MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

7220 Trade Street, Suite 350, San Diego, CA 92121 ▸ p 619-650-0010 ▸ *mulhernkulp.com*

CALCULATION PACKAGE

July 29, 2021

Architectural Innovations

Pratt Plat
Lot 6

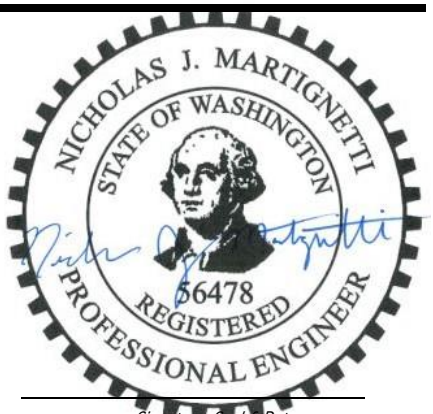
Mercer Island,
Washington

MULHERN & KULP STRUCTURAL ENGINEERING, INC.

Prepared By:

John C. Leone, E.I.T. *Staff Engineer*

Nick J. Martignetti, P.E. *Associate Owner + San Diego Office Director*



Signature, Seal & Date

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: PRATT PLAT LOT 6 ARCHITECTURAL INNOV
M&K PROJECT #: 203-21003
ENGINEER: JCL
DATE: 20-JUL-21

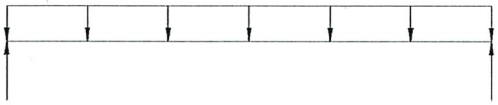
BEAM & HEADER CALCULATIONS

BEAM DESCRIPTION: TYP EXT ROOF HDR - WORST CASE

B1

PARAMETERS:

L = 7 FT
W = 0.767 KLF
P = — K



ANALYSIS:

R_{MAX} =	2.685 K	V_D =		K	< V_{ALL} =	4.468 K	☑ ADEQUATE
M_{MAX} =	4.698 K-FT	< M_{ALL} =	5.166 K-FT	(C_D=1.15)			☑ ADEQUATE
Δ_{TL} =	0.112 IN.	L/	749	< L/240			☑ ADEQUATE

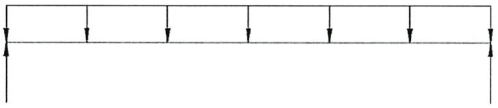
4x10

BEAM DESCRIPTION: TYP EXT FLOOR HDR - WORST CASE LENGTH

B1

PARAMETERS:

L = 8 FT
W = 0.536 KLF
P = — K



ANALYSIS:

R_{MAX} =	2.144 K	V_D =		K	< V_{ALL} =	3.886 K	☑ ADEQUATE
M_{MAX} =	4.288 K-FT	< M_{ALL} =	4.492 K-FT	(C_D=1.0)			☑ ADEQUATE
Δ_{TL} =	0.134 IN.	L/	718	< L/240			☑ ADEQUATE

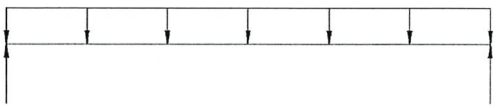
4x10

BEAM DESCRIPTION: TYP EXT FLOOR HDR - WORST CASE LOAD

B1

PARAMETERS:

L = 6 FT
W = 1.081 KLF
P = — K



ANALYSIS:

R_{MAX} =	3.243 K	V_D =		K	< V_{ALL} =	4.468 K	☑ ADEQUATE
M_{MAX} =	4.865 K-FT	< M_{ALL} =	5.166 K-FT	(C_D=1.15)			☑ ADEQUATE
Δ_{TL} =	0.085 IN.	L/	843	< L/240			☑ ADEQUATE

4x10

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PROJECT NAME: PRATT PLAT LOT 6 ARCHITECTURAL INNOV
M&K PROJECT #: 203-21003
ENGINEER: JCL
DATE: 20-JUL-21

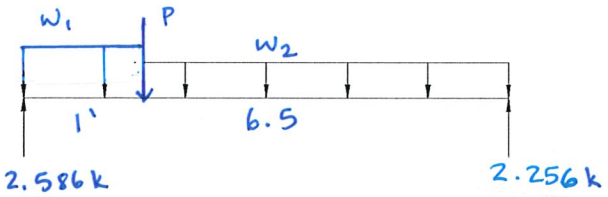
BEAM & HEADER CALCULATIONS

BEAM DESCRIPTION: RF FRMG - WNDW HDR @ REAR G.T. PT. LOAD

B2

PARAMETERS:

L = 7.5 FT
W_1 = 0.683 KLF W_2 = 0.588
P = 0.337 K



ANALYSIS:

R_{MAX} =	2.586 K	V_D =		K	< V_{ALL} = 4.468 K	☑ ADEQUATE
M_{MAX} =	4.328 K-FT	< M_{ALL} =	5.166	K-FT (C_D=1.15)		☑ ADEQUATE
Δ_{TL} =	0.119 IN.	L/	758	< L/240		☑ ADEQUATE

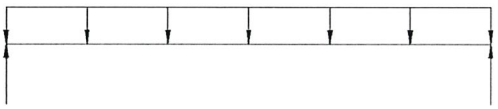
4x10

BEAM DESCRIPTION: 2ND FLR FRMG - FLUSH BM @ KITCHEN / LIVING

B3

PARAMETERS:

L = 9 FT
W = 0.88 KLF
P = — K



ANALYSIS:

R_{MAX} =	3.96 K	V_D =		K	< V_{ALL} = 11.13 K	☑ ADEQUATE
M_{MAX} =	8.91 K-FT	< M_{ALL} =	37.8	K-FT (C_D=1.0)		☑ ADEQUATE
Δ_{TL} =	0.042 IN.	L/	994	< L/240		☑ ADEQUATE

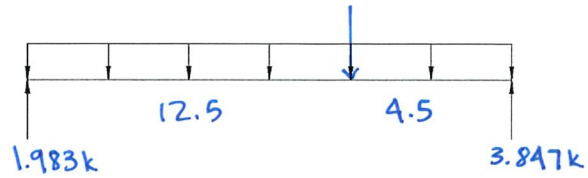
3 1/2 x 18 GLB

BEAM DESCRIPTION: 2ND FLR FRMG - FLUSH GRDR @ LIVING

B4

PARAMETERS:

L = 17 FT
W = 0.11 KLF
P = 3.96 K



ANALYSIS:

R_{MAX} =	3.847 K	V_D =		K	< V_{ALL} = 11.13 K	☑ ADEQUATE
M_{MAX} =	16.199 K-FT	< M_{ALL} =	37.8	K-FT (C_D=1.0)		☑ ADEQUATE
Δ_{TL} =	0.275 IN.	L/	741	< L/240		☑ ADEQUATE

3 1/2 x 18 GLB

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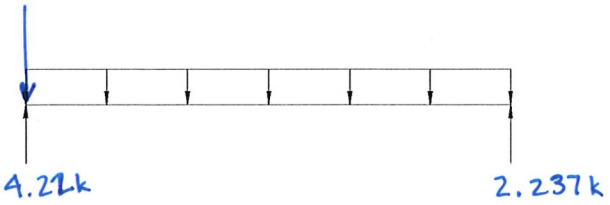
BEAM & HEADER CALCULATIONS

BEAM DESCRIPTION: 2ND FLR FRMG - WNDW HDR @ PORCH

B5

PARAMETERS:

L = 7 FT
W = 0.639 KLF
P = 1.983 K



ANALYSIS:

R_{MAX} =	4.22 K	V_D =	2.237 K	< V_{ALL} =	4.468 K	☑	ADEQUATE
M_{MAX} =	3.919 K-FT	< M_{ALL} =	5.166 K-FT	(C_D=1.15)		☑	ADEQUATE
Δ_{TL} =	0.093 IN.	L/	899	< L/240		☑	ADEQUATE

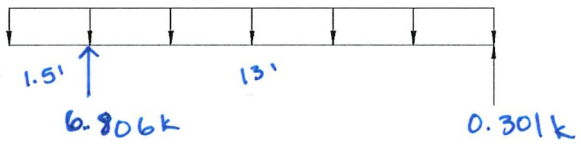
4x10

BEAM DESCRIPTION: 2ND FLR FRMG - FLUSH BM CANT'D @ FOYER

B6

PARAMETERS:

L = 14.5 FT (SEE ENERCALC OUTPUT)
W = KLF
P = K



ANALYSIS:

R_{MAX} =	K	V_D =	K	< V_{ALL} =	K	☑	ADEQUATE
M_{MAX} =	K-FT	< M_{ALL} =	K-FT	(C_D=)		☑	ADEQUATE
Δ_{TL} =	IN.	L/		< L/240		☑	ADEQUATE

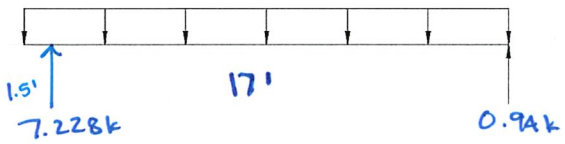
3½ x 18 GLB

BEAM DESCRIPTION: 2ND FLR FRMG - FLUSH BM CANT'D @ LIVING

B7

PARAMETERS:

L = 19.5 FT (SEE ENERCALC OUTPUT)
W = KLF
P = K



ANALYSIS:

R_{MAX} =	K	V_D =	K	< V_{ALL} =	K	☑	ADEQUATE
M_{MAX} =	K-FT	< M_{ALL} =	K-FT	(C_D=)		☑	ADEQUATE
Δ_{TL} =	IN.	L/		< L/240		☑	ADEQUATE

3½ x 18 GLB

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PROJECT NAME: PRATT PLAT LOT 6 ARCHITECTURAL INNOV
M&K PROJECT #: 203-21003
ENGINEER: JCL
DATE: 20-JUL-21

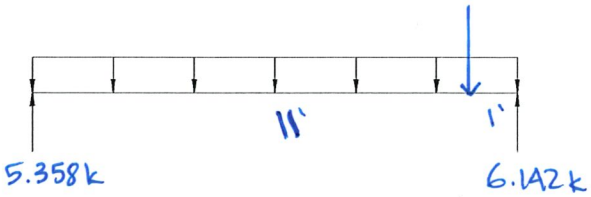
BEAM & HEADER CALCULATIONS

BEAM DESCRIPTION: 2ND FLR FRMG - SGD HDR @ PATIO W/ PT. LOAD

B8

PARAMETERS:

L = 12 FT
W = 0.88 KLF
P = 0.94 K



ANALYSIS:

R_{MAX} =	6.142 K	V_D =		K	< V_{ALL} =	9.275 K	☑ ADEQUATE
M_{MAX} =	16.311 K-FT	< M_{ALL} =	26.26	K-FT	(C_D=1.0)		☑ ADEQUATE
Δ_{TL} =	0.239 IN.	L/	604	< L/240			☑ ADEQUATE

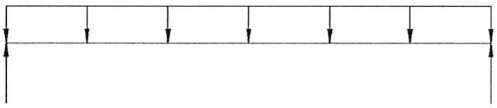
3 1/2"x15" GLB

BEAM DESCRIPTION: 2ND FLR FRMG - SGD HDR @ PATIO SIDE

B9

PARAMETERS:

L = 12 FT
W = 0.11 KLF
P = — K



ANALYSIS:

R_{MAX} =	0.66 K	V_D =		K	< V_{ALL} =	4.725 K	☑ ADEQUATE
M_{MAX} =	1.98 K-FT	< M_{ALL} =	6.091	K-FT	(C_D=1.0)		☑ ADEQUATE
Δ_{TL} =	0.139 IN.	L/	999+	< L/240			☑ ADEQUATE

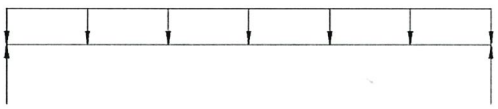
4 x 12

BEAM DESCRIPTION: 2ND FLR FRMG - FLUSH BM @ REAR PATIO EXT WALL

B10

PARAMETERS:

L = 15 FT
W = 1.081 KLF
P = — K



ANALYSIS:

R_{MAX} =	8.108 K	V_D =		K	< V_{ALL} =	16.761 K	☑ ADEQUATE
M_{MAX} =	30.403 K-FT	< M_{ALL} =	47.449	K-FT	(C_D=1.15)		☑ ADEQUATE
Δ_{TL} =	0.442 IN.	L/	407	< L/240			☑ ADEQUATE

5 1/2"x15" GLB

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M&K PROJECT #: 203-21003
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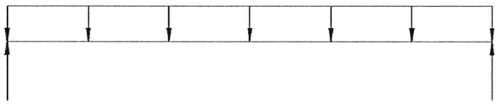
BEAM & HEADER CALCULATIONS

BEAM DESCRIPTION: 2ND FLR FRMG - FLUSH BM @ SIDE PATIO EXT WALL

B11

PARAMETERS:

L = 14.5 FT
W = 0.262 KLF
P = — K



ANALYSIS:

R_{MAX} =	1.9 K	V_D =		K	< V_{ALL} =	12.8 K	☑ ADEQUATE
M_{MAX} =	6.886 K-FT	< M_{ALL} =	43.47	K-FT	(C_D= 1.15)		☑ ADEQUATE
Δ_{TL} =	0.085 IN.	L/	999+	< L/240			☑ ADEQUATE

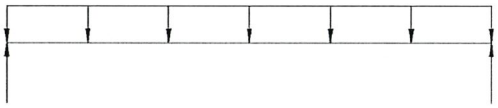
3 1/2 x 18 GLB

BEAM DESCRIPTION: 2ND FLR FRMG - DROPPED BM @ PORCH

B12

PARAMETERS:

L = 16 FT
W = 0.168 KLF
P = — K



ANALYSIS:

R_{MAX} =	1.344 K	V_D =		K	< V_{ALL} =	5.434 K	☑ ADEQUATE
M_{MAX} =	5.376 K-FT	< M_{ALL} =	7.005	K-FT	(C_D= 1.15)		☑ ADEQUATE
Δ_{TL} =	0.373 IN.	L/	515	< L/240			☑ ADEQUATE

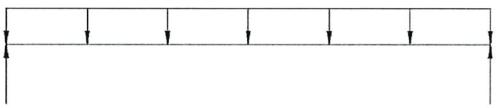
4x12

BEAM DESCRIPTION: 2ND FLR FRMG - WNDW HDR @ KITCHEN REAR

B13

PARAMETERS:

L = 6.5 FT
W = 1.194 KLF
P = — K



ANALYSIS:

R_{MAX} =	3.881 K	V_D =		K	< V_{ALL} =	6.4 K	☑ ADEQUATE
M_{MAX} =	6.306 K-FT	< M_{ALL} =	10.868	K-FT	(C_D= 1.15)		☑ ADEQUATE
Δ_{TL} =	0.094 IN.	L/	831	< L/240			☑ ADEQUATE

3 1/2"x9" GLB

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M&K PROJECT #: 203-21003
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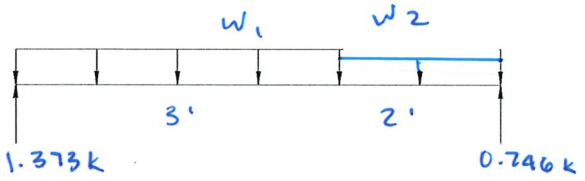
BEAM & HEADER CALCULATIONS

BEAM DESCRIPTION: 2ND FLR FRMG - FLUSH BM @ STAIRS

B14

PARAMETERS:

L = 5 FT
W_1 = 0.633 KLF W_2 = 0.11
P = — K



ANALYSIS:

R_{MAX} =	1.373 K	V_D =		K	< V_{ALL} = 3.886 K	☑ ADEQUATE
M_{MAX} =	1.489 K-FT	< M_{ALL} =	4.492	K-FT (C_D= 1.0)		☑ ADEQUATE
Δ_{TL} =	0.025 IN.	L/	999+	< L/240		☑ ADEQUATE

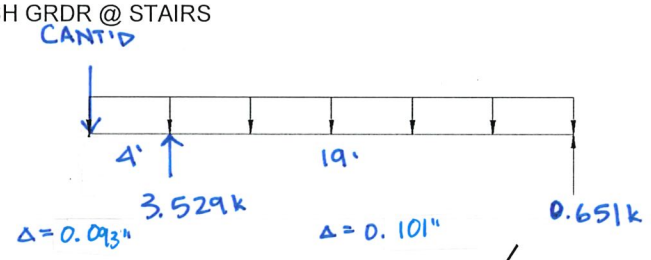
4 x 10

BEAM DESCRIPTION: 2ND FLR FRMG - FLUSH GRDR @ STAIRS

B15

PARAMETERS:

L = 23 FT
W = 0.11 KLF
P = 1.65 K



ANALYSIS:

R_{MAX} =	3.529 K	V_D =		K	< V_{ALL} = 17.49 K	☑ ADEQUATE
M_{MAX} =	7.48 K-FT	< M_{ALL} =	45.8	K-FT (C_D=1.0)		☑ ADEQUATE
Δ_{TL} =	0.093 IN.	L/	999+	< L/240		☑ ADEQUATE

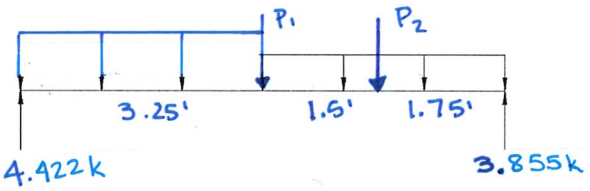
5 1/2 x 18 GLB

BEAM DESCRIPTION: 2ND FLR FRMG - WNDW HDR @ KITCHEN REAR W/ PT. LOAD

B16

PARAMETERS:

L = 6.5 FT
W_1 = 1.199 KLF W_2 = 0.66
P_1 = 1.6 K P_2 = 0.651



ANALYSIS:

R_{MAX} =	4.422 K	V_D =		K	< V_{ALL} = 6.4 K	☑ ADEQUATE
M_{MAX} =	8.066 K-FT	< M_{ALL} =	10.868	K-FT (C_D= 1.15)		☑ ADEQUATE
Δ_{TL} =	0.16 IN.	L/	487	< L/240		☑ ADEQUATE

3 1/2 x 9 GLB

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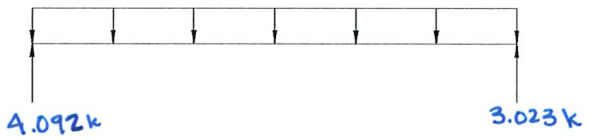
BEAM & HEADER CALCULATIONS

BEAM DESCRIPTION: 2ND FLR FRMG - FLUSH BM @ PANTRY UNDER INT SHEAR WALL

B17

PARAMETERS:

L = 22.5 FT (SEE ENERCALC OUTPUT)
W = KLF
P = K



ANALYSIS:

R_{MAX} = K V_D = K < V_{ALL} = K ☑ ADEQUATE
M_{MAX} = K-FT < M_{ALL} = K-FT (C_D=) ☑ ADEQUATE
Δ_{TL} = IN. L/ < L/240 ☑ ADEQUATE

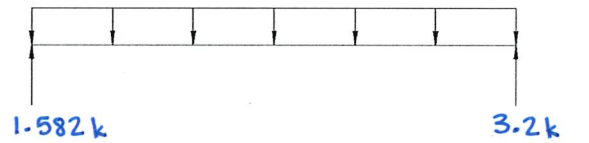
3 1/2 x 18 GLB

BEAM DESCRIPTION: 2ND FLR FRMG - FLUSH BM @ GARAGE UNDER SIDE EXT WALL

B18

PARAMETERS:

L = 21 FT (SEE ENERCALC OUTPUT)
W = KLF
P = K



ANALYSIS:

R_{MAX} = K V_D = K < V_{ALL} = K ☑ ADEQUATE
M_{MAX} = K-FT < M_{ALL} = K-FT (C_D=) ☑ ADEQUATE
Δ_{TL} = IN. L/ < L/240 ☑ ADEQUATE

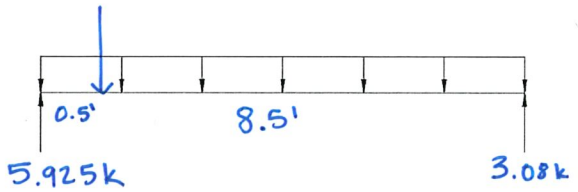
3 1/2 x 18 GLB

BEAM DESCRIPTION: 2ND FLR FRMG - MIDDLE GARAGE DR HDR

B19

PARAMETERS:

L = 9 FT
W = 0.695 KLF
P = 3.2 K



ANALYSIS:

R_{MAX} = 5.925 K V_D = K < V_{ALL} = 8.214 K ☑ ADEQUATE
M_{MAX} = 7.354 K-FT < M_{ALL} = 10.163 K-FT (C_D= 1.15) ☑ ADEQUATE
Δ_{TL} = 0.118 IN. L/ 913 < L/240 ☑ ADEQUATE

6x12

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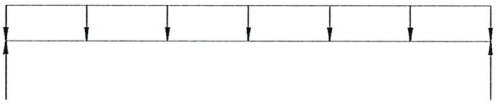
BEAM & HEADER CALCULATIONS

BEAM DESCRIPTION: 2ND FLR FRMG - REAR GARAGE DR HDR

B20

PARAMETERS:

L = 9 FT
W = 0.645 KLF
P = — K



ANALYSIS:

R_{MAX} =	2.903 K	V_D =		K	< V_{ALL} =	5.434 K	☑ ADEQUATE
M_{MAX} =	6.531 K-FT	< M_{ALL} =	7.005 K-FT	(C_D=1.15)			☑ ADEQUATE
Δ_{TL} =	0.143 IN.	L/	754	< L/240			☑ ADEQUATE

4 x 12

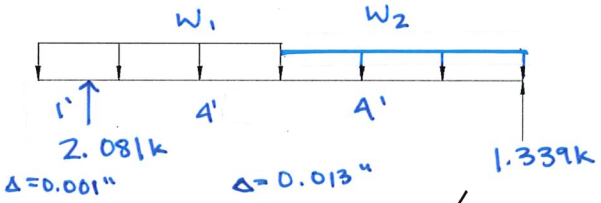
BEAM DESCRIPTION: 2ND FLR FRMG - FLUSH BM @ BEDROOM UNDER SIDE EXT WALL

B21

CANT'D

PARAMETERS:

L = 9 FT
W_1 = 0.436 KLF W_2 = 0.31
P = — K



ANALYSIS:

R_{MAX} =	2.081 K	V_D =		K	< V_{ALL} =	12.8 K	☑ ADEQUATE
M_{MAX} =	3.488 K-FT	< M_{ALL} =	43.47 K-FT	(C_D=1.15)			☑ ADEQUATE
Δ_{TL} =	0.013 IN.	L/	999+	< L/240			☑ ADEQUATE

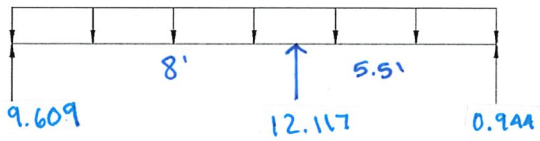
3½ x 18 GLB

BEAM DESCRIPTION: 2ND FLR FRMG - FLUSH BM @ BEDROOM/GARAGE UNDER FRONT EXT WALL

B22

PARAMETERS:

L = 13.5 FT (SEE ENERCALC OUTPUT)
W = KLF
P = K



ANALYSIS:

R_{MAX} =	K	V_D =		K	< V_{ALL} =	K	☑ ADEQUATE
M_{MAX} =	K-FT	< M_{ALL} =		K-FT	(C_D=)		☑ ADEQUATE
Δ_{TL} =	IN.	L/		< L/240			☑ ADEQUATE

3½ x 18 GLB

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: PRATT PLAT LOT 6 ARCHITECTURAL INNOV
M&K PROJECT #: 203-21003
ENGINEER: JCL
DATE: 20-JUL-21

BEAM & HEADER CALCULATIONS

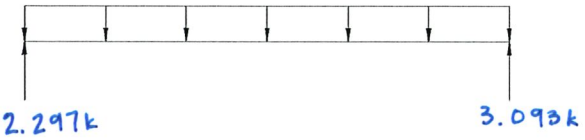
BEAM DESCRIPTION: 2ND FLR FRMG - FLUSH BM @ GARAGE/ROOF UNDER SIDE EXT WALL

B23

PARAMETERS:

L = 6.5 FT
W = KLF
P = K

SEE ENERCALC OUTPUT



ANALYSIS:

R_{MAX} =	K	V_D =	K	< V_{ALL} =	K	☑ ADEQUATE
M_{MAX} =	K-FT	< M_{ALL} =	K-FT	(C_D=)		☑ ADEQUATE
Δ_{TL} =	IN.	L/		< L/240		☑ ADEQUATE

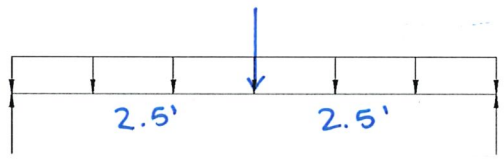
3 1/2 x 18 GLB

BEAM DESCRIPTION: 2ND FLR FRMG - WNDW HDR @ GARAGE W/ PT. LOAD

B24

PARAMETERS:

L = 5 FT
W = 0.21 KLF
P = 2.297 K



ANALYSIS:

R_{MAX} = 1.674	K	V_D =	K	< V_{ALL} = 4.468	K	☑ ADEQUATE
M_{MAX} = 3.529	K-FT	< M_{ALL} = 5.166	K-FT	(C_D=1.15)		☑ ADEQUATE
Δ_{TL} = 0.043	IN.	L/ 999+		< L/240		☑ ADEQUATE

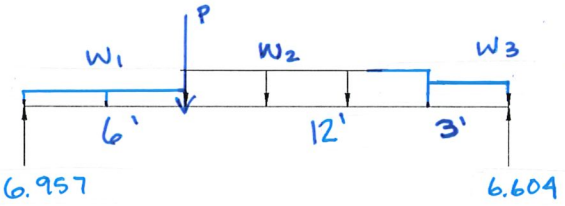
4 x 10

BEAM DESCRIPTION: 2ND FLR FRMG - FLUSH BM @ GARAGE/ROOF UNDER FRONT EXT WALL

B25

PARAMETERS:

L = 21 FT
W_1 = 0.03 KLF W_2 = 0.871 W_3 = 0.089
P = 3.093 K



ANALYSIS:

R_{MAX} = 6.957	K	V_D =	K	< V_{ALL} = 24.685	K	☑ ADEQUATE
M_{MAX} = 43.709	K-FT	< M_{ALL} = 83.835	K-FT	(C_D=1.15)		☑ ADEQUATE
Δ_{TL} = 0.615	IN.	L/ 409		< L/240		☑ ADEQUATE

6 3/4 x 18 GLB

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: PRATT PLAT LOT 6
ARCHITECTURAL INNOV
M&K PROJECT #: 203-21003
ENGINEER: JCL
DATE: 20-JUL-21

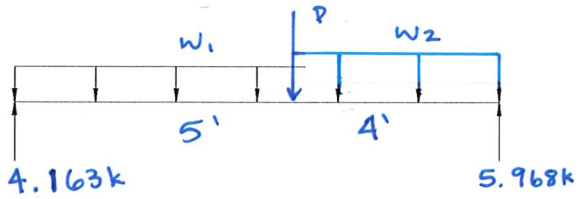
BEAM & HEADER CALCULATIONS

BEAM DESCRIPTION: 2ND FLR FRMG - FRONT GARAGE DR HDR

B26

PARAMETERS:

L = 9 FT
W_1 = 0.168 KLF W_2=0.645
P = 6.711 K



ANALYSIS:

R_{MAX} =	5.968 K	V_D =	K	< V_{ALL} =	13.409 K	☑ ADEQUATE
M_{MAX} =	18.712 K-FT	< M_{ALL} =	30.36 K-FT	(C_D=1.15)		☑ ADEQUATE
Δ_{TL} =	0.191 IN.	L/	564	< L/240		☑ ADEQUATE

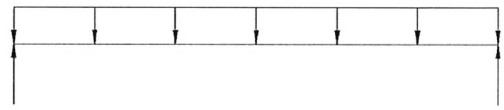
5 1/2 x 12 GLB

BEAM DESCRIPTION: 2ND FLR FRMG - FLUSH BOTTOM BM / HDR @ GARAGE & BEDROOMS

B27

PARAMETERS:

L = 3 FT
W = 0.963 KLF
P = — K



ANALYSIS:

R_{MAX} =	1.444 K	V_D =	K	< V_{ALL} =	3.886 K	☑ ADEQUATE
M_{MAX} =	1.083 K-FT	< M_{ALL} =	4.492 K-FT	(C_D=1.0)		☑ ADEQUATE
Δ_{TL} =	0.005 IN.	L/	999+	< L/240		☑ ADEQUATE

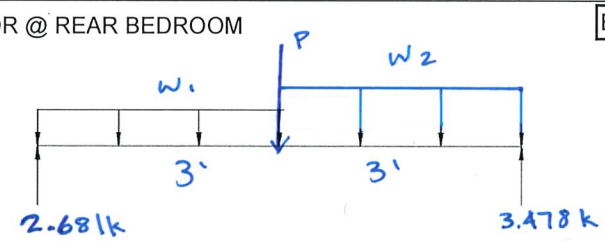
4 x 10

BEAM DESCRIPTION: 2ND FLR FRMG - WNDW HDR @ REAR BEDROOM

B28

PARAMETERS:

L = 6 FT
W_1 = 0.385 KLF W_2=0.916
P = 2.256 K



ANALYSIS:

R_{MAX} =	3.478 K	V_D =	K	< V_{ALL} =	5.434 K	☑ ADEQUATE
M_{MAX} =	6.312 K-FT	< M_{ALL} =	7.005 K-FT	(C_D=1.15)		☑ ADEQUATE
Δ_{TL} =	0.062 IN.	L/	999+	< L/240		☑ ADEQUATE

4x12

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: PRATT PLAT LOT 6
ARCHITECTURAL INNOV
M&K PROJECT #: 203-21003
ENGINEER: JCL
DATE: 20-JUL-21

BEAM & HEADER CALCULATIONS

BEAM DESCRIPTION: VOID

B29

PARAMETERS:

L =

W =

P =

ANALYSIS:

R_{MAX} =

M_{MAX} =

Δ_{TL} =

BEAM DESCRIPTION: RF FRMG - FLUSH BOTTOM BM @ STAIRS

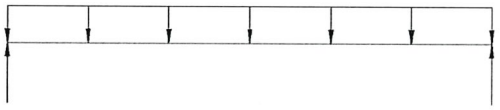
B30

PARAMETERS:

L = 8.5 FT

W = 0.735 KLF

P = — K



ANALYSIS:

R_{MAX} =	3.124 K	V_D =		K	< V_{ALL} =	6.81 K	☑ ADEQUATE
M_{MAX} =	6.638 K-FT	< M_{ALL} =	6.937	K-FT	(C_D=1.15)		☑ ADEQUATE
Δ_{TL} =	0.169 IN.	L/	604	< L/240			☑ ADEQUATE

6x10

BEAM DESCRIPTION: 1ST FLR FRMG - TYP FLOOR JOIST

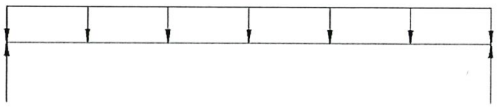
B31

PARAMETERS:

L = 14.5 FT

W = 0.067 KLF

P = — K



ANALYSIS:

R_{MAX} =	0.486 K	V_D =		K	< V_{ALL} =	1.688 K	☑ ADEQUATE
M_{MAX} =	1.761 K-FT	< M_{ALL} =	2.577	K-FT	(C_D=1.0)		☑ ADEQUATE
Δ_{TL} =	0.288 IN.	L/	604	< L/240			☑ ADEQUATE

2x12 @ 16" O.C.

