) LEVELS	= 1.33 k/f
Σ		$= 4.32 k/f$



PROJECT QUINN POINT

DATE 3.13.2017

PROJ. # KD4

DESIGN RET4

SHEET _____

INPUT:

Active= 40 pcf
 Passive= 300 pcf (ULT)
 μ = 0.4 Coeff. Friction (ULT)
 γ = 130 Soil pcf
 FS_{Active}= 1.5 slide/OT
 FS_{Seismic}= 1.2 slide/OT
 H= 8 ft
 tw= 8 inches
 tf= 12 inches
 h= 18 inches
 B2= 1.5 feet
 B1= 4 feet
 α = 8 Seismic Surcharge
 Pile Capacity= 20 Kips

OUTPUT

$\alpha*(H+tf)$ = 72 psf
 Pa= 360 psf
 Pp= 750 psf (ult)

R_{pa}= 1.62 k/ft
 R_{pp}= 0.9375 k/ft (ult)
 R_{seismic}= 0.576 k/ft

Weights in klf:		LOCATIONS (ft)	
		Relative to A	Relative to B
Soil @ Heel Weight=	1.56	5.08	1.083
Wall Weight=	0.800	4	0
Ftg Weight=	0.950	2.67	1.33
Soil @Toe Weight=	0.943	1.58	2.417
ΣV =	4.25		

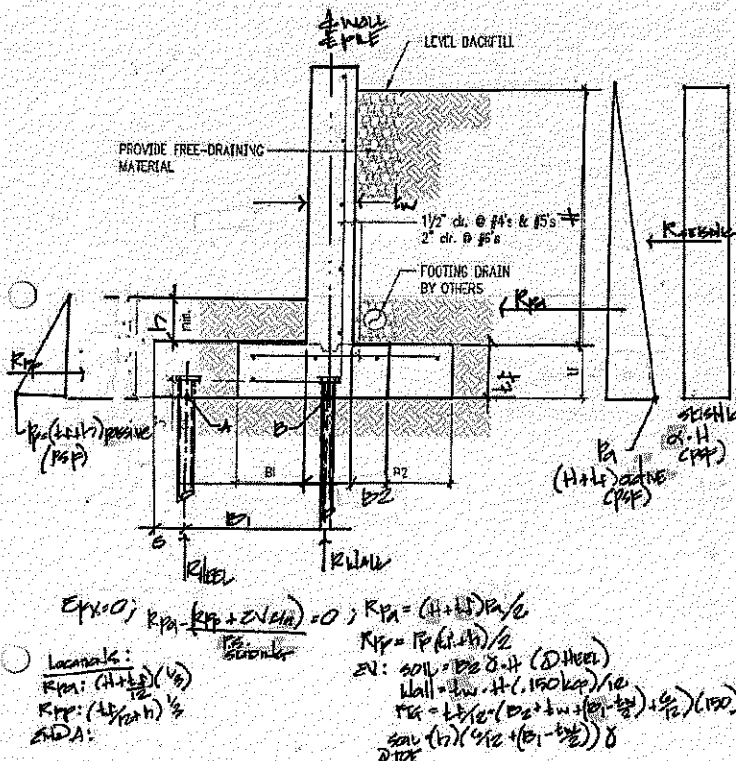
Sliding

$\Sigma V\mu$ = 1.70 k/ft (ult) R_{pp}= 0.9375 k/ft (ult)
 R_{pa}= 1.62 k/ft
 FS_{Active}= 1.63 SLIDING **OK**

 R_{pa+seismic}= 2.196 k/ft
 FS_{pa+seismic}= 1.20 SLIDING **OK**

Pin Pile Reactions:

$\Sigma M@B=0$: R_{toe}= 1.67 Klf Pile Spacing= 12.00 Ft.
 $\Sigma M@A=0$: R_{wall}= 2.59 Klf Pile Spacing= 7.73 Ft.



Concrete Design Loads:
 (includes seismic)

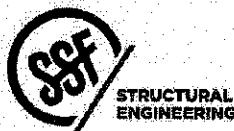
FOOTING:

R_{u Toe}= 3.13 k/ft
 ΦV_c = 105 k
 Pin Pile Spacing (ft) = 33.6
 based on Punching
 Shear
 Mu/ft= 12.5 k-ft/ft

WALL:

Mu= 9.15 k-ft/ft

Ogden Point

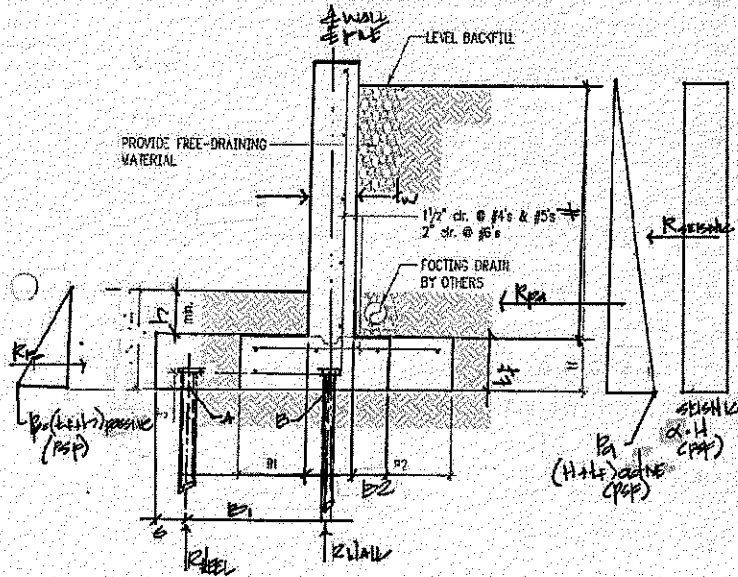


PROJECT _____

DATE: 3.14.2017
 PROJ.# RDH
 DESIGN Ret 5

INPUT:

Active= 40 pcf
 Passive= 300 pcf (ULT)
 μ = 0.4 Coeff. Friction (ULT)
 γ = 130 Soil pcf
 FS_{Active}= 1.5 slide/OT
 FS_{Seismic}= 1.2 slide/OT
 H= 6 ft
 tw= 8 inches
 tf= 12 inches
 h= 18 inches
 B2= 0.5 feet
 B1= 2 feet
 α = 8 Seismic Surcharge
 Pile Capacity= 20 Kips



OUTPUT

$\alpha^*(H+tf)$ = 56 psf
 Pa= 280 psf
 Pp= 750 psf (ult)

*Exp. 0) $R_{pa} = R_p + \alpha H$; $R_{pa} = (H+H)\alpha/\gamma$
 $R_{pp} = P_p (H+tf)/2$
 Soil = $130 \times 0.4 \times 6$ (D. Area)
 Wall = $130 \times 18 - 11 \times (130 \times 18) / 10$
 $R_{pa} = 130 \times (6 + 18) + (130 \times 18) \times (1/2)$
 Soil = $(130 \times 18) \times (1/2)$
 D. Area*

R_{pa} = 0.98 k/ft
 R_{pp} = 0.9375 k/ft (ult)
 $R_{seismic}$ = 0.336 k/ft

Weights in kif:		LOCATIONS (ft)	
		Relative to A	Relative to B
Soil @ Heel Weight=	0.39	2.58	0.583
Wall Weight=	0.600	2	0
Ftg Weight=	0.500	1.17	0.83
Soil @ Toe Weight=	0.553	0.58	1.417
ΣV =	2.04		

Concrete Design Loads:
 (includes seismic)

R_u Toe= 2.98 k/ft
 ΦV_c = 10S k
 Pin Pile Spacing (ft) = 3S.2
 based on Punching
 Shear

M_u /ft= 6.0 k-ft/ft

Sliding

$\Sigma V\mu$ = 0.82 k/ft (ult) R_{pp} = 0.9375 k/ft (ult)

R_{pa} = 0.98 k/ft

FS_{Active}= 1.79 SLIDING **OK**

$R_{pa+seismic}$ = 1.316 k/ft

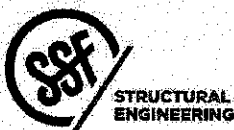
FS_{pa+seismic}= 1.33 SLIDING **OK**

WALL:

M_u = 4.11 k-ft/ft

Pin Pile Reactions:

$\Sigma M@B=0$: R_{toe} = 1.62 Klf Pile Spacing= 12.36 Ft.
 $\Sigma M@A=0$: R_{wall} = 0.42 Klf Pile Spacing= 47.10 Ft.



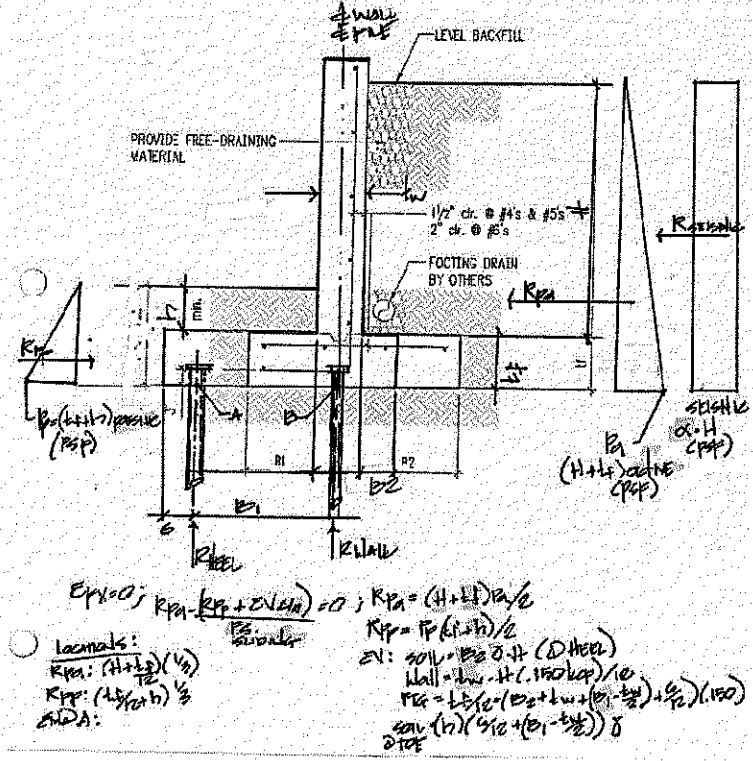
Ogden Point

PROJECT _____

DATE: 3.14.2017
 PROJ. # RDH
 DESIGN Ret 6

INPUT:

Active= 40 pcf
 Passive= 300 pcf (ULT)
 μ = 0.4 Coeff. Friction (ULT)
 γ = 130 Soil pcf
 FS_{Active}= 1.5 slide/OT
 FS_{Seismic}= 1.2 slide/OT
 H= 4 ft
 tw= 8 inches
 tf= 12 inches
 h= 6 inches
 B2= 0.5 feet
 B1= 1 feet
 α = 8 Seismic Surcharge
 Pile Capacity= 20 Kips



OUTPUT

$\alpha^*(H+tf)$ = 40 psf
 Pa= 200 psf
 Pp= 450 psf (ult)

R_{pa} = 0.5 k/ft
 R_{pp} = 0.3375 k/ft (ult)
 $R_{seismic}$ = 0.16 k/ft

Weights in klf:		LOCATIONS (ft)	
		Relative to A	Relative to B
Soil @ Heel Weight=	0.26	1.58	0.583
Wall Weight=	0.400	1	0
Ftg Weight=	0.350	0.67	0.33
Soil @ Toe Weight=	0.119	0.08	0.917
ΣV =	1.13		

Concrete Design Loads:

(includes seismic)
 R_u Toe= 1.81 k/ft
 ΦV_c = 10S k
 Pin Pile Spacing (ft) = 58.0
 based on Punching Shear
 M_u /ft= 1.8 k-ft/ft

Sliding

$\Sigma V\mu$ = 0.4S k/ft (ult) R_{pp} = 0.3375 k/ft (ult)
 R_{pa} = 0.5 k/ft
 FS_{Active}= 1.58 SLIDING **OK**
 $R_{pa+seismic}$ = 0.66 k/ft
 FS_{pa+seismic}= 1.20 SLIDING **OK**

WALL:

M_u = 1.38 k-ft/ft

Pin Pile Reactions:

$\Sigma M@B=0$: R_{toe} = 0.90 KlF Pile Spacing= 22.24 Ft.
 $\Sigma M@A=0$: R_{wall} = 0.23 KlF Pile Spacing= 86.98 Ft.

