



**MULHERN+KULP**  
RESIDENTIAL STRUCTURAL ENGINEERING

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# CALCULATION PACKAGE

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February 14, 2024

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MULHERN & KULP STRUCTURAL ENGINEERING, INC.

Prepared By:

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*Signature, Seal & Date*

### BEAM & HEADER CALCULATIONS

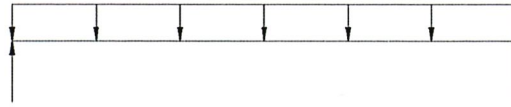
BEAM DESCRIPTION: TYP. HDR (WORST CASE LOAD) B1

PARAMETERS:

L =  FT

W =  KLF

P =  K



ANALYSIS:

$R_{MAX} =$  K  $V_D =$  K  $< V_{ALL} =$  K  ADEQUATE

$M_{MAX} =$  K-FT  $< M_{ALL} =$  K-FT  ADEQUATE

$\Delta_{TL} =$  IN.  $L/$   $< L/240$   ADEQUATE

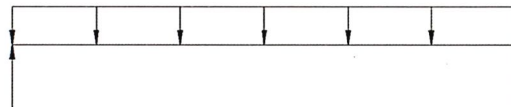
BEAM DESCRIPTION: TYP. HDR (WORST CASE LENGTH) B1

PARAMETERS:

L =  FT

W =  KLF

P =  K



ANALYSIS:

$R_{MAX} =$  K  $V_D =$  K  $< V_{ALL} =$  K  ADEQUATE

$M_{MAX} =$  K-FT  $< M_{ALL} =$  K-FT  ADEQUATE

$\Delta_{TL} =$  IN.  $L/$   $< L/240$   ADEQUATE

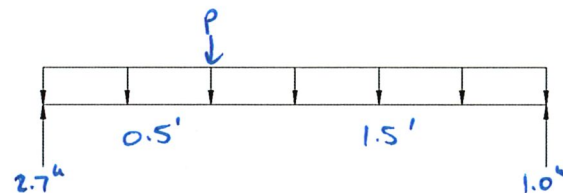
BEAM DESCRIPTION: ROOF FRMG - HDR @ BATH 5 B2

PARAMETERS:

L =  FT

W =  KLF

P =  K



ANALYSIS:

$R_{MAX} =$  K  $V_D =$  K  $< V_{ALL} =$  K  ADEQUATE

$M_{MAX} =$  K-FT  $< M_{ALL} =$  K-FT  ADEQUATE

$\Delta_{TL} =$  IN.  $L/$   $< L/240$   ADEQUATE

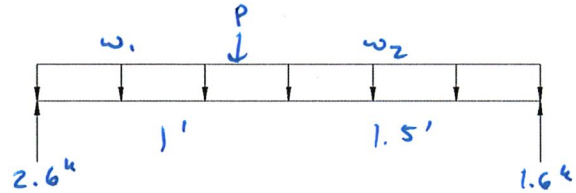
**BEAM & HEADER CALCULATIONS**

BEAM DESCRIPTION: ROOF FRMB - HDK Q BED 3/BONUS

B3

PARAMETERS:

L = 2.5 FT  
W<sub>1</sub> = 0.78 KLF, w<sub>2</sub> = 0.17 klf  
P = 3.1 K



ANALYSIS:

R<sub>MAX</sub> = 2.6 K      V<sub>D</sub> = - K < V<sub>ALL</sub> = 4.5 K       ADEQUATE  
M<sub>MAX</sub> = 2.2 K-FT < M<sub>ALL</sub> = 5.2 K-FT       ADEQUATE  
Δ<sub>TL</sub> = 0.01 IN.      L/ 999 < L/240       ADEQUATE

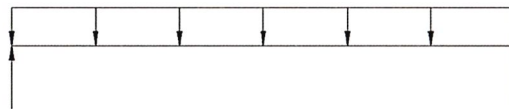
4x10 DF #2

BEAM DESCRIPTION: UPPER FLR FRMB - TYP. INT. HDK / FUSH BOT. BM / DROPPED BM (W/OUT CASE)

B4

PARAMETERS:

L = 4.25 FT  
W = 1.0 KLF  
P = - K



ANALYSIS:

R<sub>MAX</sub> = 2.1 K      V<sub>D</sub> = - K < V<sub>ALL</sub> = 3.9 K       ADEQUATE  
M<sub>MAX</sub> = 2.3 K-FT < M<sub>ALL</sub> = 4.5 K-FT       ADEQUATE  
Δ<sub>TL</sub> = 0.02 IN.      L/ 999 < L/240       ADEQUATE

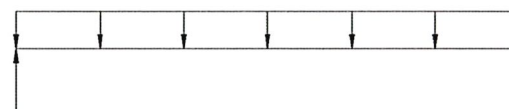
4x10 DF #2

BEAM DESCRIPTION: UPPER FLR FRMB - DROPPED BM @ W/CHEN / GREAT ROOM

B5

PARAMETERS:

L = 16.17 FT  
W = 1.1 KLF  
P = - K



ANALYSIS:

R<sub>MAX</sub> = 8.9 K      V<sub>D</sub> = - K < V<sub>ALL</sub> = 16.0 K       ADEQUATE  
M<sub>MAX</sub> = 36.0 K-FT < M<sub>ALL</sub> = 49.3 K-FT       ADEQUATE  
Δ<sub>TL</sub> = 0.46 IN.      L/ 424 < L/240       ADEQUATE

5 1/2" x 16 1/2" GLB

### BEAM & HEADER CALCULATIONS

BEAM DESCRIPTION: UPPER FLR FRMB - SGD HDR @ NOOK

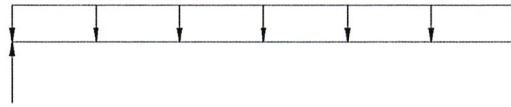
136

PARAMETERS:

L = 12 FT

W = 0.47 KLF

P = - K



ANALYSIS:

R<sub>MAX</sub> = 2.8 K      V<sub>D</sub> = - K < V<sub>ALL</sub> = 15.1 K       ADEQUATE

M<sub>MAX</sub> = 8.5 K-FT < M<sub>ALL</sub> = 38.4 K-FT       ADEQUATE

Δ<sub>TL</sub> = 0.11 IN.      L/999+ < L/240       ADEQUATE

5 1/2" x 13 1/2" GLB

BEAM DESCRIPTION: UPPER FLR FRMB - SGD HDR @ DINING

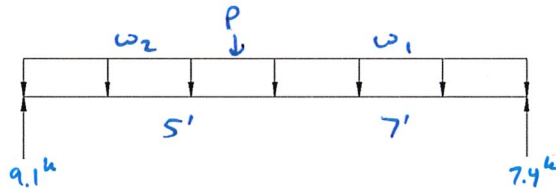
137

PARAMETERS:

L = 12 FT

W<sub>1</sub> = 1.1 KLF, w<sub>2</sub> = 1.4 klf

P = 1.2 K



ANALYSIS:

R<sub>MAX</sub> = 9.1 K      V<sub>D</sub> = - K < V<sub>ALL</sub> = 21.8 K       ADEQUATE

M<sub>MAX</sub> = 25.0 K-FT < M<sub>ALL</sub> = 79.6 K-FT       ADEQUATE

Δ<sub>TL</sub> = 0.10 IN.      L/799+ < L/240       ADEQUATE

5 1/2" x 19 1/2" GLB

BEAM DESCRIPTION: UPPER FLR FRMB - HDR @ ADU SUITE

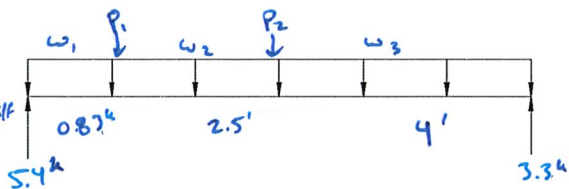
138

PARAMETERS:

L = 7.33 FT

W<sub>1</sub> = 1.2 KLF, w<sub>2</sub> = 0.55 klf, w<sub>3</sub> = 0.69 klf

P<sub>1</sub> = 2.6 K, P<sub>2</sub> = 1.6 K



ANALYSIS:

R<sub>MAX</sub> = 5.4 K      V<sub>D</sub> = - K < V<sub>ALL</sub> = 8.2 K       ADEQUATE

M<sub>MAX</sub> = 7.8 K-FT < M<sub>ALL</sub> = 20.2 K-FT       ADEQUATE

Δ<sub>TL</sub> = 0.08 IN.      L/999+ < L/240       ADEQUATE

6 x 12 DF#2

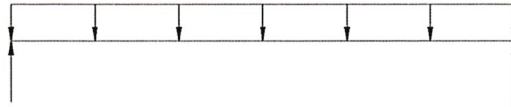
**BEAM & HEADER CALCULATIONS**

BEAM DESCRIPTION: UPPER FLR FRMG - GARAGE POOL HDR @ PORTAL FRAME

B9

PARAMETERS:

L = 8.17 FT  
W = 0.21 KLF  
P = - K



ANALYSIS:

$R_{MAX} = 0.86$  K     $V_D = -$  K     $< V_{ALL} = 5.4$  K     ADEQUATE  
 $M_{MAX} = 1.8$  K-FT     $< M_{ALL} = 7.0$  K-FT     ADEQUATE  
 $\Delta_{TL} = 0.01$  IN.     $L/999+$   $< L/240$      ADEQUATE

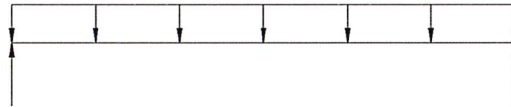
4x12 DF #2

BEAM DESCRIPTION: UPPER FLR FRMG - FURSH BM @ COVERED PATIO (PERP. TO FRMG)

B10

PARAMETERS:

L = 2.33 FT  
W = 0.4 KLF  
P = - K



ANALYSIS:

$R_{MAX} = 0.47$  K     $V_D = -$  K     $< V_{ALL} = 12.8$  K     ADEQUATE  
 $M_{MAX} = 0.27$  K-FT     $< M_{ALL} = 43.5$  K-FT     ADEQUATE  
 $\Delta_{TL} = 2.01$  IN.     $L/999+$   $< L/240$      ADEQUATE

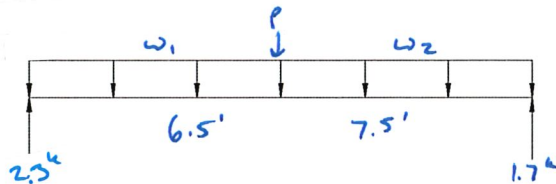
3 1/2" x 18" GLB

BEAM DESCRIPTION: UPPER FLR FRMG - FURSH BM @ COVERED PATIO (PARA. TO FRMG)

B11

PARAMETERS:

L = 14 FT  
 $W_1 = 0.34$  KLF,  $W_2 = 0.17416$  KLF  
P = 0.47 K



ANALYSIS:

$R_{MAX} = 2.3$  K     $V_D = -$  K     $< V_{ALL} = 6.9$  K     ADEQUATE  
 $M_{MAX} = 7.7$  K-FT     $< M_{ALL} = 30.8$  K-FT     ADEQUATE  
 $\Delta_{TL} = 0.19$  IN.     $L/899$   $< L/240$      ADEQUATE

(3) 1 3/4" x 11 7/8" LVL

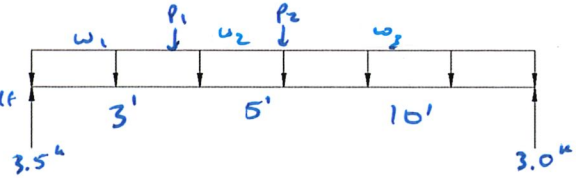
(SLOPE CUT TO 6" MIN. DEPTH)

**BEAM & HEADER CALCULATIONS**

BEAM DESCRIPTION: UPPER FLR FRMG - TYP. DROPPED BM @ COVERED PORCH (WORST CASE) (B12)

PARAMETERS:

L =  FT  
 $W_1 =$   KLF,  $w_2 = 0.17$  klf,  $w_3 = 0.29$  klf  
 $P_1 =$   K,  $P_2 = 0.8$  K



ANALYSIS:

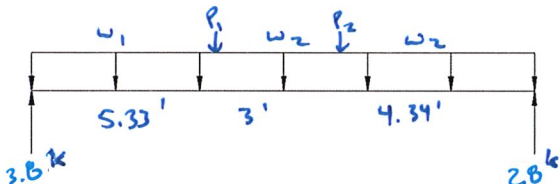
$R_{MAX} =$   K       $V_D =$   K       $< V_{ALL} =$   K       ADEQUATE  
 $M_{MAX} =$   K-FT       $< M_{ALL} =$   K-FT       ADEQUATE  
 $\Delta_{TL} =$   IN.       $L/$    $< L/240$        ADEQUATE