MULHERN+KULP
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M&K PROJECT #: 203-21003
ENGINEER: JCL
DATE: 20-JUL-21

BEAM & HEADER CALCULATIONS

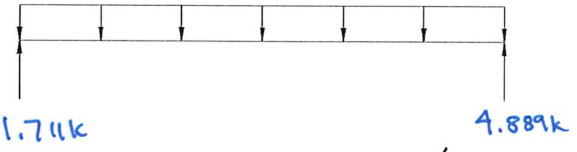
BEAM DESCRIPTION: 1ST FLR FRMG - FLUSH BM @ KITCHEN SHEAR WALL

B32

PARAMETERS:

L = 13.5 FT
W = KLF
P = K

SEE ENERCALC OUTPUT



ANALYSIS:

R_{MAX} =	K	V_D =	K	< V_{ALL} =	K	☑ ADEQUATE
M_{MAX} =	K-FT	< M_{ALL} =	K-FT	(C_D=)		☑ ADEQUATE
Δ_{TL} =	IN.	L/		< L/240		☑ ADEQUATE

3½ x 11¼ LVL

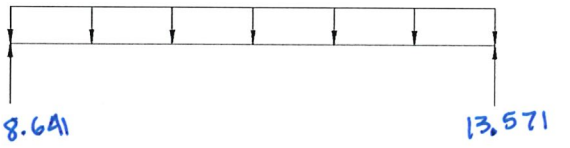
BEAM DESCRIPTION: 1ST FLR FRMG - FLUSH BM @ STAIRS SHEAR WALL

B33

PARAMETERS:

L = 10.5 FT
W = KLF
P = K

SEE ENERCALC OUTPUT



ANALYSIS:

R_{MAX} =	K	V_D =	K	< V_{ALL} =	K	☑ ADEQUATE
M_{MAX} =	K-FT	< M_{ALL} =	K-FT	(C_D=)		☑ ADEQUATE
Δ_{TL} =	IN.	L/		< L/240		☑ ADEQUATE

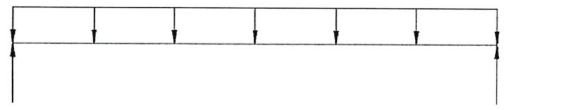
5¼ x 11¼ LVL

BEAM DESCRIPTION: 1ST FLR FRMG - TYP CRAWLSPACE GRDR

B34

PARAMETERS:

L = 7.5 FT
W = 0.6 KLF
P = — K



ANALYSIS:

R_{MAX} =	2.25 K	V_D =	K	< V_{ALL} =	3.886 K	☑ ADEQUATE
M_{MAX} =	4.219 K-FT	< M_{ALL} =	4.492 K-FT	(C_D= 1.0)		☑ ADEQUATE
Δ_{TL} =	0.116 IN.	L/	778	< L/240		☑ ADEQUATE

4x10

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

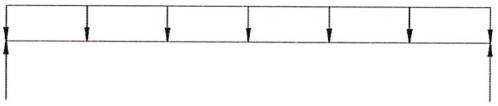
PROJECT NAME: PRATT PLAT LOT 6 ARCHITECTURAL INNOV
M&K PROJECT #: 203-21003
ENGINEER: JCL
DATE: 20-JUL-21

BEAM & HEADER CALCULATIONS

BEAM DESCRIPTION: 1ST FLR FRMG - TYP CRAWLSPACE GRDR W/ BRG WALL — B35

PARAMETERS:

L = 4.5 FT
W = 1.688 KLF
P = — K



ANALYSIS:

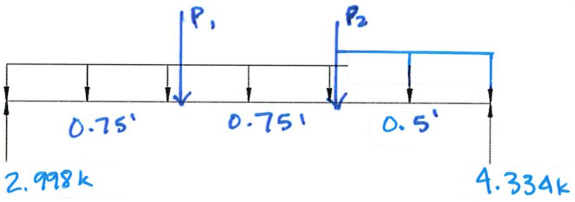
R_{MAX} =	3.798 K	V_D =		K	< V_{ALL} =	3.886 K	☑ ADEQUATE
M_{MAX} =	4.273 K-FT	< M_{ALL} =	4.492 K-FT	(C_D= 1.0)			☑ ADEQUATE
Δ_{TL} =	0.042 IN.	L/	999+	< L/240			☑ ADEQUATE

4x10

BEAM DESCRIPTION: 1ST FLR FRMG - CRAWL GRDR @ STAIRS — B36

PARAMETERS:

L = 2 FT
W_1 = 0.625 KLF W_2 = 1.688
P = 2.45 K P_2 = 3.1



ANALYSIS:

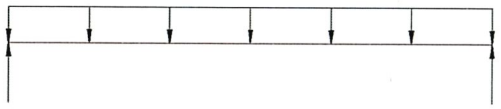
R_{MAX} =	4.334 K	V_D =	3.564 K		< V_{ALL} =	3.886 K	☑ ADEQUATE
M_{MAX} =	2.078 K-FT	< M_{ALL} =	4.492 K-FT	(C_D=)			☑ ADEQUATE
Δ_{TL} =	0.009 IN.	L/	999+	< L/240			☑ ADEQUATE

4x10

BEAM DESCRIPTION: 1ST FLR FRMG - CANT'D CRAWL GRDR END — B37

PARAMETERS:

L = 5.25 FT
W = 0.6 KLF
P = – K



ANALYSIS:

R_{MAX} =	1.95 K	V_D =		K	< V_{ALL} =	3.886 K	☑ ADEQUATE
M_{MAX} =	.75 K-FT	< M_{ALL} =	4.492 K-FT	(C_D= 1.0)			☑ ADEQUATE
Δ_{TL} =	0.01 IN.	L/	999+	< L/240			☑ ADEQUATE

4x10

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING
7220 Trade Street, Suite 350 ▸ San Diego, CA 92121
p 619-650-0010 ▸ mulhernkulp.com

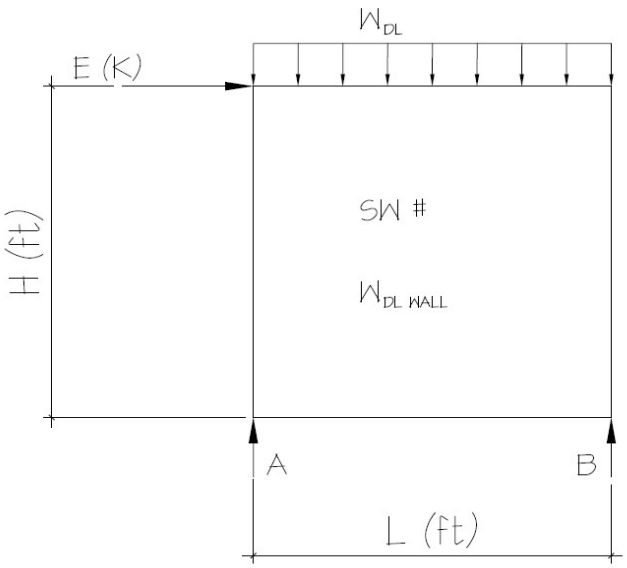
PROJECT NAME: ARCH. INNOV.
PRATT PLAT LOT 1
M&K PROJECT #: 203-21003
ENGINEER: JCL
DATE: 21-JUL-21

OVERSTRENGTH CALCULATIONS

WALL DESCRIPTION/SW #: 204

PARAMETERS:

L =	12.5	FT
H =	9.1	FT
E =	1.10	K
W_{DLWALL} =	0.10	KLF
W_{DL} =	0.034	KLF
Ω_0 =	2.5	(ASCE TABLE 12.2.1 FOOTNOTE G)
SDS =	1.176	



ANALYSIS:

$E_{MH} = \Omega_0 * E$ =	2.75 K	$E_V = 0.2*SDS*DL$ =	0.394 K
$E_M = E_{MH} + E_V$		$E_M = E_{MH} + E_V$ =	3.144 K
$E_M = E_{MH} - E_V$		$E_M = E_{MH} - E_V$ =	2.356 K

E_M (MAX) = $\sum M_A = 0$ =	3.14(9.1) + 0.134(12.5)(6.25) - R_B(12.5)	R_B =	0.8DL + 2.3E
		R_A =	0.8DL - 2.3E
E_M (MIN) = $\sum M_A = 0$ =	2.36(9.1) + 0.134(12.5)(6.25) - R_B(12.5)	R_B =	0.8DL + 1.7E
		R_A =	0.8DL - 1.7E

CHECK BEAMS FOR AXIAL FORCES SHOWN USING LOAD COMBOS PER SECTION 12.4.3.1 (ASD)

ALLOWABLE STESS PERMITTED TO BE INCREASED BY 1.2

SEE FOLLOWING BEAM CALCS FOR LOAD APPLICATION

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RESIDENTIAL STRUCTURAL ENGINEERING
7220 Trade Street, Suite 350 ▸ San Diego, CA 92121
p 619-650-0010 ▸ *mulhernkulp.com*

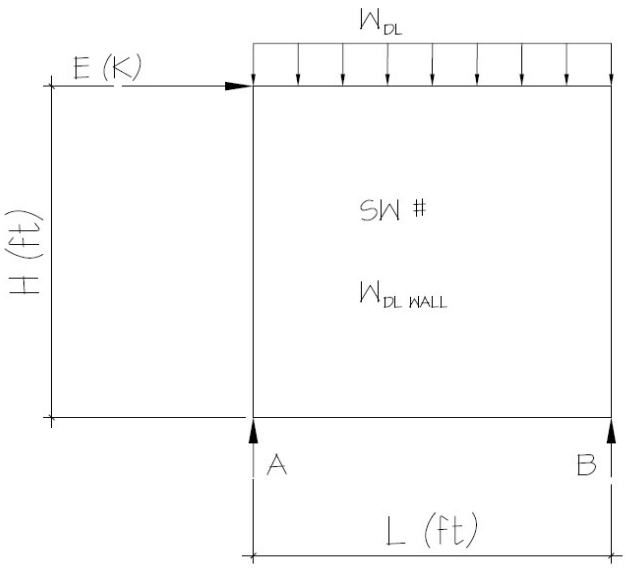
PROJECT NAME: ARCH. INNOV.
PRATT PLAT LOT 1
M&K PROJECT #: 203-21003
ENGINEER: JCL
DATE: 21-JUL-21

OVERSTRENGTH CALCULATIONS

WALL DESCRIPTION/SW #: 205

PARAMETERS:

L =	12.3	FT
H =	9.1	FT
E =	1.10	K
W_{DLWALL} =	0.10	KLF
W_{DL} =	0.272	KLF
Ω_0 =	2.5	(ASCE TABLE 12.2.1 FOOTNOTE G)
SDS =	1.176	



ANALYSIS:

$E_{MH} = \Omega_0 * E$ =	2.75 K	$E_V = 0.2*SDS*DL$ =	1.076 K
$E_M = E_{MH} + E_V$		$E_M = E_{MH} + E_V$ =	3.826 K
$E_M = E_{MH} - E_V$		$E_M = E_{MH} - E_V$ =	1.674 K

E_M (MAX) $= \sum M_A = 0$ =	3.83(9.1) + 0.372(12.3)(6.15) - R_B(12.3)	R_B =	2.3DL + 2.8E
		R_A =	2.3DL - 2.8E
E_M (MIN) $= \sum M_A = 0$ =	1.67(9.1) + 0.372(12.3)(6.15) - R_B(12.3)	R_B =	2.3DL + 1.2E
		R_A =	2.3DL - 1.2E

CHECK BEAMS FOR AXIAL FORCES SHOWN USING LOAD COMBOS PER SECTION 12.4.3.1 (ASD)

ALLOWABLE STESS PERMITTED TO BE INCREASED BY 1.2

SEE FOLLOWING BEAM CALCS FOR LOAD APPLICATION

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RESIDENTIAL STRUCTURAL ENGINEERING
7220 Trade Street, Suite 350 ▸ San Diego, CA 92121
p 619-650-0010 ▸ *mulhernkulp.com*

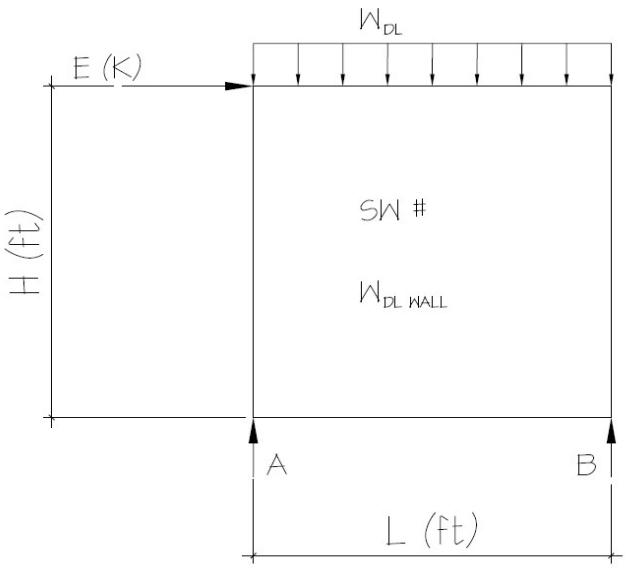
PROJECT NAME: ARCH. INNOV.
PRATT PLAT LOT 1
M&K PROJECT #: 203-21003
ENGINEER: JCL
DATE: 21-JUL-21

OVERSTRENGTH CALCULATIONS

WALL DESCRIPTION/SW #: 206

PARAMETERS:

L =	11.8	FT
H =	9.1	FT
E =	1.50	K
W_{DLWALL} =	0.10	KLF
W_{DL} =	0.034	KLF
Ω_0 =	2.5	(ASCE TABLE 12.2.1 FOOTNOTE G)
SDS =	1.176	



ANALYSIS:

$E_{MH} = \Omega_0 * E$ =	3.75 K	$E_V = 0.2*SDS*DL$ =	0.372 K
$E_M = E_{MH} + E_V$		$E_M = E_{MH} + E_V$ =	4.122 K
$E_M = E_{MH} - E_V$		$E_M = E_{MH} - E_V$ =	3.378 K

E_M (MAX) $= \sum M_A = 0$ =	4.12(9.1) + 0.134(11.8)(5.9) - R_B(11.8)	R_B =	0.8DL + 3.2E
		R_A =	0.8DL - 3.2E
E_M (MIN) $= \sum M_A = 0$ =	3.38(9.1) + 0.134(11.8)(5.9) - R_B(11.8)	R_B =	0.8DL + 2.6E
		R_A =	0.8DL - 2.6E

CHECK BEAMS FOR AXIAL FORCES SHOWN USING LOAD COMBOS PER SECTION 12.4.3.1 (ASD)

ALLOWABLE STESS PERMITTED TO BE INCREASED BY 1.2

SEE FOLLOWING BEAM CALCS FOR LOAD APPLICATION

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING
7220 Trade Street, Suite 350 ▸ San Diego, CA 92121
p 619-650-0010 ▸ *mulhernkulp.com*

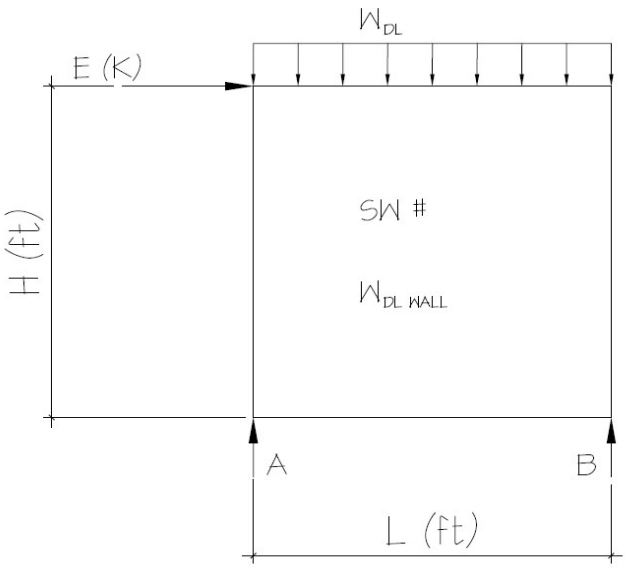
PROJECT NAME: ARCH. INNOV.
PRATT PLAT LOT 1
M&K PROJECT #: 203-21003
ENGINEER: JCL
DATE: 21-JUL-21

OVERSTRENGTH CALCULATIONS

WALL DESCRIPTION/SW #: 207

PARAMETERS:

L =	7.8	FT
H =	9.1	FT
E =	1.05	K
W_{DLWALL} =	0.10	KLF
W_{DL} =	0.000	KLF
Ω_0 =	2.5	(ASCE TABLE 12.2.1 FOOTNOTE G)
SDS =	1.176	



ANALYSIS:

$E_{MH} = \Omega_0 * E$ =	2.63 K	$E_V = 0.2*SDS*DL$ =	0.183 K
$E_M = E_{MH} + E_V$		$E_M = E_{MH} + E_V$ =	2.808 K
$E_M = E_{MH} - E_V$		$E_M = E_{MH} - E_V$ =	2.442 K

E_M (MAX) = $\sum M_A = 0$ =	2.81(9.1) + 0.1(7.8)(3.9) - R_B(7.8)	R_B =	0.4DL + 3.3E
		R_A =	0.4DL - 3.3E
E_M (MIN) = $\sum M_A = 0$ =	2.44(9.1) + 0.1(7.8)(3.9) - R_B(7.8)	R_B =	0.4DL + 2.8E
		R_A =	0.4DL - 2.8E

CHECK BEAMS FOR AXIAL FORCES SHOWN USING LOAD COMBOS PER SECTION 12.4.3.1 (ASD)

ALLOWABLE STESS PERMITTED TO BE INCREASED BY 1.2

SEE FOLLOWING BEAM CALCS FOR LOAD APPLICATION

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING
7220 Trade Street, Suite 350 ▸ San Diego, CA 92121
p 619-650-0010 ▸ *mulhernkulp.com*

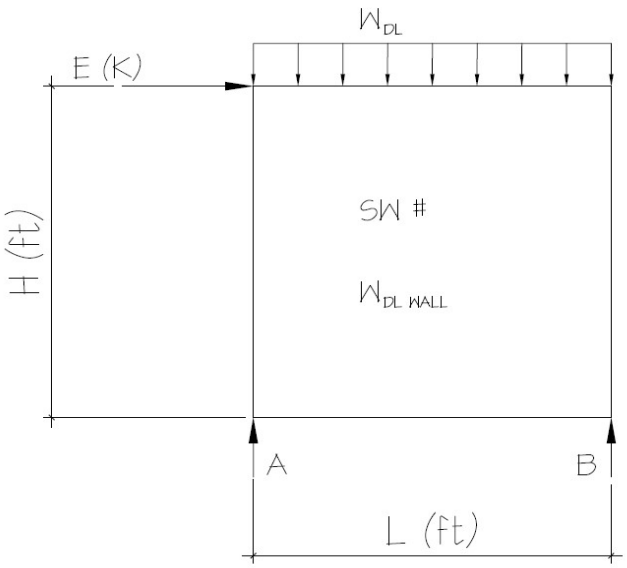
PROJECT NAME: ARCH. INNOV.
PRATT PLAT LOT 1
M&K PROJECT #: 203-21003
ENGINEER: JCL
DATE: 21-JUL-21

OVERSTRENGTH CALCULATIONS

WALL DESCRIPTION/SW #: 208

PARAMETERS:

L =	8.0	FT
H =	9.1	FT
E =	2.30	K
W_{DLWALL} =	0.10	KLF
W_{DL} =	0.085	KLF
Ω_0 =	2.5	(ASCE TABLE 12.2.1 FOOTNOTE G)
SDS =	1.176	



ANALYSIS:

$E_{MH} = \Omega_0 * E$ =	5.75 K	$E_V = 0.2*SDS*DL$ =	0.348 K
$E_M = E_{MH} + E_V$		$E_M = E_{MH} + E_V$ =	6.098 K
$E_M = E_{MH} - E_V$		$E_M = E_{MH} - E_V$ =	5.402 K

E_M (MAX) $= \sum M_A = 0$ =	6.10(9.1) + 0.185(8)(4) - R_B(8)	R_B =	0.7DL + 6.9E
		R_A =	0.7DL - 6.9E
E_M (MIN) $= \sum M_A = 0$ =	5.40(9.1) + 0.185(8)(4) - R_B(8)	R_B =	0.7DL + 6.1E
		R_A =	0.7DL - 6.1E

CHECK BEAMS FOR AXIAL FORCES SHOWN USING LOAD COMBOS PER SECTION 12.4.3.1 (ASD)

ALLOWABLE STESS PERMITTED TO BE INCREASED BY 1.2

SEE FOLLOWING BEAM CALCS FOR LOAD APPLICATION

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING
7220 Trade Street, Suite 350 ▸ San Diego, CA 92121
p 619-650-0010 ▸ mulhernkulp.com

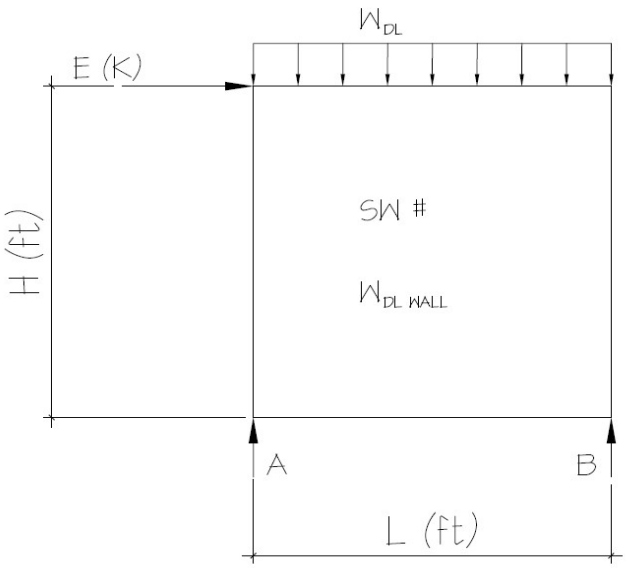
PROJECT NAME: ARCH. INNOV.
PRATT PLAT LOT 1
M&K PROJECT #: 203-21003
ENGINEER: JCL
DATE: 21-JUL-21

OVERSTRENGTH CALCULATIONS

WALL DESCRIPTION/SW #: 209

PARAMETERS:

L =	16.0	FT
H =	9.1	FT
E =	2.15	K
W_{DLWALL} =	0.10	KLF
W_{DL} =	0.000	KLF
Ω_0 =	2.5	(ASCE TABLE 12.2.1 FOOTNOTE G)
SDS =	1.176	



ANALYSIS:

$E_{MH} = \Omega_0 * E$ =	5.38 K	$E_V = 0.2*SDS*DL$ =	0.376 K
$E_M = E_{MH} + E_V$		$E_M = E_{MH} + E_V$ =	5.751 K
$E_M = E_{MH} - E_V$		$E_M = E_{MH} - E_V$ =	4.999 K

E_M (MAX) $= \sum M_A = 0$ =	5.75(9.1) + 0.1(16)(8) - R_B(16)	R_B =	0.8DL + 3.3E
		R_A =	0.8DL - 3.3E
E_M (MIN) $= \sum M_A = 0$ =	5.00(9.1) + 0.1(16)(8) - R_B(16)	R_B =	0.8DL + 2.8E
		R_A =	0.8DL - 2.8E

CHECK BEAMS FOR AXIAL FORCES SHOWN USING LOAD COMBOS PER SECTION 12.4.3.1 (ASD)

ALLOWABLE STESS PERMITTED TO BE INCREASED BY 1.2

SEE FOLLOWING BEAM CALCS FOR LOAD APPLICATION

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING
7220 Trade Street, Suite 350 ▸ San Diego, CA 92121
p 619-650-0010 ▸ *mulhernkulp.com*

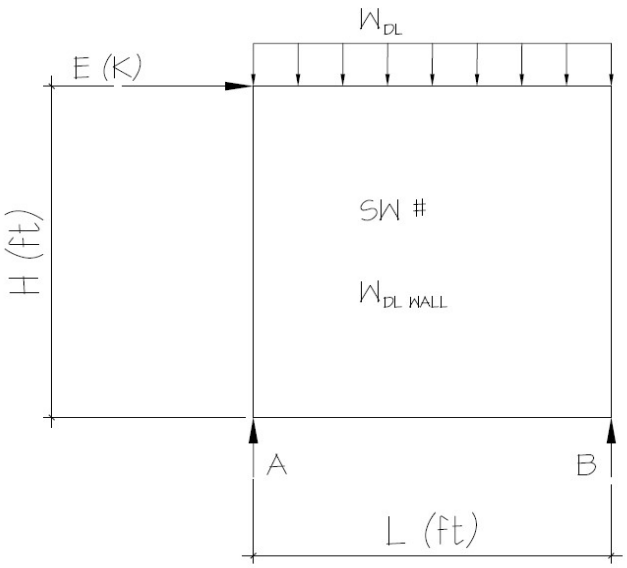
PROJECT NAME: ARCH. INNOV.
PRATT PLAT LOT 1
M&K PROJECT #: 203-21003
ENGINEER: JCL
DATE: 21-JUL-21

OVERSTRENGTH CALCULATIONS

WALL DESCRIPTION/SW #: 107

PARAMETERS:

L =	7.8	FT
H =	10.0	FT
E =	2.00	K
W_{DLWALL} =	0.10	KLF
W_{DL} =	0.100	KLF
Ω_0 =	2.5	(ASCE TABLE 12.2.1 FOOTNOTE G)
SDS =	1.176	



ANALYSIS:

$E_{MH} = \Omega_0 * E$ =	5.00 K	$E_V = 0.2*SDS*DL$ =	0.367 K
$E_M = E_{MH} + E_V$		$E_M = E_{MH} + E_V$ =	5.367 K
$E_M = E_{MH} - E_V$		$E_M = E_{MH} - E_V$ =	4.633 K

E_M (MAX) $= \sum M_A = 0$ =	5.37(10.0) + 0.2(7.8)(3.9) - R_B(7.8)	R_B =	0.8DL + 6.9E
		R_A =	0.8DL - 6.9E
E_M (MIN) $= \sum M_A = 0$ =	4.63(10.0) + 0.2(7.8)(3.9) - R_B(7.8)	R_B =	0.8DL + 5.9E
		R_A =	0.8DL - 5.9E

CHECK BEAMS FOR AXIAL FORCES SHOWN USING LOAD COMBOS PER SECTION 12.4.3.1 (ASD)

ALLOWABLE STESS PERMITTED TO BE INCREASED BY 1.2

SEE FOLLOWING BEAM CALCS FOR LOAD APPLICATION

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING
7220 Trade Street, Suite 350 ▸ San Diego, CA 92121
p 619-650-0010 ▸ *mulhernkulp.com*

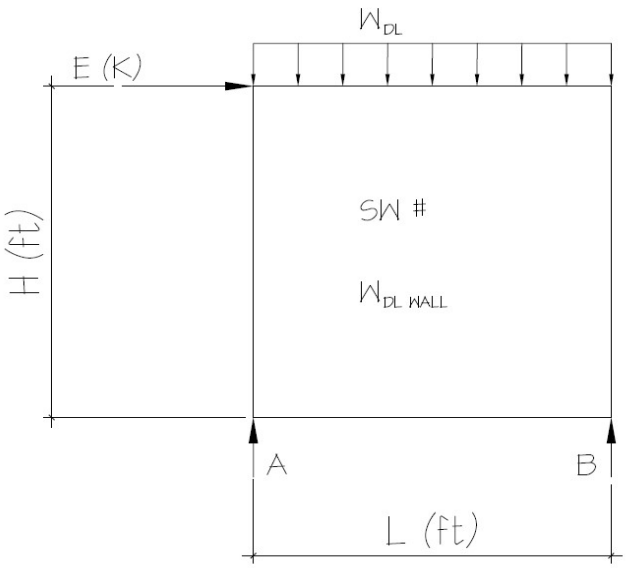
PROJECT NAME: ARCH. INNOV.
PRATT PLAT LOT 1
M&K PROJECT #: 203-21003
ENGINEER: JCL
DATE: 21-JUL-21

OVERSTRENGTH CALCULATIONS

WALL DESCRIPTION/SW #: 110

PARAMETERS:

L =	13.5	FT
H =	10.0	FT
E =	3.45	K
W_{DLWALL} =	0.10	KLF
W_{DL} =	0.000	KLF
Ω_0 =	2.5	(ASCE TABLE 12.2.1 FOOTNOTE G)
SDS =	1.176	



ANALYSIS:

$E_{MH} = \Omega_0 * E$ =	8.63 K	$E_V = 0.2*SDS*DL$ =	0.318 K
$E_M = E_{MH} + E_V$		$E_M = E_{MH} + E_V$ =	8.943 K
$E_M = E_{MH} - E_V$		$E_M = E_{MH} - E_V$ =	8.307 K

