MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

7220 Trade Street, Suite 295, San Diego, CA 92121 ▸ p 619-650-0010 ▸ *mulhernkulp.com*

CALCULATION PACKAGE

January 25, 2025

LNL Builds

4450 84th Ave SE
Mercer Island, WA

MULHERN & KULP STRUCTURAL ENGINEERING, INC.

Prepared By:

Matthew Mills, E.I.T. *Staff Engineer II*

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

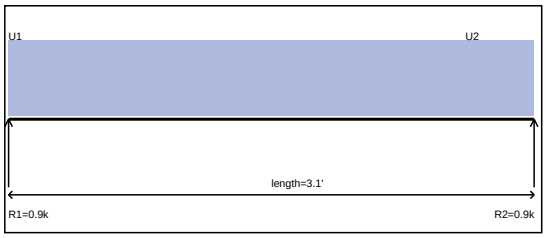
Signature, Seal & Date

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

BEAM & HEADER CALCULATIONS

M+K PROJECT #: 300-25001 - T01 - 4450 84th Ave SE - 4450 84th Ave SE
ENGINEER: Matthew Mills
Date: 01/28/2025

Description - Roof Framing - H5-3 - Header



Uniform 1 = 0.58 klf (0.0'-2.7')

Uniform 2 = 0.58 klf (2.7'-3.1')

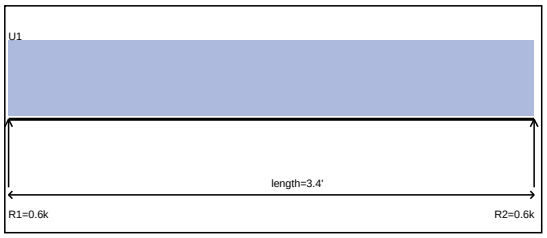
Controlling Load Combination/ Cd
V = (D + S) Cd=1.15
M = (D + S) Cd=1.15
△ = (D + S)

V = 0.89k	Vall = 3.50k	Ratio = 0.25
M = 0.68k-ft	Mall = 3.44k-ft	Ratio = 0.20

Deflection
TL = 0.01" L/999+ > L/240 min
DL = 0.00"
L = 0.00" L/999+ > L/360 min

4x8 DF #2

Description - Roof Framing - B5-2 - Flush



Uniform 1 = 0.31 klf (0.0'-3.4')

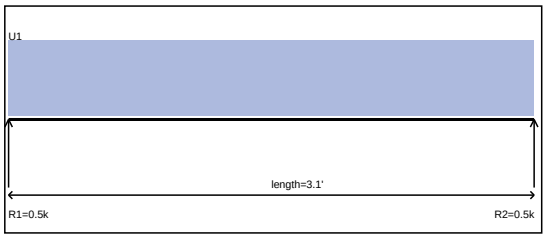
Controlling Load Combination/ Cd
V = (D + S) Cd=1.15
M = (D + S) Cd=1.15
△ = (D + S)

V = 0.54k	Vall = 4.54k	Ratio = 0.12
M = 0.46k-ft	Mall = 10.25k-ft	Ratio = 0.04

Deflection
TL = 0.00" L/999+ > L/240 min
DL = 0.00"
L = 0.00" L/999+ > L/360 min

1-3/4x11-7/8 LVL

Description - Roof Framing - B5-3 - Flush



Uniform 1 = 0.32 klf (0.0'-3.1')

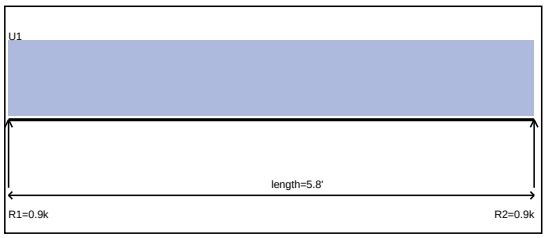
Controlling Load Combination/ Cd
V = (D + S) Cd=1.15
M = (D + S) Cd=1.15
△ = (D + S)

V = 0.49k	Vall = 4.54k	Ratio = 0.11
M = 0.37k-ft	Mall = 10.25k-ft	Ratio = 0.04

Deflection
TL = 0.00" L/999+ > L/240 min
DL = 0.00"
L = 0.00" L/999+ > L/360 min

1-3/4x11-7/8 LVL

Description - Roof Framing - B5-4 - Flush



Uniform 1 = 0.29 klf (0.0'-5.8')

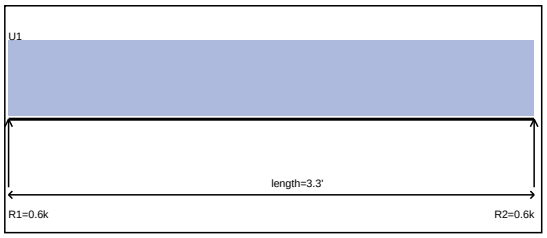
Controlling Load Combination/ Cd
V = (D + S) Cd=1.15
M = (D + S) Cd=1.15
△ = (D + S)

V = 0.84k	Vall = 4.54k	Ratio = 0.18
M = 1.22k-ft	Mall = 10.25k-ft	Ratio = 0.12

Deflection
TL = 0.02" L/999+ > L/240 min
DL = 0.01"
L = 0.00" L/999+ > L/360 min

1-3/4x11-7/8 LVL

Description - Roof Framing - B5-5 - Flush



Uniform 1 = 0.31 klf (0.0'-3.3')

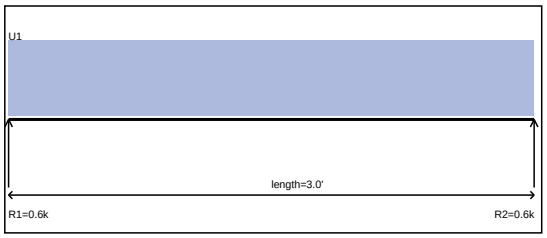
Controlling Load Combination/ Cd
V = (D + S) Cd=1.15
M = (D + S) Cd=1.15
△ = (D + S)

V = 0.51k	Vall = 4.54k	Ratio = 0.11
M = 0.42k-ft	Mall = 10.25k-ft	Ratio = 0.04

Deflection
TL = 0.00" L/999+ > L/240 min
DL = 0.00"
L = 0.00" L/999+ > L/360 min

1-3/4x11-7/8 LVL

Description - Roof Framing - B5-6 - Flush



Uniform 1 = 0.36 klf (0.0'-3.0')

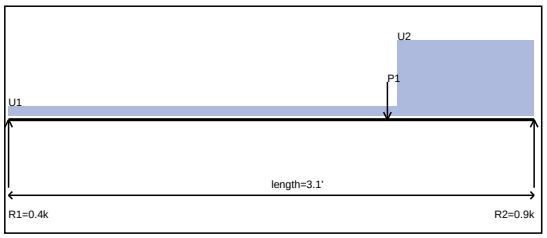
Controlling Load Combination/ Cd
V = (D + S) Cd=1.15
M = (D + S) Cd=1.15
△ = (D + S)

V = 0.55k	Vall = 4.54k	Ratio = 0.12
M = 0.42k-ft	Mall = 10.25k-ft	Ratio = 0.04

Deflection
TL = 0.00" L/999+ > L/240 min
DL = 0.00"
L = 0.00" L/999+ > L/360 min

1-3/4x11-7/8 LVL

Description - Roof Framing - B5-7 - Flush



Uniform 1 = 0.04 klf (0.0'-2.3')

P1 = 0.91 K (2.2')

Uniform 2 = 0.31 klf (2.3'-3.1')

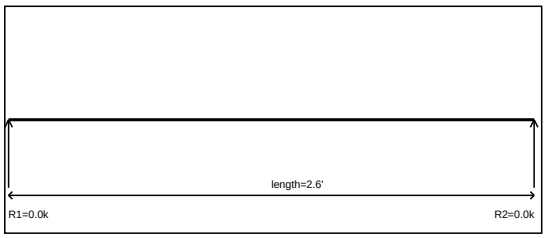
Controlling Load Combination/ Cd
V = (D + S) Cd=1.15
M = (D + S) Cd=1.15
△ = (D + S)

V = 0.90k	Vall = 4.54k	Ratio = 0.20
M = 0.66k-ft	Mall = 10.25k-ft	Ratio = 0.06

Deflection
TL = 0.00" L/999+ > L/240 min
DL = 0.00"
L = 0.00" L/999+ > L/360 min

1-3/4x11-7/8 LVL

Description - Roof Framing - B5-8 - Flush



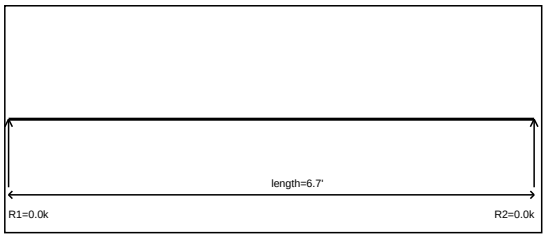
Controlling Load Combination/ Cd
V = NA Cd=1
M = NA Cd=1
△ = NA

V = 0.00k	Vall = 3.95k	Ratio = 0
M = 0.00k-ft	Mall = 8.91k-ft	Ratio = 0

Deflection
TL = 0 " L/ NA > L/240 min
DL = 0 "
L = 0 " L/ NA > L/360 min

1-3/4x11-7/8 LVL

Description - Roof Framing - B5-9 - Flush



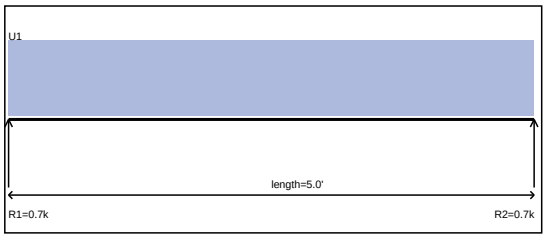
Controlling Load Combination/ Cd
V = NA Cd=1
M = NA Cd=1
△ = NA

V = 0.00k	Vall = 3.95k	Ratio = 0
M = 0.00k-ft	Mall = 8.91k-ft	Ratio = 0

Deflection
TL = 0 " L/ NA > L/240 min
DL = 0 "
L = 0 " L/ NA > L/360 min

1-3/4x11-7/8 LVL

Description - Roof Framing - B5-10 - Flush



Uniform 1 = 0.27 klf (0.0'-5.0')

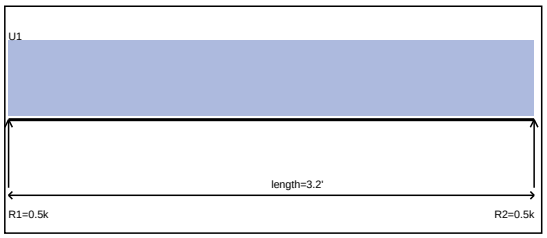
Controlling Load Combination/ Cd
V = (D + S) Cd=1.15
M = (D + S) Cd=1.15
△ = (D + S)

V = 0.68k	Vall = 4.54k	Ratio = 0.15
M = 0.85k-ft	Mall = 10.25k-ft	Ratio = 0.08

Deflection
TL = 0.01" L/999+ > L/240 min
DL = 0.00"
L = 0.00" L/999+ > L/360 min

1-3/4x11-7/8 LVL

Description - Roof Framing - B5-11 - Flush



Uniform 1 = 0.27 klf (0.0'-3.2')

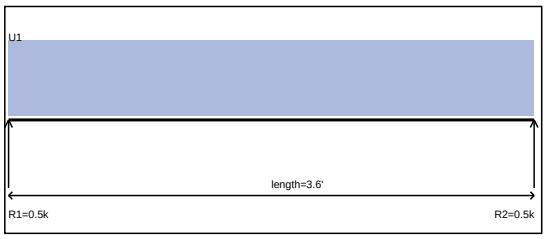
Controlling Load Combination/ Cd
V = (D + S) Cd=1.15
M = (D + S) Cd=1.15
△ = (D + S)

V = 0.43k	Vall = 4.54k	Ratio = 0.09
M = 0.34k-ft	Mall = 10.25k-ft	Ratio = 0.03

Deflection
TL = 0.00" L/999+ > L/240 min
DL = 0.00"
L = 0.00" L/999+ > L/360 min

1-3/4x11-7/8 LVL

Description - Roof Framing - B5-12 - Flush



Uniform 1 = 0.27 klf (0.0'-3.6')

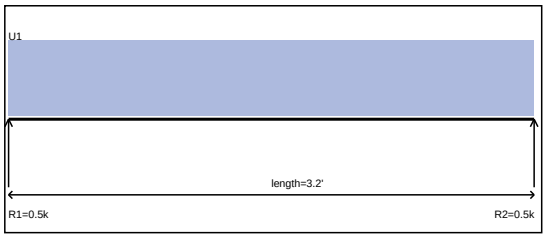
Controlling Load Combination/ Cd
V = (D + S) Cd=1.15
M = (D + S) Cd=1.15
△ = (D + S)

V = 0.49k	Vall = 4.54k	Ratio = 0.11
M = 0.44k-ft	Mall = 10.25k-ft	Ratio = 0.04

Deflection
TL = 0.00" L/999+ > L/240 min
DL = 0.00"
L = 0.00" L/999+ > L/360 min

1-3/4x11-7/8 LVL

Description - Roof Framing - B5-13 - Flush



Uniform 1 = 0.26 klf (0.0'-3.2')

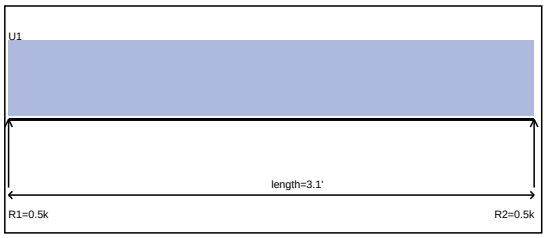
Controlling Load Combination/ Cd
V = (D + S) Cd=1.15
M = (D + S) Cd=1.15
△ = (D + S)

V = 0.42k	Vall = 4.54k	Ratio = 0.09
M = 0.33k-ft	Mall = 10.25k-ft	Ratio = 0.03

Deflection
TL = 0.00" L/999+ > L/240 min
DL = 0.00"
L = 0.00" L/999+ > L/360 min

1-3/4x11-7/8 LVL

Description - Roof Framing - B5-14 - Flush



Uniform 1 = 0.26 klf (0.0'-3.1')

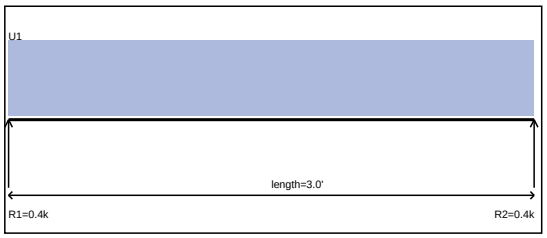
Controlling Load Combination/ Cd
V = (D + S) Cd=1.15
M = (D + S) Cd=1.15
△ = (D + S)

V = 0.41k	Vall = 4.54k	Ratio = 0.09
M = 0.31k-ft	Mall = 10.25k-ft	Ratio = 0.03

Deflection
TL = 0.00" L/999+ > L/240 min
DL = 0.00"
L = 0.00" L/999+ > L/360 min

1-3/4x11-7/8 LVL

Description - Roof Framing - B5-15 - Flush



Uniform 1 = 0.26 klf (0.0'-3.0')

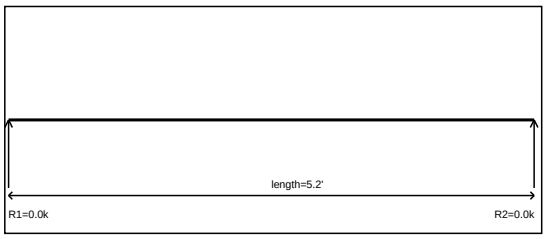
Controlling Load Combination/ Cd
V = (D + S) Cd=1.15
M = (D + S) Cd=1.15
△ = (D + S)

V = 0.40k	Vall = 4.54k	Ratio = 0.09
M = 0.30k-ft	Mall = 10.25k-ft	Ratio = 0.03

Deflection
TL = 0.00" L/999+ > L/240 min
DL = 0.00"
L = 0.00" L/999+ > L/360 min

1-3/4x11-7/8 LVL

Description - Roof Framing - B5-16 - Flush



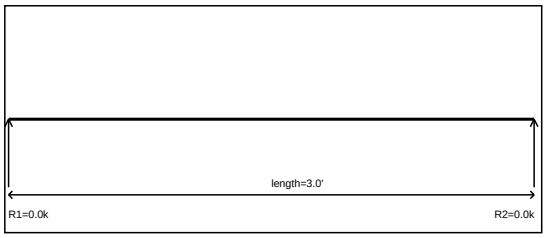
Controlling Load Combination/ Cd
V = NA Cd=1
M = NA Cd=1
△ = NA

V = 0.00k	Vall = 3.95k	Ratio = 0
M = 0.00k-ft	Mall = 8.91k-ft	Ratio = 0

Deflection
TL = 0 " L/ NA > L/240 min
DL = 0 "
L = 0 " L/ NA > L/360 min

1-3/4x11-7/8 LVL

Description - Roof Framing - B5-17 - Flush



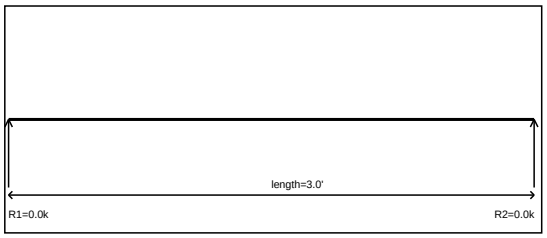
Controlling Load Combination/ Cd
V = NA Cd=1
M = NA Cd=1
△ = NA

V = 0.00k	Vall = 3.95k	Ratio = 0
M = 0.00k-ft	Mall = 8.91k-ft	Ratio = 0

Deflection
TL = 0 " L/ NA > L/240 min
DL = 0 "
L = 0 " L/ NA > L/360 min

1-3/4x11-7/8 LVL

Description - Roof Framing - B5-18 - Flush



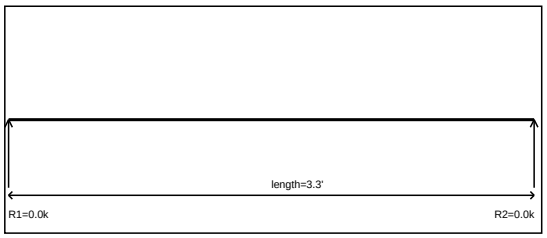
Controlling Load Combination/ Cd
V = NA Cd=1
M = NA Cd=1
△ = NA

V = 0.00k	Vall = 3.95k	Ratio = 0
M = 0.00k-ft	Mall = 8.91k-ft	Ratio = 0

Deflection
TL = 0 " L/ NA > L/240 min
DL = 0 "
L = 0 " L/ NA > L/360 min

1-3/4x11-7/8 LVL

Description - Roof Framing - B5-19 - Flush



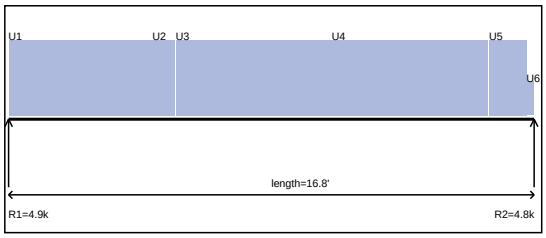
Controlling Load Combination/ Cd
V = NA Cd=1
M = NA Cd=1
△ = NA

V = 0.00k	Vall = 3.95k	Ratio = 0
M = 0.00k-ft	Mall = 8.91k-ft	Ratio = 0

Deflection
TL = 0 " L/ NA > L/240 min
DL = 0 "
L = 0 " L/ NA > L/360 min

1-3/4x11-7/8 LVL

Description - Roof Framing - B5-21 - Flush



Uniform 1 = 0.58 klf (0.0'-4.6')

Uniform 2 = 0.58 klf (4.6'-5.3')

Uniform 3 = 0.58 klf (5.3'-10.3')

Uniform 4 = 0.58 klf (10.3'-15.3')

Uniform 5 = 0.58 klf (15.3'-16.5')

Uniform 6 = 0.26 klf (16.5'-16.8')

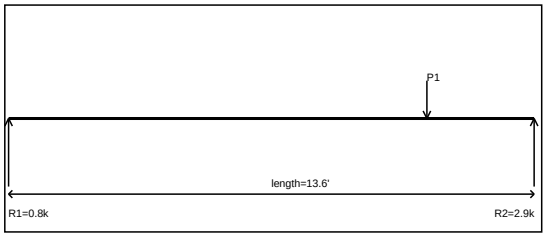
Controlling Load Combination/ Cd
V = (D + S) Cd=1.15
M = (D + S) Cd=1.15
△ = (D + S)

V = 4.83k	Vall = 18.16k	Ratio = 0.27
M = 20.26k-ft	Mall = 40.99k-ft	Ratio = 0.49

Deflection
TL = 0.55" L/365 > L/240 min
DL = 0.21"
L = 0.00" L/999+ > L/360 min

(4)1-3/4x11-7/8 LVL

Description - Roof Framing - B5-22 - Flush



P1 = 3.61 K (10.8')

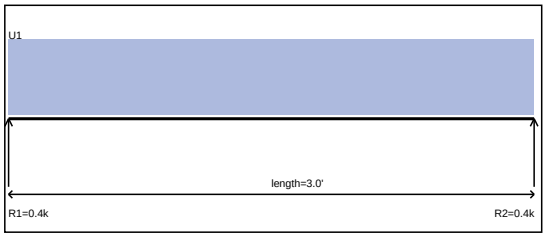
Controlling Load Combination/ Cd
V = (D + S) Cd=1.15
M = (D + S) Cd=1.15
△ = (D + S)

V = 2.87k	Vall = 4.54k	Ratio = 0.63
M = 7.95k-ft	Mall = 10.25k-ft	Ratio = 0.78

Deflection
TL = 0.57" L/287 > L/240 min
DL = 0.21"
L = 0.00" L/999+ > L/360 min

1-3/4x11-7/8 LVL

Description - Roof Framing - B5-23 - Flush



Uniform 1 = 0.22 klf (0.0'-3.0')

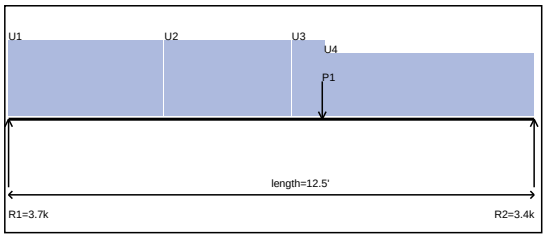
Controlling Load Combination/ Cd
V = (D + S) Cd=1.15
M = (D + S) Cd=1.15
△ = (D + S)

V = 0.32k	Vall = 4.54k	Ratio = 0.07
M = 0.24k-ft	Mall = 10.25k-ft	Ratio = 0.02

Deflection
TL = 0.00" L/999+ > L/240 min
DL = 0.00"
L = 0.00" L/999+ > L/360 min

1-3/4x11-7/8 LVL

Description - Roof Framing - B5-24 - Flush



Uniform 1 = 0.58 klf (0.0'-3.7')

Uniform 2 = 0.58 klf (3.7'-6.7')

Uniform 3 = 0.58 klf (6.7'-7.5')

Uniform 4 = 0.48 klf (7.5'-12.5')

P1 = 0.29 K (7.4')

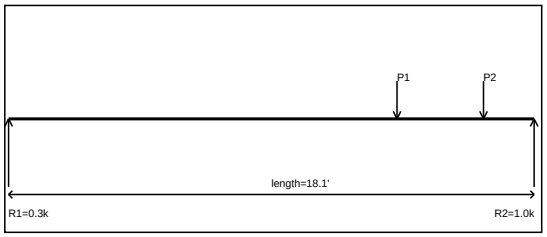
Controlling Load Combination/ Cd
V = (D + S) Cd=1.15
M = (D + S) Cd=1.15
△ = (D + S)

V = 3.61k	Vall = 9.08k	Ratio = 0.40
M = 11.30k-ft	Mall = 20.50k-ft	Ratio = 0.55

Deflection
TL = 0.34" L/439 > L/240 min
DL = 0.13"
L = 0.00" L/999+ > L/360 min

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

Description - Roof Framing - B5-25 - Flush



P1 = 0.99 K (13.4')

P2 = 0.29 K (16.3')

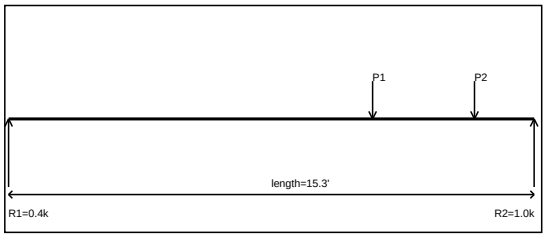
Controlling Load Combination/ Cd
V = (D + S) Cd=1.15
M = (D + S) Cd=1.15
△ = (D + S)