5 1/2" x 13 1/2" GLB

BEAM DESCRIPTION: UPPER FLR FRMG - FLOOR BM @ LAUNCH (B13)

PARAMETERS:

L =  FT  
 $W =$   KLF,  $w_2 = 0.27$  klf  
 $P_1 =$   K,  $P_2 = 1.0$  K



ANALYSIS:

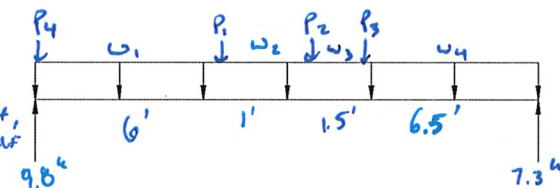
$R_{MAX} =$   K       $V_D =$   K       $< V_{ALL} =$   K       ADEQUATE  
 $M_{MAX} =$   K-FT       $< M_{ALL} =$   K-FT       ADEQUATE  
 $\Delta_{TL} =$   IN.       $L/$    $< L/240$        ADEQUATE

5 1/2" x 10" GLB

BEAM DESCRIPTION: UPPER FLR FRMG - FLOOR BM @ STUDY (B14)

PARAMETERS:

L =  FT  
 $W_1 =$   KLF,  $w_2 = 0.59$  klf,  $w_3 = 0.51$  klf,  $w_4 = 0.65$  klf  
 $P_1 =$   K,  $P_2 = 0.5$  K,  $P_3 = 1.6$  K



ANALYSIS:

$R_{MAX} =$   K       $V_D =$   K       $< V_{ALL} =$   K       ADEQUATE  
 $M_{MAX} =$   K-FT       $< M_{ALL} =$   K-FT       ADEQUATE  
 $\Delta_{TL} =$   IN.       $L/$    $< L/240$        ADEQUATE

3 1/2" x 10" GLB



**BEAM & HEADER CALCULATIONS**

BEAM DESCRIPTION: UPPER FLOOR FRAMING - FLUSH BM @ FOYER / STUDY

B15

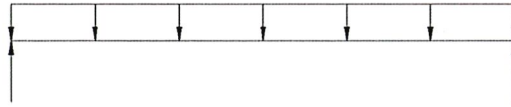
PARAMETERS:

L =  FT

W =  KLF

P =  K

SEE  
ENERCALC  
OUTPUT



ANALYSIS:

R<sub>MAX</sub> =  K

V<sub>D</sub> =  K < V<sub>ALL</sub> =  K

ADEQUATE

M<sub>MAX</sub> =  K-FT

< M<sub>ALL</sub> =  K-FT

ADEQUATE

Δ<sub>TL</sub> =  IN.

L /  < L/240

ADEQUATE

BEAM DESCRIPTION: UPPER FLOOR FRAMING - FLUSH BM @ GREAT ROOM

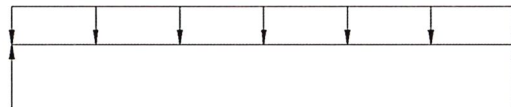
B16

PARAMETERS:

L =  FT

W =  KLF

P =  K



ANALYSIS:

R<sub>MAX</sub> =  K

V<sub>D</sub> =  K < V<sub>ALL</sub> =  K

ADEQUATE

M<sub>MAX</sub> =  K-FT

< M<sub>ALL</sub> =  K-FT

ADEQUATE

Δ<sub>TL</sub> =  IN.

L /  < L/240

ADEQUATE

BEAM DESCRIPTION: UPPER FLOOR FRAMING - DROPPED BM @ FOYER / GREAT ROOM

B17

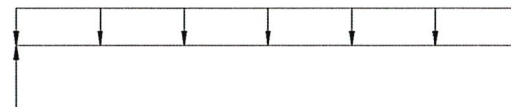
PARAMETERS:

L =  FT

W =  KLF

P =  K

SEE  
ENERCALC  
OUTPUT



ANALYSIS:

R<sub>MAX</sub> =  K

V<sub>D</sub> =  K < V<sub>ALL</sub> =  K

ADEQUATE

M<sub>MAX</sub> =  K-FT

< M<sub>ALL</sub> =  K-FT

ADEQUATE

Δ<sub>TL</sub> =  IN.

L /  < L/240

ADEQUATE

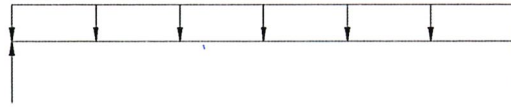
### BEAM & HEADER CALCULATIONS

BEAM DESCRIPTION: UPPER FLR FRM6 - FWSH BM @ GARAGE (PARA. TO FRM6)

B18

PARAMETERS:

L =  FT  
W =  KLF  
P =  K



ANALYSIS:

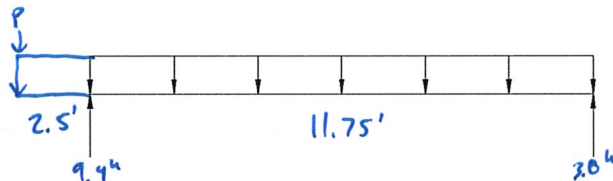
$R_{MAX} =$  K  $V_D =$  K  $< V_{ALL} =$  K  ADEQUATE  
 $M_{MAX} =$  K-FT  $< M_{ALL} =$  K-FT  ADEQUATE  
 $\Delta_{TL} =$  IN.  $L/$   $< L/240$   ADEQUATE

BEAM DESCRIPTION: UPPER FLR FRM6 - CANT'D FWSH BM @ GARAGE (PERP. TO FRM6)

B19

PARAMETERS:

L =  FT  
W =  KLF  
P =  K



ANALYSIS:

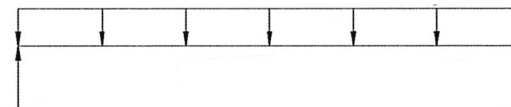
$R_{MAX} =$  K  $V_D =$  K  $< V_{ALL} =$  K  ADEQUATE  
 $M_{MAX} =$  K-FT  $< M_{ALL} =$  K-FT  ADEQUATE  
 $\Delta_{TL} =$  IN.  $L/$   $< L/240$   ADEQUATE

BEAM DESCRIPTION: UPPER FLR FRM6 - HDR @ GARAGE

B20

PARAMETERS:

L =  FT  
W =  KLF  
P =  K



ANALYSIS:

$R_{MAX} =$  K  $V_D =$  K  $< V_{ALL} =$  K  ADEQUATE  
 $M_{MAX} =$  K-FT  $< M_{ALL} =$  K-FT  ADEQUATE  
 $\Delta_{TL} =$  IN.  $L/$   $< L/240$   ADEQUATE





**BEAM & HEADER CALCULATIONS**

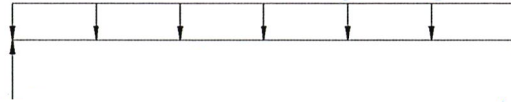
BEAM DESCRIPTION: UPPER FLR FRM G- TYP. FLUSH BOT. @ FRONT PORCH (WORST CASE LOAD) (B21)

PARAMETERS:

L =  FT

W =  KLF

P =  K



ANALYSIS:

$R_{MAX} =$  K  $V_D =$  K  $< V_{ALL} =$  K  ADEQUATE

$M_{MAX} =$  K-FT  $< M_{ALL} =$  K-FT  ADEQUATE

$\Delta_{TL} =$  IN.  $L/$   $< L/240$   ADEQUATE

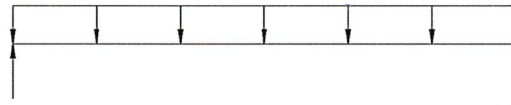
BEAM DESCRIPTION: UPPER FLR FRM G- TYP. FLUSH BOT. @ FRONT PORCH (WORST CASE LENGTH) (B21)

PARAMETERS:

L =  FT

W =  KLF

P =  K



ANALYSIS:

$R_{MAX} =$  K  $V_D =$  K  $< V_{ALL} =$  K  ADEQUATE

$M_{MAX} =$  K-FT  $< M_{ALL} =$  K-FT  ADEQUATE

$\Delta_{TL} =$  IN.  $L/$   $< L/240$   ADEQUATE

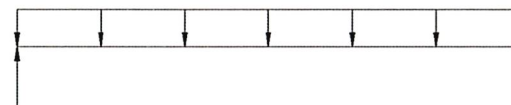
BEAM DESCRIPTION: MAIN FLR FRM G- TYP. DROPPED BM (WORST CASE) (B22)

PARAMETERS:

L =  FT

W =  KLF

P =  K



ANALYSIS:

$R_{MAX} =$  K  $V_D =$  K  $< V_{ALL} =$  K  ADEQUATE

$M_{MAX} =$  K-FT  $< M_{ALL} =$  K-FT  ADEQUATE

$\Delta_{TL} =$  IN.  $L/$   $< L/240$   ADEQUATE

**BEAM & HEADER CALCULATIONS**

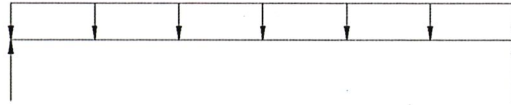
**BEAM DESCRIPTION:** MAIN FLR FRM - FLUSH BM @ B.W.A. (WORST CASE) B23

**PARAMETERS:**

L = 5 FT

W = 1.1 KLF

P = - K



**ANALYSIS:**

R<sub>MAX</sub> = 2.8 K

V<sub>D</sub> = - K

< V<sub>ALL</sub> = 7.9 K

ADEQUATE

M<sub>MAX</sub> = 3.4 K-FT

< M<sub>ALL</sub> = 17.9 K-FT

ADEQUATE

Δ<sub>TL</sub> = 0.02 IN.

L/999+ < L/240

ADEQUATE

(2) 1 3/4"x11 7/8" LVL

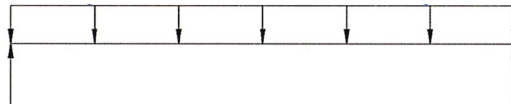
**BEAM DESCRIPTION:** UPPER FLR FRM - HDR @ FOYER / COVERED PORCH B24

**PARAMETERS:**

L = 9.75 FT

W = 0.18 KLF

P = - K



**ANALYSIS:**

R<sub>MAX</sub> = 0.88 K

V<sub>D</sub> = - K

< V<sub>ALL</sub> = 4.5 K

ADEQUATE

M<sub>MAX</sub> = 2.1 K-FT

< M<sub>ALL</sub> = 5.2 K-FT

ADEQUATE

Δ<sub>TL</sub> = 0.1 IN.

L/999+ < L/240

ADEQUATE

4x10 DF #2

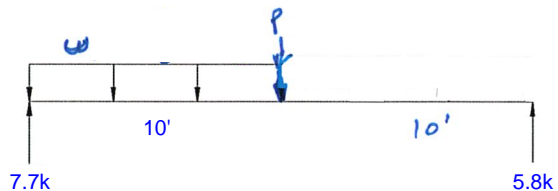
**BEAM DESCRIPTION:** UPPER FLR FRM - DROPPED BM @ GARAGE B25

**PARAMETERS:**

L = 20 FT

W = 0.4 KLF

P = 9.4 K



**ANALYSIS:**

R<sub>MAX</sub> = 7.7 K

V<sub>D</sub> = - K

< V<sub>ALL</sub> = 21.8 K

ADEQUATE

M<sub>MAX</sub> = 56.7 K-FT

< M<sub>ALL</sub> = 76.2 K-FT

ADEQUATE

Δ<sub>TL</sub> = 0.56 IN.