Ogden Point

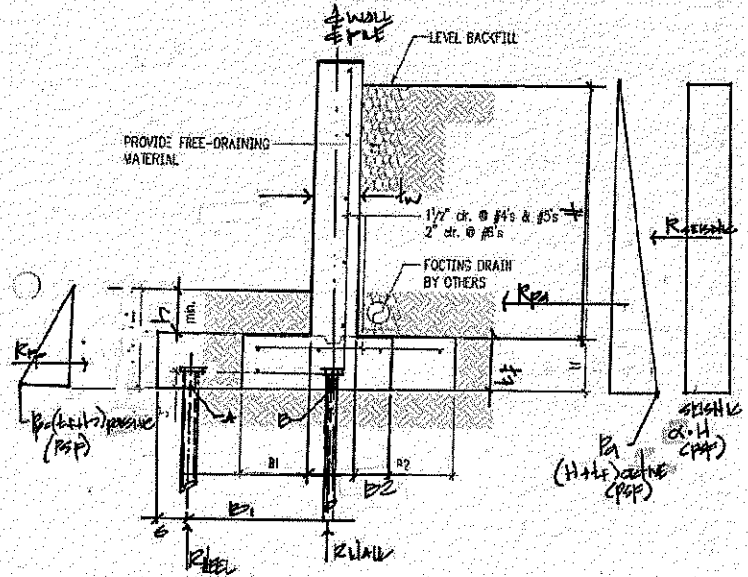


PROJECT _____

DATE: 3-14-2017
 PROJ.#: RDH
 DESIGN: Ret 7
 SHEET: _____

INPUT:

Active= 40 pcf
 Passive= 300 pcf (ULT)
 μ = 0.4 Coeff. Friction (ULT)
 γ = 130 Soil pcf
 FS_{Active}= 1.5 slide/OT
 FS_{Seismic}= 1.2 slide/OT
 H= 3 ft
 tw= 8 inches
 tf= 12 inches
 h= 6 inches
 B2= 0.5 feet
 B1= 0.75 feet
 α = 8 Seismic Surcharge
 Pile Capacity= 20 Kips



OUTPUT

$\alpha^*(H+tf)$ = 32 psf
 Pa= 160 psf
 Pp= 450 psf (ult)

Handwritten calculations:
 $E_{p1} = 0; R_{pa} = R_{pp} + E_{p1} \alpha = 0; R_{pa} = (H+tf) \alpha = 32$
 $R_{pp} = P_p (L/tw) / 2$
 $E_{p2} = \text{soil} \cdot \text{width} \cdot \text{height} \cdot (D \text{ heel})$
 $E_{p2} = 300 \cdot 1.5 \cdot 3 \cdot 8 = 10800 \text{ lb}$
 $R_{pa} = 1.5 \cdot 10800 = 16200 \text{ lb} = 160 \text{ psf}$
 $R_{pp} = 450 \cdot (8/12) = 3000 \text{ lb} = 450 \text{ psf}$

R_{pa} = 0.32 k/ft
 R_{pp} = 0.3375 k/ft (ult)
 $R_{seismic}$ = 0.096 k/ft

Weights in klf:		LOCATIONS (ft)	
		Relative to A	Relative to B
Soil @ Heel Weight=	0.19S	1.33	0.583
Wall Weight=	0.300	0.75	0
Ftg Weight=	0.313	0.54	0.21
Soil @Toe Weight=	0.103	-0.04	0.792
ΣV =	0.91		

Concrete Design Loads:

(includes seismic)
 R_u Toe= 1.21 k/ft
 ΦV_c = 10S k
 Pin Pile Spacing (ft) = 86.8
 based on Punching Shear
 M_u /ft= 0.9 k-ft/ft

Sliding

$\Sigma V \mu$ = 0.36 k/ft (ult) R_{pp} = 0.3375 k/ft (ult)
 R_{pa} = 0.32 k/ft
 FS_{Active}= 2.19 SLIDING **OK**
 $R_{pa+seismic}$ = 0.416 k/ft
 FS_{pa+seismic}= 1.69 SLIDING **OK**

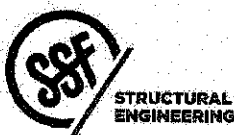
WALL:

M_u = 0.6S k-ft/ft

Pin Pile Reactions:

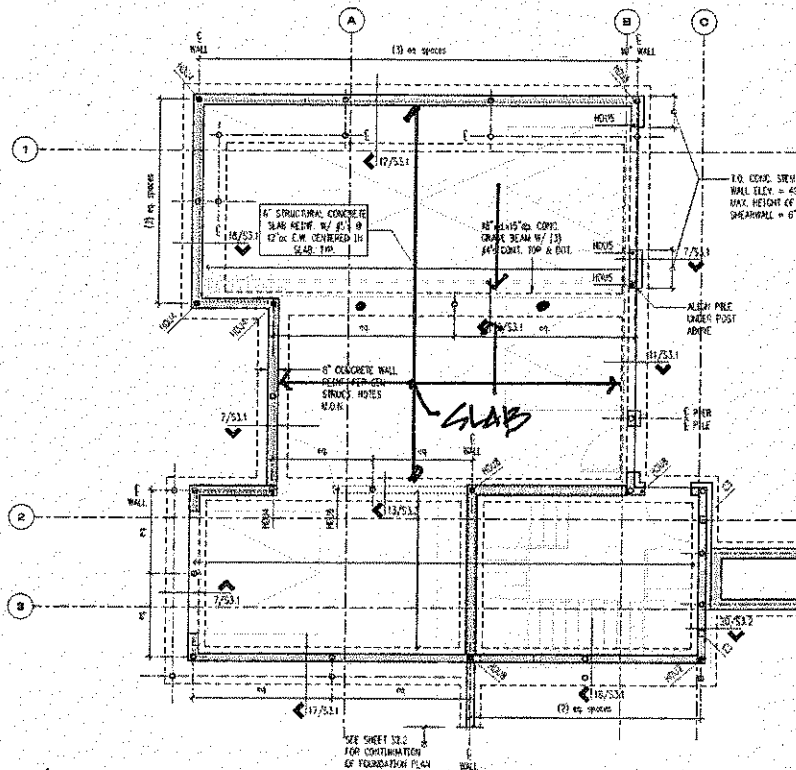
$\Sigma M@B=0$: R_{toe} = 0.61 Klf Pile Spacing= 32.9S Ft.
 $\Sigma M@A=0$: R_{wall} = 0.30 Klf Pile Spacing= 6S.91 Ft.

Ogden Point



PROJECT _____

DATE 3-14-2017
 PROJ.# RDH
 DESIGN Ret



Guest House Foundation Plan

Scale: 1/4" = 1'-0"

L.L. = 40 ksf

D.L. = 6' SLAB = .075 ksf

SLAB: 2 span comb.

$t_{hd} = 1/2d$; $l = 144"$; $t_{hd} = 6"$

$T_{12} = 1.0$; $W_u = 1.2(.075 ksf) + 1.6(40 ksf)$
 $W_u = 66.4 ksf$

$M_u: M_u = 2.77 k'$; $M_u = 1.70 k'$ (skip)

$d = 3"$
 $f_c = 4000 psi$
 $b = 12"$; #5 @ 12" o/c
 $\phi M_u = 3.67 k'$

GRADE BM: 18' x 18'

$W_u = 1.2(.3950 \times .825)$

$T_{12} = 11' \times 1.6(.44 ksf)$

$W_u = 2.10 ksf$

(3) SPAN
 $V_u = .6 W_u l$; $l = 8'0"$

$V_u = 10.08 k$

$\phi V_c = 18" \times 15" \sqrt{f_c'} (.75)$

$\phi V_c = 10.1 k > V_u$

$M_u = .1 (W_u l^2)$; $M_u = 13.4 k'$

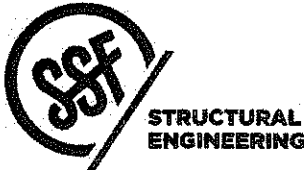
$A_s = 0.01 W_u l^2$; $a = .74$

$d = 15"$; $M_u = 42 k'$

$\phi M_u = 37.95 k'$

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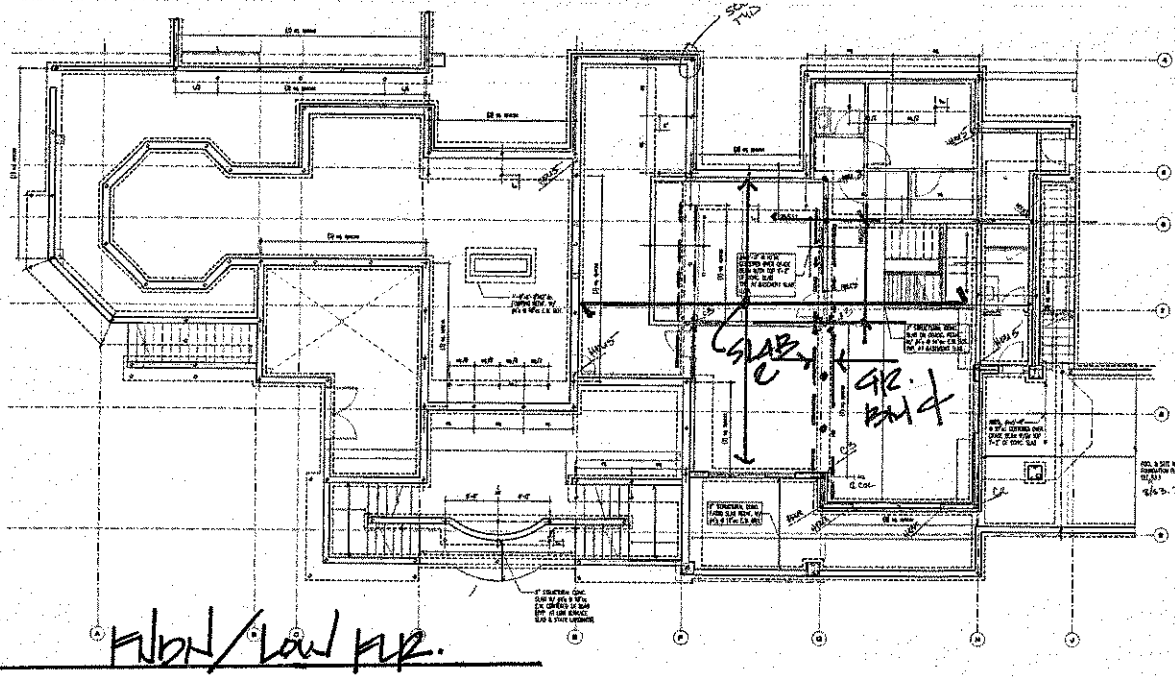
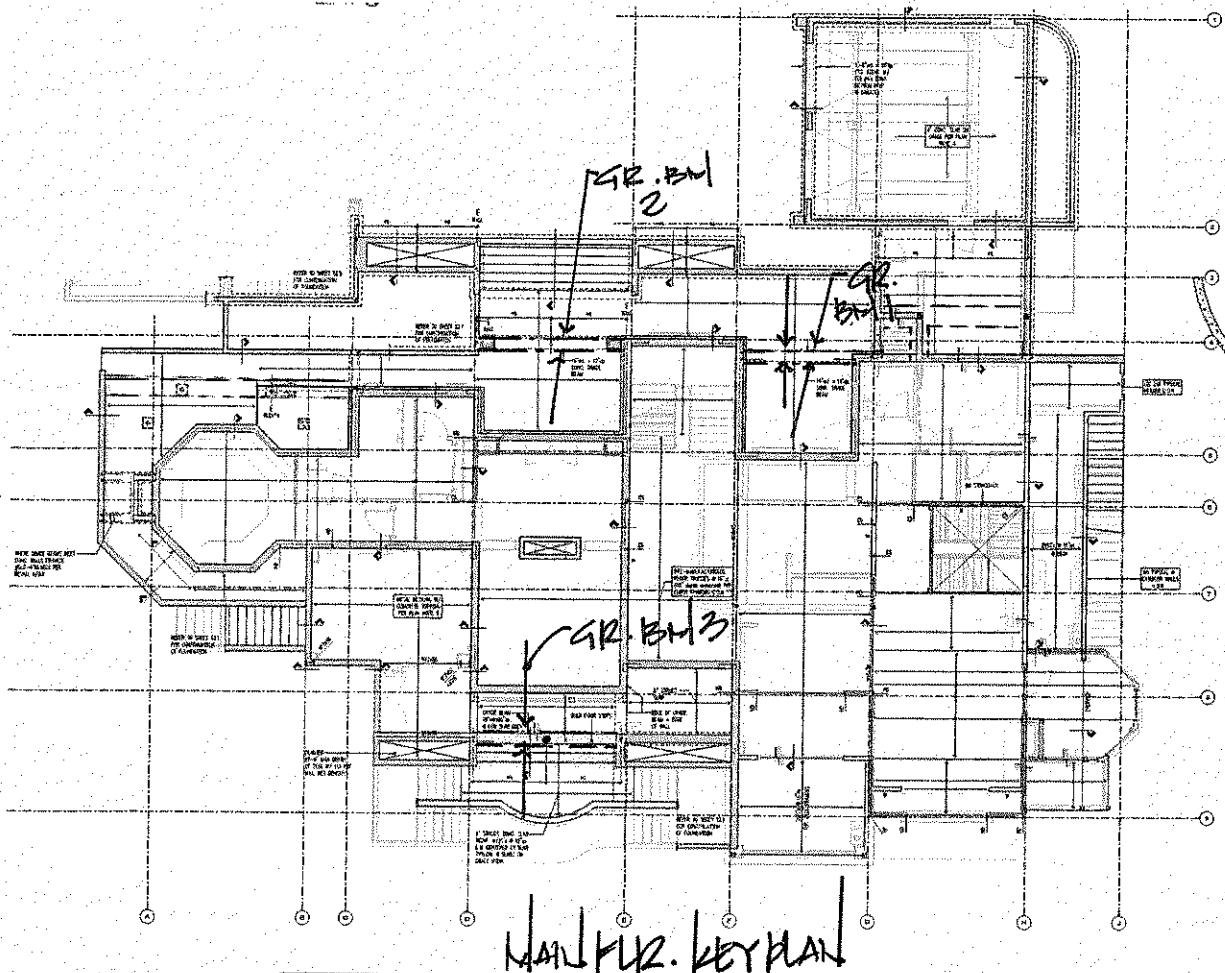