V = 0.99k	Vall = 4.54k	Ratio = 0.22
M = 3.82k-ft	Mall = 10.25k-ft	Ratio = 0.37

Deflection
TL = 0.48" L/448 > L/240 min
DL = 0.18"
L = 0.00" L/999+ > L/360 min

1-3/4x11-7/8 LVL

Description - Roof Framing - B5-26 - Flush



P1 = 0.94 K (10.6')

P2 = 0.29 K (13.6')

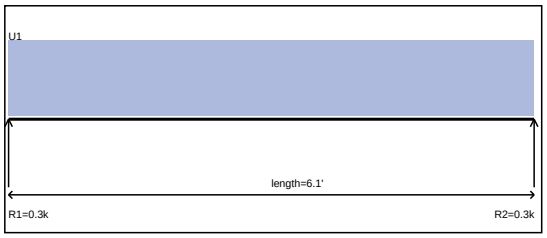
Controlling Load Combination/ Cd
V = (D + S) Cd=1.15
M = (D + S) Cd=1.15
△ = (D + S)

V = 0.91k	Vall = 4.54k	Ratio = 0.20
M = 3.42k-ft	Mall = 10.25k-ft	Ratio = 0.33

Deflection
TL = 0.31" L/590 > L/240 min
DL = 0.12"
L = 0.00" L/999+ > L/360 min

1-3/4x11-7/8 LVL

Description - Roof Framing - B5-27 - Flush



Uniform 1 = 0.09 klf (0.0'-6.1')

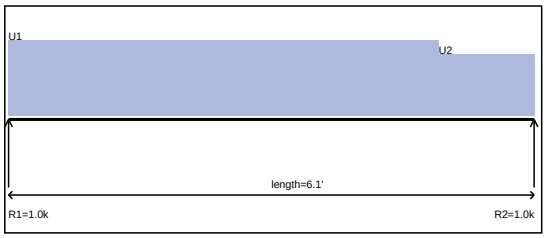
Controlling Load Combination/ Cd
V = (D + S) Cd=1.15
M = (D + S) Cd=1.15
△ = (D + S)

V = 0.29k	Vall = 4.54k	Ratio = 0.06
M = 0.44k-ft	Mall = 10.25k-ft	Ratio = 0.04

Deflection
TL = 0.01" L/999+ > L/240 min
DL = 0.00"
L = 0.00" L/999+ > L/360 min

1-3/4x11-7/8 LVL

Description - Roof Framing - B5-28 - Flush



Uniform 1 = 0.33 klf (0.0'-5.0')

Uniform 2 = 0.27 klf (5.0'-6.1')

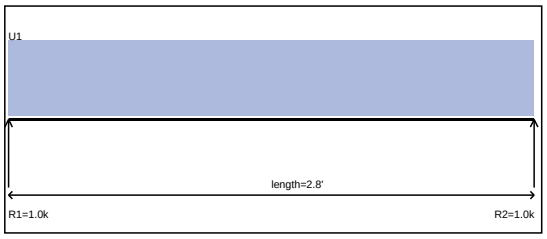
Controlling Load Combination/ Cd
V = (D + S) Cd=1.15
M = (D + S) Cd=1.15
△ = (D + S)

V = 0.99k	Vall = 4.54k	Ratio = 0.22
M = 1.50k-ft	Mall = 10.25k-ft	Ratio = 0.15

Deflection
TL = 0.02" L/999+ > L/240 min
DL = 0.01"
L = 0.00" L/999+ > L/360 min

1-3/4x11-7/8 LVL

Description - Upper Floor Framing - H4-1 - Header



Uniform 1 = 0.71 klf (0.0'-2.8')

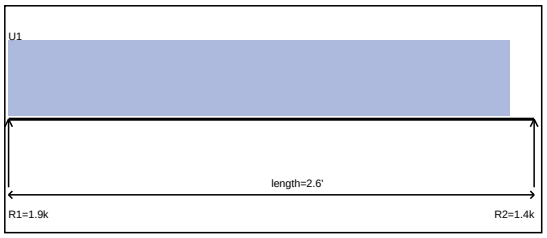
Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
△ = (D + L)

V = 0.97k	Vall = 3.04k	Ratio = 0.32
M = 0.67k-ft	Mall = 2.99k-ft	Ratio = 0.22

Deflection
TL = 0.01" L/999+ > L/240 min
DL = 0.00"
L = 0.00" L/999+ > L/360 min

4x8 DF #2

Description - Upper Floor Framing - H4-2 - Header



Uniform 1 = 1.51 klf (0.0'-2.5')

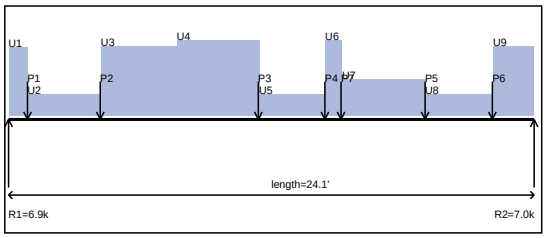
Controlling Load Combination/ Cd
V = (D + 0.75 * (L + S)) Cd=1.15
M = (D + 0.75 * (L + S)) Cd=1.15
△ = (D + 0.75 * (L + S))

V = 1.54k	Vall = 3.50k	Ratio = 0.44
M = 0.92k-ft	Mall = 3.44k-ft	Ratio = 0.27

Deflection
TL = 0.01" L/999+ > L/240 min
DL = 0.00"
L = 0.00" L/999+ > L/360 min

4x8 DF #2

Description - Upper Floor Framing - B4-1 - Flush



Uniform 1 = 0.58 klf (0.0'-0.9')
Uniform 2 = 0.18 klf (0.9'-4.2')
Uniform 3 = 0.59 klf (4.2'-7.7')
Uniform 4 = 0.64 klf (7.7'-11.5')
Uniform 5 = 0.18 klf (11.5'-14.5')
Uniform 6 = 0.64 klf (14.5'-15.3')
Uniform 7 = 0.31 klf (15.3'-19.1')
Uniform 8 = 0.18 klf (19.1'-22.2')
Uniform 9 = 0.59 klf (22.2'-24.1')

P1 = 0.51 K (0.9')
P2 = 0.51 K (4.2')
P3 = 0.55 K (11.4')
P4 = 0.55 K (14.5')
P5 = 0.34 K (19.1')
P6 = 0.90 K (22.1')
P7 = 0.99 K (15.2')

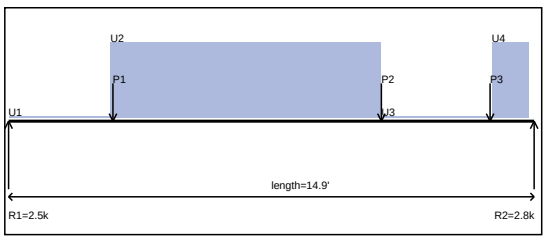
Controlling Load Combination/ Cd
V = (D + 0.75 * (L + S)) Cd= NA
M = (D + 0.75 * (L + S)) Cd= NA
△ = (D + 0.75 * (L + S))

V = 5.87k	Vall = 70.70k	Ratio = 0.08
M = 36.16k-ft	Mall = 137.00k-ft	Ratio = 0.26

Deflection
TL = 0.52" L/552 > L/240 min
DL = 0.24"
L = 0.15" L/999+ > L/360 min

W10x45 Steel

Description - Upper Floor Framing - B4-2 - Flush



Uniform 1 = 0.01 klf (0.0'-2.9')
Uniform 2 = 0.43 klf (2.9'-10.6')
Uniform 3 = 0.01 klf (10.6'-13.7')
Uniform 4 = 0.43 klf (13.7'-14.7')

P1 = 0.54 K (3.0')
P2 = 0.49 K (10.6')
P3 = 0.49 K (13.6')

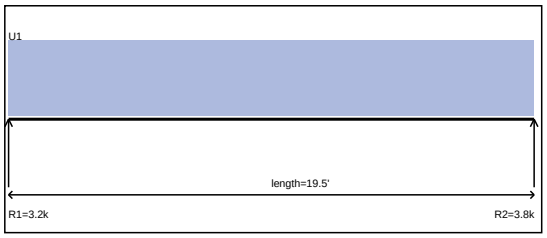
Controlling Load Combination/ Cd
V = (D + S) Cd=1.15
M = (D + S) Cd=1.15
△ = NA

V = 2.68k	Vall = 0 k	Ratio = 0
M = 11.09k-ft	Mall = 0 k-ft	Ratio = 0

Deflection
TL = NA L/ NA > L/240 min
DL = NA
L = NA L/ NA > L/360 min

Refer to External Design

Description - Upper Floor Framing - B4-3 - Refer to External Design



Uniform 1 = 0.38 klf (0.0'-19.5')

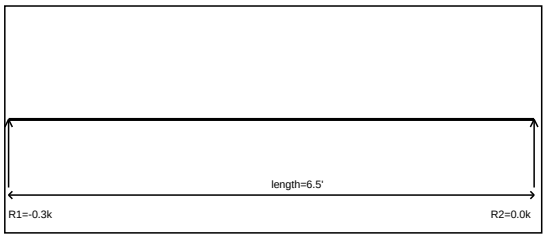
Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
△ = NA

V = 3.73k	Vall = 0 k	Ratio = 0
M = 12.69k-ft	Mall = 0 k-ft	Ratio = 0

Deflection
TL = NA L/ NA > L/240 min
DL = NA
L = NA L/ NA > L/360 min

Refer to External Design

Description - Upper Floor Framing - B4-4 - Flush



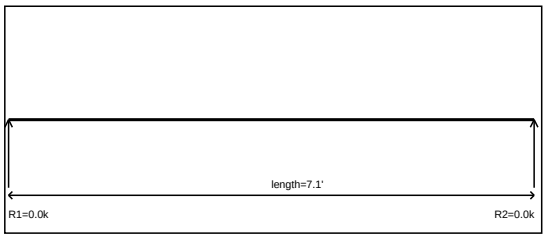
Controlling Load Combination/ Cd
V = NA Cd=1
M = NA Cd=1
△ = NA

V = 0.00k	Vall = 0 k	Ratio = 0
M = 0.00k-ft	Mall = 0 k-ft	Ratio = 0

Deflection
TL = NA L/ NA > L/240 min
DL = NA
L = NA L/ NA > L/360 min

Refer to External Design

Description - Upper Floor Framing - B4-5 - Flush



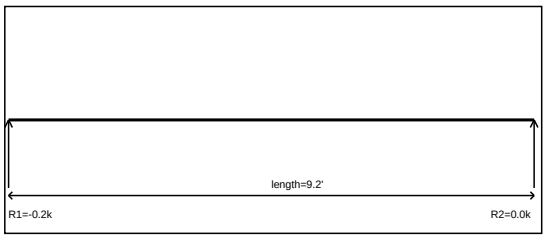
Controlling Load Combination/ Cd
V = NA Cd=1
M = NA Cd=1
△ = NA

V = 0.00k	Vall = 3.95k	Ratio = 0
M = 0.00k-ft	Mall = 8.91k-ft	Ratio = 0

Deflection
TL = 0 " L/ NA > L/240 min
DL = 0 "
L = 0 " L/ NA > L/360 min

1-3/4x11-7/8 LVL

Description - Upper Floor Framing - B4-6 - Refer to External Design



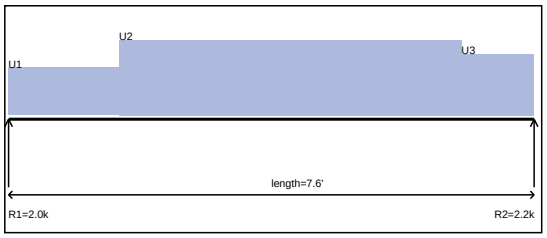
Controlling Load Combination/ Cd
V = NA Cd=1
M = NA Cd=1
△ = NA

V = 0.00k	Vall = 0 k	Ratio = 0
M = 0.00k-ft	Mall = 0 k-ft	Ratio = 0

Deflection
TL = NA L/ NA > L/240 min
DL = NA
L = NA L/ NA > L/360 min

Refer to External Design

Description - Upper Floor Framing - B4-8 - Flush



Uniform 1 = 0.38 klf (0.0'-1.6')

Uniform 2 = 0.60 klf (1.6'-6.5')

Uniform 3 = 0.49 klf (6.5'-7.6')

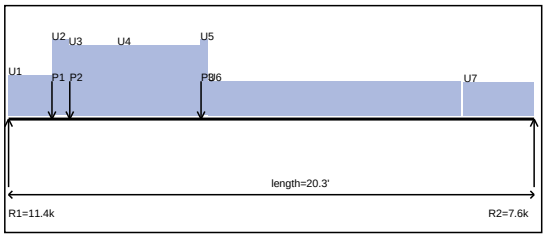
Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
△ = (D + 0.75 * (L + S))

V = 1.77k	Vall = 7.90k	Ratio = 0.22
M = 3.39k-ft	Mall = 17.82k-ft	Ratio = 0.19

Deflection
TL = 0.04" L/999+ > L/240 min
DL = 0.01"
L = 0.02" L/999+ > L/360 min

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

Description - Upper Floor Framing - B4-9 - Refer to External Design



Uniform 1 = 0.65 klf (0.0'-1.7')

Uniform 2 = 1.22 klf (1.7'-2.3')

Uniform 3 = 1.13 klf (2.3'-4.2')

Uniform 4 = 1.13 klf (4.2'-7.4')

Uniform 5 = 1.22 klf (7.4'-7.7')

Uniform 6 = 0.55 klf (7.7'-17.4')

Uniform 7 = 0.54 klf (17.6'-20.3')

P1 = 0.89 K (1.7')

P2 = 0.24 K (2.4')

P3 = 3.11 K (7.4')

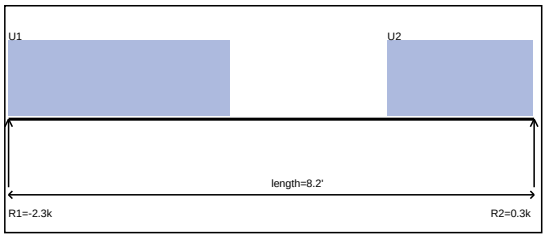
Controlling Load Combination/ Cd
V = (D + 0.75 * (L + S)) Cd=1.15
M = (D + 0.75 * (L + S)) Cd=1.15
△ = NA

V = 9.43k	Vall = 0 k	Ratio = 0
M = 42.85k-ft	Mall = 0 k-ft	Ratio = 0

Deflection
TL = NA L/ NA > L/240 min
DL = NA
L = NA L/ NA > L/360 min

Refer to External Design

Description - Upper Floor Framing - B4-10 - Refer to External Design



Uniform 1 = 0.10 klf (0.0'-3.5')

Uniform 2 = 0.10 klf (5.9'-8.2')

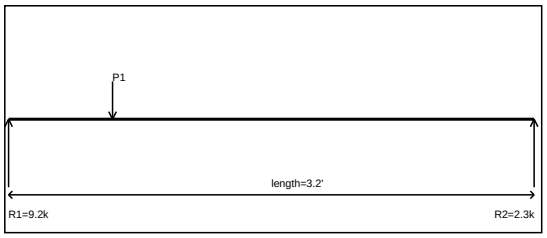
Controlling Load Combination/ Cd
V = D Cd=0.9
M = D Cd=0.9
△ = NA

V = 0.27k	Vall = 0 k	Ratio = 0
M = 54.04k-ft	Mall = 0 k-ft	Ratio = 0

Deflection
TL = NA L/ NA > L/240 min
DL = NA
L = NA L/ NA > L/360 min

Refer to External Design

Description - Upper Floor Framing - B4-12 - Flush



P1 = 11.36 K (0.6')

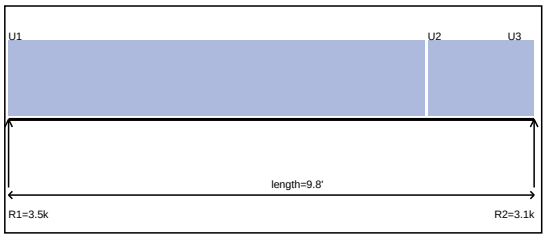
Controlling Load Combination/ Cd
V = (D + 0.75 * (L + S)) Cd=1.15
M = (D + 0.75 * (L + S)) Cd=1.15
△ = (D + 0.75 * (L + S))

V = 7.56k	Vall = 8.24k	Ratio = 0.92
M = 4.74k-ft	Mall = 10.17k-ft	Ratio = 0.47

Deflection
TL = 0.01" L/999+ > L/240 min
DL = 0.00"
L = 0.00" L/999+ > L/360 min

6x12 DF #2

Description - Upper Floor Framing - B4-13 - Flush



Uniform 1 = 0.71 klf (0.0'-7.7')

Uniform 2 = 0.71 klf (7.8'-9.3')

Uniform 3 = 0.71 klf (9.3'-9.8')

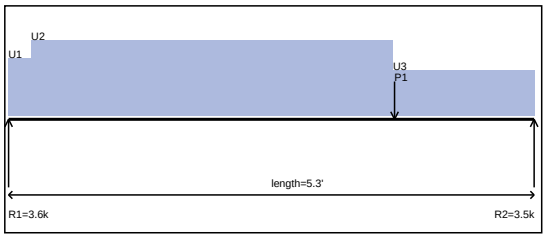
Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
△ = NA

V = 3.45k	Vall = 0 k	Ratio = 0
M = 8.39k-ft	Mall = 0 k-ft	Ratio = 0

Deflection
TL = NA L/ NA > L/240 min
DL = NA
L = NA L/ NA > L/360 min

Refer to External Design

Description - Upper Floor Framing - B4-14 - Flush



Uniform 1 = 1.02 klf (0.0'-0.2')

Uniform 2 = 1.33 klf (0.2'-3.8')

Uniform 3 = 0.80 klf (3.8'-5.3')

P1 = 0.82 K (3.9')

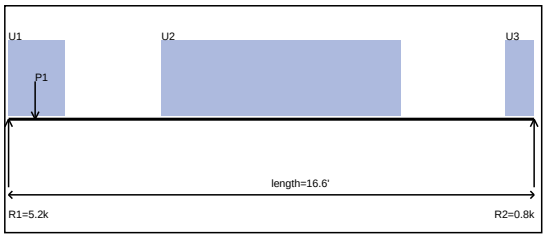
Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
△ = (D + 0.75 * (L + S))

V = 2.61k	Vall = 7.90k	Ratio = 0.33
M = 3.56k-ft	Mall = 17.82k-ft	Ratio = 0.20

Deflection
TL = 0.02" L/999+ > L/240 min
DL = 0.01"
L = 0.01" L/999+ > L/360 min

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

Description - Upper Floor Framing - B4-15 - Flush



Uniform 1 = 0.10 klf (0.0'-1.8')

P1 = 4.83 K (0.8')

Uniform 2 = 0.10 klf (4.8'-12.4')

Uniform 3 = 0.10 klf (15.7'-16.6')

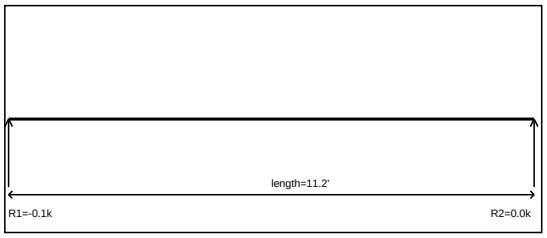
Controlling Load Combination/ Cd
V = (D + S) Cd=1.15
M = (D + S) Cd=1.15
△ = (D + S)

V = 5.12k	Vall = 9.08k	Ratio = 0.56
M = 4.82k-ft	Mall = 20.50k-ft	Ratio = 0.24

Deflection
TL = 0.26" L/774 > L/240 min
DL = 0.18"
L = 0.00" L/999+ > L/360 min

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

Description - Upper Floor Framing - B4-16 - Refer to External Design



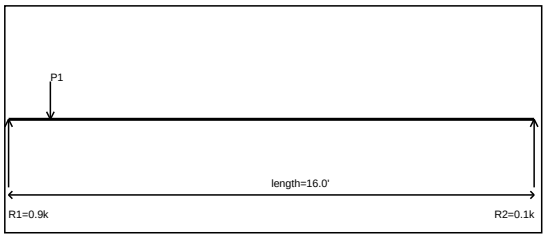
Controlling Load Combination/ Cd
V = NA Cd=1
M = NA Cd=1
△ = NA

V = 0.00k	Vall = 0 k	Ratio = 0
M = 0.00k-ft	Mall = 0 k-ft	Ratio = 0

Deflection
TL = NA L/ NA > L/240 min
DL = NA
L = NA L/ NA > L/360 min

Refer to External Design

Description - Upper Floor Framing - B4-17 - Flush



P1 = 0.89 K (1.3')

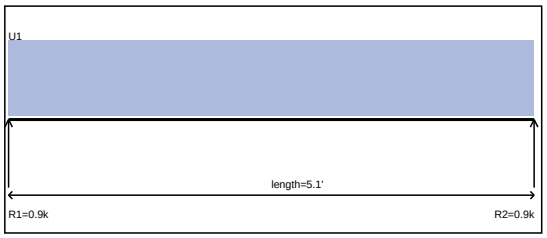
Controlling Load Combination/ Cd
V = (D + S) Cd=1.15
M = (D + S) Cd=1.15
△ = (D + S)

V = 0.82k	Vall = 9.08k	Ratio = 0.09
M = 1.04k-ft	Mall = 20.50k-ft	Ratio = 0.05

Deflection
TL = 0.05" L/999+ > L/240 min
DL = 0.02"
L = 0.00" L/999+ > L/360 min

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

Description - Upper Floor Framing - B4-18 - Flush



Uniform 1 = 0.34 klf (0.0'-5.1')

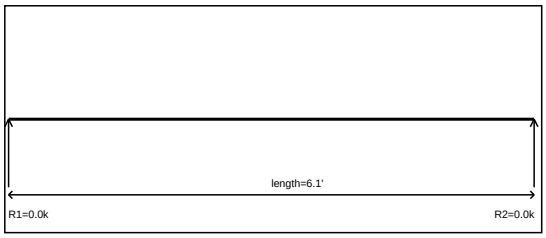
Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
△ = (D + L)

V = 0.87k	Vall = 3.95k	Ratio = 0.22
M = 1.10k-ft	Mall = 8.91k-ft	Ratio = 0.12

Deflection
TL = 0.01" L/999+ > L/240 min
DL = 0.00"
L = 0.01" L/999+ > L/360 min

1-3/4x11-7/8 LVL

Description - Upper Floor Framing - B4-19 - Flush



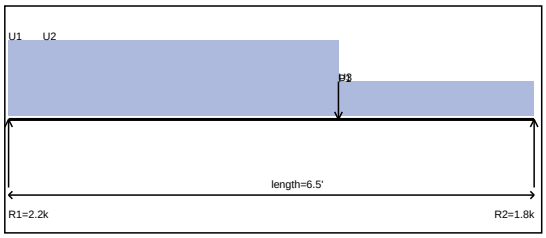
Controlling Load Combination/ Cd
V = NA Cd=1
M = NA Cd=1
△ = NA

V = 0.00k	Vall = 3.95k	Ratio = 0
M = 0.00k-ft	Mall = 8.91k-ft	Ratio = 0

Deflection
TL = 0 " L/ NA > L/240 min
DL = 0 "
L = 0 " L/ NA > L/360 min

1-3/4x11-7/8 LVL

Description - Upper Floor Framing - B4-20 - Flush



Uniform 1 = 0.67 klf (0.0'-0.4') P1 = 0.42 K (4.1')

Uniform 2 = 0.67 klf (0.4'-4.1')

Uniform 3 = 0.31 klf (4.1'-6.5')

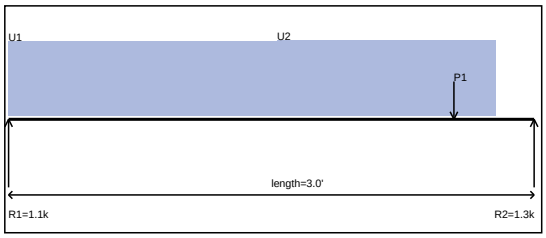
Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
△ = (D + 0.75 * (L + S))

V = 1.61k	Vall = 3.95k	Ratio = 0.41
M = 2.57k-ft	Mall = 8.91k-ft	Ratio = 0.29

Deflection
TL = 0.05" L/999+ > L/240 min
DL = 0.02"
L = 0.02" L/999+ > L/360 min

1-3/4x11-7/8 LVL

Description - Upper Floor Framing - B4-22 - Flush



Uniform 1 = 0.67 klf (0.0'-1.5') P1 = 0.43 K (2.5')

Uniform 2 = 0.68 klf (1.5'-2.8')

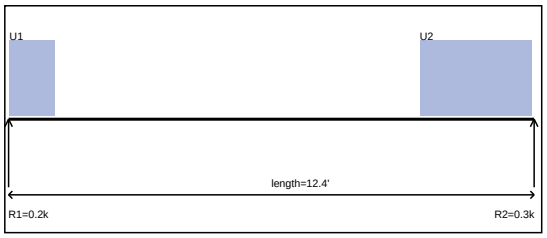
Controlling Load Combination/ Cd
V = (D + 0.75 * (L + S)) Cd=1.15
M = (D + 0.75 * (L + S)) Cd=1.15
△ = (D + 0.75 * (L + S))

V = 1.05k	Vall = 4.54k	Ratio = 0.23
M = 0.72k-ft	Mall = 10.25k-ft	Ratio = 0.07

Deflection
TL = 0.00" L/999+ > L/240 min
DL = 0.00"
L = 0.00" L/999+ > L/360 min

1-3/4x11-7/8 LVL

Description - Upper Floor Framing - B4-23 - Flush



Uniform 1 = 0.10 klf (0.0'-1.1')

Uniform 2 = 0.10 klf (9.7'-12.3')

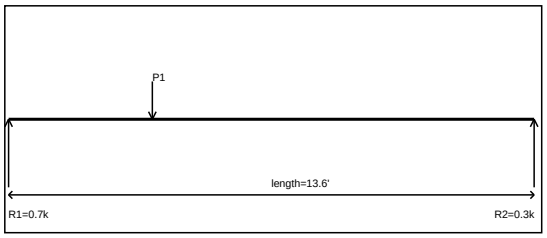
Controlling Load Combination/ Cd
V = D Cd=0.9
M = D Cd=0.9
△ = D

V = 0.24k	Vall = 7.11k	Ratio = 0.03
M = 0.30k-ft	Mall = 16.04k-ft	Ratio = 0.02

Deflection
TL = 0.01" L/999+ > L/240 min
DL = 0.01"
L = 0.00" L/999+ > L/360 min

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

Description - Upper Floor Framing - B4-24 - Flush



P1 = 0.87 K (3.7')

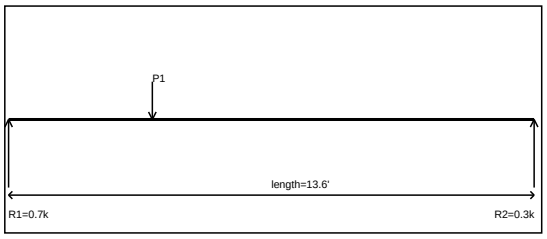
Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
△ = (D + L)

V = 0.63k	Vall = 3.95k	Ratio = 0.16
M = 2.33k-ft	Mall = 8.91k-ft	Ratio = 0.26

Deflection
TL = 0.17" L/977 > L/240 min
DL = 0.03"
L = 0.13" L/999+ > L/360 min

1-3/4x11-7/8 LVL

Description - Upper Floor Framing - B4-25 - Flush



P1 = 0.87 K (3.7')

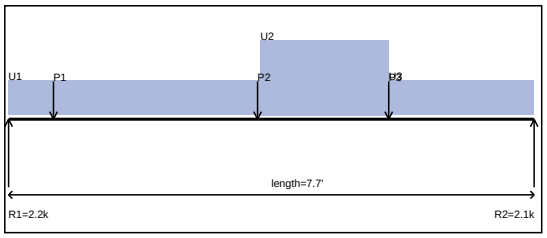
Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
△ = (D + L)

V = 0.63k	Vall = 3.95k	Ratio = 0.16
M = 2.33k-ft	Mall = 8.91k-ft	Ratio = 0.26

Deflection
TL = 0.17" L/977 > L/240 min
DL = 0.03"
L = 0.13" L/999+ > L/360 min

1-3/4x11-7/8 LVL

Description - Upper Floor Framing - B4-26 - Flush



Uniform 1 = 0.31 klf (0.0'-3.7')
Uniform 2 = 0.67 klf (3.7'-5.6')
Uniform 3 = 0.31 klf (5.6'-7.7')

P1 = 0.40 K (0.7')
P2 = 0.40 K (3.7')
P3 = 0.41 K (5.6')

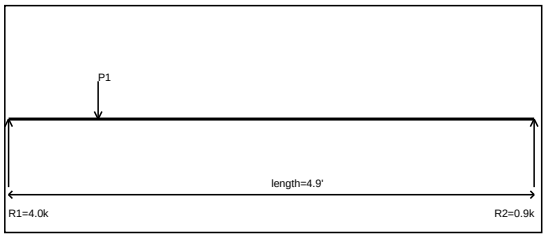
Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
△ = NA

V = 1.60k	Vall = 0 k	Ratio = 0
M = 3.38k-ft	Mall = 0 k-ft	Ratio = 0

Deflection
TL = NA L/ NA > L/240 min
DL = NA
L = NA L/ NA > L/360 min

Refer to External Design

Description - Upper Floor Framing - B4-27 - Flush



P1 = 4.75 K (0.8')

Controlling Load Combination/ Cd
V = (D + S) Cd=1.15
M = (D + S) Cd=1.15
△ = (D + S)

V = 3.94k	Vall = 9.08k	Ratio = 0.43
M = 3.30k-ft	Mall = 20.50k-ft	Ratio = 0.16

Deflection
TL = 0.02" L/999+ > L/240 min
DL = 0.01"
L = 0.00" L/999+ > L/360 min

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

Wood Beam

Project File: Calcs.ec6

LIC# : KW-06017913, Build:20.24.05.02 MULHERN & KULP STRUCTURAL ENGINEERING INC (c) ENERCALC INC 1983-2023

DESCRIPTION: B4-2

CODE REFERENCES

Calculations per NDS 2018, IBC 2021, ASCE 7-16
Load Combination Set : IBC 2021

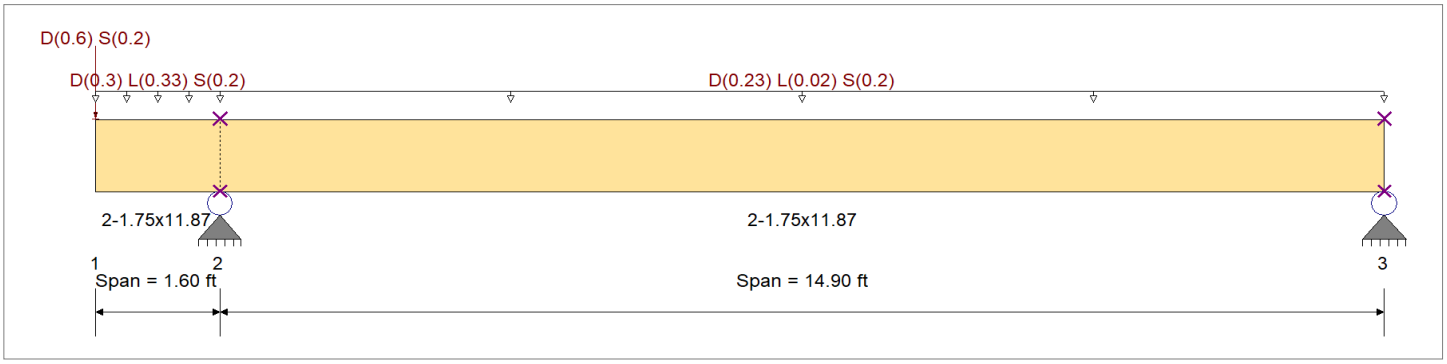
Material Properties

Analysis Method :	Allowable Stress Design
Load Combination :	IBC 2021
Wood Species :	iLevel Truss Joist
Wood Grade :	MicroLam LVL 2.0 E
Beam Bracing :	Completely Unbraced

Fb +	2,600.0 psi
Fb -	2,600.0 psi
Fc - Prll	2,510.0 psi
Fc - Perp	750.0 psi
Fv	285.0 psi
Ft	1,555.0 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 loading
Load for Span Number 1
Point Load : D = 0.60, S = 0.20 k @ 0.0 ft
Uniform Load : D = 0.30, L = 0.330, S = 0.20 , Tributary Width = 1.0 ft
Load for Span Number 2
Uniform Load : D = 0.230, L = 0.020, S = 0.20 , Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.616 : 1	Maximum Shear Stress Ratio	=	0.332 : 1
Section used for this span		2-1.75x11.87	Section used for this span		2-1.75x11.87
fb: Actual	=	1,651.49 psi	fv: Actual	=	108.95 psi
F'b	=	2,680.40 psi	F'v	=	327.75 psi
Load Combination		+D+S	Load Combination		+D+S
Location of maximum on span	=	7.741 ft	Location of maximum on span	=	1.600 ft
Span # where maximum occurs	=	Span # 2	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.215 in	Ratio =	554 >=360	Span: 2 : S Only
Max Upward Transient Deflection	-0.069 in	Ratio =	832 >=360	Span: 1 : S Only
Max Downward Total Deflection	0.458 in	Ratio =	390 >=240	Span: 2 : +D+S
Max Upward Total Deflection	-0.143 in	Ratio =	268 >=240	Span: 1 : +D+S

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	M	fb	F'b	V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 1.60 ft	1	0.085	0.235	0.90	1.00	1.00	1.00	1.001	1.00	1.00	1.00	1.36	198.3	2,334.1	1.67	60.4	256.5
Length = 14.90 ft	2	0.402	0.235	0.90	1.00	1.00	0.94	1.001	1.00	1.00	1.00	6.06	883.6	2,195.4	1.67	60.4	256.5
+D+L					1.00	1.00	0.94	1.001	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 1.60 ft	1	0.100	0.232	1.00	1.00	1.00	1.00	1.001	1.00	1.00	1.00	1.78	259.9	2,592.2	1.83	66.1	285.0
Length = 14.90 ft	2	0.389	0.232	1.00	1.00	1.00	0.92	1.001	1.00	1.00	1.00	6.41	935.2	2,401.2	1.83	66.1	285.0

Steel Beam

Project File: Calcs.ec6

DESCRIPTION: B4-4

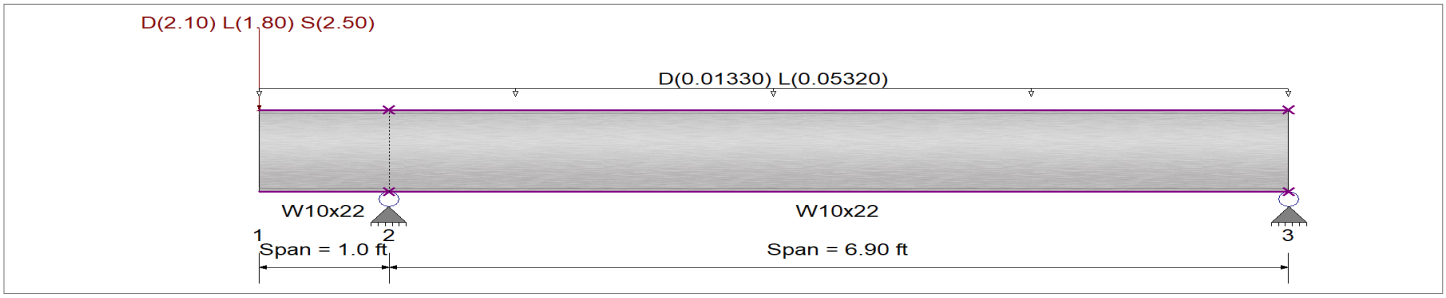
CODE REFERENCES

Calculations per AISC 360-16, IBC 2021, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method : Allowable Strength Design
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling
Bending Axis : Major Axis Bending

Fy : Steel Yield : 50.0 ksi
E: Modulus : 29,000.0 ksi



Applied Loads

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

Beam self weight calculated and added to loading
Loads on all spans...
Uniform Load on ALL spans : D = 0.010, L = 0.040 ksf, Tributary Width = 1.330 ft

Load(s) for Span Number 1
Point Load : D = 2.10, L = 1.80, S = 2.50 k @ 0.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	**0.083** : 1	Maximum Shear Stress Ratio =	**0.110** : 1
Section used for this span	**W10x22**	Section used for this span	**W10x22**
Ma : Applied	5.363 k-ft	Va : Applied	5.40 k
Mn / Omega : Allowable	64.870 k-ft	Vn/Omega : Allowable	48.960 k
Load Combination	+D+0.750L+0.750S	Load Combination	+D+0.750L+0.750S
		Location of maximum on span	1.000 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.003 in	Ratio =	7,216	>=360	Span: 2 : S Only
Max Upward Transient Deflection	-0.004 in	Ratio =	21,253	>=360	Span: 2 : S Only
Max Downward Total Deflection	0.007 in	Ratio =	3630	>=240.	Span: 2 : +D+0.750L+0.750S
Max Upward Total Deflection	-0.007 in	Ratio =	11395	>=240.	Span: 2 : +D+0.750L+0.750S

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Summary of Shear Values Va Max	Vnx	Vnx/Omega
D Only													
Dsgn. L = 1.00 ft	1	0.033	0.044		-2.12	2.12	108.33	64.87	1.00	1.00	2.14	73.44	48.96
Dsgn. L = 6.90 ft	2	0.033	0.009		-2.12	2.12	108.33	64.87	1.00	1.00	0.43	73.44	48.96
+D+L													
Dsgn. L = 1.00 ft	1	0.061	0.081		-3.94	3.94	108.33	64.87	1.00	1.00	3.99	73.44	48.96
Dsgn. L = 6.90 ft	2	0.061	0.018		-3.94	3.94	108.33	64.87	1.00	1.00	0.88	73.44	48.96
+D+S													
Dsgn. L = 1.00 ft	1	0.071	0.095		-4.62	4.62	108.33	64.87	1.00	1.00	4.64	73.44	48.96
Dsgn. L = 6.90 ft	2	0.071	0.016		-4.62	4.62	108.33	64.87	1.00	1.00	0.79	73.44	48.96
+D+0.750L													
Dsgn. L = 1.00 ft	1	0.054	0.072		-3.49	3.49	108.33	64.87	1.00	1.00	3.53	73.44	48.96
Dsgn. L = 6.90 ft	2	0.054	0.016		-3.49	3.49	108.33	64.87	1.00	1.00	0.76	73.44	48.96
+D+0.750L+0.750S													
Dsgn. L = 1.00 ft	1	0.083	0.110		-5.36	5.36	108.33	64.87	1.00	1.00	5.40	73.44	48.96
Dsgn. L = 6.90 ft	2	0.083	0.021		-5.36	5.36	108.33	64.87	1.00	1.00	1.04	73.44	48.96
+0.60D													
Dsgn. L = 1.00 ft	1	0.020	0.026		-1.27	1.27	108.33	64.87	1.00	1.00	1.28	73.44	48.96

Steel Beam

Project File: Calcs.ec6

DESCRIPTION: B4-3 (overstrength)

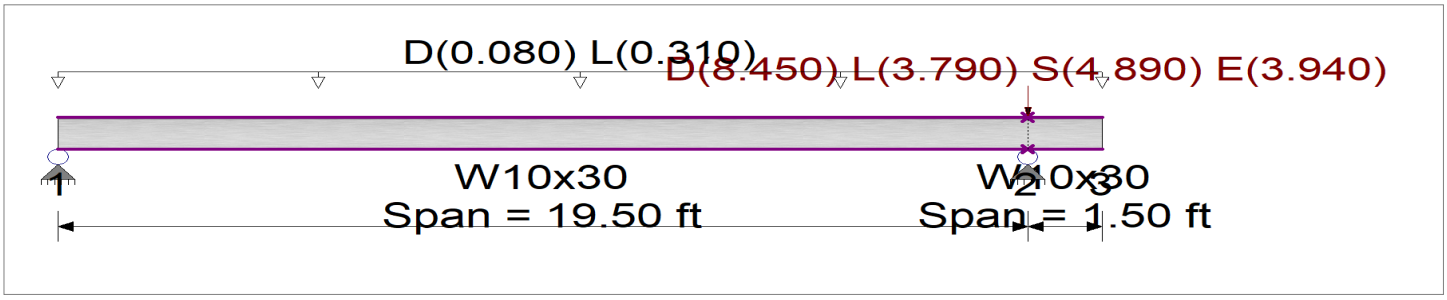
CODE REFERENCES

Calculations per AISC 360-16, IBC 2021, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method : Allowable Strength Design
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling
Bending Axis : Major Axis Bending

Fy : Steel Yield : 50.0 ksi
E: Modulus : 29,000.0 ksi



Applied Loads

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

Beam self weight calculated and added to loading
Loads on all spans...
Uniform Load on ALL spans : D = 0.080, L = 0.310 k/ft
Load(s) for Span Number 2
Point Load : D = 8.450, L = 3.790, S = 4.890, E = 3.940 k @ 0.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.216 : 1	Maximum Shear Stress Ratio =	0.065 : 1
Section used for this span	W10x30	Section used for this span	W10x30
Ma : Applied	19.732 k-ft	Va : Applied	4.120 k
Mn / Omega : Allowable	91.317 k-ft	Vn/Omega : Allowable	63.0 k
Load Combination	+D+L	Load Combination	+D+L
		Location of maximum on span	19.500 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.203 in	Ratio =	1,152	>=360	Span: 2 : L Only
Max Upward Transient Deflection	-0.049 in	Ratio =	733	>=360	Span: 2 : L Only
Max Downward Total Deflection	0.275 in	Ratio =	851	>=240.	Span: 2 : +D+L
Max Upward Total Deflection	-0.067 in	Ratio =	541	>=240.	Span: 2 : +D+L

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Summary of Shear Values Va Max	Vnx	Vnx/Omega
D Only													
Dsgn. L = 19.50 ft	1	0.057	0.017	5.17	-0.12	5.17	152.50	91.32	1.00	1.00	1.08	94.50	63.00
Dsgn. L = 1.50 ft	2	0.001	0.003		-0.12	0.12	152.50	91.32	1.00	1.00	0.17	94.50	63.00
+D+L													
Dsgn. L = 19.50 ft	1	0.216	0.065	19.73	-0.47	19.73	152.50	91.32	1.00	1.00	4.12	94.50	63.00
Dsgn. L = 1.50 ft	2	0.005	0.010		-0.47	0.47	152.50	91.32	1.00	1.00	0.63	94.50	63.00
+D+S													
Dsgn. L = 19.50 ft	1	0.057	0.017	5.17	-0.12	5.17	152.50	91.32	1.00	1.00	1.08	94.50	63.00
Dsgn. L = 1.50 ft	2	0.001	0.003		-0.12	0.12	152.50	91.32	1.00	1.00	0.17	94.50	63.00
+D+0.750L													
Dsgn. L = 19.50 ft	1	0.176	0.053	16.09	-0.39	16.09	152.50	91.32	1.00	1.00	3.36	94.50	63.00
Dsgn. L = 1.50 ft	2	0.004	0.008		-0.39	0.39	152.50	91.32	1.00	1.00	0.51	94.50	63.00
+D+0.750L+0.750S													
Dsgn. L = 19.50 ft	1	0.176	0.053	16.09	-0.39	16.09	152.50	91.32	1.00	1.00	3.36	94.50	63.00
Dsgn. L = 1.50 ft	2	0.004	0.008		-0.39	0.39	152.50	91.32	1.00	1.00	0.51	94.50	63.00
+D+0.70E													
Dsgn. L = 19.50 ft	1	0.057	0.017	5.17	-0.12	5.17	152.50	91.32	1.00	1.00	1.08	94.50	63.00
Dsgn. L = 1.50 ft	2	0.001	0.003		-0.12	0.12	152.50	91.32	1.00	1.00	0.17	94.50	63.00
+D+0.750L+0.750S+0.5250E													
Dsgn. L = 19.50 ft	1	0.176	0.053	16.09	-0.39	16.09	152.50	91.32	1.00	1.00	3.36	94.50	63.00
Dsgn. L = 1.50 ft	2	0.004	0.008		-0.39	0.39	152.50	91.32	1.00	1.00	0.51	94.50	63.00

Wood Beam

Project File: Calcs.ec6

DESCRIPTION: B4-6

CODE REFERENCES

Calculations per NDS 2018, IBC 2021, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : IBC 2021

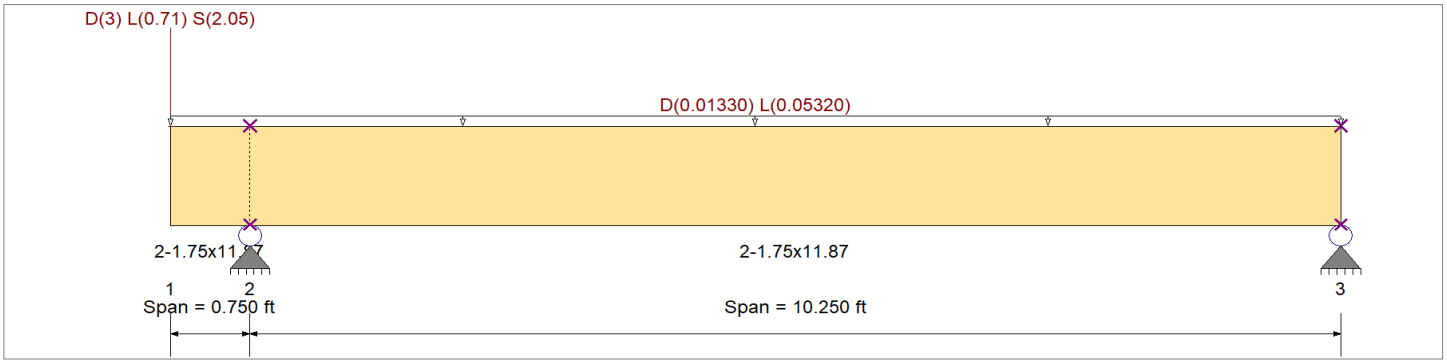
Wood Species : iLevel Truss Joist
Wood Grade : MicroLam LVL 2.0 E

Beam Bracing : Completely Unbraced

Fb +	2,600.0 psi
Fb -	2,600.0 psi
Fc - Prll	2,510.0 psi
Fc - Perp	750.0 psi
Fv	285.0 psi
Ft	1,555.0 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 loading
Loads on all spans...
Uniform Load on ALL spans : D = 0.010, L = 0.040 ksf, Tributary Width = 1.330 ft
Load for Span Number 1
Point Load : D = 3.0, L = 0.710, S = 2.050 k @ 0.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	**0.197** : 1	Maximum Shear Stress Ratio	=	**0.564** : 1
Section used for this span		**2-1.75x11.87**	Section used for this span		**2-1.75x11.87**
fb: Actual	=	557.39 psi	fv: Actual	=	184.75 psi
F'b	=	2,833.44 psi	F'v	=	327.75 psi
Load Combination		+D+0.750L+0.750S	Load Combination		+D+0.750L+0.750S
Location of maximum on span	=	0.000 ft	Location of maximum on span	=	0.750 ft
Span # where maximum occurs	=	Span # 2	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.007 in	Ratio =	6613 >=360	Span: 1 : S Only
Max Upward Transient Deflection	-0.019 in	Ratio =	2404 >=360	Span: 2 : S Only
Max Downward Total Deflection	0.017 in	Ratio =	1060 >=240	Span: 1 : +D+S
Max Upward Total Deflection	-0.040 in	Ratio =	3106 >=240	Span: 2 : +D+S

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 0.750 ft	1	0.141	0.425	0.90	1.00	1.00	1.00	1.001	1.00	1.00	1.00	2.26	329.3	2,339.2	3.02	109.0	256.5
Length = 10.250 ft	2	0.146	0.425	0.90	1.00	1.00	0.96	1.001	1.00	1.00	1.00	2.26	329.3	2,260.1	0.33	109.0	256.5
+D+L					1.00	1.00	0.96	1.001	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 0.750 ft	1	0.157	0.477	1.00	1.00	1.00	1.00	1.001	1.00	1.00	1.00	2.80	409.1	2,598.5	3.77	136.0	285.0
Length = 10.250 ft	2	0.164	0.477	1.00	1.00	1.00	0.96	1.001	1.00	1.00	1.00	2.80	409.1	2,494.0	0.60	136.0	285.0
+D+S					1.00	1.00	0.96	1.001	1.00	1.00	1.00			0.0	0.00	0.0	0.0

Steel Beam

Project File: Calcs.ec6

LIC# : KW-06017913, Build:20.24.05.02 MULHERN & KULP STRUCTURAL ENGINEERING INC (c) ENERCALC INC 1983-2023

DESCRIPTION: B4-9

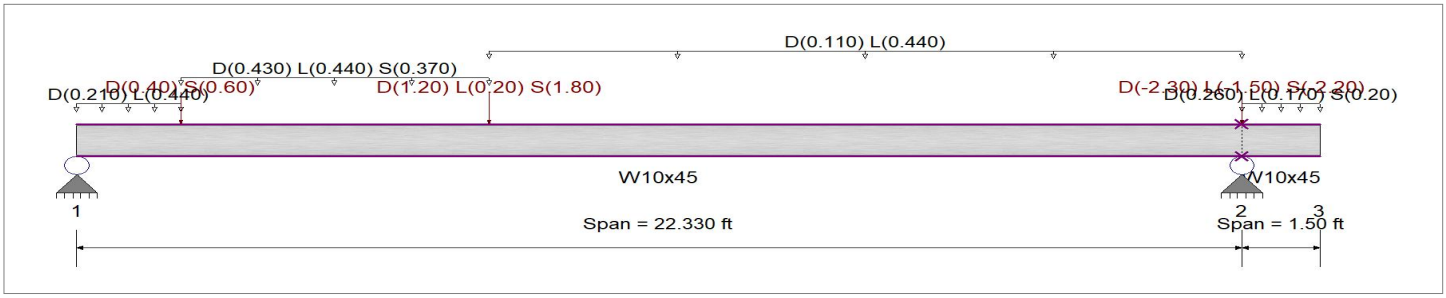
CODE REFERENCES

Calculations per AISC 360-16, IBC 2021, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method : Allowable Strength Design
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling
Bending Axis : Major Axis Bending

Fy : Steel Yield : 50.0 ksi
E: Modulus : 29,000.0 ksi



Applied Loads

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

Beam self weight calculated and added to loading
Load for Span Number 1
Uniform Load : D = 0.210, L = 0.440 k/ft, Extent = 0.0 -->> 2.0 ft, Tributary Width = 1.0 ft

Uniform Load : D = 0.430, L = 0.440, S = 0.370 k/ft, Extent = 2.0 -->> 7.90 ft, Tributary Width = 1.0 ft

Uniform Load : D = 0.110, L = 0.440 k/ft, Extent = 7.90 -->> 22.330 ft, Tributary Width = 1.0 ft

Point Load : D = 0.40, S = 0.60 k @ 2.0 ft

Point Load : D = 1.20, L = 0.20, S = 1.80 k @ 7.90 ft

Load for Span Number 2
Uniform Load : D = 0.260, L = 0.170, S = 0.20 k/ft, Tributary Width = 1.0 ft

Point Load : D = -2.30, L = -1.50, S = -2.20 k @ 0.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.392 : 1	Maximum Shear Stress Ratio =	0.153 : 1
Section used for this span	W10x45	Section used for this span	W10x45
Ma : Applied	53.687 k-ft	Va : Applied	10.839 k
Mn / Omega : Allowable	136.976 k-ft	Vn/Omega : Allowable	70.70 k
Load Combination	+D+0.750L+0.750S	Load Combination	+D+0.750L+0.750S
		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	0.353 in	Ratio =	759	>=360	Span: 2 : L Only
Max Upward Transient Deflection	-0.075 in	Ratio =	480	>=360	Span: 2 : L Only
Max Downward Total Deflection	0.644 in	Ratio =	416	>=240.	Span: 2 : +D+0.750L+0.750S
Max Upward Total Deflection	-0.129 in	Ratio =	280	>=240.	Span: 2 : +D+0.750L+0.750S

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Summary of Shear Values Va Max	Vnx	Vnx/Omega
D Only													
Dsgn. L = 22.33 ft	1	0.157	0.064	21.51	-0.34	21.51	228.75	136.98	1.00	1.00	4.52	106.05	70.70
Dsgn. L = 1.50 ft	2	0.003	0.006		-0.34	0.34	228.75	136.98	1.00	1.00	0.46	106.05	70.70
+D+L													
Dsgn. L = 22.33 ft	1	0.353	0.135	48.33	-0.53	48.33	228.75	136.98	1.00	1.00	9.55	106.05	70.70

Steel Beam

Project File: Calcs.ec6

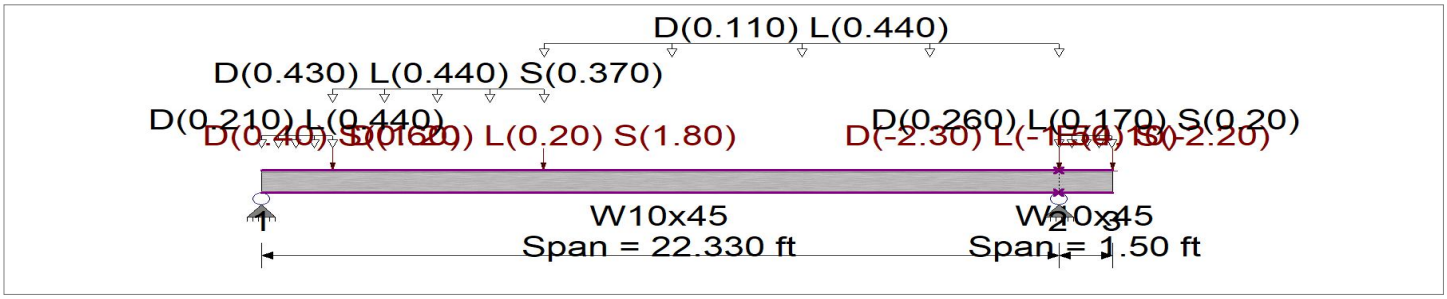
DESCRIPTION: B4-9 (overstrength)

CODE REFERENCES

Calculations per AISC 360-16, IBC 2021, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method :	Allowable Strength Design	Fy : Steel Yield :	50.0 ksi
Beam Bracing :	Beam is Fully Braced against lateral-torsional buckling	E: Modulus :	29,000.0 ksi
Bending Axis :	Major Axis Bending		



Applied Loads

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

Beam self weight calculated and added to loading
Load for Span Number 1
- Uniform Load : D = 0.210, L = 0.440 k/ft, Extent = 0.0 -->> 2.0 ft, Tributary Width = 1.0 ft
- Uniform Load : D = 0.430, L = 0.440, S = 0.370 k/ft, Extent = 2.0 -->> 7.90 ft, Tributary Width = 1.0 ft
- Uniform Load : D = 0.110, L = 0.440 k/ft, Extent = 7.90 -->> 22.330 ft, Tributary Width = 1.0 ft
- Point Load : D = 0.40, S = 0.60 k @ 2.0 ft
- Point Load : D = 1.20, L = 0.20, S = 1.80 k @ 7.90 ft

Load for Span Number 2
- Uniform Load : D = 0.260, L = 0.170, S = 0.20 k/ft, Tributary Width = 1.0 ft
- Point Load : D = -2.30, L = -1.50, S = -2.20 k @ 0.0 ft
- Point Load : E = 4.10 k @ 1.50 ft, (overstrength)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.400 : 1	Maximum Shear Stress Ratio =	0.155 : 1
Section used for this span	W10x45	Section used for this span	W10x45
Ma : Applied	54.836 k-ft	Va : Applied	10.984 k
Mn / Omega : Allowable	136.976 k-ft	Vn/Omega : Allowable	70.70 k
Load Combination	+D+0.750L+0.750S-0.5250E	Load Combination	+D+0.750L+0.750S-0.5250E
		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	0.353 in	Ratio =	759	>=360	Span: 2 : L Only
Max Upward Transient Deflection	-0.075 in	Ratio =	480	>=360	Span: 2 : L Only
Max Downward Total Deflection	0.644 in	Ratio =	416	>=240.	Span: 2 : +D+0.750L+0.750S
Max Upward Total Deflection	-0.129 in	Ratio =	280	>=240.	Span: 2 : +D+0.750L+0.750S

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Summary of Shear Values Va Max	Vnx	Vnx/Omega
D Only													
Dsgn. L = 22.33 ft	1	0.157	0.064	21.51	-0.34	21.51	228.75	136.98	1.00	1.00	4.52	106.05	70.70
Dsgn. L = 1.50 ft	2	0.003	0.006		-0.34	0.34	228.75	136.98	1.00	1.00	0.46	106.05	70.70
+D+L													
Dsgn. L = 22.33 ft	1	0.353	0.135	48.33	-0.53	48.33	228.75	136.98	1.00	1.00	9.55	106.05	70.70
Dsgn. L = 1.50 ft	2	0.004	0.010		-0.53	0.53	228.75	136.98	1.00	1.00	0.71	106.05	70.70
+D+S													
Dsgn. L = 22.33 ft	1	0.280	0.112	38.34	-0.57	38.34	228.75	136.98	1.00	1.00	7.91	106.05	70.70
Dsgn. L = 1.50 ft	2	0.004	0.011		-0.57	0.57	228.75	136.98	1.00	1.00	0.76	106.05	70.70
+D+0.750L													
Dsgn. L = 22.33 ft	1	0.303	0.117	41.45	-0.49	41.45	228.75	136.98	1.00	1.00	8.29	106.05	70.70
Dsgn. L = 1.50 ft	2	0.004	0.009		-0.49	0.49	228.75	136.98	1.00	1.00	0.65	106.05	70.70
+D+0.750L+0.750S													
Dsgn. L = 22.33 ft	1	0.392	0.153	53.69	-0.66	53.69	228.75	136.98	1.00	1.00	10.84	106.05	70.70
Dsgn. L = 1.50 ft	2	0.005	0.012		-0.66	0.66	228.75	136.98	1.00	1.00	0.87	106.05	70.70

Steel Beam

Project File: Calcs.ec6

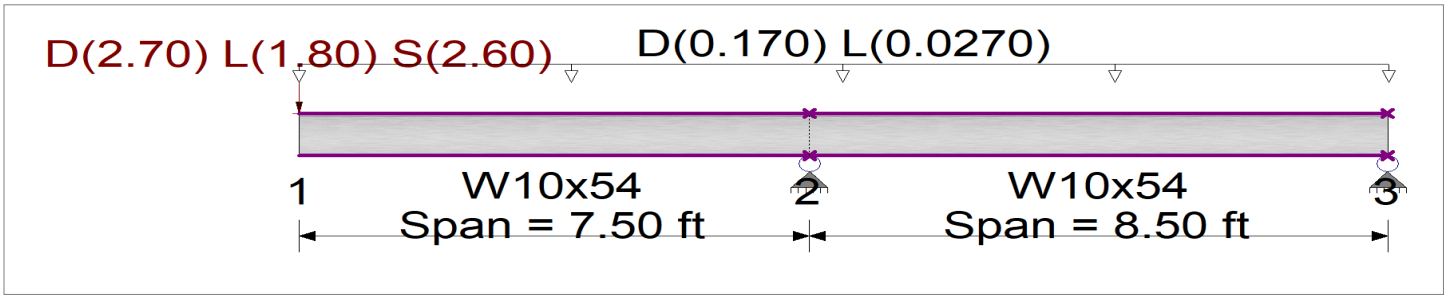
DESCRIPTION: B4-10

CODE REFERENCES

Calculations per AISC 360-16, IBC 2021, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method :	Allowable Strength Design	Fy : Steel Yield :	50.0 ksi
Beam Bracing :	Beam is Fully Braced against lateral-torsional buckling	E: Modulus :	29,000.0 ksi
Bending Axis :	Major Axis Bending		



Applied Loads

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

Beam self weight calculated and added to loading
Loads on all spans...
Uniform Load on ALL spans : D = 0.170, L = 0.0270 k/ft
Load(s) for Span Number 1
Point Load : D = 2.70, L = 1.80, S = 2.60 k @ 0.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.312 : 1	Maximum Shear Stress Ratio =	0.105 : 1
Section used for this span	W10x54	Section used for this span	W10x54
Ma : Applied	51.863 k-ft	Va : Applied	7.830 k
Mn / Omega : Allowable	166.168 k-ft	Vn/Omega : Allowable	74.740 k
Load Combination	+D+0.750L+0.750S	Load Combination	+D+0.750L+0.750S
		Location of maximum on span	7.500 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.154 in	Ratio =	1,171	>=360	Span: 2 : S Only
Max Upward Transient Deflection	-0.018 in	Ratio =	5,679	>=360	Span: 2 : S Only
Max Downward Total Deflection	0.393 in	Ratio =	458	>=240.	Span: 2 : +D+0.750L+0.750S
Max Upward Total Deflection	-0.045 in	Ratio =	2288	>=240.	Span: 2 : +D+0.750L+0.750S

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Summary of Shear Values Va Max	Vnx	Vnx/Omega
D Only													
Dsgn. L = 7.50 ft	1	0.160	0.059		-26.54	26.54	277.50	166.17	1.00	1.00	4.38	112.11	74.74
Dsgn. L = 8.50 ft	2	0.160	0.055		-26.54	26.54	277.50	166.17	1.00	1.00	4.07	112.11	74.74
+D+L													
Dsgn. L = 7.50 ft	1	0.246	0.085		-40.80	40.80	277.50	166.17	1.00	1.00	6.38	112.11	74.74
Dsgn. L = 8.50 ft	2	0.246	0.078		-40.80	40.80	277.50	166.17	1.00	1.00	5.87	112.11	74.74
+D+S													
Dsgn. L = 7.50 ft	1	0.277	0.093		-46.04	46.04	277.50	166.17	1.00	1.00	6.98	112.11	74.74
Dsgn. L = 8.50 ft	2	0.277	0.085		-46.04	46.04	277.50	166.17	1.00	1.00	6.37	112.11	74.74
+D+0.750L													
Dsgn. L = 7.50 ft	1	0.224	0.079		-37.24	37.24	277.50	166.17	1.00	1.00	5.88	112.11	74.74
Dsgn. L = 8.50 ft	2	0.224	0.072		-37.24	37.24	277.50	166.17	1.00	1.00	5.42	112.11	74.74
+D+0.750L+0.750S													
Dsgn. L = 7.50 ft	1	0.312	0.105		-51.86	51.86	277.50	166.17	1.00	1.00	7.83	112.11	74.74
Dsgn. L = 8.50 ft	2	0.312	0.096		-51.86	51.86	277.50	166.17	1.00	1.00	7.14	112.11	74.74
+0.60D													
Dsgn. L = 7.50 ft	1	0.096	0.035		-15.93	15.93	277.50	166.17	1.00	1.00	2.63	112.11	74.74
Dsgn. L = 8.50 ft	2	0.096	0.033		-15.93	15.93	277.50	166.17	1.00	1.00	2.44	112.11	74.74

Steel Beam

Project File: Calcs.ec6

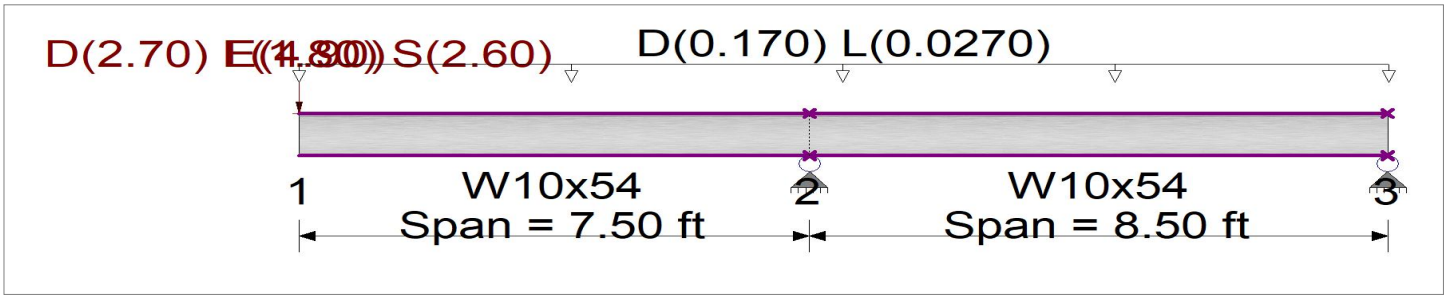
DESCRIPTION: B4-10 (overstrength)

CODE REFERENCES

Calculations per AISC 360-16, IBC 2021, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method :	Allowable Strength Design	Fy : Steel Yield :	50.0 ksi
Beam Bracing :	Beam is Fully Braced against lateral-torsional buckling	E: Modulus :	29,000.0 ksi
Bending Axis :	Major Axis Bending		



Applied Loads

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

Beam self weight calculated and added to loading
Loads on all spans...
Uniform Load on ALL spans : D = 0.170, L = 0.0270 k/ft
Load(s) for Span Number 1
Point Load : D = 2.70, L = 1.80, S = 2.60 k @ 0.0 ft
Point Load : E = 4.90 k @ 0.0 ft, (overstrength)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.428 : 1	Maximum Shear Stress Ratio =	0.139 : 1
Section used for this span	W10x54	Section used for this span	W10x54
Ma : Applied	71.157 k-ft	Va : Applied	10.403 k
Mn / Omega : Allowable	166.168 k-ft	Vn/Omega : Allowable	74.740 k
Load Combination	+D+0.750L+0.750S+0.5250E	Load Combination	+D+0.750L+0.750S+0.5250E
		Location of maximum on span	7.500 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.289 in	Ratio =	621	>=360	Span: 2 : E Only
Max Upward Transient Deflection	-0.034 in	Ratio =	3,013	>=360	Span: 2 : E Only
Max Downward Total Deflection	0.545 in	Ratio =	330	>=240.	Span: 2 : +D+0.750L+0.750S+0.5250E
Max Upward Total Deflection	-0.062 in	Ratio =	1636	>=240.	Span: 2 : +D+0.750L+0.750S+0.5250E

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Summary of Shear Values Va Max	Vnx	Vnx/Omega
D Only													
Dsgn. L = 7.50 ft	1	0.160	0.059		-26.54	26.54	277.50	166.17	1.00	1.00	4.38	112.11	74.74
Dsgn. L = 8.50 ft	2	0.160	0.055		-26.54	26.54	277.50	166.17	1.00	1.00	4.07	112.11	74.74
+D+L													
Dsgn. L = 7.50 ft	1	0.246	0.085		-40.80	40.80	277.50	166.17	1.00	1.00	6.38	112.11	74.74
Dsgn. L = 8.50 ft	2	0.246	0.078		-40.80	40.80	277.50	166.17	1.00	1.00	5.87	112.11	74.74
+D+S													
Dsgn. L = 7.50 ft	1	0.277	0.093		-46.04	46.04	277.50	166.17	1.00	1.00	6.98	112.11	74.74
Dsgn. L = 8.50 ft	2	0.277	0.085		-46.04	46.04	277.50	166.17	1.00	1.00	6.37	112.11	74.74
+D+0.750L													
Dsgn. L = 7.50 ft	1	0.224	0.079		-37.24	37.24	277.50	166.17	1.00	1.00	5.88	112.11	74.74
Dsgn. L = 8.50 ft	2	0.224	0.072		-37.24	37.24	277.50	166.17	1.00	1.00	5.42	112.11	74.74
+D+0.750L+0.750S													
Dsgn. L = 7.50 ft	1	0.312	0.105		-51.86	51.86	277.50	166.17	1.00	1.00	7.83	112.11	74.74
Dsgn. L = 8.50 ft	2	0.312	0.096		-51.86	51.86	277.50	166.17	1.00	1.00	7.14	112.11	74.74
+D+0.70E													
Dsgn. L = 7.50 ft	1	0.315	0.104		-52.27	52.27	277.50	166.17	1.00	1.00	7.81	112.11	74.74
Dsgn. L = 8.50 ft	2	0.315	0.095		-52.27	52.27	277.50	166.17	1.00	1.00	7.10	112.11	74.74
+D-0.70E													
Dsgn. L = 7.50 ft	1	0.007	0.014	1.19	-0.82	1.19	277.50	166.17	1.00	1.00	1.05	112.11	74.74

Wood Beam

Project File: Calcs.ec6

DESCRIPTION: B4-13

CODE REFERENCES

Calculations per NDS 2018, IBC 2021, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : IBC 2021

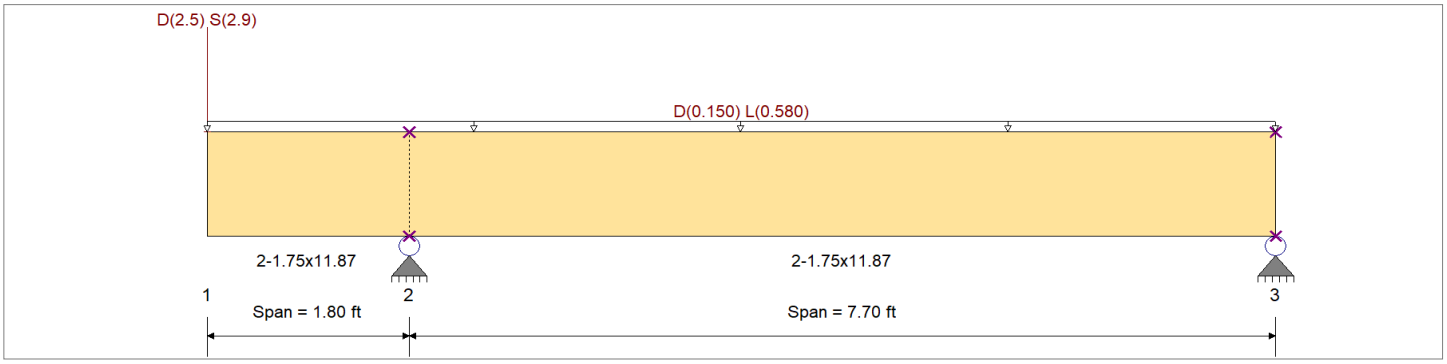
Wood Species : iLevel Truss Joist
Wood Grade : MicroLam LVL 2.0 E

Beam Bracing : Completely Unbraced

Fb +	2,600.0 psi
Fb -	2,600.0 psi
Fc - Prll	2,510.0 psi
Fc - Perp	750.0 psi
Fv	285.0 psi
Ft	1,555.0 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 loading
Loads on all spans...
Uniform Load on ALL spans : D = 0.150, L = 0.580 k/ft
Load for Span Number 1
Point Load : D = 2.50, S = 2.90 k @ 0.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.504 : 1	Maximum Shear Stress Ratio	=	0.612 : 1
Section used for this span		2-1.75x11.87	Section used for this span		2-1.75x11.87
fb: Actual	=	1,456.27 psi	fv: Actual	=	200.71 psi
F'b	=	2,886.61 psi	F'v	=	327.75 psi
Load Combination		+D+S	Load Combination		+D+S
Location of maximum on span	=	0.000 ft	Location of maximum on span	=	0.996 ft
Span # where maximum occurs	=	Span # 2	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.053 in	Ratio =	1654 >=360	Span: 1 : S Only
Max Upward Transient Deflection	-0.026 in	Ratio =	820 >=360	Span: 1 : L Only
Max Downward Total Deflection	0.091 in	Ratio =	474 >=240	Span: 1 : +D+S
Max Upward Total Deflection	-0.055 in	Ratio =	1668 >=240	Span: 2 : +D+S

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 1.80 ft	1	0.298	0.374	0.90	1.00	1.00	1.00	1.001	1.00	1.00	1.00	4.76	694.8	2,332.8	2.66	96.1	256.5
Length = 7.70 ft	2	0.304	0.374	0.90	1.00	1.00	0.98	1.001	1.00	1.00	1.00	4.76	694.8	2,285.0	1.08	96.1	256.5
+D+L					1.00	1.00	0.98	1.001	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 1.80 ft	1	0.321	0.410	1.00	1.00	1.00	0.99	1.001	1.00	1.00	1.00	5.70	831.8	2,590.6	3.24	116.9	285.0
Length = 7.70 ft	2	0.329	0.410	1.00	1.00	1.00	0.97	1.001	1.00	1.00	1.00	5.70	831.8	2,528.1	2.86	116.9	285.0
+D+S					1.00	1.00	0.97	1.001	1.00	1.00	1.00			0.0	0.00	0.0	0.0

Wood Beam

Project File: Calcs.ec6

DESCRIPTION: B4-15 (overstrength)

CODE REFERENCES

Calculations per NDS 2018, IBC 2021, ASCE 7-16
Load Combination Set : ASCE 7-22 / IBC 2024 (L<=100psf)

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : ASCE 7-22 / IBC 2024 (L<=100psf)

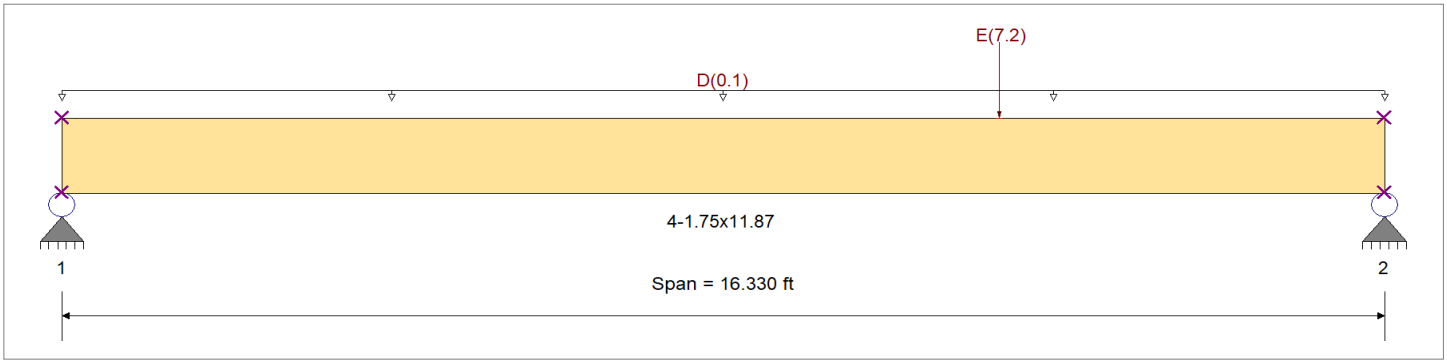
Wood Species : Trus Joist
Wood Grade : MicroLam LVL 2.0 E