L/428 < L/240

ADEQUATE

5 1/2" x 1 1/2" GLB



Beam & Header Calculations

Beam Description: UPPER FLR FRMG - HDR @ NOOK

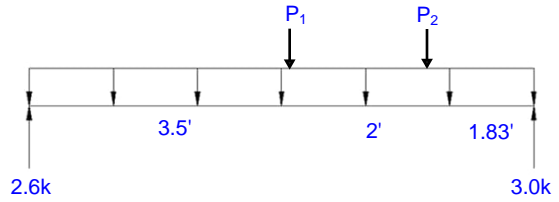
B26

Parameters:

L =  ft

W =  kl f

P<sub>1</sub> =  k, P<sub>2</sub> = 1.0k



Analysis:

R<sub>max</sub> =  K      V<sub>d</sub> =  K < V<sub>all</sub> =  K       Adequate

M<sub>max</sub> =  k-ft < M<sub>all</sub> =  k-ft       Adequate

Δ<sub>tl</sub> =  in.      L/  < L/240       Adequate

6x12 DF #2

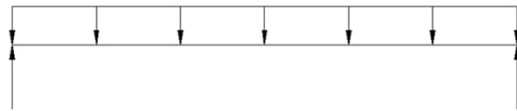
Beam Description:

Parameters:

L =  ft

W =  kl f

P =  k



Analysis:

R<sub>max</sub> =  K      V<sub>d</sub> =  K < V<sub>all</sub> =  K       Adequate

M<sub>max</sub> =  k-ft < M<sub>all</sub> =  k-ft       Adequate

Δ<sub>tl</sub> =  in.      L/  < L/240       Adequate

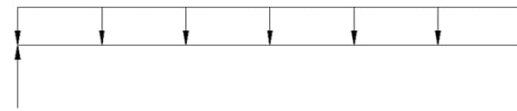
Beam Description:

Parameters:

L =  ft

W =  kl f

P =  k



Analysis:

R<sub>max</sub> =  K      V<sub>d</sub> =  K < V<sub>all</sub> =  K       Adequate

M<sub>max</sub> =  k-ft < M<sub>all</sub> =  k-ft       Adequate

Δ<sub>tl</sub> =  in.      L/  < L/240       Adequate

# Wood Beam

Project File: 4216 83rd Ave SE.ec6

LIC# : KW-06017913, Build:20.23.08.01

MULHERN & KULP STRUCTURAL ENGINEERING INC

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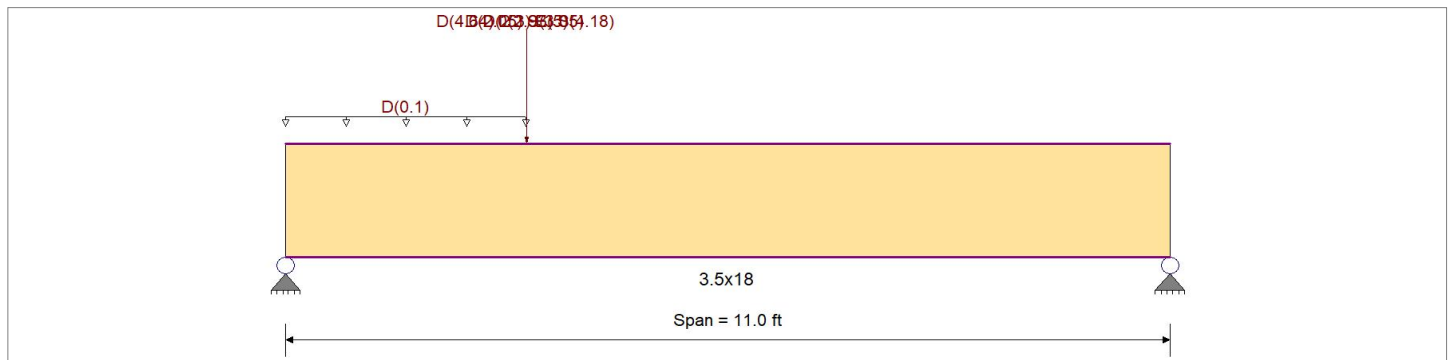
## DESCRIPTION: B15

### CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16  
Load Combination Set : ASCE 7-16

### Material Properties

Analysis Method : Allowable Stress Design	Fb +	2,880.0 psi	E : Modulus of Elasticity
Load Combination : ASCE 7-16	Fb -	2,220.0 psi	Ebend- xx
	Fc - Prll	1,980.0 psi	Eminbend - xx
Wood Species : DF/DF	Fc - Perp	780.0 psi	Ebend- yy
Wood Grade : 24F - V4	Fv	318.0 psi	Eminbend - yy
	Ft	1,320.0 psi	Density
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling			31.210pcf



### Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading  
Load for Span Number 1  
Uniform Load : D = 0.10 k/ft, Extent = 0.0 --> 3.0 ft, Tributary Width = 1.0 ft, (wall)  
Point Load : D = 2.050, S = 3.050 k @ 3.0 ft, (g.t.)  
Point Load : D = 4.640, L = 2.930, S = 4.180 k @ 3.0 ft, (B14)  
Point Load : D = 2.30, E = 5.0 k @ 3.0 ft, (OS)

### DESIGN SUMMARY

**Design OK**

<b>Maximum Bending Stress Ratio</b>	=	<b>0.703</b> : 1	<b>Maximum Shear Stress Ratio</b>	=	<b>0.797</b> : 1
Section used for this span		<b>3.5x18</b>	Section used for this span		<b>3.5x18</b>
fb: Actual	=	2,328.98psi	fv: Actual	=	291.56 psi
F'b	=	3,312.00psi	F'v	=	365.70 psi
Load Combination		+D+0.750L+0.750S+H	Load Combination		+D+0.750L+0.750S+H
Location of maximum on span	=	3.011ft	Location of maximum on span	=	0.000ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1
<b>Maximum Deflection</b>					
Max Downward Transient Deflection		0.085 in Ratio = 1549 >=360	Span: 1 : S Only		
Max Upward Transient Deflection		-0.059 in Ratio = 2240 >=360	Span: 1 : E Only * -1.0		
Max Downward Total Deflection		0.230 in Ratio = 574 >=300	Span: 1 : +D+0.750L+0.750S+0.5250E+H		
Max Upward Total Deflection		0 in Ratio = 0 <300	n/a		

### Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios										Moment Values			Shear Values				
			M	V	CD	CM	C <sub>t</sub>	CLx	C <sub>v</sub>	C <sub>fu</sub>	C <sub>i</sub>	C <sub>r</sub>	M	fb	F'b	V	fv	F'v		
+D+H	Length = 11.0 ft	1	0.492	0.558	0.90	1.00	1.00	1.00	1.000	1.00	1.00	1.00	20.08	1,274.8	2,592.0	0.0	0.00	0.0	0.0	286.2
+D+L+H	Length = 11.0 ft	1	0.583	0.661	1.00	1.00	1.00	1.00	1.000	1.00	1.00	1.00	26.46	1,680.2	2,880.0	0.0	0.00	0.0	0.0	318.0
+D+Lr+H	Length = 11.0 ft	1	0.354	0.402	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	20.08	1,274.8	3,600.0	0.0	0.00	0.0	0.0	397.5
+D+S+H	Length = 11.0 ft	1				1.00	1.00	1.00	1.000	1.00	1.00	1.00				0.0	0.00	0.0	0.0	

# Wood Beam

Project File: 4216 83rd Ave SE.ec6

LIC# : KW-06017913, Build:20.23.08.01

MULHERN & KULP STRUCTURAL ENGINEERING INC

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## DESCRIPTION: B15

### Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios									Moment Values			Shear Values		
			M	V	CD	CM	C <sub>t</sub>	CLx	C <sub>v</sub>	C <sub>fu</sub>	C <sub>i</sub>	C <sub>r</sub>	M	fb	F'b	V	fv
Length = 11.0 ft	1	0.687	0.779	1.15	1.00	1.00	1.00	1.000	1.00	1.00	1.00	35.83	2,275.0	3,312.0	11.96	284.8	365.7
+D+0.750Lr+0.750L+H								1.00	1.00	1.00	1.000	1.00		0.0	0.00	0.0	0.0
Length = 11.0 ft	1	0.439	0.497	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	24.87	1,578.8	3,600.0	8.30	197.7	397.5
+D+0.750L+0.750S+H								1.00	1.00	1.00	1.000	1.00		0.0	0.00	0.0	0.0
Length = 11.0 ft	1	0.703	0.797	1.15	1.00	1.00	1.00	1.000	1.00	1.00	1.00	36.68	2,329.0	3,312.0	12.25	291.6	365.7
+D+0.60W+H								1.00	1.00	1.00	1.000	1.00		0.0	0.00	0.0	0.0
Length = 11.0 ft	1	0.277	0.314	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	20.08	1,274.8	4,608.0	6.70	159.6	508.8
+D-0.60W+H								1.00	1.00	1.00	1.000	1.00		0.0	0.00	0.0	0.0
Length = 11.0 ft	1	0.277	0.314	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	20.08	1,274.8	4,608.0	6.70	159.6	508.8
+D+0.750Lr+0.750L+0.450W+								1.00	1.00	1.00	1.000	1.00		0.0	0.00	0.0	0.0
Length = 11.0 ft	1	0.343	0.388	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	24.87	1,578.8	4,608.0	8.30	197.7	508.8
+D+0.750Lr+0.750L-0.450W+I								1.00	1.00	1.00	1.000	1.00		0.0	0.00	0.0	0.0
Length = 11.0 ft	1	0.343	0.388	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	24.87	1,578.8	4,608.0	8.30	197.7	508.8
+D+0.750L+0.750S+0.450W+I								1.00	1.00	1.00	1.000	1.00		0.0	0.00	0.0	0.0
Length = 11.0 ft	1	0.505	0.573	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	36.68	2,329.0	4,608.0	12.25	291.6	508.8
+D+0.750L+0.750S-0.450W+I								1.00	1.00	1.00	1.000	1.00		0.0	0.00	0.0	0.0
Length = 11.0 ft	1	0.505	0.573	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	36.68	2,329.0	4,608.0	12.25	291.6	508.8
+0.60D+0.60W+0.60H								1.00	1.00	1.00	1.000	1.00		0.0	0.00	0.0	0.0
Length = 11.0 ft	1	0.166	0.188	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	12.05	764.9	4,608.0	4.02	95.8	508.8
+0.60D-0.60W+0.60H								1.00	1.00	1.00	1.000	1.00		0.0	0.00	0.0	0.0
Length = 11.0 ft	1	0.166	0.188	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	12.05	764.9	4,608.0	4.02	95.8	508.8
+D+0.70E+0.60H								1.00	1.00	1.00	1.000	1.00		0.0	0.00	0.0	0.0
Length = 11.0 ft	1	0.382	0.433	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	27.70	1,759.0	4,608.0	9.25	220.2	508.8
+D-0.70E+0.60H								1.00	1.00	1.00	1.000	1.00		0.0	0.00	0.0	0.0
Length = 11.0 ft	1	0.172	0.195	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	12.45	790.7	4,608.0	4.16	99.0	508.8
+D+0.750L+0.750S+0.5250E+								1.00	1.00	1.00	1.000	1.00		0.0	0.00	0.0	0.0
Length = 11.0 ft	1	0.584	0.662	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	42.40	2,692.1	4,608.0	14.15	337.0	508.8
+D+0.750L+0.750S-0.5250E+I								1.00	1.00	1.00	1.000	1.00		0.0	0.00	0.0	0.0
Length = 11.0 ft	1	0.427	0.484	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	30.96	1,965.8	4,608.0	10.34	246.1	508.8
+0.60D+0.70E+H								1.00	1.00	1.00	1.000	1.00		0.0	0.00	0.0	0.0
Length = 11.0 ft	1	0.271	0.307	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	19.67	1,249.1	4,608.0	6.57	156.4	508.8
+0.60D-0.70E+H								1.00	1.00	1.00	1.000	1.00		0.0	0.00	0.0	0.0
Length = 11.0 ft	1	0.061	0.069	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	4.42	280.7	4,608.0	1.48	35.2	508.8

### Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+0.750L+0.750S+0.5250E+H	1	0.2300	4.898		0.0000	0.000

### Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	14.323	5.362
Max Upward from Load Combinations	14.323	5.362
Max Upward from Load Cases	6.872	2.568
Max Downward from all Load Conditio	-3.636	-1.364
Max Downward from Load Cases (Resis	-3.636	-1.364
+D+H	6.872	2.568
+D+L+H	9.003	3.367
+D+Lr+H	6.872	2.568
+D+S+H	12.131	4.540
+D+0.750Lr+0.750L+H	8.471	3.167
+D+0.750L+0.750S+H	12.414	4.646

**Wood Beam**

Project File: 4216 83rd Ave SE.ec6

LIC# : KW-06017913, Build:20.23.08.01

MULHERN &amp; KULP STRUCTURAL ENGINEERING INC

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**DESCRIPTION: B15****Vertical Reactions**

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
+D+0.60W+H	6.872	2.568
+D-0.60W+H	6.872	2.568
+D+0.750Lr+0.750L+0.450W+H	8.471	3.167
+D+0.750Lr+0.750L-0.450W+H	8.471	3.167
+D+0.750L+0.750S+0.450W+H	12.414	4.646
+D+0.750L+0.750S-0.450W+H	12.414	4.646
+0.60D+0.60W+0.60H	4.123	1.541
+0.60D-0.60W+0.60H	4.123	1.541
+D+0.70E+0.60H	9.418	3.522
+D-0.70E+0.60H	4.327	1.613
+D+0.750L+0.750S+0.5250E+H	14.323	5.362
+D+0.750L+0.750S-0.5250E+H	10.505	3.930
+0.60D+0.70E+H	6.669	2.495
+0.60D-0.70E+H	1.578	0.586
D Only	6.872	2.568
L Only	2.131	0.799
S Only	5.258	1.972
E Only	3.636	1.364
E Only * -1.0	-3.636	-1.364
H Only		