Ogden Point

03/10/2017

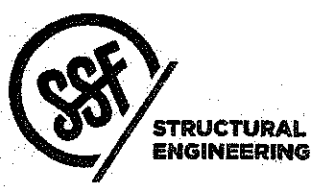
PROJECT _____

DATE _____
 PROJ. # RDH
 DESIGN *Con...*
 SHEET _____



Ogden Point

03/10/2017



PROJECT _____

DATE _____

PROJ. # **RDH**

DESIGN **CON. 2**

SHEET _____

MAIN FUR. GR. BMS:

DL: 6" CONC. SLAB
2" CONC. POWERS

GR. BMS. WT . . .

LL: 40 psf

- GR. BM 1 18' x 20' dp. S.Wt = 375 klf
 $T_{12} B = 10.25'$ $d = 1.41'$
 $l = 12'$; $W_u = 2.34$ klf
 $V_u = W_u \cdot l / 2 - W_u \cdot d$; $V_u = 10.71$ k

$\phi V_c = 11.48$ k

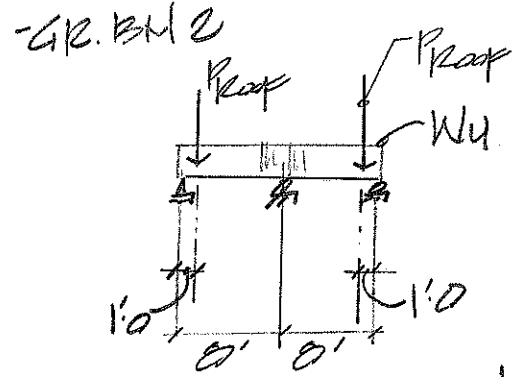
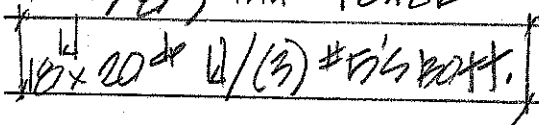
ASMIN. FLEX = $200bd^2 / 60000$

ASMIN. FLEX = 1.02 in²

• (3) #5's TOP $K_s = 0.99$ in²
 $A_s \cdot 2/3 = .66$ in²; $d = 17"$
 $d = .97$; $d/2 = .48$

$M_n = 51.2$ k'; $\phi M_n = 47$ k'

$M_u = W_u \cdot l^2 / 8$; $M_u = 42.12$ k'



SLAB $T_{12} B = 0$; $W_{SLAB} = 1.47$ klf
 ASSUME 18' x 18' GR. BM:
 S.Wt. $W_u = .405$ klf
 $W_u = 1.88$ klf

P_{roof} : LL = 1.2 k (FULL)
 $DL = .65 + .675$ k

$P_u = 3.52$ k

$V_{u12} B = .375(0)(1.88) + 3.52$ k

$V_{u12} B = 3.16$ k

$V_{uM12} B = .625(1.88)18'$

$V_{uM12} B = 2.04$ k

$d = 15"$; $b = 18"$
 $\phi V_c = 10.1$ k

$M_u = .125(1.88)(64)$

$M_u = 15.04$ k'

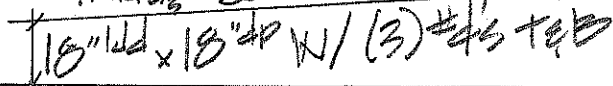
ASMIN. FLEX = $.9$ in²

TR- (3) #4's TOP:

$A_s = .6$ in²; $A_s \cdot 2/3 = 0.4$ in²

$d_{2/3} = .607$; $M_n \cdot 2/3 = 29.3$ k'

$\phi M_n \cdot 2/3 = 26.4$ k'



STRUCTURAL ENGINEERING

PROJECT CGRAV. POINT

DATE 3.10.2017

PROJ. # R04

DESIGN CONC. 3

SHEET

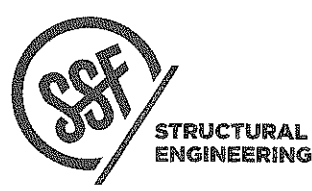
MANFLR CONK. (CONT'S)

GRADE BM 3
 SLAB TRIB = 6' 1/2' ; $W_{USLAB} = 1.8 klf$
 STEP IN SLAB = 3' 0" ; $W_{USLAB STEP} = .30 klf$
 18" x 20" GR. BM ; $W_{UGB} = .450 klf$
 OVER PAIR ; $W_{OP} = .810 klf$
 $L_1 = L_2 = 8' 0"$; $\Sigma W_U = 2.80 klf$
 $V_U = .605(2.80)(8)$; $V_U = 14.1 k$
 $V_{U DESIGN} = V_U - (2.80)(1.40)$
 $V_{U DESIGN} = 10.1 k$
 $\phi V_c = 11.5 k$; $d = 17"$
 $M_U = -.125(2.80 klf)(8)^2$
 $M_U = 22.56 k'$
 $A_s MID = 1.08 in^2$
 TYP (3) #5/8 ; $A_s = 0.93 in^2$
 $2/3 A_s = 0.62 in^2$; $d_{2/3} = .975$
 $M_{d_{2/3}} = 51.2 k'$; $\phi M_{d_{2/3}} = 46.1 k'$
 GRADE BM 18" Wd x 20" DP
 W/ (3) #5/8 TYP

FLOR/LOW FLR.

SLAB - $h = 17 1/2"$
 (3) SPAN - BOTH ENDS CONTINUOUS
 $T_{MID} = 1/20$; $T_{MID} = 7 1/2"$
 $D_{LSLAB} = .094 ksf$
 $W_{SLAB} = .04 ksf$
 $W_{USLAB} = .177 ksf$
 $A_s MID = .0010(10')(6")$
 $A_s MID = .108 in^2$
 $M_U = (.125)(17 1/2)^2 (.177)$
 $M_U / ft = 6.78 k'$
 TYP #5/8 @ 12" OC
 $A_s = 0.93 in^2$; $d = 7 1/2" - 1 1/2"$
 $d = 6"$; $d = .720$
 $2/3 = .360$; $M_U = 0.73 k'$
 $\phi M_U = 7.86 k'$

USE 7 1/2" SLAB W/
 #5/8 @ 12" OC E.W.
 BOTT. E @ 12" OC @
 GR. BM SUPPORTS W/IN
 TOP 1 1/2"



PROJECT OGDEN POINT

DATE 3.10.2017

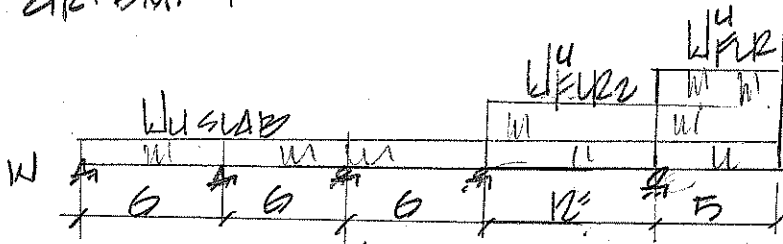
PROJ. # ROTH

DESIGN CONC 4

SHEET

Low floor coll'd

GR. BM. 4



TRIS SLAB = 16.75'

WU SLAB = 2.96 klf

ASSUME 20x20 CONK. BM; 375 klf

WU BM = .450 klf

EWU SLAB = 3.41 klf

MAIN FUR TRIS₁ = 16'0"

MAIN FUR. TRIS₂ = 11.25'

UPPER FUR. TRIS = 11.25'

WUFUR₂ = 1.2(2)(.03)11.25'
+ 1.6(2)(.04)11.25'

WUFUR₂ = 2.25 klf

WUFUR₁ = 1.2(.03)16'(2)
+ 1.6(.04)16'(2)

WUFUR₁ = 3.2 klf

U_T Max = 82.63 k'

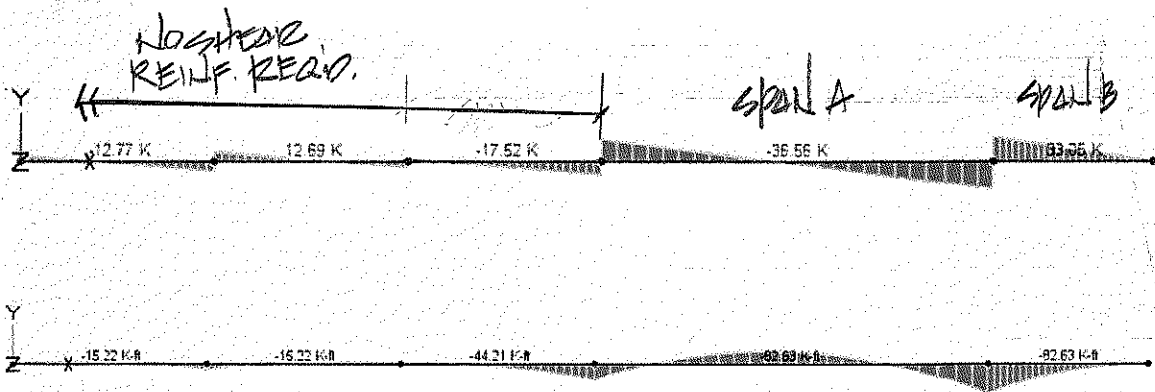
V_U Max = 36.5 k'

φV_n = φ(V_c + V_s)
NO SHEAR REIN. REQ'D

V_U ≤ 12.75 k

φV_c = 2√f'_c bld
φV_c = 25.5 k

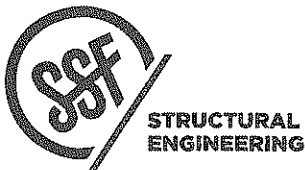
d = 17"
b = 20"