Beam Bracing : Completely Unbraced

Fb +	2,600.0 psi
Fb -	2,600.0 psi
Fc - Prll	2,510.0 psi
Fc - Perp	750.0 psi
Fv	285.0 psi
Ft	1,555.0 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 loading
Uniform Load : D = 0.10 , Tributary Width = 1.0 ft
Point Load : E = 7.20 k @ 11.580 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.364 : 1	Maximum Shear Stress Ratio	=	0.177 : 1
Section used for this span		4-1.75x11.87	Section used for this span		4-1.75x11.87
fb: Actual	=	1,486.16 psi	fv: Actual	=	80.66 psi
F'b	=	4,081.60 psi	F'v	=	456.00 psi
Load Combination		+D+0.70E	Load Combination		+D+0.70E
Location of maximum on span	=	11.562 ft	Location of maximum on span	=	15.376 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.455 in	Ratio =	430 >=360	Span: 1 : E Only
Max Upward Transient Deflection	0 in	Ratio =	0 <360	n/a
Max Downward Total Deflection	0.420 in	Ratio =	466 >=240	Span: 1 : +D+0.70E
Max Upward Total Deflection	0 in	Ratio =	0 <240	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	M	fb	F'b	V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 16.330 ft	1	0.130	0.063	0.90	1.00	1.00	0.99	1.001	1.00	1.00	1.00	4.14	302.1	2,320.2	0.90	16.2	256.5
+0.60D					1.00	1.00	0.99	1.001	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 16.330 ft	1	0.044	0.021	1.60	1.00	1.00	0.98	1.001	1.00	1.00	1.00	2.49	181.3	4,081.6	0.54	9.7	456.0
+D+0.70E					1.00	1.00	0.98	1.001	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 16.330 ft	1	0.364	0.177	1.60	1.00	1.00	0.98	1.001	1.00	1.00	1.00	20.37	1,486.2	4,081.6	4.47	80.7	456.0
+D-0.70E					1.00	1.00	0.98	1.001	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 16.330 ft	1	0.242	0.124	1.60	1.00	1.00	0.98	1.001	1.00	1.00	1.00	13.53	986.5	4,081.6	3.14	56.7	456.0
+D+0.5250E					1.00	1.00	0.98	1.001	1.00	1.00	1.00			0.0	0.00	0.0	0.0

Wood Beam

Project File: Calcs.ec6

DESCRIPTION: B4-16

CODE REFERENCES

Calculations per NDS 2018, IBC 2021, ASCE 7-16
Load Combination Set : IBC 2021

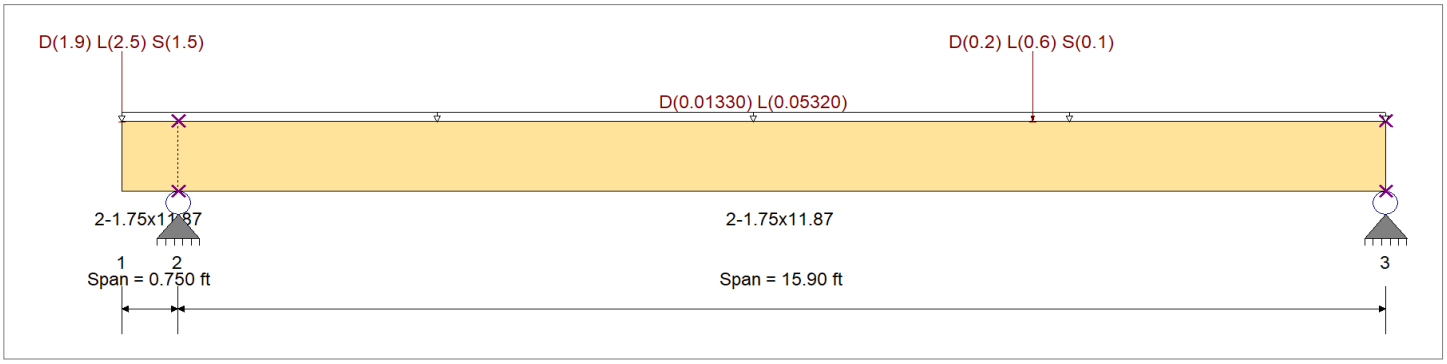
Material Properties

Analysis Method :	Allowable Stress Design
Load Combination :	IBC 2021
Wood Species :	iLevel Truss Joist
Wood Grade :	MicroLam LVL 2.0 E
Beam Bracing :	Completely Unbraced

Fb +	2600 psi
Fb -	2600 psi
Fc - Prll	2510 psi
Fc - Perp	750 psi
Fv	285 psi
Ft	1555 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 loading
Loads on all spans...
Uniform Load on ALL spans : D = 0.010, L = 0.040 ksf, Tributary Width = 1.330 ft
Load for Span Number 1
Point Load : D = 1.90, L = 2.50, S = 1.50 k @ 0.0 ft
Load for Span Number 2
Point Load : D = 0.20, L = 0.60, S = 0.10 k @ 11.250 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.228 : 1	Maximum Shear Stress Ratio	=	0.565 : 1
Section used for this span		2-1.75x11.87	Section used for this span		2-1.75x11.87
fb: Actual	=	540.68 psi	fv: Actual	=	160.93 psi
F'b	=	2,371.75 psi	F'v	=	285.00 psi
Load Combination		+D+L	Load Combination		+D+L
Location of maximum on span	=	11.192 ft	Location of maximum on span	=	0.750 ft
Span # where maximum occurs	=	Span # 2	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.097 in	Ratio =	2618 >=360	Span: 2 : L Only
Max Upward Transient Deflection	-0.007 in	Ratio =	1958 >=360	Span: 1 : L Only
Max Downward Total Deflection	0.120 in	Ratio =	1591 >=240	Span: 2 : +D+L
Max Upward Total Deflection	-0.005 in	Ratio =	3622 >=240	Span: 1 : +D+L

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 0.750 ft	1	0.089	0.270	0.90	1.00	1.00	1.00	1.001	1.00	1.00	1.00	1.43	208.9	2,339.2	1.92	69.3	256.5
Length = 15.90 ft	2	0.096	0.270	0.90	1.00	1.00	0.93	1.001	1.00	1.00	1.00	1.43	208.9	2,175.4	0.33	69.3	256.5
+D+L					1.00	1.00	0.93	1.001	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 0.750 ft	1	0.187	0.565	1.00	1.00	1.00	1.00	1.001	1.00	1.00	1.00	3.32	484.6	2,598.5	4.46	160.9	285.0

Wood Beam

Project File: Calcs.ec6

DESCRIPTION: B4-23 (overstrength)

CODE REFERENCES

Calculations per NDS 2018, IBC 2021, ASCE 7-16
Load Combination Set : ASCE 7-22 / IBC 2024 (L<=100psf)

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : ASCE 7-22 / IBC 2024 (L<=100psf)

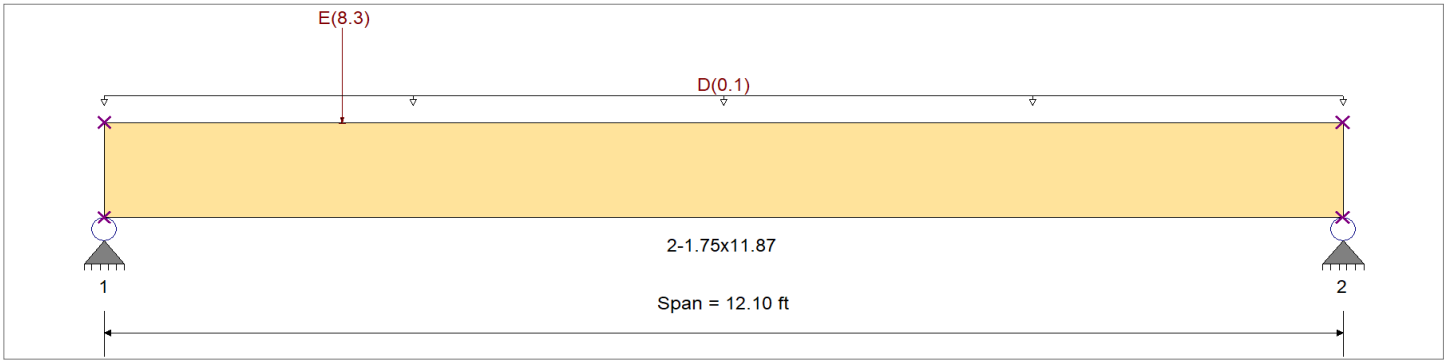
Wood Species : Trus Joist
Wood Grade : MicroLam LVL 2.0 E

Beam Bracing : Completely Unbraced

Fb +	2600 psi
Fb -	2600 psi
Fc - Prll	2510 psi
Fc - Perp	750 psi
Fv	285 psi
Ft	1555 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 loading
Uniform Load : D = 0.10 , Tributary Width = 1.0 ft
Point Load : E = 8.30 k @ 2.330 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.499 : 1	Maximum Shear Stress Ratio	=	0.416 : 1
Section used for this span		2-1.75x11.87	Section used for this span		2-1.75x11.87
fb: Actual	=	1,779.65 psi	fv: Actual	=	189.86 psi
F'b	=	3,564.63 psi	F'v	=	456.00 psi
Load Combination		+D+0.70E	Load Combination		+D+0.70E
Location of maximum on span	=	2.341 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	0.306 in	Ratio =	474 >=360	Span: 1 : E Only
Max Upward Transient Deflection	0 in	Ratio =	0 <360	n/a
Max Downward Total Deflection	0.269 in	Ratio =	540 >=240	Span: 1 : +D+0.70E
Max Upward Total Deflection	0 in	Ratio =	0 <240	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 12.10 ft	1	0.134	0.080	0.90	1.00	1.00	0.96	1.001	1.00	1.00	1.00	2.05	299.4	2,238.2	0.57	20.6	256.5
+0.60D					1.00	1.00	0.96	1.001	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 12.10 ft	1	0.050	0.027	1.60	1.00	1.00	0.86	1.001	1.00	1.00	1.00	1.23	179.6	3,564.6	0.34	12.3	456.0
+D+0.70E					1.00	1.00	0.86	1.001	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 12.10 ft	1	0.499	0.416	1.60	1.00	1.00	0.86	1.001	1.00	1.00	1.00	12.20	1,779.6	3,564.6	5.26	189.9	456.0
+D+0.5250E					1.00	1.00	0.86	1.001	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 12.10 ft	1	0.388	0.324	1.60	1.00	1.00	0.86	1.001	1.00	1.00	1.00	9.47	1,381.4	3,564.6	4.09	147.5	456.0
+0.60D+0.70E					1.00	1.00	0.86	1.001	1.00	1.00	1.00			0.0	0.00	0.0	0.0

Wood Beam

Project File: Calcs.ec6

DESCRIPTION: B4-26

CODE REFERENCES

Calculations per NDS 2018, IBC 2021, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : IBC 2021

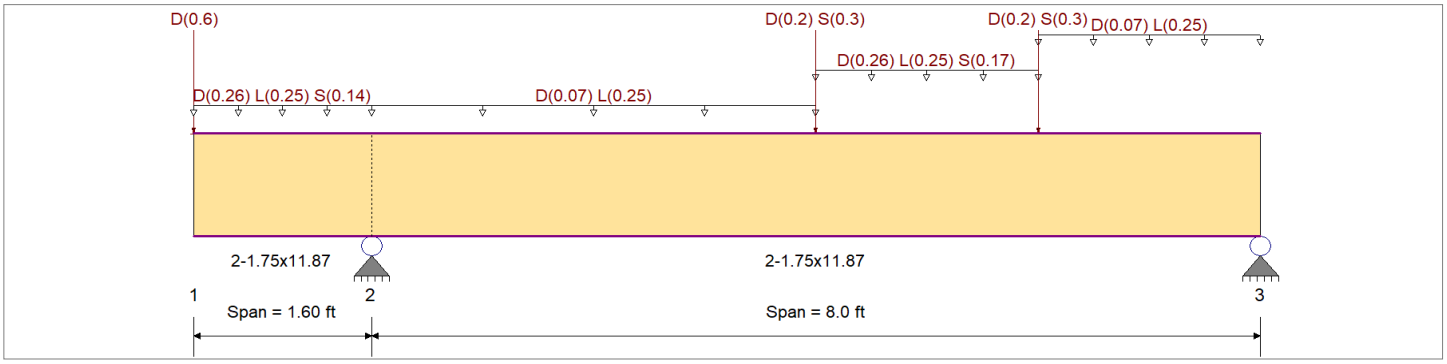
Wood Species : iLevel Truss Joist
Wood Grade : MicroLam LVL 2.0 E

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

Fb +	2600 psi
Fb -	2600 psi
Fc - Prll	2510 psi
Fc - Perp	750 psi
Fv	285 psi
Ft	1555 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 loading
Load for Span Number 1
Point Load : D = 0.60 k @ 0.0 ft
Uniform Load : D = 0.260, L = 0.250, S = 0.140 , Tributary Width = 1.0 ft
Load for Span Number 2
Uniform Load : D = 0.070, L = 0.250 k/ft, Extent = 0.0 -->> 4.0 ft, Tributary Width = 1.0 ft
Uniform Load : D = 0.260, L = 0.250, S = 0.170 k/ft, Extent = 4.0 -->> 6.0 ft, Tributary Width = 1.0 ft
Uniform Load : D = 0.070, L = 0.250 k/ft, Extent = 6.0 -->> 8.0 ft, Tributary Width = 1.0 ft
Point Load : D = 0.20, S = 0.30 k @ 4.0 ft
Point Load : D = 0.20, S = 0.30 k @ 6.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.183 : 1	Maximum Shear Stress Ratio	=	0.190 : 1
Section used for this span		2-1.75x11.87	Section used for this span		2-1.75x11.87
fb: Actual	=	546.48 psi	fv: Actual	=	54.06 psi
F'b	=	2,994.26 psi	F'v	=	285.00 psi
Load Combination		+D+0.750L+0.750S+H, LL Comb Run (*L)	Load Combination		+D+L+H, LL Comb Run (LL)
Location of maximum on span	=	4.514 ft	Location of maximum on span	=	1.600 ft
Span # where maximum occurs	=	Span # 2	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.024 in	Ratio =	2542 >=360	Span: 2 : L Only, LL Comb Run (*L)
Max Upward Transient Deflection	-0.015 in	Ratio =	4033 >=360	Span: 1 : L Only, LL Comb Run (*L)
Max Downward Total Deflection	0.040 in	Ratio =	2405 >=240	Span: 2 : +D+0.750L+0.750S+H, LL Comb Run (*L)
Max Upward Total Deflection	-0.017 in	Ratio =	2222 >=240	Span: 1 : +D+0.750L+0.750S+H, LL Comb Run (*L)

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
+D+H														0.0	0.00	0.0	0.0
Length = 1.60 ft	1	0.081	0.122	0.90	1.00	1.00	1.00	1.001	1.00	1.00	1.00	1.31	190.9	2,343.3	0.87	31.4	256.5
Length = 8.0 ft	2	0.081	0.122	0.90	1.00	1.00	1.00	1.001	1.00	1.00	1.00	1.31	190.9	2,343.3	0.70	31.4	256.5

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING
7220 Trade Street, Suite 295, San Diego, CA 92121 ▸ p 619-650-0010 ▸ *mulhernkulp.com*

Project Name: 4450 84th Ave

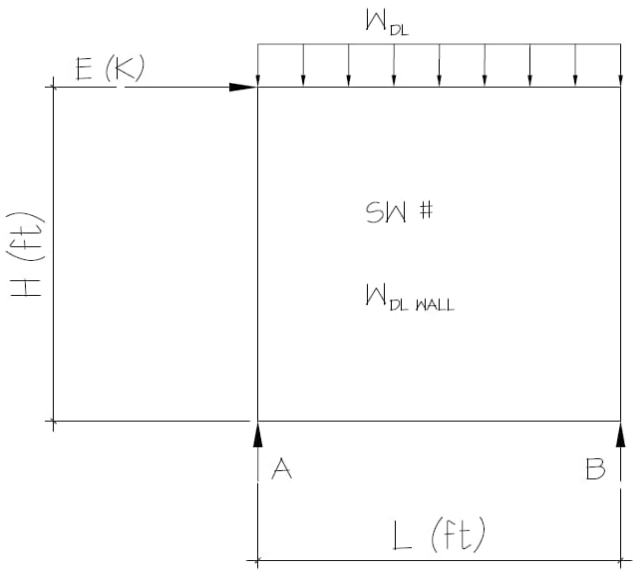
M&K Project #: 300-25001
Engineer: MPM
Date: 20-Jan-25

Overstrength Calculations

Wall Description/SW #: 209

Parameters:

L =	7.7	ft
H =	10.0	ft
E =	1.50	k
W_{DLwall} =	0.10	klf
W_{DL} =	0.000	klf
Ω_0 =	2.5	(ASCE table 12.2.1 footnote
SDS =	1.144	



Analysis:

E (unfactored) = 2.14

$E_{MH} = \Omega_0 * E$ = 5.36 k

$E_V = 0.2*SDS*DL$ = 0.176 k

$E_M = E_{MH} + E_V$

$E_M = E_{MH} - E_V$

$E_M = E_{MH} + E_V$ = 5.533 k

$E_M = E_{MH} - E_V$ = 5.181 k

E_M (max) $= \sum M_A = 0$ =	5.53(10.0) - R_B(7.7)	R_B =	7.2E
		R_A =	- 7.2E
E_M (min) $= \sum M_A = 0$ =	5.18(10.0) - R_B(7.7)	R_B =	6.7E
		R_A =	- 6.7E

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

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING
7220 Trade Street, Suite 295, San Diego, CA 92121 ▸ p 619-650-0010 ▸ *mulhernkulp.com*

PROJECT NAME: 4450 84TH AVE

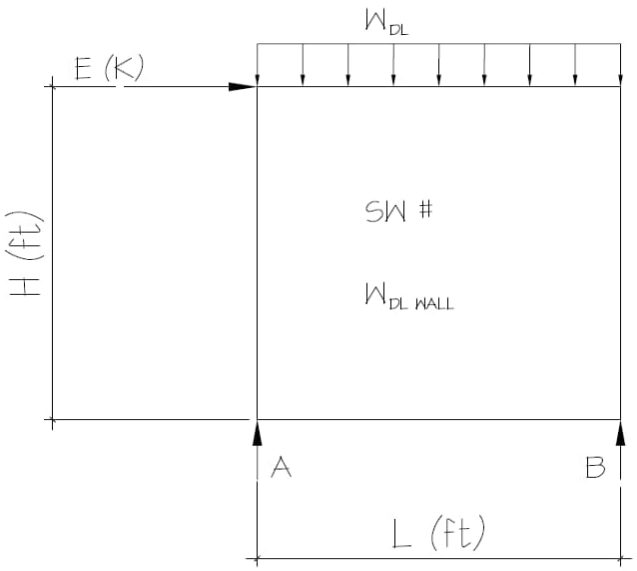
M&K PROJECT #: 300-25001
ENGINEER: MPM
DATE: 20-JAN-25

OVERSTRENGTH CALCULATIONS

WALL DESCRIPTION/SW #: 208

PARAMETERS:

L =	4.4	FT
H =	10.0	FT
E =	1.00	K
W_{DLWALL} =	0.10	KLF
W_{DL} =	0.000	KLF
Ω_0 =	2.5	(ASCE TABLE 12.2.1 FOOTNOTE
SDS =	1.144	



ANALYSIS:

E (UNFACTORED) = 1.43

$E_{MH} = \Omega_0 * E$ = 3.57 K

$E_V = 0.2*SDS*DL$ = 0.101 K

$E_M = E_{MH} + E_V$

$E_M = E_{MH} - E_V$

$E_M = E_{MH} + E_V$ = 3.672 K

$E_M = E_{MH} - E_V$ = 3.471 K

E_M (MAX) $= \sum M_A = 0$ = 3.67(10.0) - R_B(4.4)

R_B = 8.3E

R_A = - 8.3E

E_M (MIN) $= \sum M_A = 0$ = 3.47(10.0) - R_B(4.4)

R_B = 7.9E

R_A = - 7.9E

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 295, San Diego, CA 92121 ▸ p 619-650-0010 ▸ *mulhernkulp.com*

PROJECT NAME: 4450 84TH AVE

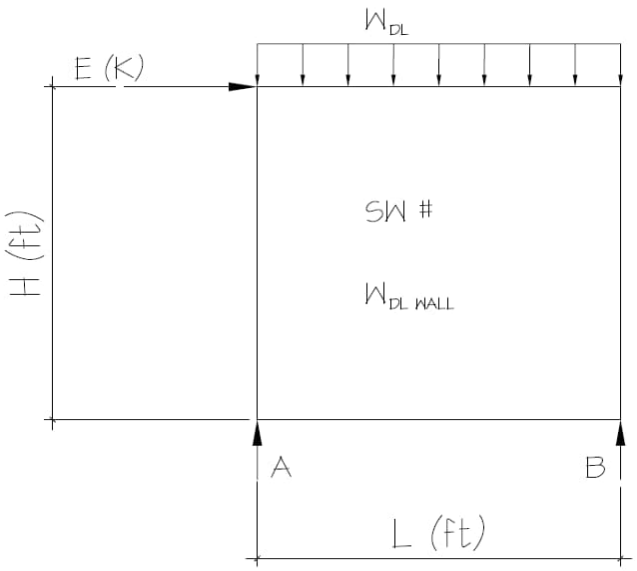
M&K PROJECT #: 300-25001
ENGINEER: MPM
DATE: 20-JAN-25

OVERSTRENGTH CALCULATIONS

WALL DESCRIPTION/SW #: 212

PARAMETERS:

L =	3.7	FT
H =	10.0	FT
E =	0.40	K
W_{DLWALL} =	0.10	KLF
W_{DL} =	0.000	KLF
Ω_0 =	2.5	(ASCE TABLE 12.2.1 FOOTNOTE
SDS =	1.144	



ANALYSIS:

E (UNFACTORED) = 0.57

$E_{MH} = \Omega_0 * E$ = 1.43 K

$E_V = 0.2*SDS*DL$ = 0.085 K

$E_M = E_{MH} + E_V$

$E_M = E_{MH} - E_V$

$E_M = E_{MH} + E_V$ = 1.513 K

$E_M = E_{MH} - E_V$ = 1.344 K

E_M (MAX) $= \sum M_A = 0$ = 1.51(10.0) - R_B(3.7)

R_B = 4.1E

R_A = - 4.1E

E_M (MIN) $= \sum M_A = 0$ = 1.34(10.0) - R_B(3.7)

R_B = 3.6E

R_A = - 3.6E

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

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PROJECT NAME: 4450 84TH AVE

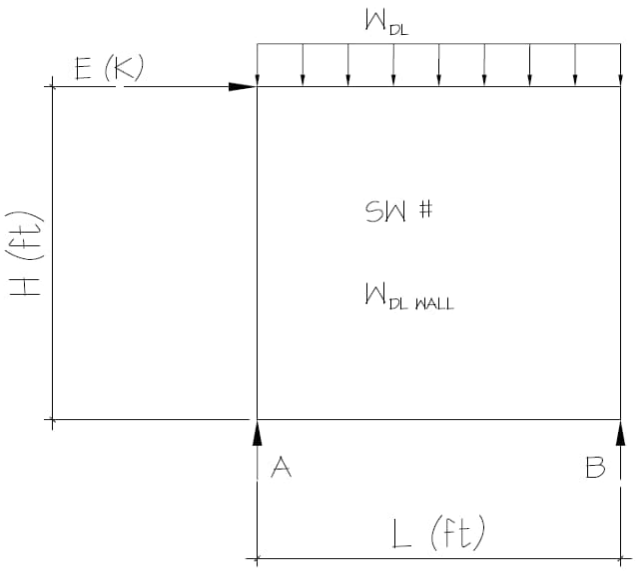
M&K PROJECT #: 300-25001
ENGINEER: MPM
DATE: 20-JAN-25

OVERSTRENGTH CALCULATIONS

WALL DESCRIPTION/SW #: 213

PARAMETERS:

L =	9.7	FT
H =	9.7	FT
E =	1.30	K
W_{DLWALL} =	0.10	KLF
W_{DL} =	0.000	KLF
Ω_0 =	2.5	(ASCE TABLE 12.2.1 FOOTNOTE
SDS =	1.144	



ANALYSIS:

E (UNFACTORED) = 1.86

$E_{MH} = \Omega_0 * E$ = 4.64 K

$E_V = 0.2*SDS*DL$ = 0.222 K

$E_M = E_{MH} + E_V$

$E_M = E_{MH} + E_V$ = 4.865 K

$E_M = E_{MH} - E_V$

$E_M = E_{MH} - E_V$ = 4.421 K

E_M (MAX) $= \sum M_A = 0 =$ 4.86(9.7) - R_B(9.7)

R_B = 4.9E

R_A = - 4.9E

E_M (MIN) $= \sum M_A = 0 =$ 4.42(9.7) - R_B(9.7)

R_B = 4.4E

R_A = - 4.4E

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

Wind Wall Calculations

Blake & Vann Lanz

4450 84th Ave SE

Mercer Island, WA

Parameters:

Single Family Home

Design Wind Speed: 100 MPH

Wind Exposure Category: C

Seismic Design Category: D

Code & Design Standard: 2021 IBC Ch. 1609, ASCE 7-16 Ch. 26-30

MULHERN & KULP STRUCTURAL ENGINEERING, INC.

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

Matthew Mills, Staff Engineer

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

WIND DESIGN SUMMARY PER ASCE 7-16

M+K PROJECT #: 300-25001
ENGINEER: MPM

PARAMETERS:

WIND SPEED	100
EXPOSURE CATEGORY	C
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	0.0	:12
LONG. ROOF PITCH	0.0	:12
MEAN ROOF HEIGHT, H	21.30	FT

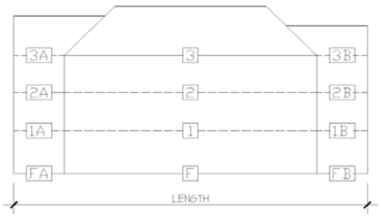
BUILDING GEOMETRY:

LENGTH	55	FT
WIDTH	30	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	10.75 FT	ROOF SURFACE	0	0	0	SQ FT
		WALL SURFACE	0	338	0	SQ FT
1	9.5 FT	ROOF SURFACE	0	0	0	SQ FT
		WALL SURFACE	0	261	0	SQ FT
FND		ROOF SURFACE	0	0	0	SQ FT
		WALL SURFACE	0	0	0	SQ FT



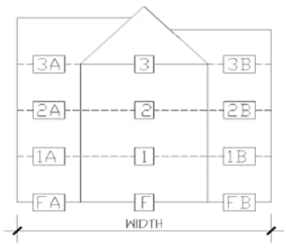
TRIBUTARY DESIGN LOADS: (0.6W)

	SECTION A	SECTION O	SECTION B	
STORY SHEAR	0.00	7.08	0.00	KIPS
TOTAL SHEAR	0.00	7.08	0.00	KIPS
		7.08		KIPS
STORY SHEAR	0.00	5.26	0.00	KIPS
TOTAL SHEAR	0.00	12.35	0.00	KIPS
		12.35		KIPS
STORY SHEAR	0.00	0.00	0.00	KIPS
TOTAL SHEAR	0.00	12.35	0.00	KIPS
		12.35		KIPS

LONGITUDINAL DIRECTION (PARALLEL TO MAIN RIDGE LINE)

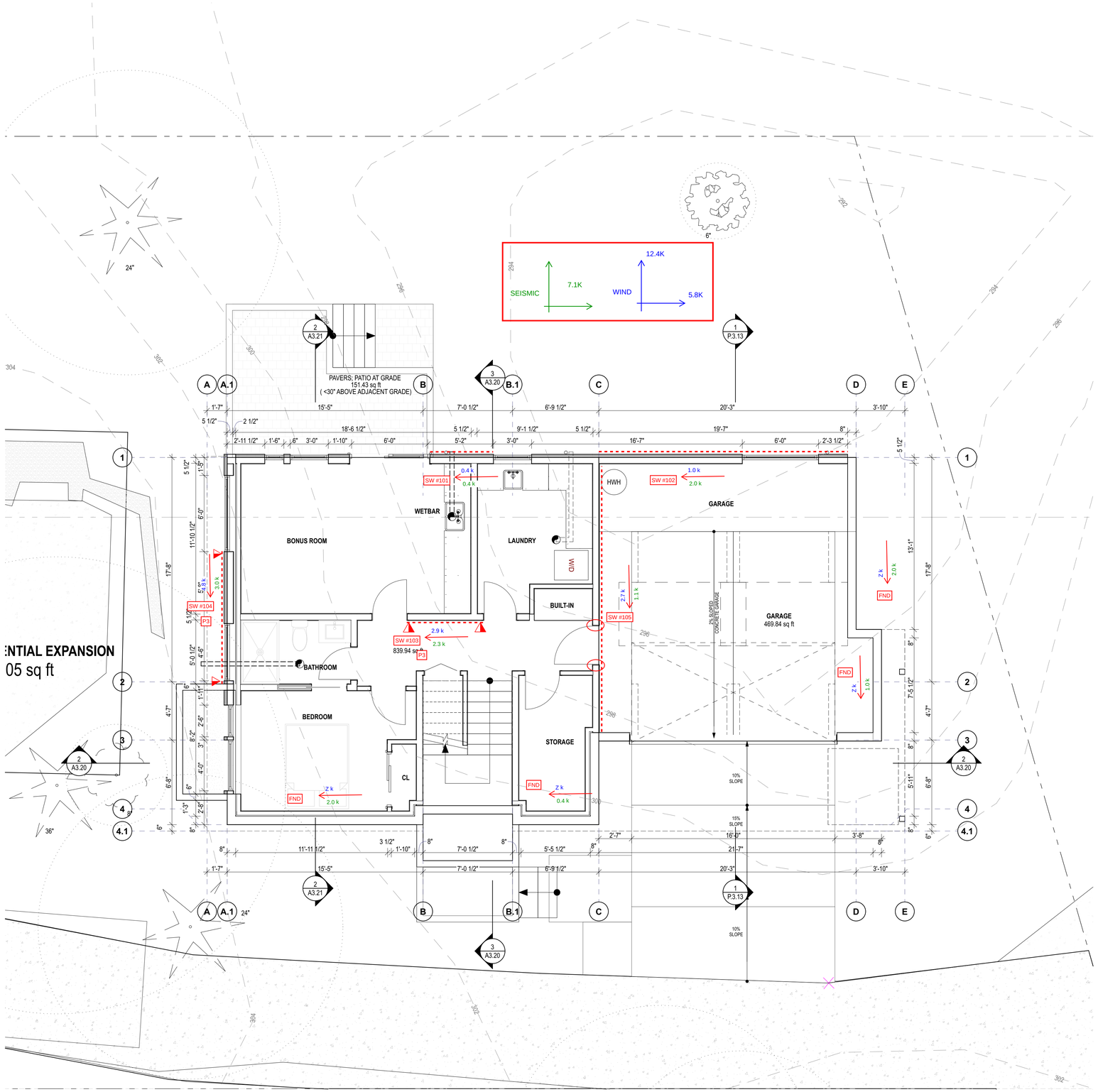
TRIBUTARY DESIGN AREAS:

DIAPHRAGM LEVEL	FLOOR-TO-FLOOR HEIGHT		SECTION A	SECTION O	SECTION B	
2	10.75 FT	ROOF SURFACE	0	0	0	SQ FT
		WALL SURFACE	0	185	0	SQ FT
1	9.5 FT	ROOF SURFACE	0	0	0	SQ FT
		WALL SURFACE	0	143	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	3.36	0.00	KIPS
TOTAL SHEAR	0.00	3.36	0.00	KIPS
		3.36		KIPS
STORY SHEAR	0.00	2.48	0.00	KIPS
TOTAL SHEAR	0.00	5.84	0.00	KIPS
		5.84		KIPS
STORY SHEAR	0.00	0.00	0.00	KIPS
TOTAL SHEAR	0.00	5.84	0.00	KIPS
		5.84		KIPS



1 FIRST FLOOR PLAN

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

0 2' 4' 8'

PLAN NOTES

1. PROPERTY LINE
2. ROOF/DECK ABOVE
3. PEDESTRIAN ACCESS
4. PROVIDE BICYCLE PARKING PER SMC 23.54.015.K. REFER TO A1.10 FOR SHORT-TERM AND LONG-TERM LOCATIONS AND COMPLIANCE CALCULATIONS.
5. STRUCTURE ABOVE, TYP
6. STRUCTURE BELOW, TYP
7. PROVIDE WHOLE HOUSE EXHAUST FAN WITH A NOISE RATING OF SONE 1.0 OR LESS THAT MEETS THE REQUIREMENTS OF SRC M1507.4. SEE A0.00 WHOLE HOUSE VENTILATION NOTE
8. PROVIDE ENVIRONMENTAL AIR EXHAUST OUTLETS AT FAN LOCATIONS. THEY SHALL BE PROVIDED A MIN OF 3 FEET FROM OPERABLE OPENINGS INTO THE BUILDING AND PROPERTY LINES PER SMC 501.3.
9. PER SRC TABLE M1502.4.4, AT KITCHENS, PROVIDE 100 CFM LOCAL EXHAUST FAN AT 0.25 W.G. OR GREATER. TO RUN INTERMITTENTLY.
10. PROVIDE GUARDRAIL AT MIN 36" A.F.F. PER SRC R312.1.2. OPENINGS SHALL BE 4" MAX PER SRC R312.1.3, TYP. REFER TO STRUCTURAL DRAWINGS 11/S4.3 FOR CONNECTION DETAIL AT EXTERIOR ATTACHMENTS TO THE STRUCTURE. AT ALL EXTERIOR LOCATIONS PROVIDE CONNECTION THROUGH VERTICAL WALL SURFACE ONLY, DO NOT PROVIDE CONNECTION THROUGH ROOF MEMBRANE OR PARAPET CAP OR OTHER FLASHING AT TOP OF WALL.
11. PROVIDE HANDRAIL AT 34" - 38" ABOVE TREAD PER SRC R311.7.8.1, 1 1/4" MIN - 1 1/2" MAX GRASP DIMENSION PER SRC R311.7.8.5, 1 1/2" CLEARANCE BETWEEN WALL AND HANDRAIL PER SRC R311.7.8.3 AND CONTINUITY PER R311.7.8.4, TYP.
12. PROVIDE (2) 1-HOUR WALLS BETWEEN DWELLING UNITS PER SRC R302.2.3. SEE W50, W51, AND W56 ON SHEET A8.00
13. PROVIDE 6'-8" MIN VERTICAL CLEARANCE TO FINISH AT ALL STAIRS PER SRC R311.7.2, TYP.
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15. PROVIDE (1) LAYER 5/8" EXTERIOR TYPE 'X' GWB AT OVERHANG, TYP FOR 1-HOUR PROTECTION.
16. PROVIDE NON-COMBUSTIBLE STEEL CANOPY PROVIDED BY OTHERS OVER ENTRY DOOR FOR WEATHER PROTECTION, TYP. CANOPY TO PROJECT NO CLOSER THAN 3-FEET TO ANY PROPERTY LINE, PER SMC 23.45.518H.1. PAINT PER ELEVATIONS.
17. PROVIDE WOOD-FRAMED CANOPY PROJECTION ABOVE; TO PROJECT NO CLOSER THAN 3-FEET TO ANY PROPERTY LINE, PER SMC 23.45.518H.1. PAINT PER ELEVATIONS.
18. SIGHT TRIANGLE PER SMC 23.54.030.G
19. PROVIDE SHORING FOR EXCAVATION ADJACENT TO PROPERTY LINE, PER STRUCTURAL.
20. VEHICULAR ENTRY.
21. PROVIDE ROOF OVERHANG ABOVE, TYP, PER SMC 23.45.518.H
22. MIN 1/2" GYPSUM WALLBOARD WRAPPING WALLS SUPPORTING GARAGE OR COMMON AREA PER SRC R302.6
23. TREE PROTECTION AREA, REFER TO PLOT PLAN, SHEET A1.10, AND ARBORIST REPORT, SHEET A0.16
24. TREE DRIP LINE, REFER TO TREE PROTECTION PLAN, SHEET A1.10, PLOT PLAN, SHEET A1.10, AND ARBORIST REPORT, SHEET A0.16

X1.

X2. MIN 1/2" GYPSUM WALLBOARD WRAPPING POSTS SUPPORTING GARAGE OR COMMON AREA PER SRC R302.6

X3. MIN 1/2" GYPSUM WALLBOARD WRAPPING BEAMS SUPPORTING GARAGE OR COMMON AREA PER SRC R302.6

X4. MIN 1/2" GYPSUM WALLBOARD WRAPPING WALLS SUPPORTING GARAGE OR COMMON AREA PER SRC R302.6

X5. PROVIDE PLANTER, REFER TO L1 FOR PLANTING SCHEDULE.

X6.

X7. PROVIDE UNDER FLOOR VENT PER SRC R408. OPENING SHALL BE _" X _ "

X8. PROVIDE 1'-6" X 2'-0" MIN CRAWL SPACE ACCESS HATCH PER SRC R408.4. PANEL TO ALIGN WITH FLOOR SUBSTRATE TO ALLOW FOR A SEAMLESS FLOOR FINISH.

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X12. PLUMBING WASTE STACK

X13. RESTORE CURB CUT PER SDOT STANDARDS

X14. PROVIDE 10-FOOT NEW CURB CUT, PER SMC 23.54.030.F.1.B FOR DRIVEWAY ACCESS TO WOONERF AND UNIT PARKING

X15. HRV NOTE

X16.

X17. PROVIDE CANOPY, TYP., PER SMC 23.45.018.H

X18. ASSUMED PROPERTY LINE PER FUTURE UNIT LOT SUBDIVISION

X19. DUCTLESS HEAT PUMP CONDENSER

PLAN LEGEND

DOOR DESIGNATION 1.1

WINDOW DESIGNATION 1.1 — 3'-0" WINDOW WIDTH, 5'-0" WINDOW HEIGHT

XX / X.X DETAIL NUMBER / SHEET NUMBER

1-HOUR FIRE-RESISTANCE RATED CONSTRUCTION 2 X 4 FRAMING

1-HOUR FIRE-RESISTANCE RATED CONSTRUCTION 2 x 6 FRAMING

CAST-IN-PLACE CONCRETE WALL

PROVIDE (1) LAYER 5/8" EXTERIOR GWB AT OVERHANG

PROVIDE CMU WALL

W/D WASHING/ DRYER MACHINE (COMBO)

W WASHING MACHINE

D CLOTHES DRYER

XX / X.X SECTION MARKER

HWH ON-DEMAND HOT WATER HEATER

SD SRC R314 AND SFC 907.2.10.2: SMOKE ALARMS SHALL BE INSTALLED IN THE FOLLOWING LOCATIONS:
1. IN EACH SLEEPING ROOM
2. OUTSIDE EACH SEPARATE SLEEPING AREA IN THE IMMEDIATE VICINITY OF THE BEDROOMS.
3. ON EACH ADDITIONAL STORY OF THE DWELLING INCLUDING BASEMENTS BUT NOT INCLUDING CRAWL SPACES.
4. PER SFC 907.2.10 AND SRC R314.3 SMOKE ALARMS SHALL BE: INSTALLED 20' MIN FROM KITCHEN APPLIANCES OR 10' MIN WITH AN ALARM-SILENCING SWITCH; 3' MIN FROM BATHROOM DOORS
5. SMOKE ALARMS REQUIRED TO BE INSTALLED, HARDWIRED AND INTERCONNECTED, TYP.

SD SW SMOKE ALARM WITH SWITCH, PER ITEM 4 ABOVE

HD HEAT DETECTOR/HEAT ALARM PER IRC R314.2.1. SHALL BE CONNECTED TO AN ALARM THAT IS INSTALLED IN THE DWELLING PER R314.4.1

FAN LOCATION (SRC TABLE M 1505.4.4(1) AND SMC TABLE 403.4.7)
1. AT BATHROOMS AND LAUNDRY, PROVIDE 50 CFM FAN W/ TIMER AT 0.25 W.G. OR GREATER
2. AT KITCHENS, PROVIDE 100 CFM FAN AT 0.25 W.G. OR GREATER
3. VENT ALL EXHAUST FANS TO THE OUTSIDE
4. EXHAUST DUCTS ARE TO BE CONST. OF SMOOTH BORE NONCOMBUSTIBLE MATERIAL AND ARE TO BE INSUL. AS REQUIRED PER WSEC.

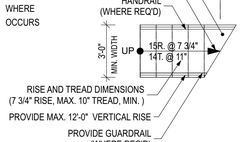
CO SRC R315 AND 2021 SFC 915: AN APPROVED CARBON MONOXIDE ALARM SHALL BE INSTALLED OUTSIDE OF EACH SEPARATE SLEEPING AREA IN THE IMMEDIATE VICINITY OF THE BEDROOMS IN DWELLING UNITS AND ON EACH LEVEL OF THE DWELLING. SINGLE STATION CARBON MONOXIDE ALARMS SHALL BE LISTED AS COMPLYING WITH UL 2075.
SRC R315.5. CARBON MONOXIDE ALARMS REQUIRED TO BE INSTALLED, HARDWIRED AND INTERCONNECTED, TYP.

FLOOR STEP DOWN

SOFFIT STEP DOWN

TYPICAL STAIR

PROVIDE MIN. 3'-0" LANDING WHERE OCCURS



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Architect of Record

b9 architects
400 E Pine Street
Suite 215
Seattle, WA 98122
206.297.1284
www.b9architects.com

Project:

Spec House + Existing DADU Conversion

Location:

4450 84th Ave SE
Mercer Island, WA #Site Postcode

SDCI Number:
#SDCI CN#

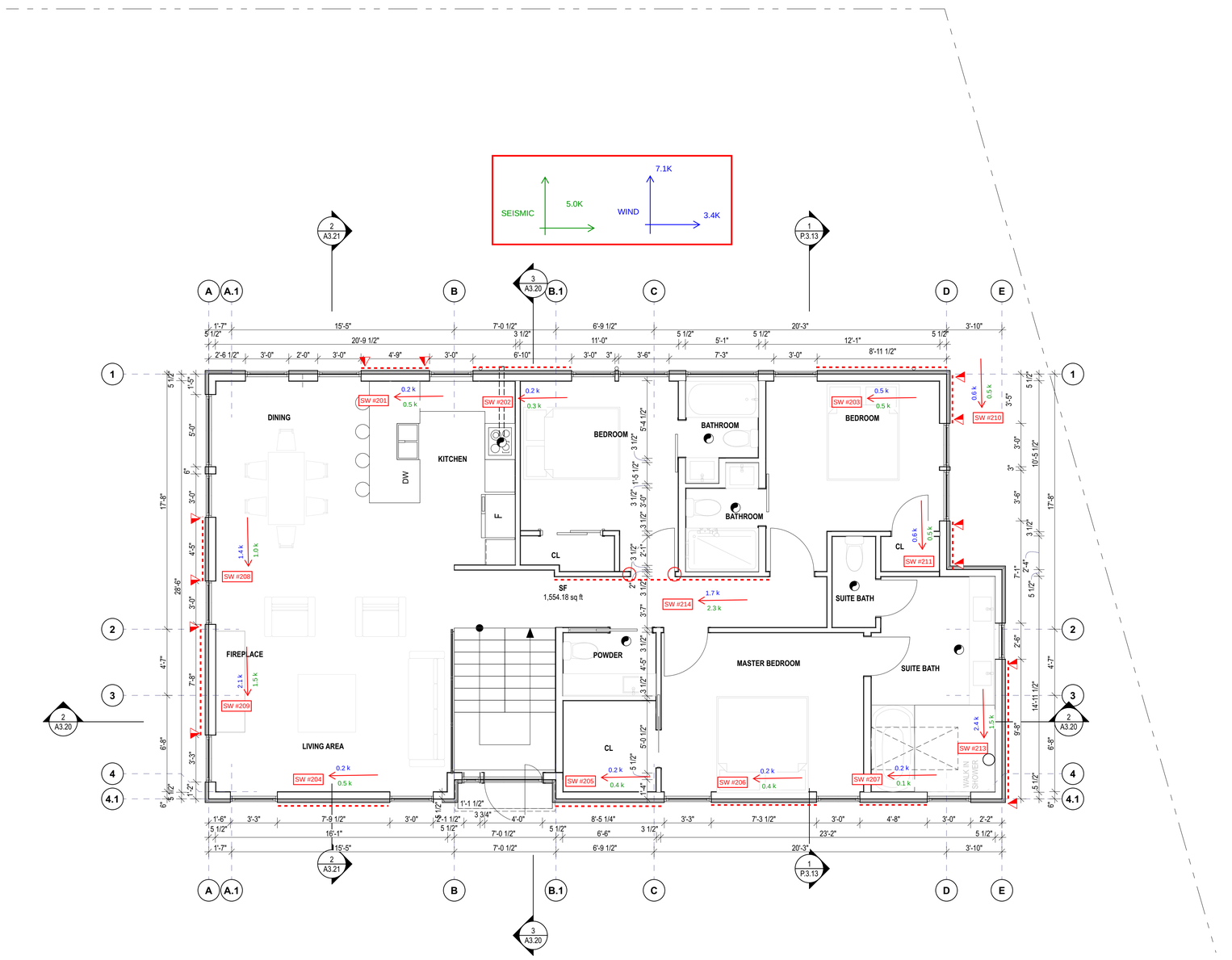
Professional Stamp

Issue ID	Issue Name	Issue Date

City Stamp

First Floor Plan

A2.01



4 SECOND FLOOR PLAN

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

0 2' 4' 8'

PLAN NOTES

1. PROPERTY LINE
2. ROOF/DECK ABOVE
3. PEDESTRIAN ACCESS
4. PROVIDE BICYCLE PARKING PER SMC 23.54.015.K. REFER TO A1.10 FOR SHORT-TERM AND LONG-TERM LOCATIONS AND COMPLIANCE CALCULATIONS.
5. STRUCTURE ABOVE, TYP
6. STRUCTURE BELOW, TYP
7. PROVIDE WHOLE HOUSE EXHAUST FAN WITH A NOISE RATING OF SONE 1.0 OR LESS THAT MEETS THE REQUIREMENTS OF SRC M1507.4. SEE A0.00 WHOLE HOUSE VENTILATION NOTE
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X19. DUCTLESS HEAT PUMP CONDENSER

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WINDOW DESIGNATION 1.1 — 3'-0" WINDOW WIDTH, 5'-0" WINDOW HEIGHT

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1-HOUR FIRE-RESISTANCE RATED CONSTRUCTION 2 x 6 FRAMING

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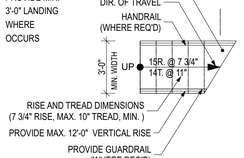

N

Architect of Record

b9 architects
400 E Pine Street
Suite 215
Seattle, WA 98122
206.297.1284
www.b9architects.com

Project:

Spec House + Existing DADU Conversion

Location:

4450 84th Ave SE
Mercer Island, WA #Site Postcode

SDCI Number:
#SDCI CN#

Professional Stamp

Issue ID	Issue Name	Issue Date

City Stamp

Second Floor Plan

A2.02

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

Shearwall Design Summary

M+K Project #: 300-25001
Engineer: MPM

Shearwall 201: 2nd - Kitcehn Rear Wall

Shearwall Properties:

Wall height, H	10.0	ft.	Max wall opening ht, H_o	0.0	ft.		
Wall Length, L	4.8	ft.	Qualifying Wall Length, L	4.8	ft.	Shearwall Assembly	P1

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
200 lbs	<	1574 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	200	plf	Overturning Moment	2.0	k-ft	Hold Down Design Load	0	lbs
DL at ends of wall	200	lbs	Resistive Moment	2.9	k-ft	Holdown Capacity	0	lbs

Hold-down Specification

No Holdown Required

Shearwall 202: 2nd - Bedroom Rear Wall

Shearwall Properties:

Wall height, H	10.0	ft.	Max wall opening ht, Hc	0.0	ft.		
Wall Length, L	6.8	ft.	Qualifying Wall Length, L	6.8	ft.	Shearwall Assembly	P1

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
200 lbs	<	2283 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	200	plf	Overturning Moment	2.0	k-ft	Hold Down Design Load	0	lbs
DL at ends of wall	200	lbs	Resistive Moment	5.4	k-ft	Holdown Capacity	0	lbs

Hold-down Specification

No Holdown Required

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

Shearwall Design Summary

M+K Project #: 300-25001
Engineer: MPM

Shearwall 203: 2nd - Bedroom Rear Wall

Shearwall Properties:

Wall height, H	10.0	ft.	Max wall opening ht, H_c	0.0	ft.		
Wall Length, L	8.9	ft.	Qualifying Wall Length, L	8.9	ft.	Shearwall Assembly	P1

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
500 lbs	<	2989 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	180	plf	Overturning Moment	5.0	k-ft	Hold Down Design Load	0	lbs
DL at ends of wall	200	lbs	Resistive Moment	8.0	k-ft	Holdown Capacity	0	lbs

Hold-down Specification

No Holdown Required

Shearwall 204: 2nd - Living Area Front Wall

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	P1

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
200 lbs	<	2619 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	220	plf	Overturning Moment	2.0	k-ft	Hold Down Design Load	0	lbs
DL at ends of wall	200	lbs	Resistive Moment	7.4	k-ft	Holdown Capacity	0	lbs

Hold-down Specification

No Holdown Required

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 300-25001
ENGINEER: MPM

SHEARWALL 205: 2ND - CLOSET FRONT WALL

SHEARWALL PROPERTIES:

WALL HEIGHT, H	10.0	FT.	MAX WALL OPENING HT, H_c	0.0	FT.		
WALL LENGTH, L	7.5	FT.	QUALIFYING WALL LENGTH, L	7.5	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
200 LBS	<	2519 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	220	PLF	OVERTURNING MOMENT	2.0	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	200	LBS	RESISTIVE MOMENT	6.9	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 206: 2ND - MASTER BED FRONT WALL

SHEARWALL PROPERTIES:

WALL HEIGHT, H	10.0	FT.	MAX WALL OPENING HT, Hc	0.0	FT.		
WALL LENGTH, L	7.3	FT.	QUALIFYING WALL LENGTH, L	7.3	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
200 LBS	<	2435 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	220	PLF	OVERTURNING MOMENT	2.0	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	200	LBS	RESISTIVE MOMENT	6.5	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

Shearwall Design Summary

M+K Project #: 300-25001
Engineer: MPM

Shearwall 207: 2nd - Master Bath Front Wall

Shearwall Properties:

Wall height, H	10.0	ft.	Max wall opening ht, H_c	0.0	ft.		
Wall Length, L	4.7	ft.	Qualifying Wall Length, L	4.7	ft.	Shearwall Assembly	P1

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
200 lbs	<	1553 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	120	plf	Overturning Moment	2.0	k-ft	Hold Down Design Load	0	lbs
DL at ends of wall	200	lbs	Resistive Moment	2.0	k-ft	Holdown Capacity	0	lbs

Hold-down Specification

No Holdown Required

Shearwall 208: 2nd - Dining Side Wall

Shearwall Properties:

Wall height, H	10.0	ft.	Max wall opening ht, Hc	0.0	ft.		
Wall Length, L	4.4	ft.	Qualifying Wall Length, L	4.4	ft.	Shearwall Assembly	P1

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
1400 lbs	<	1427 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	14.0	k-ft	Hold Down Design Load	2984	lbs
DL at ends of wall	0	lbs	Resistive Moment	0.9	k-ft	Holdown Capacity	5850	lbs

Hold-down Specification

SIMPSON MSTC66 STRAP TIE (24" END LENGTH)

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

Shearwall Design Summary

M+K Project #: 300-25001
Engineer: MPM

Shearwall 209: 2nd - Fireplace Ext Wall

Shearwall Properties:

Wall height, H	10.0	ft.	Max wall opening ht, H_c	0.0	ft.		
Wall Length, L	7.7	ft.	Qualifying Wall Length, L	7.7	ft.	Shearwall Assembly	P1

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
2100 lbs	<	2586 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	21.0	k-ft	Hold Down Design Load	2381	lbs
DL at ends of wall	0	lbs	Resistive Moment	2.7	k-ft	Holdown Capacity	2655	lbs

Hold-down Specification

Simpson MSTC40 strap tie (12" end length)

Shearwall : Basement - 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	0.0	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

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 300-25001
ENGINEER: MPM

SHEARWALL 210: 2ND - BEDROOM SIDE WALL

SHEARWALL PROPERTIES:

WALL HEIGHT, H	10.0	FT.	MAX WALL OPENING HT, H_c	0.0	FT.		
WALL LENGTH, L	3.4	FT.	QUALIFYING WALL LENGTH, L	3.4	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
500 LBS	<	1007 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	5.0	K-FT	HOLD DOWN DESIGN LOAD	1318	LBS
DL AT ENDS OF WALL	0	LBS	RESISTIVE MOMENT	0.5	K-FT	HOLDOWN CAPACITY	4935	LBS

HOLD-DOWN SPECIFICATION

SIMPSON STHD14RJ HOLDOWN

SHEARWALL 211: 2ND - BEDROOM SIDE WALL

SHEARWALL PROPERTIES:

WALL HEIGHT, H	10.0	FT.	MAX WALL OPENING HT, Hc	0.0	FT.		
WALL LENGTH, L	3.4	FT.	QUALIFYING WALL LENGTH, L	3.4	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
600 LBS	<	1007 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	6.0	K-FT	HOLD DOWN DESIGN LOAD	1612	LBS
DL AT ENDS OF WALL	0	LBS	RESISTIVE MOMENT	0.5	K-FT	HOLDOWN CAPACITY	4935	LBS

HOLD-DOWN SPECIFICATION

SIMPSON STHD14RJ HOLDOWN

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 300-25001
ENGINEER: MPM

SHEARWALL : BASEMENT -

SHEARWALL PROPERTIES:

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

CAPACITY EVALUATION:

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

SHEARWALL ASSEMBLY SPECIFICATION

#N/A
#N/A
#VALUE!

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	#N/A	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 213: 2ND - MASTER BATH SIDE WALL

SHEARWALL PROPERTIES:

WALL HEIGHT, H	10.0	FT.	MAX WALL OPENING HT, Hc	0.0	FT.		
WALL LENGTH, L	9.7	FT.	QUALIFYING WALL LENGTH, L	9.7	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
2400 LBS	<	3257 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	24.0	K-FT	HOLD DOWN DESIGN LOAD	2038	LBS
DL AT ENDS OF WALL	0	LBS	RESISTIVE MOMENT	4.2	K-FT	HOLDOWN CAPACITY	2655	LBS

HOLD-DOWN SPECIFICATION

SIMPSON MSTC40 STRAP TIE (12" END LENGTH)

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

Shearwall Design Summary

M+K Project #: 300-25001
Engineer: MPM

Shearwall 214: 2nd - Int Hallway Wall

Shearwall Properties:

Wall height, H	10.0	ft.	Max wall opening ht, H_c	7.0	ft.		
Wall Length, L	14.8	ft.	Qualifying Wall Length, L	11.8	ft.	Shearwall Assembly	P1

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
1700 lbs	<	3962 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	320	plf	Overturning Moment	17.0	k-ft	Hold Down Design Load	0	lbs
DL at ends of wall	0	lbs	Resistive Moment	31.5	k-ft	Holdown Capacity	0	lbs

Hold-down Specification

No Holdown Required

Shearwall : Basement -

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	0.0

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
0 lbs	####	#VALUE! lbs

Shearwall Assembly Specification

#N/A
#N/A
#VALUE!

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	#N/A	lbs

Hold-down Specification

No Holdown Required

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 300-25001
ENGINEER: MPM

SHEARWALL 101: 1ST - REAR WALL

SHEARWALL PROPERTIES:

WALL HEIGHT, H	8.5	FT.	MAX WALL OPENING HT, H_c	0.0	FT.		
WALL LENGTH, L	5.1	FT.	QUALIFYING WALL LENGTH, L	5.1	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
400 LBS	<	1713 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	360	PLF	OVERTURNING MOMENT	3.4	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	500	LBS	RESISTIVE MOMENT	6.5	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 102: 1ST - GARAGE REAR WALL

SHEARWALL PROPERTIES:

WALL HEIGHT, H	8.5	FT.	MAX WALL OPENING HT, Hc	0.0	FT.		
WALL LENGTH, L	19.6	FT.	QUALIFYING WALL LENGTH, L	19.6	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
1000 LBS	<	6582 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	170	PLF	OVERTURNING MOMENT	8.5	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	500	LBS	RESISTIVE MOMENT	38.2	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

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RESIDENTIAL STRUCTURAL ENGINEERING

Shearwall Design Summary

M+K Project #: 300-25001
Engineer: MPM

Shearwall 103: 1st - Int Hallway Wall

Shearwall Properties:

Wall height, H	8.5	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	P3

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
2900 lbs	<	3781 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	700	plf	Overturning Moment	24.7	k-ft	Hold Down Design Load	1858	lbs
DL at ends of wall	400	lbs	Resistive Moment	13.5	k-ft	Holdown Capacity	4935	lbs

Hold-down Specification

Simpson STHD14RJ Holdown

Shearwall : Basement - 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	P1

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
0 lbs	####	#DIV/0! lbs

Shearwall Assembly Specification

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

Overturning Evaluation:

Resistive DL	0	plf	Overturning Moment	0.0	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

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Shearwall Design Summary

M+K Project #: 300-25001
Engineer: MPM

Shearwall 104: 1st - Bonus Room Side Wall

Shearwall Properties:

Wall height, H	3.3	ft.	Max wall opening ht, H_c	0.0	ft.		
Wall Length, L	10.4	ft.	Qualifying Wall Length, L	10.4	ft.	Shearwall Assembly	P3

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
4800 lbs	<	6554 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	15.8	k-ft	Hold Down Design Load	1055	lbs
DL at ends of wall	0	lbs	Resistive Moment	4.9	k-ft	Holdown Capacity	4935	lbs

Hold-down Specification

Simpson STHD14RJ Holdown

Shearwall 105: 1st - Interior Garage Wall

Shearwall Properties:

Wall height, H	8.5	ft.	Max wall opening ht, Hc	7.0	ft.		
Wall Length, L	21.2	ft.	Qualifying Wall Length, L	18.0	ft.	Shearwall Assembly	P1

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
2700 lbs	<	6044 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	23.0	k-ft	Hold Down Design Load	0	lbs
DL at ends of wall	680	lbs	Resistive Moment	33.2	k-ft	Holdown Capacity	0	lbs

Hold-down Specification

No Holdown Required

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Seismic Shear Wall Calculations

Blake & Vann Lanz

4450 84th Ave SE

Mercer Island, WA

Parameters:

Single Family Home

Design Wind Speed: 100 MPH

Wind Exposure Category: C

Seismic Design Category: D

Code & Design Standard: 2021 IBC Ch. 1609, ASCE 7-16 Ch. 26-30

MULHERN & KULP STRUCTURAL ENGINEERING, INC.

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

Matthew Mills, Staff Engineer

MULHERN+KULP
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SEISMIC CALCULATION - ASCE 7-16

M+K PROJECT #: 300-25001
ENGINEER: MPM

SEISMIC DESIGN CATEGORY:

User Inputs:

Site Class	D
Spectral Response Acceleration 0.2 sec, S_S	1.430
Spectral Response Acceleration 1.0 sec, S_1	0.497
Occupancy Category	II

Variables:

Site coefficient, Fa	1.20
Site coefficient, Fv	1.80

Calculated Values:

Maximum spectral response acceleration, S_{MS}	1.716
Maximum spectral response acceleration, S_{M1}	0.896
Design spectral response acceleration, S_{DS}	1.144
Design spectral response acceleration, S_{D1}	0.597
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	20

Calculated Values:

Approximate Fundamental Period, T_A	0.191
T_O	0.104
T_S	0.522
Spectral Response Acc., S_A (g)	1.144

SITE CLASS ASSUMPTION

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

EQUIVALENT LATERAL FORCE PROCEDURE

Dead Load Calculation:

Level	Story Ht. (ft.)	Area (ft^2)	Dead Load (psf)	DL of ext wall trib. to level (kips)	Total level DL
1	9.5	1607	10	11.2	27 k
2	10.8	1607	15	6.0	30 k
3	0.0	0	0	0.0	0 k
4	0.0	0	0	0.0	0 k
5	0.0	0	0	0.0	0 k
6	0.0	0	0	0.0	0 k
7	0.0	0	0	0.0	0 k
8	0.0	0	0	0.0	0 k
9	0.0	0	0	0.0	0 k
10	0.0	0	0	0.0	0 k
11	0.0	0	0	0.0	0 k
12	0.0	0	0	0.0	0 k
13	0.0	0	0	0.0	0 k
14	0.0	0	0	0.0	0 k
15	0.0	0	0	0.0	0 k

TOTAL DEAD LOAD OF STRUCTURE 57 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	0.176	0.176

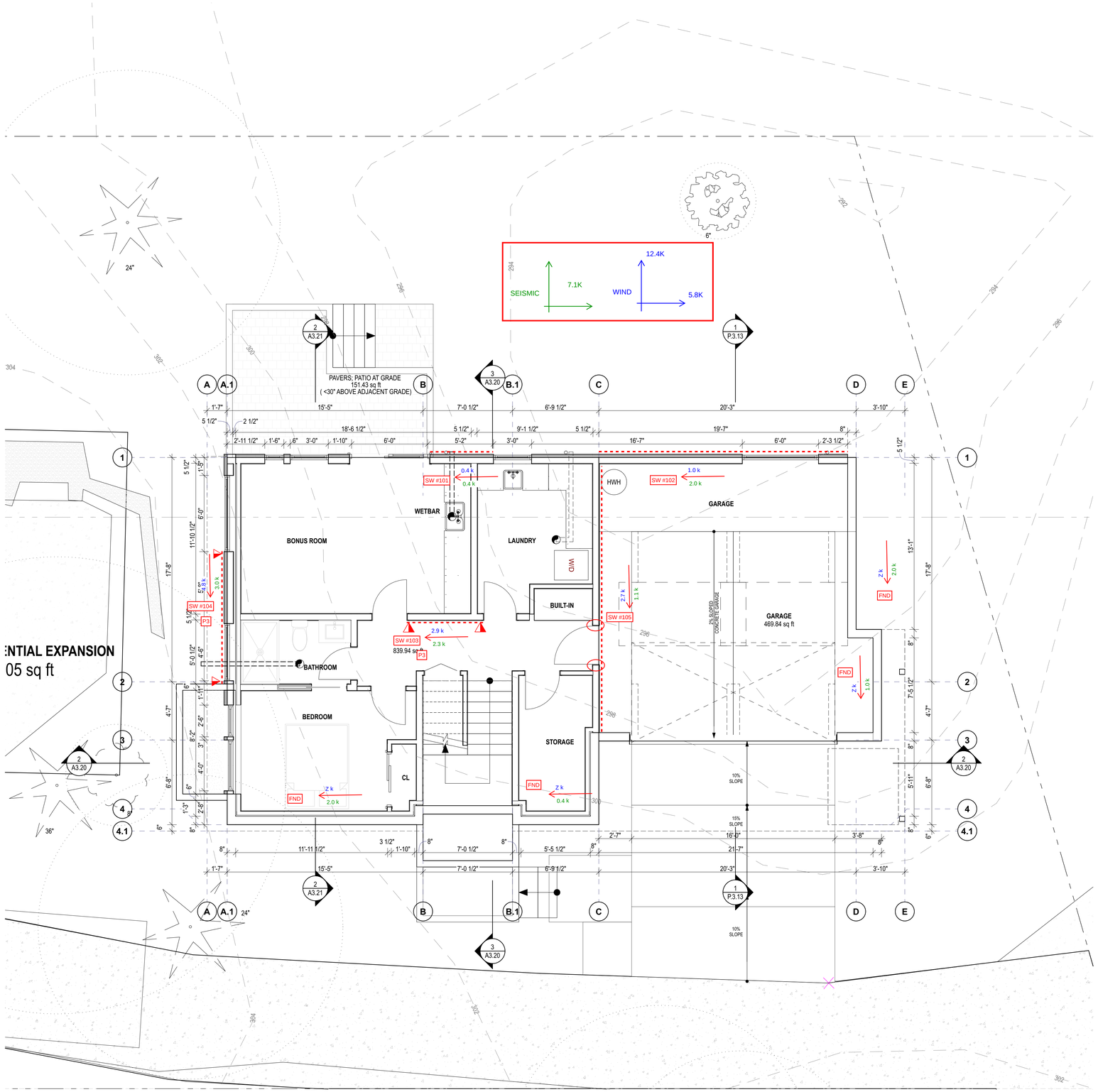
Base Shears:

Ultimate Loads				x 0.7 =	Allowable Loads			
Transverse		Longitudinal			Transverse		Longitudinal	
10	k	10	k		7.1	k	7.1	k

Story Shear Calculation:

Distribution exponent, k: 1.00

Level	Vert. Dist. Factor, C_{VX}	Ultimate Loads: Transverse Story Shear, F_x		Ultimate Loads: Longitudinal Story Shear, F_x		x 0.7 = Allowable Loads: Transverse Story Shear, F_x		Allowable Loads: Transverse Σ Story Shear		Allowable Loads: Longitudinal Story Shear, F_x		Allowable Loads: Longitudinal Σ Story Shear	
1	0.298	3.0	k	3.0	k	2.1	k	7.1	k	2.1	k	7.1	k
2	0.702	7.1	k	7.1	k	5.0	k	5.0	k	5.0	k	5.0	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



1 FIRST FLOOR PLAN

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

0 2' 4' 8'

PLAN NOTES

1. PROPERTY LINE
2. ROOF/DECK ABOVE
3. PEDESTRIAN ACCESS
4. PROVIDE BICYCLE PARKING PER SMC 23.54.015.K. REFER TO A1.10 FOR SHORT-TERM AND LONG-TERM LOCATIONS AND COMPLIANCE CALCULATIONS.
5. STRUCTURE ABOVE, TYP
6. STRUCTURE BELOW, TYP
7. PROVIDE WHOLE HOUSE EXHAUST FAN WITH A NOISE RATING OF SONE 1.0 OR LESS THAT MEETS THE REQUIREMENTS OF SRC M1507.4. SEE A0.00 WHOLE HOUSE VENTILATION NOTE
8. PROVIDE ENVIRONMENTAL AIR EXHAUST OUTLETS AT FAN LOCATIONS. THEY SHALL BE PROVIDED A MIN OF 3 FEET FROM OPERABLE OPENINGS INTO THE BUILDING AND PROPERTY LINES PER SMC 501.3.
9. PER SRC TABLE M1502.4.4, AT KITCHENS, PROVIDE 100 CFM LOCAL EXHAUST FAN AT 0.25 W.G. OR GREATER. TO RUN INTERMITTENTLY.
10. PROVIDE GUARDRAIL AT MIN 36" A.F.F. PER SRC R312.1.2. OPENINGS SHALL BE 4" MAX PER SRC R312.1.3, TYP. REFER TO STRUCTURAL DRAWINGS 11/S4.3 FOR CONNECTION DETAIL AT EXTERIOR ATTACHMENTS TO THE STRUCTURE. AT ALL EXTERIOR LOCATIONS PROVIDE CONNECTION THROUGH VERTICAL WALL SURFACE ONLY, DO NOT PROVIDE CONNECTION THROUGH ROOF MEMBRANE OR PARAPET CAP OR OTHER FLASHING AT TOP OF WALL.
11. PROVIDE HANDRAIL AT 34" - 38" ABOVE TREAD PER SRC R311.7.8.1, 1 1/4" MIN - 1 1/2" MAX GRASP DIMENSION PER SRC R311.7.8.5, 1 1/2" CLEARANCE BETWEEN WALL AND HANDRAIL PER SRC R311.7.8.3 AND CONTINUITY PER R311.7.8.4, TYP.
12. PROVIDE (2) 1-HOUR WALLS BETWEEN DWELLING UNITS PER SRC R302.2.3. SEE W50, W51, AND W56 ON SHEET A8.00
13. PROVIDE 6'-8" MIN VERTICAL CLEARANCE TO FINISH AT ALL STAIRS PER SRC R311.7.2, TYP.
14. PER SRC R302.7, PROVIDE MIN 1/2" GYPSUM BOARD BENEATH STAIR AT ACCESSIBLE SPACE, TYP.
15. PROVIDE (1) LAYER 5/8" EXTERIOR TYPE 'X' GWB AT OVERHANG, TYP FOR 1-HOUR PROTECTION.
16. PROVIDE NON-COMBUSTIBLE STEEL CANOPY PROVIDED BY OTHERS OVER ENTRY DOOR FOR WEATHER PROTECTION, TYP. CANOPY TO PROJECT NO CLOSER THAN 3-FEET TO ANY PROPERTY LINE, PER SMC 23.45.518H.1. PAINT PER ELEVATIONS.
17. PROVIDE WOOD-FRAMED CANOPY PROJECTION ABOVE; TO PROJECT NO CLOSER THAN 3-FEET TO ANY PROPERTY LINE, PER SMC 23.45.518H.1. PAINT PER ELEVATIONS.
18. SIGHT TRIANGLE PER SMC 23.54.030.G
19. PROVIDE SHORING FOR EXCAVATION ADJACENT TO PROPERTY LINE, PER STRUCTURAL.
20. VEHICULAR ENTRY.
21. PROVIDE ROOF OVERHANG ABOVE, TYP, PER SMC 23.45.518.H
22. MIN 1/2" GYPSUM WALLBOARD WRAPPING WALLS SUPPORTING GARAGE OR COMMON AREA PER SRC R302.6
23. TREE PROTECTION AREA, REFER TO PLOT PLAN, SHEET A1.10, AND ARBORIST REPORT, SHEET A0.16
24. TREE DRIP LINE, REFER TO TREE PROTECTION PLAN, SHEET A1.10, PLOT PLAN, SHEET A1.10, AND ARBORIST REPORT, SHEET A0.16

X1.

X2. MIN 1/2" GYPSUM WALLBOARD WRAPPING POSTS SUPPORTING GARAGE OR COMMON AREA PER SRC R302.6

X3. MIN 1/2" GYPSUM WALLBOARD WRAPPING BEAMS SUPPORTING GARAGE OR COMMON AREA PER SRC R302.6

X4. MIN 1/2" GYPSUM WALLBOARD WRAPPING WALLS SUPPORTING GARAGE OR COMMON AREA PER SRC R302.6

X5. PROVIDE PLANTER, REFER TO L1 FOR PLANTING SCHEDULE.

X6.

X7. PROVIDE UNDER FLOOR VENT PER SRC R408. OPENING SHALL BE _" X _ "

X8. PROVIDE 1'-6" X 2'-0" MIN CRAWL SPACE ACCESS HATCH PER SRC R408.4. PANEL TO ALIGN WITH FLOOR SUBSTRATE TO ALLOW FOR A SEAMLESS FLOOR FINISH.

X9. TREE PROTECTION AREA, REFER TO PLOT PLAN, SHEET A1.10, AND ARBORIST REPORT, SHEET A0.16

X10. TREE DRIP LINE, REFER TO TREE PROTECTION PLAN, SHEET A1.10, PLOT PLAN, SHEET A1.10, AND ARBORIST REPORT, SHEET A0.16

X11. PROPOSED DISTURBED AREA WITHIN TREE PROTECTION AREA, PER ARBORIST REPORT, SHEET A0.16.

X12. PLUMBING WASTE STACK

X13. RESTORE CURB CUT PER SDOT STANDARDS

X14. PROVIDE 10-FOOT NEW CURB CUT, PER SMC 23.54.030.F.1.B FOR DRIVEWAY ACCESS TO WOONERF AND UNIT PARKING

X15. HRV NOTE

X16.

X17. PROVIDE CANOPY, TYP., PER SMC 23.45.018.H

X18. ASSUMED PROPERTY LINE PER FUTURE UNIT LOT SUBDIVISION

X19. DUCTLESS HEAT PUMP CONDENSER

PLAN LEGEND

DOOR DESIGNATION 1.1

WINDOW DESIGNATION 1.1 — 3'-0" WINDOW WIDTH, 5'-0" WINDOW HEIGHT

XX / X.X DETAIL NUMBER / SHEET NUMBER

1-HOUR FIRE-RESISTANCE RATED CONSTRUCTION 2 X 4 FRAMING

1-HOUR FIRE-RESISTANCE RATED CONSTRUCTION 2 x 6 FRAMING

CAST-IN-PLACE CONCRETE WALL

PROVIDE (1) LAYER 5/8" EXTERIOR GWB AT OVERHANG

PROVIDE CMU WALL

W/D WASHING/ DRYER MACHINE (COMBO)

W WASHING MACHINE

D CLOTHES DRYER

XX / X.X SECTION MARKER

HWH ON-DEMAND HOT WATER HEATER

SD SRC R314 AND SFC 907.2.10.2: SMOKE ALARMS SHALL BE INSTALLED IN THE FOLLOWING LOCATIONS:
1. IN EACH SLEEPING ROOM
2. OUTSIDE EACH SEPARATE SLEEPING AREA IN THE IMMEDIATE VICINITY OF THE BEDROOMS.
3. ON EACH ADDITIONAL STORY OF THE DWELLING INCLUDING BASEMENTS BUT NOT INCLUDING CRAWL SPACES.
4. PER SFC 907.2.10 AND SRC R314.3 SMOKE ALARMS SHALL BE: INSTALLED 20' MIN FROM KITCHEN APPLIANCES OR 10' MIN WITH AN ALARM-SILENCING SWITCH; 3' MIN FROM BATHROOM DOORS
5. SMOKE ALARMS REQUIRED TO BE INSTALLED, HARDWIRED AND INTERCONNECTED, TYP.

SD SW SMOKE ALARM WITH SWITCH, PER ITEM 4 ABOVE

HD HEAT DETECTOR/HEAT ALARM PER IRC R314.2.1. SHALL BE CONNECTED TO AN ALARM THAT IS INSTALLED IN THE DWELLING PER R314.4.1

FAN LOCATION (SRC TABLE M 1505.4.4(1) AND SMC TABLE 403.4.7)
1. AT BATHROOMS AND LAUNDRY, PROVIDE 50 CFM FAN W/ TIMER AT 0.25 W.G. OR GREATER
2. AT KITCHENS, PROVIDE 100 CFM FAN AT 0.25 W.G. OR GREATER
3. VENT ALL EXHAUST FANS TO THE OUTSIDE
4. EXHAUST DUCTS ARE TO BE CONST. OF SMOOTH BORE NONCOMBUSTIBLE MATERIAL AND ARE TO BE INSUL. AS REQUIRED PER WSEC.

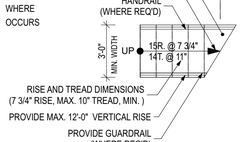
CO SRC R315 AND 2021 SFC 915: AN APPROVED CARBON MONOXIDE ALARM SHALL BE INSTALLED OUTSIDE OF EACH SEPARATE SLEEPING AREA IN THE IMMEDIATE VICINITY OF THE BEDROOMS IN DWELLING UNITS AND ON EACH LEVEL OF THE DWELLING. SINGLE STATION CARBON MONOXIDE ALARMS SHALL BE LISTED AS COMPLYING WITH UL 2075.
SRC R315.5. CARBON MONOXIDE ALARMS REQUIRED TO BE INSTALLED, HARDWIRED AND INTERCONNECTED, TYP.

FLOOR STEP DOWN

SOFFIT STEP DOWN

TYPICAL STAIR

PROVIDE MIN. 3'-0" LANDING WHERE OCCURS



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Architect of Record

b9 architects
400 E Pine Street
Suite 215
Seattle, WA 98122
206.297.1284
www.b9architects.com

Project:

Spec House + Existing DADU Conversion

Location:

4450 84th Ave SE
Mercer Island, WA #Site Postcode

SDCI Number:
#SDCI CN#

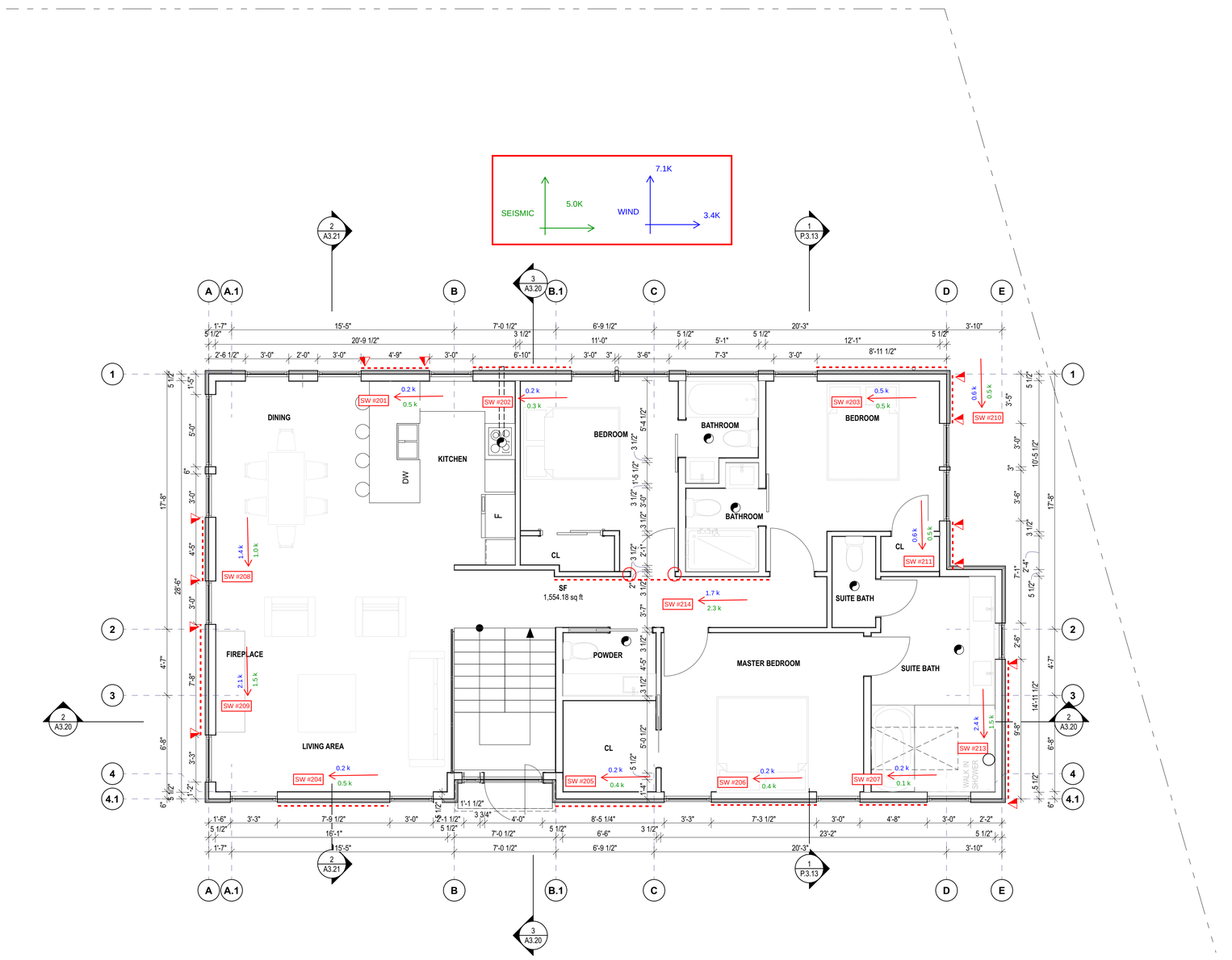
Professional Stamp

Issue ID	Issue Name	Issue Date

City Stamp

First Floor Plan

A2.01



4 SECOND FLOOR PLAN

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

0 2' 4' 8'

PLAN NOTES

1. PROPERTY LINE
2. ROOF/DECK ABOVE
3. PEDESTRIAN ACCESS
4. PROVIDE BICYCLE PARKING PER SMC 23.54.015.K. REFER TO A1.10 FOR SHORT-TERM AND LONG-TERM LOCATIONS AND COMPLIANCE CALCULATIONS.
5. STRUCTURE ABOVE, TYP
6. STRUCTURE BELOW, TYP
7. PROVIDE WHOLE HOUSE EXHAUST FAN WITH A NOISE RATING OF SONE 1.0 OR LESS THAT MEETS THE REQUIREMENTS OF SRC M1507.4. SEE A0.00 WHOLE HOUSE VENTILATION NOTE
8. PROVIDE ENVIRONMENTAL AIR EXHAUST OUTLETS AT FAN LOCATIONS. THEY SHALL BE PROVIDED A MIN OF 3 FEET FROM OPERABLE OPENINGS INTO THE BUILDING AND PROPERTY LINES PER SMC 501.3.
9. PER SRC TABLE M1502.4.4, AT KITCHENS, PROVIDE 100 CFM LOCAL EXHAUST FAN AT 0.25 W.G. OR GREATER. TO RUN INTERMITTENTLY.
10. PROVIDE GUARDRAIL AT MIN 36" A.F.F. PER SRC R312.1.2. OPENINGS SHALL BE 4" MAX PER SRC R312.1.3, TYP. REFER TO STRUCTURAL DRAWINGS 11/S4.3 FOR CONNECTION DETAIL AT EXTERIOR ATTACHMENTS TO THE STRUCTURE. AT ALL EXTERIOR LOCATIONS PROVIDE CONNECTION THROUGH VERTICAL WALL SURFACE ONLY, DO NOT PROVIDE CONNECTION THROUGH ROOF MEMBRANE OR PARAPET CAP OR OTHER FLASHING AT TOP OF WALL.
11. PROVIDE HANDRAIL AT 34" - 38" ABOVE TREAD PER SRC R311.7.8.1, 1 1/4" MIN - 1 1/2" MAX GRASP DIMENSION PER SRC R311.7.8.5, 1 1/2" CLEARANCE BETWEEN WALL AND HANDRAIL PER SRC R311.7.8.3 AND CONTINUITY PER R311.7.8.4, TYP.
12. PROVIDE (2) 1-HOUR WALLS BETWEEN DWELLING UNITS PER SRC R302.2.3. SEE W50, W51, AND W56 ON SHEET A8.00
13. PROVIDE 6'-8" MIN VERTICAL CLEARANCE TO FINISH AT ALL STAIRS PER SRC R311.7.2, TYP.
14. PER SRC R302.7, PROVIDE MIN 1/2" GYPSUM BOARD BENEATH STAIR AT ACCESSIBLE SPACE, TYP.
15. PROVIDE (1) LAYER 5/8" EXTERIOR TYPE 'X' GWB AT OVERHANG, TYP FOR 1-HOUR PROTECTION.
16. PROVIDE NON-COMBUSTIBLE STEEL CANOPY PROVIDED BY OTHERS OVER ENTRY DOOR FOR WEATHER PROTECTION, TYP. CANOPY TO PROJECT NO CLOSER THAN 3-FEET TO ANY PROPERTY LINE, PER SMC 23.45.518H.1. PAINT PER ELEVATIONS.
17. PROVIDE WOOD-FRAMED CANOPY PROJECTION ABOVE; TO PROJECT NO CLOSER THAN 3-FEET TO ANY PROPERTY LINE, PER SMC 23.45.518H.1. PAINT PER ELEVATIONS.
18. SIGHT TRIANGLE PER SMC 23.54.030.G
19. PROVIDE SHORING FOR EXCAVATION ADJACENT TO PROPERTY LINE, PER STRUCTURAL.
20. VEHICULAR ENTRY.
21. PROVIDE ROOF OVERHANG ABOVE, TYP, PER SMC 23.45.518.H
22. MIN 1/2" GYPSUM WALLBOARD WRAPPING WALLS SUPPORTING GARAGE OR COMMON AREA PER SRC R302.6
23. TREE PROTECTION AREA, REFER TO PLOT PLAN, SHEET A1.10, AND ARBORIST REPORT, SHEET A0.16
24. TREE DRIP LINE, REFER TO TREE PROTECTION PLAN, SHEET A1.10, PLOT PLAN, SHEET A1.10, AND ARBORIST REPORT, SHEET A0.16

X1.

X2. MIN 1/2" GYPSUM WALLBOARD WRAPPING POSTS SUPPORTING GARAGE OR COMMON AREA PER SRC R302.6

X3. MIN 1/2" GYPSUM WALLBOARD WRAPPING BEAMS SUPPORTING GARAGE OR COMMON AREA PER SRC R302.6

X4. MIN 1/2" GYPSUM WALLBOARD WRAPPING WALLS SUPPORTING GARAGE OR COMMON AREA PER SRC R302.6

X5. PROVIDE PLANTER, REFER TO L1 FOR PLANTING SCHEDULE.

X6.

X7. PROVIDE UNDER FLOOR VENT PER SRC R408. OPENING SHALL BE _" X _ " .

X8. PROVIDE 1'-6" X 2'-0" MIN CRAWL SPACE ACCESS HATCH PER SRC R408.4. PANEL TO ALIGN WITH FLOOR SUBSTRATE TO ALLOW FOR A SEAMLESS FLOOR FINISH.

X9. TREE PROTECTION AREA, REFER TO PLOT PLAN, SHEET A1.10, AND ARBORIST REPORT, SHEET A0.16

X10. TREE DRIP LINE, REFER TO TREE PROTECTION PLAN, SHEET A1.10, PLOT PLAN, SHEET A1.10, AND ARBORIST REPORT, SHEET A0.16

X11. PROPOSED DISTURBED AREA WITHIN TREE PROTECTION AREA, PER ARBORIST REPORT, SHEET A0.16.

X12. PLUMBING WASTE STACK

X13. RESTORE CURB CUT PER SDOT STANDARDS

X14. PROVIDE 10-FOOT NEW CURB CUT, PER SMC 23.54.030.F.1.B FOR DRIVEWAY ACCESS TO WOONERF AND UNIT PARKING

X15. HRV NOTE

X16.

X17. PROVIDE CANOPY, TYP., PER SMC 23.45.018.H

X18. ASSUMED PROPERTY LINE PER FUTURE UNIT LOT SUBDIVISION

X19. DUCTLESS HEAT PUMP CONDENSER

PLAN LEGEND

DOOR DESIGNATION 1.1

WINDOW DESIGNATION 1.1 — 3'-0" WINDOW WIDTH, 5'-0" WINDOW HEIGHT

XX / X.X DETAIL NUMBER / SHEET NUMBER

1-HOUR FIRE-RESISTANCE RATED CONSTRUCTION 2 X 4 FRAMING

1-HOUR FIRE-RESISTANCE RATED CONSTRUCTION 2 x 6 FRAMING

CAST-IN-PLACE CONCRETE WALL

PROVIDE (1) LAYER 5/8" EXTERIOR GWB AT OVERHANG

PROVIDE CMU WALL

W/D WASHING/ DRYER MACHINE (COMBO)

W WASHING MACHINE

D CLOTHES DRYER

XX / X.X SECTION MARKER

HWH ON-DEMAND HOT WATER HEATER

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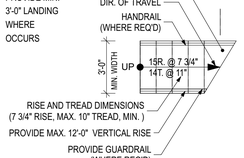

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#SDCI CN#

Professional Stamp

Issue ID	Issue Name	Issue Date

City Stamp

Second Floor Plan

A2.02

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

Shearwall Design Summary

M+K Project #: 300-25001
Engineer: MPM

Shearwall 201: 2nd - Kitcehn Rear Wall

Shearwall Properties:

Wall height, H	10.0	ft.	Max wall opening ht, H_o	0.0	ft.		
Wall Length, L	4.8	ft.	Qualifying Wall Length, L	4.8	ft.	Shearwall Assembly	P1

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
500 lbs	<	1124 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	200	plf	Overturning Moment	5.0	k-ft	Hold Down Design Load	607	lbs
DL at ends of wall	200	lbs	Resistive Moment	2.1	k-ft	Holdown Capacity	1705	lbs

Hold-down Specification

SIMPSON CS16 STRAP TIE (14" END LENGTH)

Shearwall 202: 2nd - Bedroom Rear Wall

Shearwall Properties:

Wall height, H	10.0	ft.	Max wall opening ht, Hc	0.0	ft.		
Wall Length, L	6.8	ft.	Qualifying Wall Length, L	6.8	ft.	Shearwall Assembly	P1

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
300 lbs	<	1631 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	200	plf	Overturning Moment	3.0	k-ft	Hold Down Design Load	0	lbs
DL at ends of wall	200	lbs	Resistive Moment	3.9	k-ft	Holdown Capacity	0	lbs

Hold-down Specification

No Holdown Required

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

Shearwall Design Summary

M+K Project #: 300-25001
Engineer: MPM

Shearwall 203: 2nd - Bedroom Rear Wall

Shearwall Properties:

Wall height, H	10.0	ft.	Max wall opening ht, H_c	0.0	ft.		
Wall Length, L	8.9	ft.	Qualifying Wall Length, L	8.9	ft.	Shearwall Assembly	P1

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
500 lbs	<	2135 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	180	plf	Overturning Moment	5.0	k-ft	Hold Down Design Load	0	lbs
DL at ends of wall	200	lbs	Resistive Moment	5.9	k-ft	Holdown Capacity	0	lbs

Hold-down Specification

No Holdown Required

Shearwall 204: 2nd - Living Area Front Wall

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	P1

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
500 lbs	<	1871 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	220	plf	Overturning Moment	5.0	k-ft	Hold Down Design Load	0	lbs
DL at ends of wall	200	lbs	Resistive Moment	5.4	k-ft	Holdown Capacity	0	lbs

Hold-down Specification

No Holdown Required

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

Shearwall Design Summary

M+K Project #: 300-25001
Engineer: MPM

Shearwall 205: 2nd - Closet Front Wall

Shearwall Properties:

Wall height, H	10.0	ft.	Max wall opening ht, H_c	0.0	ft.		
Wall Length, L	7.5	ft.	Qualifying Wall Length, L	7.5	ft.	Shearwall Assembly	P1

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
500 lbs	<	1799 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	220	plf	Overturning Moment	5.0	k-ft	Hold Down Design Load	0	lbs
DL at ends of wall	200	lbs	Resistive Moment	5.1	k-ft	Holdown Capacity	0	lbs

Hold-down Specification

No Holdown Required

Shearwall 206: 2nd - Master Bed Front Wall

Shearwall Properties:

Wall height, H	10.0	ft.	Max wall opening ht, Hc	0.0	ft.		
Wall Length, L	7.3	ft.	Qualifying Wall Length, L	7.3	ft.	Shearwall Assembly	P1

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
400 lbs	<	1739 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	220	plf	Overturning Moment	4.0	k-ft	Hold Down Design Load	0	lbs
DL at ends of wall	200	lbs	Resistive Moment	4.8	k-ft	Holdown Capacity	0	lbs

Hold-down Specification

No Holdown Required

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

Shearwall Design Summary

M+K Project #: 300-25001
Engineer: MPM

Shearwall 207: 2nd - Master Bath Front Wall

Shearwall Properties:

Wall height, H	10.0	ft.	Max wall opening ht, H_c	0.0	ft.		
Wall Length, L	4.7	ft.	Qualifying Wall Length, L	4.7	ft.	Shearwall Assembly	P1

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
100 lbs	<	1109 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	120	plf	Overturning Moment	1.0	k-ft	Hold Down Design Load	0	lbs
DL at ends of wall	200	lbs	Resistive Moment	1.5	k-ft	Holdown Capacity	0	lbs

Hold-down Specification

No Holdown Required

Shearwall 208: 2nd - Dining Side Wall

Shearwall Properties:

Wall height, H	10.0	ft.	Max wall opening ht, Hc	0.0	ft.		
Wall Length, L	4.4	ft.	Qualifying Wall Length, L	4.4	ft.	Shearwall Assembly	P1

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
1000 lbs	<	1019 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	10.0	k-ft	Hold Down Design Load	2128	lbs
DL at ends of wall	0	lbs	Resistive Moment	0.6	k-ft	Holdown Capacity	2655	lbs

Hold-down Specification

SIMPSON MSTC40 STRAP TIE (12" END LENGTH)

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

Shearwall Design Summary

M+K Project #: 300-25001
Engineer: MPM

Shearwall 209: 2nd - Fireplace Ext Wall

Shearwall Properties:

Wall height, H	10.0	ft.	Max wall opening ht, H_c	0.0	ft.		
Wall Length, L	7.7	ft.	Qualifying Wall Length, L	7.7	ft.	Shearwall Assembly	P1

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
1500 lbs	<	1847 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	15.0	k-ft	Hold Down Design Load	1694	lbs
DL at ends of wall	0	lbs	Resistive Moment	2.0	k-ft	Holdown Capacity	1705	lbs

Hold-down Specification

SIMPSON CS16 STRAP TIE (14" END LENGTH)

Shearwall : Basement - 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	0.0	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

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 300-25001
ENGINEER: MPM

SHEARWALL 210: 2ND - BEDROOM SIDE WALL

SHEARWALL PROPERTIES:

WALL HEIGHT, H	10.0	FT.	MAX WALL OPENING HT, H_c	0.0	FT.		
WALL LENGTH, L	3.4	FT.	QUALIFYING WALL LENGTH, L	3.4	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
500 LBS	<	720 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	5.0	K-FT	HOLD DOWN DESIGN LOAD	1358	LBS
DL AT ENDS OF WALL	0	LBS	RESISTIVE MOMENT	0.4	K-FT	HOLDOWN CAPACITY	3695	LBS

HOLD-DOWN SPECIFICATION

SIMPSON STHD14RJ HOLDOWN

SHEARWALL 211: 2ND - BEDROOM SIDE WALL

SHEARWALL PROPERTIES:

WALL HEIGHT, H	10.0	FT.	MAX WALL OPENING HT, Hc	0.0	FT.		
WALL LENGTH, L	3.4	FT.	QUALIFYING WALL LENGTH, L	3.4	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
500 LBS	<	720 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

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RESISTIVE DL	100	PLF	OVERTURNING MOMENT	5.0	K-FT	HOLD DOWN DESIGN LOAD	1358	LBS
DL AT ENDS OF WALL	0	LBS	RESISTIVE MOMENT	0.4	K-FT	HOLDOWN CAPACITY	3695	LBS

HOLD-DOWN SPECIFICATION

SIMPSON STHD14RJ HOLDOWN

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

Shearwall Design Summary

M+K Project #: 300-25001
Engineer: MPM

Shearwall : Basement -

Shearwall Properties:

Wall height, H	0.0	ft.	Max wall opening ht, H_c	0.0	ft.		
Wall Length, L	0.0	ft.	Qualifying Wall Length, L	0.0	ft.	Shearwall Assembly	0.0

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity	
0 lbs	####	#VALUE! lbs	

Shearwall Assembly Specification

#N/A
#N/A
#VALUE!

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	#N/A	lbs

Hold-down Specification

No Holdown Required

Shearwall 213: 2nd - Master Bath Side Wall

Shearwall Properties:

Wall height, H	10.0	ft.	Max wall opening ht, Hc	0.0	ft.		
Wall Length, L	9.7	ft.	Qualifying Wall Length, L	9.7	ft.	Shearwall Assembly	P1

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
1500 lbs	<	2327 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	15.0	k-ft	Hold Down Design Load	1226	lbs
DL at ends of wall	0	lbs	Resistive Moment	3.1	k-ft	Holdown Capacity	1705	lbs

Hold-down Specification

SIMPSON CS16 STRAP TIE (14" END LENGTH)

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

Shearwall Design Summary

M+K Project #: 300-25001
Engineer: MPM

Shearwall 214: 2nd - Int Hallway Wall

Shearwall Properties:

Wall height, H	10.0	ft.	Max wall opening ht, H_c	7.0	ft.		
Wall Length, L	14.8	ft.	Qualifying Wall Length, L	11.8	ft.	Shearwall Assembly	P1

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
2300 lbs	<	2830 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	320	plf	Overturning Moment	23.0	k-ft	Hold Down Design Load	0	lbs
DL at ends of wall	0	lbs	Resistive Moment	23.1	k-ft	Holdown Capacity	0	lbs

Hold-down Specification

No Holdown Required

Shearwall : Basement -

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	0.0

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
0 lbs	####	#VALUE! lbs

Shearwall Assembly Specification

#N/A
#N/A
#VALUE!

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	#N/A	lbs

Hold-down Specification

No Holdown Required

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 300-25001
ENGINEER: MPM

SHEARWALL 101: 1ST - REAR WALL

SHEARWALL PROPERTIES:

WALL HEIGHT, H	8.5	FT.	MAX WALL OPENING HT, H_c	0.0	FT.		
WALL LENGTH, L	5.1	FT.	QUALIFYING WALL LENGTH, L	5.1	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
400 LBS	<	1223 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	360	PLF	OVERTURNING MOMENT	3.4	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	500	LBS	RESISTIVE MOMENT	4.8	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 102: 1ST - GARAGE REAR WALL

SHEARWALL PROPERTIES:

WALL HEIGHT, H	8.5	FT.	MAX WALL OPENING HT, Hc	0.0	FT.		
WALL LENGTH, L	19.6	FT.	QUALIFYING WALL LENGTH, L	19.6	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
2000 LBS	<	4701 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	170	PLF	OVERTURNING MOMENT	17.0	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	500	LBS	RESISTIVE MOMENT	28.0	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

Shearwall Design Summary

M+K Project #: 300-25001
Engineer: MPM

Shearwall 103: 1st - Int Hallway Wall

Shearwall Properties:

Wall height, H	8.5	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	P3

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
2300 lbs	<	2701 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	700	plf	Overturning Moment	19.6	k-ft	Hold Down Design Load	1609	lbs
DL at ends of wall	400	lbs	Resistive Moment	9.9	k-ft	Holdown Capacity	3695	lbs

Hold-down Specification

SIMPSON STHD14RJ HOLDOWN

Shearwall : Basement - 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	P1

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
0 lbs	####	#DIV/0! lbs

Shearwall Assembly Specification

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

Overturning Evaluation:

Resistive DL	0	plf	Overturning Moment	0.0	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

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

Shearwall Design Summary

M+K Project #: 300-25001
Engineer: MPM

Shearwall 104: 1st - Bonus Room Side Wall

Shearwall Properties:

Wall height, H	3.3	ft.	Max wall opening ht, H_c	0.0	ft.		
Wall Length, L	10.4	ft.	Qualifying Wall Length, L	10.4	ft.	Shearwall Assembly	P3

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
3000 lbs	<	4681 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	9.9	k-ft	Hold Down Design Load	609	lbs
DL at ends of wall	0	lbs	Resistive Moment	3.6	k-ft	Holdown Capacity	3695	lbs

Hold-down Specification

Simpson STHD14RJ Holdown

Shearwall 105: 1st - Interior Garage Wall

Shearwall Properties:

Wall height, H	8.5	ft.	Max wall opening ht, Hc	7.0	ft.		
Wall Length, L	21.2	ft.	Qualifying Wall Length, L	18.0	ft.	Shearwall Assembly	P1

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
1100 lbs	<	4317 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	9.4	k-ft	Hold Down Design Load	0	lbs
DL at ends of wall	680	lbs	Resistive Moment	24.3	k-ft	Holdown Capacity	0	lbs

Hold-down Specification

No Holdown Required