E_M (MAX) $= \sum M_A = 0$ =	8.94(10.0) + 0.1(13.5)(6.75) - R_B(13.5)	R_B =	0.7DL + 6.6E
		R_A =	0.7DL - 6.6E
E_M (MIN) $= \sum M_A = 0$ =	8.31(10.0) + 0.1(13.5)(6.75) - R_B(13.5)	R_B =	0.7DL + 6.2E
		R_A =	0.7DL - 6.2E

CHECK BEAMS FOR AXIAL FORCES SHOWN USING LOAD COMBOS PER SECTION 12.4.3.1 (ASD)

ALLOWABLE STESS PERMITTED TO BE INCREASED BY 1.2

SEE FOLLOWING BEAM CALCS FOR LOAD APPLICATION

Title Block Line 1
You can change this area
using the "Settings" menu item
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Title Block" selection.
Title Block Line 6

Project Title:
Engineer:
Project ID:
Project Descr:

Printed: 21 JUL 2021, 12:58PM

Wood Beam

File: beam calcs with overstrength.ec6

Lic. # : KW-06004787
MULHERN & KULP STRUCTURAL ENGINEERING INC

DESCRIPTION: B6 - 2ND FLR FRMG - FLUSH BM CANT'D @ FOYER

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
Load Combination : ASCE 7-16

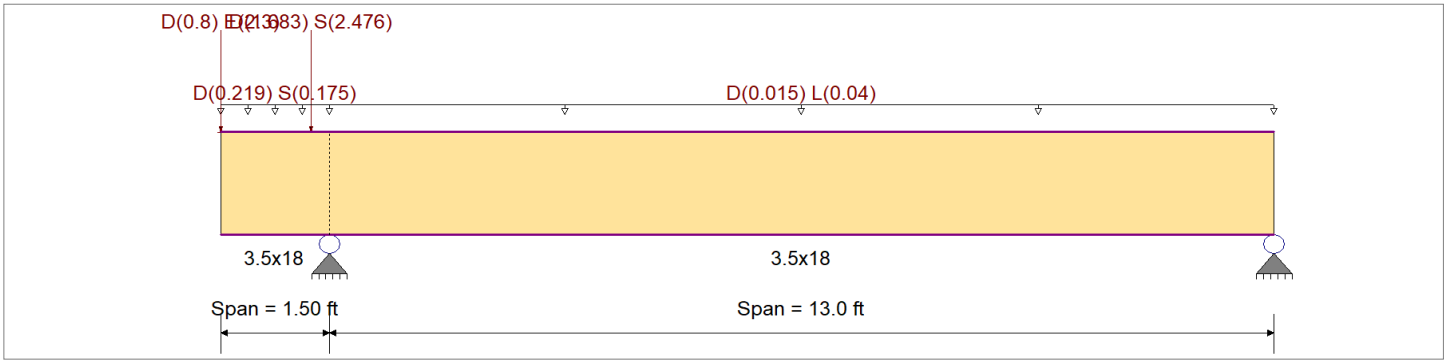
Wood Species : DF/DF
Wood Grade : 24F - V4

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	2,880.0 psi
Fb -	2,220.0 psi
Fc - Prll	1,980.0 psi
Fc - Perp	780.0 psi
Fv	318.0 psi
Ft	1,320.0 psi

E : Modulus of Elasticity

Ebend- xx	1,800.0 ksi
Eminbend - xx	950.0 ksi
Ebend- yy	1,600.0 ksi
Eminbend - yy	850.0 ksi
Density	31.210 pcf



Applied Loads

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

Beam self weight calculated and added to loads
Load for Span Number 1
Point Load : D = 1.683, S = 2.476 k @ 1.250 ft
Uniform Load : D = 0.2190, S = 0.1750 k/ft, Extent = 0.0 -->> 1.50 ft, Tributary Width = 1.0 ft
Point Load : D = 0.80, E = 2.30 k @ 0.0 ft
Load for Span Number 2
Uniform Load : D = 0.0150, L = 0.040 , Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.077 : 1	Maximum Shear Stress Ratio	=	0.363 : 1
Section used for this span		3.5x18	Section used for this span		3.5x18
fb: Actual	=	273.37 psi	fv: Actual	=	132.63 psi
Fb: Allowable	=	3,552.00 psi	Fv: Allowable	=	365.70 psi
Load Combination		+D+0.750L+0.750S+0.5250E+H, LL Com	Load Combination		+D+S+H
Location of maximum on span	=	1.500 ft	Location of maximum on span	=	1.500 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.014 in	Ratio =	2548 >=360
Max Upward Transient Deflection	-0.021 in	Ratio =	7284 >=360
Max Downward Total Deflection	0.015 in	Ratio =	2366 >=300
Max Upward Total Deflection	-0.021 in	Ratio =	7469 >=300

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 1.50 ft	1	0.060	0.236	0.90	1.000	1.00	1.00	1.00	1.00	1.00	1.88	119.52	1998.00	2.83	67.43	286.20
Length = 13.0 ft	2	0.060	0.236	0.90	1.000	1.00	1.00	1.00	1.00	1.00	1.88	119.52	1998.00	0.29	67.43	286.20
+D+L+H, LL Comb Run (*L)					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 1.50 ft	1	0.054	0.212	1.00	1.000	1.00	1.00	1.00	1.00	1.00	1.88	119.52	2220.00	2.83	67.43	318.00
Length = 13.0 ft	2	0.054	0.212	1.00	1.000	1.00	1.00	1.00	1.00	1.00	1.88	119.52	2220.00	0.49	67.43	318.00
+D+L+H, LL Comb Run (L*)					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 1.50 ft	1	0.054	0.212	1.00	1.000	1.00	1.00	1.00	1.00	1.00	1.88	119.52	2220.00	2.83	67.43	318.00

Wood Beam

DESCRIPTION: B6 - 2ND FLR FRMG - FLUSH BM CANT'D @ FOYER

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
Length = 13.0 ft	2	0.054	0.212	1.00	1.000	1.00	1.00	1.00	1.00	1.00	1.88	119.52	2220.00	0.29	67.43	318.00
+D+L+H, LL Comb Run (LL)					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 1.50 ft	1	0.054	0.212	1.00	1.000	1.00	1.00	1.00	1.00	1.00	1.88	119.52	2220.00	2.83	67.43	318.00
Length = 13.0 ft	2	0.054	0.212	1.00	1.000	1.00	1.00	1.00	1.00	1.00	1.88	119.52	2220.00	0.49	67.43	318.00
+D+Lr+H, LL Comb Run (*L)					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 1.50 ft	1	0.043	0.170	1.25	1.000	1.00	1.00	1.00	1.00	1.00	1.88	119.52	2775.00	2.83	67.43	397.50
Length = 13.0 ft	2	0.043	0.170	1.25	1.000	1.00	1.00	1.00	1.00	1.00	1.88	119.52	2775.00	0.29	67.43	397.50
+D+Lr+H, LL Comb Run (L*)					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 1.50 ft	1	0.043	0.170	1.25	1.000	1.00	1.00	1.00	1.00	1.00	1.88	119.52	2775.00	2.83	67.43	397.50
Length = 13.0 ft	2	0.043	0.170	1.25	1.000	1.00	1.00	1.00	1.00	1.00	1.88	119.52	2775.00	0.29	67.43	397.50
+D+Lr+H, LL Comb Run (LL)					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 1.50 ft	1	0.043	0.170	1.25	1.000	1.00	1.00	1.00	1.00	1.00	1.88	119.52	2775.00	2.83	67.43	397.50
Length = 13.0 ft	2	0.043	0.170	1.25	1.000	1.00	1.00	1.00	1.00	1.00	1.88	119.52	2775.00	0.29	67.43	397.50
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 1.50 ft	1	0.067	0.363	1.15	1.000	1.00	1.00	1.00	1.00	1.00	2.70	171.32	2553.00	5.57	132.63	365.70
Length = 13.0 ft	2	0.067	0.363	1.15	1.000	1.00	1.00	1.00	1.00	1.00	2.70	171.32	2553.00	0.35	132.63	365.70
+D+0.750Lr+0.750L+H, LL Comb Ru					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 1.50 ft	1	0.043	0.170	1.25	1.000	1.00	1.00	1.00	1.00	1.00	1.88	119.52	2775.00	2.83	67.43	397.50
Length = 13.0 ft	2	0.043	0.170	1.25	1.000	1.00	1.00	1.00	1.00	1.00	1.88	119.52	2775.00	0.44	67.43	397.50
+D+0.750Lr+0.750L+H, LL Comb Ru					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 1.50 ft	1	0.043	0.170	1.25	1.000	1.00	1.00	1.00	1.00	1.00	1.88	119.52	2775.00	2.83	67.43	397.50
Length = 13.0 ft	2	0.043	0.170	1.25	1.000	1.00	1.00	1.00	1.00	1.00	1.88	119.52	2775.00	0.29	67.43	397.50
+D+0.750Lr+0.750L+H, LL Comb Ru					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 1.50 ft	1	0.043	0.170	1.25	1.000	1.00	1.00	1.00	1.00	1.00	1.88	119.52	2775.00	2.83	67.43	397.50
Length = 13.0 ft	2	0.043	0.170	1.25	1.000	1.00	1.00	1.00	1.00	1.00	1.88	119.52	2775.00	0.44	67.43	397.50
+D+0.750L+0.750S+H, LL Comb Ru					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 1.50 ft	1	0.062	0.318	1.15	1.000	1.00	1.00	1.00	1.00	1.00	2.49	158.37	2553.00	4.89	116.33	365.70
Length = 13.0 ft	2	0.062	0.318	1.15	1.000	1.00	1.00	1.00	1.00	1.00	2.49	158.37	2553.00	0.49	116.33	365.70
+D+0.750L+0.750S+H, LL Comb Ru					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 1.50 ft	1	0.062	0.318	1.15	1.000	1.00	1.00	1.00	1.00	1.00	2.49	158.37	2553.00	4.89	116.33	365.70
Length = 13.0 ft	2	0.062	0.318	1.15	1.000	1.00	1.00	1.00	1.00	1.00	2.49	158.37	2553.00	0.34	116.33	365.70
+D+0.750L+0.750S+H, LL Comb Ru					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 1.50 ft	1	0.062	0.318	1.15	1.000	1.00	1.00	1.00	1.00	1.00	2.49	158.37	2553.00	4.89	116.33	365.70
Length = 13.0 ft	2	0.062	0.318	1.15	1.000	1.00	1.00	1.00	1.00	1.00	2.49	158.37	2553.00	0.49	116.33	365.70
+D+0.60W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 1.50 ft	1	0.034	0.133	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.88	119.52	3552.00	2.83	67.43	508.80
Length = 13.0 ft	2	0.034	0.133	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.88	119.52	3552.00	0.29	67.43	508.80
+D+0.750Lr+0.750L+0.450W+H, LL					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 1.50 ft	1	0.034	0.133	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.88	119.52	3552.00	2.83	67.43	508.80
Length = 13.0 ft	2	0.034	0.133	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.88	119.52	3552.00	0.44	67.43	508.80
+D+0.750Lr+0.750L+0.450W+H, LL					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 1.50 ft	1	0.034	0.133	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.88	119.52	3552.00	2.83	67.43	508.80
Length = 13.0 ft	2	0.034	0.133	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.88	119.52	3552.00	0.29	67.43	508.80
+D+0.750Lr+0.750L+0.450W+H, LL					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 1.50 ft	1	0.034	0.133	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.88	119.52	3552.00	2.83	67.43	508.80
Length = 13.0 ft	2	0.034	0.133	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.88	119.52	3552.00	0.44	67.43	508.80
+D+0.750L+0.750S+0.450W+H, LL					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 1.50 ft	1	0.045	0.229	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.49	158.37	3552.00	4.89	116.33	508.80
Length = 13.0 ft	2	0.045	0.229	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.49	158.37	3552.00	0.49	116.33	508.80
+D+0.750L+0.750S+0.450W+H, LL					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 1.50 ft	1	0.045	0.229	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.49	158.37	3552.00	4.89	116.33	508.80
Length = 13.0 ft	2	0.045	0.229	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.49	158.37	3552.00	0.34	116.33	508.80
+D+0.750L+0.750S+0.450W+H, LL					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 1.50 ft	1	0.045	0.229	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.49	158.37	3552.00	4.89	116.33	508.80
Length = 13.0 ft	2	0.045	0.229	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.49	158.37	3552.00	0.49	116.33	508.80
+0.60D+0.60W+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 1.50 ft	1	0.020	0.080	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.13	71.71	3552.00	1.70	40.46	508.80
Length = 13.0 ft	2	0.020	0.080	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.13	71.71	3552.00	0.17	40.46	508.80
+D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 1.50 ft	1	0.077	0.208	1.60	1.000	1.00	1.00	1.00	1.00	1.00	4.30	272.86	3552.00	4.44	105.76	508.80

Title Block Line 1
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and then using the "Printing &
Title Block" selection.
Title Block Line 6

Project Title:
Engineer:
Project ID:
Project Descr:

Printed: 21 JUL 2021, 12:58PM

Wood Beam

File: beam calcs with overstrength.ec6

Lic. # : KW-06004787

MULHERN & KULP STRUCTURAL ENGINEERING INC

DESCRIPTION: B6 - 2ND FLR FRMG - FLUSH BM CANT'D @ FOYER

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
Length = 13.0 ft	2	0.077	0.208	1.60	1.000	1.00	1.00	1.00	1.00	1.00	4.30	272.86	3552.00	0.48	105.76	508.80
+D-0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 1.50 ft	1	0.011	0.057	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.83	52.70	4608.00	1.22	29.09	508.80
Length = 13.0 ft	2	0.012	0.057	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.90	57.20	4608.00	0.19	29.09	508.80
+D+0.750L+0.750S+0.5250E+H, LL					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 1.50 ft	1	0.077	0.285	1.60	1.000	1.00	1.00	1.00	1.00	1.00	4.31	273.37	3552.00	6.09	145.08	508.80
Length = 13.0 ft	2	0.077	0.285	1.60	1.000	1.00	1.00	1.00	1.00	1.00	4.31	273.37	3552.00	0.63	145.08	508.80
+D+0.750L+0.750S+0.5250E+H, LL					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 1.50 ft	1	0.077	0.285	1.60	1.000	1.00	1.00	1.00	1.00	1.00	4.31	273.37	3552.00	6.09	145.08	508.80
Length = 13.0 ft	2	0.077	0.285	1.60	1.000	1.00	1.00	1.00	1.00	1.00	4.31	273.37	3552.00	0.48	145.08	508.80
+D+0.750L+0.750S+0.5250E+H, LL					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 1.50 ft	1	0.077	0.285	1.60	1.000	1.00	1.00	1.00	1.00	1.00	4.31	273.37	3552.00	6.09	145.08	508.80
Length = 13.0 ft	2	0.077	0.285	1.60	1.000	1.00	1.00	1.00	1.00	1.00	4.31	273.37	3552.00	0.63	145.08	508.80
+D+0.750L+0.750S-0.5250E+H, LL					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 1.50 ft	1	0.012	0.172	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.68	43.37	3552.00	3.68	87.58	508.80
Length = 13.0 ft	2	0.013	0.172	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.92	58.48	4608.00	0.35	87.58	508.80
+D+0.750L+0.750S-0.5250E+H, LL					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 1.50 ft	1	0.012	0.172	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.68	43.37	3552.00	3.68	87.58	508.80
Length = 13.0 ft	2	0.012	0.172	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.68	43.37	3552.00	0.20	87.58	508.80
+D+0.750L+0.750S-0.5250E+H, LL					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 1.50 ft	1	0.012	0.172	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.68	43.37	3552.00	3.68	87.58	508.80
Length = 13.0 ft	2	0.013	0.172	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.92	58.48	4608.00	0.35	87.58	508.80

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+0.70E+0.60H	1	0.0152	0.000		0.0000	0.000
	2	0.0000	0.000	E Only	-0.0214	5.520

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Overall MAXimum		6.806	0.301
Overall MINimum		2.565	-0.063
+D+H		3.163	0.041
+D+L+H, LL Comb Run (*L)		3.423	0.301
+D+L+H, LL Comb Run (L*)		3.163	0.041
+D+L+H, LL Comb Run (LL)		3.423	0.301
+D+Lr+H, LL Comb Run (*L)		3.163	0.041
+D+Lr+H, LL Comb Run (L*)		3.163	0.041
+D+Lr+H, LL Comb Run (LL)		3.163	0.041
+D+S+H		5.964	-0.021
+D+0.750Lr+0.750L+H, LL Comb Run (*		3.358	0.236
+D+0.750Lr+0.750L+H, LL Comb Run (L		3.163	0.041
+D+0.750Lr+0.750L+H, LL Comb Run (L		3.358	0.236
+D+0.750L+0.750S+H, LL Comb Run (*L		5.459	0.189
+D+0.750L+0.750S+H, LL Comb Run (L*		5.264	-0.006
+D+0.750L+0.750S+H, LL Comb Run (LL		5.459	0.189
+D+0.60W+H		3.163	0.041
+D+0.750Lr+0.750L+0.450W+H, LL Comb		3.358	0.236
+D+0.750Lr+0.750L+0.450W+H, LL Comb		3.163	0.041
+D+0.750Lr+0.750L+0.450W+H, LL Comb		3.358	0.236
+D+0.750L+0.750S+0.450W+H, LL Comb		5.459	0.189
+D+0.750L+0.750S+0.450W+H, LL Comb		5.264	-0.006
+D+0.750L+0.750S+0.450W+H, LL Comb		5.459	0.189
+0.60D+0.60W+0.60H		1.898	0.025
+D+0.70E+0.60H		4.959	-0.144
+D+0.750L+0.750S+0.5250E+H, LL Comb		6.806	0.050
+D+0.750L+0.750S+0.5250E+H, LL Comb		6.611	-0.145
+D+0.750L+0.750S+0.5250E+H, LL Comb		6.806	0.050
+0.60D+0.70E+H		3.694	-0.161
D Only		3.163	0.041

Wood Beam

DESCRIPTION: B6 - 2ND FLR FRMG - FLUSH BM CANT'D @ FOYER

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3
L Only, LL Comb Run (*L)		0.260	0.260
L Only, LL Comb Run (LL)		0.260	0.260
S Only		2.801	-0.063
E Only		2.565	-0.265
H Only			

Title Block Line 1
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using the "Settings" menu item
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Title Block" selection.
Title Block Line 6

Project Title:
Engineer:
Project ID:
Project Descr:

Printed: 21 JUL 2021, 1:00PM

Wood Beam

File: beam calcs with overstrength.ec6

Lic. # : KW-06004787
MULHERN & KULP STRUCTURAL ENGINEERING INC

DESCRIPTION: B7 - 2ND FLR FRMG - FLUSH BM CANT'D @ LIVING

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
Load Combination : ASCE 7-16

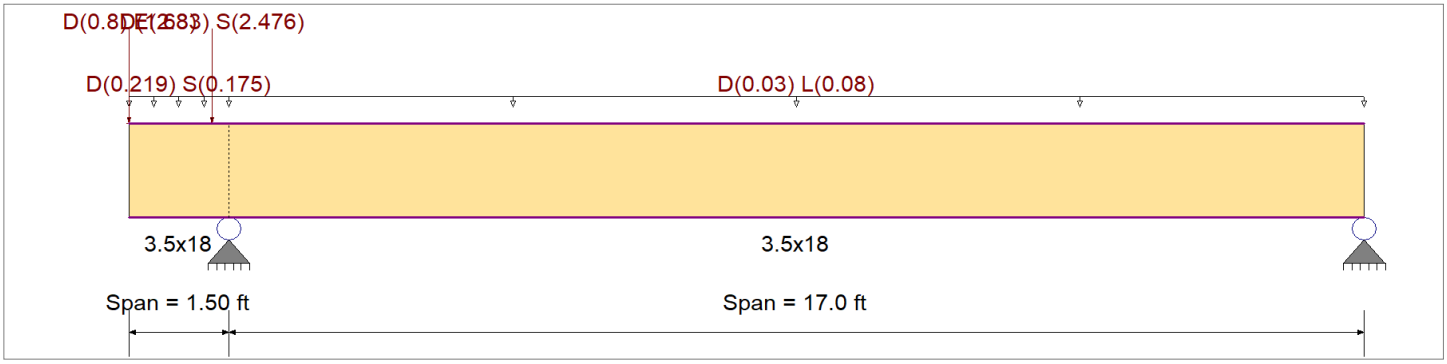
Wood Species : DF/DF
Wood Grade : 24F - V4

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	2,880.0 psi
Fb -	2,220.0 psi
Fc - Prll	1,980.0 psi
Fc - Perp	780.0 psi
Fv	318.0 psi
Ft	1,320.0 psi

E : Modulus of Elasticity

Ebend- xx	1,800.0 ksi
Eminbend - xx	950.0 ksi
Ebend- yy	1,600.0 ksi
Eminbend - yy	850.0 ksi
Density	31.210 pcf



Applied Loads

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

Beam self weight calculated and added to loads
Load for Span Number 1
Point Load : D = 1.683, S = 2.476 k @ 1.250 ft
Uniform Load : D = 0.2190, S = 0.1750 k/ft, Extent = 0.0 -->> 1.50 ft, Tributary Width = 1.0 ft
Point Load : D = 0.80, E = 2.30 k @ 0.0 ft
Load for Span Number 2
Uniform Load : D = 0.030, L = 0.080 , Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.079 : 1	Maximum Shear Stress Ratio	=	0.363 : 1
Section used for this span		3.5x18	Section used for this span		3.5x18
fb: Actual	=	227.01 psi	fv: Actual	=	132.63 psi
Fb: Allowable	=	2,880.00 psi	Fv: Allowable	=	365.70 psi
Load Combination		+D+L+H, LL Comb Run (*L)	Load Combination		+D+S+H
Location of maximum on span	=	9.402 ft	Location of maximum on span	=	1.500 ft
Span # where maximum occurs	=	Span # 2	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.018 in	Ratio =	1998 >=360
Max Upward Transient Deflection	-0.014 in	Ratio =	2596 >=360
Max Downward Total Deflection	0.015 in	Ratio =	2446 >=300
Max Upward Total Deflection	-0.012 in	Ratio =	3060 >=300

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 1.50 ft	1	0.060	0.236	0.90	1.000	1.00	1.00	1.00	1.00	1.00	1.88	119.52	1998.00	2.83	67.43	286.20
Length = 17.0 ft	2	0.060	0.236	0.90	1.000	1.00	1.00	1.00	1.00	1.00	1.88	119.52	1998.00	0.42	67.43	286.20
+D+L+H, LL Comb Run (*L)					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 1.50 ft	1	0.054	0.212	1.00	1.000	1.00	1.00	1.00	1.00	1.00	1.88	119.52	2220.00	2.83	67.43	318.00
Length = 17.0 ft	2	0.079	0.212	1.00	1.000	1.00	1.00	1.00	1.00	1.00	3.58	227.01	2880.00	0.99	67.43	318.00
+D+L+H, LL Comb Run (L*)					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 1.50 ft	1	0.054	0.212	1.00	1.000	1.00	1.00	1.00	1.00	1.00	1.88	119.52	2220.00	2.83	67.43	318.00

Wood Beam

DESCRIPTION: B7 - 2ND FLR FRMG - FLUSH BM CANT'D @ LIVING

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
Length = 17.0 ft	2	0.054	0.212	1.00	1.000	1.00	1.00	1.00	1.00	1.00	1.88	119.52	2220.00	0.42	67.43	318.00
+D+L+H, LL Comb Run (LL)					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 1.50 ft	1	0.054	0.212	1.00	1.000	1.00	1.00	1.00	1.00	1.00	1.88	119.52	2220.00	2.83	67.43	318.00
Length = 17.0 ft	2	0.079	0.212	1.00	1.000	1.00	1.00	1.00	1.00	1.00	3.58	227.01	2880.00	0.99	67.43	318.00
+D+Lr+H, LL Comb Run (*L)					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 1.50 ft	1	0.043	0.170	1.25	1.000	1.00	1.00	1.00	1.00	1.00	1.88	119.52	2775.00	2.83	67.43	397.50
Length = 17.0 ft	2	0.043	0.170	1.25	1.000	1.00	1.00	1.00	1.00	1.00	1.88	119.52	2775.00	0.42	67.43	397.50
+D+Lr+H, LL Comb Run (L*)					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 1.50 ft	1	0.043	0.170	1.25	1.000	1.00	1.00	1.00	1.00	1.00	1.88	119.52	2775.00	2.83	67.43	397.50
Length = 17.0 ft	2	0.043	0.170	1.25	1.000	1.00	1.00	1.00	1.00	1.00	1.88	119.52	2775.00	0.42	67.43	397.50
+D+Lr+H, LL Comb Run (LL)					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 1.50 ft	1	0.043	0.170	1.25	1.000	1.00	1.00	1.00	1.00	1.00	1.88	119.52	2775.00	2.83	67.43	397.50
Length = 17.0 ft	2	0.043	0.170	1.25	1.000	1.00	1.00	1.00	1.00	1.00	1.88	119.52	2775.00	0.42	67.43	397.50
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 1.50 ft	1	0.067	0.363	1.15	1.000	1.00	1.00	1.00	1.00	1.00	2.70	171.32	2553.00	5.57	132.63	365.70
Length = 17.0 ft	2	0.067	0.363	1.15	1.000	1.00	1.00	1.00	1.00	1.00	2.70	171.32	2553.00	0.47	132.63	365.70
+D+0.750Lr+0.750L+H, LL Comb Ru					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 1.50 ft	1	0.043	0.170	1.25	1.000	1.00	1.00	1.00	1.00	1.00	1.88	119.52	2775.00	2.83	67.43	397.50
Length = 17.0 ft	2	0.050	0.170	1.25	1.000	1.00	1.00	1.00	1.00	1.00	2.86	181.74	3600.00	0.84	67.43	397.50
+D+0.750Lr+0.750L+H, LL Comb Ru					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 1.50 ft	1	0.043	0.170	1.25	1.000	1.00	1.00	1.00	1.00	1.00	1.88	119.52	2775.00	2.83	67.43	397.50
Length = 17.0 ft	2	0.043	0.170	1.25	1.000	1.00	1.00	1.00	1.00	1.00	1.88	119.52	2775.00	0.42	67.43	397.50
+D+0.750Lr+0.750L+H, LL Comb Ru					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 1.50 ft	1	0.043	0.170	1.25	1.000	1.00	1.00	1.00	1.00	1.00	1.88	119.52	2775.00	2.83	67.43	397.50
Length = 17.0 ft	2	0.050	0.170	1.25	1.000	1.00	1.00	1.00	1.00	1.00	2.86	181.74	3600.00	0.84	67.43	397.50
+D+0.750L+0.750S+H, LL Comb Ru					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 1.50 ft	1	0.062	0.318	1.15	1.000	1.00	1.00	1.00	1.00	1.00	2.49	158.37	2553.00	4.89	116.33	365.70
Length = 17.0 ft	2	0.050	0.318	1.15	1.000	1.00	1.00	1.00	1.00	1.00	2.60	165.15	3312.00	0.88	116.33	365.70
+D+0.750L+0.750S+H, LL Comb Ru					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 1.50 ft	1	0.062	0.318	1.15	1.000	1.00	1.00	1.00	1.00	1.00	2.49	158.37	2553.00	4.89	116.33	365.70
Length = 17.0 ft	2	0.062	0.318	1.15	1.000	1.00	1.00	1.00	1.00	1.00	2.49	158.37	2553.00	0.46	116.33	365.70
+D+0.750L+0.750S+H, LL Comb Ru					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 1.50 ft	1	0.062	0.318	1.15	1.000	1.00	1.00	1.00	1.00	1.00	2.49	158.37	2553.00	4.89	116.33	365.70
Length = 17.0 ft	2	0.050	0.318	1.15	1.000	1.00	1.00	1.00	1.00	1.00	2.60	165.15	3312.00	0.88	116.33	365.70
+D+0.60W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 1.50 ft	1	0.034	0.133	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.88	119.52	3552.00	2.83	67.43	508.80
Length = 17.0 ft	2	0.034	0.133	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.88	119.52	3552.00	0.42	67.43	508.80
+D+0.750Lr+0.750L+0.450W+H, LL					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 1.50 ft	1	0.034	0.133	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.88	119.52	3552.00	2.83	67.43	508.80
Length = 17.0 ft	2	0.039	0.133	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.86	181.74	4608.00	0.84	67.43	508.80
+D+0.750Lr+0.750L+0.450W+H, LL					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 1.50 ft	1	0.034	0.133	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.88	119.52	3552.00	2.83	67.43	508.80
Length = 17.0 ft	2	0.034	0.133	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.88	119.52	3552.00	0.42	67.43	508.80
+D+0.750Lr+0.750L+0.450W+H, LL					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 1.50 ft	1	0.034	0.133	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.88	119.52	3552.00	2.83	67.43	508.80
Length = 17.0 ft	2	0.039	0.133	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.86	181.74	4608.00	0.84	67.43	508.80
+D+0.750L+0.750S+0.450W+H, LL (					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 1.50 ft	1	0.045	0.229	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.49	158.37	3552.00	4.89	116.33	508.80
Length = 17.0 ft	2	0.036	0.229	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.60	165.15	4608.00	0.88	116.33	508.80
+D+0.750L+0.750S+0.450W+H, LL (					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 1.50 ft	1	0.045	0.229	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.49	158.37	3552.00	4.89	116.33	508.80
Length = 17.0 ft	2	0.045	0.229	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.49	158.37	3552.00	0.46	116.33	508.80
+D+0.750L+0.750S+0.450W+H, LL (					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 1.50 ft	1	0.045	0.229	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.49	158.37	3552.00	4.89	116.33	508.80
Length = 17.0 ft	2	0.036	0.229	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.60	165.15	4608.00	0.88	116.33	508.80
+0.60D+0.60W+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 1.50 ft	1	0.020	0.080	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.13	71.71	3552.00	1.70	40.46	508.80
Length = 17.0 ft	2	0.020	0.080	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.13	71.71	3552.00	0.25	40.46	508.80
+D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 1.50 ft	1	0.077	0.208	1.60	1.000	1.00	1.00	1.00	1.00	1.00	4.30	272.86	3552.00	4.44	105.76	508.80