# Wood Beam

Project File: 4216 83rd Ave SE.ec6

LIC# : KW-06017913, Build:20.23.08.01

MULHERN & KULP STRUCTURAL ENGINEERING INC

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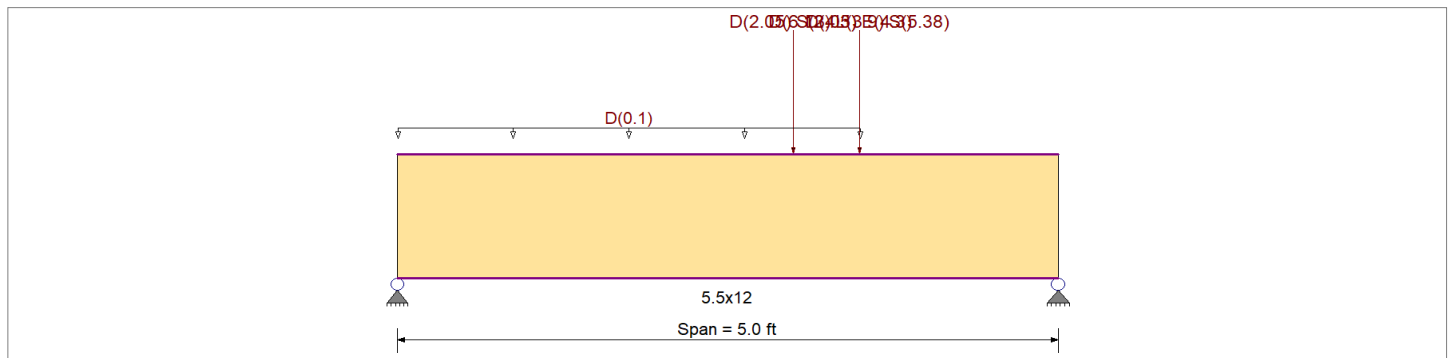
## DESCRIPTION: B17

### CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16  
Load Combination Set : ASCE 7-16

### Material Properties

Analysis Method : Allowable Stress Design	Fb +	2,880.0 psi	E : Modulus of Elasticity	
Load Combination : ASCE 7-16	Fb -	2,220.0 psi	Ebend- xx	1,800.0ksi
	Fc - Prll	1,980.0 psi	Eminbend - xx	950.0ksi
Wood Species : DF/DF	Fc - Perp	780.0 psi	Ebend- yy	1,600.0ksi
Wood Grade : 24F - V4	Fv	318.0 psi	Eminbend - yy	850.0ksi
	Ft	1,320.0 psi	Density	31.210pcf
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling				



### Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading  
Load for Span Number 1  
Uniform Load : D = 0.10 k/ft, Extent = 0.0 -->> 3.50 ft, Tributary Width = 1.0 ft, (wall)  
Point Load : D = 2.050, S = 3.050 k @ 3.0 ft, (g.t.)  
Point Load : D = 6.120, L = 3.90, S = 5.380 k @ 3.50 ft, (B16)  
Point Load : D = 4.30, E = 4.30 k @ 3.50 ft, (OS)

### DESIGN SUMMARY

Design OK

<b>Maximum Bending Stress Ratio</b>	=	<b>0.613</b> : 1	<b>Maximum Shear Stress Ratio</b>	=	<b>0.927</b> : 1
Section used for this span		<b>5.5x12</b>	Section used for this span		<b>5.5x12</b>
fb: Actual	=	2,030.72psi	fv: Actual	=	338.92 psi
F'b	=	3,312.00psi	F'v	=	365.70 psi
Load Combination		+D+0.750L+0.750S+H	Load Combination		+D+0.750L+0.750S+H
Location of maximum on span	=	3.485ft	Location of maximum on span	=	4.015 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1
<b>Maximum Deflection</b>					
Max Downward Transient Deflection		0.023 in Ratio = 2625 >=240	Span: 1 : S Only		
Max Upward Transient Deflection		-0.011 in Ratio = 5485 >=240	Span: 1 : E Only * -1.0		
Max Downward Total Deflection		0.064 in Ratio = 939 >=180	Span: 1 : +D+0.750L+0.750S+0.5250E+H		
Max Upward Total Deflection		0 in Ratio = 0 <180	n/a		

### Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios										Moment Values			Shear Values			
			M	V	CD	CM	C <sub>t</sub>	CLx	C <sub>v</sub>	C <sub>fu</sub>	C <sub>i</sub>	C <sub>r</sub>	M	fb	F'b	V	fv	F'v	
+D+H	Length = 5.0 ft	1	0.455	0.688	0.90	1.00	1.00	1.00	1.000	1.00	1.00	1.00	12.98	1,180.1	2,592.0	0.0	0.00	0.0	286.2
+D+L+H	Length = 5.0 ft	1	0.539	0.815	1.00	1.00	1.00	1.00	1.000	1.00	1.00	1.00	17.06	1,551.0	2,880.0	0.0	0.00	0.0	0.0
+D+Lr+H	Length = 5.0 ft	1	0.328	0.496	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	12.98	1,180.1	3,600.0	0.0	0.00	0.0	397.5
+D+S+H						1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0	

# Wood Beam

Project File: 4216 83rd Ave SE.ec6

LIC# : KW-06017913, Build:20.23.08.01

MULHERN & KULP STRUCTURAL ENGINEERING INC

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## DESCRIPTION: B17

### Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios									Moment Values			Shear Values		
			M	V	CD	CM	C <sub>t</sub>	CLx	C <sub>y</sub>	C <sub>fu</sub>	C <sub>i</sub>	C <sub>r</sub>	M	fb	F'b	V	fv
Length = 5.0 ft	1	0.587	0.886	1.15	1.00	1.00	1.00	1.000	1.00	1.00	1.00	21.38	1,943.5	3,312.0	14.26	324.2	365.7
+D+0.750Lr+0.750L+H								1.00	1.00	1.00	1.000			0.0	0.00	0.0	0.0
Length = 5.0 ft	1	0.405	0.613	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	16.04	1,458.2	3,600.0	10.72	243.5	397.5
+D+0.750L+0.750S+H								1.00	1.00	1.00	1.000			0.0	0.00	0.0	0.0
Length = 5.0 ft	1	0.613	0.927	1.15	1.00	1.00	1.00	1.000	1.00	1.00	1.00	22.34	2,030.7	3,312.0	14.91	338.9	365.7
+D+0.60W+H								1.00	1.00	1.00	1.000			0.0	0.00	0.0	0.0
Length = 5.0 ft	1	0.256	0.387	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	12.98	1,180.1	4,608.0	8.67	197.0	508.8
+D-0.60W+H								1.00	1.00	1.00	1.000			0.0	0.00	0.0	0.0
Length = 5.0 ft	1	0.256	0.387	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	12.98	1,180.1	4,608.0	8.67	197.0	508.8
+D+0.750Lr+0.750L+0.450W+								1.00	1.00	1.00	1.000			0.0	0.00	0.0	0.0
Length = 5.0 ft	1	0.316	0.479	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	16.04	1,458.2	4,608.0	10.72	243.5	508.8
+D+0.750Lr+0.750L-0.450W+I								1.00	1.00	1.00	1.000			0.0	0.00	0.0	0.0
Length = 5.0 ft	1	0.316	0.479	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	16.04	1,458.2	4,608.0	10.72	243.5	508.8
+D+0.750L+0.750S+0.450W+I								1.00	1.00	1.00	1.000			0.0	0.00	0.0	0.0
Length = 5.0 ft	1	0.441	0.666	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	22.34	2,030.7	4,608.0	14.91	338.9	508.8
+D+0.750L+0.750S-0.450W+I								1.00	1.00	1.00	1.000			0.0	0.00	0.0	0.0
Length = 5.0 ft	1	0.441	0.666	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	22.34	2,030.7	4,608.0	14.91	338.9	508.8
+0.60D+0.60W+0.60H								1.00	1.00	1.00	1.000			0.0	0.00	0.0	0.0
Length = 5.0 ft	1	0.154	0.232	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	7.79	708.1	4,608.0	5.20	118.2	508.8
+0.60D-0.60W+0.60H								1.00	1.00	1.00	1.000			0.0	0.00	0.0	0.0
Length = 5.0 ft	1	0.154	0.232	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	7.79	708.1	4,608.0	5.20	118.2	508.8
+D+0.70E+0.60H								1.00	1.00	1.00	1.000			0.0	0.00	0.0	0.0
Length = 5.0 ft	1	0.318	0.481	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	16.13	1,466.3	4,608.0	10.78	244.9	508.8
+D-0.70E+0.60H								1.00	1.00	1.00	1.000			0.0	0.00	0.0	0.0
Length = 5.0 ft	1	0.194	0.293	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	9.83	894.0	4,608.0	6.56	149.1	508.8
+D+0.750L+0.750S+0.5250E+								1.00	1.00	1.00	1.000			0.0	0.00	0.0	0.0
Length = 5.0 ft	1	0.487	0.737	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	24.70	2,245.3	4,608.0	16.49	374.8	508.8
+D+0.750L+0.750S-0.5250E+I								1.00	1.00	1.00	1.000			0.0	0.00	0.0	0.0
Length = 5.0 ft	1	0.394	0.596	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	19.98	1,816.1	4,608.0	13.33	303.0	508.8
+0.60D+0.70E+H								1.00	1.00	1.00	1.000			0.0	0.00	0.0	0.0
Length = 5.0 ft	1	0.216	0.326	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	10.94	994.4	4,608.0	7.31	166.1	508.8
+0.60D-0.70E+H								1.00	1.00	1.00	1.000			0.0	0.00	0.0	0.0
Length = 5.0 ft	1	0.092	0.138	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	4.64	422.0	4,608.0	3.09	70.3	508.8

### Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+0.750L+0.750S+0.5250E+H	1	0.0639	2.737		0.0000	0.000

### Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	7.890	16.507
Max Upward from Load Combinations	7.890	16.507
Max Upward from Load Cases	4.209	8.682
Max Downward from all Load Conditions	-1.290	-3.010
Max Downward from Load Cases (Resis)	-1.290	-3.010
+D+H	4.209	8.682
+D+L+H	5.379	11.412
+D+Lr+H	4.209	8.682
+D+S+H	7.043	14.278
+D+0.750Lr+0.750L+H	5.087	10.730
+D+0.750L+0.750S+H	7.212	14.927



**Wood Beam**

Project File: 4216 83rd Ave SE.ec6

LIC# : KW-06017913, Build:20.23.08.01

MULHERN &amp; KULP STRUCTURAL ENGINEERING INC

(c) ENERCALC INC 1983-2023

**DESCRIPTION: B17****Vertical Reactions**

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
+D+0.60W+H	4.209	8.682
+D-0.60W+H	4.209	8.682
+D+0.750Lr+0.750L+0.450W+H	5.087	10.730
+D+0.750Lr+0.750L-0.450W+H	5.087	10.730
+D+0.750L+0.750S+0.450W+H	7.212	14.927
+D+0.750L+0.750S-0.450W+H	7.212	14.927
+0.60D+0.60W+0.60H	2.526	5.209
+0.60D-0.60W+0.60H	2.526	5.209
+D+0.70E+0.60H	5.112	10.789
+D-0.70E+0.60H	3.306	6.575
+D+0.750L+0.750S+0.5250E+H	7.890	16.507
+D+0.750L+0.750S-0.5250E+H	6.535	13.347
+0.60D+0.70E+H	3.429	7.316
+0.60D-0.70E+H	1.623	3.102
D Only	4.209	8.682
L Only	1.170	2.730
S Only	2.834	5.596
E Only	1.290	3.010
E Only * -1.0	-1.290	-3.010
H Only		



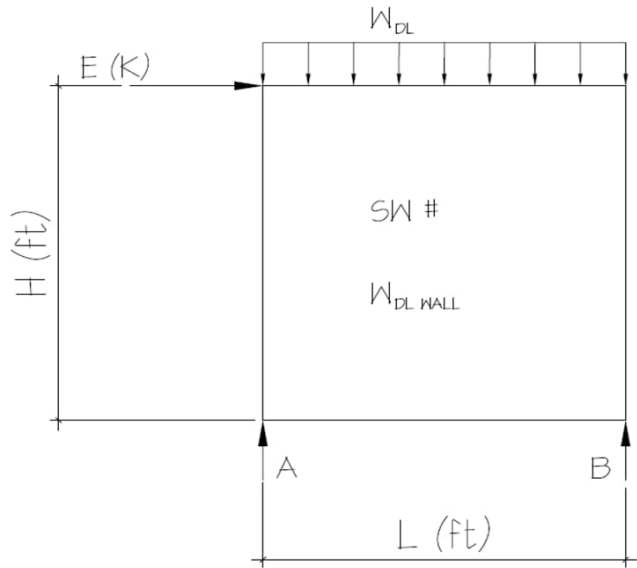
### Overstrength Calculations

Wall Description/SW #:

201

Parameters:

L = 20.1 ft  
 H = 9.1 ft  
 E = 2.10 k  
 W<sub>DLWall</sub> = 0.10 kl f  
 W<sub>DL</sub> = 0.332 kl f  
 Ω<sub>0</sub> = 2.5 (ASCE TABLE 12.2.1 FOOTNOTE)  
 SDS = 1.137



analysis:

E (unfactored) = 3.00  
 E<sub>mh</sub> = Ω<sub>0</sub> \* E = 7.50 K      E<sub>v</sub> = 0.2 \* SDS \* DL = 1.975 K  
 E<sub>m</sub> = E<sub>mh</sub> + E<sub>v</sub> = 9.475 K  
 E<sub>m</sub> = E<sub>mh</sub> - E<sub>v</sub> = 5.525 K

E<sub>m</sub> (max) = ΣM<sub>A</sub> = 0 = 9.47(9.1) + 0.432(20.1)(10.05) - R<sub>b</sub>(20.1)      R<sub>B</sub> = 4.3DL + 4.3E  
 Ra = 4.3DL - 4.3E

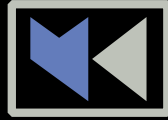
E<sub>m</sub> (min) = ΣM<sub>A</sub> = 0 = 5.53(9.1) + 0.432(20.1)(10.05) - R<sub>b</sub>(20.1)      R<sub>B</sub> = 4.3DL + 2.5E  
 Ra = 4.3DL - 2.5E

check beams for axial forces shown using load combos per section 12.4.3.1 (asd)

allowable stress permitted to be increased by 1.2

see following beam calcs for load application





**MULHERN+KULP**  
RESIDENTIAL STRUCTURAL ENGINEERING

# Shear Wall Calculations - Wind

JayMarc Homes

4216 83rd Ave SE

*Mercer Island, WA*

*Parameters:*

*Single Family Home*

*Design Wind Speed: 100 MPH*

*wind Exposure Category: B*

*Seismic Design Category: D*

*Code & Design Standard: 2018 IBC Ch. 1609, ASCE 7-16 Ch. 26-30*

MULHERN & KULP STRUCTURAL ENGINEERING, INC.

Richard J. Zabel, P.E., Project Manager

Blake F. Durham, Staff Engineer



**WIND DESIGN SUMMARY PER ASCE 7-16**

M+K Project #: 154-24003  
Engineer: BFD

**Parameters:**

Wind Speed	100
Exposure Category	B
Risk Category	II
Wind Directionality Factor, $K_d$	0.85
Topographic Factor, $K_{zt}$	1.30
Gust Factor, $G$	0.85
Ground Elev. Above Sea Level [ft]	0
Design Type	ASD

0.60

**Roof Geometry:**

Trans. Roof Pitch	3.0	:12
Long. Roof Pitch	3.0	:12
Mean Roof Height, H	24.00	ft

**Building Geometry:**

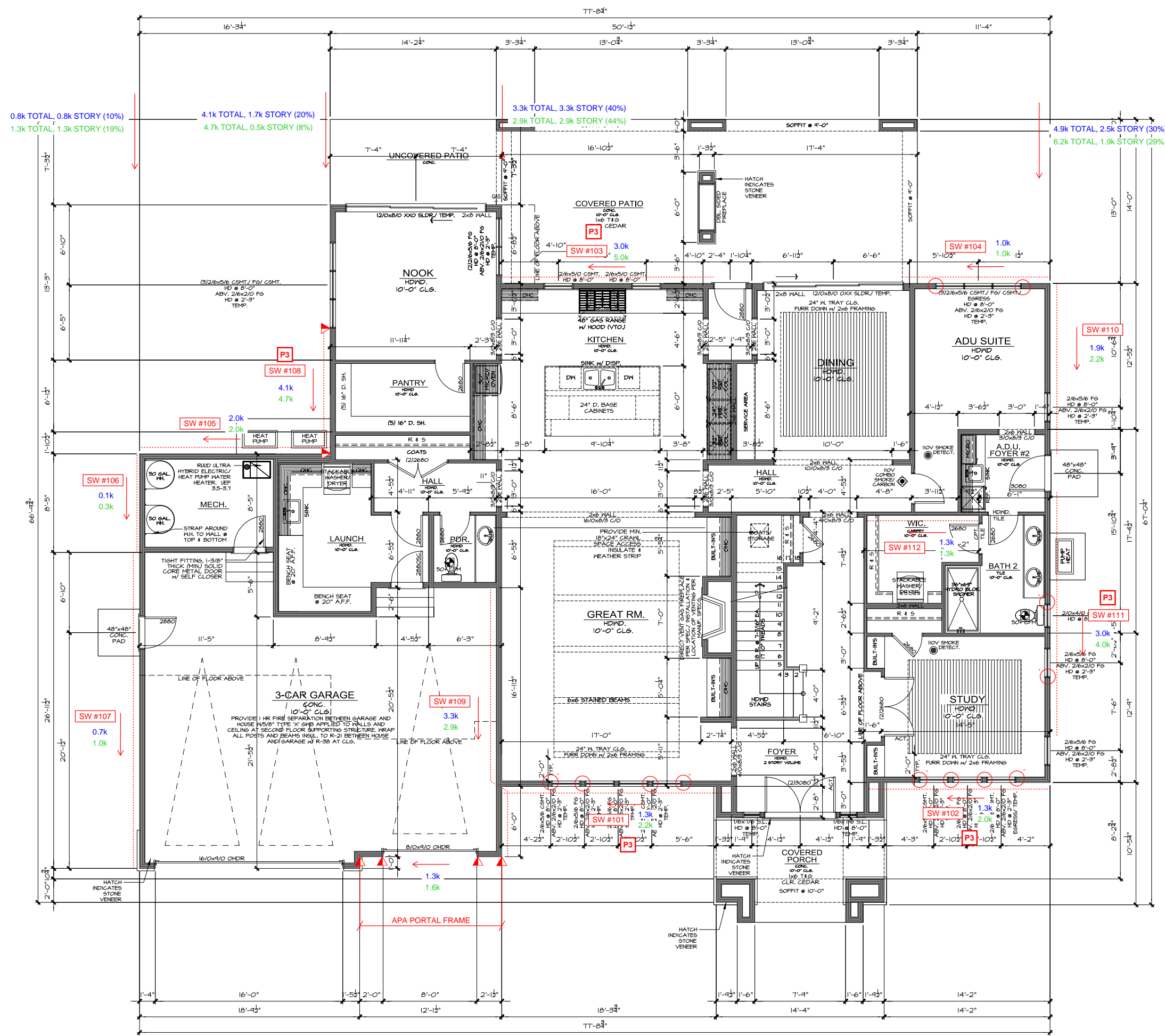
length	78	ft
Width	55	ft
Number of stories	2	

**Transverse Direction (Perpendicular to Main Ridge Line)**

Diaphragm Level	Floor-to-Floor Height	Roof Surface	Tributary Design Areas:			sq ft	Tributary Design Loads: (0.6W)			kips	
			Section A	O	B		Section A	O	B		
2	9.1 ft	Roof Surface	0	183	0	sq ft	Story Shear	0.00	4.75	0.00	kips
		Wall surface	0	325	0	sq ft	Total Shear	0.00	4.75	0.00	kips
1	11.56 ft	Roof Surface	0	194	0	sq ft	Story Shear	0.00	8.35	0.00	kips
		Wall surface	0	655	0	sq ft	Total Shear	0.00	13.10	0.00	kips
FND		Roof Surface	0	0	0	sq ft	Story Shear	0.00	0.00	0.00	kips
		Wall surface	0	0	0	sq ft	Total Shear	0.00	13.10	0.00	kips

**Longitudinal Direction (Parallel to Main Ridge Line)**

Diaphragm Level	Floor-to-Floor Height	Roof Surface	Tributary Design Areas:			sq ft	Tributary Design Loads: (0.6W)			kips	
			Section A	O	B		Section A	O	B		
2	9.1 ft	Roof Surface	0	315	0	sq ft	Story Shear	0.00	4.41	0.00	kips
		Wall surface	0	268	0	sq ft	Total Shear	0.00	4.41	0.00	kips
1	11.56 ft	Roof Surface	0	42	0	sq ft	Story Shear	0.00	6.80	0.00	kips
		Wall surface	0	624	0	sq ft	Total Shear	0.00	11.21	0.00	kips
FND		Roof Surface	0	0	0	sq ft	Story Shear	0.00	0.00	0.00	kips
		Wall surface	0	0	0	sq ft	Total Shear	0.00	11.21	0.00	kips



0.8k TOTAL, 0.8k STORY (10%)  
 1.3k TOTAL, 1.3k STORY (19%)

4.1k TOTAL, 1.7k STORY (20%)  
 4.7k TOTAL, 0.5k STORY (8%)

3.3k TOTAL, 3.3k STORY (40%)  
 2.9k TOTAL, 2.9k STORY (44%)

4.9k TOTAL, 2.5k STORY (30%)  
 6.2k TOTAL, 1.9k STORY (29%)

4.0k TOTAL, 1.8k STORY (26%)  
 6.0k TOTAL, 1.7k STORY (26%)

3.3k TOTAL, 3.3k STORY (49%)  
 3.3k TOTAL, 3.3k STORY (50%)

3.0k TOTAL, 1.7k STORY (25%)  
 5.8k TOTAL, 1.6k STORY (24%)

**JAYMARC HOMES**  
 7525 SE 24th St., 487  
 Mercer Island, WA  
 98040  
 425.266.9100

Issue	Issue Date	By	Description

4216 83rd Ave SE  
 Mercer Island, WA.  
 Job Number:  
**MIS076**

plan name:	-
marketing name:	XXXXXX
plan number:	MIS076
mark sys. number:	-

Conditions not specifically represented graphically or in writing or which conflict with the current International Residential Code (IRC), or those of the local municipality then the current standards and requirements of each respectively shall govern.

The drawings in this set are instruments of service and shall remain the property of JayMarc Homes, LLC.

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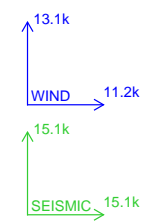
06.15.21  
 Submittal Date

Sheet Title/Description  
**JAYMARC HOMES**  
 Design Firm

R.R.  
 Drawn by:  
 R.R./S.K.  
 Checked by:

Primary Scale

**A5**  
 of .



Sheet Title/Description

**4216 83rd Ave SE  
 Mercer Island, WA.  
 Job Number:  
 MIS076**

plan name:  
 marketing name: XXXXXX  
 plan number: MIS076  
 mark sys. number: -

Conditions not specifically represented graphically or in writing or which conflict with the current International Residential Code (IRC), or those of the local municipality then the current standards and requirements of each respectively shall govern.

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06.15.21  
 Submittal Date

Sheet Title/Description  
 JAYMARC HOMES  
 Design Firm

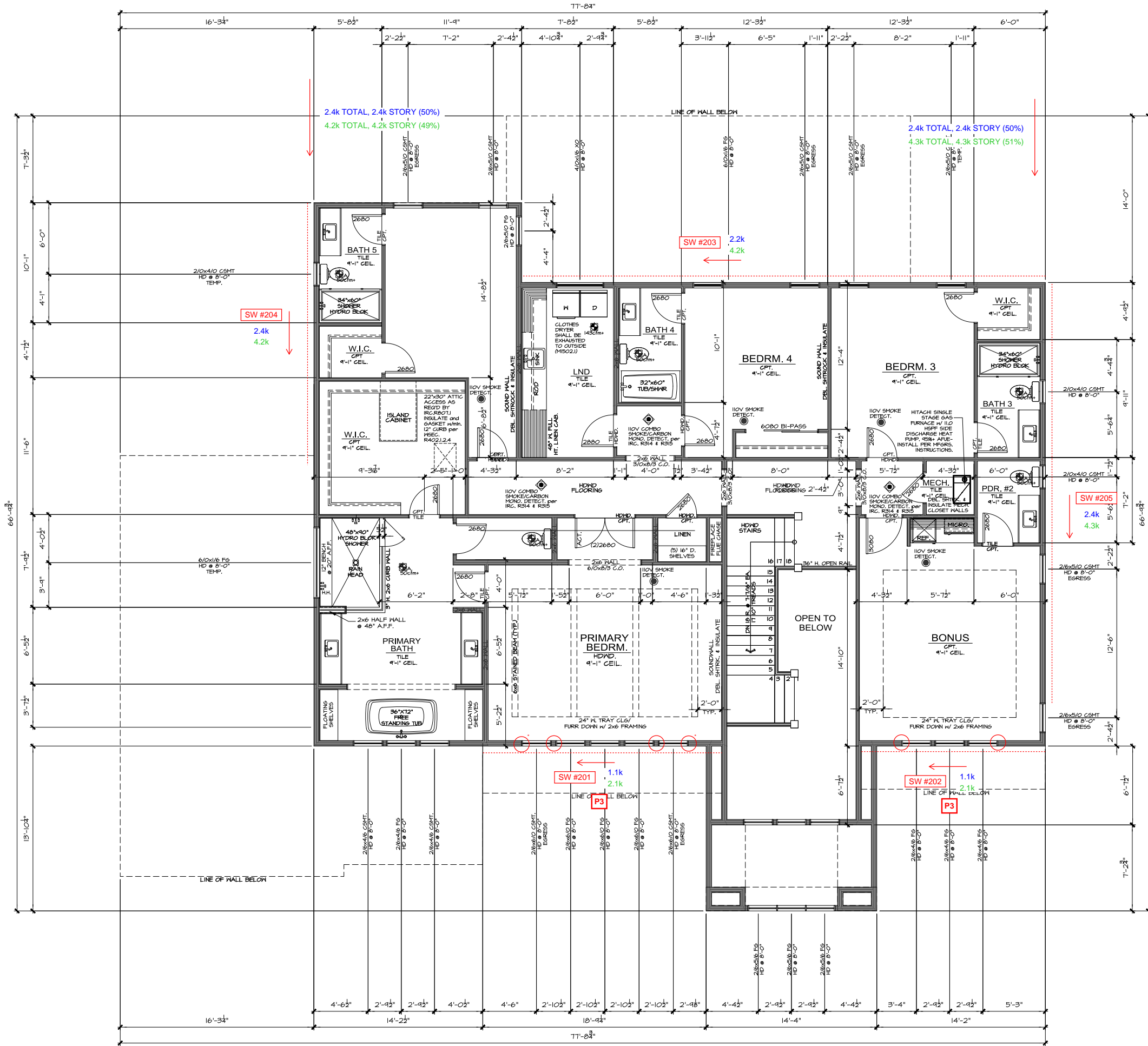
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R.R./S.K.  
 Checked by:

Primary Scale

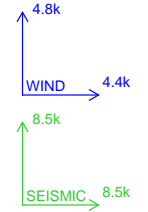
**A7**  
 of .

Sheet Title/Description



2.2k TOTAL, 2.2k STORY (50%)  
 4.3k TOTAL, 4.3k STORY (51%)

2.2k TOTAL, 2.2k STORY (50%)  
 4.2k TOTAL, 4.2k STORY (49%)



2.4k TOTAL, 2.4k STORY (50%)  
 4.2k TOTAL, 4.2k STORY (49%)

2.4k TOTAL, 2.4k STORY (50%)  
 4.3k TOTAL, 4.3k STORY (51%)

SW #203 2.2k  
 4.2k

SW #204 2.4k  
 4.2k

SW #205 2.4k  
 4.3k

SW #201 1.1k  
 2.1k

SW #202 1.1k  
 2.1k



Shearwall Design Summary

M+K Project #: 154-24003

Engineer: BFD

**Shearwall 201:** 2nd - Front Ext. Wall @ Primary Bed

Shearwall Properties:

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
 Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

Capacity Evaluation:

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

Shearwall Assembly Specification

P3 - 1-side 7/16" OSB  
 fastened w/ 8d nails at 3"o.c. panel edges & 12"o.c. panel field - edges blocked  
**ADEQUATE**

Overturning Evaluation:

Resistive DL  plf Overturning Moment  k-ft Hold Down Design Load  lbs  
 DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

Hold-down Specification

**No Hold down Required**

**Shearwall 202:** 2nd - Front Ext. Wall @ Bonus

Shearwall Properties:

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
 Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

Capacity Evaluation:

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

Shearwall Assembly Specification

P3 - 1-side 7/16" OSB  
 fastened w/ 8d nails at 3"o.c. panel edges & 12"o.c. panel field - edges blocked  
**ADEQUATE**

Overturning Evaluation:

Resistive DL  plf Overturning Moment  k-ft Hold Down Design Load  lbs  
 DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

Hold-down Specification

**No Hold down Required**





**Shearwall 203:** 2nd - Rear Ext. Wall @ Laundry/Bed 3/4

**Shearwall Properties:**

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

**Capacity Evaluation:**

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

**Shearwall Assembly Specification**

P1 - 1-side 7/16" OSB  
fastened w/ 8d nails at 6"o.c. panel edges & 12"o.c. panel field - edges blocked  
**ADEQUATE**

**Overturning Evaluation:**

Resistive DL  plf Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

**Hold-down Specification**

**No Hold down Required**

**Shearwall 204:** 2nd - Side Ext. Wall @ Primary Bath/WIC/Bath 5

**Shearwall Properties:**

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

**Capacity Evaluation:**

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

**Shearwall Assembly Specification**

P1 - 1-side 7/16" OSB  
fastened w/ 8d nails at 6"o.c. panel edges & 12"o.c. panel field - edges blocked  
**ADEQUATE**

**Overturning Evaluation:**

Resistive DL  plf Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

**Hold-down Specification**

**No Hold down Required**



**Shearwall 205:** 2nd - Side Ext. Wall @ Bath 3/Bonus

**Shearwall Properties:**

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

**Capacity Evaluation:**

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

**Shearwall Assembly Specification**

P1 - 1-side 7/16" OSB  
fastened w/ 8d nails at 6"o.c. panel edges & 12"o.c. panel field - edges blocked  
**ADEQUATE**

**Overturning Evaluation:**

Resistive DL  pl f Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

**Hold-down Specification**

**No Hold down Required**

**Shearwall :** Basement - Not Used

**Shearwall Properties:**

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

**Capacity Evaluation:**

Total Shear Load on Wall  lbs **####** Allowable Shearwall Capacity  lbs

**Shearwall Assembly Specification**

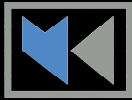
P1 - 1-side 7/16" OSB  
fastened w/ 8d nails at 6"o.c. panel edges & 12"o.c. panel field - edges blocked  
**#DIV/0!**

**Overturning Evaluation:**

Resistive DL  pl f Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

**Hold-down Specification**

**No Hold down Required**



**Shearwall 101:** 1st - Front Ext. Wall @ Great Room

Shearwall Properties:

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

Capacity Evaluation:

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

Shearwall Assembly Specification

P3 - 1-side 7/16" OSB  
fastened w/ 8d nails at 3"o.c. panel edges & 12"o.c. panel field - edges blocked  
**ADEQUATE**

Overturning Evaluation:

Resistive DL  pl f Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

Hold-down Specification

**No Hold down Required**

**Shearwall 102:** 1st - Front Ext. Wall @ Study

Shearwall Properties:

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

Capacity Evaluation:

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

Shearwall Assembly Specification

P3 - 1-side 7/16" OSB  
fastened w/ 8d nails at 3"o.c. panel edges & 12"o.c. panel field - edges blocked  
**ADEQUATE**

Overturning Evaluation:

Resistive DL  pl f Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

Hold-down Specification

**No Hold down Required**



*Shearwall Design Summary*

M+K Project #: 154-24003  
Engineer: BFD

**Shearwall 103:** 1st - Rear Ext. Wall @ Kitchen/Patio

**Shearwall Properties:**

Wall height, H	<input type="text" value="10.0"/> ft.	Max wall opening ht, H <sub>c</sub>	<input type="text" value="5.0"/> ft.	Shearwall Assembly	<input type="text" value="P3"/>
Wall Length, L	<input type="text" value="18.1"/> ft.	Qualifying Wall Length, L	<input type="text" value="13.1"/> ft.		

**Capacity Evaluation:**

Total Shear Load on Wall	<input type="text" value="3000"/> lbs	<	Allowable Shearwall Capacity	<input type="text" value="8243"/> lbs
--------------------------	---------------------------------------	---	------------------------------	---------------------------------------

**Shearwall Assembly Specification**

P3 - 1-side 7/16" OSB  
fastened w/ 8d nails at 3"o.c. panel edges & 12"o.c. panel field - edges blocked  
**ADEQUATE**

**Overturning Evaluation:**

Resistive DL	<input type="text" value="801"/> plf	Overturning Moment	<input type="text" value="30.0"/> k-ft	Hold Down Design Load	<input type="text" value="0"/> lbs
DL at ends of wall	<input type="text" value="400"/> lbs	Resistive Moment	<input type="text" value="124.3"/> k-ft	Hold down Capacity	<input type="text" value="0"/> lbs

**Hold-down Specification**

**No Hold down Required**

**Shearwall 104:** 1st - Rear Ext. Wall @ ADU Suite

**Shearwall Properties:**

Wall height, H	<input type="text" value="10.0"/> ft.	Max wall opening ht, H <sub>c</sub>	<input type="text" value="7.5"/> ft.	Shearwall Assembly	<input type="text" value="P1"/>
Wall Length, L	<input type="text" value="12.5"/> ft.	Qualifying Wall Length, L	<input type="text" value="5.2"/> ft.		

**Capacity Evaluation:**

Total Shear Load on Wall	<input type="text" value="1000"/> lbs	<	Allowable Shearwall Capacity	<input type="text" value="1508"/> lbs
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**Shearwall Assembly Specification**

P1 - 1-side 7/16" OSB  
fastened w/ 8d nails at 6"o.c. panel edges & 12"o.c. panel field - edges blocked  
**ADEQUATE**

**Overturning Evaluation:**

Resistive DL	<input type="text" value="418"/> plf	Overturning Moment	<input type="text" value="10.0"/> k-ft	Hold Down Design Load	<input type="text" value="0"/> lbs
DL at ends of wall	<input type="text" value="800"/> lbs	Resistive Moment	<input type="text" value="38.4"/> k-ft	Hold down Capacity	<input type="text" value="0"/> lbs

**Hold-down Specification**

**No Hold down Required**



*Shearwall Design Summary*

M+K Project #: 154-24003  
Engineer: BFD

**Shearwall 105:** 1st - Rear Ext. Wall @ Mech/Launch

Shearwall Properties:

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

Capacity Evaluation:

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

Shearwall Assembly Specification

P1 - 1-side 7/16" OSB  
fastened w/ 8d nails at 6"o.c. panel edges & 12"o.c. panel field - edges blocked  
**ADEQUATE**

Overturning Evaluation:

Resistive DL  plf Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

Hold-down Specification

**No Hold down Required**

**Shearwall 106:** 1st - Side Ext. Wall @ Mech

Shearwall Properties:

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

Capacity Evaluation:

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

Shearwall Assembly Specification

P1 - 1-side 7/16" OSB  
fastened w/ 8d nails at 6"o.c. panel edges & 12"o.c. panel field - edges blocked  
**ADEQUATE**

Overturning Evaluation:

Resistive DL  plf Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

Hold-down Specification

**No Hold down Required**



**Shearwall 107:** 1st - Side Ext. Wall @ Garage

Shearwall Properties:

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

Capacity Evaluation:

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

Shearwall Assembly Specification

P1 - 1-side 7/16" OSB  
fastened w/ 8d nails at 6"o.c. panel edges & 12"o.c. panel field - edges blocked  
**ADEQUATE**

Overturning Evaluation:

Resistive DL  plf Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

Hold-down Specification

**No Hold down Required**

**Shearwall 108:** 1st - Side Ext. Wall @ Pantry/Nook

Shearwall Properties:

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

Capacity Evaluation:

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

Shearwall Assembly Specification

P3 - 1-side 7/16" OSB  
fastened w/ 8d nails at 3"o.c. panel edges & 12"o.c. panel field - edges blocked  
**ADEQUATE**

Overturning Evaluation:

Resistive DL  plf Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

Hold-down Specification

**SIMPSON STHD14RJ HOLDOWN**



*Shearwall Design Summary*

M+K Project #: 154-24003  
Engineer: BFD

**Shearwall 109:** 1st - Side Ext./Int. Wall @ Garage/Great Room

**Shearwall Properties:**

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

**Capacity Evaluation:**

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

**Shearwall Assembly Specification**

P1 - 1-side 7/16" OSB  
fastened w/ 8d nails at 6"o.c. panel edges & 12"o.c. panel field - edges blocked  
**ADEQUATE**

**Overturning Evaluation:**

Resistive DL  plf Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

**Hold-down Specification**

**No Hold down Required**

**Shearwall 110:** 1st - Side Ext. Wall @ ADU Suite

**Shearwall Properties:**

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

**Capacity Evaluation:**

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

**Shearwall Assembly Specification**

P1 - 1-side 7/16" OSB  
fastened w/ 8d nails at 6"o.c. panel edges & 12"o.c. panel field - edges blocked  
**ADEQUATE**

**Overturning Evaluation:**

Resistive DL  plf Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

**Hold-down Specification**

**No Hold down Required**



**Shearwall 111:** 1st - Side Ext. Wall @ Bath 2/Study

Shearwall Properties:

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

Capacity Evaluation:

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

Shearwall Assembly Specification

P3 - 1-side 7/16" OSB  
fastened w/ 8d nails at 3"o.c. panel edges & 12"o.c. panel field - edges blocked  
**ADEQUATE**

Overturning Evaluation:

Resistive DL  pl f Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

Hold-down Specification

**No Hold down Required**

**Shearwall 112:** 1st - Front Int. Wall @ WIC/ADU Suite

Shearwall Properties:

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

Capacity Evaluation:

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

Shearwall Assembly Specification

P1 - 1-side 7/16" OSB  
fastened w/ 8d nails at 6"o.c. panel edges & 12"o.c. panel field - edges blocked  
**ADEQUATE**

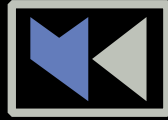
Overturning Evaluation:

Resistive DL  pl f Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

Hold-down Specification

**No Hold down Required**





**MULHERN+KULP**  
RESIDENTIAL STRUCTURAL ENGINEERING

# Shear Wall Calculations - Seismic

JayMarc Homes

4216 83rd Ave SE

*Mercer Island, WA*

*Parameters:*

*Single Family Home*

*Design Wind Speed: 100 MPH*

*wind Exposure Category: B*

*Seismic Design Category: D*

*Code & Design Standard: 2018 IBC Ch. 1609, ASCE 7-16 Ch. 26-30*

MULHERN & KULP STRUCTURAL ENGINEERING, INC.

Richard J. Zabel, P.E., Project Manager

Blake F. Durham, Staff Engineer



**SEISMIC CALCULATION - ASCE 7-16**

M+K Project #: 154-24003  
Engineer: BFD

**Seismic Design Category:**

User Inputs:

Site Class	D
Spectral Response Acceleration 0.2 sec, <b>S<sub>s</sub></b>	1.421
Spectral Response Acceleration 1.0 sec, <b>S<sub>1</sub></b>	0.494
Occupancy Category	II

Variables:

Site coefficient, <b>F<sub>a</sub></b>	1.20
Site coefficient, <b>F<sub>v</sub></b>	1.81

Calculated Values:

Maximum spectral response acceleration, <b>S<sub>ms</sub></b>	1.705
Maximum spectral response acceleration, <b>S<sub>m1</sub></b>	0.892
Design spectral response acceleration, <b>S<sub>ds</sub></b>	1.137
Design spectral response acceleration, <b>S<sub>d1</sub></b>	0.595
Seismic Design Category (short term)	D
Seismic Design Category (1.0 second term)	D

**Building period Determination:**

User Inputs:

Building period coefficient, <b>C<sub>t</sub></b>	0.020
Long-Period Trans Period, <b>T<sub>L</sub></b> (sec)	6
Ht. abv base to highest level, <b>h<sub>n</sub></b>	21

Calculated Values:

Approximate Fundamental Period, <b>T<sub>a</sub></b>	0.194
<b>T<sub>0</sub></b>	0.105
<b>T<sub>s</sub></b>	0.523
Spectral Response Acc., <b>S<sub>s</sub></b> (g)	1.137

**Site Class Assumption**

Yes Per ASCE 7-16 Section 11.4.3 the Site Class may be assumed to be D

**Equivalent lateral force procedure**

Dead Load Calculation:

Level	Story Ht. (ft.)	Area (ft <sup>2</sup> )	Dead Load (psf)	DL of ext wall / trib. to level (kips)	Total Level DL
1	11.6	3850	15	14.6	72 k
2	9.1	2694	17	5.6	51 k
3	0.0	0	0	0.0	0 k
4	0.0	0	0	0.0	0 k
5	0.0	0	0	0.0	0 k
6	0.0	0	0	0.0	0 k
7	0.0	0	0	0.0	0 k
8	0.0	0	0	0.0	0 k
9	0.0	0	0	0.0	0 k
10	0.0	0	0	0.0	0 k
11	0.0	0	0	0.0	0 k
12	0.0	0	0	0.0	0 k
13	0.0	0	0	0.0	0 k
14	0.0	0	0	0.0	0 k
15	0.0	0	0	0.0	0 k

**Total Dead Load Of Structure** = 124 Kips

Seismic Response Coefficient:

	Transverse	Longitudinal
Response modification factor, <b>R</b>	6.5	6.5
Occupancy Importance Factor, <b>I<sub>e</sub></b>	1.00	1.00
Seismic Response Coefficient, <b>C<sub>s</sub></b>	0.175	0.175

Base Shears:

	Ultimate Loads		x 0.7 =	Allowable Loads	
	Transverse	Longitudinal		Transverse	Longitudinal
	22 k	22 k		15.1 k	15.1 k

Story Shear Calculation:

Distribution exponent, **n** = 1.00

Level	Vert. Dist. Factor, <b>C<sub>vt</sub></b>	Ultimate Loads		x 0.7 =	Allowable Loads			
		Transverse Story Shear, <b>F<sub>x</sub></b>	Longitudinal Story Shear, <b>F<sub>x</sub></b>		Transverse Story Shear, <b>F<sub>x</sub></b>	Longitudinal Story Shear, <b>F<sub>x</sub></b>	Transverse Story Shear, <b>F<sub>x</sub></b>	Longitudinal Story Shear, <b>F<sub>x</sub></b>
1	0.441	9.5 k	9.5 k		6.7 k	15.1 k	6.7 k	15.1 k
2	0.559	12.1 k	12.1 k		8.5 k	8.5 k	8.5 k	8.5 k
3	0.000	0.0 k	0.0 k		0.0 k	0.0 k	0.0 k	0.0 k
4	0.000	0.0 k	0.0 k		0.0 k	0.0 k	0.0 k	0.0 k
5	0.00	0.0 k	0.0 k		0.0 k	0.0 k	0.0 k	0.0 k
6	0.00	0.0 k	0.0 k		0.0 k	0.0 k	0.0 k	0.0 k
7	0.00	0.0 k	0.0 k		0.0 k	0.0 k	0.0 k	0.0 k
8	0.00	0.0 k	0.0 k		0.0 k	0.0 k	0.0 k	0.0 k
9	0.00	0.0 k	0.0 k		0.0 k	0.0 k	0.0 k	0.0 k
10	0.00	0.0 k	0.0 k		0.0 k	0.0 k	0.0 k	0.0 k
11	0.00	0.0 k	0.0 k		0.0 k	0.0 k	0.0 k	0.0 k
12	0.00	0.0 k	0.0 k		0.0 k	0.0 k	0.0 k	0.0 k
13	0.00	0.0 k	0.0 k		0.0 k	0.0 k	0.0 k	0.0 k
14	0.00	0.0 k	0.0 k		0.0 k	0.0 k	0.0 k	0.0 k
15	0.00	0.0 k	0.0 k		0.0 k	0.0 k	0.0 k	0.0 k



7525 SE 24th St., 487  
Mercer Island, WA  
98040  
425.266.9100

4216 83rd Ave SE  
Mercer Island, WA.  
Job Number:  
MIS076

Issue Issue Date By  
Description

plan name: -  
marketing name: XXXXXX  
plan number: MIS076  
mark sys. number: -

Conditions not specifically represented graphically or in writing or which conflict with the current International Residential Code (IRC), or those of the local municipality then the current standards and requirements of each respectively shall govern.

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06.15.21  
Submission Date

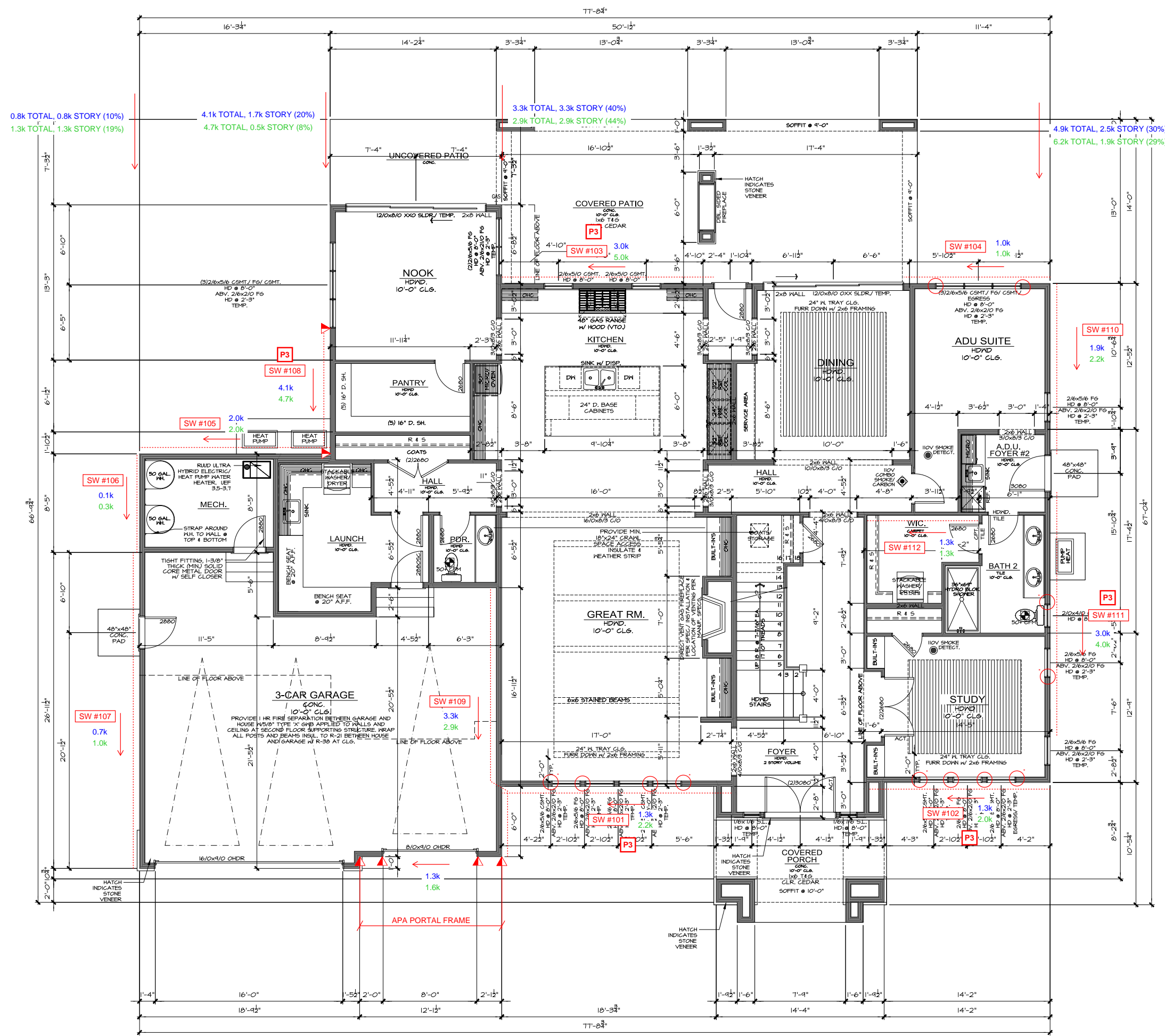
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JAYMARC HOMES  
Design Firm

R.R.  
Drawn by:

R.R./S.K.  
Checked by:

Primary Scale

A5  
of .



4.0k TOTAL, 1.8k STORY (26%)  
6.0k TOTAL, 1.7k STORY (26%)

3.3k TOTAL, 3.3k STORY (49%)  
3.3k TOTAL, 3.3k STORY (50%)

3.9k TOTAL, 1.7k STORY (25%)  
5.8k TOTAL, 1.6k STORY (24%)

13.1k  
WIND 11.2k  
15.1k  
SEISMIC 15.1k

Sheet Title/Description

**4216 83rd Ave SE  
 Mercer Island, WA.  
 Job Number:  
 MIS076**

plan name:  
 marketing name: XXXXXX  
 plan number: MIS076  
 mark sys. number: -

Conditions not specifically represented graphically or in writing or which conflict with the current International Residential Code (IRC), or those of the local municipality then the current standards and requirements of each respectively shall govern.