SPAN A: V_U REQ'D = V_U - V_c ; V_U = 36.5 k

V_U REQ'D = 14.74 k ; s = d/2 OR 8" O/C

SPAN B: V_U REQ'D = 10.00 k ; A_S REQ'D = .115 IN²



PROJECT OPEN POINT

DATE 30/10/2017

DESIGN RSAT

SHEET calc.5

GR. BMD CONT'D

$A_{VRQ'D} = .115 \text{ in}^2$; #3 [] $\frac{1}{4}$ D \emptyset 1" ϕ ; $A_{S \text{ PROVIDED}} = .22 \text{ in}^2$

$A_{VRQ'D} = .133 \text{ in}^2 < A_{S \text{ PROVIDED}}$

D SPAN C EXTEND SHEAR REINF.:

$17.52 \text{ k} - x(3.41 \text{ k/ft}) = 12.75 \text{ k}$

$x = 1.30' < d \therefore \text{NO SHEAR REINF. REQ'D}$
D SPAN C

D SPAN A EXTEND SHEAR REINF.:

$30.56 \text{ k} - x(5.66 \text{ k/ft}) = 12.75 \text{ k}$

$x = 4.2'$ SAT \emptyset : 0

D SPAN B EXTEND SHEAR REINF.:

$33.05 \text{ k} - x(6.01) = 12.75 \text{ k}$

$x = 3.0'$ SAT \emptyset TO MATCH

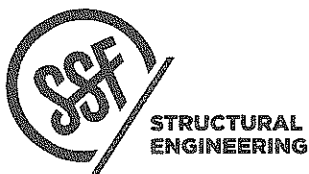
FLEXURE:

$M_U = 82.63 \text{ k}'$; $A_{S \text{ MIN}} = \frac{200(82.63)}{60,000}$; $A_{S \text{ MIN}} = 1.13 \text{ in}^2$

TRYP (4) #5's TOP; $A_S = 1.24 \text{ in}^2$; $d = 17$;

$a = 1.75$; $a/d = .875$; $M_{UD} = 99.97 \text{ k}'$; $\phi M_{UD} = 89.9 \text{ k}'$

20x20 GR. BH W/ (4) #5's TOP & #3 [] $\frac{1}{4}$ D \emptyset 1" ϕ
FROM GRID 7.1 TO GRID 5.1



PROJECT OPEN POINT

DATE 3.10.2017

PROJ. # 1007

DESIGN CONC. 6

SHEET _____



Structural Calculations For:

DETACHED GARAGE HOUSE



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Seismic Design

ASCE 7-10 Seismic Analysis
Equivalent Lateral Force Procedure

Risk Category	II	I, II, or III, or IV per Table 1.5-1
Site Class	D	per soils report (D assumed, without soils report)

Ω_o	2.5	
S_s	1.404	2% in 50 yr, Latitude & Longitude lookup
S_1	0.54	2% in 50 yr, Latitude & Longitude lookup
h_n	26.5 ft	
R	6.50	Light Framed Shear Walls
I_e	1.0	Table 1.5-2
C_d	4	
T	0.23 (sec)	Eq. 12.8-7
T_o	0.12 (sec)	
T_s	0.58 (sec)	
k	1.000	
F_a	1.00	Table 11.4-1
F_v	1.50	Table 11.4-2
S_{MS}	1.40	Eq. 11.4-1
S_{M1}	0.81	Eq. 11.4-2
S_{DS}	0.94	Eq. 11.4-3
S_{D1}	0.54	Eq. 11.4-4
C_s	0.144	Eq. 12.8-2
	0.356	Eq. 12.8-3 need not exceed, $T < T_L$
	0.010	Eq. 12.8-5 or 12.8-6 minimum
C_s , design	0.144	
Bldg. Weight	69.2 k	
$V = C_s W$	10.0 k	Eq. 12.8-1, Strength Level Base Shear
$V = C_{Ssd} W$	7.0 k	Eq. 12.8-1 Allowable Stress Base Shear

$$T_a = C_t h_n^x \quad \text{Eq. 12.8-7}$$

$$S_{MS} = F_a S_s \quad \text{Eq. 11.4-1}$$

$$S_{M1} = F_v S_1 \quad \text{Eq. 11.4-2}$$

$$S_{DS} = \frac{2}{3} S_{MS} \quad \text{Eq. 11.4-3}$$

$$S_{D1} = \frac{2}{3} S_{M1} \quad \text{Eq. 11.4-4}$$

$$C_s = \frac{S_{DS}}{\left(\frac{R}{I}\right)} \quad \text{Eq. 12.8-2}$$

$$C_s = \frac{S_{D1}}{T \left(\frac{R}{I}\right)} \quad \text{Eq. 12.8-3}$$

$$C_s = 0.01 \quad \text{Eq. 12.8-5}$$

$$C_s = \frac{0.5 S_1}{\left(\frac{R}{I}\right)} \quad \text{Eq. 12.8-6}$$

Vertical Distribution							Story Shear		Diaphragm	
ASD			$\rho = 1.0$				ASD		Force (ρ not included)	
Level	hx (ft)	Wx	hx^k (ft)	$Wxhx^k$	Cvx (%)	Fx (k)	ΣV (k)	Fpx (k)	$v = Fpx/Fx$	
			0.0	0.0	0.000	0.0		0.0	0.0	0.00
			0.0	0.0	0.000	0.0		0.0	0.0	0.00
Roof	26.5	20.9	26.5	554.9	0.426	3.0	3.0	3.0	1.00	
Upper	15.5	48.3	15.5	748.0	0.574	4.0	7.0	4.9	1.21	
	Σ	69.2		1302.9		7.0				

$$C_{vx} = \frac{w_x h_x^k}{\sum_{i=1}^n w_i h_i^k} \quad \text{Eq. 12.8-12}$$



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Project: Ogden Point Guest House Date: 8/18/2017

Guest House Project #: _____

Design: JWJ

Sheet: L

Wind Design

ASCE 7-10

Method 2 - Analytical Procedure

Exposure **C**
 $V = 110$ mpg
 $K_d = 0.85$ Table 26.6-1
 Risk Category II Fig. 26.5-1A
 $G = 0.85$ 26.9.4
 Calculate K_{zt} ? **yes**

Roof Angle = **23** degrees
 Ground to top of roof **29.5** ft
 Bottom of roof to top of roof **6** ft
 (mean roof height) $h = 26.5$ ft

Topography from Figure 6-4

Terrain = Escarpment
 Site = upwind
 $H = 282$ ft Height of topography
 $L_h = 1465$ ft Distance from $H/2$ to crest > 0
 $x =$ ft Distance from crest to site
 $z =$ ft Height from bottom of building
 $\mu = 1.5$
 $\gamma = 2.5$
 K_1 value = 0.85
 $K_1 = 0.16$
 $K_2 = 1.00$
 $K_3 = 1.00$

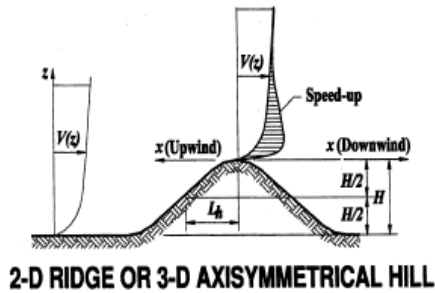
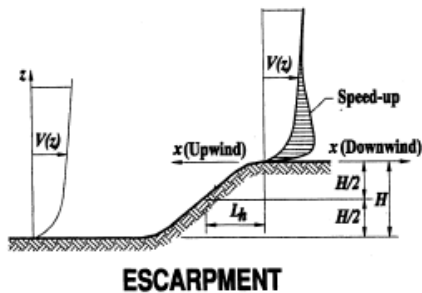
Pressure Coefficients
 from Figure 27.4-1:

Bldg Face	C_p
Windward Wall	0.8
Leeward Wall	-0.5
Windward Roof	0.3
Leeward Roof	-0.7

*Note= C_p values are conservative worst case values.

$H/L_h = 0.19 < 0.2?$ If so, $K_{zt} = 1.0$ if $H/L_h < 0.2$ per 6.5.7.1
 $K_{zt} = (1 + K_1 K_2 K_3)^2 = 1.00$

Pressures:	Ht	K_z	q_z	Strength		Allowable Stress	
				$P_{ww\ walls}$	$P_{lw\ walls}$	$P_{walls} (psf)$	$P_{walls} (psf)$
	0-15	0.85	22.38	15.22	10.97	26.18	15.71
	15-20	0.9	23.70	16.11	10.97	27.08	16.25
	20-25	0.94	24.75	16.83	10.97	27.80	16.68
	25-30	0.98	25.80	17.55	10.97	28.51	17.11
	30-40	1.04	27.38	18.62	10.97	29.59	17.75
	41-50	1.09	28.70	19.52	10.97	30.48	18.29
				$P_{ww\ roof}$	$P_{lw\ roof}$	$P_{roof} (psf)$	$P_{roof} (psf)$
				6.58	15.35	21.93	13.16



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Project: Ogden Point Guest House Date: 8/18/2017
Guest House Project #: _____
 Design: JWJ
 Sheet: L

OGDEN POINT

WIND ANALYSIS

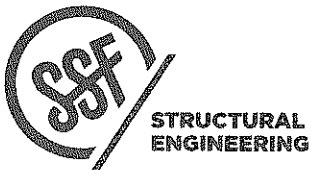
N/S

LEVEL	P (PSF)	L (ft)	H (ft)	F _x (k)
UPPER	15.71 PSF	38'	7.75'	6.75
	16.25 PSF	32.6'	4'	
ROOF	16.68 PSF	32.6'	4'	5.2
	13.16 PSF	38'	6'	
				EV = 11.95k

E/W

LEVEL	P (PSF)	L (ft)	H (ft)	F _x (k)
UPPER	15.71 PSF	24.75'	7.75'	4.7k
	16.25 PSF	26'	4'	
ROOF	16.68 PSF	26'	4'	3.1
	17.11 PSF	20'1/2	6'	
				7.8k

WIND CONTROLS
BOTH DIRECTIONS



O.D. GUEST HOUSE
PROJECT

8/17/17
DATE

PROJ. # JWW
DESIGN

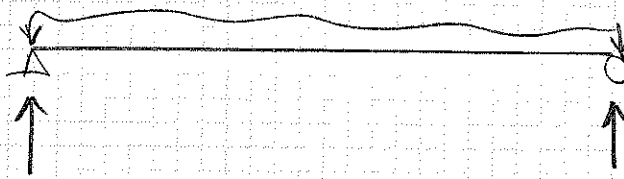
SHEET

E/W

ROOF

$F_x = 3.1K$

H=8'

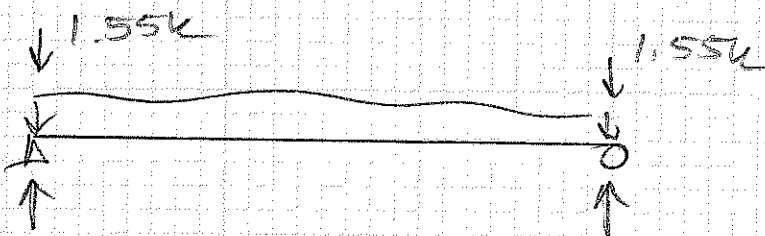


LOAD (K)
 LENGTH (ft)
 SHEAR (PUF)
 WALL
 OT (lb)
 HD

1.55K
 23.5'
 66 PUF
 W6
 0
 —

1.55K
 6.5'
 238 PUF
 W4
 1410 lb
 CS1P

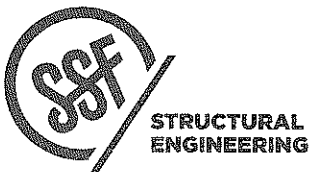
UPPER
 $F_x = 4.7K$



H=14.5'
 LOAD (K)
 LENGTH (ft)
 SHEAR (PUF)
 WALL
 OT (lb)
 OT TOTAL
 HD

3.9K
 28.5'
 137 PUF
 W6
 1508 lb
 1508 lb
 HD02

3.9K
 M.F.