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Project Title:
Engineer:
Project ID:
Project Descr:

Printed: 21 JUL 2021, 1:00PM

Wood Beam

File: beam calcs with overstrength.ec6

Lic. # : KW-06004787

MULHERN & KULP STRUCTURAL ENGINEERING INC

DESCRIPTION: B7 - 2ND FLR FRMG - FLUSH BM CANT'D @ LIVING

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
Length = 17.0 ft	2	0.077	0.208	1.60	1.000	1.00	1.00	1.00	1.00	1.00	4.30	272.86	3552.00	0.56	105.76	508.80
+D-0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 1.50 ft	1	0.011	0.057	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.83	52.70	4608.00	1.22	29.09	508.80
Length = 17.0 ft	2	0.026	0.057	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.85	117.75	4608.00	0.34	29.09	508.80
+D+0.750L+0.750S+0.5250E+H, LL					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 1.50 ft	1	0.077	0.285	1.60	1.000	1.00	1.00	1.00	1.00	1.00	4.31	273.37	3552.00	6.09	145.08	508.80
Length = 17.0 ft	2	0.077	0.285	1.60	1.000	1.00	1.00	1.00	1.00	1.00	4.31	273.37	3552.00	0.99	145.08	508.80
+D+0.750L+0.750S+0.5250E+H, LL					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 1.50 ft	1	0.077	0.285	1.60	1.000	1.00	1.00	1.00	1.00	1.00	4.31	273.37	3552.00	6.09	145.08	508.80
Length = 17.0 ft	2	0.077	0.285	1.60	1.000	1.00	1.00	1.00	1.00	1.00	4.31	273.37	3552.00	0.56	145.08	508.80
+D+0.750L+0.750S+0.5250E+H, LL					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 1.50 ft	1	0.077	0.285	1.60	1.000	1.00	1.00	1.00	1.00	1.00	4.31	273.37	3552.00	6.09	145.08	508.80
Length = 17.0 ft	2	0.077	0.285	1.60	1.000	1.00	1.00	1.00	1.00	1.00	4.31	273.37	3552.00	0.99	145.08	508.80
+D+0.750L+0.750S-0.5250E+H, LL					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 1.50 ft	1	0.012	0.172	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.68	43.37	3552.00	3.68	87.58	508.80
Length = 17.0 ft	2	0.047	0.172	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.41	216.55	4608.00	0.77	87.58	508.80
+D+0.750L+0.750S-0.5250E+H, LL					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 1.50 ft	1	0.012	0.172	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.68	43.37	3552.00	3.68	87.58	508.80
Length = 17.0 ft	2	0.017	0.172	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.25	79.61	4608.00	0.35	87.58	508.80
+D+0.750L+0.750S-0.5250E+H, LL					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 1.50 ft	1	0.012	0.172	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.68	43.37	3552.00	3.68	87.58	508.80
Length = 17.0 ft	2	0.047	0.172	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.41	216.55	4608.00	0.77	87.58	508.80

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
E Only	1	0.0180	0.000		0.0000	0.000
+D+L+H, LL Comb Run (LL)	2	0.0572	8.927	E Only	-0.0205	2.279

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Overall MAXimum		7.228	0.940
Overall MINimum		2.503	-0.048
+D+H		3.314	0.260
+D+L+H, LL Comb Run (*L)		3.994	0.940
+D+L+H, LL Comb Run (L*)		3.314	0.260
+D+L+H, LL Comb Run (LL)		3.994	0.940
+D+Lr+H, LL Comb Run (*L)		3.314	0.260
+D+Lr+H, LL Comb Run (L*)		3.314	0.260
+D+Lr+H, LL Comb Run (LL)		3.314	0.260
+D+S+H		6.100	0.212
+D+0.750Lr+0.750L+H, LL Comb Run (*		3.824	0.770
+D+0.750Lr+0.750L+H, LL Comb Run (L		3.314	0.260
+D+0.750Lr+0.750L+H, LL Comb Run (L		3.824	0.770
+D+0.750L+0.750S+H, LL Comb Run (*L		5.914	0.734
+D+0.750L+0.750S+H, LL Comb Run (L*		5.404	0.224
+D+0.750L+0.750S+H, LL Comb Run (LL		5.914	0.734
+D+0.60W+H		3.314	0.260
+D+0.750Lr+0.750L+0.450W+H, LL Comb		3.824	0.770
+D+0.750Lr+0.750L+0.450W+H, LL Comb		3.314	0.260
+D+0.750Lr+0.750L+0.450W+H, LL Comb		3.824	0.770
+D+0.750L+0.750S+0.450W+H, LL Comb		5.914	0.734
+D+0.750L+0.750S+0.450W+H, LL Comb		5.404	0.224
+D+0.750L+0.750S+0.450W+H, LL Comb		5.914	0.734
+0.60D+0.60W+0.60H		1.988	0.156
+D+0.70E+0.60H		5.066	0.118
+D+0.750L+0.750S+0.5250E+H, LL Comb		7.228	0.628
+D+0.750L+0.750S+0.5250E+H, LL Comb		6.718	0.118
+D+0.750L+0.750S+0.5250E+H, LL Comb		7.228	0.628
+0.60D+0.70E+H		3.740	0.014
D Only		3.314	0.260

Wood Beam

DESCRIPTION: B7 - 2ND FLR FRMG - FLUSH BM CANT'D @ LIVING

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3
L Only, LL Comb Run (*L)		0.680	0.680
L Only, LL Comb Run (LL)		0.680	0.680
S Only		2.786	-0.048
E Only		2.503	-0.203
H Only			

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Project Title:
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Wood Beam

File: beam calcs with overstrength.ec6

Lic. # : KW-06004787
MULHERN & KULP STRUCTURAL ENGINEERING INC

DESCRIPTION: B17 - 2ND FLR FRMG - FLUSH BM @ PANTRY UNDER INT SHEAR WALL

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
Load Combination : ASCE 7-16

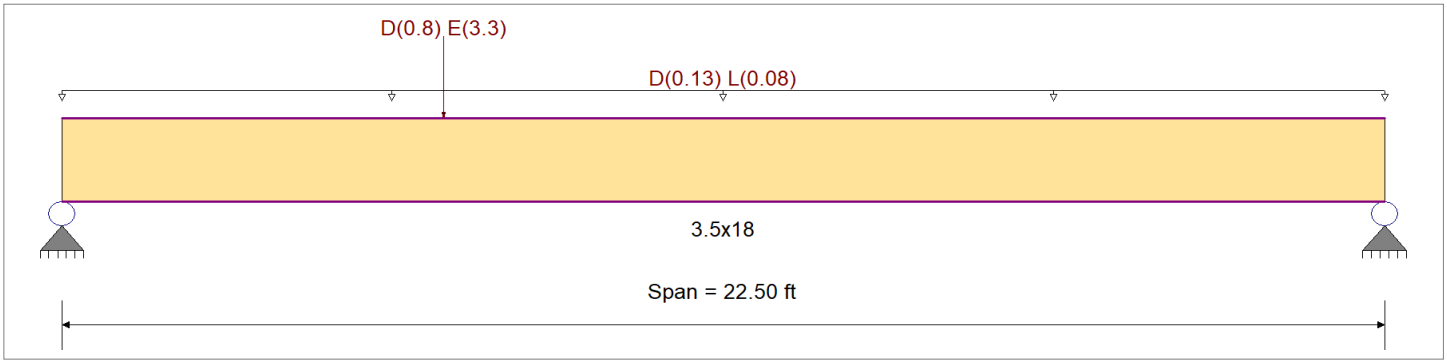
Wood Species : DF/DF
Wood Grade : 24F - V4

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	2,880.0 psi
Fb -	2,220.0 psi
Fc - Prll	1,980.0 psi
Fc - Perp	780.0 psi
Fv	318.0 psi
Ft	1,320.0 psi

E : Modulus of Elasticity

Ebend- xx	1,800.0 ksi
Eminbend - xx	950.0 ksi
Ebend- yy	1,600.0 ksi
Eminbend - yy	850.0 ksi
Density	31.210 pcf



Applied Loads

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

Beam self weight calculated and added to loads
Uniform Load : D = 0.130, L = 0.080 , Tributary Width = 1.0 ft
Point Load : D = 0.80, E = 3.30 k @ 6.50 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.375 : 1	Maximum Shear Stress Ratio	=	0.206 : 1
Section used for this span		3.5x18	Section used for this span		3.5x18
fb: Actual	=	1,071.26 psi	fv: Actual	=	65.58 psi
Fb: Allowable	=	2,853.31 psi	Fv: Allowable	=	318.00 psi
Load Combination		+D+L+H	Load Combination		+D+L+H
Location of maximum on span	=	10.182 ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.347 in	Ratio =	777 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.650 in	Ratio =	415 >=300
Max Upward Total Deflection	0.000 in	Ratio =	0 <300

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 22.50 ft	1	0.294	0.164	0.90	0.991	1.00	1.00	1.00	1.00	1.00	11.88	754.06	2567.98	1.97	46.97	286.20
+D+L+H					0.991	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 22.50 ft	1	0.375	0.206	1.00	0.991	1.00	1.00	1.00	1.00	1.00	16.87	1,071.26	2853.31	2.75	65.58	318.00
+D+Lr+H					0.991	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 22.50 ft	1	0.211	0.118	1.25	0.991	1.00	1.00	1.00	1.00	1.00	11.88	754.06	3566.64	1.97	46.97	397.50
+D+S+H					0.991	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 22.50 ft	1	0.230	0.128	1.15	0.991	1.00	1.00	1.00	1.00	1.00	11.88	754.06	3281.31	1.97	46.97	365.70
+D+0.750Lr+0.750L+H					0.991	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 22.50 ft	1	0.278	0.153	1.25	0.991	1.00	1.00	1.00	1.00	1.00	15.62	991.66	3566.64	2.56	60.93	397.50
+D+0.750L+0.750S+H					0.991	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 22.50 ft	1	0.302	0.167	1.15	0.991	1.00	1.00	1.00	1.00	1.00	15.62	991.66	3281.31	2.56	60.93	365.70

Wood Beam

DESCRIPTION: B17 - 2ND FLR FRMG - FLUSH BM @ PANTRY UNDER INT SHEAR WALL

Load Combination / Segment Length	Span #	Max Stress Ratios M	Max Stress Ratios V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	Moment Values fb	Moment Values F'b	Shear Values V	Shear Values fv	Shear Values F'v
+D+0.60W+H					0.991	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 22.50 ft	1	0.165	0.092	1.60	0.991	1.00	1.00	1.00	1.00	1.00	11.88	754.06	4565.30	1.97	46.97	508.80
+D+0.750Lr+0.750L+0.450W+H					0.991	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 22.50 ft	1	0.217	0.120	1.60	0.991	1.00	1.00	1.00	1.00	1.00	15.62	991.66	4565.30	2.56	60.93	508.80
+D+0.750L+0.750S+0.450W+H					0.991	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 22.50 ft	1	0.217	0.120	1.60	0.991	1.00	1.00	1.00	1.00	1.00	15.62	991.66	4565.30	2.56	60.93	508.80
+0.60D+0.60W+0.60H					0.991	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 22.50 ft	1	0.099	0.055	1.60	0.991	1.00	1.00	1.00	1.00	1.00	7.13	452.44	4565.30	1.18	28.18	508.80
+D+0.70E+0.60H					0.991	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 22.50 ft	1	0.304	0.169	1.60	0.991	1.00	1.00	1.00	1.00	1.00	21.83	1,386.02	4565.30	3.62	86.08	508.80
+D-0.70E+0.60H					0.991	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 22.50 ft	1	0.067	0.052	1.60	0.991	1.00	1.00	1.00	1.00	1.00	4.85	307.65	4565.30	1.11	26.40	508.80
+D+0.750L+0.750S+0.5250E+H					0.991	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 22.50 ft	1	0.312	0.177	1.60	0.991	1.00	1.00	1.00	1.00	1.00	22.43	1,424.27	4565.30	3.79	90.26	508.80
+D+0.750L+0.750S-0.5250E+H					0.991	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 22.50 ft	1	0.140	0.081	1.60	0.991	1.00	1.00	1.00	1.00	1.00	10.04	637.15	4565.30	1.72	40.97	508.80

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	0.6502	10.839		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	4.092	3.023
Overall MINimum	2.347	0.953
+D+H	2.185	1.847
+D+L+H	3.085	2.747
+D+Lr+H	2.185	1.847
+D+S+H	2.185	1.847
+D+0.750Lr+0.750L+H	2.860	2.522
+D+0.750L+0.750S+H	2.860	2.522
+D+0.60W+H	2.185	1.847
+D+0.750Lr+0.750L+0.450W+H	2.860	2.522
+D+0.750L+0.750S+0.450W+H	2.860	2.522
+0.60D+0.60W+0.60H	1.311	1.108
+D+0.70E+0.60H	3.828	2.515
+D+0.750L+0.750S+0.5250E+H	4.092	3.023
+0.60D+0.70E+H	2.954	1.776
D Only	2.185	1.847
L Only	0.900	0.900
E Only	2.347	0.953
H Only		

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Engineer:
Project ID:
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Wood Beam

File: beam calcs with overstrength.ec6

Lic. # : KW-06004787
MULHERN & KULP STRUCTURAL ENGINEERING INC

DESCRIPTION: B18 - 2ND FLR FRMG - FLUSH BM @ GARAGE UNDER SIDE EXT WALL

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
Load Combination : ASCE 7-16

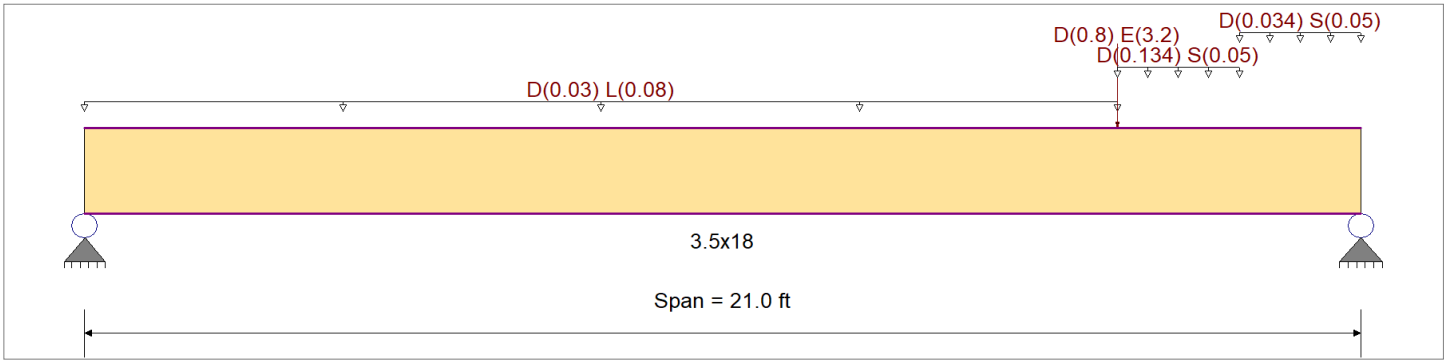
Wood Species : DF/DF
Wood Grade : 24F - V4

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	2,880.0 psi
Fb -	2,220.0 psi
Fc - Prll	1,980.0 psi
Fc - Perp	780.0 psi
Fv	318.0 psi
Ft	1,320.0 psi

E : Modulus of Elasticity

Ebend- xx	1,800.0 ksi
Eminbend - xx	950.0 ksi
Ebend- yy	1,600.0 ksi
Eminbend - yy	850.0 ksi
Density	31.210 pcf



Applied Loads

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

Beam self weight calculated and added to loads
Load for Span Number 1
Uniform Load : D = 0.030, L = 0.080 k/ft, Extent = 0.0 -->> 17.0 ft, Tributary Width = 1.0 ft
Point Load : D = 0.80, E = 3.20 k @ 17.0 ft
Uniform Load : D = 0.1340, S = 0.050 k/ft, Extent = 17.0 -->> 19.0 ft, Tributary Width = 1.0 ft
Uniform Load : D = 0.0340, S = 0.050 k/ft, Extent = 19.0 -->> 21.0 ft, Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.188 : 1	Maximum Shear Stress Ratio	=	0.144 : 1
Section used for this span		3.5x18	Section used for this span		3.5x18
fb: Actual	=	540.06 psi	fv: Actual	=	73.25 psi
Fb: Allowable	=	2,873.07 psi	Fv: Allowable	=	508.80 psi
Load Combination		+D+L+H	Load Combination		+D+0.750L+0.750S+0.5250E+H
Location of maximum on span	=	11.726 ft	Location of maximum on span	=	19.544 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.194 in	Ratio =	1297 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.305 in	Ratio =	826 >=300
Max Upward Total Deflection	0.000 in	Ratio =	0 <300

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L		M	fb	F'b	V	fv	F'v
+D+H														0.00	0.00	0.00	0.00
Length = 21.0 ft	1	0.115	0.102	0.90	0.998	1.00	1.00	1.00	1.00	1.00		4.70	298.65	2585.76	1.22	29.11	286.20
+D+L+H					0.998	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 21.0 ft	1	0.188	0.133	1.00	0.998	1.00	1.00	1.00	1.00	1.00		8.51	540.06	2873.07	1.77	42.21	318.00
+D+Lr+H					0.998	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 21.0 ft	1	0.083	0.073	1.25	0.998	1.00	1.00	1.00	1.00	1.00		4.70	298.65	3591.34	1.22	29.11	397.50
+D+S+H					0.998	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 21.0 ft	1	0.096	0.087	1.15	0.998	1.00	1.00	1.00	1.00	1.00		4.99	316.67	3304.03	1.33	31.68	365.70
+D+0.750Lr+0.750L+H					0.998	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00

Title Block Line 1
You can change this area
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and then using the "Printing &
Title Block" selection.
Title Block Line 6

Project Title:
Engineer:
Project ID:
Project Descr:

Printed: 21 JUL 2021, 3:01PM

Wood Beam

File: beam calcs with overstrength.ec6

Lic. # : KW-06004787

MULHERN & KULP STRUCTURAL ENGINEERING INC

DESCRIPTION: B18 - 2ND FLR FRMG - FLUSH BM @ GARAGE UNDER SIDE EXT WALL

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
Length = 21.0 ft	1	0.133	0.098	1.25	0.998	1.00	1.00	1.00	1.00	1.00	7.51	477.01	3591.34	1.64	38.94	397.50
+D+0.750L+0.750S+H					0.998	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 21.0 ft	1	0.148	0.112	1.15	0.998	1.00	1.00	1.00	1.00	1.00	7.69	487.99	3304.03	1.72	40.87	365.70
+D+0.60W+H					0.998	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 21.0 ft	1	0.065	0.057	1.60	0.998	1.00	1.00	1.00	1.00	1.00	4.70	298.65	4596.91	1.22	29.11	508.80
+D+0.750Lr+0.750L+0.450W+H					0.998	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 21.0 ft	1	0.104	0.077	1.60	0.998	1.00	1.00	1.00	1.00	1.00	7.51	477.01	4596.91	1.64	38.94	508.80
+D+0.750L+0.750S+0.450W+H					0.998	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 21.0 ft	1	0.106	0.080	1.60	0.998	1.00	1.00	1.00	1.00	1.00	7.69	487.99	4596.91	1.72	40.87	508.80
+0.60D+0.60W+0.60H					0.998	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 21.0 ft	1	0.039	0.034	1.60	0.998	1.00	1.00	1.00	1.00	1.00	2.82	179.19	4596.91	0.73	17.46	508.80
+D+0.70E+0.60H					0.998	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 21.0 ft	1	0.163	0.142	1.60	0.998	1.00	1.00	1.00	1.00	1.00	11.82	750.44	4596.91	3.04	72.28	508.80
+D-0.70E+0.60H					0.998	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 21.0 ft	1	0.048	0.043	1.60	0.998	1.00	1.00	1.00	1.00	1.00	2.65	168.49	3543.45	0.91	21.66	508.80
+D+0.750L+0.750S+0.5250E+H					0.998	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 21.0 ft	1	0.167	0.144	1.60	0.998	1.00	1.00	1.00	1.00	1.00	12.08	766.77	4596.91	3.08	73.25	508.80
+D+0.750L+0.750S-0.5250E+H					0.998	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 21.0 ft	1	0.059	0.038	1.60	0.998	1.00	1.00	1.00	1.00	1.00	4.28	271.93	4596.91	0.81	19.37	508.80

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	0.3050	11.266		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	1.582	3.200
Overall MINimum	0.610	2.590
+D+H	0.641	1.292
+D+L+H	1.450	1.842
+D+Lr+H	0.641	1.292
+D+S+H	0.660	1.473
+D+0.750Lr+0.750L+H	1.248	1.705
+D+0.750L+0.750S+H	1.262	1.840
+D+0.60W+H	0.641	1.292
+D+0.750Lr+0.750L+0.450W+H	1.248	1.705
+D+0.750L+0.750S+0.450W+H	1.262	1.840
+0.60D+0.60W+0.60H	0.385	0.775
+D+0.70E+0.60H	1.068	3.105
+D+0.750L+0.750S+0.5250E+H	1.582	3.200
+0.60D+0.70E+H	0.811	2.588
D Only	0.641	1.292
L Only	0.810	0.550
S Only	0.019	0.181
E Only	0.610	2.590
H Only		

Title Block Line 1
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Title Block" selection.
Title Block Line 6

Project Title:
Engineer:
Project ID:
Project Descr:

Printed: 21 JUL 2021, 3:38PM

Wood Beam

File: beam calcs with overstrength.ec6

Lic. # : KW-06004787
MULHERN & KULP STRUCTURAL ENGINEERING INC

DESCRIPTION: B22 - 2ND FLR FRMG - FLUSH BM @ BEDROOM/GARAGE UNDER FRONT EXT WALL

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
Load Combination : ASCE 7-16

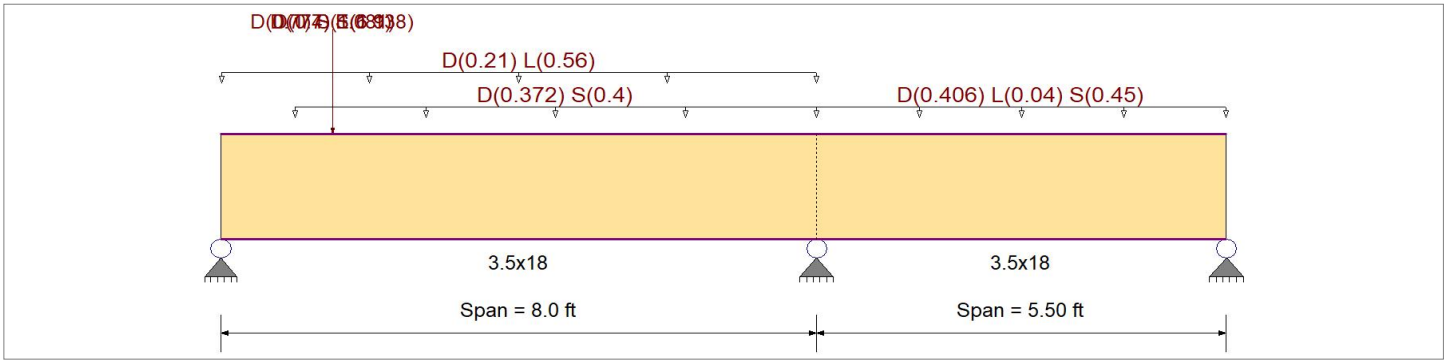
Wood Species : DF/DF
Wood Grade : 24F - V4

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	2,880.0 psi
Fb -	2,220.0 psi
Fc - Prll	1,980.0 psi
Fc - Perp	780.0 psi
Fv	318.0 psi
Ft	1,320.0 psi

E : Modulus of Elasticity

Ebend- xx	1,800.0 ksi
Eminbend - xx	950.0 ksi
Ebend- yy	1,600.0 ksi
Eminbend - yy	850.0 ksi
Density	31.210 pcf



Applied Loads

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

Beam self weight calculated and added to loads
Load for Span Number 1
- Uniform Load : D = 0.3720, S = 0.40 k/ft, Extent = 1.0 -->> 8.0 ft, Tributary Width = 1.0 ft
- Point Load : D = 0.7740, S = 1.138 k @ 1.50 ft
- Point Load : D = 0.70, E = 6.90 k @ 1.50 ft
- Point Load : D = 1.0, S = 1.081 k @ 1.50 ft
- Uniform Load : D = 0.210, L = 0.560 , Tributary Width = 1.0 ft

Load for Span Number 2
- Uniform Load : D = 0.4060, L = 0.040, S = 0.450 , Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.227 : 1	Maximum Shear Stress Ratio	=	0.390 : 1
Section used for this span		3.5x18	Section used for this span		3.5x18
fb: Actual	=	579.40 psi	fv: Actual	=	198.59 psi
Fb: Allowable	=	2,553.00 psi	Fv: Allowable	=	508.80 psi
Load Combination		+D+0.750L+0.750S+H, LL Comb Run (L	Load Combination		+D+0.750L+0.750S+0.5250E+H, LL Com
Location of maximum on span	=	0.000 ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 2	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.017 in	Ratio =	5698 >=360
Max Upward Transient Deflection	-0.003 in	Ratio =	20074 >=360
Max Downward Total Deflection	0.041 in	Ratio =	2313 >=300
Max Upward Total Deflection	-0.007 in	Ratio =	9513 >=300

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.126	0.248	0.90	1.000	1.00	1.00	1.00	1.00	1.00	5.13	325.66	2592.00	2.98	70.90	286.20
Length = 5.50 ft	2	0.142	0.248	0.90	1.000	1.00	1.00	1.00	1.00	1.00	4.48	284.22	1998.00	1.35	70.90	286.20
+D+L+H, LL Comb Run (*L)					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.113	0.222	1.00	1.000	1.00	1.00	1.00	1.00	1.00	5.11	324.53	2880.00	2.97	70.72	318.00

Wood Beam

DESCRIPTION: B22 - 2ND FLR FRMG - FLUSH BM @ BEDROOM/GARAGE UNDER FRONT EXT WALL

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
Length = 5.50 ft	2	0.130	0.222	1.00	1.000	1.00	1.00	1.00	1.00	1.00	4.54	288.14	2220.00	1.41	70.72	318.00
+D+L+H, LL Comb Run (L*)					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.181	0.318	1.00	1.000	1.00	1.00	1.00	1.00	1.00	8.21	521.25	2880.00	4.25	101.20	318.00
Length = 5.50 ft	2	0.204	0.318	1.00	1.000	1.00	1.00	1.00	1.00	1.00	7.13	452.78	2220.00	1.83	101.20	318.00
+D+L+H, LL Comb Run (LL)					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.181	0.319	1.00	1.000	1.00	1.00	1.00	1.00	1.00	8.19	519.85	2880.00	4.26	101.38	318.00
Length = 5.50 ft	2	0.206	0.319	1.00	1.000	1.00	1.00	1.00	1.00	1.00	7.19	456.70	2220.00	1.89	101.38	318.00
+D+Lr+H, LL Comb Run (*L)					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.090	0.178	1.25	1.000	1.00	1.00	1.00	1.00	1.00	5.13	325.66	3600.00	2.98	70.90	397.50
Length = 5.50 ft	2	0.102	0.178	1.25	1.000	1.00	1.00	1.00	1.00	1.00	4.48	284.22	2775.00	1.35	70.90	397.50
+D+Lr+H, LL Comb Run (L*)					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.090	0.178	1.25	1.000	1.00	1.00	1.00	1.00	1.00	5.13	325.66	3600.00	2.98	70.90	397.50
Length = 5.50 ft	2	0.102	0.178	1.25	1.000	1.00	1.00	1.00	1.00	1.00	4.48	284.22	2775.00	1.35	70.90	397.50
+D+Lr+H, LL Comb Run (LL)					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.090	0.178	1.25	1.000	1.00	1.00	1.00	1.00	1.00	5.13	325.66	3600.00	2.98	70.90	397.50
Length = 5.50 ft	2	0.102	0.178	1.25	1.000	1.00	1.00	1.00	1.00	1.00	4.48	284.22	2775.00	1.35	70.90	397.50
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.172	0.350	1.15	1.000	1.00	1.00	1.00	1.00	1.00	8.99	570.65	3312.00	5.38	128.11	365.70
Length = 5.50 ft	2	0.198	0.350	1.15	1.000	1.00	1.00	1.00	1.00	1.00	7.96	505.32	2553.00	2.56	128.11	365.70
+D+0.750Lr+0.750L+H, LL Comb Ru					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.090	0.178	1.25	1.000	1.00	1.00	1.00	1.00	1.00	5.12	324.81	3600.00	2.97	70.77	397.50
Length = 5.50 ft	2	0.103	0.178	1.25	1.000	1.00	1.00	1.00	1.00	1.00	4.52	287.16	2775.00	1.40	70.77	397.50
+D+0.750Lr+0.750L+H, LL Comb Ru					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.131	0.228	1.25	1.000	1.00	1.00	1.00	1.00	1.00	7.42	471.24	3600.00	3.81	90.80	397.50
Length = 5.50 ft	2	0.148	0.228	1.25	1.000	1.00	1.00	1.00	1.00	1.00	6.47	410.64	2775.00	1.71	90.80	397.50
+D+0.750Lr+0.750L+H, LL Comb Ru					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.131	0.229	1.25	1.000	1.00	1.00	1.00	1.00	1.00	7.41	470.22	3600.00	3.82	90.94	397.50
Length = 5.50 ft	2	0.149	0.229	1.25	1.000	1.00	1.00	1.00	1.00	1.00	6.51	413.58	2775.00	1.76	90.94	397.50
+D+0.750L+0.750S+H, LL Comb Ru					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.154	0.311	1.15	1.000	1.00	1.00	1.00	1.00	1.00	8.01	508.52	3312.00	4.77	113.67	365.70
Length = 5.50 ft	2	0.177	0.311	1.15	1.000	1.00	1.00	1.00	1.00	1.00	7.13	452.98	2553.00	2.30	113.67	365.70
+D+0.750L+0.750S+H, LL Comb Ru					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.196	0.364	1.15	1.000	1.00	1.00	1.00	1.00	1.00	10.25	650.70	3312.00	5.59	133.13	365.70
Length = 5.50 ft	2	0.226	0.364	1.15	1.000	1.00	1.00	1.00	1.00	1.00	9.08	576.47	2553.00	2.62	133.13	365.70
+D+0.750L+0.750S+H, LL Comb Ru					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.196	0.364	1.15	1.000	1.00	1.00	1.00	1.00	1.00	10.23	649.74	3312.00	5.59	133.00	365.70
Length = 5.50 ft	2	0.227	0.364	1.15	1.000	1.00	1.00	1.00	1.00	1.00	9.13	579.40	2553.00	2.66	133.00	365.70
+D+0.60W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.071	0.139	1.60	1.000	1.00	1.00	1.00	1.00	1.00	5.13	325.66	4608.00	2.98	70.90	508.80
Length = 5.50 ft	2	0.080	0.139	1.60	1.000	1.00	1.00	1.00	1.00	1.00	4.48	284.22	3552.00	1.35	70.90	508.80
+D+0.750Lr+0.750L+0.450W+H, LL					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.070	0.139	1.60	1.000	1.00	1.00	1.00	1.00	1.00	5.12	324.81	4608.00	2.97	70.77	508.80
Length = 5.50 ft	2	0.081	0.139	1.60	1.000	1.00	1.00	1.00	1.00	1.00	4.52	287.16	3552.00	1.40	70.77	508.80
+D+0.750Lr+0.750L+0.450W+H, LL					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.102	0.178	1.60	1.000	1.00	1.00	1.00	1.00	1.00	7.42	471.24	4608.00	3.81	90.80	508.80
Length = 5.50 ft	2	0.116	0.178	1.60	1.000	1.00	1.00	1.00	1.00	1.00	6.47	410.64	3552.00	1.71	90.80	508.80
+D+0.750Lr+0.750L+0.450W+H, LL					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.102	0.179	1.60	1.000	1.00	1.00	1.00	1.00	1.00	7.41	470.22	4608.00	3.82	90.94	508.80
Length = 5.50 ft	2	0.116	0.179	1.60	1.000	1.00	1.00	1.00	1.00	1.00	6.51	413.58	3552.00	1.76	90.94	508.80
+D+0.750L+0.750S+0.450W+H, LL					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.110	0.223	1.60	1.000	1.00	1.00	1.00	1.00	1.00	8.01	508.52	4608.00	4.77	113.67	508.80
Length = 5.50 ft	2	0.128	0.223	1.60	1.000	1.00	1.00	1.00	1.00	1.00	7.13	452.98	3552.00	2.30	113.67	508.80
+D+0.750L+0.750S+0.450W+H, LL					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.141	0.262	1.60	1.000	1.00	1.00	1.00	1.00	1.00	10.25	650.70	4608.00	5.59	133.13	508.80
Length = 5.50 ft	2	0.162	0.262	1.60	1.000	1.00	1.00	1.00	1.00	1.00	9.08	576.47	3552.00	2.62	133.13	508.80
+D+0.750L+0.750S+0.450W+H, LL					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.141	0.261	1.60	1.000	1.00	1.00	1.00	1.00	1.00	10.23	649.74	4608.00	5.59	133.00	508.80
Length = 5.50 ft	2	0.163	0.261	1.60	1.000	1.00	1.00	1.00	1.00	1.00	9.13	579.40	3552.00	2.66	133.00	508.80
+0.60D+0.60W+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.042	0.084	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.08	195.40	4608.00	1.79	42.54	508.80