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06.15.21  
 Submittal Date

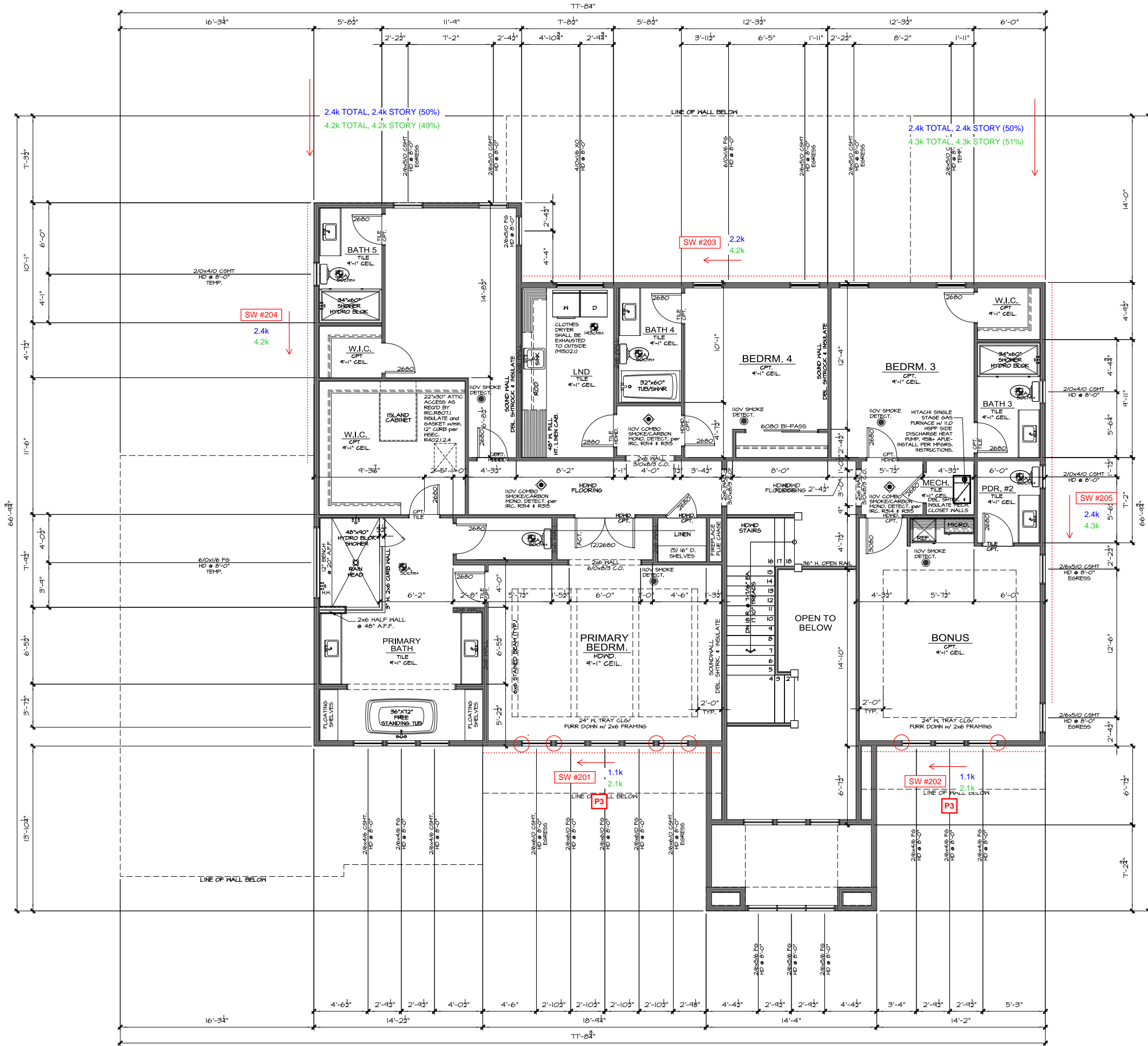
Sheet Title/Description  
 JAYMARC HOMES  
 Design Firm

R.R.  
 Drawn by:

R.R./S.K.  
 Checked by:

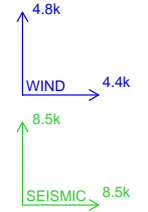
Primary Scale

**A7**  
 of .



2.2k TOTAL, 2.2k STORY (50%)  
 4.3k TOTAL, 4.3k STORY (51%)

2.2k TOTAL, 2.2k STORY (50%)  
 4.2k TOTAL, 4.2k STORY (49%)



Sheet Title/Description



Shearwall Design Summary

M+K Project #: 154-24003

Engineer: BFD

**Shearwall 201:** 2nd - Front Ext. Wall @ Primary Bed

Shearwall Properties:

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
 Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

Capacity Evaluation:

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

Shearwall Assembly Specification

P3 - 1-side 7/16" OSB  
 fastened w/ 8d nails at 3"o.c. panel edges & 12"o.c. panel field - edges blocked  
**ADEQUATE**

Overturning Evaluation:

Resistive DL  plf Overturning Moment  k-ft Hold Down Design Load  lbs  
 DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

Hold-down Specification

**No Hold down Required**

**Shearwall 202:** 2nd - Front Ext. Wall @ Bonus

Shearwall Properties:

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
 Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

Capacity Evaluation:

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

Shearwall Assembly Specification

P3 - 1-side 7/16" OSB  
 fastened w/ 8d nails at 3"o.c. panel edges & 12"o.c. panel field - edges blocked  
**ADEQUATE**

Overturning Evaluation:

Resistive DL  plf Overturning Moment  k-ft Hold Down Design Load  lbs  
 DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

Hold-down Specification

**No Hold down Required**



*Shearwall Design Summary*

M+K Project #: 154-24003  
Engineer: BFD

**Shearwall 203:** 2nd - Rear Ext. Wall @ Laundry/Bed 3/4

Shearwall Properties:

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

Capacity Evaluation:

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

Shearwall Assembly Specification

P1 - 1-side 7/16" OSB  
fastened w/ 8d nails at 6"o.c. panel edges & 12"o.c. panel field - edges blocked  
**ADEQUATE**

Overturning Evaluation:

Resistive DL  pl f Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

Hold-down Specification

**No Hold down Required**

**Shearwall 204:** 2nd - Side Ext. Wall @ Primary Bath/WIC/Bath 5

Shearwall Properties:

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

Capacity Evaluation:

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

Shearwall Assembly Specification

P1 - 1-side 7/16" OSB  
fastened w/ 8d nails at 6"o.c. panel edges & 12"o.c. panel field - edges blocked  
**ADEQUATE**

Overturning Evaluation:

Resistive DL  pl f Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

Hold-down Specification

**No Hold down Required**



**Shearwall 205:** 2nd - Side Ext. Wall @ Bath 3/Bonus

**Shearwall Properties:**

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

**Capacity Evaluation:**

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

**Shearwall Assembly Specification**

P1 - 1-side 7/16" OSB  
fastened w/ 8d nails at 6"o.c. panel edges & 12"o.c. panel field - edges blocked  
**ADEQUATE**

**Overturning Evaluation:**

Resistive DL  pl f Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

**Hold-down Specification**

**No Hold down Required**

**Shearwall :** Basement - Not Used

**Shearwall Properties:**

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

**Capacity Evaluation:**

Total Shear Load on Wall  lbs ### Allowable Shearwall Capacity  lbs

**Shearwall Assembly Specification**

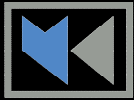
P1 - 1-side 7/16" OSB  
fastened w/ 8d nails at 6"o.c. panel edges & 12"o.c. panel field - edges blocked  
**#DIV/0!**

**Overturning Evaluation:**

Resistive DL  pl f Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

**Hold-down Specification**

**No Hold down Required**



**Shearwall 101:** 1st - Front Ext. Wall @ Great Room

Shearwall Properties:

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

Capacity Evaluation:

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

Shearwall Assembly Specification

P3 - 1-side 7/16" OSB  
fastened w/ 8d nails at 3"o.c. panel edges & 12"o.c. panel field - edges blocked  
**ADEQUATE**

Overturning Evaluation:

Resistive DL  pl f Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

Hold-down Specification

**No Hold down Required**

**Shearwall 102:** 1st - Front Ext. Wall @ Study

Shearwall Properties:

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

Capacity Evaluation:

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

Shearwall Assembly Specification

P3 - 1-side 7/16" OSB  
fastened w/ 8d nails at 3"o.c. panel edges & 12"o.c. panel field - edges blocked  
**ADEQUATE**

Overturning Evaluation:

Resistive DL  pl f Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

Hold-down Specification

**No Hold down Required**





*Shearwall Design Summary*

M+K Project #: 154-24003  
Engineer: BFD

**Shearwall 103:** 1st - Rear Ext. Wall @ Kitchen/Patio

Shearwall Properties:

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

Capacity Evaluation:

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

Shearwall Assembly Specification

P3 - 1-side 7/16" OSB  
fastened w/ 8d nails at 3"o.c. panel edges & 12"o.c. panel field - edges blocked  
**ADEQUATE**

Overturning Evaluation:

Resistive DL  plf Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

Hold-down Specification

**No Hold down Required**

**Shearwall 104:** 1st - Rear Ext. Wall @ ADU Suite

Shearwall Properties:

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

Capacity Evaluation:

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

Shearwall Assembly Specification

P1 - 1-side 7/16" OSB  
fastened w/ 8d nails at 6"o.c. panel edges & 12"o.c. panel field - edges blocked  
**ADEQUATE**

Overturning Evaluation:

Resistive DL  plf Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

Hold-down Specification

**No Hold down Required**



*Shearwall Design Summary*

M+K Project #: 154-24003  
Engineer: BFD

**Shearwall 105:** 1st - Rear Ext. Wall @ Mech/Launch

Shearwall Properties:

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

Capacity Evaluation:

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

Shearwall Assembly Specification

P1 - 1-side 7/16" OSB  
fastened w/ 8d nails at 6"o.c. panel edges & 12"o.c. panel field - edges blocked  
**ADEQUATE**

Overturning Evaluation:

Resistive DL  plf Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

Hold-down Specification

**No Hold down Required**

**Shearwall 106:** 1st - Side Ext. Wall @ Mech

Shearwall Properties:

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

Capacity Evaluation:

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

Shearwall Assembly Specification

P1 - 1-side 7/16" OSB  
fastened w/ 8d nails at 6"o.c. panel edges & 12"o.c. panel field - edges blocked  
**ADEQUATE**

Overturning Evaluation:

Resistive DL  plf Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

Hold-down Specification

**No Hold down Required**



*Shearwall Design Summary*

M+K Project #: 154-24003  
Engineer: BFD

**Shearwall 107:** 1st - Side Ext. Wall @ Garage

Shearwall Properties:

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

Capacity Evaluation:

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

Shearwall Assembly Specification

P1 - 1-side 7/16" OSB  
fastened w/ 8d nails at 6"o.c. panel edges & 12"o.c. panel field - edges blocked  
**ADEQUATE**

Overturning Evaluation:

Resistive DL  plf Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

Hold-down Specification

**No Hold down Required**

**Shearwall 108:** 1st - Side Ext. Wall @ Pantry/Nook

Shearwall Properties:

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

Capacity Evaluation:

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

Shearwall Assembly Specification

P3 - 1-side 7/16" OSB  
fastened w/ 8d nails at 3"o.c. panel edges & 12"o.c. panel field - edges blocked  
**ADEQUATE**

Overturning Evaluation:

Resistive DL  plf Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

Hold-down Specification

**SIMPSON STHD14RJ HOLDOWN**



**Shearwall 109:** 1st - Side Ext./Int. Wall @ Garage/Great Room

Shearwall Properties:

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

Capacity Evaluation:

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

Shearwall Assembly Specification

P1 - 1-side 7/16" OSB  
fastened w/ 8d nails at 6"o.c. panel edges & 12"o.c. panel field - edges blocked  
**ADEQUATE**

Overturning Evaluation:

Resistive DL  plf Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

Hold-down Specification

**No Hold down Required**

**Shearwall 110:** 1st - Side Ext. Wall @ ADU Suite

Shearwall Properties:

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

Capacity Evaluation:

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

Shearwall Assembly Specification

P1 - 1-side 7/16" OSB  
fastened w/ 8d nails at 6"o.c. panel edges & 12"o.c. panel field - edges blocked  
**ADEQUATE**

Overturning Evaluation:

Resistive DL  plf Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

Hold-down Specification

**No Hold down Required**



*Shearwall Design Summary*

M+K Project #: 154-24003  
Engineer: BFD

**Shearwall 111:** 1st - Side Ext. Wall @ Bath 2/Study

**Shearwall Properties:**

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

**Capacity Evaluation:**

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

**Shearwall Assembly Specification**

P3 - 1-side 7/16" OSB  
fastened w/ 8d nails at 3"o.c. panel edges & 12"o.c. panel field - edges blocked  
**ADEQUATE**

**Overturning Evaluation:**

Resistive DL  plf Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

**Hold-down Specification**

**No Hold down Required**

**Shearwall 112:** 1st - Front Int. Wall @ WIC/ADU Suite

**Shearwall Properties:**

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

**Capacity Evaluation:**

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

**Shearwall Assembly Specification**

P1 - 1-side 7/16" OSB  
fastened w/ 8d nails at 6"o.c. panel edges & 12"o.c. panel field - edges blocked  
**ADEQUATE**

**Overturning Evaluation:**

Resistive DL  plf Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

**Hold-down Specification**

**No Hold down Required**