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8/17/17
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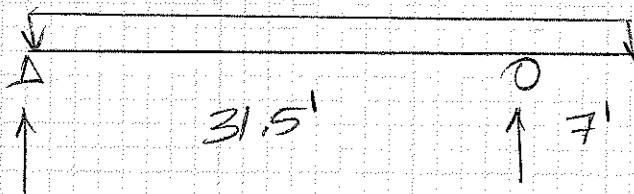
N/S

ROOF

$F_v = 5.2k$

$H = 8'$

$W = 135.1 \text{ DUF}$



F (k)	2.13k
L (ft)	19.5'
V (DUF)	109 DUF
WALL	W6
OT (lb)	752 lb
Hb	CS10

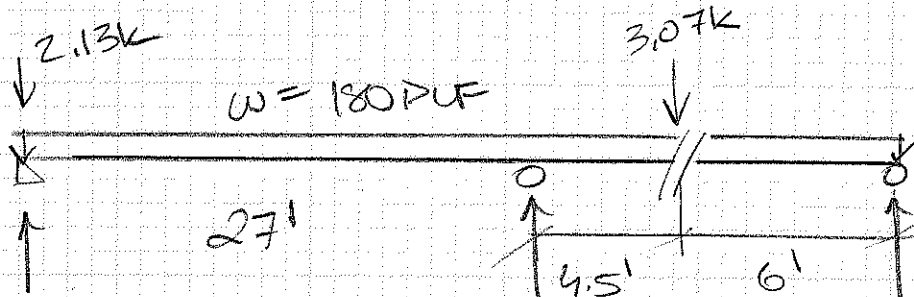
3.07k
MF

UPPER

$F_v = 6.75k$

$H = 14.5'$

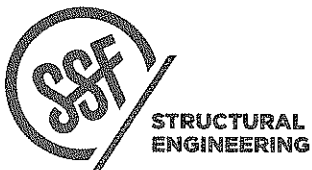
$W = 180 \text{ DUF}$



F (k)	4.56k
L (ft)	15'
V (DUF)	304 DUF
WALL	W4
OT (lb)	3755 lb
OT TOTAL (lb)	4507 lb
Hb	H045

3.07k
6.31k
1.08k
MF

180 DUF → 288 DUF
W6
2349 lb
2349 lb
H041



O.P. GUEST HOUSE
PROJECT

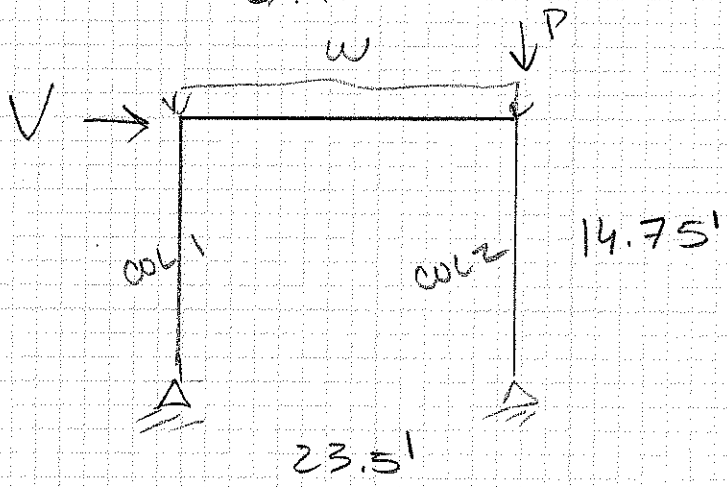
8/17/17
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FRAME S.H. 1:



$$V = 6.3k \left(\frac{6.5}{3.5} \right) \left(\frac{1}{1.7} \right) = 16.7k \text{ UT}$$

$$W = W_{DL} = 97.5 \text{ PLF}$$

$$W_{LL} = 130 \text{ PLF}$$

$$P_{DL} = 4.7 + 1.53 + 1.62k = 7.9k$$

$$P_{LL} = 7k + 1.9 = 8.9k$$

$$P_{SN} = 2.7k + 9 = 3.6k$$

DISPLACEMENT

$$\frac{C_d \delta}{I} = \frac{3.0 (1.17'')}{1.0} = 3.51'' < 0.02 h_{sx} = 3.54$$

COL 1 W18x106 $L_b = 15'$

$$P = 1.2(10.5k) + 1.38(3.6) + 1.2(0) + 1.5 = 32.7k$$

$$M = 180k\text{-ft} \quad \phi P = 100k$$

$$V = 12.2k \quad \phi M = 780k\text{-ft}$$

$$\phi V = 33k$$

$$I = 1.247 \checkmark$$

BM W18x76 $L_b = 23.5'$

$$P = 5k \quad \phi P = 411.5k$$

$$M = 180.4k\text{-ft} \quad \phi M = 423.2k\text{-ft}$$

$$V = 14k \quad \phi V = 232k$$

$$I = 1.43 \checkmark$$

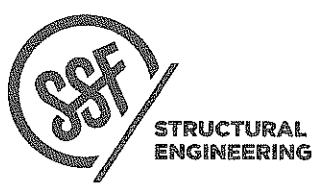
COL W18x106 weak axis $L_b = 15'$

$$P = 1.2(10.5k) + 1.38(11.5) + 1.2(3.6) + 10.4 = 53.2k$$

$$M = 71.7k\text{-ft} \quad \phi M = 227k\text{-ft} \quad \phi P = 100k$$

$$V = 4.8k \quad \phi V = \text{---} \quad \text{OK}$$

$$I = 1.34 \checkmark$$



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GH 1:

FORCES @ BASE @ COL 1:

$T = -7.9k \text{ (UT)} \rightarrow \frac{1}{2} \text{ GRADE BMT CONC SLAB}$
 $C = 16.97k \text{ (UT)} = 3.1k + 8.6k = 11.7k$
 $V = 8.35k \text{ (UT)}$

FORCES @ BASE @ COL 2: UT

$T = -2.3k$
 $C = 37.5k$
 $V = 8.35k$

CONNECTION

$M = 1.1 R_y M_p = 1.1 (1.4) (50 \text{ ksi}) (163 \text{ in}^3) = 1045.9k\text{-ft}$
BM

$T = C = \frac{1045.9k\text{-ft}}{18.2/12} = 689.6k$

Weld @ CONTINUITY PL'S

$L = 12.5 \text{ ft} \quad (4) \text{ welds } \frac{3}{4}'' \quad \phi R_n = 834k \checkmark$

@ COL 2 : Full PEN weld



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BASE PL ANCHORAGE

(4) 3/4" ϕ A.B. embed 15" min
(12" INTO FTG)

$T = 7.9k$

$V = 8.35k$

w/ HAIRPINS

HILTI - OK ✓

Tension 70%
Shr 30%
Combo 68%

BASE PL

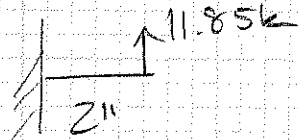
$T = -23.7k$ UUT w/ Ω

$C = 53.2k$ w/ Ω

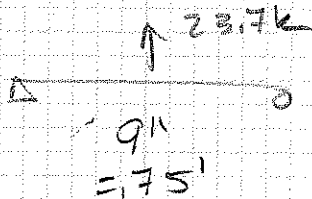
$V = 8.35k$

(4) 3/4" ϕ AB $\phi R_n = 36k > 23.7k$ ✓

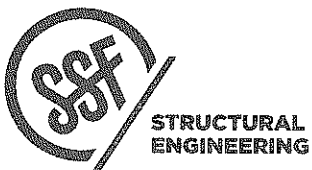
PL



$M = 23.7k-in < \phi S_{fy} = 36.5k-in$
 $b = 12" \quad d = 3/4"$



$M = 4.44k-ft < \phi S_{fy} = 4.8k-ft$
 $b = 19" \quad d = 3/4"$



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Project: MF Guest House 1

Joanna Klimczak, SWENSON SAY FAGET

August 18, 2017

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Steel Beam Report: BmX001

Member Details

Member Properties

Length	23.50000 ft
Shape	W18x76
Material	ASTM A992 Grade 50
Weight	1.78596 K
Framing	Beam
Beta	0 deg

Connections

Start	End
Node N003	N004
Location (0, 14.7500, 0 ft)	(23.5000, 14.7500, 0 ft)
Support Fix Z Only	Fix Z Only

Analysis Results (First Order)

Load Combinations: ASCE 7-10 LRFD

Extreme Forces

Axial	-4.86530 K	1.2D+E+.5L+Lpa+.2S »+X+30%+Z
My	-0.00000 K-ft	.9D+E »+X+30%+Z
Mz	180.39582 K-ft	E+X
Vy	-14.07525 K	1.2D+E+.5L+Lpa+.2S »+X+30%+Z
Vz	-0.00000 K	.9D+E »+X+30%+Z
Torsion	0.00000 K-ft	1.2D+E+.5L+Lpa+.2S »+X+30%+Z

Extreme Deflections (all cases)

Total Dy	-0.23084 in	1.2D+E+.5L+Lpa+.2S »+X+30%+Z
Total Dz	0.00000 in	1.2D+E+.5L+Lpa+.2S »+X+30%+Z
Beam Dy	-0.22921 in	1.2D+E+.5L+Lpa+.2S »+X+30%+Z
Beam Dz	0.00000 in	1.2D+E+.5L+Lpa+.2S »+X+30%+Z

Steel Design per AISC LRFD (2010)

Controlling Design Checks

Type	Case	Demand	Capacity	Unity	Status	Reference
Combined Check	.9D+E »+X+30%+Z	-NA-	-NA-	0.30	OK	H1-1b
Axial Check	1.2D+E+.5L+Lpa+.2S »+X+30%+Z	4.86530 K	427.60052 K	0.01	OK	E3-2FB
Strong Flexure Check	.9D+E »+X+30%+Z	178.03926 K-ft	611.25000 K-ft	0.29	OK	F2-1
Strong Shear Check	1.2D+E+.5L+Lpa+.2S »+X+30%+Z	-14.07525 K	232.05002 K	0.06	OK	G2-1

Project: MF Guest House 1

Joanna Klimczak, SWENSON SAY FAGET

August 18, 2017

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Steel Column Report: COL001

Member Details

Member Properties

Length	14.75000 ft
Shape	W18x106
Material	ASTM A992 Grade 50
Weight	1.56333 K
Framing	Column
Beta	0 deg

Connections

Start	End
Node N001	N003
Location (0, 0, 0 ft)	(0, 14.7500, 0 ft)
Support Pinned	Fix Z Only

Analysis Results (First Order)

Load Combinations: ASCE 7-10 LRFD

Extreme Forces

Axial	10.48191 K	E+X
My	0.00000 K-ft	1.2D+E+.5L+Lpa+.2S »+X+30%+Z
Mz	180.39582 K-ft	E+X
Vy	12.23022 K	E+X
Vz	0.00000 K	1.2D+E+.5L+Lpa+.2S »+X+30%+Z
Torsion	-0.00000 K-ft	.9D+E »+X+30%+Z

Extreme Drift (all cases)

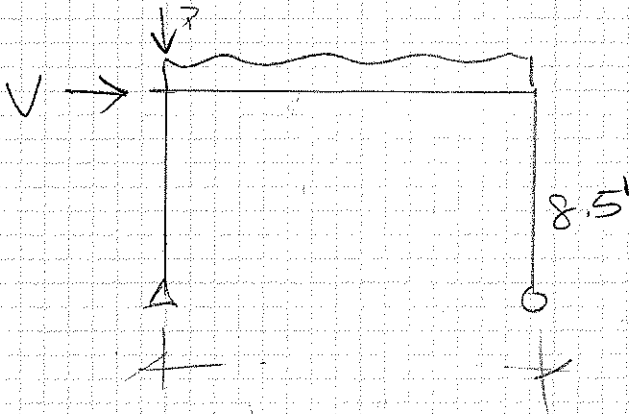
Drift Dy	1.22666 in	1.2D+E+.5L+Lpa+.2S »+X+30%+Z
Drift Dz	0.00000 in	1.2D+E+.5L+Lpa+.2S »+X+30%+Z

Steel Design per AISC LRFD (2010)

Controlling Design Checks

Type	Case	Demand	Capacity	Unity	Status	Reference
Combined Check	.9D+E »+X+30%+Z	-NA-	-NA-	0.21	OK	H1-1b
Axial Check	1.2D+1.6L+.2Di+.5S	6.76633 K	1012.37052 K	0.01	OK	E3-2FB
Strong Flexure Check	.9D+E »+X+30%+Z	178.03926 K-ft	862.50000 K-ft	0.21	OK	F2-1
Strong Shear Check	.9D+E »+X+30%+Z	12.07046 K	330.99000 K	0.04	OK	G2-1