Wood Beam

DESCRIPTION: B22 - 2ND FLR FRMG - FLUSH BM @ BEDROOM/GARAGE UNDER FRONT EXT WALL

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
Length = 5.50 ft	2	0.048	0.084	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.69	170.53	3552.00	0.81	42.54	508.80
+D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.143	0.311	1.60	1.000	1.00	1.00	1.00	1.00	1.00	10.41	661.17	4608.00	6.64	158.18	508.80
Length = 5.50 ft	2	0.117	0.311	1.60	1.000	1.00	1.00	1.00	1.00	1.00	6.55	415.73	3552.00	1.73	158.18	508.80
+D-0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.043	0.077	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.41	152.72	3552.00	1.64	39.09	508.80
Length = 5.50 ft	2	0.043	0.077	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.41	152.72	3552.00	0.97	39.09	508.80
+D+0.750L+0.750S+0.5250E+H, LL					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.164	0.352	1.60	1.000	1.00	1.00	1.00	1.00	1.00	11.92	756.67	4608.00	7.52	179.13	508.80
Length = 5.50 ft	2	0.155	0.352	1.60	1.000	1.00	1.00	1.00	1.00	1.00	8.69	551.61	3552.00	2.58	179.13	508.80
+D+0.750L+0.750S+0.5250E+H, LL					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.189	0.390	1.60	1.000	1.00	1.00	1.00	1.00	1.00	13.72	871.06	4608.00	8.34	198.59	508.80
Length = 5.50 ft	2	0.190	0.390	1.60	1.000	1.00	1.00	1.00	1.00	1.00	10.63	675.10	3552.00	2.90	198.59	508.80
+D+0.750L+0.750S+0.5250E+H, LL					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.189	0.390	1.60	1.000	1.00	1.00	1.00	1.00	1.00	13.71	870.36	4608.00	8.33	198.45	508.80
Length = 5.50 ft	2	0.191	0.390	1.60	1.000	1.00	1.00	1.00	1.00	1.00	10.68	678.03	3552.00	2.95	198.45	508.80
+D+0.750L+0.750S-0.5250E+H, LL					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.100	0.141	1.60	1.000	1.00	1.00	1.00	1.00	1.00	5.58	354.35	3552.00	3.01	71.76	508.80
Length = 5.50 ft	2	0.100	0.141	1.60	1.000	1.00	1.00	1.00	1.00	1.00	5.58	354.35	3552.00	2.02	71.76	508.80
+D+0.750L+0.750S-0.5250E+H, LL					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.135	0.202	1.60	1.000	1.00	1.00	1.00	1.00	1.00	7.53	477.84	3552.00	4.32	102.80	508.80
Length = 5.50 ft	2	0.135	0.202	1.60	1.000	1.00	1.00	1.00	1.00	1.00	7.53	477.84	3552.00	2.33	102.80	508.80
+D+0.750L+0.750S-0.5250E+H, LL					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.135	0.202	1.60	1.000	1.00	1.00	1.00	1.00	1.00	7.57	480.77	3552.00	4.32	102.94	508.80
Length = 5.50 ft	2	0.135	0.202	1.60	1.000	1.00	1.00	1.00	1.00	1.00	7.57	480.77	3552.00	2.38	102.94	508.80

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, LL C	1	0.0415	3.441		0.0000	0.000
	2	0.0000	3.441	+D+0.750L+0.750S+0.5250E+H, LL C	-0.0069	2.028

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Overall MAXimum	9.609	12.117	0.944
Overall MINimum	5.236	2.202	-0.538
+D+H	3.484	5.351	0.340
+D+L+H, LL Comb Run (*L)	3.477	5.480	0.439
+D+L+H, LL Comb Run (L*)	5.393	8.405	-0.143
+D+L+H, LL Comb Run (LL)	5.385	8.534	-0.044
+D+Lr+H, LL Comb Run (*L)	3.484	5.351	0.340
+D+Lr+H, LL Comb Run (L*)	3.484	5.351	0.340
+D+Lr+H, LL Comb Run (LL)	3.484	5.351	0.340
+D+S+H	6.077	9.648	0.944
+D+0.750Lr+0.750L+H, LL Comb Run (*	3.479	5.447	0.414
+D+0.750Lr+0.750L+H, LL Comb Run (L	4.916	7.642	-0.022
+D+0.750Lr+0.750L+H, LL Comb Run (L	4.910	7.738	0.052
+D+0.750L+0.750S+H, LL Comb Run (*L	5.423	8.670	0.867
+D+0.750L+0.750S+H, LL Comb Run (L*	6.860	10.864	0.431
+D+0.750L+0.750S+H, LL Comb Run (LL	6.854	10.961	0.505
+D+0.60W+H	3.484	5.351	0.340
+D+0.750Lr+0.750L+0.450W+H, LL Comb	3.479	5.447	0.414
+D+0.750Lr+0.750L+0.450W+H, LL Comb	4.916	7.642	-0.022
+D+0.750Lr+0.750L+0.450W+H, LL Comb	4.910	7.738	0.052
+D+0.750L+0.750S+0.450W+H, LL Comb	5.423	8.670	0.867
+D+0.750L+0.750S+0.450W+H, LL Comb	6.860	10.864	0.431
+D+0.750L+0.750S+0.450W+H, LL Comb	6.854	10.961	0.505
+0.60D+0.60W+0.60H	2.091	3.210	0.204
+D+0.70E+0.60H	7.150	6.892	-0.036
+D+0.750L+0.750S+0.5250E+H, LL Comb	8.172	9.826	0.585
+D+0.750L+0.750S+0.5250E+H, LL Comb	9.609	12.020	0.149

Wood Beam

DESCRIPTION: B22 - 2ND FLR FRMG - FLUSH BM @ BEDROOM/GARAGE UNDER FRONT EXT WALL

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3
+D+0.750L+0.750S+0.5250E+H, LL Comb	9.603	12.117	0.223
+0.60D+0.70E+H	5.756	4.752	-0.173
D Only	3.484	5.351	0.340
L Only, LL Comb Run (*L)	-0.008	0.129	0.099
L Only, LL Comb Run (L*)	1.908	3.055	-0.483
L Only, LL Comb Run (LL)	1.900	3.183	-0.384
S Only	2.593	4.297	0.604
E Only	5.236	2.202	-0.538
H Only			

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Project Title:
Engineer:
Project ID:
Project Descr:

Printed: 21 JUL 2021, 3:46PM

Wood Beam

File: beam calcs with overstrength.ec6

Lic. # : KW-06004787
MULHERN & KULP STRUCTURAL ENGINEERING INC

DESCRIPTION: B23 - 2ND FLR FRMG - FLUSH BM @ GARAGE/ROOF UNDER SIDE EXT WALL

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
Load Combination : ASCE 7-16

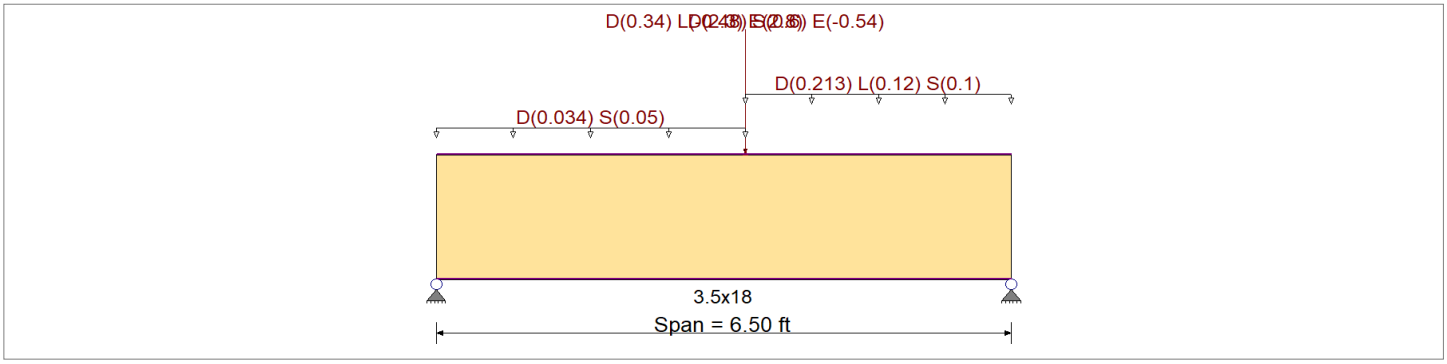
Wood Species : DF/DF
Wood Grade : 24F - V4

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	2,880.0 psi
Fb -	2,220.0 psi
Fc - Prll	1,980.0 psi
Fc - Perp	780.0 psi
Fv	318.0 psi
Ft	1,320.0 psi

E : Modulus of Elasticity

Ebend- xx	1,800.0 ksi
Eminbend - xx	950.0 ksi
Ebend- yy	1,600.0 ksi
Eminbend - yy	850.0 ksi
Density	31.210 pcf



Applied Loads

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

Beam self weight calculated and added to loads
Point Load : D = 0.340, L = -0.480, S = 0.60, E = -0.540 k @ 3.50 ft
Point Load : D = 2.30, E = 2.80 k @ 3.50 ft
Uniform Load : D = 0.0340, S = 0.050 k/ft, Extent = 0.0 -->> 3.50 ft, Tributary Width = 1.0 ft
Uniform Load : D = 0.2130, L = 0.120, S = 0.10 k/ft, Extent = 3.50 -->> 6.50 ft, Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.121 : 1	Maximum Shear Stress Ratio	=	0.137 : 1
Section used for this span		3.5x18	Section used for this span		3.5x18
fb: Actual	=	313.28 psi	fv: Actual	=	39.30 psi
Fb: Allowable	=	2,592.00 psi	Fv: Allowable	=	286.20 psi
Load Combination		+D+H	Load Combination		+D+H
Location of maximum on span	=	3.511 ft	Location of maximum on span	=	5.005 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.007 in	Ratio =	10715 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.016 in	Ratio =	5026 >=300
Max Upward Total Deflection	0.000 in	Ratio =	0 <300

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 6.50 ft	1	0.121	0.137	0.90	1.000	1.00	1.00	1.00	1.00	1.00	4.93	313.28	2592.00	1.65	39.30	286.20
+D+L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.50 ft	1	0.098	0.112	1.00	1.000	1.00	1.00	1.00	1.00	1.00	4.45	282.75	2880.00	1.49	35.47	318.00
+D+Lr+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.50 ft	1	0.087	0.099	1.25	1.000	1.00	1.00	1.00	1.00	1.00	4.93	313.28	3600.00	1.65	39.30	397.50
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.50 ft	1	0.120	0.137	1.15	1.000	1.00	1.00	1.00	1.00	1.00	6.28	398.97	3312.00	2.10	50.05	365.70
+D+0.750Lr+0.750L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.50 ft	1	0.081	0.092	1.25	1.000	1.00	1.00	1.00	1.00	1.00	4.57	290.38	3600.00	1.53	36.43	397.50

Wood Beam

DESCRIPTION: B23 - 2ND FLR FRMG - FLUSH BM @ GARAGE/ROOF UNDER SIDE EXT WALL

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
+D+0.750L+0.750S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.50 ft	1	0.107	0.122	1.15	1.000	1.00	1.00	1.00	1.00	1.00	5.59	354.65	3312.00	1.87	44.49	365.70
+D+0.60W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.50 ft	1	0.068	0.077	1.60	1.000	1.00	1.00	1.00	1.00	1.00	4.93	313.28	4608.00	1.65	39.30	508.80
+D+0.750Lr+0.750L+0.450W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.50 ft	1	0.063	0.072	1.60	1.000	1.00	1.00	1.00	1.00	1.00	4.57	290.38	4608.00	1.53	36.43	508.80
+D+0.750L+0.750S+0.450W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.50 ft	1	0.077	0.087	1.60	1.000	1.00	1.00	1.00	1.00	1.00	5.59	354.65	4608.00	1.87	44.49	508.80
+0.60D+0.60W+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.50 ft	1	0.041	0.046	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.96	187.97	4608.00	0.99	23.58	508.80
+D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.50 ft	1	0.103	0.117	1.60	1.000	1.00	1.00	1.00	1.00	1.00	7.48	474.95	4608.00	2.50	59.59	508.80
+D-0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.50 ft	1	0.033	0.037	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.39	151.62	4608.00	0.80	19.02	508.80
+D+0.750L+0.750S+0.5250E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.50 ft	1	0.103	0.117	1.60	1.000	1.00	1.00	1.00	1.00	1.00	7.50	475.90	4608.00	2.51	59.70	508.80
+D+0.750L+0.750S-0.5250E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.50 ft	1	0.051	0.058	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.68	233.40	4608.00	1.23	29.28	508.80

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	0.0155	3.369		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	2.297	3.093
Overall MINimum	1.043	1.217
+D+H	1.497	1.989
+D+L+H	1.359	2.008
+D+Lr+H	1.497	1.989
+D+S+H	1.971	2.590
+D+0.750Lr+0.750L+H	1.393	2.003
+D+0.750L+0.750S+H	1.749	2.454
+D+0.60W+H	1.497	1.989
+D+0.750Lr+0.750L+0.450W+H	1.393	2.003
+D+0.750L+0.750S+0.450W+H	1.749	2.454
+0.60D+0.60W+0.60H	0.898	1.194
+D+0.70E+0.60H	2.227	2.841
+D+0.750L+0.750S+0.5250E+H	2.297	3.093
+0.60D+0.70E+H	1.629	2.046
D Only	1.497	1.989
L Only	-0.138	0.018
S Only	0.474	0.601
E Only	1.043	1.217
H Only		

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Project Title:
Engineer:
Project ID:
Project Descr:

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Wood Beam

File: beam calcs with overstrength.ec6

Lic. # : KW-06004787
MULHERN & KULP STRUCTURAL ENGINEERING INC

DESCRIPTION: B32 - 1ST FLR FRMG - FLUSH BM @ KITCHEN SHEAR WALL

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
Load Combination : ASCE 7-16

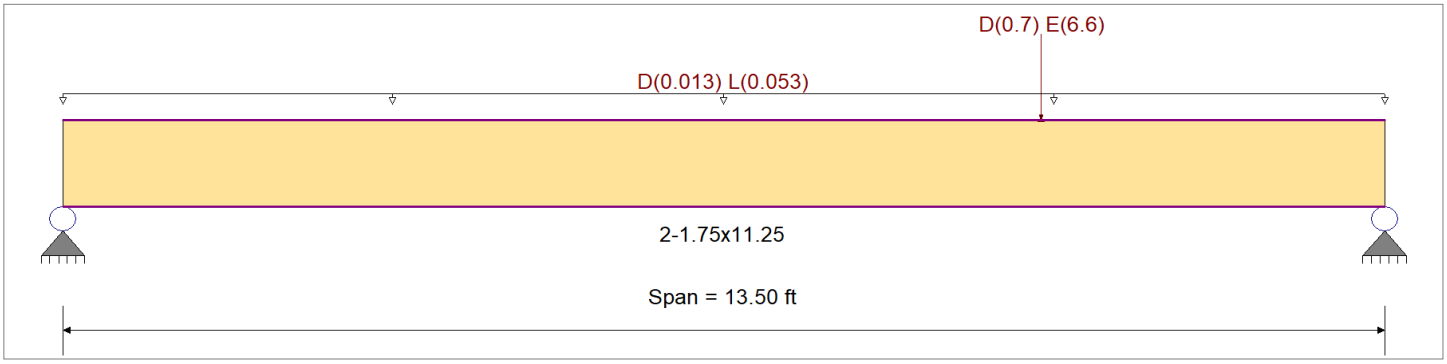
Wood Species : iLevel Truss Joist
Wood Grade : MicroLam LVL 2.0 E

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	3,120.0 psi
Fb -	3,120.0 psi
Fc - Prll	3,012.0 psi
Fc - Perp	900.0 psi
Fv	328.0 psi
Ft	1,866.0 psi

E : Modulus of Elasticity

Ebend- xx	2000 ksi
Eminbend - xx	1016.535 ksi
Density	42.01 pcf



Applied Loads

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

Beam self weight calculated and added to loads
Uniform Load : D = 0.0130, L = 0.0530 , Tributary Width = 1.0 ft
Point Load : D = 0.70, E = 6.60 k @ 10.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.463 : 1	Maximum Shear Stress Ratio	=	0.296 : 1
Section used for this span		2-1.75x11.25	Section used for this span		2-1.75x11.25
fb: Actual	=	2,310.30 psi	fv: Actual	=	155.55 psi
Fb: Allowable	=	4,992.00 psi	Fv: Allowable	=	524.80 psi
Load Combination		+D+0.70E+0.60H	Load Combination		+D+0.70E+0.60H
Location of maximum on span	=	10.002 ft	Location of maximum on span	=	12.564 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.509 in	Ratio =	318 >=300
Max Upward Transient Deflection	0.000 in	Ratio =	0 <300
Max Downward Total Deflection	0.432 in	Ratio =	375 >=300
Max Upward Total Deflection	0.000 in	Ratio =	0 <300

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 13.451 ft	1	0.130	0.085	0.90	1.000	1.00	1.00	1.00	1.00	1.00	2.24	364.45	2808.00	0.66	25.18	295.20
Length = 0.04927 ft	1	0.002	0.085	0.90	1.000	1.00	1.00	1.00	1.00	1.00	0.03	5.47	2808.00	0.66	25.18	295.20
+D+L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 13.451 ft	1	0.167	0.113	1.00	1.000	1.00	1.00	1.00	1.00	1.00	3.20	520.57	3120.00	0.97	36.91	328.00
Length = 0.04927 ft	1	0.003	0.113	1.00	1.000	1.00	1.00	1.00	1.00	1.00	0.05	8.33	3120.00	0.97	36.91	328.00
+D+Lr+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 13.451 ft	1	0.093	0.061	1.25	1.000	1.00	1.00	1.00	1.00	1.00	2.24	364.45	3900.00	0.66	25.18	410.00
Length = 0.04927 ft	1	0.001	0.061	1.25	1.000	1.00	1.00	1.00	1.00	1.00	0.03	5.47	3900.00	0.66	25.18	410.00
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 13.451 ft	1	0.102	0.067	1.15	1.000	1.00	1.00	1.00	1.00	1.00	2.24	364.45	3588.00	0.66	25.18	377.20
Length = 0.04927 ft	1	0.002	0.067	1.15	1.000	1.00	1.00	1.00	1.00	1.00	0.03	5.47	3588.00	0.66	25.18	377.20

Wood Beam

DESCRIPTION: B32 - 1ST FLR FRMG - FLUSH BM @ KITCHEN SHEAR WALL

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
+D+0.750Lr+0.750L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 13.451 ft	1	0.123	0.083	1.25	1.000	1.00	1.00	1.00	1.00	1.00	2.94	478.64	3900.00	0.89	33.98	410.00
Length = 0.04927 ft	1	0.002	0.083	1.25	1.000	1.00	1.00	1.00	1.00	1.00	0.05	7.61	3900.00	0.89	33.98	410.00
+D+0.750L+0.750S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 13.451 ft	1	0.133	0.090	1.15	1.000	1.00	1.00	1.00	1.00	1.00	2.94	478.64	3588.00	0.89	33.98	377.20
Length = 0.04927 ft	1	0.002	0.090	1.15	1.000	1.00	1.00	1.00	1.00	1.00	0.05	7.61	3588.00	0.89	33.98	377.20
+D+0.60W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 13.451 ft	1	0.073	0.048	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.24	364.45	4992.00	0.66	25.18	524.80
Length = 0.04927 ft	1	0.001	0.048	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.03	5.47	4992.00	0.66	25.18	524.80
+D+0.750Lr+0.750L+0.450W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 13.451 ft	1	0.096	0.065	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.94	478.64	4992.00	0.89	33.98	524.80
Length = 0.04927 ft	1	0.002	0.065	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.05	7.61	4992.00	0.89	33.98	524.80
+D+0.750L+0.750S+0.450W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 13.451 ft	1	0.096	0.065	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.94	478.64	4992.00	0.89	33.98	524.80
Length = 0.04927 ft	1	0.002	0.065	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.05	7.61	4992.00	0.89	33.98	524.80
+0.60D+0.60W+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 13.451 ft	1	0.044	0.029	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.35	218.67	4992.00	0.40	15.11	524.80
Length = 0.04927 ft	1	0.001	0.029	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.02	3.28	4992.00	0.40	15.11	524.80
+D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 13.451 ft	1	0.463	0.296	1.60	1.000	1.00	1.00	1.00	1.00	1.00	14.21	2,310.30	4992.00	4.08	155.55	524.80
Length = 0.04927 ft	1	0.007	0.296	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.20	32.88	4992.00	4.08	155.55	524.80
+D-0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 13.451 ft	1	0.317	0.205	1.60	1.000	1.00	1.00	1.00	1.00	1.00	9.73	1,581.39	4992.00	2.82	107.58	524.80
Length = 0.04927 ft	1	0.004	0.205	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.13	21.94	4992.00	2.74	107.58	524.80
+D+0.750L+0.750S+0.5250E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 13.451 ft	1	0.388	0.251	1.60	1.000	1.00	1.00	1.00	1.00	1.00	11.92	1,936.87	4992.00	3.46	131.76	524.80
Length = 0.04927 ft	1	0.006	0.251	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.17	28.17	4992.00	3.46	131.76	524.80
+D+0.750L+0.750S-0.5250E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 13.451 ft	1	0.197	0.134	1.60	1.000	1.00	1.00	1.00	1.00	1.00	6.04	981.90	4992.00	1.84	70.07	524.80
Length = 0.04927 ft	1	0.003	0.134	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.08	12.94	4992.00	1.61	70.07	524.80

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
E Only	1	0.5087	7.538		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	1.711	4.889
Overall MINimum	1.711	4.889
+D+H	0.347	0.684
+D+L+H	0.705	1.042
+D+Lr+H	0.347	0.684
+D+S+H	0.347	0.684
+D+0.750Lr+0.750L+H	0.615	0.952
+D+0.750L+0.750S+H	0.615	0.952
+D+0.60W+H	0.347	0.684
+D+0.750Lr+0.750L+0.450W+H	0.615	0.952
+D+0.750L+0.750S+0.450W+H	0.615	0.952
+0.60D+0.60W+0.60H	0.208	0.410
+D+0.70E+0.60H	1.545	4.106
+D+0.750L+0.750S+0.5250E+H	1.513	3.519
+0.60D+0.70E+H	1.406	3.833
D Only	0.347	0.684
L Only	0.358	0.358
E Only	1.711	4.889
H Only		

Title Block Line 1
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using the "Settings" menu item
and then using the "Printing &
Title Block" selection.
Title Block Line 6

Project Title:
Engineer:
Project ID:
Project Descr:

Printed: 22 JUL 2021, 11:45AM

Wood Beam

File: beam calcs with overstrength.ec6

Lic. # : KW-06004787
MULHERN & KULP STRUCTURAL ENGINEERING INC

DESCRIPTION: B33 - 1ST FLR FRMG - FLUSH BM @ STAIRS SHEAR WALL

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
Load Combination : ASCE 7-16

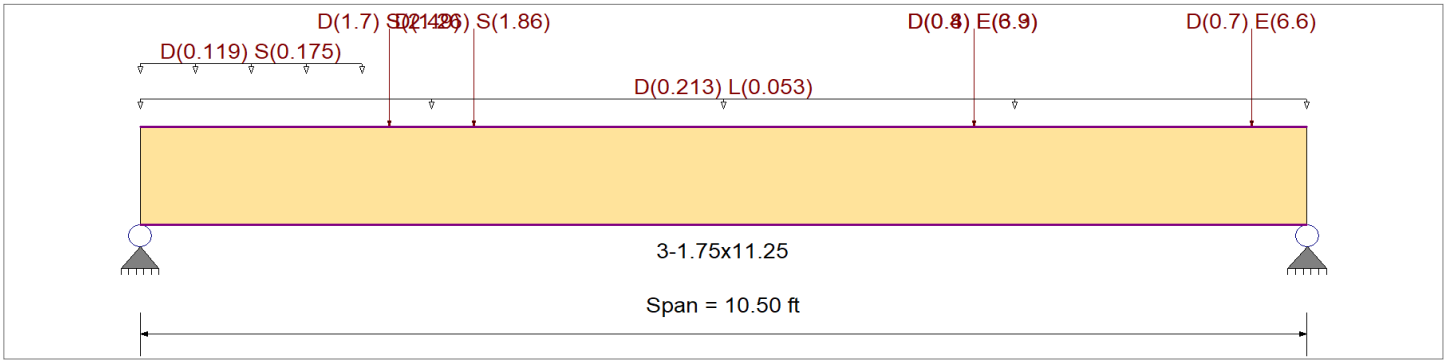
Wood Species : iLevel Truss Joist
Wood Grade : MicroLam LVL 2.0 E

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	3,120.0 psi
Fb -	3,120.0 psi
Fc - Prll	3,012.0 psi
Fc - Perp	900.0 psi
Fv	328.0 psi
Ft	1,866.0 psi

E : Modulus of Elasticity

Ebend- xx	2,000.0 ksi
Eminbend - xx	1,016.54 ksi
Density	42.010 pcf



Applied Loads

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

Beam self weight calculated and added to loads
- Uniform Load : D = 0.2130, L = 0.0530 , Tributary Width = 1.0 ft
- Point Load : D = 0.70, E = 6.60 k @ 10.0 ft
- Uniform Load : D = 0.1190, S = 0.1750 k/ft, Extent = 0.0 -->> 2.0 ft, Tributary Width = 1.0 ft
- Point Load : D = 1.70, S = 2.490 k @ 2.250 ft
- Point Load : D = 1.260, S = 1.860 k @ 3.0 ft
- Point Load : D = 0.40, E = 3.30 k @ 7.50 ft
- Point Load : D = 0.80, E = 6.90 k @ 7.50 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.533 : 1	Maximum Shear Stress Ratio	=	0.482 : 1
Section used for this span		3-1.75x11.25	Section used for this span		3-1.75x11.25
fb: Actual	=	2,661.83 psi	fv: Actual	=	181.73 psi
Fb: Allowable	=	4,992.00 psi	Fv: Allowable	=	377.20 psi
Load Combination		+D+0.70E+0.60H	Load Combination		+D+S+H
Location of maximum on span	=	7.473 ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.298 in	Ratio =	423 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.393 in	Ratio =	320 >=300
Max Upward Total Deflection	0.000 in	Ratio =	0 <300

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	Max Stress Ratios V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	Moment Values fb	Moment Values F'b	Shear Values V	Shear Values fv	Shear Values F'v
+D+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 10.50 ft	1	0.362	0.320	0.90	1.000	1.00	1.00	1.00	1.00	1.00	9.37	1,015.10	2808.00	3.71	94.34	295.20
+D+L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 10.50 ft	1	0.349	0.305	1.00	1.000	1.00	1.00	1.00	1.00	1.00	10.04	1,088.20	3120.00	3.94	100.17	328.00
+D+Lr+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 10.50 ft	1	0.260	0.230	1.25	1.000	1.00	1.00	1.00	1.00	1.00	9.37	1,015.10	3900.00	3.71	94.34	410.00

Wood Beam

DESCRIPTION: B33 - 1ST FLR FRMG - FLUSH BM @ STAIRS SHEAR WALL

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 10.50 ft	1	0.530	0.482	1.15	1.000	1.00	1.00	1.00	1.00	1.00	17.53	1,900.04	3588.00	7.16	181.73	377.20
+D+0.750Lr+0.750L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 10.50 ft	1	0.274	0.241	1.25	1.000	1.00	1.00	1.00	1.00	1.00	9.87	1,069.70	3900.00	3.89	98.71	410.00
+D+0.750L+0.750S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 10.50 ft	1	0.481	0.435	1.15	1.000	1.00	1.00	1.00	1.00	1.00	15.93	1,726.17	3588.00	6.47	164.25	377.20
+D+0.60W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 10.50 ft	1	0.203	0.180	1.60	1.000	1.00	1.00	1.00	1.00	1.00	9.37	1,015.10	4992.00	3.71	94.34	524.80
+D+0.750Lr+0.750L+0.450W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 10.50 ft	1	0.214	0.188	1.60	1.000	1.00	1.00	1.00	1.00	1.00	9.87	1,069.70	4992.00	3.89	98.71	524.80
+D+0.750L+0.750S+0.450W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 10.50 ft	1	0.346	0.313	1.60	1.000	1.00	1.00	1.00	1.00	1.00	15.93	1,726.17	4992.00	6.47	164.25	524.80
+0.60D+0.60W+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 10.50 ft	1	0.122	0.108	1.60	1.000	1.00	1.00	1.00	1.00	1.00	5.62	609.06	4992.00	2.23	56.61	524.80
+D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 10.50 ft	1	0.533	0.360	1.60	1.000	1.00	1.00	1.00	1.00	1.00	24.56	2,661.83	4992.00	7.45	189.15	524.80
+D-0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 10.50 ft	1	0.201	0.152	1.60	1.000	1.00	1.00	1.00	1.00	1.00	9.27	1,004.18	4992.00	3.14	79.81	524.80
+D+0.750L+0.750S+0.5250E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 10.50 ft	1	0.506	0.395	1.60	1.000	1.00	1.00	1.00	1.00	1.00	23.30	2,525.27	4992.00	8.16	207.30	524.80
+D+0.750L+0.750S-0.5250E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 10.50 ft	1	0.236	0.231	1.60	1.000	1.00	1.00	1.00	1.00	1.00	10.86	1,176.46	4992.00	4.77	121.20	524.80

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	0.3935	5.327		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	8.641	13.571
Overall MINimum	3.229	13.571
+D+H	4.036	3.479
+D+L+H	4.314	3.758
+D+Lr+H	4.036	3.479
+D+S+H	7.638	4.578
+D+0.750Lr+0.750L+H	4.245	3.688
+D+0.750L+0.750S+H	6.946	4.512
+D+0.60W+H	4.036	3.479
+D+0.750Lr+0.750L+0.450W+H	4.245	3.688
+D+0.750L+0.750S+0.450W+H	6.946	4.512
+0.60D+0.60W+0.60H	2.422	2.088
+D+0.70E+0.60H	6.296	12.979
+D+0.750L+0.750S+0.5250E+H	8.641	11.637
+0.60D+0.70E+H	4.682	11.588
D Only	4.036	3.479
L Only	0.278	0.278
S Only	3.602	1.098
E Only	3.229	13.571
H Only		

Architectural Innovations

Pratt Plat - Lot 6

Mercer Island, WA

Shear Wall Calculations - Wind

Reviewed By: NJM

July 19, 2021

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
RESIDENTIAL STRUCTURAL ENGINEERING

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: PRATT PLAT LOT 6
M&K PROJECT #: 203-21003
ENGINEER: JCL
DATE: 19-JUL-21

WIND DESIGN SUMMARY PER ASCE 7-16

PARAMETERS:

WIND SPEED	100
EXPOSURE CATEGORY	B
RISK CATEGORY	II
WIND DIRECTIONALITY FACTOR, K_d	0.85
TOPOGRAPHIC FACTOR, K_{zt}	1.60
GUST FACTOR, G	0.85
GROUND ELEV. ABOVE SEA LEVEL [FT]	0
DESIGN TYPE	ASD

0.60

ROOF GEOMETRY:

TRANS. ROOF PITCH	4.0	:12
LONG. ROOF PITCH	10.5	:12
MEAN ROOF HEIGHT, H	24.00	FT

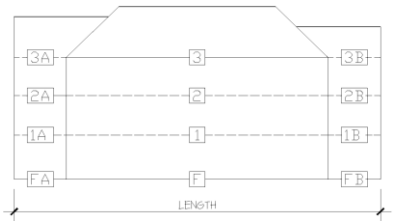
BUILDING GEOMETRY:

LENGTH	80	FT
WIDTH	37	FT
NUMBER OF STORIES	2	

TRANSVERSE DIRECTION (PERPENDICULAR TO MAIN RIDGE LINE)

TRIBUTARY DESIGN AREAS:

DIAPHRAGM LEVEL	FLOOR-TO-FLOOR HEIGHT		SECTION A	SECTION O	SECTION B	
2	9.1 FT	Roof Surface	0	378	0	sq ft
		Wall surface	0	348	0	sq ft
1	10 FT	Roof Surface	0	22	0	sq ft
		Wall surface	0	852	0	sq ft
FND		Roof Surface	0	0	0	sq ft
		Wall surface	0	0	0	sq ft



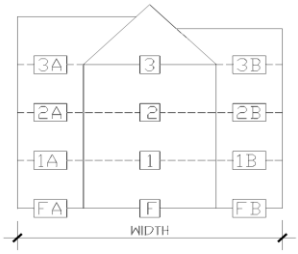
TRIBUTARY DESIGN LOADS: (0.6W)

	SECTION A	SECTION O	SECTION B	
Story Shear	0.00	7.60	0.00	kips
Total Shear	0.00	7.60	0.00	kips
		7.60		kips
Story Shear	0.00	12.07	0.00	kips
Total Shear	0.00	19.67	0.00	kips
		19.67		kips
Story Shear	0.00	0.00	0.00	kips
Total Shear	0.00	19.67	0.00	kips
		19.67		kips

LONGITUDINAL DIRECTION (PARALLEL TO MAIN RIDGE LINE)

TRIBUTARY DESIGN AREAS:

DIAPHRAGM LEVEL	FLOOR-TO-FLOOR HEIGHT		SECTION A	SECTION O	SECTION B	
2	9.1 FT	Roof Surface	0	79	0	sq ft
		Wall surface	0	262	0	sq ft
1	10 FT	Roof Surface	0	0	0	sq ft
		Wall surface	0	407	0	sq ft
FND		Roof Surface	0	0	0	sq ft
		Wall surface	0	0	0	sq ft



TRIBUTARY DESIGN LOADS: (0.6W)

	SECTION A	SECTION O	SECTION B	
Story Shear	0.00	4.10	0.00	kips
Total Shear	0.00	4.10	0.00	kips
		4.10		kips
Story Shear	0.00	4.71	0.00	kips
Total Shear	0.00	8.81	0.00	kips
		8.81		kips
Story Shear	0.00	0.00	0.00	kips
Total Shear	0.00	8.81	0.00	kips
		8.81		kips

SYMBOLS AND LEGEND

(F) FAN- DIRECT VENT TO OUTSIDE
-BATHROOMS/LAUNDRY 50 CFM MIN.
-KITCHEN EXHAUST HOOD TO BE MIN. OF 100CFM. IF EXHAUST HOOD EXCEEDS 400 CFM MAKE UP AIR MUST BE PROVIDED PER SECTION M1503.4.

(UF) WHOLE-HOUSE FAN ON TIMER, SYSTEMS TO CONFORM TO IRC, M1507.3. FAN SIZE PER PLAN. TIMER TO BE LOCATED AT THE FAU WITH A MANUAL OVERRIDE SWITCH AT THE FAN LOCATION. TIMER TO BE SET TO RUN 50% IN EACH 4-HOUR SEGMENT. FRESH AIR TO BE PROVIDED BY THE FORCED AIR SYSTEM DUCTS PER SECTION M1507.3.6.1.

(T) THERMOSTAT @ 50" ABOVE FLOOR

(S) 110v SMOKE ALARM PER I.R.C. R314 WITH BATTERY BACKUP INTERCONNECTED. USE A COMBINATION SMOKE/CARBON MONOXIDE ALARM WHEN NOTED

MECHANICAL, PLUMBING, AND ELECTRICAL SYSTEM FOR UNITS: PER DIV. 15,16 SEE SHEET A1

FURN WH

A. PROVIDE 6" DIAMETER FRESH AIR INTAKE FROM OUTSIDE TO RETURN AIR PLENUM AT FURNACE WITH MOTORIZED FLOW DAMPERS.
B. PROVIDE THERMAL EXPANSION TANK AT WATER HEATER.
C. STRAP WATER HEATER TO FRAMING TOP AND BOTTOM.
D. PROVIDE PRESSURE RELIEF LINE PLUMBED TO OUTSIDE.

14.8k
14.8k
SEISMIC

19.7k
8.8k
WIND

P1/P3 = 336/630 = 0.53(130 PLF) = 69 PLF
P1/P3 = 239/451 = 0.53(219 PLF) = 116 PLF
SHEAR WALL #101 & #102 ARE
PROPORTIONAL TO THEIR STIFFNESSES

4.4k W (50%)
7.4k S (50%)

#101
2.9k W (130 PLF)
4.9k S (219 PLF)

#102
1.5k W (70 PLF)
2.5k S (117 PLF)

APA P.F. (2)
2.9k W
1.5k S

#110
4.3k W (319 PLF)
3.45k S (256 PLF)

SW #206 ABOVE
75% TO APA P.F. -->
<-- 25% TO #106

APA P.F. (1)
1.2k W
0.85k S

P1/P3 = 336/630 = 0.53(260 PLF) = 138 PLF
P1/P3 = 239/451 = 0.53(242 PLF) = 128 PLF
SHEAR WALL #108 & #109 ARE
PROPORTIONAL TO THEIR STIFFNESSES

#106
4.5k W (158 PLF)
3.25k S (114 PLF)

#108
0.85k W (142 PLF)
0.8k S (133 PLF)

#109
2.25k W (260 PLF)
2.1k S (242 PLF)

SW #208 ABOVE
65% TO #106 -->
<-- 35% TO #107 & #110

APA P.F. (1)
1.2k W
0.85k S

#107
2.5k W (321 PLF)
2.0k S (256 PLF)

#105
1.25k W (51 PLF)
2.1k S (86 PLF)

4.4k W (50%)
7.4k S (50%)

#103
2.45k W (98 PLF)
4.1k S (164 PLF)

#104
0.7k W (51 PLF)
1.2k S (87 PLF)

P1/P3 = 336/630 = 0.53(98 PLF) = 52 PLF
P1/P3 = 239/451 = 0.53(164 PLF) = 87 PLF
SHEAR WALL #103, #104, & #105 ARE
PROPORTIONAL TO THEIR STIFFNESSES

3.1k W (9% STORY, 16% TOTAL)
2.9k S (8% STORY, 20% TOTAL)

2.9k W (24% STORY, 15% TOTAL)
1.5k S (28% STORY, 9% TOTAL)

6.8k W (30% STORY, 34% TOTAL)
5.45k S (27% STORY, 37% TOTAL)

4.5k W (25% STORY, 23% TOTAL)
3.25k S (26% STORY, 22% TOTAL)

2.4k W (12% STORY, 12% TOTAL)
1.7k S (11% STORY, 12% TOTAL)

MAIN FLOOR PLAN

Scale 1/4"=1'-0"

GENERAL PLAN NOTES

1. SEE SHEET A-1 FOR ALL GENERAL NOTES AND REQUIREMENTS.
2. ENERGY AND AIR QUALITY INFORMATION SEE DIV. 17 SHEET A-1
3. SEE BUILDING ELEVATION FOR WINDOW OPERATION SEE DIV. 8 SHEET A-1
4. SEE TYP. MATERIALS LIST ON SECTION SHEET
5. SEE SHEET A-1 FOR ALL NOTES AND REQUIREMENTS CONCERNING MECHANICAL, PLUMBING, AND ELECTRICAL.

FLOOR PLAN KEY NOTES

P-1 OCCUPANCY SEPARATION:
APPLY (1) LAYER OF ½" GWB. TO GARAGE SIDE OF RESIDENCE, ATTIC SPACES, AND TO ALL BEAMS AND POSTS SUPPORTING A FLOOR-CEILING ASSEMBLY. APPLY (1) LAYER OF ⅝" TYPE 'X' GWB. TO GARAGE CEILING WHEN UNDER HABITABLE ROOMS. DUCTS THROUGH WALL OR CEILING COMMON TO HOUSE SHALL HAVE MINIMUM 26 GAUGE STEEL SEE DIV. 01002.6.A. SHEET A-1.

P-2 1⅜" MIN. SELF CLOSING SOLID WOOD CORE, HONEY-COMB CORE STEEL, OR 20-MINUTE FIRE RATED DOOR. SEE DIV. 01002.6.B. SHEET A-1

P-3 STAIR ASSEMBLY NOTES: PER I.R.C. SECTION R311.5 AND DETAIL 12/D2.
A. HEADROOM MIN. 6'-8", WIDTH MIN. 3'-0".
B. TREADS 10" MIN. DEPTH AND MIN. WIDTH OF 36" ABOVE HANDRAIL HEIGHT, RISERS 7¾" MAX. HT. TREAD NOSING TO BE MINIMUM 3/4" AND A MAXIMUM OF 1 1/4" ON STAIRS WITH SOLID RISERS.
C. HANDRAIL MIN. 34" TO MAX 38" ABOVE TREAD NOSING. HANDRAIL TYPE 1 CIRCULAR TO HAVE 1¼" MIN. TO 2" MAX. CROSS SECTION DIMENSION AND 1 1/2" MIN. CLEAR FROM WALL. RETURN RAIL ENDS. HANDRAILS SHALL BE STRONG ENOUGH TO RESIST A 200 POUND POINT LOAD IN ANY DIRECTION PER I.R.C. TABLE R301.5
D. INSTALL FIRE BLOCKING BETWEEN STRINGERS AT THE TOP AND BOTTOM OF EACH RUN PER I.R.C. SECTION R302.11.
E. COVER USABLE SPACE UNDER STAIR W/ ½" GWB. PER I.R.C. SECTION R302.7.
F. INTERMEDIATE BALUSTERS SHALL BE SPACED W/ LESS THAN 4" BETWEEN BALUSTERS.
G. PROVIDE STAIRWAY ILLUMINATION PER I.R.C. SECTION R303.6.
SEE DIV. 01002.7 SHEET A-1.

P-4 SAFETY GLAZING PER I.R.C., SECTION R308
A. WINDOWS WITHIN 18" OF FLOOR
B. WINDOWS WITHIN A 24" ARC OF DOORS
C. WINDOWS AT TUBS AND SHOWERS
D. GLAZING IN DOORS
E. LESS THAN 60" HORIZ. FROM THE BOT. STAIR TREAD NOSING, 4 BOT. EDGE OF GLAZING IS LESS THAN 36" ABV. LANDING/WALKING SURFACE
SEE DIV. 08800 SHEET A-1

P-5 EGRESS WINDOW PER I.R.C., SECTION R310 SEE DIV. 08600 SHEET A-1

P-6 IGNITERS FOR GAS FIRED APPLIANCES IN GARAGE TO BE 18" MIN. ABOVE TOP OF SLAB. SEE DIV. 15 SHEET A-1

P-7 COVER WALLS ADJACENT TO TUBS AND SHOWERS WITH NON-ABSORBENT MATERIAL TO 72" ABOVE DRAIN INLETS, PER I.R.C. SECTION 307.2. SEE DIV. 09250 SHEET A-1

P-8 (2) LAYERS OF FLOOR SHEATHING OVER FRAMING.

P-9 7¾" MAX. RISER WITH 10" MIN. RUN, IF MORE THAN (3) RISERS, HANDRAIL REQUIRED PER I.R.C. SECTION R311.7.8. SEE DIV. 01002.7 SHEET A-1

P-10 18"x24" CRAWL SPACE ACCESS, INSULATE AND WEATHER STRIP. SEE DIV. 01002.1 SHEET A-1

P-11 22"x30" ATTIC SPACE ACCESS W/ 30" HEAD CLEARANCE. INSULATE AND WEATHER STRIP. SEE DIV. 01002.2 SHEET A-1

P-12 FLOOR MATERIAL BREAK LINE

P-13 WALL LINE ABOVE

P-14 WALL LINE BELOW

P-15 FIREPLACE ASSEMBLY NOTES:
A. DIRECT VENT GAS FIREPLACES, MUST BE LISTED, LABELED & INSTALLED PER MFG. SPECIFICATIONS, SHALL CONFORM TO I.R.C. REQUIREMENTS. SEE DIV. 01002.12 SHEET A-1
B. ZERO CLEARANCE FIREPLACES SHALL CONFORM TO I.R.C. REQUIREMENTS. SEE DIV. 01002.12 SHT A-1
C. HEARTH SHALL CONFORM TO I.R.C. REQUIREMENT SEE DIV. 01002.12
D. FIREBLOCK OPENINGS AROUND PENETRATIONS @ EACH FLOOR PER I.R.C. SECTION R1003.19.
E. FIREPLACE MUST COMPLY WITH UL 127 TESTING

P-16 SEE SITE PLAN FOR EXTENT OF WALKS & DRIVEWAYS

P-17 3" DIAMETER STEEL POST

P-18 36" GUARDRAIL PER I.R.C. SECTION R312 & TABLE R301.5 CONTRACTOR TO VERIFY TO INSPECTOR THAT ALL GUARDS & RAILINGS ARE CAPABLE OF RESISTING 200lb LOAD ON TOP RAIL ACTING IN ANY DIRECTION.

P-19 12" VENT FOR MECHANICAL 1" CLEARANCE ALL SIDES PER I.R.C. SECTION R302.11. SEE DIV. 15 SHEET A-1

P-20 PLANT SHELF

P-21 UPPER AND LOWER LINEN CABINETS

P-22 SOFFIT AREA

P-23 INTEGRATED MAKE UP AIR

P-24 2x6 STUDS W/ R-21 INSULATION MIN.

SQUARE FOOTAGE

MAIN FLOOR	1861 SF
UPPER FLOOR	2357 SF
TOTAL	4218 SF
GARAGE	682 SF
PORCH	213 SF
PATIO	225 SF

Date	By	Description
03/17/20	SM	PRELIMINARY DESIGN
04/20/20	SM	ELEVATION DESIGN
06/29/21	SM	ENGINEERING SET

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TITLE

JOB NO.: 19039.05
STARTING NO.: 19039.03

SHEET
A3

SYMBOLS AND LEGEND

(F) FAN- DIRECT VENT TO OUTSIDE
-BATHROOMS/LAUNDRY 50 CFM MIN.
-KITCHEN EXHAUST HOOD TO BE MIN. OF 100CFM. IF EXHAUST HOOD EXCEEDS 400 CFM MAKE UP AIR MUST BE PROVIDED PER SECTION M1503.4.

(WF) WHOLE-HOUSE FAN ON TIMER, SYSTEMS TO CONFORM TO IRC, M1507.3. FAN SIZE PER PLAN. TIMER TO BE LOCATED AT THE FAU WITH A MANUAL OVERRIDE SWITCH AT THE FAN LOCATION. TIMER TO BE SET TO RUN 50% IN EACH 4-HOUR SEGMENT. FRESH AIR TO BE PROVIDED BY THE FORCED AIR SYSTEM DUCTS PER SECTION M1507.3.6.1.

(T) THERMOSTAT @ 50" ABOVE FLOOR

(S) 110V SMOKE ALARM PER I.R.C. R314 WITH BATTERY BACKUP INTERCONNECTED. USE A COMBINATION SMOKE/CARBON MONOXIDE ALARM WHEN NOTED

MECHANICAL, PLUMBING, AND ELECTRICAL SYSTEM FOR UNITS: PER DIV. 15,16 SEE SHEET A1

FURN WH

A. PROVIDE 6" DIAMETER FRESH AIR INTAKE FROM OUTSIDE TO RETURN AIR PLENUM AT FURNACE WITH MOTORIZED FLOW DAMPERS.
B. PROVIDE THERMAL EXPANSION TANK AT WATER HEATER.
C. STRAP WATER HEATER TO FRAMING TOP AND BOTTOM.
D. PROVIDE PRESSURE RELIEF LINE PLUMBED TO OUTSIDE.

9.5k
9.5k
SEISMIC

7.6k
4.1k
WIND

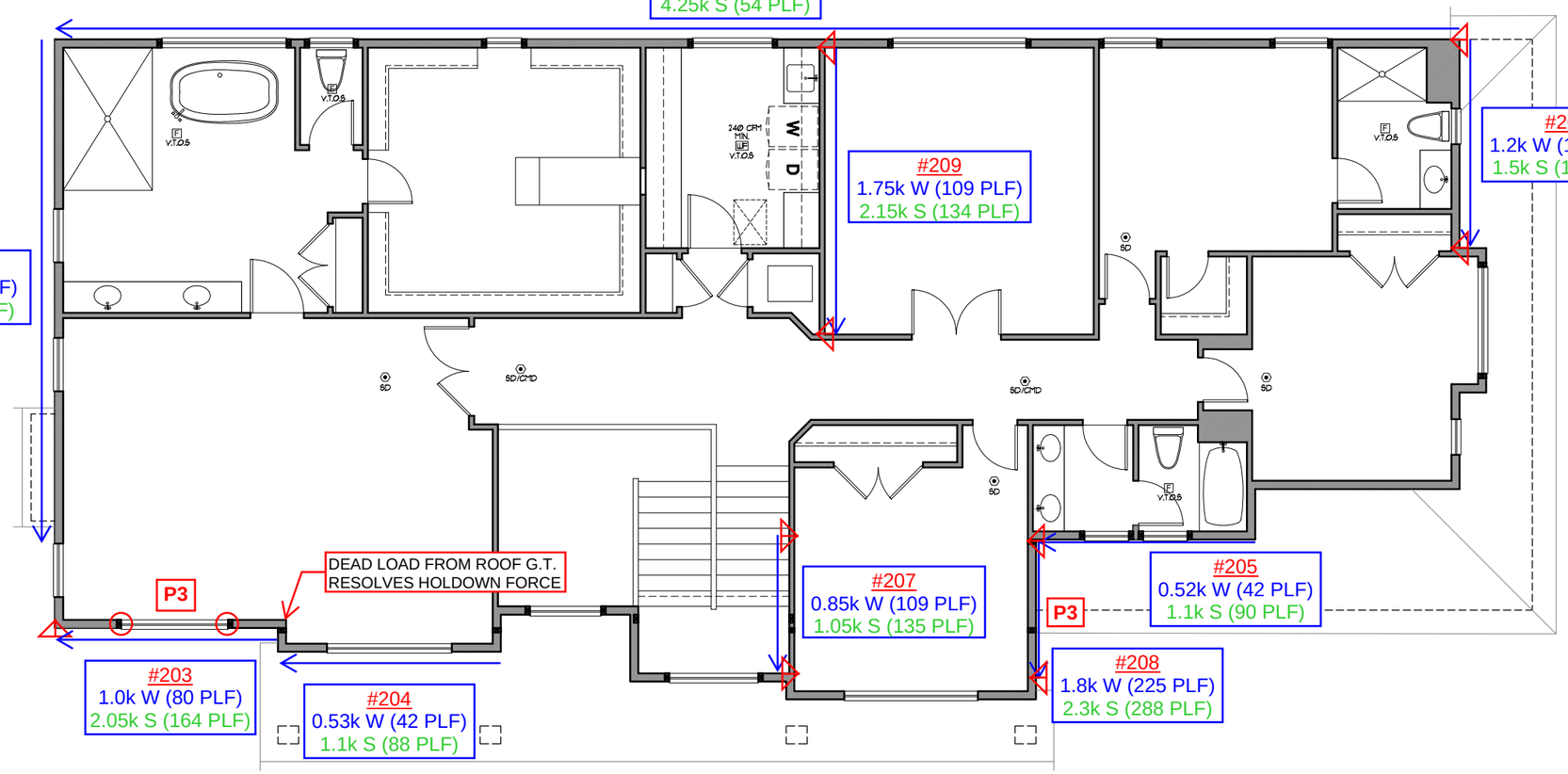
2.05k W (50%)
4.25k S (50%)

#201
2.05k W (26 PLF)
4.25k S (54 PLF)

#206
1.2k W (102 PLF)
1.5k S (128 PLF)

#209
1.75k W (109 PLF)
2.15k S (134 PLF)

#202
2.0k W (71 PLF)
2.5k S (88 PLF)



DEAD LOAD FROM ROOF G.T. RESOLVES HOLDOWN FORCE

P3

P3

#207
0.85k W (109 PLF)
1.05k S (135 PLF)

#205
0.52k W (42 PLF)
1.1k S (90 PLF)

#208
1.8k W (225 PLF)
2.3k S (288 PLF)

2.05k W (50%)
4.25k S (50%)

#203
1.0k W (80 PLF)
2.05k S (164 PLF)

#204
0.53k W (42 PLF)
1.1k S (88 PLF)

P1/P3 = 336/630 = 0.53(80 PLF) = 42 PLF
P1/P3 = 239/451 = 0.53(164 PLF) = 87 PLF
SHEAR WALL #203, #204, & #205 ARE PROPORTIONAL TO THEIR STIFFNESSES

2.0k W (26%)
2.5k S (26%)

2.6k W (34%)
3.2k S (34%)

1.8k W (24%)
2.3k S (24%)

1.2k W (16%)
1.5k S (16%)

UPPER FLOOR

Scale 1/4"=1'-0"

GENERAL PLAN NOTES

1. SEE SHEET A-1 FOR ALL GENERAL NOTES AND REQUIREMENTS.
2. ENERGY AND AIR QUALITY INFORMATION SEE DIV. 11 SHEET A-1
3. SEE BUILDING ELEVATION FOR WINDOW OPERATION SEE DIV. 8 SHEET A-1
4. SEE TYP. MATERIALS LIST ON SECTION SHEET
5. SEE SHEET A-1 FOR ALL NOTES AND REQUIREMENTS CONCERNING MECHANICAL, PLUMBING, AND ELECTRICAL.

FLOOR PLAN KEY NOTES

P-1 OCCUPANCY SEPARATION:
APPLY (1) LAYER OF ½" GWB. TO GARAGE SIDE OF RESIDENCE, ATTIC SPACES, AND TO ALL BEAMS AND POSTS SUPPORTING A FLOOR-CEILING ASSEMBLY.
APPLY (1) LAYER OF ⅝" TYPE 'X' GWB. TO GARAGE CEILING WHEN UNDER HABITABLE ROOMS.
DUCTS THROUGH WALL OR CEILING COMMON TO HOUSE SHALL HAVE MINIMUM 26 GAUGE STEEL
SEE DIV. 01002.6.A. SHEET A-1.

P-2 1⅜" MIN. SELF CLOSING SOLID WOOD CORE, HONEY-COMB CORE STEEL, OR 20-MINUTE FIRE RATED DOOR. SEE DIV. 01002.6.B. SHEET A-1

P-3 STAIR ASSEMBLY NOTES: PER I.R.C. SECTION R311.5 AND DETAIL 12/D2.
A. HEADROOM MIN. 6'-8", WIDTH MIN. 3'-0".
B. TREADS 10" MIN. DEPTH AND MIN. WIDTH OF 36" ABOVE HANDRAIL HEIGHT, RISERS 7¾" MAX. HT. TREAD NOSING TO BE MINIMUM 3/4" AND A MAXIMUM OF 1 1/4" ON STAIRS WITH SOLID RISERS.
C. HANDRAIL MIN. 34" TO MAX 38" ABOVE TREAD NOSING. HANDRAIL TYPE 1 CIRCULAR TO HAVE 1¼" MIN. TO 2" MAX. CROSS SECTION DIMENSION AND 1 1/2" MIN. CLEAR FROM WALL. RETURN RAIL ENDS. HANDRAILS SHALL BE STRONG ENOUGH TO RESIST A 200 POUND POINT LOAD IN ANY DIRECTION PER I.R.C. TABLE R301.5
D. INSTALL FIRE BLOCKING BETWEEN STRINGERS AT THE TOP AND BOTTOM OF EACH RUN PER I.R.C. SECTION R302.11.
E. COVER USABLE SPACE UNDER STAIR W/ ½" G.W.B. PER I.R.C. SECTION R302.7.
F. INTERMEDIATE BALUSTERS SHALL BE SPACED W/ LESS THAN 4" BETWEEN BALUSTERS.
G. PROVIDE STAIRWAY ILLUMINATION PER I.R.C. SECTION R303.6.
SEE DIV. 01002.7 SHEET A-1.

P-4 SAFETY GLAZING PER I.R.C., SECTION R308
A. WINDOWS WITHIN 18" OF FLOOR
B. WINDOWS WITHIN A 24" ARC OF DOORS
C. WINDOWS AT TUBS AND SHOWERS
D. GLAZING IN DOORS
E. LESS THAN 60" HORIZ. FROM THE BOT. STAIR TREAD NOSING, & BOT. EDGE OF GLAZING IS LESS THAN 36" ABV. LANDING/WALKING SURFACE
SEE DIV. 08800 SHEET A-1

P-5 EGRESS WINDOW PER I.R.C., SECTION R310 SEE DIV. 08600 SHEET A-1

P-6 IGNITERS FOR GAS FIRED APPLIANCES IN GARAGE TO BE 18" MIN. ABOVE TOP OF SLAB. SEE DIV. 15 SHEET A-1

P-7 COVER WALLS ADJACENT TO TUBS AND SHOWERS WITH NON-ABSORBENT MATERIAL TO 72" ABOVE DRAIN INLETS, PER I.R.C. SECTION 3012. SEE DIV. 09250 SHEET A-1

P-8 (2) LAYERS OF FLOOR SHEATHING OVER FRAMING.