FRAME GH 2:



$$V_u = 3.07k \left(\frac{6.5}{3.5} \right) \frac{1}{1.7} = 8.14k$$

$$W = W_{DL} = 30 \text{ DIF}$$

$$W_{SNF} = 50 \text{ DIF}$$

$$P = P_{DL} = 540 \text{ LB}$$

$$P_{SNF} = 900 \text{ LB}$$

DRIFT

$$\frac{C_d S}{1.0} = \frac{3(.48'')}{1.0} = 1.44'' < 0.02 h_{sx} = 2.04''$$

BM W14x26 $L_b = 11.5'$

$$P = 4.4k$$

$$\phi P = 98k$$

$$M = 37 \text{ k-ft}$$

$$\phi M = 80 \text{ k-ft}$$

$$I = .48$$

$$V = 4k$$

$$\phi V = 106k$$

COL W14x26 $L_b = 8.5'$

$$P = \Omega(3k) + 1.38(1.4) + .2(1.5) = 9.73k \quad \phi P = 167k$$

$$M = 37 \text{ k-ft}$$

$$\phi M = 109 \text{ k-ft}$$

$$V = 4.4k$$

$$\phi V = 106k$$

$$I = .37$$



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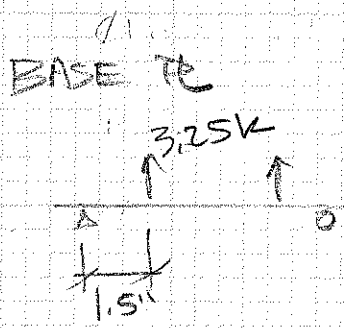
@ BASE :

T = -2k (ULT)
C = 5.2k (ULT)
V = 4.1k (ULT)

W/O (BASE 10's)
-6.5k
9.73k
10.25k

BASE PLATE 4 BOLTS

@ WOOD : (2) 3/4" ϕ BOLTS $Z = 1.67(1.6)(2) = 5.3k > 2.9k$ ALL



M = 4.9k-in < $\phi S F_y = 6.75k$ -in
b = 5" d = 1/2"

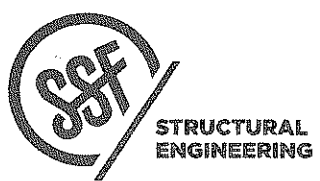
BOLTS 3/4" ϕ (2) $\phi R_n = 18k$ ✓

CONNECTION

M = 3095.4 k-in

T = C = 222.69

L = 8.76" (4) 3/4" weld $\phi R_n = 584.4k$ ✓



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Project: MF Guest House 2

Joanna Klimczak, SWENSON SAY FAGET

August 18, 2017

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Steel Beam Report: BmX001

Member Details

Member Properties

Length	23.00000 ft
Shape	W14x26
Material	ASTM A992 Grade 50
Weight	0.60277 K
Framing	Beam
Beta	0 deg

Connections

Start	End
Node N003	N004
Location (0, 8.50000, 0 ft)	(23, 8.50000, 0 ft)
Support Fix Z Only	Fix Z Only

Analysis Results (First Order)

Load Combinations: ASCE 7-10 LRFD

Extreme Forces

Axial	-4.38386 K	1.2D+E+.5L+Lpa+.2S »+X+30%+Z
My	0.00000 K-ft	-NA-
Mz	-37.26281 K-ft	1.2D+E+.5L+Lpa+.2S »+X+30%+Z
Vy	-3.90545 K	1.2D+E+.5L+Lpa+.2S »+X+30%+Z
Vz	0.00000 K	-NA-
Torsion	0.00000 K-ft	-NA-

Extreme Deflections (all cases)

Total Dy	-0.08680 in	1.2D+E+.5L+Lpa+.2S »+X+30%+Z
Total Dz	0.00000 in	-NA-
Beam Dy	-0.08677 in	1.2D+E+.5L+Lpa+.2S »+X+30%+Z
Beam Dz	0.00000 in	-NA-

Steel Design per AISC LRFD (2010)

Controlling Design Checks

Type	Case	Demand	Capacity	Unity	Status	Reference
Combined Check	1.2D+E+.5L+Lpa+.2S »+X+30%+Z	-NA-	-NA-	0.60	OK	H1-1b
Axial Check	1.2D+E+.5L+Lpa+.2S »+X+30%+Z	4.38386 K	26.42405 K	0.17	OK	E3-3FB
Strong Flexure Check	1.2D+E+.5L+Lpa+.2S »+X+30%+Z	-37.26281 K-ft	72.56704 K-ft	0.51	OK	F2-3
Strong Shear Check	1.2D+E+.5L+Lpa+.2S »+X+30%+Z	-3.90545 K	106.33500 K	0.04	OK	G2-1

Project: MF Guest House 2

Joanna Klimczak, SWENSON SAY FAGET

August 18, 2017

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Steel Column Report: COL001

Member Details

Member Properties

Length	8.50000 ft
Shape	W14x26
Material	ASTM A992 Grade 50
Weight	0.22276 K
Framing	Column
Beta	0 deg

Connections

Start	End
Node N001	N003
Location (0, 0, 0 ft)	(0, 8.50000, 0 ft)
Support Pinned	Fix Z Only

Analysis Results (First Order)

Load Combinations: ASCE 7-10 LRFD

Extreme Forces

Axial	3.00826 K	E+X
My	0.00000 K-ft	-NA-
Mz	34.67979 K-ft	E+X
Vy	4.07998 K	E+X
Vz	0.00000 K	-NA-
Torsion	0.00000 K-ft	-NA-

Extreme Drift (all cases)

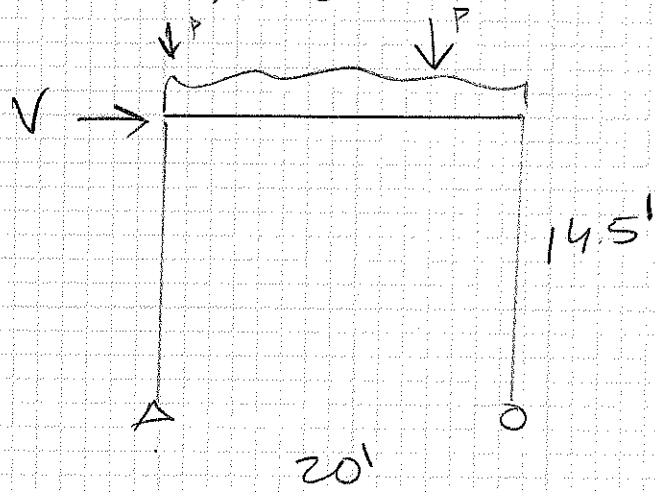
Drift Dy	0.48039 in	1.2D+E+.5L+Lpa+.2S »+X+30%+Z
Drift Dz	0.00000 in	-NA-

Steel Design per AISC LRFD (2010)

Controlling Design Checks

Type	Case	Demand	Capacity	Unity	Status	Reference
Combined Check	.9D+E »+X+30%+Z	-NA-	-NA-	0.22	OK	H1-1b
Axial Check	1.4D+.9H	1.97281 K	179.47421 K	0.01	OK	E3-2FB
Strong Flexure Check	.9D+E »+X+30%+Z	33.26779 K-ft	150.75000 K-ft	0.22	OK	F2-1
Strong Shear Check	.9D+E »+X+30%+Z	3.91386 K	106.33500 K	0.04	OK	G2-1

FRAME GH 3:



$$V = 3.9 \left(\frac{6.5}{3.5} \right) \left(\frac{1}{.7} \right) = 10.3k$$

$$W = W_{DL} = 30 \text{ PUF}$$

$$W_{LL} = 40 \text{ PUF}$$

$$P = P_{DL} = 4.7k \text{ @ } 14'$$

$$P_{LL} = 7k$$

$$P_{SN} = 3k$$

$$P = P_{DL} = 7.9k \text{ @ } 0'$$

$$P_{LL} = 8.9k$$

$$P_{SN} = 3.6k$$

DRIFT.

$$\frac{\Delta_{Sel}}{I} = \frac{3(.36'')}{1.0} = 1.08'' \quad 2.02 \text{ hrs} = 3.48''$$

BM W18x76 $L_b = 20'$

$$P = 6.5k \quad \phi P = 340.5k$$

$$M = 94k\text{-ft} \quad \phi M = 472k\text{-ft}$$

$$V = 18.3k \quad \phi V = 232k$$

$$I = .21$$

COL W18x76 $L_b = 14.5'$

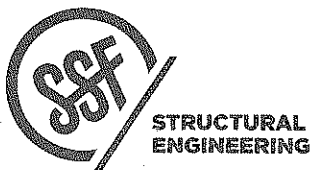
$$P = \Omega(7.5) + 1.38(12.4) + .2(4.5) + 11.4 = 48.2k$$

$$\phi P = 709k$$

$$M = 94k\text{-ft} \quad \phi M = 538k\text{-ft}$$

$$V = 6.5k \quad \phi V = 232k$$

$$I = .208$$



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COL 1 @ BASE W18x106

$$T = 0$$

$$C = 37k$$

$$V = 5.2k$$

COL 2 @ BASE W18x76

$$T = -2.73k$$

$$C = 22.4k$$

$$V = 5.2k$$

Connection

$$M = 1045.9 \text{ k-ft}$$

$$T = C = 689.6k$$

Weld

$$L = 12.54''$$

(4) $\frac{3}{4}''$ welds

$$\phi R_n = 836k \checkmark$$



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Project: MF Guest House 3

Joanna Klimczak, SWENSON SAY FAGET

August 18, 2017

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Steel Beam Report: BmX001

Member Details

Member Properties

Length	20.00000 ft
Shape	W18x76
Material	ASTM A992 Grade 50
Weight	1.51997 K
Framing	Beam
Beta	0 deg

Connections

Start	End
Node N003	N004
Location (0, 14.5000, 0 ft)	(20, 14.5000, 0 ft)
Support Fix Z Only	Fix Z Only

Analysis Results (First Order)

Load Combinations: ASCE 7-10 LRFD

Extreme Forces

Axial	-6.49324 K	1.2D+E+.5L+Lpa+.2S »+X+30%+Z
My	0.00000 K-ft	-NA-
Mz	-94.15197 K-ft	1.2D+E+.5L+Lpa+.2S »+X+30%+Z
Vy	-18.32416 K	1.2D+E+.5L+Lpa+.2S »+X+30%+Z
Vz	0.00000 K	-NA-
Torsion	0.00000 K-ft	-NA-

Extreme Deflections (all cases)

Total Dy	-0.06855 in	1.2D+1.6L+.2Di+.5S
Total Dz	0.00000 in	-NA-
Beam Dy	-0.06312 in	1.2D+1.6L+.2Di+.5S
Beam Dz	0.00000 in	-NA-

Steel Design per AISC LRFD (2010)

Controlling Design Checks

Type	Case	Demand	Capacity	Unity	Status	Reference
Combined Check	1.2D+E+.5L+Lpa+.2S »+X+30%+Z	-NA-	-NA-	0.16	OK	H1-1b
Axial Check	1.2D+E+.5L+Lpa+.2S »+X+30%+Z	6.49324 K	540.97320 K	0.01	OK	E3-2FB
Strong Flexure Check	1.2D+E+.5L+Lpa+.2S »+X+30%+Z	-94.15197 K-ft	611.25000 K-ft	0.15	OK	F2-1
Strong Shear Check	1.2D+E+.5L+Lpa+.2S »+X+30%+Z	-18.32416 K	232.05002 K	0.08	OK	G2-1

Project: MF Guest House 3

Joanna Klimczak, SWENSON SAY FAGET

August 18, 2017

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Steel Column Report: COL001

Member Details

Member Properties

Length	14.50000 ft
Shape	W18x106
Material	ASTM A992 Grade 50
Weight	1.53684 K
Framing	Column
Beta	0 deg

Connections

Start	End
Node N001	N003
Location (0, 0, 0 ft)	(0, 14.5000, 0 ft)
Support Pinned	Fix Z Only

Analysis Results (First Order)

Load Combinations: ASCE 7-10 LRFD

Extreme Forces

Axial	-35.42619 K	1.2D+1.6L+.2Di+.5S
My	0.00000 K-ft	-NA-
Mz	78.66049 K-ft	E+X
Vy	5.42486 K	E+X
Vz	0.00000 K	-NA-
Torsion	0.00000 K-ft	-NA-

Extreme Drift (all cases)

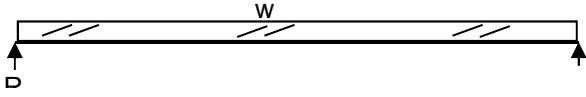
Drift Dy	0.36208 in	E+X
Drift Dz	0.00000 in	-NA-

Steel Design per AISC LRFD (2010)

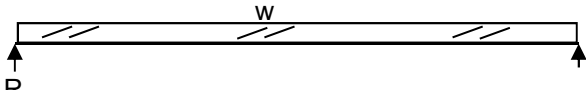
Controlling Design Checks

Type	Case	Demand	Capacity	Unity	Status	Reference
Combined Check	.9D+E »+X+30%+Z	-NA-	-NA-	0.08	OK	H1-1b
Axial Check	1.2D+1.6L+.2Di+.5S	35.42619 K	1023.44928 K	0.03	OK	E3-2FB
Strong Flexure Check	.9D+E »+X+30%+Z	69.99532 K-ft	862.50000 K-ft	0.08	OK	F2-1
Strong Shear Check	.9D+E »+X+30%+Z	4.82726 K	330.99000 K	0.01	OK	G2-1

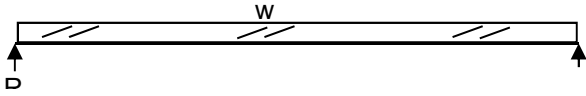
Beam	B1	LVL	3 1/2 x 18
w=	560	plf	R= 1,540 lbs
L=	5.5	ft	M= 2,118 ft-lbs
b=	3.50	in	Fb= 134 psi
d=	18.00	in	Fv= 17 psi
E=	2000	ksi	Δ = 0.00 in
Cv=	1.00	≤ 1.0	I / 19474



Beam	B2	DF-L	6 x 4
w=	120	plf	R= 240 lbs
L=	4	ft	M= 240 ft-lbs
b=	5.50	in	Fb= 256 psi
d=	3.50	in	Fv= 16 psi
E=	1700	ksi	Δ = 0.02 in
Cv=	1.00	≤ 1.0	I / 2320



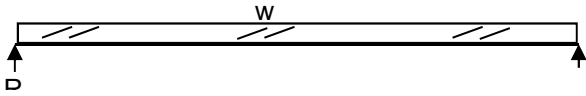
Beam	B3	HF	3 x 8
w=	560	plf	R= 1,400 lbs
L=	5	ft	M= 1,750 ft-lbs
b=	3.00	in	Fb= 799 psi
d=	7.25	in	Fv= 73 psi
E=	1300	ksi	Δ = 0.06 in
Cv=	1.00	≤ 1.0	I / 944



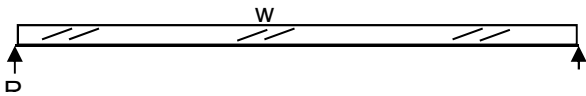
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Project: Ogden Point Guest House Roof Gravity Date: 08/18/17
DL=15 psf LL=25 psf Project #: _____
Deflection: TL=L/240 LL=L/360 Design: JWJ
 Sheet: _____

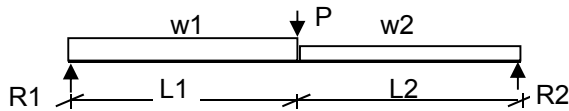
Beam	B1	HF	2	x 12
w=	93.3333333	plf	R=	280 lbs
L=	6	ft	M=	420 ft-lbs
b=	1.50	in	Fb=	159 psi
d=	11.25	in	Fv=	17 psi
E=	1300	ksi	Δ =	0.01 in
Cv=	1.00	≤ 1.0	I/	6121



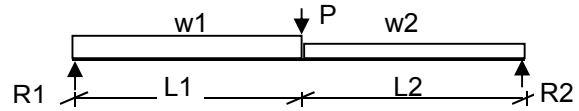
Beam	B2	GL	5 1/8	x 13
w=	237.5	plf	R=	1,425 lbs
L=	12	ft	M=	4,275 ft-lbs
b=	5.13	in	Fb=	355 psi
d=	13.00	in	Fv=	26 psi
E=	1800	ksi	Δ =	0.07 in
Cv=	1.00	≤ 1.0	I/	2195



Beam	B3	LVL	5 1/4	x 18
w1=	413	plf	R1 =	14,370 lbs
w2=	413	plf	R2 =	5,054 lbs
L1=	1	ft	M =	30,907 lb-ft
L2=	23	ft	Fb =	1,308 psi
X=	11.8	ft	Fv =	218 psi
P=	9,730	lbs	Δ =	0.61 in
b=	5.25	in	I/	461
d=	18.00	in	Cv=	0.95
E=	2,000	ksi		

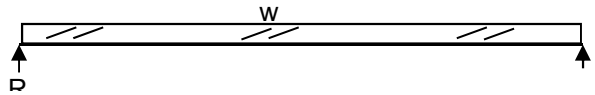


Beam	B4	PSL	1	x 1
w1=	70	plf	R1 =	10,652 lbs
w2=	70	plf	R2 =	7,218 lbs
L1=	4	ft	M =	42,048 lb-ft
L2=	6	ft	Fb =	3,027,431 psi
X=	5.0	ft	Fv =	15,969 psi
P=	17,170	lbs	Δ =	##### in
b=	1.00	in	I/	0
d=	1.00	in	Cv=	1.00
E=	1	ksi		

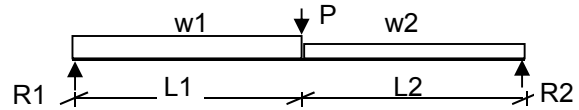


Steel Size	W18X76			
I =	1330	in ⁴	Fy=	50 ksi
Δ =	0.016	in	Mn/ Ω =	406.7 k-ft
I/	7724		Vn/ Ω =	221.7 kips

Beam	B5	LVL	3 1/2	x 18
w=	437.5	plf	R=	1,422 lbs
L=	6.5	ft	M=	2,311 ft-lbs
b=	3.50	in	Fb=	147 psi
d=	18.00	in	Fv=	18 psi
E=	2000	ksi	Δ =	0.01 in
Cv=	1.00	≤ 1.0	I/	15101



Beam	B6	LVL	3 1/2	x 18
w1=	140	plf	R1 =	1,842 lbs
w2=	140	plf	R2 =	1,330 lbs
L1=	4	ft	M =	6,248 lb-ft
L2=	9	ft	Fb =	397 psi
X=	6.3	ft	Fv =	39 psi
P=	1,422	lbs	Δ =	0.05 in
b=	3.50	in	I/	3,194
d=	18.00	in	Cv=	1.00
E=	2,000	ksi		



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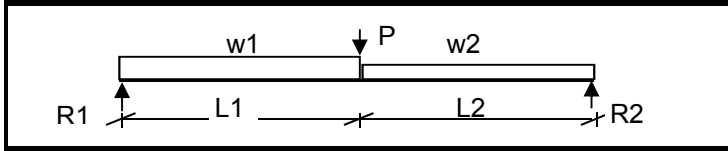
Project: Ogden Point Guest House Upper Floor Date: 08/18/17

DL=30 psf LL=40 psf Project #: _____

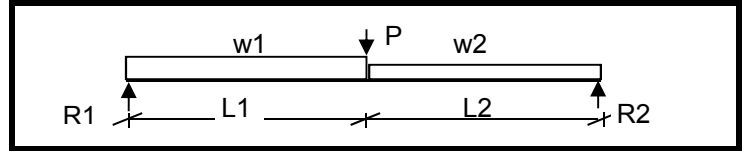
Deck: DL=35psf LL=60 psf Design: JWJ

Deflection= TL=L/500 LL=L/700 Sheet: _____

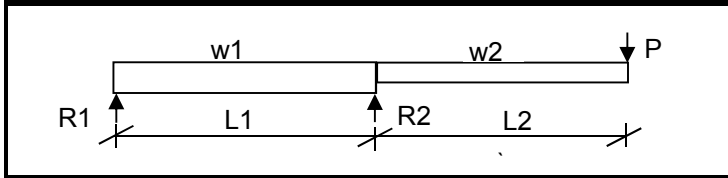
Beam	B7	LVL	5 1/4 x 18
w1=	560	plf	R1 = 7,719 lbs
w2=	560	plf	R2 = 3,179 lbs
L1=	1	ft	M = 8,969 lb-ft
L2=	10	ft	Fb = 380 psi
X=	5.3	ft	Fv = 109 psi
P=	5,018	lbs	Δ = 0.04 in
b=	5.25	in	I / 3,515
d=	18.00	in	Cv = 1.00
E=	2,000	ksi	



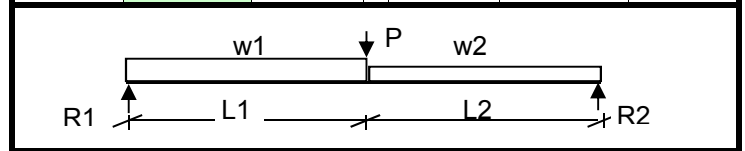
Beam	B10	LVL	5 1/4 x 18
w1=	70	plf	R1 = 5,053 lbs
w2=	70	plf	R2 = 5,053 lbs
L1=	8	ft	M = 38,186 lb-ft
L2=	8	ft	Fb = 1,616 psi
X=	8.0	ft	Fv = 79 psi
P=	8,987	lbs	Δ = 0.28 in
b=	5.25	in	I / 686
d=	18.00	in	Cv = 0.98
E=	2,000	ksi	



Beam	B8	LVL	5 1/4 x 18
w1=	893	plf	R1 = 7565 lbs
w2=	-	plf	R2 = 11,709 lbs
L1=	19	ft	M+ = 32,057 lb-ft
L2=	8	ft	M- = 17,370 lb-ft
X=	9.50	ft	Fb = 1,357 psi
P=	2,316	lbs	Fv = 128 psi
b=	5.25	in	Δspan = 0.380 in
d=	18.00	in	I span / 600
E=	2,000	ksi	Δcant = (0.26) in
Cv=	0.97		I cant / (697)

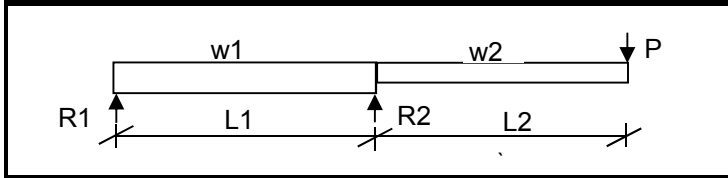


Beam	B11	PSL	1 x 1
w1=	70	plf	R1 = 11,785 lbs
w2=	70	plf	R2 = 7,064 lbs
L1=	8	ft	M = 92,038 lb-ft
L2=	14	ft	Fb = 6,626,761 psi
X=	11.0	ft	Fv = 17,668 psi
P=	17,309	lbs	Δ = ##### in
b=	1.00	in	I / 0
d=	1.00	in	Cv = 1.00
E=	1	ksi	



Steel Size		W18X76	
I =	1330 in ⁴	Fy =	50 ksi
Δ =	0.164 in	Mn/Ω =	406.7 k-ft
I /	1608	Vn/Ω =	221.7 kips

Beam	B9	LVL	5 1/4 x 18
w1=	490	plf	R1 = 5018 lbs
w2=	-	plf	R2 = 8,813 lbs
L1=	24	ft	M+ = 25,698 lb-ft
L2=	8	ft	M- = 17,370 lb-ft
X=	11.75	ft	Fb = 1,088 psi
P=	2,316	lbs	Fv = 91 psi
b=	5.25	in	Δspan = 0.456 in
d=	18.00	in	I span / 619
E=	2,000	ksi	Δcant = (0.22) in
Cv=	0.95		I cant / (829)



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DL=30 psf LL=40 psf Project #: _____

Deck: DL=35psf LL=60 psf Design: JWJ

Deflection= TL=L/500 LL=L/700 Sheet: _____

USGS Design Maps Summary Report

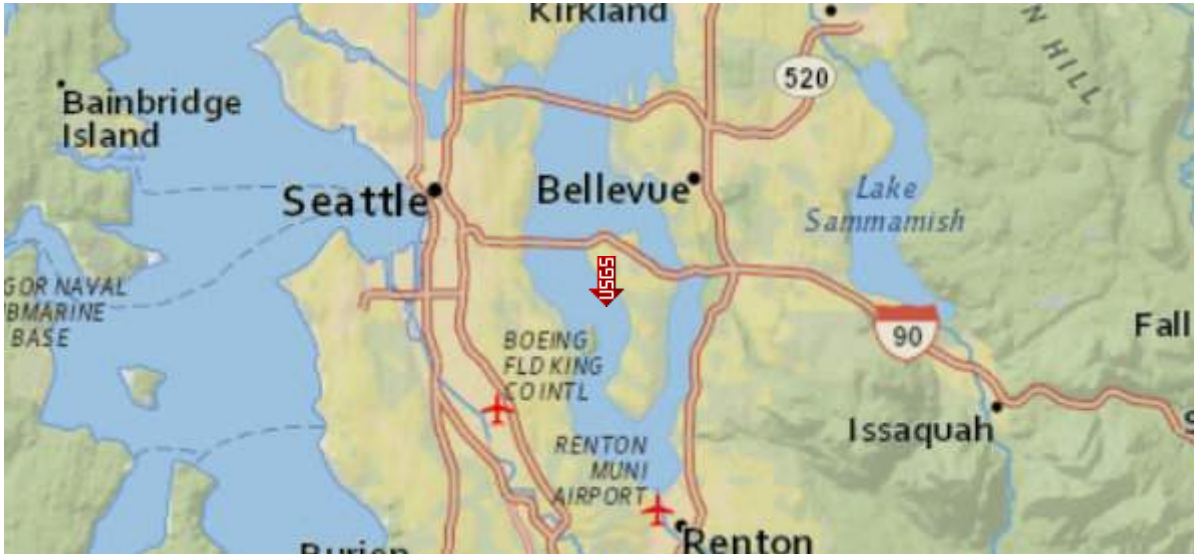
User-Specified Input

Building Code Reference Document 2012/2015 International Building Code
(which utilizes USGS hazard data available in 2008)

Site Coordinates 47.57645°N, 122.24366°W

Site Soil Classification Site Class D – “Stiff Soil”

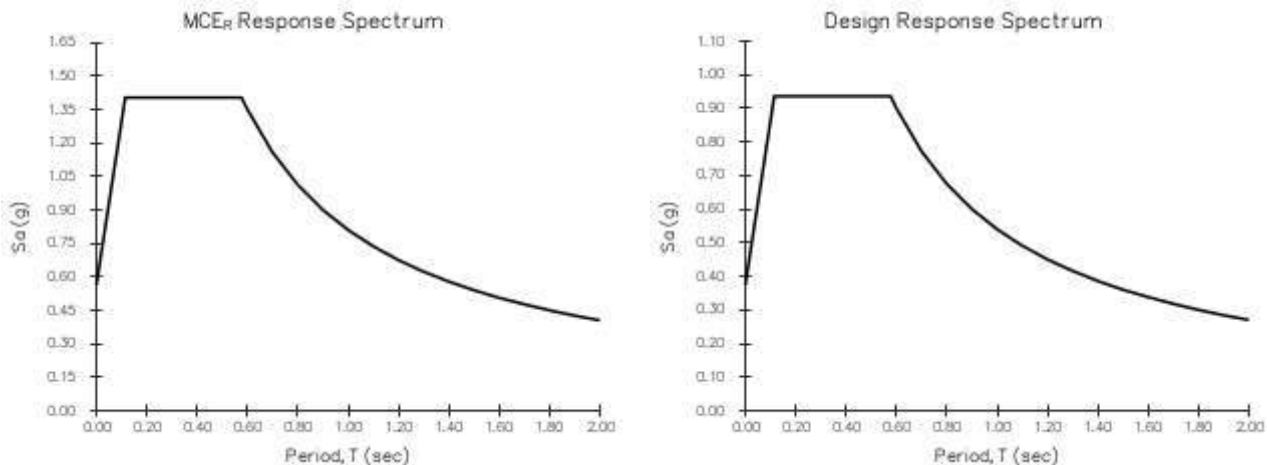
Risk Category I/II/III



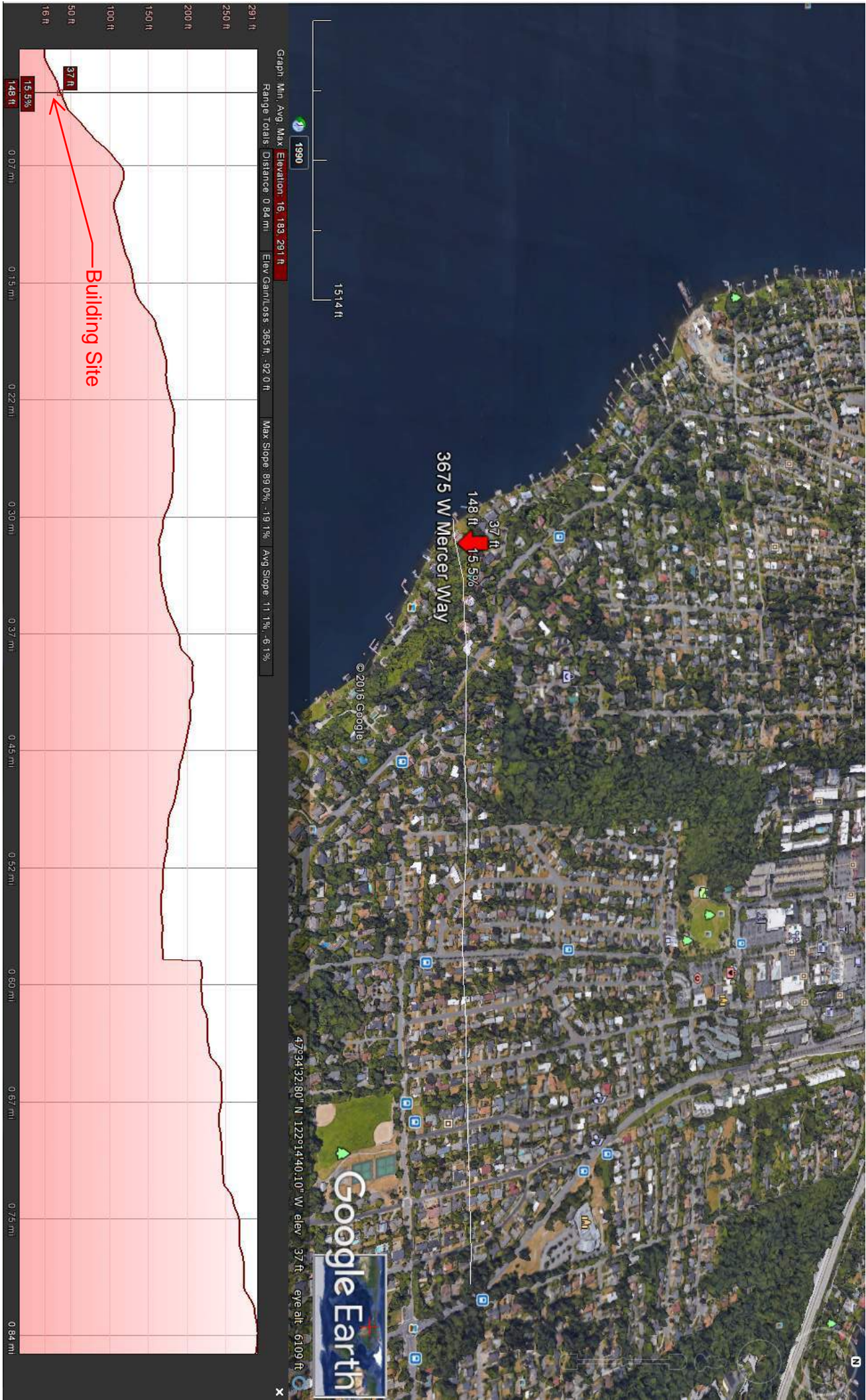
USGS-Provided Output

$S_s = 1.404 \text{ g}$	$S_{MS} = 1.404 \text{ g}$	$S_{DS} = 0.936 \text{ g}$
$S_1 = 0.540 \text{ g}$	$S_{M1} = 0.810 \text{ g}$	$S_{D1} = 0.540 \text{ g}$

For information on how the S_s and S_1 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.

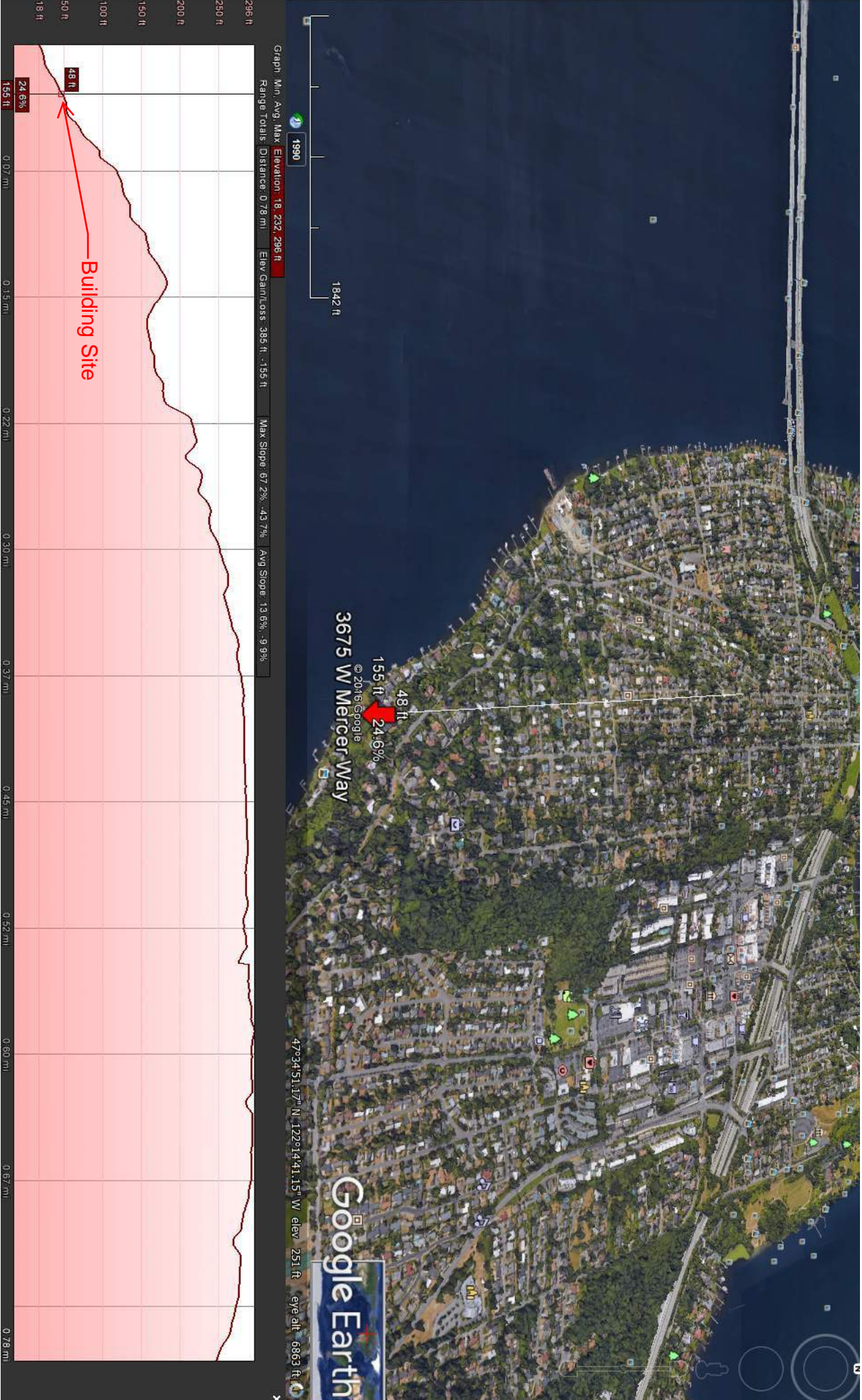


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Exposure Category C

Kzt=1.0



Exposure Category C
 Kzt=1.0