P-9 7¾" MAX. RISER WITH 10" MIN. RUN. IF MORE THAN (3) RISERS, HANDRAIL REQUIRED PER I.R.C. SECTION R311.7.8. SEE DIV. 01002.7 SHEET A-1

P-10 18"x24" CRAWL SPACE ACCESS, INSULATE AND WEATHER STRIP. SEE DIV. 01002.1 SHEET A-1

P-11 22"x30" ATTIC SPACE ACCESS W/ 30" HEAD CLEARANCE. INSULATE AND WEATHER STRIP. SEE DIV. 01002.2 SHEET A-1

P-12 FLOOR MATERIAL BREAK LINE

P-13 WALL LINE ABOVE

P-14 WALL LINE BELOW

P-15 FIREPLACE ASSEMBLY NOTES:
A. DIRECT VENT GAS FIREPLACES, MUST BE LISTED, LABELED &INSTALLED PER MFG. SPECIFICATIONS, SHALL CONFORM TO I.R.C.REQUIREMENTS. SEE DIV. 01002.12 SHEET A-1
B. ZERO CLEARANCE FIREPLACES SHALL CONFORM TO I.R.C. REQUIREMENTS. SEE DIV. 01002.12 SHT A-1
C. HEARTH SHALL CONFORM TO I.R.C REQUIREMENT SEE DIV. 01002.12
D. FIREBLOCK OPENINGS AROUND PENETRATIONS @ EACH FLOOR PER I.R.C. SECTION R1003.19.
E. FIREPLACE MUST COMPLY WITH UL 127 TESTING

P-16 SEE SITE PLAN FOR EXTENT OF WALKS & DRIVEWAYS

P-17 3" DIAMETER STEEL POST

P-18 36" GUARDRAIL PER I.R.C. SECTION R312 & TABLE R301.5 CONTRACTOR TO VERIFY TO INSPECTOR THAT ALL GUARDS & RAILINGS ARE CAPABLE OF RESISTING 200lb LOAD ON TOP RAIL ACTING IN ANY DIRECTION.

P-19 'B' VENT FOR MECHANICAL. 1" CLEARANCE ALL SIDES PER I.R.C. SECTION R302.11. SEE DIV. 15 SHEET A-1

P-20 PLANT SHELF

P-21 UPPER AND LOWER LINEN CABINETS

P-22 SOFFIT AREA

P-23 INTEGRATED MAKE UP AIR

P-24 2x6 STUDS W/ R-21 INSULATION MIN.

Date	By	Description
03/17/20	SM	PRELIMINARY DESIGN
04/20/20	SM	ELEVATION DESIGN
06/29/21	SM	ENGINEERING SET

Atlin Investments Inc.

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TITLE

JOB NO. : 19039.05
STARTING NO. : 19039.03

SHEET
A5

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: ARCHITECTURAL INNOVAT
PRATT PLAT - LOT 6
M&K PROJECT #: 203-21003
ENGINEER: JCL
DATE: 19-JUL-21

SHEARWALL DESIGN SUMMARY

SHEARWALL 201: 2ND - REAR EXT ENTIRE LENGTH

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.1	FT.	MAX WALL OPENING HT, H_c	6.5	FT.		
WALL LENGTH, L	78.8	FT.	QUALIFYING WALL LENGTH, L	48.0	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
2050 LBS	<	16128 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	338	PLF	OVERTURNING MOMENT	18.7	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	400	LBS	RESISTIVE MOMENT	647.7	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 202: 2ND - SIDE EXT MASTER BED / BATH

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.1	FT.	MAX WALL OPENING HT, Hc	7.0	FT.		
WALL LENGTH, L	28.3	FT.	QUALIFYING WALL LENGTH, L	22.3	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
2000 LBS	<	7476 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	134	PLF	OVERTURNING MOMENT	18.2	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	200	LBS	RESISTIVE MOMENT	35.5	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: ARCHITECTURAL INNOVAT
PRATT PLAT - LOT 6
M&K PROJECT #: 203-21003
ENGINEER: JCL
DATE: 19-JUL-21

SHEARWALL DESIGN SUMMARY

SHEARWALL 203: 2ND - FRONT EXT MASTER BED CORNER

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.1	FT.	MAX WALL OPENING HT, H_c	5.5	FT.		
WALL LENGTH, L	12.5	FT.	QUALIFYING WALL LENGTH, L	6.5	FT.	SHEARWALL ASSEMBLY	P3

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
1000 LBS	<	4095 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	411	PLF	OVERTURNING MOMENT	9.1	K-FT	UPLIFT CONNECTOR DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	300	LBS	RESISTIVE MOMENT	21.5	K-FT	HOLDOWN CAPACITY	1705	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 204: 2ND - FRONT EXT MASTER BED POPOUT

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.1	FT.	MAX WALL OPENING HT, Hc	5.0	FT.		
WALL LENGTH, L	12.5	FT.	QUALIFYING WALL LENGTH, L	5.5	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
530 LBS	<	1848 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	134	PLF	OVERTURNING MOMENT	4.8	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	1200	LBS	RESISTIVE MOMENT	15.3	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: ARCHITECTURAL INNOVAT
PRATT PLAT - LOT 6
M&K PROJECT #: 203-21003
ENGINEER: JCL
DATE: 19-JUL-21

SHEARWALL DESIGN SUMMARY

SHEARWALL 205: 2ND - FRONT EXT BATHROOM

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.1	FT.	MAX WALL OPENING HT, H_c	3.5	FT.		
WALL LENGTH, L	12.3	FT.	QUALIFYING WALL LENGTH, L	6.5	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
520 LBS	<	2184 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	372	PLF	OVERTURNING MOMENT	4.7	K-FT	UPLIFT CONNECTOR DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	400	LBS	RESISTIVE MOMENT	19.7	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 206: 2ND - SIDE EXT BATH / CLOSET

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.1	FT.	MAX WALL OPENING HT, Hc	3.0	FT.		
WALL LENGTH, L	11.8	FT.	QUALIFYING WALL LENGTH, L	9.8	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
1200 LBS	<	3276 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	134	PLF	OVERTURNING MOMENT	10.9	K-FT	HOLD DOWN DESIGN LOAD	337	LBS
DL AT ENDS OF WALL	200	LBS	RESISTIVE MOMENT	7.0	K-FT	HOLDOWN CAPACITY	1705	LBS

HOLD-DOWN SPECIFICATION

SIMPSON CS16 STRAP TIE (14" END LENGTH)

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: ARCHITECTURAL INNOVAT
PRATT PLAT - LOT 6
M&K PROJECT #: 203-21003
ENGINEER: JCL
DATE: 19-JUL-21

SHEARWALL DESIGN SUMMARY

SHEARWALL 207: 2ND - SIDE INT STAIRS

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.1	FT.	MAX WALL OPENING HT, H_c	0.0	FT.		
WALL LENGTH, L	7.8	FT.	QUALIFYING WALL LENGTH, L	7.8	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
850 LBS	<	2621 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	100	PLF	OVERTURNING MOMENT	7.7	K-FT	UPLIFT CONNECTOR DESIGN LOAD	398	LBS
DL AT ENDS OF WALL	600	LBS	RESISTIVE MOMENT	4.6	K-FT	HOLDOWN CAPACITY	1705	LBS

HOLD-DOWN SPECIFICATION

SIMPSON CS16 STRAP TIE (14" END LENGTH)

SHEARWALL 208: 2ND - SIDE EXT BEDROOM

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.1	FT.	MAX WALL OPENING HT, Hc	0.0	FT.		
WALL LENGTH, L	8.0	FT.	QUALIFYING WALL LENGTH, L	8.0	FT.	SHEARWALL ASSEMBLY	P3

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
1800 LBS	<	5040 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	185	PLF	OVERTURNING MOMENT	16.4	K-FT	HOLD DOWN DESIGN LOAD	1244	LBS
DL AT ENDS OF WALL	600	LBS	RESISTIVE MOMENT	6.4	K-FT	HOLDOWN CAPACITY	4645	LBS

HOLD-DOWN SPECIFICATION

SIMPSON MSTC66 STRAP TIE (20" END LENGTH)

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: ARCHITECTURAL INNOVAT
PRATT PLAT - LOT 6
M&K PROJECT #: 203-21003
ENGINEER: JCL
DATE: 19-JUL-21

SHEARWALL DESIGN SUMMARY

SHEARWALL 209: 2ND - SIDE INT REAR WALL

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.1	FT.	MAX WALL OPENING HT, H_c	0.0	FT.		
WALL LENGTH, L	16.0	FT.	QUALIFYING WALL LENGTH, L	16.0	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
1750 LBS	<	5376 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	100	PLF	OVERTURNING MOMENT	15.9	K-FT	UPLIFT CONNECTOR DESIGN LOAD	275	LBS
DL AT ENDS OF WALL	400	LBS	RESISTIVE MOMENT	11.5	K-FT	HOLDOWN CAPACITY	1705	LBS

HOLD-DOWN SPECIFICATION

SIMPSON CS16 STRAP TIE (14" END LENGTH)

SHEARWALL 101: 1ST - REAR EXT KITCHEN / BED

SHEARWALL PROPERTIES:

WALL HEIGHT, H	10.0	FT.	MAX WALL OPENING HT, Hc	5.0	FT.		
WALL LENGTH, L	22.3	FT.	QUALIFYING WALL LENGTH, L	13.8	FT.	SHEARWALL ASSEMBLY	P3

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
2900 LBS	<	8713 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	607	PLF	OVERTURNING MOMENT	34.3	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	400	LBS	RESISTIVE MOMENT	96.2	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: ARCHITECTURAL INNOVAT
PRATT PLAT - LOT 6
M&K PROJECT #: 203-21003
ENGINEER: JCL
DATE: 19-JUL-21

SHEARWALL DESIGN SUMMARY

SHEARWALL 102: 1ST - REAR EXT GARAGE

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.5	FT.	MAX WALL OPENING HT, H_c	0.0	FT.		
WALL LENGTH, L	21.3	FT.	QUALIFYING WALL LENGTH, L	21.3	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
1500 LBS	<	7140 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	453	PLF	OVERTURNING MOMENT	19.3	K-FT	UPLIFT CONNECTOR DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	600	LBS	RESISTIVE MOMENT	69.5	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 103: 1ST - FRONT EXT BY FIREPLACE

SHEARWALL PROPERTIES:

WALL HEIGHT, H	10.0	FT.	MAX WALL OPENING HT, Hc	5.5	FT.		
WALL LENGTH, L	25.0	FT.	QUALIFYING WALL LENGTH, L	12.2	FT.	SHEARWALL ASSEMBLY	P3

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
2450 LBS	<	7686 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	515	PLF	OVERTURNING MOMENT	42.7	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	400	LBS	RESISTIVE MOMENT	102.6	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: ARCHITECTURAL INNOVAT
PRATT PLAT - LOT 6
M&K PROJECT #: 203-21003
ENGINEER: JCL
DATE: 19-JUL-21

SHEARWALL DESIGN SUMMARY

SHEARWALL 104: 1ST - FRONT EXT BY STAIRS

SHEARWALL PROPERTIES:

WALL HEIGHT, H	10.0	FT.	MAX WALL OPENING HT, H_c	5.5	FT.		
WALL LENGTH, L	13.8	FT.	QUALIFYING WALL LENGTH, L	5.9	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
700 LBS	<	1982 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	339	PLF	OVERTURNING MOMENT	7.0	K-FT	UPLIFT CONNECTOR DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	800	LBS	RESISTIVE MOMENT	26.0	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 105: 1ST - FRONT EXT GARAGE

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.5	FT.	MAX WALL OPENING HT, Hc	4.5	FT.		
WALL LENGTH, L	24.5	FT.	QUALIFYING WALL LENGTH, L	14.8	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
1250 LBS	<	4956 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	185	PLF	OVERTURNING MOMENT	11.9	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	800	LBS	RESISTIVE MOMENT	45.1	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: ARCHITECTURAL INNOVAT
PRATT PLAT - LOT 6
M&K PROJECT #: 203-21003
ENGINEER: JCL
DATE: 19-JUL-21

SHEARWALL DESIGN SUMMARY

SHEARWALL 106: 1ST - SIDE INT GARAGE

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.5	FT.	MAX WALL OPENING HT, H_o	8.0	FT.		
WALL LENGTH, L	28.4	FT.	QUALIFYING WALL LENGTH, L	25.4	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
4500 LBS	<	8534 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	235	PLF	OVERTURNING MOMENT	42.8	K-FT	UPLIFT CONNECTOR DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	400	LBS	RESISTIVE MOMENT	63.7	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 107: 1ST - SIDE INT STAIRS

SHEARWALL PROPERTIES:

WALL HEIGHT, H	10.0	FT.	MAX WALL OPENING HT, Hc	0.0	FT.		
WALL LENGTH, L	7.8	FT.	QUALIFYING WALL LENGTH, L	7.8	FT.	SHEARWALL ASSEMBLY	P3

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
2500 LBS	<	4914 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	200	PLF	OVERTURNING MOMENT	32.7	K-FT	HOLD DOWN DESIGN LOAD	3489	LBS
DL AT ENDS OF WALL	400	LBS	RESISTIVE MOMENT	5.5	K-FT	HOLDOWN CAPACITY	5850	LBS

HOLD-DOWN SPECIFICATION

SIMPSON MSTC66 STRAP TIE (24" END LENGTH)

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: ARCHITECTURAL INNOVAT
PRATT PLAT - LOT 6
M&K PROJECT #: 203-21003
ENGINEER: JCL
DATE: 19-JUL-21

SHEARWALL DESIGN SUMMARY

SHEARWALL 108: 1ST - SIDE EXT FIREPLACE

SHEARWALL PROPERTIES:

WALL HEIGHT, H	10.0	FT.	MAX WALL OPENING HT, H_c	0.0	FT.		
WALL LENGTH, L	6.0	FT.	QUALIFYING WALL LENGTH, L	6.0	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
850 LBS	<	2016 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	134	PLF	OVERTURNING MOMENT	8.5	K-FT	UPLIFT CONNECTOR DESIGN LOAD	935	LBS
DL AT ENDS OF WALL	400	LBS	RESISTIVE MOMENT	2.9	K-FT	HOLDOWN CAPACITY	4935	LBS

HOLD-DOWN SPECIFICATION

SIMPSON STHD14RJ HOLDOWN

SHEARWALL 109: 1ST - SIDE EXT FIREPLACE OPENING

SHEARWALL PROPERTIES:

WALL HEIGHT, H	10.0	FT.	MAX WALL OPENING HT, Hc	4.0	FT.		
WALL LENGTH, L	8.7	FT.	QUALIFYING WALL LENGTH, L	4.7	FT.	SHEARWALL ASSEMBLY	P3

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
2250 LBS	<	2942 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	264	PLF	OVERTURNING MOMENT	28.1	K-FT	HOLD DOWN DESIGN LOAD	2433	LBS
DL AT ENDS OF WALL	200	LBS	RESISTIVE MOMENT	7.0	K-FT	HOLDOWN CAPACITY	4935	LBS

HOLD-DOWN SPECIFICATION

SIMPSON STHD14RJ HOLDOWN

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: ARCHITECTURAL INNOVAT
PRATT PLAT - LOT 6
M&K PROJECT #: 203-21003
ENGINEER: JCL
DATE: 19-JUL-21

SHEARWALL DESIGN SUMMARY

SHEARWALL 110: 1ST - SIDE INT KITCHEN

SHEARWALL PROPERTIES:

WALL HEIGHT, H	10.0	FT.	MAX WALL OPENING HT, H_c	0.0	FT.		
WALL LENGTH, L	13.5	FT.	QUALIFYING WALL LENGTH, L	13.5	FT.	SHEARWALL ASSEMBLY	P3

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
4300 LBS	<	8505 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	100	PLF	OVERTURNING MOMENT	43.0	K-FT	UPLIFT CONNECTOR DESIGN LOAD	2540	LBS
DL AT ENDS OF WALL	400	LBS	RESISTIVE MOMENT	8.7	K-FT	HOLDOWN CAPACITY	2655	LBS

HOLD-DOWN SPECIFICATION

SIMPSON MSTC40 STRAP TIE (12" END LENGTH)

SHEARWALL XXX: - NOT USED

SHEARWALL PROPERTIES:

WALL HEIGHT, H	0.0	FT.	MAX WALL OPENING HT, Hc	0.0	FT.		
WALL LENGTH, L	0.0	FT.	QUALIFYING WALL LENGTH, L	0.0	FT.	SHEARWALL ASSEMBLY	P0

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
0 LBS	####	#DIV/0! LBS

SHEARWALL ASSEMBLY SPECIFICATION

P0 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - UNBLOCKED
#DIV/0!

OVERTURNING EVALUATION:

RESISTIVE DL	0	PLF	OVERTURNING MOMENT	#DIV/0!	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	0	LBS	RESISTIVE MOMENT	0.0	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

Architectural Innovations

Pratt Plat - Lot 6

Mercer Island, WA

Shear Wall Calculations - Seismic

Reviewed By: NJM

July 19, 2021

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
RESIDENTIAL STRUCTURAL ENGINEERING

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: PRATT PLAT LOT 6
ARCHITECTURAL INNOV.
M&K PROJECT #: 203-21003
ENGINEER: JCL
DATE: 19-JUL-21

SEISMIC CALCULATION - ASCE 7-16

SEISMIC DESIGN CATEGORY:

USER INPUTS:

SITE CLASS	C
SPECTRAL RESPONSE ACCELERATION 0.2 SEC, **Ss**	1.470
SPECTRAL RESPONSE ACCELERATION 1.0 SEC, **S1**	0.508
OCCUPANCY CATEGORY	II

VARIABLES:

SITE COEFFICIENT, Fa	1.20
SITE COEFFICIENT, Fv	1.49

CALCULATED VALUES:

MAXIMUM SPECTRAL RESPONSE ACCELERATION, S_{MS}	1.764
MAXIMUM SPECTRAL RESPONSE ACCELERATION, S_{M1}	0.758
DESIGN SPECTRAL RESPONSE ACCELERATION, S_{DS}	1.176
DESIGN SPECTRAL RESPONSE ACCELERATION, S_{D1}	0.505
SEISMIC DESIGN CATEGORY (SHORT TERM)	D
SEISMIC DESIGN CATEGORY (1.0 SECOND TERM)	D

BUILDING PERIOD DETERMINATION:

USER INPUTS:

BUILDING PERIOD COEFFICIENT, C_T	0.020
LONG-PERIOD TRANS PERIOD, T_L (SEC)	6
HT. ABV BASE TO HIGHEST LEVEL, h_n	19

CALCULATED VALUES:

APPROXIMATE FUNDAMENTAL PERIOD, T_A	0.183
T_0	0.086
T_S	0.430
SPECTRAL RESPONSE ACC., S_A (G)	1.176

SITE CLASS ASSUMPTION

No — 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^2)	DEAD LOAD (PSF)	DL OF EXT WALL TRIB. TO LEVEL (KIPS)	TOTAL LEVEL DL
1	10.0	2935	15	16.0	60 K
2	9.1	2878	17	8.0	57 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
16	0.0	0	0	0.0	0 K
17	0.0	0	0	0.0	0 K
18	0.0	0	0	0.0	0 K
19	0.0	0	0	0.0	0 K
20	0.0	0	0	0.0	0 K

TOTAL DEAD LOAD OF STRUCTURE 117 KIPS

SEISMIC RESPONSE COEFFICIENT:

	TRANSVERSE	LONGITUDINAL
RESPONSE MODIFICATION FACTOR, **R**	6.5	6.5
OCCUPANCY IMPORTANCE FACTOR, I_E	1.00	1.00
SEISMIC RESPONSE COEFFICIENT, C_s	0.181	0.181

BASE SHEARS:

ULTIMATE LOADS		x 0.7 =	ALLOWABLE LOADS	
TRANSVERSE	LONGITUDINAL		TRANSVERSE	LONGITUDINAL
21 K	21 K		14.8 K	14.8 K

STORY SHEAR CALCULATION:

DISTRIBUTION EXPONENT, k: 1.00

		ULTIMATE LOADS		x 0.7 =	ALLOWABLE LOADS			
		TRANSVERSE	LONGITUDINAL		TRANSVERSE		LONGITUDINAL	
LEVEL	VERT. DIST. FACTOR, C_{VX}	STORY SHEAR, F_x	STORY SHEAR, F_x		STORY SHEAR, F_x	Σ STORY SHEAR	STORY SHEAR, F_x	Σ STORY SHEAR
1	0.356	7.5 K	7.5 K		5.3 K	14.8 K	5.3 K	14.8 K
2	0.644	13.6 K	13.6 K		9.5 K	9.5 K	9.5 K	9.5 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
16	0.00	0.0 K	0.0 K		0.0 K	0.0 K	0.0 K	0.0 K
17	0.00	0.0 K	0.0 K		0.0 K	0.0 K	0.0 K	0.0 K
18	0.00	0.0 K	0.0 K		0.0 K	0.0 K	0.0 K	0.0 K
19	0.00	0.0 K	0.0 K		0.0 K	0.0 K	0.0 K	0.0 K
20	0.00	0.0 K	0.0 K		0.0 K	0.0 K	0.0 K	0.0 K

SYMBOLS AND LEGEND

(F) FAN- DIRECT VENT TO OUTSIDE
-BATHROOMS/LAUNDRY 50 CFM MIN.
-KITCHEN EXHAUST HOOD TO BE MIN. OF 100CFM. IF EXHAUST HOOD EXCEEDS 400 CFM MAKE UP AIR MUST BE PROVIDED PER SECTION M1503.4.

(UF) WHOLE-HOUSE FAN ON TIMER, SYSTEMS TO CONFORM TO IRC, M1507.3. FAN SIZE PER PLAN. TIMER TO BE LOCATED AT THE FAU WITH A MANUAL OVERRIDE SWITCH AT THE FAN LOCATION. TIMER TO BE SET TO RUN 50% IN EACH 4-HOUR SEGMENT. FRESH AIR TO BE PROVIDED BY THE FORCED AIR SYSTEM DUCTS PER SECTION M1507.3.6.1.

(T) THERMOSTAT @ 50" ABOVE FLOOR

(S) 110v SMOKE ALARM PER I.R.C. R314 WITH BATTERY BACKUP INTERCONNECTED. USE A COMBINATION SMOKE/CARBON MONOXIDE ALARM WHEN NOTED

MECHANICAL, PLUMBING, AND ELECTRICAL SYSTEM FOR UNITS: PER DIV. 15,16 SEE SHEET A1

FURN WH

A. PROVIDE 6" DIAMETER FRESH AIR INTAKE FROM OUTSIDE TO RETURN AIR PLENUM AT FURNACE WITH MOTORIZED FLOW DAMPERS.
B. PROVIDE THERMAL EXPANSION TANK AT WATER HEATER.
C. STRAP WATER HEATER TO FRAMING TOP AND BOTTOM.
D. PROVIDE PRESSURE RELIEF LINE PLUMBED TO OUTSIDE.

14.8k
14.8k
SEISMIC

19.7k
8.8k
WIND

P1/P3 = 336/630 = 0.53(130 PLF) = 69 PLF
P1/P3 = 239/451 = 0.53(219 PLF) = 116 PLF
SHEAR WALL #101 & #102 ARE
PROPORTIONAL TO THEIR STIFFNESSES

4.4k W (50%)
7.4k S (50%)

#101
2.9k W (130 PLF)
4.9k S (219 PLF)

#102
1.5k W (70 PLF)
2.5k S (117 PLF)

APA P.F. (2)
2.9k W
1.5k S

#110
4.3k W (319 PLF)
3.45k S (256 PLF)

SW #206 ABOVE
75% TO APA P.F. -->
<-- 25% TO #106

APA P.F. (1)
1.2k W
0.85k S

P1/P3 = 336/630 = 0.53(260 PLF) = 138 PLF
P1/P3 = 239/451 = 0.53(242 PLF) = 128 PLF
SHEAR WALL #108 & #109 ARE
PROPORTIONAL TO THEIR STIFFNESSES

#106
4.5k W (158 PLF)
3.25k S (114 PLF)

#108
0.85k W (142 PLF)
0.8k S (133 PLF)

#109
2.25k W (260 PLF)
2.1k S (242 PLF)

SW #208 ABOVE
65% TO #106 -->
<-- 35% TO #107 & #110

APA P.F. (1)
1.2k W
0.85k S

#107
2.5k W (321 PLF)
2.0k S (256 PLF)

#105
1.25k W (51 PLF)
2.1k S (86 PLF)

4.4k W (50%)
7.4k S (50%)

#103
2.45k W (98 PLF)
4.1k S (164 PLF)

#104
0.7k W (51 PLF)
1.2k S (87 PLF)

P1/P3 = 336/630 = 0.53(98 PLF) = 52 PLF
P1/P3 = 239/451 = 0.53(164 PLF) = 87 PLF
SHEAR WALL #103, #104, & #105 ARE
PROPORTIONAL TO THEIR STIFFNESSES

3.1k W (9% STORY, 16% TOTAL)
2.9k S (8% STORY, 20% TOTAL)

2.9k W (24% STORY, 15% TOTAL)
1.5k S (28% STORY, 9% TOTAL)

6.8k W (30% STORY, 34% TOTAL)
5.45k S (27% STORY, 37% TOTAL)

4.5k W (25% STORY, 23% TOTAL)
3.25k S (26% STORY, 22% TOTAL)

2.4k W (12% STORY, 12% TOTAL)
1.7k S (11% STORY, 12% TOTAL)

MAIN FLOOR PLAN

Scale 1/4"=1'-0"

GENERAL PLAN NOTES

1. SEE SHEET A-1 FOR ALL GENERAL NOTES AND REQUIREMENTS.
2. ENERGY AND AIR QUALITY INFORMATION SEE DIV. 17 SHEET A-1
3. SEE BUILDING ELEVATION FOR WINDOW OPERATION SEE DIV. 8 SHEET A-1
4. SEE TYP. MATERIALS LIST ON SECTION SHEET
5. SEE SHEET A-1 FOR ALL NOTES AND REQUIREMENTS CONCERNING MECHANICAL, PLUMBING, AND ELECTRICAL.

FLOOR PLAN KEY NOTES

P-1 OCCUPANCY SEPARATION:
APPLY (1) LAYER OF ½" GWB. TO GARAGE SIDE OF RESIDENCE, ATTIC SPACES, AND TO ALL BEAMS AND POSTS SUPPORTING A FLOOR-CEILING ASSEMBLY. APPLY (1) LAYER OF ⅝" TYPE 'X' GWB. TO GARAGE CEILING WHEN UNDER HABITABLE ROOMS. DUCTS THROUGH WALL OR CEILING COMMON TO HOUSE SHALL HAVE MINIMUM 26 GAUGE STEEL SEE DIV. 01002.6.A. SHEET A-1.

P-2 1⅜" MIN. SELF CLOSING SOLID WOOD CORE, HONEY-COMB CORE STEEL, OR 20-MINUTE FIRE RATED DOOR. SEE DIV. 01002.6.B. SHEET A-1

P-3 STAIR ASSEMBLY NOTES: PER I.R.C. SECTION R311.5 AND DETAIL 12/D2.
A. HEADROOM MIN. 6'-8", WIDTH MIN. 3'-0".
B. TREADS 10" MIN. DEPTH AND MIN. WIDTH OF 36" ABOVE HANDRAIL HEIGHT, RISERS 7¾" MAX. HT. TREAD NOSING TO BE MINIMUM 3/4" AND A MAXIMUM OF 1 1/4" ON STAIRS WITH SOLID RISERS.
C. HANDRAIL MIN. 34" TO MAX 38" ABOVE TREAD NOSING. HANDRAIL TYPE 1 CIRCULAR TO HAVE 1¼" MIN. TO 2" MAX. CROSS SECTION DIMENSION AND 1 1/2" MIN. CLEAR FROM WALL. RETURN RAIL ENDS. HANDRAILS SHALL BE STRONG ENOUGH TO RESIST A 200 POUND POINT LOAD IN ANY DIRECTION PER I.R.C. TABLE R301.5
D. INSTALL FIRE BLOCKING BETWEEN STRINGERS AT THE TOP AND BOTTOM OF EACH RUN PER I.R.C. SECTION R302.11.
E. COVER USABLE SPACE UNDER STAIR W/ ½" GWB. PER I.R.C. SECTION R302.7.
F. INTERMEDIATE BALUSTERS SHALL BE SPACED W/ LESS THAN 4" BETWEEN BALUSTERS.
G. PROVIDE STAIRWAY ILLUMINATION PER I.R.C. SECTION R303.6.
SEE DIV. 01002.7 SHEET A-1.

P-4 SAFETY GLAZING PER I.R.C., SECTION R308
A. WINDOWS WITHIN 18" OF FLOOR
B. WINDOWS WITHIN A 24" ARC OF DOORS
C. WINDOWS AT TUBS AND SHOWERS
D. GLAZING IN DOORS
E. LESS THAN 60" HORIZ. FROM THE BOT. STAIR TREAD NOSING, 4 BOT. EDGE OF GLAZING IS LESS THAN 36" ABV. LANDING/WALKING SURFACE
SEE DIV. 08800 SHEET A-1

P-5 EGRESS WINDOW PER I.R.C., SECTION R310 SEE DIV. 08600 SHEET A-1

P-6 IGNITERS FOR GAS FIRED APPLIANCES IN GARAGE TO BE 18" MIN. ABOVE TOP OF SLAB. SEE DIV. 15 SHEET A-1

P-7 COVER WALLS ADJACENT TO TUBS AND SHOWERS WITH NON-ABSORBENT MATERIAL TO 72" ABOVE DRAIN INLETS, PER I.R.C. SECTION 307.2. SEE DIV. 09250 SHEET A-1

P-8 (2) LAYERS OF FLOOR SHEATHING OVER FRAMING.

P-9 7¾" MAX. RISER WITH 10" MIN. RUN, IF MORE THAN (3) RISERS, HANDRAIL REQUIRED PER I.R.C. SECTION R311.7.8. SEE DIV. 01002.7 SHEET A-1

P-10 18"x24" CRAWL SPACE ACCESS, INSULATE AND WEATHER STRIP. SEE DIV. 01002.1 SHEET A-1

P-11 22"x30" ATTIC SPACE ACCESS W/ 30" HEAD CLEARANCE. INSULATE AND WEATHER STRIP. SEE DIV. 01002.2 SHEET A-1

P-12 FLOOR MATERIAL BREAK LINE

P-13 WALL LINE ABOVE

P-14 WALL LINE BELOW

P-15 FIREPLACE ASSEMBLY NOTES:
A. DIRECT VENT GAS FIREPLACES, MUST BE LISTED, LABELED & INSTALLED PER MFG. SPECIFICATIONS, SHALL CONFORM TO I.R.C. REQUIREMENTS. SEE DIV. 01002.12 SHEET A-1
B. ZERO CLEARANCE FIREPLACES SHALL CONFORM TO I.R.C. REQUIREMENTS. SEE DIV. 01002.12 SHT A-1
C. HEARTH SHALL CONFORM TO I.R.C. REQUIREMENT SEE DIV. 01002.12
D. FIREBLOCK OPENINGS AROUND PENETRATIONS @ EACH FLOOR PER I.R.C. SECTION R1003.19.
E. FIREPLACE MUST COMPLY WITH UL 127 TESTING

P-16 SEE SITE PLAN FOR EXTENT OF WALKS & DRIVEWAYS

P-17 3" DIAMETER STEEL POST

P-18 36" GUARDRAIL PER I.R.C. SECTION R312 & TABLE R301.5 CONTRACTOR TO VERIFY TO INSPECTOR THAT ALL GUARDS & RAILINGS ARE CAPABLE OF RESISTING 200lb LOAD ON TOP RAIL ACTING IN ANY DIRECTION.

P-19 12" VENT FOR MECHANICAL 1" CLEARANCE ALL SIDES PER I.R.C. SECTION R302.11. SEE DIV. 15 SHEET A-1

P-20 PLANT SHELF

P-21 UPPER AND LOWER LINEN CABINETS

P-22 SOFFIT AREA

P-23 INTEGRATED MAKE UP AIR

P-24 2x6 STUDS W/ R-21 INSULATION MIN.

SQUARE FOOTAGE

MAIN FLOOR	1861 SF
UPPER FLOOR	2357 SF
TOTAL	4218 SF
GARAGE	682 SF
PORCH	213 SF
PATIO	225 SF

Date	By	Description
03/17/20	SM	PRELIMINARY DESIGN
04/20/20	SM	ELEVATION DESIGN
06/29/21	SM	ENGINEERING SET

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TITLE

JOB NO.: 19039.05
STARTING NO.: 19039.03

SHEET
A3

SYMBOLS AND LEGEND

(F) FAN- DIRECT VENT TO OUTSIDE
-BATHROOMS/LAUNDRY 50 CFM MIN.
-KITCHEN EXHAUST HOOD TO BE MIN. OF 100CFM. IF EXHAUST HOOD EXCEEDS 400 CFM MAKE UP AIR MUST BE PROVIDED PER SECTION M1503.4.

(WF) WHOLE-HOUSE FAN ON TIMER, SYSTEMS TO CONFORM TO IRC, M1507.3. FAN SIZE PER PLAN. TIMER TO BE LOCATED AT THE FAU WITH A MANUAL OVERRIDE SWITCH AT THE FAN LOCATION. TIMER TO BE SET TO RUN 50% IN EACH 4-HOUR SEGMENT. FRESH AIR TO BE PROVIDED BY THE FORCED AIR SYSTEM DUCTS PER SECTION M1507.3.6.1.

(T) THERMOSTAT @ 50" ABOVE FLOOR

(S) 110V SMOKE ALARM PER I.R.C. R314 WITH BATTERY BACKUP INTERCONNECTED. USE A COMBINATION SMOKE/CARBON MONOXIDE ALARM WHEN NOTED

MECHANICAL, PLUMBING, AND ELECTRICAL SYSTEM FOR UNITS: PER DIV. 15,16 SEE SHEET A1

FURN WH

A. PROVIDE 6" DIAMETER FRESH AIR INTAKE FROM OUTSIDE TO RETURN AIR PLENUM AT FURNACE WITH MOTORIZED FLOW DAMPERS.
B. PROVIDE THERMAL EXPANSION TANK AT WATER HEATER.
C. STRAP WATER HEATER TO FRAMING TOP AND BOTTOM.
D. PROVIDE PRESSURE RELIEF LINE PLUMBED TO OUTSIDE.

9.5k
9.5k
SEISMIC

7.6k
4.1k
WIND

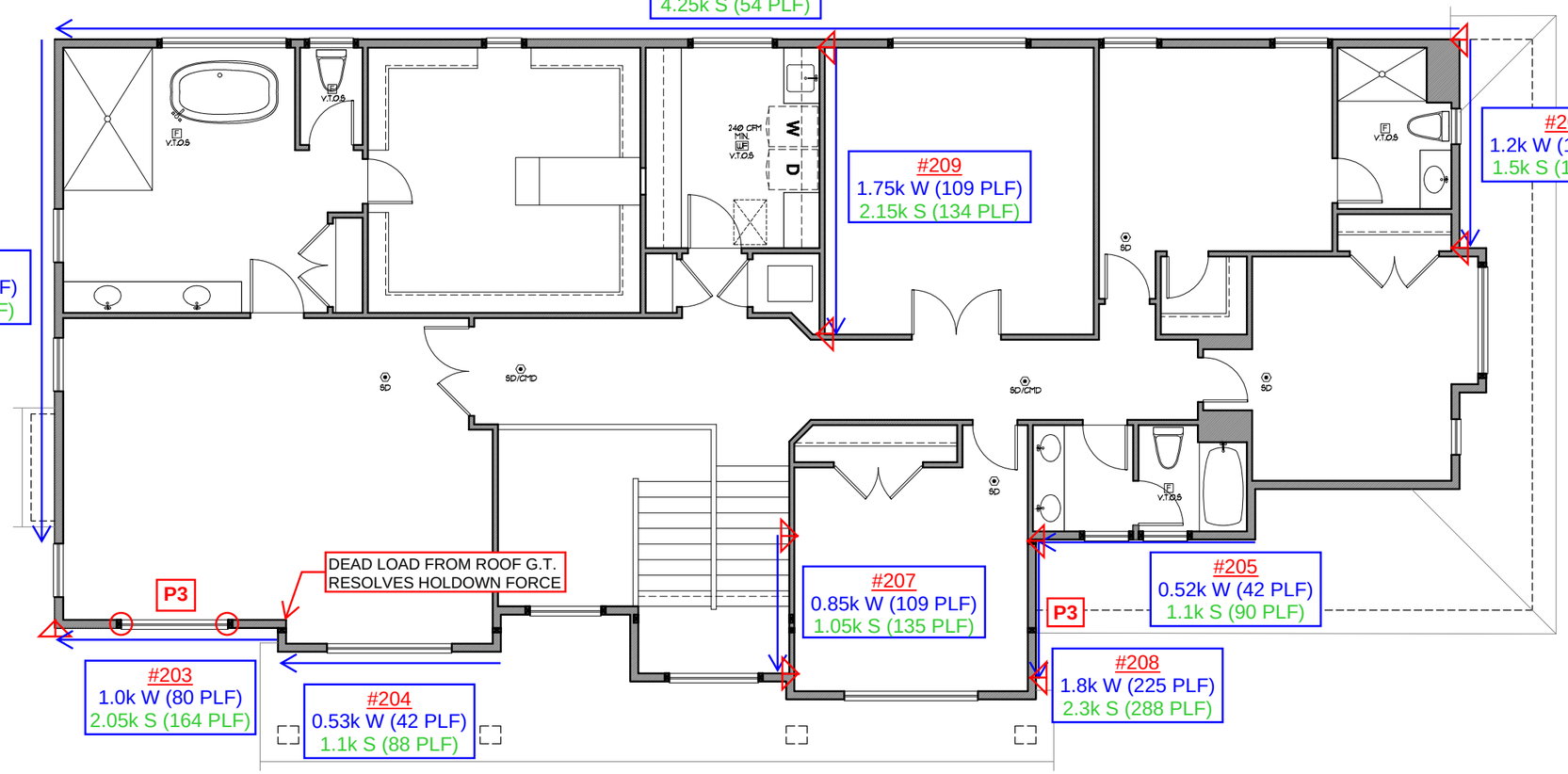
2.05k W (50%)
4.25k S (50%)

#201
2.05k W (26 PLF)
4.25k S (54 PLF)

#206
1.2k W (102 PLF)
1.5k S (128 PLF)

#209
1.75k W (109 PLF)
2.15k S (134 PLF)

#202
2.0k W (71 PLF)
2.5k S (88 PLF)



DEAD LOAD FROM ROOF G.T. RESOLVES HOLDOWN FORCE

P3

P3

#207
0.85k W (109 PLF)
1.05k S (135 PLF)

#205
0.52k W (42 PLF)
1.1k S (90 PLF)

#208
1.8k W (225 PLF)
2.3k S (288 PLF)

2.05k W (50%)
4.25k S (50%)

#203
1.0k W (80 PLF)
2.05k S (164 PLF)

#204
0.53k W (42 PLF)
1.1k S (88 PLF)

P1/P3 = 336/630 = 0.53(80 PLF) = 42 PLF
P1/P3 = 239/451 = 0.53(164 PLF) = 87 PLF
SHEAR WALL #203, #204, & #205 ARE PROPORTIONAL TO THEIR STIFFNESSES

2.0k W (26%)
2.5k S (26%)

2.6k W (34%)
3.2k S (34%)

1.8k W (24%)
2.3k S (24%)

1.2k W (16%)
1.5k S (16%)

UPPER FLOOR

Scale 1/4"=1'-0"

GENERAL PLAN NOTES

1. SEE SHEET A-1 FOR ALL GENERAL NOTES AND REQUIREMENTS.
2. ENERGY AND AIR QUALITY INFORMATION SEE DIV. 11 SHEET A-1
3. SEE BUILDING ELEVATION FOR WINDOW OPERATION SEE DIV. 8 SHEET A-1
4. SEE TYP. MATERIALS LIST ON SECTION SHEET
5. SEE SHEET A-1 FOR ALL NOTES AND REQUIREMENTS CONCERNING MECHANICAL, PLUMBING, AND ELECTRICAL.

FLOOR PLAN KEY NOTES

P-1 OCCUPANCY SEPARATION:
APPLY (1) LAYER OF ½" GWB. TO GARAGE SIDE OF RESIDENCE, ATTIC SPACES, AND TO ALL BEAMS AND POSTS SUPPORTING A FLOOR-CEILING ASSEMBLY.
APPLY (1) LAYER OF ⅝" TYPE 'X' GWB. TO GARAGE CEILING WHEN UNDER HABITABLE ROOMS.
DUCTS THROUGH WALL OR CEILING COMMON TO HOUSE SHALL HAVE MINIMUM 26 GAUGE STEEL
SEE DIV. 01002.6.A. SHEET A-1.

P-2 1⅜" MIN. SELF CLOSING SOLID WOOD CORE, HONEY-COMB CORE STEEL, OR 20-MINUTE FIRE RATED DOOR. SEE DIV. 01002.6.B. SHEET A-1

P-3 STAIR ASSEMBLY NOTES: PER I.R.C. SECTION R311.5 AND DETAIL 12/D2.
A. HEADROOM MIN. 6'-8", WIDTH MIN. 3'-0".
B. TREADS 10" MIN. DEPTH AND MIN. WIDTH OF 36" ABOVE HANDRAIL HEIGHT, RISERS 7¾" MAX. HT. TREAD NOSING TO BE MINIMUM 3/4" AND A MAXIMUM OF 1 1/4" ON STAIRS WITH SOLID RISERS.
C. HANDRAIL MIN. 34" TO MAX 38" ABOVE TREAD NOSING. HANDRAIL TYPE 1 CIRCULAR TO HAVE 1¼" MIN. TO 2" MAX. CROSS SECTION DIMENSION AND 1 1/2" MIN. CLEAR FROM WALL. RETURN RAIL ENDS. HANDRAILS SHALL BE STRONG ENOUGH TO RESIST A 200 POUND POINT LOAD IN ANY DIRECTION PER I.R.C. TABLE R301.5
D. INSTALL FIRE BLOCKING BETWEEN STRINGERS AT THE TOP AND BOTTOM OF EACH RUN PER I.R.C. SECTION R302.11.
E. COVER USABLE SPACE UNDER STAIR W/ ½" G.W.B. PER I.R.C. SECTION R302.7.
F. INTERMEDIATE BALUSTERS SHALL BE SPACED W/ LESS THAN 4" BETWEEN BALUSTERS.
G. PROVIDE STAIRWAY ILLUMINATION PER I.R.C. SECTION R303.6.
SEE DIV. 01002.7 SHEET A-1.

P-4 SAFETY GLAZING PER I.R.C., SECTION R308
A. WINDOWS WITHIN 18" OF FLOOR
B. WINDOWS WITHIN A 24" ARC OF DOORS
C. WINDOWS AT TUBS AND SHOWERS
D. GLAZING IN DOORS
E. LESS THAN 60" HORIZ. FROM THE BOT. STAIR TREAD NOSING, & BOT. EDGE OF GLAZING IS LESS THAN 36" ABV. LANDING/WALKING SURFACE
SEE DIV. 08800 SHEET A-1

P-5 EGRESS WINDOW PER I.R.C., SECTION R310 SEE DIV. 08600 SHEET A-1

P-6 IGNITERS FOR GAS FIRED APPLIANCES IN GARAGE TO BE 18" MIN. ABOVE TOP OF SLAB. SEE DIV. 15 SHEET A-1

P-7 COVER WALLS ADJACENT TO TUBS AND SHOWERS WITH NON-ABSORBENT MATERIAL TO 72" ABOVE DRAIN INLETS, PER I.R.C. SECTION 3012. SEE DIV. 09250 SHEET A-1

P-8 (2) LAYERS OF FLOOR SHEATHING OVER FRAMING.

P-9 7¾" MAX. RISER WITH 10" MIN. RUN. IF MORE THAN (3) RISERS, HANDRAIL REQUIRED PER I.R.C. SECTION R311.7.8. SEE DIV. 01002.7 SHEET A-1

P-10 18"x24" CRAWL SPACE ACCESS, INSULATE AND WEATHER STRIP. SEE DIV. 01002.1 SHEET A-1

P-11 22"x30" ATTIC SPACE ACCESS W/ 30" HEAD CLEARANCE. INSULATE AND WEATHER STRIP. SEE DIV. 01002.2 SHEET A-1

P-12 FLOOR MATERIAL BREAK LINE

P-13 WALL LINE ABOVE

P-14 WALL LINE BELOW

P-15 FIREPLACE ASSEMBLY NOTES:
A. DIRECT VENT GAS FIREPLACES, MUST BE LISTED, LABELED &INSTALLED PER MFG. SPECIFICATIONS, SHALL CONFORM TO I.R.C.REQUIREMENTS. SEE DIV. 01002.12 SHEET A-1
B. ZERO CLEARANCE FIREPLACES SHALL CONFORM TO I.R.C. REQUIREMENTS. SEE DIV. 01002.12 SHT A-1
C. HEARTH SHALL CONFORM TO I.R.C REQUIREMENT SEE DIV. 01002.12
D. FIREBLOCK OPENINGS AROUND PENETRATIONS @ EACH FLOOR PER I.R.C. SECTION R1003.19.
E. FIREPLACE MUST COMPLY WITH UL 127 TESTING

P-16 SEE SITE PLAN FOR EXTENT OF WALKS & DRIVEWAYS

P-17 3" DIAMETER STEEL POST

P-18 36" GUARDRAIL PER I.R.C. SECTION R312 & TABLE R301.5 CONTRACTOR TO VERIFY TO INSPECTOR THAT ALL GUARDS & RAILINGS ARE CAPABLE OF RESISTING 200lb LOAD ON TOP RAIL ACTING IN ANY DIRECTION.

P-19 'B' VENT FOR MECHANICAL. 1" CLEARANCE ALL SIDES PER I.R.C. SECTION R302.11. SEE DIV. 15 SHEET A-1

P-20 PLANT SHELF

P-21 UPPER AND LOWER LINEN CABINETS

P-22 SOFFIT AREA

P-23 INTEGRATED MAKE UP AIR

P-24 2x6 STUDS W/ R-21 INSULATION MIN.

Date	By	Description
03/17/20	SM	PRELIMINARY DESIGN
04/20/20	SM	ELEVATION DESIGN
06/29/21	SM	ENGINEERING SET

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TITLE

JOB NO. : 19039.05
STARTING NO. : 19039.03

SHEET
A5

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: ARCHITECTURAL INNOVAT
PRATT PLAT - LOT 6
M&K PROJECT #: 203-21003
ENGINEER: JCL
DATE: 19-JUL-21

SHEARWALL DESIGN SUMMARY

SHEARWALL 201: 2ND - REAR EXT ENTIRE LENGTH

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.1	FT.	MAX WALL OPENING HT, H_c	6.5	FT.		
WALL LENGTH, L	78.8	FT.	QUALIFYING WALL LENGTH, L	48.0	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
4250 LBS	<	11472 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	338	PLF	OVERTURNING MOMENT	38.7	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	400	LBS	RESISTIVE MOMENT	496.6	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 202: 2ND - SIDE EXT MASTER BED / BATH

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.1	FT.	MAX WALL OPENING HT, Hc	7.0	FT.		
WALL LENGTH, L	28.3	FT.	QUALIFYING WALL LENGTH, L	22.3	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
2500 LBS	<	5318 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	134	PLF	OVERTURNING MOMENT	22.8	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	200	LBS	RESISTIVE MOMENT	27.2	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: ARCHITECTURAL INNOVAT
PRATT PLAT - LOT 6
M&K PROJECT #: 203-21003
ENGINEER: JCL
DATE: 19-JUL-21

SHEARWALL DESIGN SUMMARY

SHEARWALL 203: 2ND - FRONT EXT MASTER BED CORNER

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.1	FT.	MAX WALL OPENING HT, H_c	5.5	FT.		
WALL LENGTH, L	12.5	FT.	QUALIFYING WALL LENGTH, L	6.5	FT.	SHEARWALL ASSEMBLY	P3

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
2050 LBS	<	2932 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	411	PLF	OVERTURNING MOMENT	18.7	K-FT	UPLIFT CONNECTOR DESIGN LOAD	173	LBS
DL AT ENDS OF WALL	300	LBS	RESISTIVE MOMENT	16.5	K-FT	HOLDOWN CAPACITY	1705	LBS

HOLD-DOWN SPECIFICATION

SIMPSON CS16 STRAP TIE (14" END LENGTH)

SHEARWALL 204: 2ND - FRONT EXT MASTER BED POPOUT

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.1	FT.	MAX WALL OPENING HT, Hc	5.0	FT.		
WALL LENGTH, L	12.5	FT.	QUALIFYING WALL LENGTH, L	5.5	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
1100 LBS	<	1315 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	134	PLF	OVERTURNING MOMENT	10.0	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	1200	LBS	RESISTIVE MOMENT	11.7	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: ARCHITECTURAL INNOVAT
PRATT PLAT - LOT 6
M&K PROJECT #: 203-21003
ENGINEER: JCL
DATE: 19-JUL-21

SHEARWALL DESIGN SUMMARY

SHEARWALL 205: 2ND - FRONT EXT BATHROOM

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.1	FT.	MAX WALL OPENING HT, H_c	3.5	FT.		
WALL LENGTH, L	12.3	FT.	QUALIFYING WALL LENGTH, L	6.5	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
1100 LBS	<	1554 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	372	PLF	OVERTURNING MOMENT	10.0	K-FT	UPLIFT CONNECTOR DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	400	LBS	RESISTIVE MOMENT	15.1	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 206: 2ND - SIDE EXT BATH / CLOSET

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.1	FT.	MAX WALL OPENING HT, Hc	3.0	FT.		
WALL LENGTH, L	11.8	FT.	QUALIFYING WALL LENGTH, L	9.8	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
1500 LBS	<	2330 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	134	PLF	OVERTURNING MOMENT	13.7	K-FT	HOLD DOWN DESIGN LOAD	708	LBS
DL AT ENDS OF WALL	200	LBS	RESISTIVE MOMENT	5.3	K-FT	HOLDOWN CAPACITY	1705	LBS

HOLD-DOWN SPECIFICATION

SIMPSON CS16 STRAP TIE (14" END LENGTH)

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: ARCHITECTURAL INNOVAT
PRATT PLAT - LOT 6
M&K PROJECT #: 203-21003
ENGINEER: JCL
DATE: 19-JUL-21

SHEARWALL DESIGN SUMMARY

SHEARWALL 207: 2ND - SIDE INT STAIRS

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.1	FT.	MAX WALL OPENING HT, H_c	0.0	FT.		
WALL LENGTH, L	7.8	FT.	QUALIFYING WALL LENGTH, L	7.8	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
1050 LBS	<	1864 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	100	PLF	OVERTURNING MOMENT	9.6	K-FT	UPLIFT CONNECTOR DESIGN LOAD	770	LBS
DL AT ENDS OF WALL	600	LBS	RESISTIVE MOMENT	3.6	K-FT	HOLDOWN CAPACITY	1705	LBS

HOLD-DOWN SPECIFICATION

SIMPSON CS16 STRAP TIE (14" END LENGTH)

SHEARWALL 208: 2ND - SIDE EXT BEDROOM

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.1	FT.	MAX WALL OPENING HT, Hc	0.0	FT.		
WALL LENGTH, L	8.0	FT.	QUALIFYING WALL LENGTH, L	8.0	FT.	SHEARWALL ASSEMBLY	P3

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
2300 LBS	<	3608 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	185	PLF	OVERTURNING MOMENT	20.9	K-FT	HOLD DOWN DESIGN LOAD	2000	LBS
DL AT ENDS OF WALL	600	LBS	RESISTIVE MOMENT	4.9	K-FT	HOLDOWN CAPACITY	4645	LBS

HOLD-DOWN SPECIFICATION

SIMPSON MSTC66 STRAP TIE (20" END LENGTH)

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: ARCHITECTURAL INNOVAT
PRATT PLAT - LOT 6
M&K PROJECT #: 203-21003
ENGINEER: JCL
DATE: 19-JUL-21

SHEARWALL DESIGN SUMMARY

SHEARWALL 209: 2ND - SIDE INT REAR WALL

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.1	FT.	MAX WALL OPENING HT, H_c	0.0	FT.		
WALL LENGTH, L	16.0	FT.	QUALIFYING WALL LENGTH, L	16.0	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
2150 LBS	<	3824 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	100	PLF	OVERTURNING MOMENT	19.6	K-FT	UPLIFT CONNECTOR DESIGN LOAD	671	LBS
DL AT ENDS OF WALL	400	LBS	RESISTIVE MOMENT	8.8	K-FT	HOLDOWN CAPACITY	1705	LBS

HOLD-DOWN SPECIFICATION

SIMPSON CS16 STRAP TIE (14" END LENGTH)

SHEARWALL 101: 1ST - REAR EXT KITCHEN / BED

SHEARWALL PROPERTIES:

WALL HEIGHT, H	10.0	FT.	MAX WALL OPENING HT, Hc	5.0	FT.		
WALL LENGTH, L	22.3	FT.	QUALIFYING WALL LENGTH, L	13.8	FT.	SHEARWALL ASSEMBLY	P3

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
4900 LBS	<	6237 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	607	PLF	OVERTURNING MOMENT	60.0	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	400	LBS	RESISTIVE MOMENT	73.7	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: ARCHITECTURAL INNOVAT
PRATT PLAT - LOT 6
M&K PROJECT #: 203-21003
ENGINEER: JCL
DATE: 19-JUL-21

SHEARWALL DESIGN SUMMARY

SHEARWALL 102: 1ST - REAR EXT GARAGE

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.5	FT.	MAX WALL OPENING HT, H_c	0.0	FT.		
WALL LENGTH, L	21.3	FT.	QUALIFYING WALL LENGTH, L	21.3	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
2500 LBS	<	5079 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	453	PLF	OVERTURNING MOMENT	34.2	K-FT	UPLIFT CONNECTOR DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	600	LBS	RESISTIVE MOMENT	53.3	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 103: 1ST - FRONT EXT BY FIREPLACE

SHEARWALL PROPERTIES:

WALL HEIGHT, H	10.0	FT.	MAX WALL OPENING HT, Hc	5.5	FT.		
WALL LENGTH, L	25.0	FT.	QUALIFYING WALL LENGTH, L	12.2	FT.	SHEARWALL ASSEMBLY	P3

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
4100 LBS	<	5502 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	515	PLF	OVERTURNING MOMENT	78.3	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	400	LBS	RESISTIVE MOMENT	78.6	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: ARCHITECTURAL INNOVAT
PRATT PLAT - LOT 6
M&K PROJECT #: 203-21003
ENGINEER: JCL
DATE: 19-JUL-21

SHEARWALL DESIGN SUMMARY

SHEARWALL 104: 1ST - FRONT EXT BY STAIRS

SHEARWALL PROPERTIES:

WALL HEIGHT, H	10.0	FT.	MAX WALL OPENING HT, H_c	5.5	FT.		
WALL LENGTH, L	13.8	FT.	QUALIFYING WALL LENGTH, L	5.9	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
1200 LBS	<	1410 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	339	PLF	OVERTURNING MOMENT	12.0	K-FT	UPLIFT CONNECTOR DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	800	LBS	RESISTIVE MOMENT	19.9	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 105: 1ST - FRONT EXT GARAGE

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.5	FT.	MAX WALL OPENING HT, Hc	4.5	FT.		
WALL LENGTH, L	24.5	FT.	QUALIFYING WALL LENGTH, L	14.8	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
2100 LBS	<	3525 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	185	PLF	OVERTURNING MOMENT	20.0	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	800	LBS	RESISTIVE MOMENT	34.6	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: ARCHITECTURAL INNOVAT
PRATT PLAT - LOT 6
M&K PROJECT #: 203-21003
ENGINEER: JCL
DATE: 19-JUL-21

SHEARWALL DESIGN SUMMARY

SHEARWALL 106: 1ST - SIDE INT GARAGE

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.5	FT.	MAX WALL OPENING HT, H_o	8.0	FT.		
WALL LENGTH, L	28.4	FT.	QUALIFYING WALL LENGTH, L	25.4	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
3250 LBS	<	6071 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	235	PLF	OVERTURNING MOMENT	30.9	K-FT	UPLIFT CONNECTOR DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	400	LBS	RESISTIVE MOMENT	48.8	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 107: 1ST - SIDE INT STAIRS

SHEARWALL PROPERTIES:

WALL HEIGHT, H	10.0	FT.	MAX WALL OPENING HT, Hc	0.0	FT.		
WALL LENGTH, L	7.8	FT.	QUALIFYING WALL LENGTH, L	7.8	FT.	SHEARWALL ASSEMBLY	P3

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
2000 LBS	<	3518 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	200	PLF	OVERTURNING MOMENT	29.6	K-FT	HOLD DOWN DESIGN LOAD	3246	LBS
DL AT ENDS OF WALL	400	LBS	RESISTIVE MOMENT	4.2	K-FT	HOLDOWN CAPACITY	5850	LBS

HOLD-DOWN SPECIFICATION

SIMPSON MSTC66 STRAP TIE (24" END LENGTH)

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: ARCHITECTURAL INNOVAT
PRATT PLAT - LOT 6
M&K PROJECT #: 203-21003
ENGINEER: JCL
DATE: 19-JUL-21

SHEARWALL DESIGN SUMMARY

SHEARWALL 108: 1ST - SIDE EXT FIREPLACE

SHEARWALL PROPERTIES:

WALL HEIGHT, H	10.0	FT.	MAX WALL OPENING HT, H_c	0.0	FT.		
WALL LENGTH, L	6.0	FT.	QUALIFYING WALL LENGTH, L	6.0	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
800 LBS	<	1434 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	134	PLF	OVERTURNING MOMENT	8.0	K-FT	UPLIFT CONNECTOR DESIGN LOAD	964	LBS
DL AT ENDS OF WALL	400	LBS	RESISTIVE MOMENT	2.2	K-FT	HOLDOWN CAPACITY	3695	LBS

HOLD-DOWN SPECIFICATION

SIMPSON STHD14RJ HOLDOWN

SHEARWALL 109: 1ST - SIDE EXT FIREPLACE OPENING

SHEARWALL PROPERTIES:

WALL HEIGHT, H	10.0	FT.	MAX WALL OPENING HT, Hc	4.0	FT.		
WALL LENGTH, L	8.7	FT.	QUALIFYING WALL LENGTH, L	4.7	FT.	SHEARWALL ASSEMBLY	P3

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
2100 LBS	<	2106 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	264	PLF	OVERTURNING MOMENT	28.0	K-FT	HOLD DOWN DESIGN LOAD	2609	LBS
DL AT ENDS OF WALL	200	LBS	RESISTIVE MOMENT	5.4	K-FT	HOLDOWN CAPACITY	3695	LBS

HOLD-DOWN SPECIFICATION

SIMPSON STHD14RJ HOLDOWN

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: ARCHITECTURAL INNOVAT
PRATT PLAT - LOT 6
M&K PROJECT #: 203-21003
ENGINEER: JCL
DATE: 19-JUL-21

SHEARWALL DESIGN SUMMARY

SHEARWALL 110: 1ST - SIDE INT KITCHEN

SHEARWALL PROPERTIES:

WALL HEIGHT, H	10.0	FT.	MAX WALL OPENING HT, H_o	0.0	FT.		
WALL LENGTH, L	13.5	FT.	QUALIFYING WALL LENGTH, L	13.5	FT.	SHEARWALL ASSEMBLY	P3

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
3450 LBS	<	6089 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	100	PLF	OVERTURNING MOMENT	34.5	K-FT	UPLIFT CONNECTOR DESIGN LOAD	2061	LBS
DL AT ENDS OF WALL	400	LBS	RESISTIVE MOMENT	6.7	K-FT	HOLDOWN CAPACITY	2655	LBS

HOLD-DOWN SPECIFICATION

SIMPSON MSTC40 STRAP TIE (12" END LENGTH)

SHEARWALL XXX: - NOT USED

SHEARWALL PROPERTIES:

WALL HEIGHT, H	0.0	FT.	MAX WALL OPENING HT, Hc	0.0	FT.		
WALL LENGTH, L	0.0	FT.	QUALIFYING WALL LENGTH, L	0.0	FT.	SHEARWALL ASSEMBLY	P0

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
0 LBS	####	#DIV/0! LBS

SHEARWALL ASSEMBLY SPECIFICATION

P0 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - UNBLOCKED
#DIV/0!

OVERTURNING EVALUATION:

RESISTIVE DL	0	PLF	OVERTURNING MOMENT	#DIV/0!	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	0	LBS	RESISTIVE MOMENT	0.0	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED