



MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

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CALCULATION PACKAGE

March 27, 2025

MacPherson Construction & Design

5330 Butterworth Rd – North Lot
Mercer Island, WA

MULHERN & KULP STRUCTURAL ENGINEERING, INC.

Prepared By:

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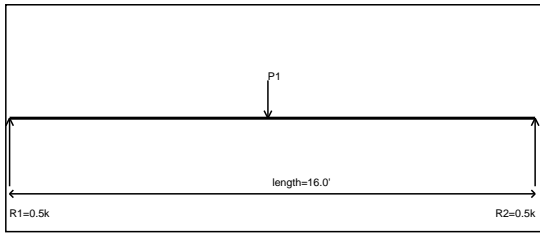
Nicholas J. Martignetti, P.E. *Associate Owner + San Diego Office Director*



Signature, Seal & Date

BEAM & HEADER CALCULATIONS

Description - Low Roof Framing Plan - H10-1 - Header



P1 = 0.98 K (7.9')

Controlling Load Combination/ Cd

V = (D + S) Cd=1.15

M = (D + S) Cd=1.15

Δ = (D + S)

V = 0.50k Vall = 13.41k Ratio = 0.04

M = 3.91k-ft Mall = 30.36k-ft Ratio = 0.13

Deflection

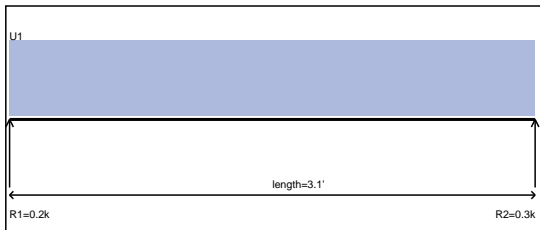
TL = 0.13" L/999+ > L/240 min

DL = 0.04"

L = 0.00" L/999+ > L/360 min

5-1/2x12 GLB

Description - Low Roof Framing Plan - B10-1 - Flush



Uniform 1 = 0.19 klf (0.0'-3.1')

Controlling Load Combination/ Cd

V = (D + S) Cd=1.15

M = D Cd=0.9

Δ = NA

V = 0.29k Vall = 0 k Ratio = 0

M = 0.06k-ft Mall = 0 k-ft Ratio = 0

Deflection

TL = NA L/NA > L/240 min

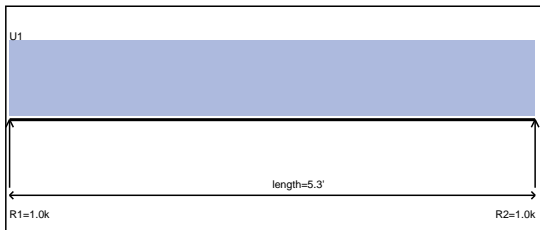
DL = NA

L = NA L/NA > L/360 min

SEE ENERCALC OUTPUT

Refer to External Design

Description - Low Roof Framing Plan - B10-2 - Flush



Uniform 1 = 0.37 klf (0.0'-5.3')

Controlling Load Combination/ Cd

V = (D + S) Cd=1.15

M = (D + S) Cd=1.15

Δ = (D + S)

V = 0.98k Vall = 2.50k Ratio = 0.39

M = 1.30k-ft Mall = 2.57k-ft Ratio = 0.51

Deflection

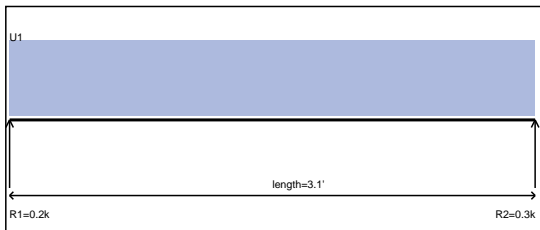
TL = 0.05" L/999+ > L/240 min

DL = 0.02"

L = 0.00" L/999+ > L/360 min

(2)2x8 HF #2

Description - Low Roof Framing Plan - B10-3 - Flush



Uniform 1 = 0.18 klf (0.0'-3.1')

Controlling Load Combination/ Cd

V = (D + S) Cd=1.15

M = D Cd=0.9

Δ = NA

V = 0.28k Vall = 0 k Ratio = 0

M = 0.07k-ft Mall = 0 k-ft Ratio = 0

Deflection

TL = NA L/NA > L/240 min

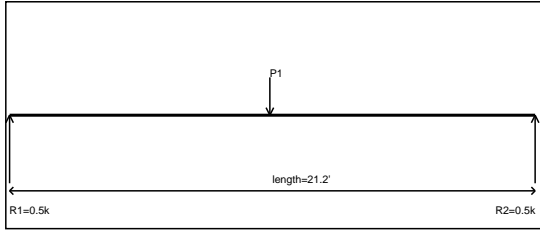
DL = NA

L = NA L/NA > L/360 min

SEE ENERCALC OUTPUT

Refer to External Design

Description - Low Roof Framing Plan - B10-4 - Flush



P1 = 0.98 K (10.5')

Controlling Load Combination/ Cd

V = (D + S) Cd= NA

M = (D + S) Cd= NA

Δ = (D + S)

V = 0.49k	Vall = 26.80k	Ratio = 0.02
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M = 5.19k-ft	Mall = 21.90k-ft	Ratio = 0.24
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Deflection

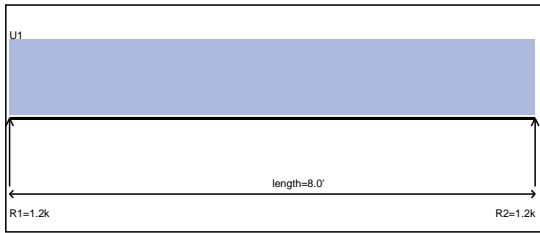
TL = 0.47" L/541 > L/240 min

DL = 0.13"

L = 0.00" L/999+ > L/360 min

W8x10 Steel

Description - Angled Roof Framing Plan - H8-1 - Header



Uniform 1 = 0.29 klf (0.0'-8.0')

Controlling Load Combination/ Cd

V = (D + S) Cd=1.15

M = (D + S) Cd=1.15

Δ = (D + S)

V = 1.16k	Vall = 3.50k	Ratio = 0.33
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M = 2.33k-ft	Mall = 3.44k-ft	Ratio = 0.68
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Deflection

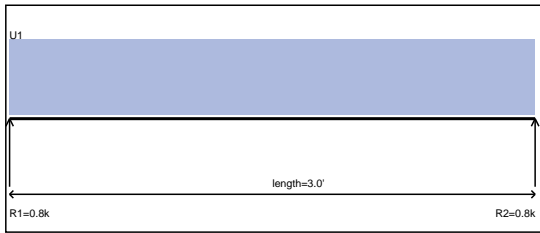
TL = 0.15" L/637 > L/240 min

DL = 0.04"

L = 0.00" L/999+ > L/360 min

4x8 DF #2

Description - Angled Roof Framing Plan - H8-2 - Header



Uniform 1 = 0.49 klf (0.0'-3.0')

Controlling Load Combination/ Cd

V = (D + S) Cd=1.15

M = (D + S) Cd=1.15

Δ = (D + S)

V = 0.74k	Vall = 3.50k	Ratio = 0.21
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M = 0.55k-ft	Mall = 3.44k-ft	Ratio = 0.16
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Deflection

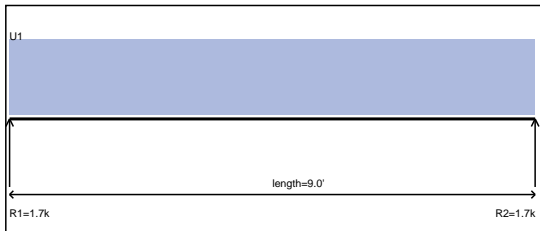
TL = 0.01" L/999+ > L/240 min

DL = 0.00"

L = 0.00" L/999+ > L/360 min

4x8 DF #2

Description - Angled Roof Framing Plan - H8-3 - Header



Uniform 1 = 0.37 klf (0.0'-9.0')

Controlling Load Combination/ Cd

V = (D + S) Cd=1.15

M = (D + S) Cd=1.15

Δ = (D + S)

V = 1.69k	Vall = 5.33k	Ratio = 0.32
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M = 3.79k-ft	Mall = 7.55k-ft	Ratio = 0.50
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Deflection

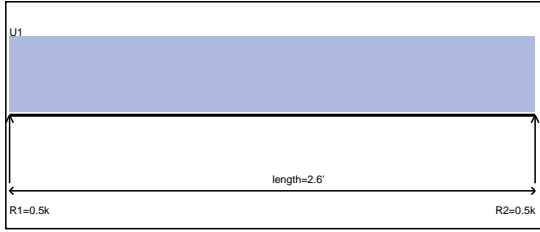
TL = 0.25" L/433 > L/240 min

DL = 0.07"

L = 0.00" L/999+ > L/360 min

3-1/2x7-1/2 GLB

Description - Angled Roof Framing Plan - H8-4 - Header



Uniform 1 = 0.33 klf (0.0'-2.6')

Controlling Load Combination/ Cd

$V = (D + S) \quad Cd=1.15$

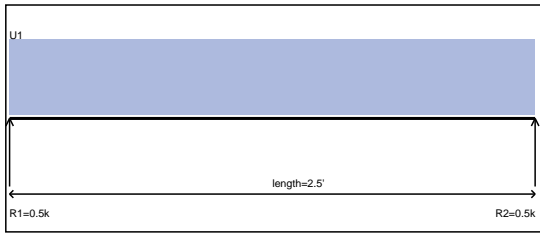
$M = (D + S) \quad Cd=1.15$

$\Delta = (D + S)$

V = 0.43k	Vall = 3.50k	Ratio = 0.12
M = 0.28k-ft	Mall = 3.44k-ft	Ratio = 0.08
Deflection		
TL = 0.00" L/999+ > L/240 min		
DL = 0.00"		
L = 0.00" L/999+ > L/360 min		

4x8 DF #2

Description - Angled Roof Framing Plan - H8-5 - Header



Uniform 1 = 0.33 klf (0.0'-2.5')

Controlling Load Combination/ Cd

$V = (D + S) \quad Cd=1.15$

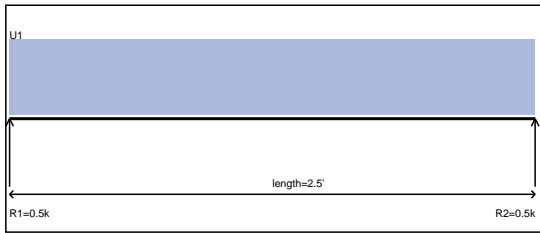
$M = (D + S) \quad Cd=1.15$

$\Delta = (D + S)$

V = 0.42k	Vall = 3.50k	Ratio = 0.12
M = 0.26k-ft	Mall = 3.44k-ft	Ratio = 0.08
Deflection		
TL = 0.00" L/999+ > L/240 min		
DL = 0.00"		
L = 0.00" L/999+ > L/360 min		

4x8 DF #2

Description - Angled Roof Framing Plan - H8-6 - Header



Uniform 1 = 0.33 klf (0.0'-2.5')

Controlling Load Combination/ Cd

$V = (D + S) \quad Cd=1.15$

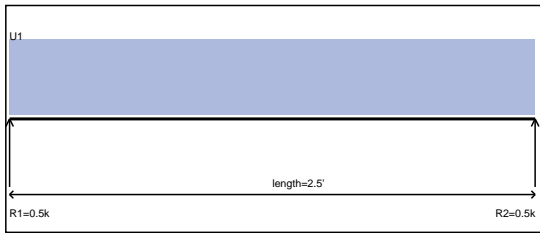
$M = (D + S) \quad Cd=1.15$

$\Delta = (D + S)$

V = 0.42k	Vall = 3.50k	Ratio = 0.12
M = 0.26k-ft	Mall = 3.44k-ft	Ratio = 0.08
Deflection		
TL = 0.00" L/999+ > L/240 min		
DL = 0.00"		
L = 0.00" L/999+ > L/360 min		

4x8 DF #2

Description - Angled Roof Framing Plan - H8-7 - Header



Uniform 1 = 0.33 klf (0.0'-2.5')

Controlling Load Combination/ Cd

$V = (D + S) \quad Cd=1.15$

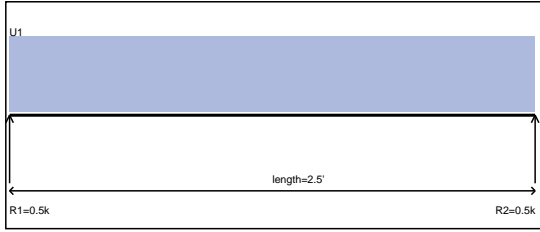
$M = (D + S) \quad Cd=1.15$

$\Delta = (D + S)$

V = 0.42k	Vall = 3.50k	Ratio = 0.12
M = 0.26k-ft	Mall = 3.44k-ft	Ratio = 0.08
Deflection		
TL = 0.00" L/999+ > L/240 min		
DL = 0.00"		
L = 0.00" L/999+ > L/360 min		

4x8 DF #2

Description - Angled Roof Framing Plan - H8-8 - Header



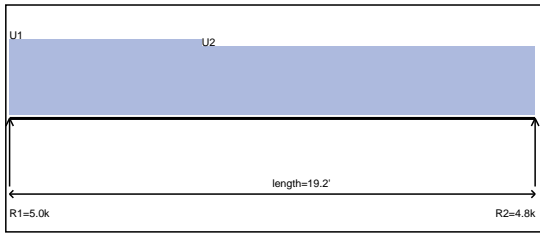
Uniform 1 = 0.38 klf (0.0'-2.5')

Controlling Load Combination/ Cd
 $V = (D + S) \quad Cd=1.15$
 $M = (D + S) \quad Cd=1.15$
 $\Delta = (D + S)$

V = 0.47k	Vall = 3.50k	Ratio = 0.13
M = 0.29k-ft	Mall = 3.44k-ft	Ratio = 0.09
Deflection		
TL = 0.00" L/999+ > L/240 min		
DL = 0.00"		
L = 0.00" L/999+ > L/360 min		

4x8 DF #2

Description - Angled Roof Framing Plan - B8-1 - Flush



Uniform 1 = 0.54 klf (0.0'-7.0')

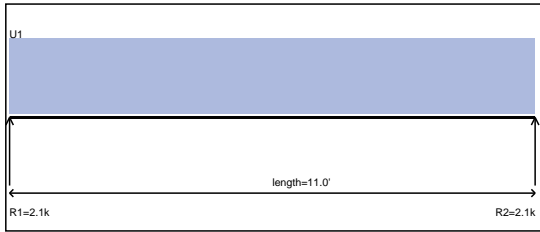
Uniform 2 = 0.49 klf (7.0'-19.2')

Controlling Load Combination/ Cd
 $V = (D + S) \quad Cd=NA$
 $M = (D + S) \quad Cd=NA$
 $\Delta = (D + S)$

V = 4.98k	Vall = 49.00k	Ratio = 0.10
M = 23.25k-ft	Mall = 64.90k-ft	Ratio = 0.36
Deflection		
TL = 0.45" L/512 > L/240 min		
DL = 0.13"		
L = 0.00" L/999+ > L/360 min		

W10x22 Steel

Description - Angled Roof Framing Plan - B8-2 - Flush



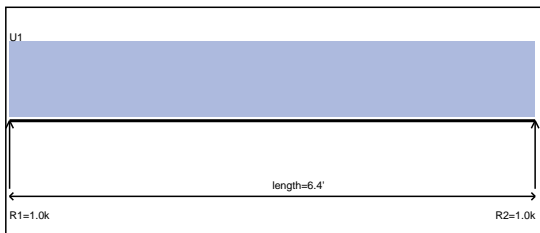
Uniform 1 = 0.38 klf (0.0'-11.0')

Controlling Load Combination/ Cd
 $V = (D + S) \quad Cd=1.15$
 $M = (D + S) \quad Cd=1.15$
 $\Delta = (D + S)$

V = 2.07k	Vall = 9.08k	Ratio = 0.23
M = 5.69k-ft	Mall = 20.50k-ft	Ratio = 0.28
Deflection		
TL = 0.13" L/989 > L/240 min		
DL = 0.04"		
L = 0.00" L/999+ > L/360 min		

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

Description - Angled Roof Framing Plan - B8-3 - Flush



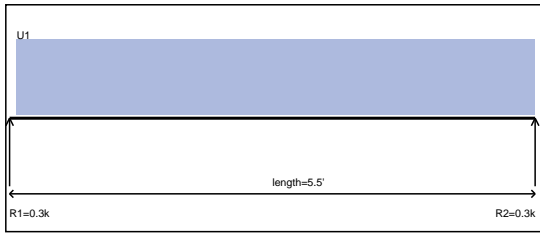
Uniform 1 = 0.31 klf (0.0'-6.4')

Controlling Load Combination/ Cd
 $V = (D + S) \quad Cd=1.15$
 $M = (D + S) \quad Cd=1.15$
 $\Delta = (D + S)$

V = 0.99k	Vall = 4.54k	Ratio = 0.22
M = 1.59k-ft	Mall = 10.25k-ft	Ratio = 0.16
Deflection		
TL = 0.03" L/999+ > L/240 min		
DL = 0.01"		
L = 0.00" L/999+ > L/360 min		

1-3/4x11-7/8 LVL

Description - Angled Upper Floor Framing Plan - H7-1 - Header



Uniform 1 = 0.10 klf (0.1'-5.5')

Controlling Load Combination/ Cd

$V = D \quad Cd=0.9$

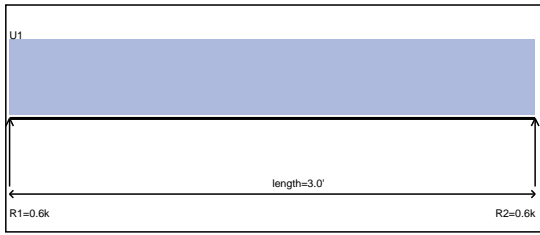
$M = D \quad Cd=0.9$

$\Delta = D$

V = 0.27k	Vall = 2.74k	Ratio = 0.10
M = 0.38k-ft	Mall = 2.69k-ft	Ratio = 0.14
Deflection		
TL = 0.01" L/999+ > L/240 min		
DL = 0.01"		
L = 0.00" L/999+ > L/360 min		

4x8 DF #2

Description - Angled Upper Floor Framing Plan - H7-2 - Header



Uniform 1 = 0.35 klf (0.0'-3.0')

Controlling Load Combination/ Cd

$V = (D + L) \quad Cd=1$

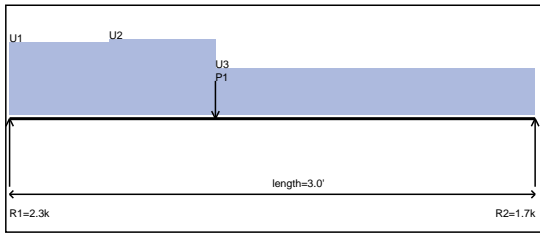
$M = (D + L) \quad Cd=1$

$\Delta = (D + L)$

V = 0.52k	Vall = 3.04k	Ratio = 0.17
M = 0.39k-ft	Mall = 2.99k-ft	Ratio = 0.13
Deflection		
TL = 0.00" L/999+ > L/240 min		
DL = 0.00"		
L = 0.00" L/999+ > L/360 min		

4x8 DF #2

Description - Angled Upper Floor Framing Plan - H7-3 - Header



Uniform 1 = 0.96 klf (0.0'-0.6')

P1 = 1.69 K (1.2')

Uniform 2 = 1.00 klf (0.6'-1.2')

Uniform 3 = 0.62 klf (1.2'-3.0')

Controlling Load Combination/ Cd

$V = (D + 0.75 * (L + S)) \quad Cd=1.15$

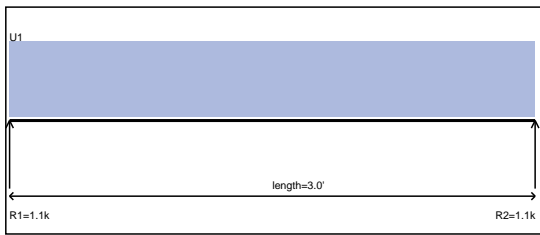
$M = (D + 0.75 * (L + S)) \quad Cd=1.15$

$\Delta = (D + 0.75 * (L + S))$

V = 1.91k	Vall = 3.50k	Ratio = 0.55
M = 1.68k-ft	Mall = 3.44k-ft	Ratio = 0.49
Deflection		
TL = 0.02" L/999+ > L/240 min		
DL = 0.01"		
L = 0.00" L/999+ > L/360 min		

4x8 DF #2

Description - Angled Upper Floor Framing Plan - H7-4 - Header



Uniform 1 = 0.69 klf (0.0'-3.0')

Controlling Load Combination/ Cd

$V = (D + L) \quad Cd=1$

$M = (D + L) \quad Cd=1$

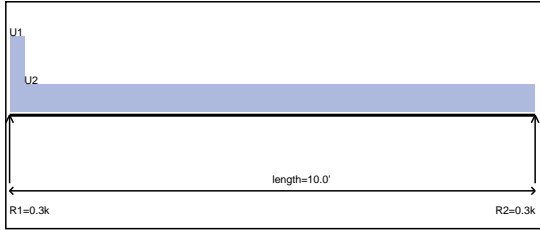
$\Delta = (D + L)$

V = 1.04k	Vall = 3.04k	Ratio = 0.34
M = 0.78k-ft	Mall = 2.99k-ft	Ratio = 0.26
Deflection		
TL = 0.01" L/999+ > L/240 min		
DL = 0.00"		
L = 0.00" L/999+ > L/360 min		

4x8 DF #2



Description - Angled Upper Floor Framing Plan - H7-5 - Header



Uniform 1 = 0.11 klf (0.0'-0.3')

Uniform 2 = 0.04 klf (0.3'-10.0')

Controlling Load Combination/ Cd

$V = (D + S) \quad Cd=1.15$

$M = (D + S) \quad Cd=1.15$

$\Delta = (D + S)$

V = 0.21k	Vall = 4.47k	Ratio = 0.05
M = 0.52k-ft	Mall = 5.17k-ft	Ratio = 0.10

Deflection

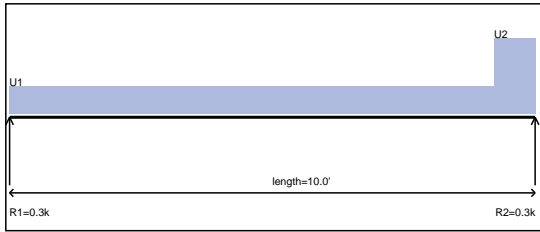
TL = 0.03" L/999+ > L/240 min

DL = 0.01"

L = 0.00" L/999+ > L/360 min

4x10 DF #2

Description - Angled Upper Floor Framing Plan - H7-6 - Header



Uniform 1 = 0.04 klf (0.0'-9.2')

Uniform 2 = 0.11 klf (9.2'-10.0')

Controlling Load Combination/ Cd

$V = (D + S) \quad Cd=1.15$

$M = (D + S) \quad Cd=1.15$

$\Delta = (D + S)$

V = 0.22k	Vall = 4.47k	Ratio = 0.05
M = 0.52k-ft	Mall = 5.17k-ft	Ratio = 0.10

Deflection

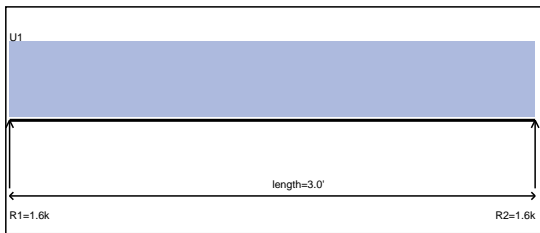
TL = 0.03" L/999+ > L/240 min

DL = 0.01"

L = 0.00" L/999+ > L/360 min

4x10 DF #2

Description - Angled Upper Floor Framing Plan - H7-7 - Header



Uniform 1 = 1.07 klf (0.0'-3.0')

Controlling Load Combination/ Cd

$V = (D + L) \quad Cd=1$

$M = (D + L) \quad Cd=1$

$\Delta = (D + 0.75 * (L + S))$

V = 1.20k	Vall = 3.04k	Ratio = 0.39
M = 0.90k-ft	Mall = 2.99k-ft	Ratio = 0.30

Deflection

TL = 0.01" L/999+ > L/240 min

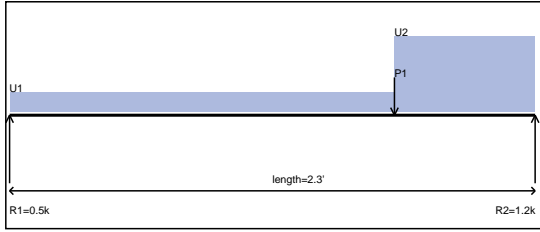
DL = 0.00"

L = 0.00" L/999+ > L/360 min

4x8 DF #2



Description - Angled Upper Floor Framing Plan - B7-1 - Flush



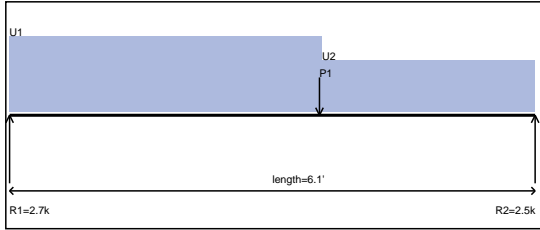
Uniform 1 = 0.10 klf (0.0'-1.6') P1 = 1.16 K (1.6')
Uniform 2 = 0.39 klf (1.6'-2.3')

Controlling Load Combination/ Cd
V = (D + S) Cd=1.15
M = (D + S) Cd=1.15
 $\Delta = (D + S)$

V = 1.12k	Vall = 12.80k	Ratio = 0.09
M = 0.60k-ft	Mall = 43.47k-ft	Ratio = 0.01
Deflection		
TL = 0.00" L/999+ > L/240 min		
DL = 0.00"		
L = 0.00" L/999+ > L/360 min		

3-1/2x18 GLB

Description - Angled Upper Floor Framing Plan - B7-2 - Flush



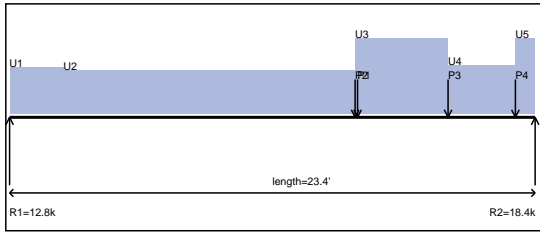
Uniform 1 = 0.75 klf (0.0'-3.6') P1 = 1.12 K (3.6')
Uniform 2 = 0.51 klf (3.6'-6.1')

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

V = 2.35k	Vall = 11.13k	Ratio = 0.21
M = 3.67k-ft	Mall = 37.80k-ft	Ratio = 0.10
Deflection		
TL = 0.01" L/999+ > L/240 min		
DL = 0.00"		
L = 0.01" L/999+ > L/360 min		

3-1/2x18 GLB

Description - Angled Upper Floor Framing Plan - B7-3 - Flush



Uniform 1 = 0.84 klf (0.0'-2.4') P1 = 3.21 K (15.5')
Uniform 2 = 0.78 klf (2.4'-15.4') P2 = 4.79 K (15.4')
Uniform 3 = 1.37 klf (15.4'-19.5') P3 = 0.74 K (19.5')
Uniform 4 = 0.88 klf (19.5'-22.5') P4 = 0.74 K (22.5')
Uniform 5 = 1.37 klf (22.5'-23.4')

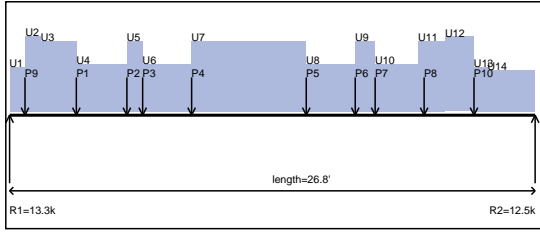
Controlling Load Combination/ Cd
V = (D + 0.75 * (L + S)) Cd= NA
M = (D + 0.75 * (L + S)) Cd= NA
 $\Delta = (D + 0.75 * (L + S))$

V = 15.17k	Vall = 111.00k	Ratio = 0.14
M = 84.67k-ft	Mall = 205.00k-ft	Ratio = 0.41
Deflection		
TL = 0.49" L/572 > L/240 min		
DL = 0.18"		
L = 0.28" L/999+ > L/360 min		

W16x45 Steel



Description - Angled Upper Floor Framing Plan - B7-4 - Flush



- | | |
|-------------------------------------|----------------------|
| Uniform 1 = 0.63 klf (0.0'-0.8') | P1 = 0.43 K (3.4') |
| Uniform 2 = 1.07 klf (0.8'-1.6') | P2 = 0.43 K (6.0') |
| Uniform 3 = 1.00 klf (1.6'-3.4') | P3 = 0.42 K (6.8') |
| Uniform 4 = 0.67 klf (3.4'-6.0') | P4 = 0.42 K (9.3') |
| Uniform 5 = 1.00 klf (6.0'-6.8') | P5 = 0.42 K (15.1') |
| Uniform 6 = 0.67 klf (6.8'-9.3') | P6 = 0.42 K (17.6') |
| Uniform 7 = 1.00 klf (9.3'-15.1') | P7 = 0.42 K (18.7') |
| Uniform 8 = 0.67 klf (15.1'-17.6') | P8 = 0.42 K (21.2') |
| Uniform 9 = 1.00 klf (17.6'-18.7') | P9 = 0.11 K (0.8') |
| Uniform 10 = 0.67 klf (18.7'-20.9') | P10 = 0.11 K (23.7') |
| Uniform 11 = 1.00 klf (20.9'-22.2') | |
| Uniform 12 = 1.06 klf (22.2'-23.7') | |
| Uniform 13 = 0.63 klf (23.7'-24.4') | |
| Uniform 14 = 0.59 klf (24.4'-26.8') | |

Controlling Load Combination/ Cd

$V = (D + 0.75 * (L + S))$ Cd= NA

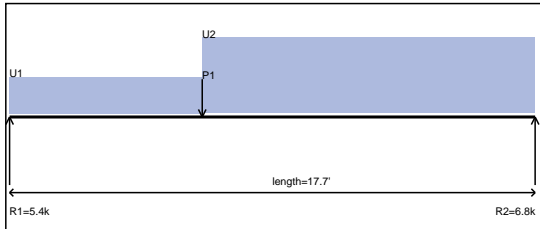
$M = (D + 0.75 * (L + S))$ Cd= NA

$\Delta = (D + 0.75 * (L + S))$

V = 11.10k	Vall = 111.00k	Ratio = 0.10
M = 75.10k-ft	Mall = 205.00k-ft	Ratio = 0.37
Deflection		
TL = 0.57" L/563 > L/240 min		
DL = 0.24"		
L = 0.26" L/999+ > L/360 min		

W16x45 Steel

Description - Angled Upper Floor Framing Plan - B7-5 - Flush



- | | |
|-----------------------------------|--------------------|
| Uniform 1 = 0.37 klf (0.0'-6.5') | P1 = 0.99 K (6.5') |
| Uniform 2 = 0.77 klf (6.5'-17.7') | |

Controlling Load Combination/ Cd

$V = (D + 0.75 * (L + S))$ Cd=1.15

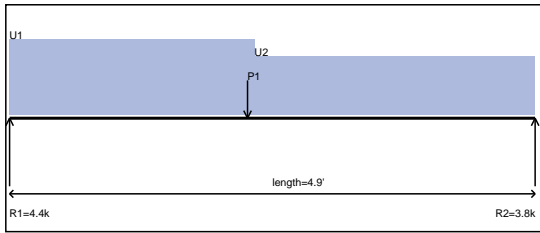
$M = (D + 0.75 * (L + S))$ Cd=1.15

$\Delta = (D + 0.75 * (L + S))$

V = 5.65k	Vall = 12.80k	Ratio = 0.44
M = 24.46k-ft	Mall = 43.47k-ft	Ratio = 0.56
Deflection		
TL = 0.45" L/472 > L/240 min		
DL = 0.19"		
L = 0.19" L/999+ > L/360 min		

3-1/2x18 GLB

Description - Angled Main Floor Framing Plan - B6-1 - Dropped



Uniform 1 = 1.38 klf (0.0'-2.3') P1 = 2.07 K (2.2')
Uniform 2 = 1.07 klf (2.3'-4.9')

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

V = 3.60k	Vall = 4.47k	Ratio = 0.81
M = 5.16k-ft	Mall = 5.17k-ft	Ratio = 1.00
Deflection		
TL = 0.06" L/971 > L/240 min		
DL = 0.02"		
L = 0.02" L/999+ > L/360 min		

4x10 DF #2

Description - Angled Main Floor Framing Plan - B6-2 - Dropped



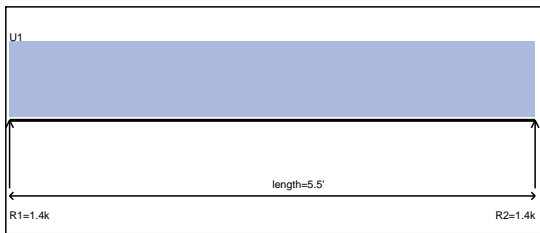
Uniform 1 = 0.51 klf (0.0'-3.7')
Uniform 2 = 1.38 klf (3.7'-4.1')

Controlling Load Combination/ Cd
 $V = (D + L)$ Cd=1
 $M = (D + L)$ Cd=1
 $\Delta = (D + L)$

V = 1.26k	Vall = 3.88k	Ratio = 0.33
M = 1.08k-ft	Mall = 4.49k-ft	Ratio = 0.24
Deflection		
TL = 0.01" L/999+ > L/240 min		
DL = 0.00"		
L = 0.01" L/999+ > L/360 min		

4x10 DF #2

Description - Angled Main Floor Framing Plan - B6-3 - Dropped



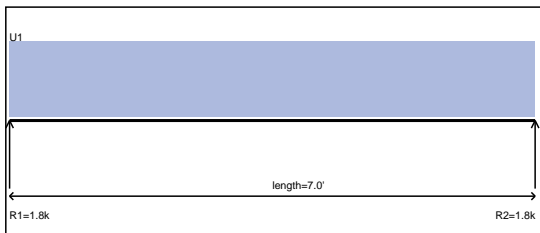
Uniform 1 = 0.51 klf (0.0'-5.5')

Controlling Load Combination/ Cd
 $V = (D + L)$ Cd=1
 $M = (D + L)$ Cd=1
 $\Delta = (D + L)$

V = 1.40k	Vall = 3.88k	Ratio = 0.36
M = 1.92k-ft	Mall = 4.49k-ft	Ratio = 0.43
Deflection		
TL = 0.03" L/999+ > L/240 min		
DL = 0.01"		
L = 0.02" L/999+ > L/360 min		

4x10 DF #2

Description - Angled Main Floor Framing Plan - B6-4 - Dropped



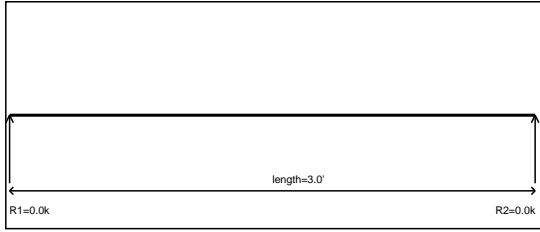
Uniform 1 = 0.51 klf (0.0'-7.0')

Controlling Load Combination/ Cd
 $V = (D + L)$ Cd=1
 $M = (D + L)$ Cd=1
 $\Delta = (D + L)$

V = 1.78k	Vall = 3.88k	Ratio = 0.46
M = 3.11k-ft	Mall = 4.49k-ft	Ratio = 0.69
Deflection		
TL = 0.07" L/999+ > L/240 min		
DL = 0.01"		
L = 0.06" L/999+ > L/360 min		

4x10 DF #2

Description - Roof Framing Plan - H3-1 - Header

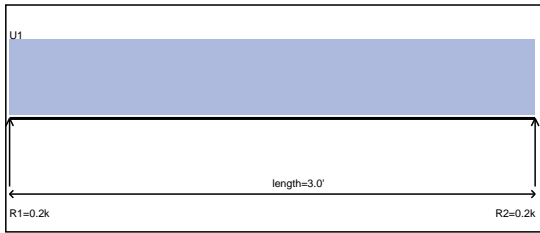


Controlling Load Combination/ Cd
V = NA Cd=1
M = NA Cd=1
 Δ = NA

V = 0.00k	Vall = 3.04k	Ratio = 0
M = 0.00k-ft	Mall = 2.99k-ft	Ratio = 0
Deflection		
TL = 0" L/ NA > L/240 min		
DL = 0"		
L = 0" L/ NA > L/360 min		

4x8 DF #2

Description - Roof Framing Plan - H3-2 - Header



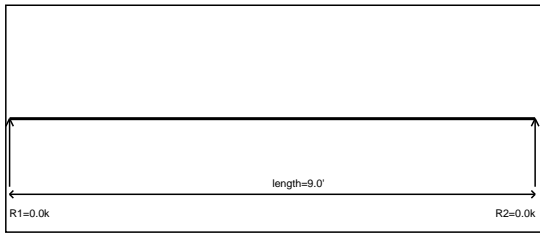
Uniform 1 = 0.09 klf (0.0'-3.0')

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

V = 0.14k	Vall = 3.50k	Ratio = 0.04
M = 0.10k-ft	Mall = 3.44k-ft	Ratio = 0.03
Deflection		
TL = 0.00" L/999+ > L/240 min		
DL = 0.00"		
L = 0.00" L/999+ > L/360 min		

4x8 DF #2

Description - Roof Framing Plan - H3-3 - Header

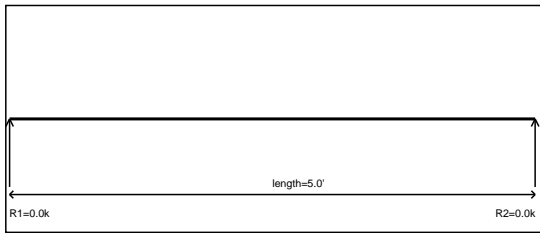


Controlling Load Combination/ Cd
V = NA Cd=1
M = NA Cd=1
 Δ = NA

V = 0.00k	Vall = 3.04k	Ratio = 0
M = 0.00k-ft	Mall = 2.99k-ft	Ratio = 0
Deflection		
TL = 0" L/ NA > L/240 min		
DL = 0"		
L = 0" L/ NA > L/360 min		

4x8 DF #2

Description - Roof Framing Plan - H3-4 - Header

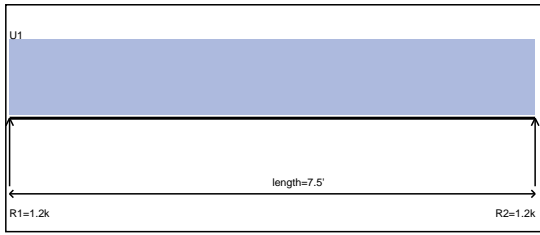


Controlling Load Combination/ Cd
V = NA Cd=1
M = NA Cd=1
 Δ = NA

V = 0.00k	Vall = 3.04k	Ratio = 0
M = 0.00k-ft	Mall = 2.99k-ft	Ratio = 0
Deflection		
TL = 0" L/ NA > L/240 min		
DL = 0"		
L = 0" L/ NA > L/360 min		

4x8 DF #2

Description - Roof Framing Plan - H3-5 - Header



Uniform 1 = 0.31 klf (0.0'-7.5')

Controlling Load Combination/ Cd

V = (D + S) Cd=1.15

M = (D + S) Cd=1.15

Δ = (D + S)

V = 1.16k	Vall = 3.50k	Ratio = 0.33
M = 2.17k-ft	Mall = 3.44k-ft	Ratio = 0.63

Deflection

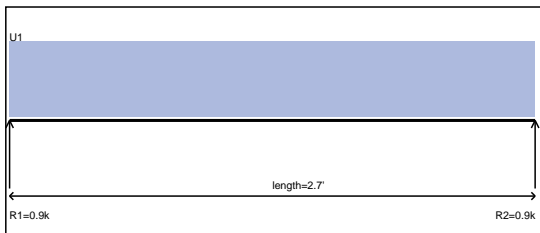
TL = 0.12" L/730 > L/240 min

DL = 0.04"

L = 0.00" L/999+ > L/360 min

4x8 DF #2

Description - Roof Framing Plan - H3-6 - Header



Uniform 1 = 0.61 klf (0.0'-2.7')

Controlling Load Combination/ Cd

V = (D + S) Cd=1.15

M = (D + S) Cd=1.15

Δ = (D + S)

V = 0.80k	Vall = 3.50k	Ratio = 0.23
M = 0.54k-ft	Mall = 3.44k-ft	Ratio = 0.16

Deflection

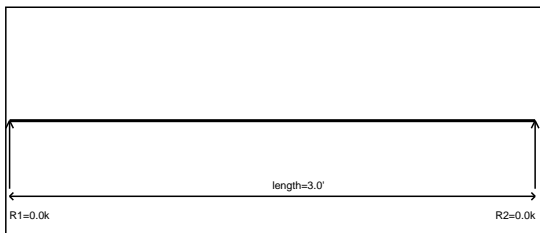
TL = 0.00" L/999+ > L/240 min

DL = 0.00"

L = 0.00" L/999+ > L/360 min

4x8 DF #2

Description - Roof Framing Plan - H3-7 - Header



Controlling Load Combination/ Cd

V = NA Cd=1

M = NA Cd=1

Δ = NA

V = 0.00k	Vall = 3.04k	Ratio = 0
M = 0.00k-ft	Mall = 2.99k-ft	Ratio = 0

Deflection

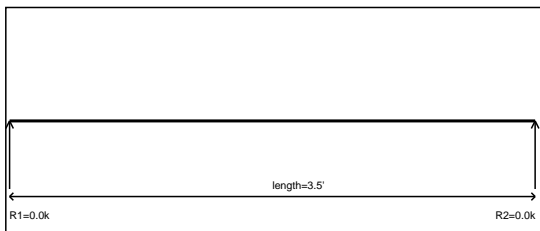
TL = 0" L/NA > L/240 min

DL = 0"

L = 0" L/NA > L/360 min

4x8 DF #2

Description - Roof Framing Plan - H3-8 - Header



Controlling Load Combination/ Cd

V = NA Cd=1

M = NA Cd=1

Δ = NA

V = 0.00k	Vall = 3.04k	Ratio = 0
M = 0.00k-ft	Mall = 2.99k-ft	Ratio = 0

Deflection

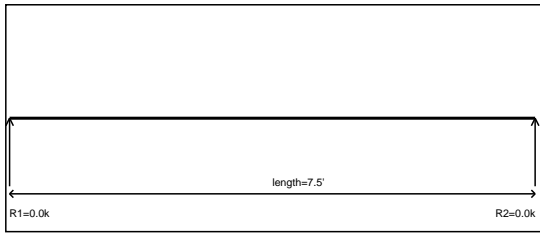
TL = 0" L/NA > L/240 min

DL = 0"

L = 0" L/NA > L/360 min

4x8 DF #2

Description - Roof Framing Plan - H3-9 - Header



Controlling Load Combination/ Cd

V = NA Cd=1

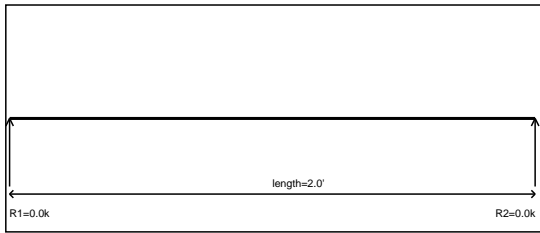
M = NA Cd=1

Δ = NA

V = 0.00k	Vall = 3.04k	Ratio = 0
M = 0.00k-ft	Mall = 2.99k-ft	Ratio = 0
Deflection		
TL = 0 " L/ NA > L/240 min		
DL = 0 "		
L = 0 " L/ NA > L/360 min		

4x8 DF #2

Description - Roof Framing Plan - H3-10 - Header



Controlling Load Combination/ Cd

V = NA Cd=1

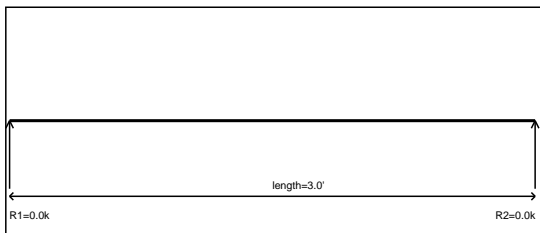
M = NA Cd=1

Δ = NA

V = 0.00k	Vall = 3.04k	Ratio = 0
M = 0.00k-ft	Mall = 2.99k-ft	Ratio = 0
Deflection		
TL = 0 " L/ NA > L/240 min		
DL = 0 "		
L = 0 " L/ NA > L/360 min		

4x8 DF #2

Description - Roof Framing Plan - H3-11 - Header



Controlling Load Combination/ Cd

V = NA Cd=1

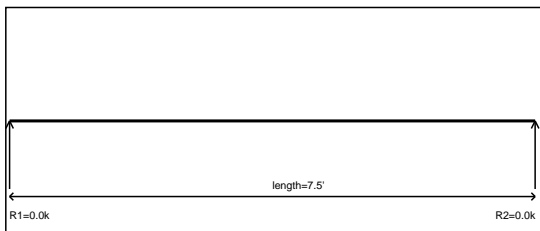
M = NA Cd=1

Δ = NA

V = 0.00k	Vall = 3.04k	Ratio = 0
M = 0.00k-ft	Mall = 2.99k-ft	Ratio = 0
Deflection		
TL = 0 " L/ NA > L/240 min		
DL = 0 "		
L = 0 " L/ NA > L/360 min		

4x8 DF #2

Description - Roof Framing Plan - H3-12 - Header



Controlling Load Combination/ Cd

V = NA Cd=1

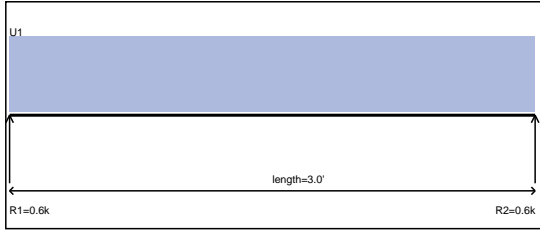
M = NA Cd=1

Δ = NA

V = 0.00k	Vall = 3.04k	Ratio = 0
M = 0.00k-ft	Mall = 2.99k-ft	Ratio = 0
Deflection		
TL = 0 " L/ NA > L/240 min		
DL = 0 "		
L = 0 " L/ NA > L/360 min		

4x8 DF #2

Description - Roof Framing Plan - H3-13 - Header



Uniform 1 = 0.34 klf (0.0'-3.0')

Controlling Load Combination/ Cd

$V = (D + S) \quad Cd=1.15$

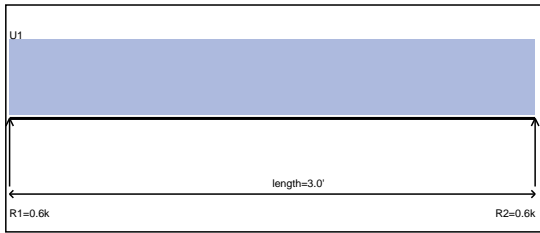
$M = (D + S) \quad Cd=1.15$

$\Delta = (D + S)$

V = 0.51k	Vall = 3.50k	Ratio = 0.15
M = 0.38k-ft	Mall = 3.44k-ft	Ratio = 0.11
Deflection		
TL = 0.00" L/999+ > L/240 min		
DL = 0.00"		
L = 0.00" L/999+ > L/360 min		

4x8 DF #2

Description - Roof Framing Plan - H3-14 - Header



Uniform 1 = 0.34 klf (0.0'-3.0')

Controlling Load Combination/ Cd

$V = (D + S) \quad Cd=1.15$

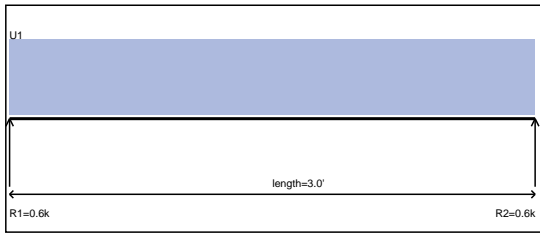
$M = (D + S) \quad Cd=1.15$

$\Delta = (D + S)$

V = 0.51k	Vall = 3.50k	Ratio = 0.15
M = 0.38k-ft	Mall = 3.44k-ft	Ratio = 0.11
Deflection		
TL = 0.00" L/999+ > L/240 min		
DL = 0.00"		
L = 0.00" L/999+ > L/360 min		

4x8 DF #2

Description - Roof Framing Plan - H3-15 - Header



Uniform 1 = 0.34 klf (0.0'-3.0')

Controlling Load Combination/ Cd

$V = (D + S) \quad Cd=1.15$

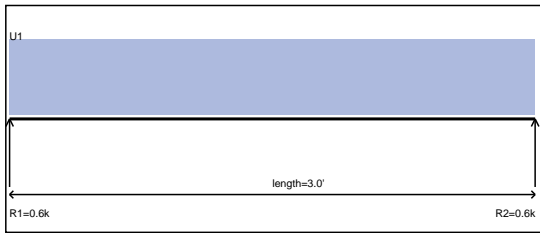
$M = (D + S) \quad Cd=1.15$

$\Delta = (D + S)$

V = 0.51k	Vall = 3.50k	Ratio = 0.15
M = 0.38k-ft	Mall = 3.44k-ft	Ratio = 0.11
Deflection		
TL = 0.00" L/999+ > L/240 min		
DL = 0.00"		
L = 0.00" L/999+ > L/360 min		

4x8 DF #2

Description - Roof Framing Plan - H3-16 - Header



Uniform 1 = 0.34 klf (0.0'-3.0')

Controlling Load Combination/ Cd

$V = (D + S) \quad Cd=1.15$

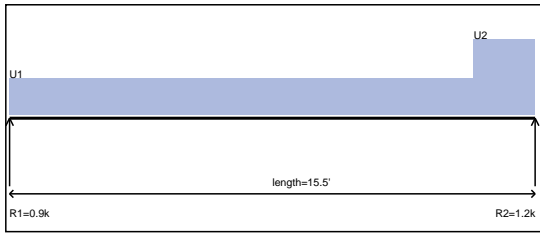
$M = (D + S) \quad Cd=1.15$

$\Delta = (D + S)$

V = 0.51k	Vall = 3.50k	Ratio = 0.15
M = 0.38k-ft	Mall = 3.44k-ft	Ratio = 0.11
Deflection		
TL = 0.00" L/999+ > L/240 min		
DL = 0.00"		
L = 0.00" L/999+ > L/360 min		

4x8 DF #2

Description - Roof Framing Plan - B3-1 - Flush



Uniform 1 = 0.12 klf (0.0'-13.6')

Uniform 2 = 0.25 klf (13.7'-15.5')

Controlling Load Combination/ Cd

$V = (D + S) \quad Cd=1.15$

$M = (D + S) \quad Cd=1.15$

$\Delta = NA$

V = 1.15k	Vall = 0 k	Ratio = 0
M = 2.78k-ft	Mall = 0 k-ft	Ratio = 0

Deflection

TL = NA L/NA > L/240 min

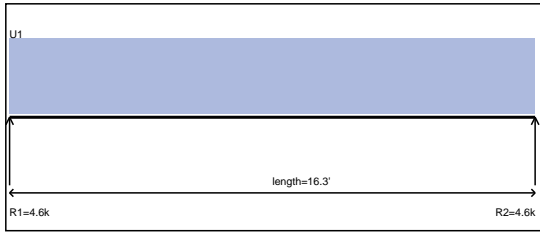
DL = NA

L = NA L/NA > L/360 min

SEE
ENERCALC
OUTPUT

Refer to External Design

Description - Roof Framing Plan - B3-2 - Flush



Uniform 1 = 0.56 klf (0.0'-16.3')

Controlling Load Combination/ Cd

$V = (D + S) \quad Cd=1.15$

$M = (D + S) \quad Cd=1.15$

$\Delta = (D + S)$

V = 4.54k	Vall = 13.62k	Ratio = 0.33
M = 18.46k-ft	Mall = 30.74k-ft	Ratio = 0.60

Deflection

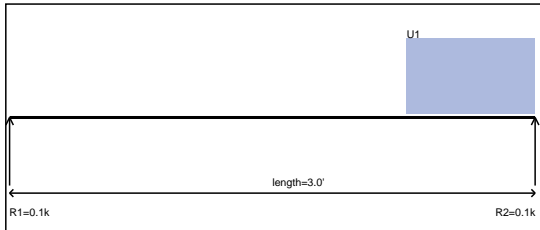
TL = 0.63" L/309 > L/240 min

DL = 0.18"

L = 0.00" L/999+ > L/360 min

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

Description - Upper Floor Framing Plan - H2-1 - Header



Uniform 1 = 0.15 klf (2.3'-3.0')

Controlling Load Combination/ Cd

$V = (D + L) \quad Cd=1$

$M = (D + L) \quad Cd=1$

$\Delta = (D + L)$

V = 0.10k	Vall = 3.04k	Ratio = 0.03
M = 0.03k-ft	Mall = 2.99k-ft	Ratio = 0.01

Deflection

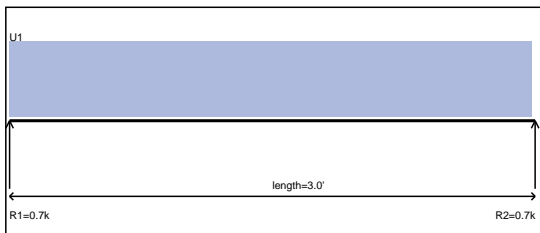
TL = 0.00" L/999+ > L/240 min

DL = 0.00"

L = 0.00" L/999+ > L/360 min

4x8 DF #2

Description - Upper Floor Framing Plan - H2-2 - Header



Uniform 1 = 0.46 klf (0.0'-3.0')

Controlling Load Combination/ Cd

$V = (D + L) \quad Cd=1$

$M = (D + L) \quad Cd=1$

$\Delta = (D + L)$

V = 0.70k	Vall = 3.04k	Ratio = 0.23
M = 0.52k-ft	Mall = 2.99k-ft	Ratio = 0.17

Deflection

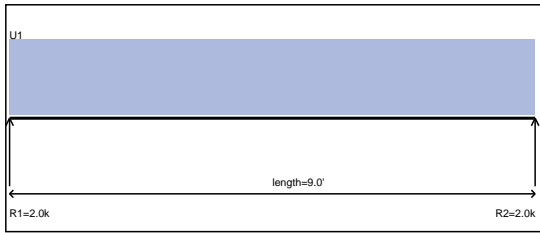
TL = 0.00" L/999+ > L/240 min

DL = 0.00"

L = 0.00" L/999+ > L/360 min

4x8 DF #2

Description - Upper Floor Framing Plan - H2-3 - Header



Uniform 1 = 0.43 klf (0.0'-9.0')

Controlling Load Combination/ Cd

$V = (D + L) \quad Cd=1$

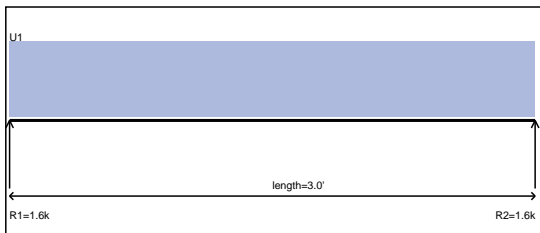
$M = (D + L) \quad Cd=1$

$\Delta = (D + L)$

V = 1.92k	Vall = 4.64k	Ratio = 0.41
M = 4.32k-ft	Mall = 6.56k-ft	Ratio = 0.66
Deflection		
TL = 0.28" L/380 > L/240 min		
DL = 0.04"		
L = 0.24" L/444 > L/360 min		

3-1/2x7-1/2 GLB

Description - Upper Floor Framing Plan - H2-5 - Header



Uniform 1 = 1.06 klf (0.0'-3.0')

Controlling Load Combination/ Cd

$V = (D + 0.75 * (L + S)) \quad Cd=1.15$

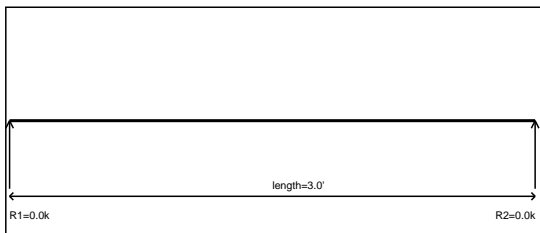
$M = (D + 0.75 * (L + S)) \quad Cd=1.15$

$\Delta = (D + 0.75 * (L + S))$

V = 1.32k	Vall = 3.50k	Ratio = 0.38
M = 0.99k-ft	Mall = 3.44k-ft	Ratio = 0.29
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 Plan - H2-6 - Header



Controlling Load Combination/ Cd

$V = NA \quad Cd=NA$

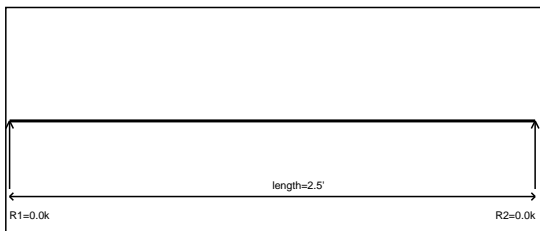
$M = NA \quad Cd=NA$

$\Delta = NA$

V = 0 k	Vall = 0 k	Ratio = 0
M = 0 k-ft	Mall = 0 k-ft	Ratio = 0
Deflection		
TL = 0 " L/ NA > L/240 min		
DL = 0 "		
L = 0 " L/ NA > L/360 min		

4x8 DF #2

Description - Upper Floor Framing Plan - H2-7 - Header



Controlling Load Combination/ Cd

$V = NA \quad Cd=1$

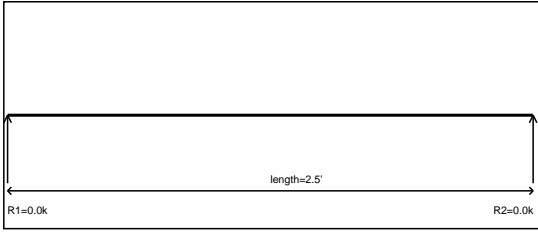
$M = NA \quad Cd=1$

$\Delta = NA$

V = 0.00k	Vall = 3.04k	Ratio = 0
M = 0.00k-ft	Mall = 2.99k-ft	Ratio = 0
Deflection		
TL = 0 " L/ NA > L/240 min		
DL = 0 "		
L = 0 " L/ NA > L/360 min		

4x8 DF #2

Description - Upper Floor Framing Plan - H2-8 - Header

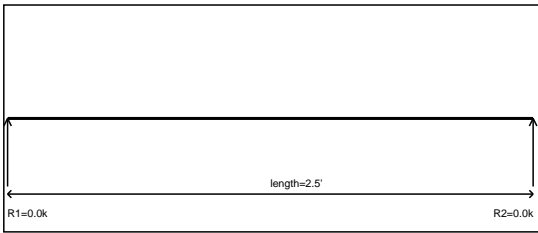


Controlling Load Combination/ Cd
 V = NA Cd=1
 M = NA Cd=1
 Δ = NA

V = 0.00k	Vall = 3.04k	Ratio = 0
M = 0.00k-ft	Mall = 2.99k-ft	Ratio = 0
Deflection		
TL = 0" L/ NA > L/240 min		
DL = 0"		
L = 0" L/ NA > L/360 min		

4x8 DF #2

Description - Upper Floor Framing Plan - H2-9 - Header

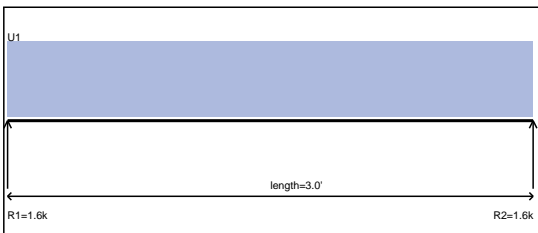


Controlling Load Combination/ Cd
 V = NA Cd=1
 M = NA Cd=1
 Δ = NA

V = 0.00k	Vall = 3.04k	Ratio = 0
M = 0.00k-ft	Mall = 2.99k-ft	Ratio = 0
Deflection		
TL = 0" L/ NA > L/240 min		
DL = 0"		
L = 0" L/ NA > L/360 min		

4x8 DF #2

Description - Upper Floor Framing Plan - H2-10 - Header



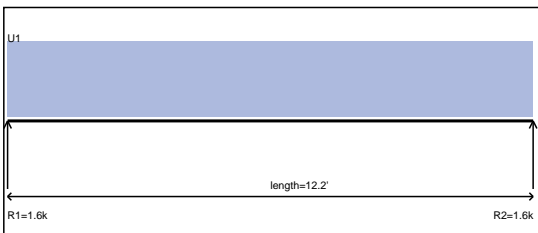
Uniform 1 = 1.06 klf (0.0'-3.0')

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

V = 1.32k	Vall = 3.50k	Ratio = 0.38
M = 0.99k-ft	Mall = 3.44k-ft	Ratio = 0.29
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 Plan - H2-11 - Header



Uniform 1 = 0.26 klf (0.0'-12.2')

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

V = 1.57k	Vall = 5.43k	Ratio = 0.29
M = 4.81k-ft	Mall = 7.00k-ft	Ratio = 0.69
Deflection		
TL = 0.20" L/752 > L/240 min		
DL = 0.06"		
L = 0.00" L/999+ > L/360 min		

4x12 DF #2



Description - Upper Floor Framing Plan - H2-12 - Header

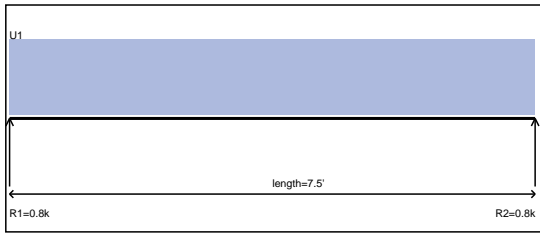


Controlling Load Combination/ Cd
V = NA Cd=1
M = NA Cd=1
 Δ = NA

V = 0.00k	Vall = 3.04k	Ratio = 0
M = 0.00k-ft	Mall = 2.99k-ft	Ratio = 0
Deflection		
TL = 0" L/NA > L/240 min		
DL = 0"		
L = 0" L/NA > L/360 min		

4x8 DF #2

Description - Upper Floor Framing Plan - H2-13 - Header



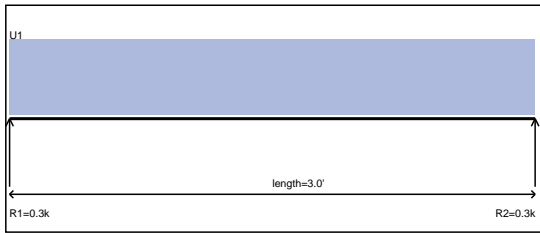
Uniform 1 = 0.20 klf (0.0'-7.5')

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

V = 0.74k	Vall = 3.50k	Ratio = 0.21
M = 1.38k-ft	Mall = 3.44k-ft	Ratio = 0.40
Deflection		
TL = 0.08" L/999+ > L/240 min		
DL = 0.02"		
L = 0.00" L/999+ > L/360 min		

4x8 DF #2

Description - Upper Floor Framing Plan - H2-14 - Header



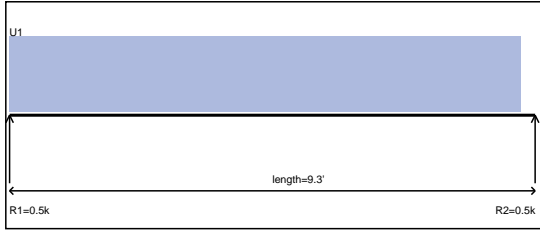
Uniform 1 = 0.20 klf (0.0'-3.0')

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

V = 0.29k	Vall = 3.50k	Ratio = 0.08
M = 0.22k-ft	Mall = 3.44k-ft	Ratio = 0.06
Deflection		
TL = 0.00" L/999+ > L/240 min		
DL = 0.00"		
L = 0.00" L/999+ > L/360 min		

4x8 DF #2

Description - Upper Floor Framing Plan - H2-15 - Header



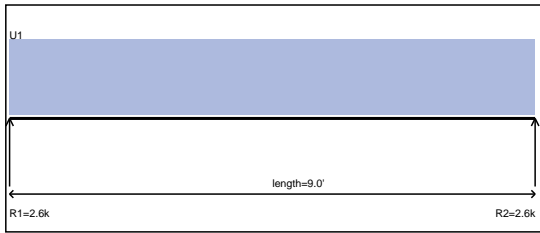
Uniform 1 = 0.10 klf (0.0'-9.0')

Controlling Load Combination/ Cd
 $V = D \quad Cd=0.9$
 $M = D \quad Cd=0.9$
 $\Delta = D$

V = 0.46k	Vall = 3.50k	Ratio = 0.13
M = 1.07k-ft	Mall = 4.04k-ft	Ratio = 0.26
Deflection		
TL = 0.04" L/999+ > L/240 min		
DL = 0.04"		
L = 0.00" L/999+ > L/360 min		

4x10 DF #2

Description - Upper Floor Framing Plan - H2-16 - Header



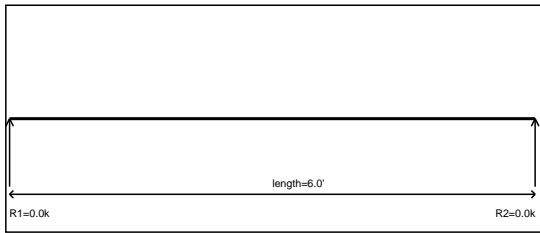
Uniform 1 = 0.57 klf (0.0'-9.0')

Controlling Load Combination/ Cd
 $V = (D + L) \quad Cd=1$
 $M = (D + L) \quad Cd=1$
 $\Delta = (D + L)$

V = 2.56k	Vall = 4.72k	Ratio = 0.54
M = 5.76k-ft	Mall = 6.09k-ft	Ratio = 0.95
Deflection		
TL = 0.13" L/855 > L/240 min		
DL = 0.02"		
L = 0.11" L/997 > L/360 min		

4x12 DF #2

Description - Upper Floor Framing Plan - H2-20 - Header

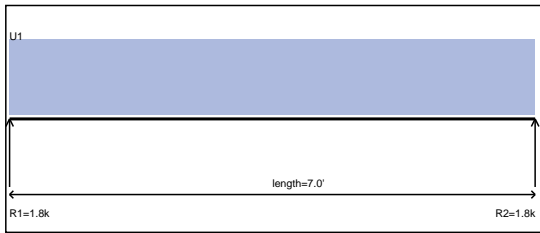


Controlling Load Combination/ Cd
 $V = NA \quad Cd=1$
 $M = NA \quad Cd=1$
 $\Delta = NA$

V = 0.00k	Vall = 3.04k	Ratio = 0
M = 0.00k-ft	Mall = 2.99k-ft	Ratio = 0
Deflection		
TL = 0" L/NA > L/240 min		
DL = 0"		
L = 0" L/NA > L/360 min		

4x8 DF #2

Description - Upper Floor Framing Plan - H2-21 - Header



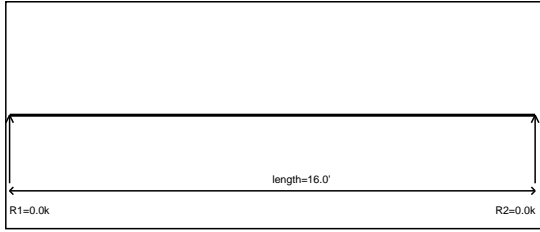
Uniform 1 = 0.50 klf (0.0'-7.0')

Controlling Load Combination/ Cd
 $V = (D + S) \quad Cd=1.15$
 $M = (D + S) \quad Cd=1.15$
 $\Delta = (D + S)$

V = 1.75k	Vall = 3.50k	Ratio = 0.50
M = 3.06k-ft	Mall = 3.44k-ft	Ratio = 0.89
Deflection		
TL = 0.15" L/554 > L/240 min		
DL = 0.04"		
L = 0.00" L/999+ > L/360 min		

4x8 DF #2

Description - Upper Floor Framing Plan - H2-22 - Header

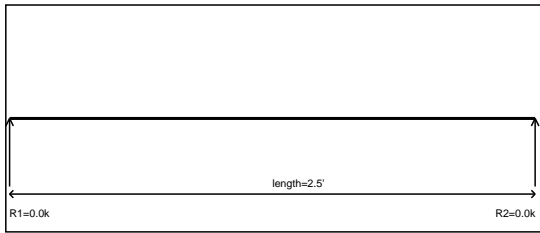


Controlling Load Combination/ Cd
V = NA Cd=1
M = NA Cd=1
 Δ = NA

V = 0.00k	Vall = 1.71k	Ratio = 0
M = 0.00k-ft	Mall = 6.18k-ft	Ratio = 0
Deflection		
TL = 0" L/ NA > L/240 min		
DL = 0"		
L = 0" L/ NA > L/360 min		

11-7/8" TJI 360 I-Joists

Description - Upper Floor Framing Plan - H2-23 - Header

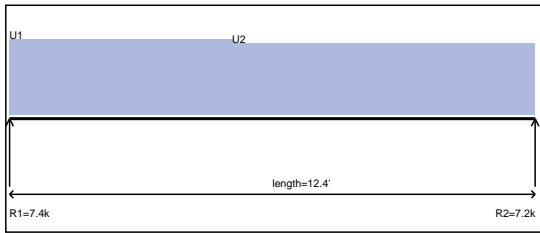


Controlling Load Combination/ Cd
V = NA Cd=1
M = NA Cd=1
 Δ = NA

V = 0.00k	Vall = 3.04k	Ratio = 0
M = 0.00k-ft	Mall = 2.99k-ft	Ratio = 0
Deflection		
TL = 0" L/ NA > L/240 min		
DL = 0"		
L = 0" L/ NA > L/360 min		

4x8 DF #2

Description - Upper Floor Framing Plan - H2-24 - Header



Uniform 1 = 1.19 klf (0.0'-5.3')
Uniform 2 = 1.13 klf (5.3'-12.4')

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

V = 7.31k	Vall = 11.66k	Ratio = 0.63
M = 22.36k-ft	Mall = 26.40k-ft	Ratio = 0.85
Deflection		
TL = 0.43" L/343 > L/240 min		
DL = 0.12"		
L = 0.32" L/471 > L/360 min		

5-1/2x12 GLB

Description - Upper Floor Framing Plan - H2-25 - Header



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

V = 0.00k	Vall = 3.04k	Ratio = 0
M = 0.00k-ft	Mall = 2.99k-ft	Ratio = 0
Deflection		
TL = 0" L/ NA > L/240 min		
DL = 0"		
L = 0" L/ NA > L/360 min		

4x8 DF #2

Description - Upper Floor Framing Plan - H2-26 - Header

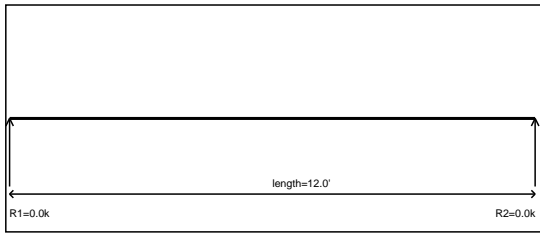


Controlling Load Combination/ Cd
V = NA Cd=1
M = NA Cd=1
 Δ = NA

V = 0.00k	Vall = 3.04k	Ratio = 0
M = 0.00k-ft	Mall = 2.99k-ft	Ratio = 0
Deflection		
TL = 0 " L/ NA > L/240 min		
DL = 0 "		
L = 0 " L/ NA > L/360 min		

4x8 DF #2

Description - Upper Floor Framing Plan - H2-27 - Header

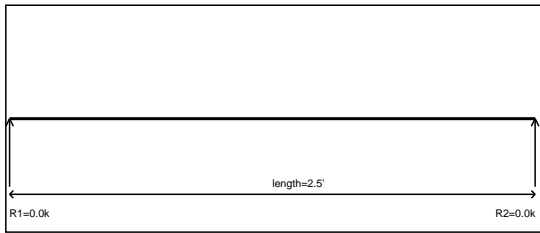


Controlling Load Combination/ Cd
V = NA Cd=1
M = NA Cd=1
 Δ = NA

V = 0.00k	Vall = 3.04k	Ratio = 0
M = 0.00k-ft	Mall = 2.99k-ft	Ratio = 0
Deflection		
TL = 0 " L/ NA > L/240 min		
DL = 0 "		
L = 0 " L/ NA > L/360 min		

4x8 DF #2

Description - Upper Floor Framing Plan - H2-28 - Header

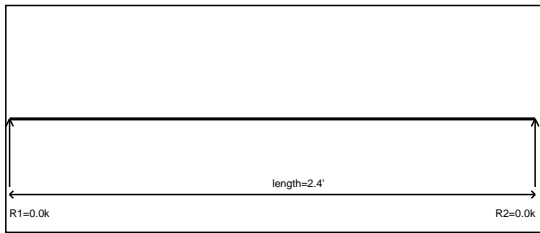


Controlling Load Combination/ Cd
V = NA Cd=1
M = NA Cd=1
 Δ = NA

V = 0.00k	Vall = 3.04k	Ratio = 0
M = 0.00k-ft	Mall = 2.99k-ft	Ratio = 0
Deflection		
TL = 0 " L/ NA > L/240 min		
DL = 0 "		
L = 0 " L/ NA > L/360 min		

4x8 DF #2

Description - Upper Floor Framing Plan - H2-30 - Header

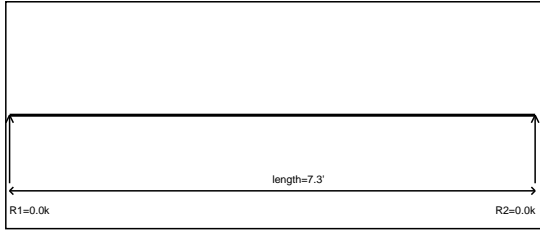


Controlling Load Combination/ Cd
V = NA Cd=1
M = NA Cd=1
 Δ = NA

V = 0.00k	Vall = 3.04k	Ratio = 0
M = 0.00k-ft	Mall = 2.99k-ft	Ratio = 0
Deflection		
TL = 0 " L/ NA > L/240 min		
DL = 0 "		
L = 0 " L/ NA > L/360 min		

4x8 DF #2

Description - Upper Floor Framing Plan - H2-31 - Header

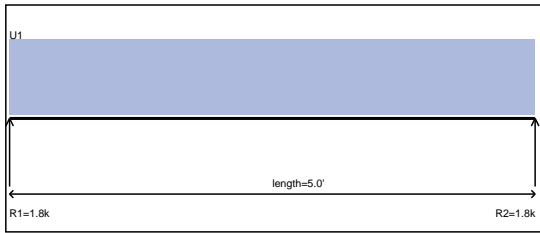


Controlling Load Combination/ Cd
V = NA Cd=1
M = NA Cd=1
 Δ = NA

V = 0.00k	Vall = 3.04k	Ratio = 0
M = 0.00k-ft	Mall = 2.99k-ft	Ratio = 0
Deflection		
TL = 0" L/ NA > L/240 min		
DL = 0"		
L = 0" L/ NA > L/360 min		

4x8 DF #2

Description - Upper Floor Framing Plan - H2-32 - Header



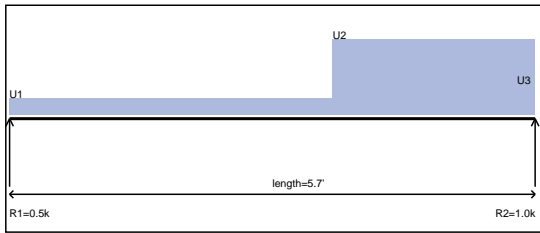
Uniform 1 = 0.71 klf (0.0'-5.0')

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

V = 1.78k	Vall = 3.50k	Ratio = 0.51
M = 2.23k-ft	Mall = 3.44k-ft	Ratio = 0.65
Deflection		
TL = 0.06" L/999+ > L/240 min		
DL = 0.02"		
L = 0.00" L/999+ > L/360 min		

4x8 DF #2

Description - Upper Floor Framing Plan - B2-1 - Flush



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

Uniform 2 = 0.46 klf (3.5'-5.7')

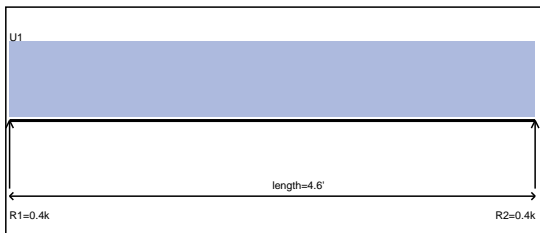
Uniform 3 = 0.19 klf (5.5'-5.7')

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

V = 0.95k	Vall = 17.49k	Ratio = 0.05
M = 0.92k-ft	Mall = 59.40k-ft	Ratio = 0.02
Deflection		
TL = 0.00" L/999+ > L/240 min		
DL = 0.00"		
L = 0.00" L/999+ > L/360 min		

5-1/2x18 GLB

Description - Upper Floor Framing Plan - B2-2 - Flush



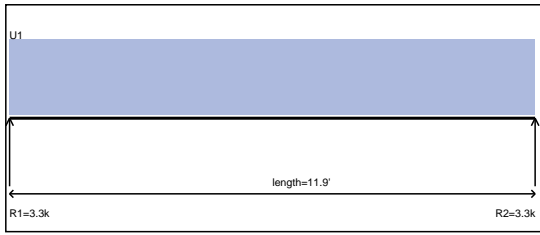
Uniform 1 = 0.13 klf (0.0'-4.6')

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

V = 0.30k	Vall = 3.95k	Ratio = 0.08
M = 0.35k-ft	Mall = 8.91k-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 - Upper Floor Framing Plan - B2-3 - Flush



Uniform 1 = 0.54 klf (0.0'-11.9')

Controlling Load Combination/ Cd

$V = (D + L) \quad Cd=1$

$M = (D + L) \quad Cd=1$

$\Delta = (D + L)$

V = 3.21k	Vall = 11.13k	Ratio = 0.29
M = 9.56k-ft	Mall = 37.80k-ft	Ratio = 0.25

Deflection

TL = 0.08" L/999+ > L/240 min

DL = 0.03"

L = 0.05" L/999+ > L/360 min

3-1/2x18 GLB

Description - Upper Floor Framing Plan - B2-4 - Flush



Uniform 1 = 0.10 klf (0.0'-16.3')

Controlling Load Combination/ Cd

$V = D \quad Cd=0.9$

$M = D \quad Cd=0.9$

$\Delta = D$

V = 0.82k	Vall = 7.11k	Ratio = 0.11
M = 3.34k-ft	Mall = 16.04k-ft	Ratio = 0.21

Deflection

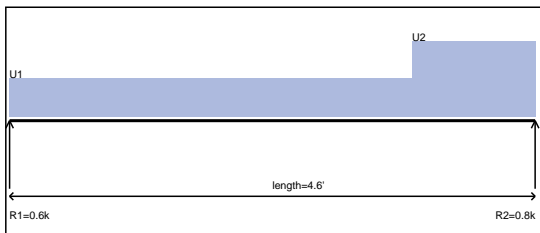
TL = 0.17" L/999+ > L/240 min

DL = 0.17"

L = 0.00" L/999+ > L/360 min

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

Description - Upper Floor Framing Plan - B2-5 - Flush



Uniform 1 = 0.23 klf (0.0'-3.5')

Uniform 2 = 0.45 klf (3.5'-4.6')

Controlling Load Combination/ Cd

$V = (D + L) \quad Cd=1$

$M = (D + L) \quad Cd=1$

$\Delta = (D + L)$

V = 0.73k	Vall = 11.13k	Ratio = 0.07
M = 0.66k-ft	Mall = 37.80k-ft	Ratio = 0.02

Deflection

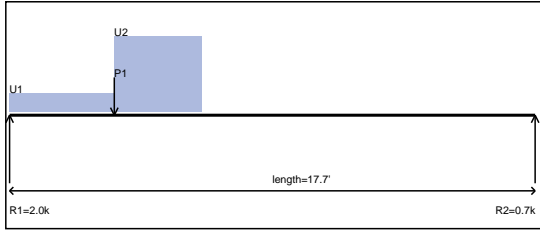
TL = 0.00" L/999+ > L/240 min

DL = 0.00"

L = 0.00" L/999+ > L/360 min

3-1/2x18 GLB

Description - Upper Floor Framing Plan - B2-6 - Flush



Uniform 1 = 0.10 klf (0.0'-3.5') P1 = 1.16 K (3.5')
Uniform 2 = 0.41 klf (3.5'-6.5')

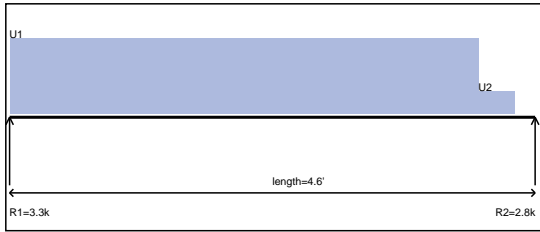
Controlling Load Combination/ Cd
V = (D + S) Cd=1.15
M = (D + S) Cd=1.15
 Δ = NA

V = 1.95k	Vall = 0 k	Ratio = 0
M = 6.51k-ft	Mall = 0 k-ft	Ratio = 0
Deflection		
TL = NA	L/NA > L/240 min	
DL = NA		
L = NA	L/NA > L/360 min	

SEE
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OUTPUT

Refer to External Design

Description - Upper Floor Framing Plan - B2-7 - Flush



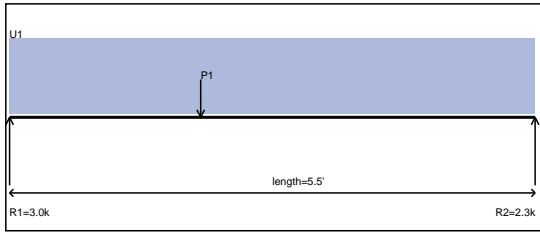
Uniform 1 = 1.44 klf (0.0'-4.1')
Uniform 2 = 0.42 klf (4.1'-4.4')

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

V = 2.69k	Vall = 4.21k	Ratio = 0.64
M = 3.05k-ft	Mall = 4.40k-ft	Ratio = 0.69
Deflection		
TL = 0.12"	L/441 > L/240 min	
DL = 0.04"		
L = 0.06"	L/884 > L/360 min	

(2)1-3/4x5-1/2 LVL

Description - Upper Floor Framing Plan - B2-8 - Dropped



Uniform 1 = 0.46 klf (0.0'-5.5') P1 = 2.65 K (2')

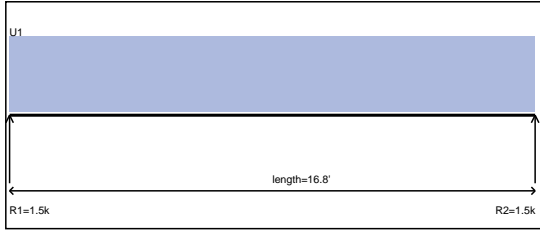
Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
 Δ = (D + L)

V = 2.78k	Vall = 4.72k	Ratio = 0.59
M = 4.62k-ft	Mall = 6.09k-ft	Ratio = 0.76
Deflection		
TL = 0.04"	L/999+ > L/240 min	
DL = 0.01"		
L = 0.03"	L/999+ > L/360 min	

4x12 DF #2



Description - Upper Floor Framing Plan - B2-10 - Flush



Uniform 1 = 0.17 klf (0.0'-16.8')

Controlling Load Combination/ Cd

V = (D + S) Cd=1.15

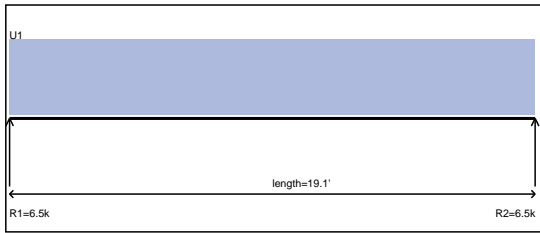
M = (D + S) Cd=1.15

Δ = (D + S)

V = 1.43k	Vall = 9.08k	Ratio = 0.16
M = 6.00k-ft	Mall = 20.50k-ft	Ratio = 0.29
Deflection		
TL = 0.33" L/616 > L/240 min		
DL = 0.23"		
L = 0.00" L/999+ > L/360 min		

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

Description - Upper Floor Framing Plan - B2-11 - Flush



Uniform 1 = 0.68 klf (0.0'-19.1')

Controlling Load Combination/ Cd

V = (D + S) Cd=1.15

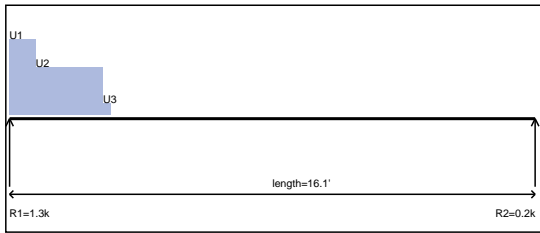
M = (D + S) Cd=1.15

Δ = (D + S)

V = 6.45k	Vall = 20.11k	Ratio = 0.32
M = 30.82k-ft	Mall = 65.75k-ft	Ratio = 0.47
Deflection		
TL = 0.42" L/545 > L/240 min		
DL = 0.16"		
L = 0.00" L/999+ > L/360 min		

5-1/2x18 GLB

Description - Upper Floor Framing Plan - B2-12 - Flush



Uniform 1 = 0.65 klf (0.0'-0.8')

Uniform 2 = 0.41 klf (0.8'-2.9')

Uniform 3 = 0.10 klf (2.9'-3.1')

Controlling Load Combination/ Cd

V = (D + S) Cd=1.15

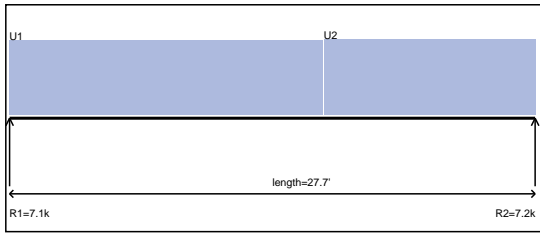
M = (D + S) Cd=1.15

Δ = (D + S)

V = 1.27k	Vall = 1.90k	Ratio = 0.67
M = 1.49k-ft	Mall = 4.36k-ft	Ratio = 0.34
Deflection		
TL = 0.22" L/877 > L/240 min		
DL = 0.10"		
L = 0.00" L/999+ > L/360 min		

11-7/8" TJI 210 I-Joists

Description - Upper Floor Framing Plan - B2-13 - Flush Top



Uniform 1 = 0.51 klf (0.0'-16.5')

Uniform 2 = 0.52 klf (16.5'-27.7')

Controlling Load Combination/ Cd

$V = (D + S) \quad Cd=1.15$

$M = (D + S) \quad Cd=1.15$

$\Delta = (D + S)$

V = 7.11k	Vall = 26.82k	Ratio = 0.27
M = 48.85k-ft	Mall = 109.46k-ft	Ratio = 0.45

Deflection

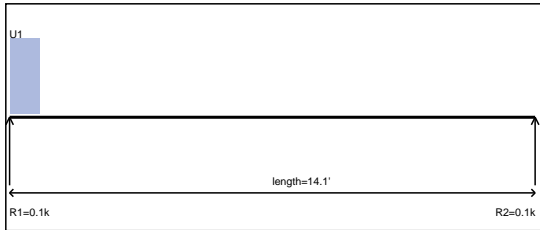
TL = 0.59" L/563 > L/240 min

DL = 0.17"

L = 0.00" L/999+ > L/360 min

5-1/2x24 GLB

Description - Upper Floor Framing Plan - B2-14 - Flush



Uniform 1 = 0.27 klf (0.0'-0.8')

Controlling Load Combination/ Cd

$V = (D + S) \quad Cd=1.15$

$M = D \quad Cd=0.9$

$\Delta = NA$

V = 0.01k	Vall = 0 k	Ratio = 0
M = 0.25k-ft	Mall = 0 k-ft	Ratio = 0

Deflection

TL = NA L/NA > L/240 min

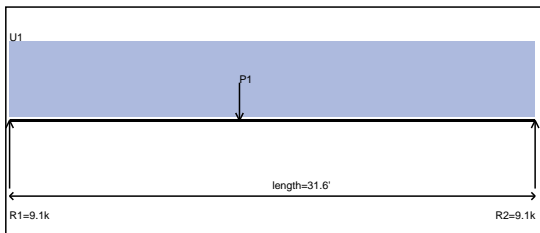
DL = NA

L = NA L/NA > L/360 min

SEE ENERCALC OUTPUT

Refer to External Design

Description - Upper Floor Framing Plan - B2-15 - Refer to External Design



Uniform 1 = 0.57 klf (0.0'-31.6')

P1 = 0.11 K (13.8')

Controlling Load Combination/ Cd

$V = (D + L) \quad Cd=1$

$M = (D + L) \quad Cd=1$

$\Delta = NA$

V = 9.02k	Vall = 0 k	Ratio = 0
M = 71.35k-ft	Mall = 0 k-ft	Ratio = 0

Deflection

TL = NA L/NA > L/240 min

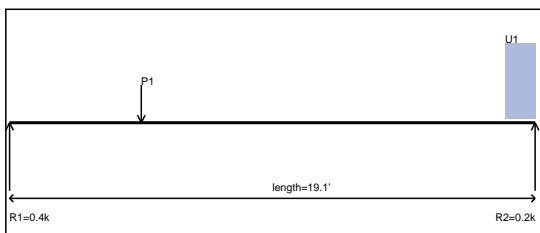
DL = NA

L = NA L/NA > L/360 min

SEE ENERCALC OUTPUT

Refer to External Design

Description - Upper Floor Framing Plan - B2-16 - Flush



Uniform 1 = 0.03 klf (18.0'-19.1')

P1 = 0.41 K (4.8')

Controlling Load Combination/ Cd

$V = (D + L) \quad Cd=1$

$M = (D + L) \quad Cd=1$

$\Delta = (D + L)$

V = 0.31k	Vall = 11.13k	Ratio = 0.03
M = 1.49k-ft	Mall = 37.80k-ft	Ratio = 0.04

Deflection

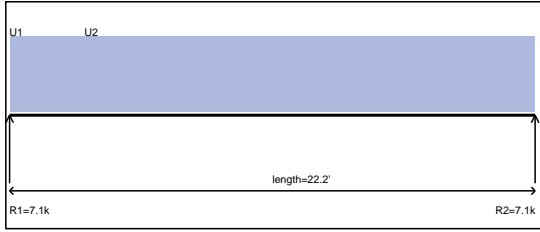
TL = 0.03" L/999+ > L/240 min

DL = 0.01"

L = 0.02" L/999+ > L/360 min

3-1/2x18 GLB

Description - Upper Floor Framing Plan - B2-17 - Flush



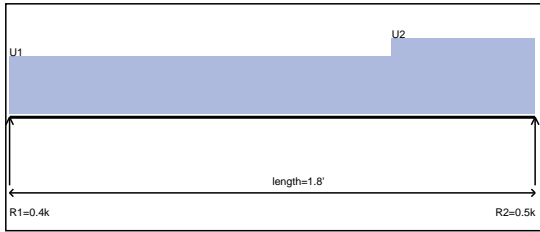
Uniform 1 = 0.64 klf (0.0'-3.1')
Uniform 2 = 0.64 klf (3.2'-22.2')

Controlling Load Combination/ Cd
V = (D + S) Cd= NA
M = (D + S) Cd= NA
 $\Delta = (D + S)$

V = 7.09k	Vall = 70.70k	Ratio = 0.10
M = 39.37k-ft	Mall = 137.00k-ft	Ratio = 0.29
Deflection		
TL = 0.49" L/548 > L/240 min		
DL = 0.14"		
L = 0.00" L/999+ > L/360 min		

W10x45 Steel

Description - Upper Floor Framing Plan - B2-18 - Flush



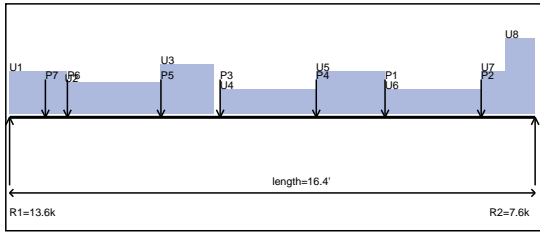
Uniform 1 = 0.40 klf (0.0'-1.3')
Uniform 2 = 0.53 klf (1.3'-1.8')

Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
 $\Delta = (D + L)$

V = 0.41k	Vall = 11.13k	Ratio = 0.04
M = 0.17k-ft	Mall = 37.80k-ft	Ratio = 0.00
Deflection		
TL = 0.00" L/999+ > L/240 min		
DL = 0.00"		
L = 0.00" L/999+ > L/360 min		

3-1/2x18 GLB

Description - Upper Floor Framing Plan - B2-19 - Flush

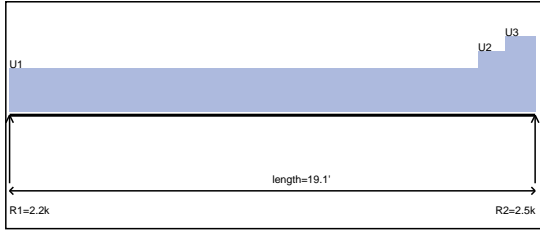


Uniform 1 = 0.79 klf (0.0'-1.8')	P1 = 0.51 K (11.7')
Uniform 2 = 0.58 klf (1.7'-4.7')	P2 = 0.51 K (14.7')
Uniform 3 = 0.92 klf (4.7'-6.4')	P3 = 0.51 K (6.6')
Uniform 4 = 0.45 klf (6.6'-9.6')	P4 = 0.51 K (9.6')
Uniform 5 = 0.79 klf (9.6'-11.7')	P5 = 0.51 K (4.7')
Uniform 6 = 0.45 klf (11.7'-14.7')	P6 = 0.65 K (1.8')
Uniform 7 = 0.79 klf (14.7'-15.5')	P7 = 7.07 K (1.1')
Uniform 8 = 1.40 klf (15.5'-16.4')	

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

V = 11.22k	Vall = 20.11k	Ratio = 0.56
M = 26.01k-ft	Mall = 66.76k-ft	Ratio = 0.39
Deflection		
TL = 0.26" L/752 > L/240 min		
DL = 0.10"		
L = 0.11" L/999+ > L/360 min		

5-1/2x18 GLB

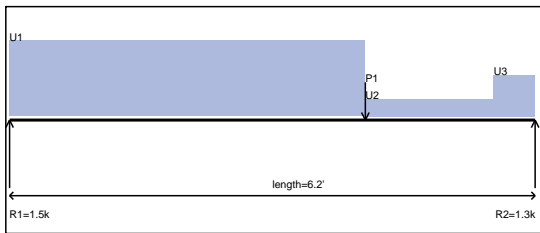
Description - Upper Floor Framing Plan - B2-20 - Flush


Uniform 1 = 0.23 klf (0.0'-17.1')
 Uniform 2 = 0.32 klf (17.1'-18.0')
 Uniform 3 = 0.40 klf (18.0'-19.1')

Controlling Load Combination/ Cd
 $V = (D + S) \quad Cd=1.15$
 $M = (D + S) \quad Cd=1.15$
 $\Delta = (D + S)$

V = 2.43k	Vall = 13.62k	Ratio = 0.18
M = 10.47k-ft	Mall = 30.74k-ft	Ratio = 0.34
Deflection		
TL = 0.50" L/464 > L/240 min		
DL = 0.22"		
L = 0.00" L/999+ > L/360 min		

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

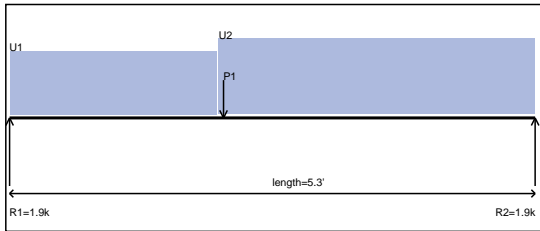
Description - Upper Floor Framing Plan - B2-21 - Flush


Uniform 1 = 0.44 klf (0.0'-4.2') P1 = 0.51 K (4.2')
 Uniform 2 = 0.10 klf (4.2'-5.8')
 Uniform 3 = 0.24 klf (5.8'-6.2')

Controlling Load Combination/ Cd
 $V = (D + S) \quad Cd=1.15$
 $M = (D + S) \quad Cd=1.15$
 $\Delta = (D + S)$

V = 1.43k	Vall = 20.11k	Ratio = 0.07
M = 2.32k-ft	Mall = 68.31k-ft	Ratio = 0.03
Deflection		
TL = 0.00" L/999+ > L/240 min		
DL = 0.00"		
L = 0.00" L/999+ > L/360 min		

5-1/2x18 GLB

Description - Upper Floor Framing Plan - B2-22 - Flush


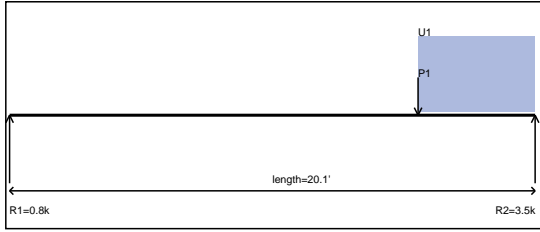
Uniform 1 = 0.50 klf (0.0'-2.1') P1 = 0.74 K (2.1')
 Uniform 2 = 0.60 klf (2.1'-5.3')

Controlling Load Combination/ Cd
 $V = (D + S) \quad Cd=1.15$
 $M = (D + S) \quad Cd=1.15$
 $\Delta = (D + S)$

V = 1.84k	Vall = 9.08k	Ratio = 0.20
M = 2.79k-ft	Mall = 20.50k-ft	Ratio = 0.14
Deflection		
TL = 0.02" L/999+ > L/240 min		
DL = 0.00"		
L = 0.00" L/999+ > L/360 min		

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

Description - Upper Floor Framing Plan - B2-23 - Flush



Uniform 1 = 0.39 klf (15.7'-20.1') P1 = 2.43 K (15.7')

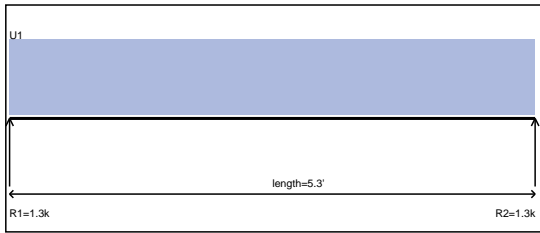
Controlling Load Combination/ Cd
 $V = (D + S) \quad Cd=1.15$
 $M = (D + S) \quad Cd=1.15$
 $\Delta = (D + S)$

V = 3.43k	Vall = 13.62k	Ratio = 0.25
M = 11.53k-ft	Mall = 30.74k-ft	Ratio = 0.38
Deflection		
TL = 0.60" L/400 > L/240 min		
DL = 0.25"		
L = 0.00" L/999+ > L/360 min		

SEE
ENERCALC
OUTPUT

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

Description - Upper Floor Framing Plan - B2-24 - Flush



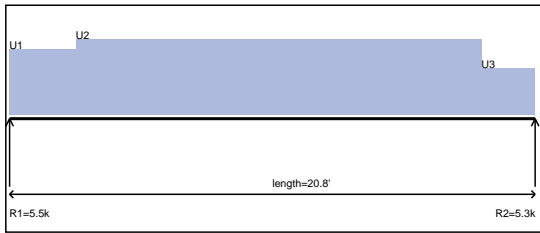
Uniform 1 = 0.48 klf (0.0'-5.3')

Controlling Load Combination/ Cd
 $V = (D + S) \quad Cd=1.15$
 $M = (D + S) \quad Cd=1.15$
 $\Delta = (D + S)$

V = 1.27k	Vall = 9.08k	Ratio = 0.14
M = 1.67k-ft	Mall = 20.50k-ft	Ratio = 0.08
Deflection		
TL = 0.01" L/999+ > L/240 min		
DL = 0.00"		
L = 0.00" L/999+ > L/360 min		

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

Description - Upper Floor Framing Plan - B2-25 - Flush



Uniform 1 = 0.48 klf (0.0'-2.6')
 Uniform 2 = 0.55 klf (2.6'-18.6')
 Uniform 3 = 0.34 klf (18.6'-20.8')

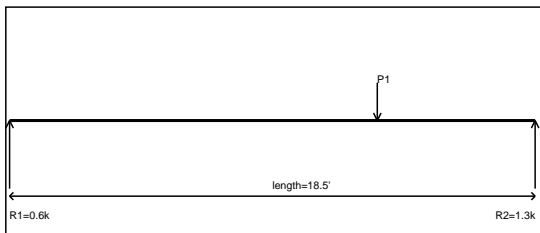
Controlling Load Combination/ Cd
 $V = (D + S) \quad Cd=1.15$
 $M = (D + S) \quad Cd=1.15$
 $\Delta = NA$

V = 5.47k	Vall = 0 k	Ratio = 0
M = 28.75k-ft	Mall = 0 k-ft	Ratio = 0
Deflection		
TL = NA L/NA > L/240 min		
DL = NA		
L = NA L/NA > L/360 min		

SEE
ENERCALC
OUTPUT

Refer to External Design

Description - Upper Floor Framing Plan - B2-26 - Flush



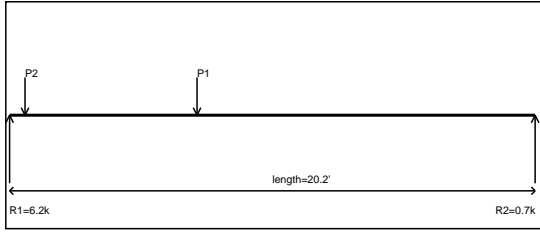
P1 = 1.84 K (13.0')

Controlling Load Combination/ Cd
 $V = (D + S) \quad Cd=1.15$
 $M = (D + S) \quad Cd=1.15$
 $\Delta = (D + S)$

V = 1.29k	Vall = 9.08k	Ratio = 0.14
M = 7.17k-ft	Mall = 20.50k-ft	Ratio = 0.35
Deflection		
TL = 0.48" L/466 > L/240 min		
DL = 0.15"		
L = 0.00" L/999+ > L/360 min		

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

Description - Upper Floor Framing Plan - B2-27 - Flush



P1 = 1.27 K (7.2)
P2 = 5.54 K (0.6)

Controlling Load Combination/ Cd
V = (D + S) Cd=1.15
M = (D + S) Cd=1.15
 $\Delta = (D + S)$

V = 6.13k	Vall = 9.08k	Ratio = 0.67
M = 7.95k-ft	Mall = 20.50k-ft	Ratio = 0.39
Deflection		
TL = 0.63" L/386 > L/240 min		
DL = 0.18"		
L = 0.00" L/999+ > L/360 min		

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

Description - Main Floor Framing Plan - B1-1 - Dropped



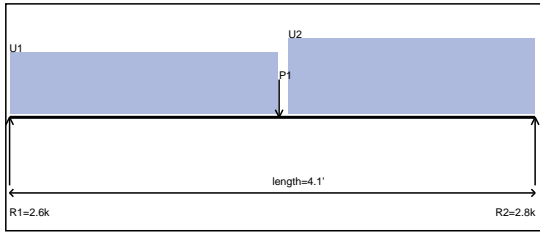
Uniform 1 = 0.44 klf (0.0'-6.3')
Uniform 2 = 0.44 klf (6.4'-7.2')

Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
 $\Delta = (D + L)$

V = 1.59k	Vall = 3.88k	Ratio = 0.41
M = 2.84k-ft	Mall = 4.49k-ft	Ratio = 0.63
Deflection		
TL = 0.07" L/999+ > L/240 min		
DL = 0.01"		
L = 0.06" L/999+ > L/360 min		

4x10 DF #2

Description - Main Floor Framing Plan - B1-2 - Dropped



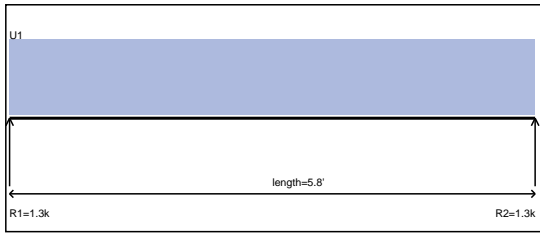
Uniform 1 = 0.44 klf (0.0'-2.1') P1 = 3.31 K (2.1)
Uniform 2 = 0.54 klf (2.2'-4.1')

Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
 $\Delta = (D + L)$

V = 2.73k	Vall = 3.88k	Ratio = 0.70
M = 4.35k-ft	Mall = 4.49k-ft	Ratio = 0.97
Deflection		
TL = 0.04" L/999+ > L/240 min		
DL = 0.01"		
L = 0.02" L/999+ > L/360 min		

4x10 DF #2

Description - Main Floor Framing Plan - B1-3 - Dropped



Uniform 1 = 0.44 klf (0.0'-5.8')

Controlling Load Combination/ Cd

$V = (D + L) \quad Cd=1$

$M = (D + L) \quad Cd=1$

$\Delta = (D + L)$

V = 1.28k	Vall = 3.88k	Ratio = 0.33
M = 1.85k-ft	Mall = 4.49k-ft	Ratio = 0.41

Deflection

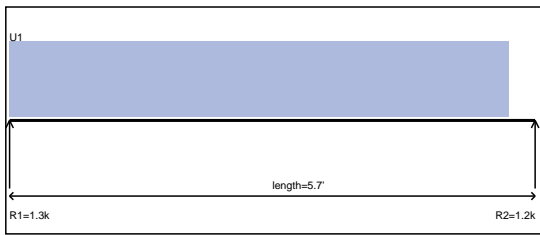
TL = 0.03" L/999+ > L/240 min

DL = 0.01"

L = 0.02" L/999+ > L/360 min

4x10 DF #2

Description - Main Floor Framing Plan - B1-4 - Dropped



Uniform 1 = 0.44 klf (0.0'-5.5')

Controlling Load Combination/ Cd

$V = (D + L) \quad Cd=1$

$M = (D + L) \quad Cd=1$

$\Delta = (D + L)$

V = 1.27k	Vall = 3.88k	Ratio = 0.33
M = 1.82k-ft	Mall = 4.49k-ft	Ratio = 0.41

Deflection

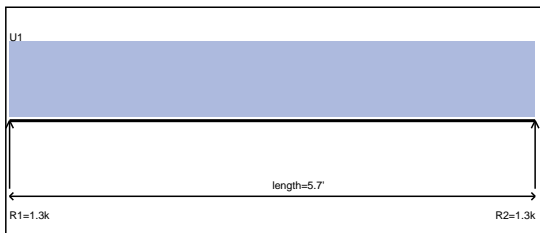
TL = 0.03" L/999+ > L/240 min

DL = 0.01"

L = 0.02" L/999+ > L/360 min

4x10 DF #2

Description - Main Floor Framing Plan - B1-5 - Dropped



Uniform 1 = 0.44 klf (0.0'-5.7')

Controlling Load Combination/ Cd

$V = (D + L) \quad Cd=1$

$M = (D + L) \quad Cd=1$

$\Delta = (D + L)$

V = 1.27k	Vall = 3.88k	Ratio = 0.33
M = 1.81k-ft	Mall = 4.49k-ft	Ratio = 0.40

Deflection

TL = 0.03" L/999+ > L/240 min

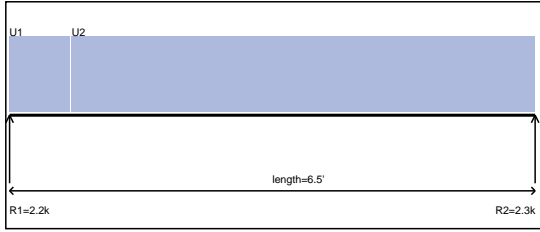
DL = 0.01"

L = 0.02" L/999+ > L/360 min

4x10 DF #2



Description - Main Floor Framing Plan - B1-6 - Dropped



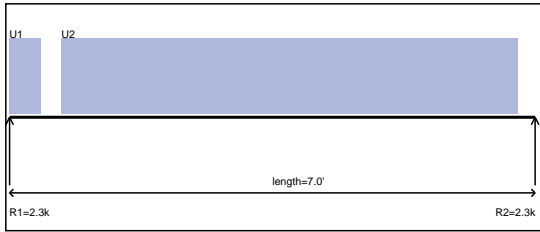
Uniform 1 = 0.68 klf (0.0'-0.7')
Uniform 2 = 0.68 klf (0.8'-6.5')

Controlling Load Combination/ Cd
 $V = (D + L) \quad Cd=1$
 $M = (D + L) \quad Cd=1$
 $\Delta = (D + L)$

V = 2.20k	Vall = 3.88k	Ratio = 0.57
M = 3.58k-ft	Mall = 4.49k-ft	Ratio = 0.80
Deflection		
TL = 0.07" L/999+ > L/240 min		
DL = 0.01"		
L = 0.06" L/999+ > L/360 min		

4x10 DF #2

Description - Main Floor Framing Plan - B1-7 - Dropped



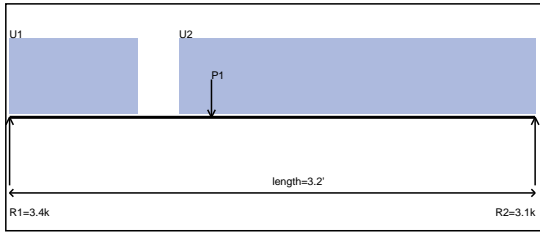
Uniform 1 = 0.68 klf (0.0'-0.4')
Uniform 2 = 0.68 klf (0.7'-6.8')

Controlling Load Combination/ Cd
 $V = (D + L) \quad Cd=1$
 $M = (D + L) \quad Cd=1$
 $\Delta = (D + L)$

V = 2.21k	Vall = 3.88k	Ratio = 0.57
M = 4.09k-ft	Mall = 4.49k-ft	Ratio = 0.91
Deflection		
TL = 0.10" L/860 > L/240 min		
DL = 0.02"		
L = 0.08" L/999+ > L/360 min		

4x10 DF #2

Description - Main Floor Framing Plan - B1-8 - Dropped



Uniform 1 = 1.45 klf (0.0'-0.8') P1 = 2.07 K (1.2)
Uniform 2 = 1.45 klf (1.0'-3.2')

Controlling Load Combination/ Cd
 $V = (D + 0.75 * (L + S)) \quad Cd=1.15$
 $M = (D + 0.75 * (L + S)) \quad Cd=1.15$
 $\Delta = (D + 0.75 * (L + S))$

V = 2.76k	Vall = 4.47k	Ratio = 0.62
M = 2.57k-ft	Mall = 5.17k-ft	Ratio = 0.50
Deflection		
TL = 0.01" L/999+ > L/240 min		
DL = 0.00"		
L = 0.00" L/999+ > L/360 min		

4x10 DF #2

Description - Main Floor Framing Plan - B1-9 - Dropped



Uniform 1 = 0.65 klf (0.0'-7.1')

Controlling Load Combination/ Cd

$V = (D + L) \quad Cd=1$

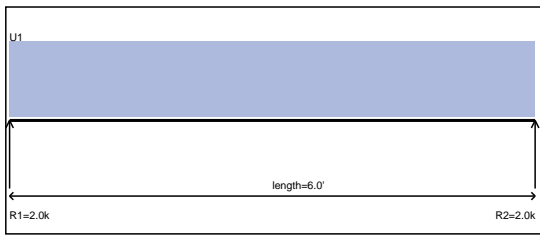
$M = (D + L) \quad Cd=1$

$\Delta = (D + L)$

V = 2.31k	Vall = 3.88k	Ratio = 0.60
M = 4.12k-ft	Mall = 4.49k-ft	Ratio = 0.92
Deflection		
TL = 0.10" L/840 > L/240 min		
DL = 0.02"		
L = 0.08" L/999+ > L/360 min		

4x10 DF #2

Description - Main Floor Framing Plan - B1-10 - Dropped



Uniform 1 = 0.65 klf (0.0'-6.0')

Controlling Load Combination/ Cd

$V = (D + L) \quad Cd=1$

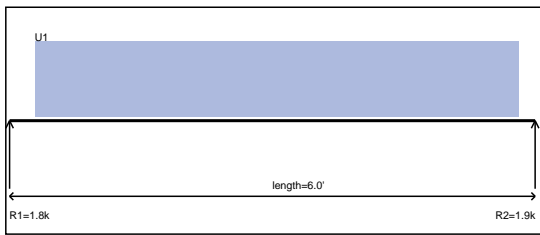
$M = (D + L) \quad Cd=1$

$\Delta = (D + L)$

V = 1.95k	Vall = 3.88k	Ratio = 0.50
M = 2.92k-ft	Mall = 4.49k-ft	Ratio = 0.65
Deflection		
TL = 0.05" L/999+ > L/240 min		
DL = 0.01"		
L = 0.04" L/999+ > L/360 min		

4x10 DF #2

Description - Main Floor Framing Plan - B1-11 - Dropped



Uniform 1 = 0.65 klf (0.3'-5.8')

Controlling Load Combination/ Cd

$V = (D + L) \quad Cd=1$

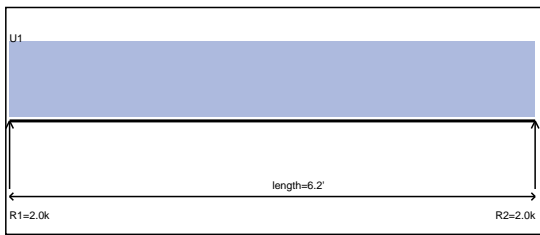
$M = (D + L) \quad Cd=1$

$\Delta = (D + L)$

V = 1.82k	Vall = 3.88k	Ratio = 0.47
M = 2.90k-ft	Mall = 4.49k-ft	Ratio = 0.65
Deflection		
TL = 0.05" L/999+ > L/240 min		
DL = 0.01"		
L = 0.04" L/999+ > L/360 min		

4x10 DF #2

Description - Main Floor Framing Plan - B1-12 - Dropped



Uniform 1 = 0.64 klf (0.0'-6.2')

Controlling Load Combination/ Cd

$V = (D + L) \quad Cd=1$

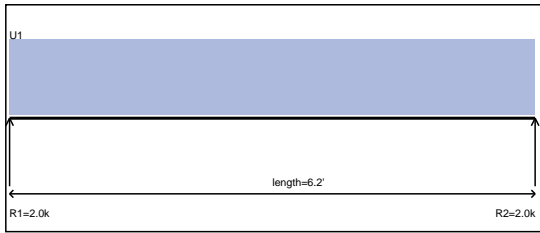
$M = (D + L) \quad Cd=1$

$\Delta = (D + L)$

V = 1.98k	Vall = 3.88k	Ratio = 0.51
M = 3.07k-ft	Mall = 4.49k-ft	Ratio = 0.68
Deflection		
TL = 0.06" L/999+ > L/240 min		
DL = 0.01"		
L = 0.05" L/999+ > L/360 min		

4x10 DF #2

Description - Main Floor Framing Plan - B1-13 - Dropped



Uniform 1 = 0.64 klf (0.0'-6.2')

Controlling Load Combination/ Cd

$V = (D + L) \quad Cd=1$

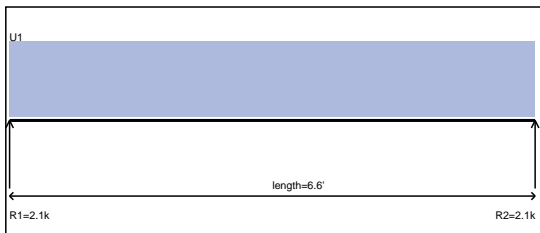
$M = (D + L) \quad Cd=1$

$\Delta = (D + L)$

V = 1.96k	Vall = 3.88k	Ratio = 0.50
M = 3.01k-ft	Mall = 4.49k-ft	Ratio = 0.67
Deflection		
TL = 0.06" L/999+ > L/240 min		
DL = 0.01"		
L = 0.04" L/999+ > L/360 min		

4x10 DF #2

Description - Main Floor Framing Plan - B1-14 - Dropped



Uniform 1 = 0.64 klf (0.0'-6.6')

Controlling Load Combination/ Cd

$V = (D + L) \quad Cd=1$

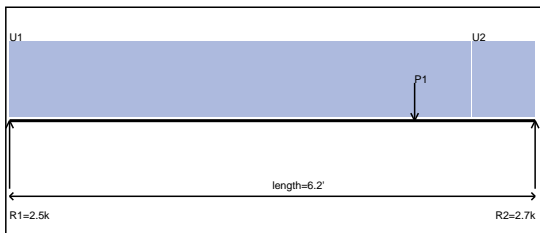
$M = (D + L) \quad Cd=1$

$\Delta = (D + L)$

V = 2.10k	Vall = 3.88k	Ratio = 0.54
M = 3.46k-ft	Mall = 4.49k-ft	Ratio = 0.77
Deflection		
TL = 0.07" L/999+ > L/240 min		
DL = 0.01"		
L = 0.06" L/999+ > L/360 min		

4x10 DF #2

Description - Main Floor Framing Plan - B1-15 - Dropped



Uniform 1 = 0.77 klf (0.0'-5.5')

P1 = 0.37 K (4.8')

Uniform 2 = 0.77 klf (5.5'-6.2')

Controlling Load Combination/ Cd

$V = (D + L) \quad Cd=1$

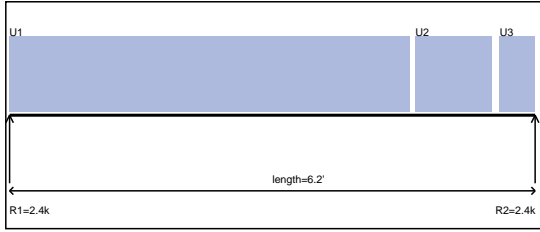
$M = (D + L) \quad Cd=1$

$\Delta = (D + L)$

V = 2.69k	Vall = 3.88k	Ratio = 0.69
M = 4.03k-ft	Mall = 4.49k-ft	Ratio = 0.90
Deflection		
TL = 0.08" L/977 > L/240 min		
DL = 0.02"		
L = 0.06" L/999+ > L/360 min		

4x10 DF #2

Description - Main Floor Framing Plan - B1-16 - Dropped



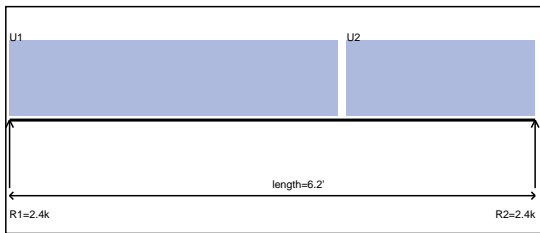
Uniform 1 = 0.77 klf (0.0'-4.8')
 Uniform 2 = 0.77 klf (4.8'-5.7')
 Uniform 3 = 0.77 klf (5.8'-6.2')

Controlling Load Combination/ Cd
 $V = (D + L) \quad Cd=1$
 $M = (D + L) \quad Cd=1$
 $\Delta = (D + L)$

V = 2.40k	Vall = 3.88k	Ratio = 0.62
M = 3.72k-ft	Mall = 4.49k-ft	Ratio = 0.83
Deflection		
TL = 0.07" L/999+ > L/240 min		
DL = 0.01"		
L = 0.06" L/999+ > L/360 min		

4x10 DF #2

Description - Main Floor Framing Plan - B1-17 - Dropped



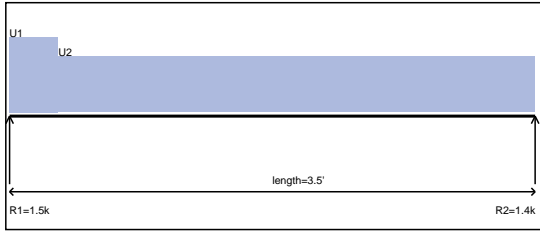
Uniform 1 = 0.77 klf (0.0'-3.9')
 Uniform 2 = 0.77 klf (4.0'-6.2')

Controlling Load Combination/ Cd
 $V = (D + L) \quad Cd=1$
 $M = (D + L) \quad Cd=1$
 $\Delta = (D + L)$

V = 2.38k	Vall = 3.88k	Ratio = 0.61
M = 3.68k-ft	Mall = 4.49k-ft	Ratio = 0.82
Deflection		
TL = 0.07" L/999+ > L/240 min		
DL = 0.01"		
L = 0.06" L/999+ > L/360 min		

4x10 DF #2

Description - Main Floor Framing Plan - B1-18 - Dropped



Uniform 1 = 1.04 klf (0.0'-0.3')
 Uniform 2 = 0.77 klf (0.3'-3.5')

Controlling Load Combination/ Cd
 $V = (D + L) \quad Cd=1$
 $M = (D + L) \quad Cd=1$
 $\Delta = (D + L)$

V = 1.44k	Vall = 3.88k	Ratio = 0.37
M = 1.19k-ft	Mall = 4.49k-ft	Ratio = 0.27
Deflection		
TL = 0.01" L/999+ > L/240 min		
DL = 0.00"		
L = 0.01" L/999+ > L/360 min		

4x10 DF #2



Description - Main Floor Framing Plan - B1-19 - Dropped



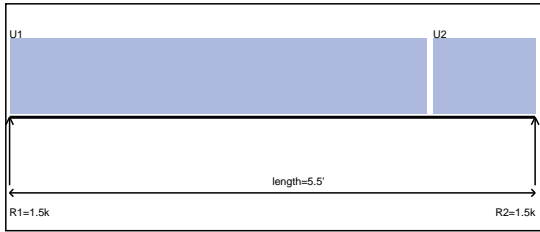
Uniform 1 = 0.53 klf (0.0'-5.6')
Uniform 2 = 0.53 klf (5.6'-6.2')

Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
 $\Delta = (D + L)$

V = 1.64k	Vall = 3.88k	Ratio = 0.42
M = 2.55k-ft	Mall = 4.49k-ft	Ratio = 0.57
Deflection		
TL = 0.05" L/999+ > L/240 min		
DL = 0.01"		
L = 0.04" L/999+ > L/360 min		

4x10 DF #2

Description - Main Floor Framing Plan - B1-20 - Dropped



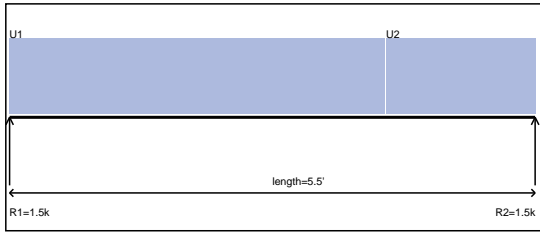
Uniform 1 = 0.53 klf (0.0'-4.4')
Uniform 2 = 0.53 klf (4.4'-5.5')

Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
 $\Delta = (D + L)$

V = 1.45k	Vall = 3.88k	Ratio = 0.37
M = 1.99k-ft	Mall = 4.49k-ft	Ratio = 0.44
Deflection		
TL = 0.03" L/999+ > L/240 min		
DL = 0.01"		
L = 0.02" L/999+ > L/360 min		

4x10 DF #2

Description - Main Floor Framing Plan - B1-21 - Dropped



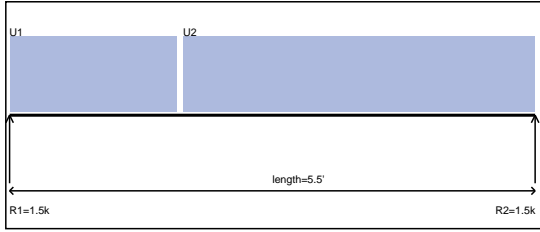
Uniform 1 = 0.53 klf (0.0'-3.9')
Uniform 2 = 0.53 klf (3.9'-5.5')

Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
 $\Delta = (D + L)$

V = 1.45k	Vall = 3.88k	Ratio = 0.37
M = 2.00k-ft	Mall = 4.49k-ft	Ratio = 0.44
Deflection		
TL = 0.03" L/999+ > L/240 min		
DL = 0.01"		
L = 0.02" L/999+ > L/360 min		

4x10 DF #2

Description - Main Floor Framing Plan - B1-22 - Dropped



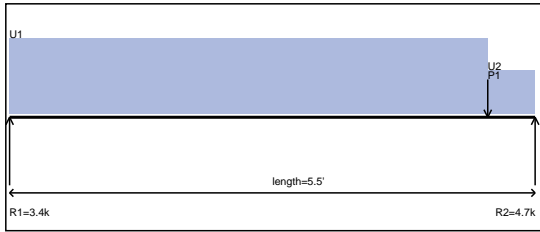
Uniform 1 = 0.53 klf (0.0'-1.7')
Uniform 2 = 0.53 klf (1.8'-5.5')

Controlling Load Combination/ Cd
 $V = (D + L) \quad Cd=1$
 $M = (D + L) \quad Cd=1$
 $\Delta = (D + L)$

V = 1.43k	Vall = 3.88k	Ratio = 0.37
M = 1.94k-ft	Mall = 4.49k-ft	Ratio = 0.43
Deflection		
TL = 0.03" L/999+ > L/240 min		
DL = 0.01"		
L = 0.02" L/999+ > L/360 min		

4x10 DF #2

Description - Main Floor Framing Plan - B1-23 - Dropped



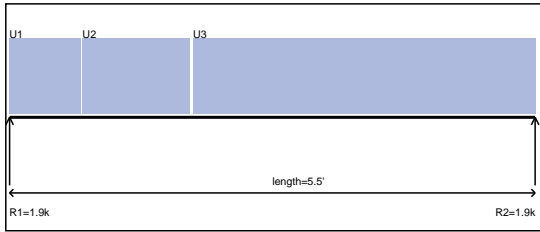
Uniform 1 = 1.18 klf (0.0'-5.0') P1 = 1.75 K (5.0')
Uniform 2 = 0.68 klf (5.0'-5.5')

Controlling Load Combination/ Cd
 $V = (D + 0.75 * (L + S)) \quad Cd=1.15$
 $M = (D + 0.75 * (L + S)) \quad Cd=1.15$
 $\Delta = (D + 0.75 * (L + S))$

V = 3.79k	Vall = 4.47k	Ratio = 0.85
M = 4.01k-ft	Mall = 5.17k-ft	Ratio = 0.78
Deflection		
TL = 0.06" L/999+ > L/240 min		
DL = 0.02"		
L = 0.03" L/999+ > L/360 min		

4x10 DF #2

Description - Main Floor Framing Plan - B1-24 - Dropped



Uniform 1 = 0.68 klf (0.0'-0.7')
Uniform 2 = 0.68 klf (0.8'-1.9')
Uniform 3 = 0.68 klf (1.9'-5.5')

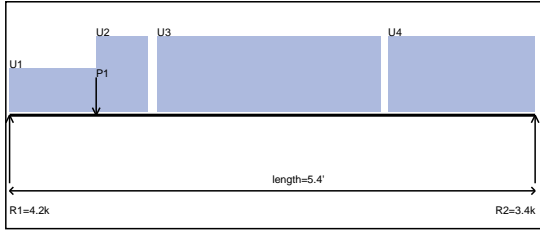
Controlling Load Combination/ Cd
 $V = (D + L) \quad Cd=1$
 $M = (D + L) \quad Cd=1$
 $\Delta = (D + L)$

V = 1.88k	Vall = 3.88k	Ratio = 0.48
M = 2.58k-ft	Mall = 4.49k-ft	Ratio = 0.58
Deflection		
TL = 0.04" L/999+ > L/240 min		
DL = 0.01"		
L = 0.03" L/999+ > L/360 min		

4x10 DF #2



Description - Main Floor Framing Plan - B1-25 - Dropped



Uniform 1 = 0.68 klf (0.0'-0.9') P1 = 1.75 K (0.9')

Uniform 2 = 1.18 klf (0.9'-1.4')

Uniform 3 = 1.18 klf (1.5'-3.8')

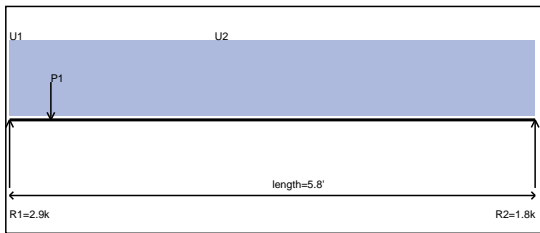
Uniform 4 = 1.18 klf (3.9'-5.4')

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

V = 3.42k	Vall = 4.47k	Ratio = 0.77
M = 4.05k-ft	Mall = 5.17k-ft	Ratio = 0.78
Deflection		
TL = 0.06" L/999+ > L/240 min		
DL = 0.02"		
L = 0.02" L/999+ > L/360 min		

4x10 DF #2

Description - Main Floor Framing Plan - B1-26 - Dropped



Uniform 1 = 0.58 klf (0.0'-2.2') P1 = 1.29 K (0.5')

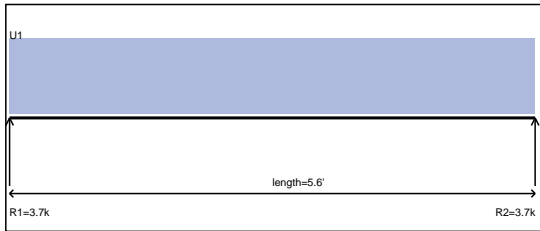
Uniform 2 = 0.58 klf (2.2'-5.8')

Controlling Load Combination/ Cd
 $V = (D + L)$ Cd=1
 $M = (D + L)$ Cd=1
 $\Delta = (D + L)$

V = 2.05k	Vall = 3.88k	Ratio = 0.53
M = 2.50k-ft	Mall = 4.49k-ft	Ratio = 0.56
Deflection		
TL = 0.04" L/999+ > L/240 min		
DL = 0.01"		
L = 0.03" L/999+ > L/360 min		

4x10 DF #2

Description - Main Floor Framing Plan - B1-27 - Dropped



Uniform 1 = 1.32 klf (0.0'-5.6')

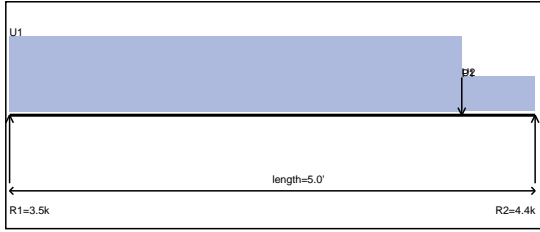
Controlling Load Combination/ Cd
 $V = (D + 0.75 * (L + S))$ Cd=1.15
 $M = (D + 0.75 * (L + S))$ Cd=1.15
 $\Delta = (D + 0.75 * (L + S))$

V = 3.03k	Vall = 4.47k	Ratio = 0.68
M = 4.21k-ft	Mall = 5.17k-ft	Ratio = 0.81
Deflection		
TL = 0.06" L/999+ > L/240 min		
DL = 0.02"		
L = 0.02" L/999+ > L/360 min		

4x10 DF #2



Description - Main Floor Framing Plan - B1-28 - Dropped



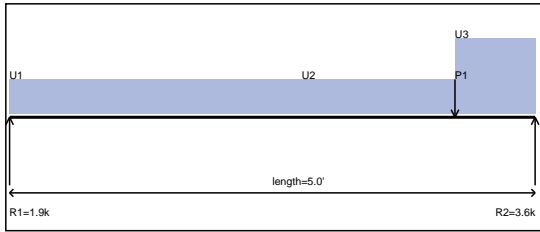
Uniform 1 = 1.32 klf (0.0'-4.3') P1 = 1.78 K (4.3')
Uniform 2 = 0.61 klf (4.3'-5.0')

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

V = 3.59k	Vall = 4.47k	Ratio = 0.80
M = 3.83k-ft	Mall = 5.17k-ft	Ratio = 0.74
Deflection		
TL = 0.05" L/999+ > L/240 min		
DL = 0.02"		
L = 0.02" L/999+ > L/360 min		

4x10 DF #2

Description - Main Floor Framing Plan - B1-29 - Dropped



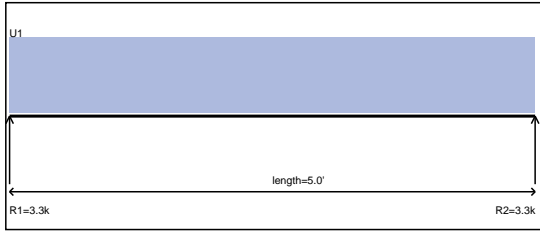
Uniform 1 = 0.61 klf (0.0'-2.8') P1 = 1.78 K (4.2')
Uniform 2 = 0.61 klf (2.8'-4.2')
Uniform 3 = 1.32 klf (4.2'-5.0')

Controlling Load Combination/ Cd
V = (D + 0.75 * (L + S)) Cd=1.15
M = (D + L) Cd=1
 $\Delta = (D + 0.75 * (L + S))$

V = 2.92k	Vall = 4.47k	Ratio = 0.65
M = 2.13k-ft	Mall = 4.49k-ft	Ratio = 0.47
Deflection		
TL = 0.03" L/999+ > L/240 min		
DL = 0.01"		
L = 0.02" L/999+ > L/360 min		

4x10 DF #2

Description - Main Floor Framing Plan - B1-30 - Dropped



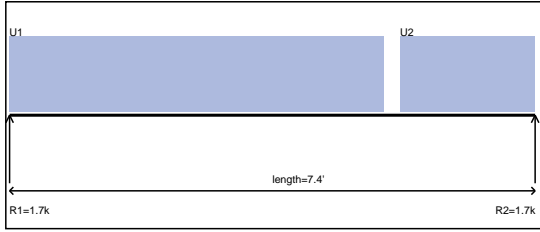
Uniform 1 = 1.32 klf (0.0'-5.0')

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

V = 2.73k	Vall = 4.47k	Ratio = 0.61
M = 3.41k-ft	Mall = 5.17k-ft	Ratio = 0.66
Deflection		
TL = 0.04" L/999+ > L/240 min		
DL = 0.02"		
L = 0.02" L/999+ > L/360 min		

4x10 DF #2

Description - Main Floor Framing Plan - B1-31 - Dropped



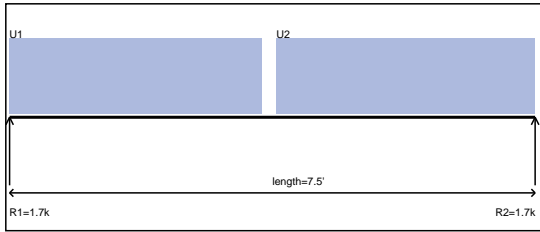
Uniform 1 = 0.46 klf (0.0'-5.3')
Uniform 2 = 0.46 klf (5.5'-7.4')

Controlling Load Combination/ Cd
 $V = (D + L) \quad Cd=1$
 $M = (D + L) \quad Cd=1$
 $\Delta = (D + L)$

V = 1.69k	Vall = 3.88k	Ratio = 0.43
M = 3.07k-ft	Mall = 4.49k-ft	Ratio = 0.68
Deflection		
TL = 0.08" L/999+ > L/240 min		
DL = 0.02"		
L = 0.07" L/999+ > L/360 min		

4x10 DF #2

Description - Main Floor Framing Plan - B1-32 - Dropped



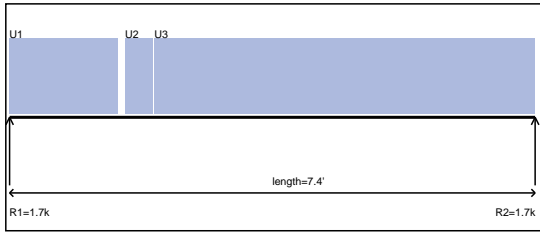
Uniform 1 = 0.46 klf (0.0'-3.6')
Uniform 2 = 0.46 klf (3.8'-7.5')

Controlling Load Combination/ Cd
 $V = (D + L) \quad Cd=1$
 $M = (D + L) \quad Cd=1$
 $\Delta = (D + L)$

V = 1.69k	Vall = 3.88k	Ratio = 0.43
M = 3.07k-ft	Mall = 4.49k-ft	Ratio = 0.68
Deflection		
TL = 0.08" L/999+ > L/240 min		
DL = 0.02"		
L = 0.07" L/999+ > L/360 min		

4x10 DF #2

Description - Main Floor Framing Plan - B1-33 - Dropped



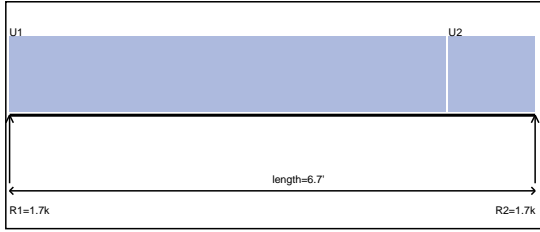
Uniform 1 = 0.46 klf (0.0'-1.5')
Uniform 2 = 0.46 klf (1.6'-2.0')
Uniform 3 = 0.46 klf (2.0'-7.4')

Controlling Load Combination/ Cd
 $V = (D + L) \quad Cd=1$
 $M = (D + L) \quad Cd=1$
 $\Delta = (D + L)$

V = 1.69k	Vall = 3.88k	Ratio = 0.44
M = 3.10k-ft	Mall = 4.49k-ft	Ratio = 0.69
Deflection		
TL = 0.08" L/999+ > L/240 min		
DL = 0.02"		
L = 0.07" L/999+ > L/360 min		

4x10 DF #2

Description - Main Floor Framing Plan - B1-34 - Dropped



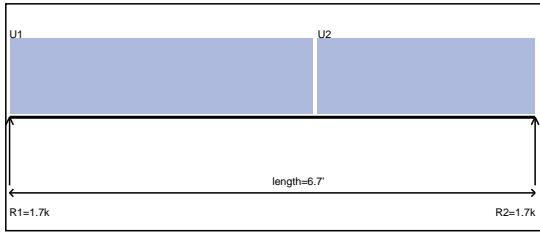
Uniform 1 = 0.49 klf (0.0'-5.6')
Uniform 2 = 0.49 klf (5.6'-6.7')

Controlling Load Combination/ Cd
 $V = (D + L) \quad Cd=1$
 $M = (D + L) \quad Cd=1$
 $\Delta = (D + L)$

V = 1.63k	Vall = 3.88k	Ratio = 0.42
M = 2.72k-ft	Mall = 4.49k-ft	Ratio = 0.61
Deflection		
TL = 0.06" L/999+ > L/240 min		
DL = 0.01"		
L = 0.05" L/999+ > L/360 min		

4x10 DF #2

Description - Main Floor Framing Plan - B1-35 - Dropped



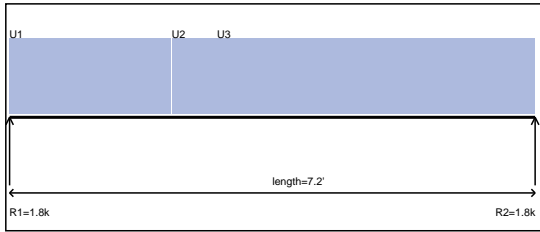
Uniform 1 = 0.49 klf (0.0'-3.9')
Uniform 2 = 0.49 klf (3.9'-6.7')

Controlling Load Combination/ Cd
 $V = (D + L) \quad Cd=1$
 $M = (D + L) \quad Cd=1$
 $\Delta = (D + L)$

V = 1.63k	Vall = 3.88k	Ratio = 0.42
M = 2.71k-ft	Mall = 4.49k-ft	Ratio = 0.60
Deflection		
TL = 0.06" L/999+ > L/240 min		
DL = 0.01"		
L = 0.05" L/999+ > L/360 min		

4x10 DF #2

Description - Main Floor Framing Plan - B1-36 - Dropped



Uniform 1 = 0.49 klf (0.0'-2.2')
Uniform 2 = 0.49 klf (2.2'-2.9')
Uniform 3 = 0.49 klf (2.9'-7.2')

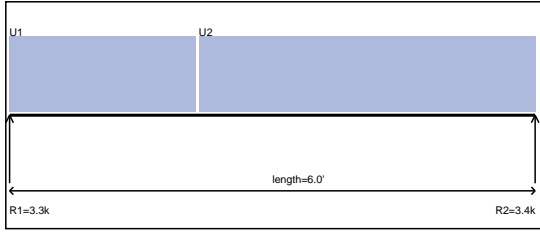
Controlling Load Combination/ Cd
 $V = (D + L) \quad Cd=1$
 $M = (D + L) \quad Cd=1$
 $\Delta = (D + L)$

V = 1.76k	Vall = 3.88k	Ratio = 0.45
M = 3.18k-ft	Mall = 4.49k-ft	Ratio = 0.71
Deflection		
TL = 0.08" L/999+ > L/240 min		
DL = 0.02"		
L = 0.06" L/999+ > L/360 min		

4x10 DF #2



Description - Main Floor Framing Plan - B1-37 - Dropped



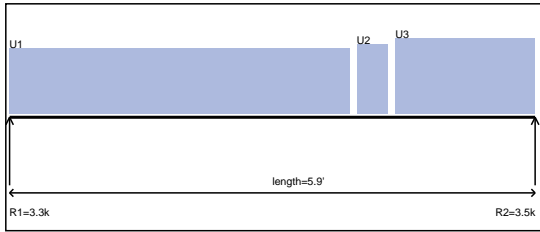
Uniform 1 = 1.11 klf (0.0'-2.1')
Uniform 2 = 1.11 klf (2.1'-6.0')

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

V = 2.74k	Vall = 4.47k	Ratio = 0.61
M = 4.06k-ft	Mall = 5.17k-ft	Ratio = 0.79
Deflection		
TL = 0.07" L/999+ > L/240 min		
DL = 0.03"		
L = 0.03" L/999+ > L/360 min		

4x10 DF #2

Description - Main Floor Framing Plan - B1-38 - Dropped



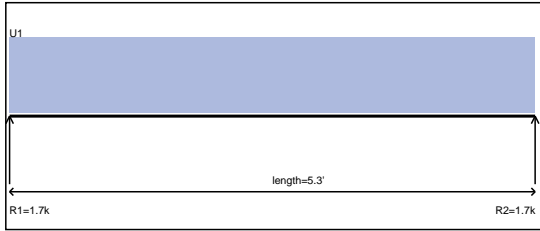
Uniform 1 = 1.11 klf (0.0'-3.8')
Uniform 2 = 1.18 klf (3.9'-4.3')
Uniform 3 = 1.28 klf (4.3'-5.9')

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

V = 2.83k	Vall = 4.47k	Ratio = 0.63
M = 4.01k-ft	Mall = 5.17k-ft	Ratio = 0.78
Deflection		
TL = 0.07" L/999+ > L/240 min		
DL = 0.03"		
L = 0.03" L/999+ > L/360 min		

4x10 DF #2

Description - Main Floor Framing Plan - B1-39 - Dropped



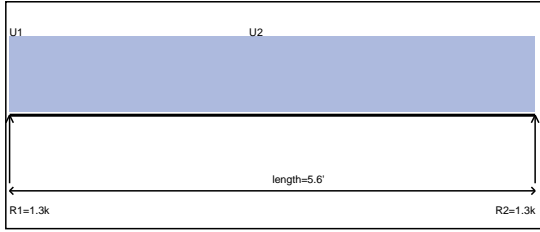
Uniform 1 = 0.61 klf (0.0'-5.3')

Controlling Load Combination/ Cd
 $V = (D + L)$ Cd=1
 $M = (D + L)$ Cd=1
 $\Delta = (D + L)$

V = 1.62k	Vall = 3.88k	Ratio = 0.42
M = 2.16k-ft	Mall = 4.49k-ft	Ratio = 0.48
Deflection		
TL = 0.03" L/999+ > L/240 min		
DL = 0.01"		
L = 0.02" L/999+ > L/360 min		

4x10 DF #2

Description - Main Floor Framing Plan - B1-40 - Dropped



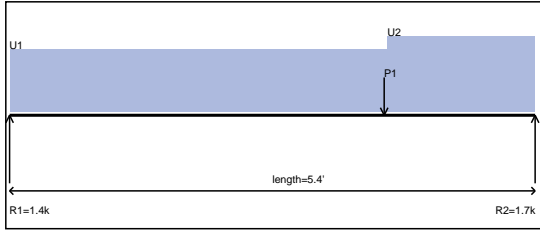
Uniform 1 = 0.46 klf (0.0'-2.5')
Uniform 2 = 0.46 klf (2.5'-5.6')

Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
 $\Delta = (D + L)$

V = 1.27k	Vall = 3.88k	Ratio = 0.33
M = 1.76k-ft	Mall = 4.49k-ft	Ratio = 0.39
Deflection		
TL = 0.03" L/999+ > L/240 min		
DL = 0.01"		
L = 0.02" L/999+ > L/360 min		

4x10 DF #2

Description - Main Floor Framing Plan - B1-41 - Dropped



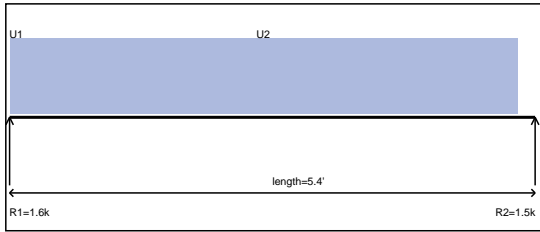
Uniform 1 = 0.46 klf (0.0'-3.9') P1 = 0.37 K (3.8')
Uniform 2 = 0.56 klf (3.9'-5.4')

Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
 $\Delta = (D + L)$

V = 1.62k	Vall = 3.88k	Ratio = 0.42
M = 2.01k-ft	Mall = 4.49k-ft	Ratio = 0.45
Deflection		
TL = 0.03" L/999+ > L/240 min		
DL = 0.01"		
L = 0.02" L/999+ > L/360 min		

4x10 DF #2

Description - Main Floor Framing Plan - B1-42 - Dropped



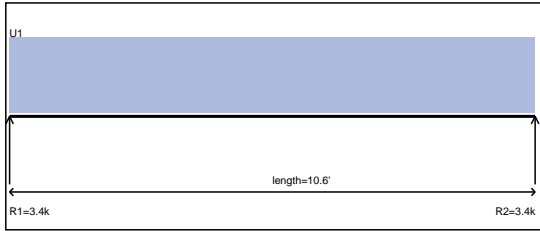
Uniform 1 = 0.56 klf (0.0'-2.5')
Uniform 2 = 0.56 klf (2.5'-5.2')

Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
 $\Delta = (D + L)$

V = 1.50k	Vall = 3.88k	Ratio = 0.39
M = 2.02k-ft	Mall = 4.49k-ft	Ratio = 0.45
Deflection		
TL = 0.03" L/999+ > L/240 min		
DL = 0.01"		
L = 0.02" L/999+ > L/360 min		

4x10 DF #2

Description - Main Floor Framing Plan - B1-43 - Flush



Uniform 1 = 0.63 klf (0.0'-10.6')

Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
 $\Delta = (D + L)$

V = 3.31k	Vall = 3.95k	Ratio = 0.84
M = 8.75k-ft	Mall = 8.91k-ft	Ratio = 0.98
Deflection		
TL = 0.38" L/335 > L/240 min		
DL = 0.15"		
L = 0.23" L/547 > L/360 min		

1-3/4x11-7/8 LVL

Description - Main Floor Framing Plan - B1-44 - Flush



P1 = 6.13 K (7.3')

Controlling Load Combination/ Cd

V = (D + S) Cd=1.15

M = (D + S) Cd=1.15

Δ = (D + S)

V = 5.64k	Vall = 9.08k	Ratio = 0.62
M = 3.59k-ft	Mall = 20.50k-ft	Ratio = 0.18

Deflection

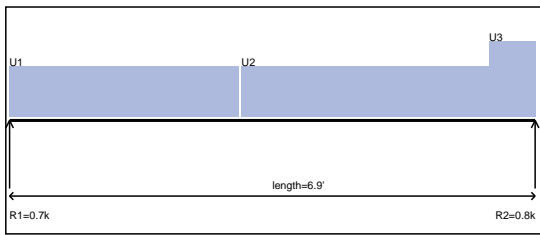
TL = 0.04" L/999+ > L/240 min

DL = 0.01"

L = 0.00" L/999+ > L/360 min

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

Description - Main Floor Framing Plan - B1-47 - Flush



Uniform 1 = 0.20 klf (0.0'-3.0')

Uniform 2 = 0.20 klf (3.1'-6.3')

Uniform 3 = 0.30 klf (6.3'-6.9')

Controlling Load Combination/ Cd

V = (D + L) Cd=1

M = (D + L) Cd=1

Δ = (D + L)

V = 0.75k	Vall = 3.95k	Ratio = 0.19
M = 1.19k-ft	Mall = 8.91k-ft	Ratio = 0.13

Deflection

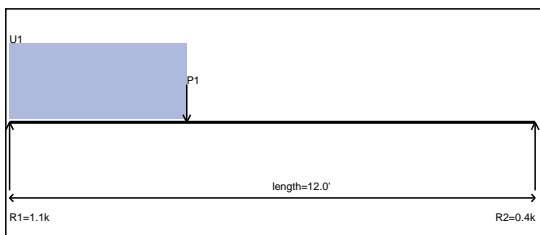
TL = 0.02" L/999+ > L/240 min

DL = 0.00"

L = 0.02" L/999+ > L/360 min

1-3/4x11-7/8 LVL

Description - Main Floor Framing Plan - B1-48 - Flush



Uniform 1 = 0.17 klf (0.0'-4.1')

P1 = 0.75 K (4.1')

Controlling Load Combination/ Cd

V = (D + L) Cd=1

M = (D + L) Cd=1

Δ = (D + L)

V = 1.07k	Vall = 3.95k	Ratio = 0.27
M = 2.94k-ft	Mall = 8.91k-ft	Ratio = 0.33

Deflection

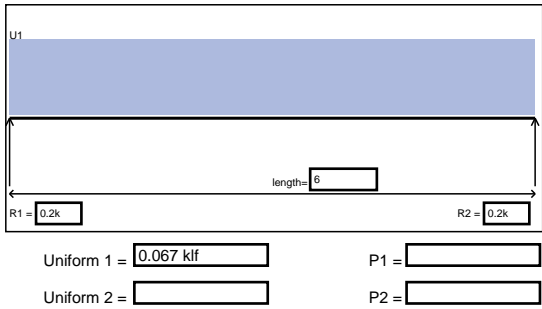
TL = 0.17" L/875 > L/240 min

DL = 0.03"

L = 0.13" L/999+ > L/360 min

1-3/4x11-7/8 LVL

Description - **Main Floor Framing - F1-1 - Flush Bottom**



Controlling Load Combination/ Cd

V = (D + L) Cd = 1

M = (D + L) Cd = 1

Δ = (D + L)

V = 0.2k Vall = 1.09k Ratio = 0.18

M = 0.3k-ft Mall = 1.28k-ft Ratio = 0.23

Deflection

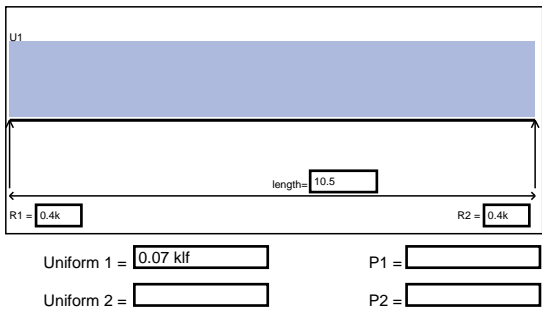
TL = 0.03" L/999+ > L/240 min

DL = 0.01"

L = 0.03" L/999+ > L/360 min

2x8 HF #2 @ 16" o.c.

Description - **Low Roof Framing - F10-1 - Flush**



Controlling Load Combination/ Cd

V = (D + S) Cd = 1.15

M = (D + S) Cd = 1.15

Δ = (D + S)

V = 0.4k Vall = 1.25k Ratio = 0.32

M = 1.0k-ft Mall = 1.48k-ft Ratio = 0.68

Deflection

TL = 0.31" L/999+ > L/240 min

DL = 0.09"

L = 0.00" L/999+ > L/360 min

2x8 HF #2 @ 24" o.c.

Description -



Controlling Load Combination/ Cd

V = Cd =

M = Cd =

Δ =

V = Vall = Ratio =

M = Mall = Ratio =

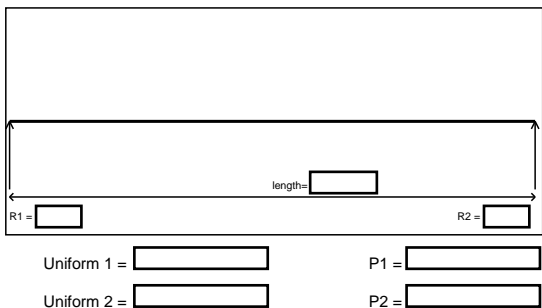
Deflection

TL =

DL =

L =

Description -



Controlling Load Combination/ Cd

V = Cd =

M = Cd =

Δ =

V = Vall = Ratio =

M = Mall = Ratio =

Deflection

TL =

DL =

L =

Wood Beam

Project File: 5330 Butterworth Rd.ec6

LIC# : KW-06017913, Build:20.24.08.01

MULHERN & KULP STRUCTURAL ENGINEERING INC

(c) ENERCALC INC 1983-2023

DESCRIPTION: B10-1/3

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	C _{fu}	C _i	C _r	M	fb	F'b	V	fv	F'v
Length = 2.250 ft	1	0.119	0.048	1.00	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.45	104.0	875.0	0.23	8.2	170.0
Length = 2.750 ft	2	0.119	0.048	1.00	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.45	104.0	875.0	0.20	8.2	170.0
+D+L+H, LL Comb Run (LL)						1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 2.250 ft	1	0.119	0.048	1.00	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.45	104.0	875.0	0.23	8.2	170.0
Length = 2.750 ft	2	0.119	0.048	1.00	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.45	104.0	875.0	0.20	8.2	170.0
+D+Lr+H, LL Comb Run (*L)						1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 2.250 ft	1	0.095	0.039	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.45	104.0	1,093.8	0.23	8.2	212.5
Length = 2.750 ft	2	0.095	0.039	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.45	104.0	1,093.8	0.20	8.2	212.5
+D+Lr+H, LL Comb Run (L*)						1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 2.250 ft	1	0.095	0.039	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.45	104.0	1,093.8	0.23	8.2	212.5
Length = 2.750 ft	2	0.095	0.039	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.45	104.0	1,093.8	0.20	8.2	212.5
+D+Lr+H, LL Comb Run (LL)						1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 2.250 ft	1	0.095	0.039	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.45	104.0	1,093.8	0.23	8.2	212.5
Length = 2.750 ft	2	0.095	0.039	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.45	104.0	1,093.8	0.20	8.2	212.5
+D+S+H						1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 2.250 ft	1	0.361	0.147	1.15	1.00	1.00	1.00	1.000	1.00	1.00	1.00	1.56	363.5	1,006.3	0.79	28.7	195.5
Length = 2.750 ft	2	0.361	0.147	1.15	1.00	1.00	1.00	1.000	1.00	1.00	1.00	1.56	363.5	1,006.3	0.71	28.7	195.5
+D+0.750Lr+0.750L+H, LL Cor						1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 2.250 ft	1	0.095	0.039	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.45	104.0	1,093.8	0.23	8.2	212.5
Length = 2.750 ft	2	0.095	0.039	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.45	104.0	1,093.8	0.20	8.2	212.5
+D+0.750Lr+0.750L+H, LL Cor						1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 2.250 ft	1	0.095	0.039	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.45	104.0	1,093.8	0.23	8.2	212.5
Length = 2.750 ft	2	0.095	0.039	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.45	104.0	1,093.8	0.20	8.2	212.5
+D+0.750Lr+0.750L+H, LL Cor						1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 2.250 ft	1	0.095	0.039	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.45	104.0	1,093.8	0.23	8.2	212.5
Length = 2.750 ft	2	0.095	0.039	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.45	104.0	1,093.8	0.20	8.2	212.5
+D+0.750L+0.750S+H, LL Cor						1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 2.250 ft	1	0.297	0.121	1.15	1.00	1.00	1.00	1.000	1.00	1.00	1.00	1.28	298.7	1,006.3	0.65	23.6	195.5
Length = 2.750 ft	2	0.297	0.121	1.15	1.00	1.00	1.00	1.000	1.00	1.00	1.00	1.28	298.7	1,006.3	0.58	23.6	195.5
+D+0.750L+0.750S+H, LL Cor						1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 2.250 ft	1	0.297	0.121	1.15	1.00	1.00	1.00	1.000	1.00	1.00	1.00	1.28	298.7	1,006.3	0.65	23.6	195.5
Length = 2.750 ft	2	0.297	0.121	1.15	1.00	1.00	1.00	1.000	1.00	1.00	1.00	1.28	298.7	1,006.3	0.58	23.6	195.5
+D+0.750L+0.750S+H, LL Cor						1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 2.250 ft	1	0.297	0.121	1.15	1.00	1.00	1.00	1.000	1.00	1.00	1.00	1.28	298.7	1,006.3	0.65	23.6	195.5
Length = 2.750 ft	2	0.297	0.121	1.15	1.00	1.00	1.00	1.000	1.00	1.00	1.00	1.28	298.7	1,006.3	0.58	23.6	195.5
+D+0.60W+H						1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 2.250 ft	1	0.074	0.030	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.45	104.0	1,400.0	0.23	8.2	272.0
Length = 2.750 ft	2	0.074	0.030	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.45	104.0	1,400.0	0.20	8.2	272.0
+D+0.750Lr+0.750L+0.450W+						1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 2.250 ft	1	0.074	0.030	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.45	104.0	1,400.0	0.23	8.2	272.0
Length = 2.750 ft	2	0.074	0.030	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.45	104.0	1,400.0	0.20	8.2	272.0
+D+0.750Lr+0.750L+0.450W+						1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 2.250 ft	1	0.074	0.030	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.45	104.0	1,400.0	0.23	8.2	272.0
Length = 2.750 ft	2	0.074	0.030	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.45	104.0	1,400.0	0.20	8.2	272.0
+D+0.750Lr+0.750L+0.450W+						1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 2.250 ft	1	0.074	0.030	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.45	104.0	1,400.0	0.23	8.2	272.0
Length = 2.750 ft	2	0.074	0.030	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.45	104.0	1,400.0	0.20	8.2	272.0

Wood Beam

Project File: 5330 Butterworth Rd.ec6

LIC# : KW-06017913, Build:20.24.08.01

MULHERN & KULP STRUCTURAL ENGINEERING INC

(c) ENERCALC INC 1983-2023

DESCRIPTION: B10-1/3

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios									Moment Values			Shear Values			
			M	V	CD	CM	C _t	CLx	C _F	C _{fu}	C _i	C _r	M	fb	F'b	V	fv	F'v
+D+0.750L+0.750S+0.450W+I						1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 2.250 ft	1	0.213	0.087	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	1.28	298.7	1,400.0	0.65	23.6	272.0	
Length = 2.750 ft	2	0.213	0.087	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	1.28	298.7	1,400.0	0.58	23.6	272.0	
+D+0.750L+0.750S+0.450W+I						1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 2.250 ft	1	0.213	0.087	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	1.28	298.7	1,400.0	0.65	23.6	272.0	
Length = 2.750 ft	2	0.213	0.087	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	1.28	298.7	1,400.0	0.58	23.6	272.0	
+D+0.750L+0.750S+0.450W+I						1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 2.250 ft	1	0.213	0.087	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	1.28	298.7	1,400.0	0.65	23.6	272.0	
Length = 2.750 ft	2	0.213	0.087	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	1.28	298.7	1,400.0	0.58	23.6	272.0	
+0.60D+0.60W+0.60H						1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 2.250 ft	1	0.045	0.018	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.27	62.4	1,400.0	0.14	4.9	272.0	
Length = 2.750 ft	2	0.045	0.018	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.27	62.4	1,400.0	0.12	4.9	272.0	
+D+0.70E+H						1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 2.250 ft	1	0.074	0.030	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.45	104.0	1,400.0	0.23	8.2	272.0	
Length = 2.750 ft	2	0.074	0.030	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.45	104.0	1,400.0	0.20	8.2	272.0	
+D+0.750L+0.750S+0.5250E+						1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 2.250 ft	1	0.213	0.087	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	1.28	298.7	1,400.0	0.65	23.6	272.0	
Length = 2.750 ft	2	0.213	0.087	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	1.28	298.7	1,400.0	0.58	23.6	272.0	
+D+0.750L+0.750S+0.5250E+						1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 2.250 ft	1	0.213	0.087	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	1.28	298.7	1,400.0	0.65	23.6	272.0	
Length = 2.750 ft	2	0.213	0.087	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	1.28	298.7	1,400.0	0.58	23.6	272.0	
+D+0.750L+0.750S+0.5250E+						1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 2.250 ft	1	0.213	0.087	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	1.28	298.7	1,400.0	0.65	23.6	272.0	
Length = 2.750 ft	2	0.213	0.087	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	1.28	298.7	1,400.0	0.58	23.6	272.0	
+0.60D+0.70E+0.60H						1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 2.250 ft	1	0.045	0.018	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.27	62.4	1,400.0	0.14	4.9	272.0	
Length = 2.750 ft	2	0.045	0.018	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.27	62.4	1,400.0	0.12	4.9	272.0	

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.0365	0.000		0.0000	0.000
	2	0.0000	0.000	+D+S+H	-0.0044	1.122

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Max Upward from all Load Conditions		1.727	
Max Upward from Load Combinations		1.727	
Max Upward from Load Cases		1.234	
Max Downward from all Load Conditions			-0.312
Max Downward from Load Combinations			-0.312
Max Downward from Load Cases (Resis)			-0.223
+D+H		0.494	-0.090
+D+L+H, LL Comb Run (*L)		0.494	-0.090
+D+L+H, LL Comb Run (L*)		0.494	-0.090
+D+L+H, LL Comb Run (LL)		0.494	-0.090
+D+Lr+H, LL Comb Run (*L)		0.494	-0.090
+D+Lr+H, LL Comb Run (L*)		0.494	-0.090
+D+Lr+H, LL Comb Run (LL)		0.494	-0.090
+D+S+H		1.727	-0.312
+D+0.750Lr+0.750L+H, LL Comb Run (*)		0.494	-0.090
+D+0.750Lr+0.750L+H, LL Comb Run (L)		0.494	-0.090
+D+0.750Lr+0.750L+H, LL Comb Run (L)		0.494	-0.090

Wood Beam

Project File: 5330 Butterworth Rd.ec6

LIC# : KW-06017913, Build:20.24.08.01

MULHERN & KULP STRUCTURAL ENGINEERING INC

(c) ENERCALC INC 1983-2023

DESCRIPTION: B10-1/3**Vertical Reactions**

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2	Support 3
+D+0.750L+0.750S+H, LL Comb Run (*L		1.419	-0.257
+D+0.750L+0.750S+H, LL Comb Run (L*		1.419	-0.257
+D+0.750L+0.750S+H, LL Comb Run (LL		1.419	-0.257
+D+0.60W+H		0.494	-0.090
+D+0.750Lr+0.750L+0.450W+H, LL Comb		0.494	-0.090
+D+0.750Lr+0.750L+0.450W+H, LL Comb		0.494	-0.090
+D+0.750Lr+0.750L+0.450W+H, LL Comb		0.494	-0.090
+D+0.750L+0.750S+0.450W+H, LL Comb		1.419	-0.257
+D+0.750L+0.750S+0.450W+H, LL Comb		1.419	-0.257
+D+0.750L+0.750S+0.450W+H, LL Comb		1.419	-0.257
+0.60D+0.60W+0.60H		0.296	-0.054
+D+0.70E+H		0.494	-0.090
+D+0.750L+0.750S+0.5250E+H, LL Comb		1.419	-0.257
+D+0.750L+0.750S+0.5250E+H, LL Comb		1.419	-0.257
+D+0.750L+0.750S+0.5250E+H, LL Comb		1.419	-0.257
+0.60D+0.70E+0.60H		0.296	-0.054
D Only		0.494	-0.090
S Only		1.234	-0.223
H Only			

Wood Beam

Project File: 5330 Butterworth Rd.ec6

LIC#: KW-06017913, Build:20.24.08.01

MULHERN & KULP STRUCTURAL ENGINEERING INC

(c) ENERCALC INC 1983-2023

DESCRIPTION: B3-1

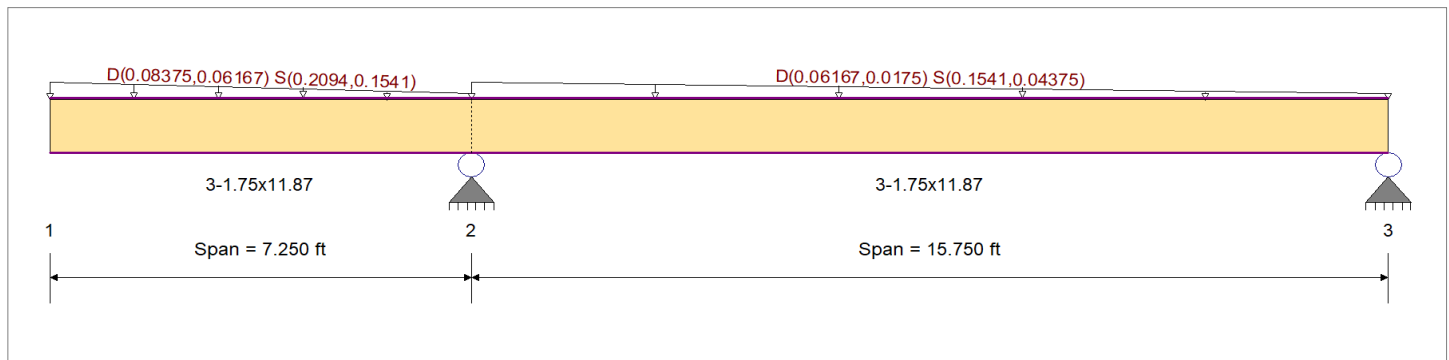
CODE REFERENCES

Calculations per NDS 2018, IBC 2021, ASCE 7-16

Load Combination Set : ASCE 7-16

Material Properties

Analysis Method : Allowable Stress Design	Fb +	2,600.0 psi	E : Modulus of Elasticity
Load Combination : ASCE 7-16	Fb -	2,600.0 psi	Ebend- xx
	Fc - Prll	2,510.0 psi	Eminbend - xx
Wood Species : iLevel Truss Joist	Fc - Perp	750.0 psi	
Wood Grade : MicroLam LVL 1.9 E	Fv	285.0 psi	Density
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling	Ft	1,555.0 psi	42.010pcf



Applied Loads

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

Beam self weight NOT internally calculated and added

Load for Span Number 1

Varying Uniform Load : D= 0.08375->0.06167, S= 0.2094->0.1541 k/ft, Extent = 0.0 -->> 7.250 ft, Trib Width = 1.0 ft

Load for Span Number 2

Varying Uniform Load : D= 0.06167->0.01750, S= 0.1541->0.04375 k/ft, Extent = 0.0 -->> 15.750 ft, Trib Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.228 1	Maximum Shear Stress Ratio	=	0.135 1
Section used for this span		3-1.75x11.87	Section used for this span		3-1.75x11.87
fb: Actual	=	683.35psi	fv: Actual	=	44.39 psi
F'b	=	2,994.26psi	F'v	=	327.75 psi
Load Combination	=	+D+S	Load Combination	=	+D+S
Location of maximum on span	=	7.250ft	Location of maximum on span	=	7.250 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1
Maximum Deflection					
Max Downward Transient Deflection		0.171 in Ratio = 1020 >=360	Span: 1 : S Only		
Max Upward Transient Deflection		-0.015 in Ratio = 12766 >=360	Span: 2 : S Only		
Max Downward Total Deflection		0.239 in Ratio = 728 >=180	Span: 1 : +D+S		
Max Upward Total Deflection		-0.021 in Ratio = 9121 >=180	Span: 2 : +D+S		

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios										Moment Values			Shear Values				
			M	V	CD	CM	C _t	CLx	C _F	C _{fu}	C _i	C _r	M	fb	F'b	V	fv	F'v		
D Only																				
	Length = 7.250 ft	1	0.083	0.049	0.90	1.00	1.00	1.00	1.001	1.00	1.00	1.00	2.01	195.2	2,343.3	0.53	12.7	256.5		
	Length = 15.750 ft	2	0.083	0.049	0.90	1.00	1.00	1.00	1.001	1.00	1.00	1.00	2.01	195.2	2,343.3	0.50	12.7	256.5		
+D+S																				
	Length = 7.250 ft	1	0.228	0.135	1.15	1.00	1.00	1.00	1.001	1.00	1.00	1.00	7.03	683.3	2,994.3	1.84	44.4	327.8		

Wood Beam

Project File: 5330 Butterworth Rd.ec6

LIC# : KW-06017913, Build:20.24.08.01

MULHERN & KULP STRUCTURAL ENGINEERING INC

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DESCRIPTION: B3-1**Maximum Forces & Stresses for Load Combinations**

Load Combination	Segment Length	Span #	Max Stress Ratios									Moment Values			Shear Values			
			M	V	CD	CM	C _t	CLx	C _F	C _{fu}	C _i	C _r	M	fb	F'b	V	fv	F'v
+D+0.750S	Length = 15.750 ft	2	0.228	0.135	1.15	1.00	1.00	1.00	1.001	1.00	1.00	1.00	7.03	683.3	2,994.3	1.74	44.4	327.8
									1.00	1.00	1.00	1.001	1.00	1.00	1.00	0.00	0.00	0.0
+0.60D	Length = 7.250 ft	1	0.187	0.111	1.15	1.00	1.00	1.00	1.001	1.00	1.00	1.00	5.77	561.3	2,994.3	1.52	36.5	327.8
	Length = 15.750 ft	2	0.187	0.111	1.15	1.00	1.00	1.00	1.001	1.00	1.00	1.00	5.77	561.3	2,994.3	1.43	36.5	327.8
	Length = 7.250 ft	1	0.028	0.017	1.60	1.00	1.00	1.00	1.001	1.00	1.00	1.00	1.20	117.1	4,165.9	0.32	7.6	456.0
	Length = 15.750 ft	2	0.028	0.017	1.60	1.00	1.00	1.00	1.001	1.00	1.00	1.00	1.20	117.1	4,165.9	0.30	7.6	456.0

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.2388	0.000		0.0000	0.000
+D+S	2	0.0107	11.351	+D+S	-0.0207	2.816

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Max Upward from all Load Conditions		3.585	0.442
Max Upward from Load Combinations		3.585	0.442
Max Upward from Load Cases		2.560	0.316
D Only		1.024	0.126
+D+S		3.585	0.442
+D+0.750S		2.944	0.363
+0.60D		0.615	0.076
S Only		2.560	0.316

Steel Beam

Project File: 5330 Butterworth Rd.ec6

LIC#: KW-06017913, Build:20.24.08.01

MULHERN & KULP STRUCTURAL ENGINEERING INC

(c) ENERCALC INC 1983-2023

DESCRIPTION: B2-6

CODE REFERENCES

Calculations per AISC 360-16, IBC 2021, ASCE 7-16

Load Combination Set : ASCE 7-16

Material Properties

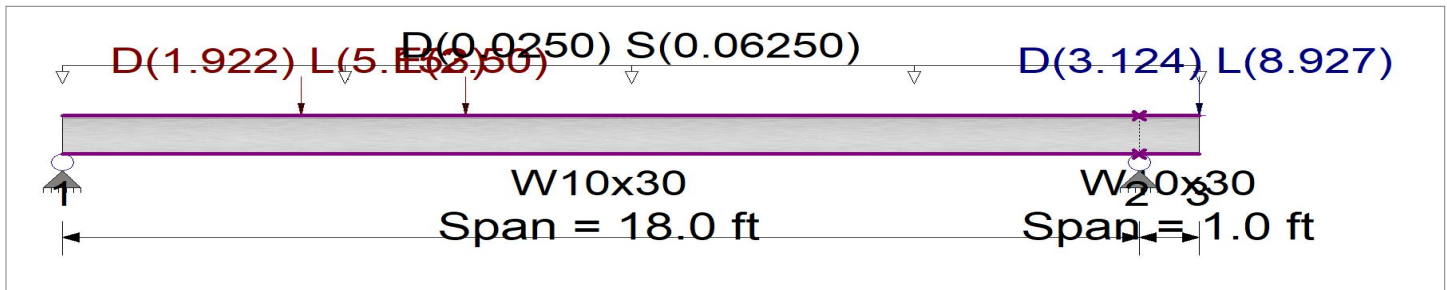
Analysis Method : Allowable Strength Design

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 = 0.010, S = 0.0250 ksf, Tributary Width = 2.50 ft

Load(s) for Span Number 1

Point Load : E = 2.50 k @ 6.750 ft, (OS)

Point Load : D = 1.922, L = 5.153 k @ 4.0 ft, (H2-24)

Linked Load(s)

Beam B2-15, Support 2: D = 3.124, L = 8.927 k @ 19 ft from left end of beam

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.257 : 1	Maximum Shear Stress Ratio =	0.192 : 1
Section used for this span	W10x30	Section used for this span	W10x30
Ma : Applied	23.427 k-ft	Va : Applied	12.106 k
Mn / Omega : Allowable	91.317 k-ft	Vn/Omega : Allowable	63.0 k
Load Combination	+D+L+H, LL Comb Run (*L)	Load Combination	+D+L+H, LL Comb Run (*L)
Location of maximum on span	18.000 ft	Location of maximum on span	18.000 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1
Maximum Deflection			
Max Downward Transient Deflection	0.020 in Ratio = 1,211 >=360	Span: 2 : L Only, LL Comb Run (*L)	
Max Upward Transient Deflection	-0.021 in Ratio = 1,164 >=360	Span: 2 : L Only, LL Comb Run (L*)	
Max Downward Total Deflection	0.236 in Ratio = 915 >=180	Span: 2 : +D+0.750L+0.750S+0.5250E+H, LL Comb Run	
Max Upward Total Deflection	-0.033 in Ratio = 732 >=180	Span: 2 : +D+0.750L+0.750S+0.5250E+H, LL Comb Run	

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios		Summary of Moment Values					Summary of Shear Values				
			M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega Cb	Rm	Va Max	Vnx	Vnx/Omega	
+D+H														
Dsgn. L = 18.00 ft		1	0.075	0.050	6.81	-3.15	6.81	152.50	91.32	1.00	1.00	3.18	94.50	63.00
Dsgn. L = 1.00 ft		2	0.035	0.050		-3.15	3.15	152.50	91.32	1.00	1.00	3.18	94.50	63.00
+D+L+H, LL Comb Run (*L)														
Dsgn. L = 18.00 ft		1	0.132	0.192	4.81	-12.08	12.08	152.50	91.32	1.00	1.00	12.11	94.50	63.00
Dsgn. L = 1.00 ft		2	0.132	0.192		-12.08	12.08	152.50	91.32	1.00	1.00	12.11	94.50	63.00
+D+L+H, LL Comb Run (L*)														
Dsgn. L = 18.00 ft		1	0.250	0.092	22.80	-3.15	22.80	152.50	91.32	1.00	1.00	5.82	94.50	63.00
Dsgn. L = 1.00 ft		2	0.035	0.050		-3.15	3.15	152.50	91.32	1.00	1.00	3.18	94.50	63.00
+D+L+H, LL Comb Run (LL)														
Dsgn. L = 18.00 ft		1	0.228	0.192	20.80	-12.08	20.80	152.50	91.32	1.00	1.00	12.11	94.50	63.00
Dsgn. L = 1.00 ft		2	0.132	0.192		-12.08	12.08	152.50	91.32	1.00	1.00	12.11	94.50	63.00
+D+Lr+H, LL Comb Run (*L)														
Dsgn. L = 18.00 ft		1	0.075	0.050	6.81	-3.15	6.81	152.50	91.32	1.00	1.00	3.18	94.50	63.00
Dsgn. L = 1.00 ft		2	0.035	0.050		-3.15	3.15	152.50	91.32	1.00	1.00	3.18	94.50	63.00
+D+Lr+H, LL Comb Run (L*)														
Dsgn. L = 18.00 ft		1	0.075	0.050	6.81	-3.15	6.81	152.50	91.32	1.00	1.00	3.18	94.50	63.00
Dsgn. L = 1.00 ft		2	0.035	0.050		-3.15	3.15	152.50	91.32	1.00	1.00	3.18	94.50	63.00

Steel Beam

Project File: 5330 Butterworth Rd.ec6

LIC# : KW-06017913, Build:20.24.08.01

MULHERN & KULP STRUCTURAL ENGINEERING INC

(c) ENERCALC INC 1983-2023

DESCRIPTION: B2-6

Maximum Forces & Stresses for Load Combinations

Load Combination	Max Stress Ratios		Summary of Moment Values							Summary of Shear Values				
	Segment Length	Span #	M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega Cb	Rm	Va Max	Vnx	Vnx/Omega	
+D+Lr+H, LL Comb Run (LL)														
Dsgn. L = 18.00 ft	1		0.075	0.050	6.81	-3.15	6.81	152.50	91.32	1.00	1.00	3.18	94.50	63.00
Dsgn. L = 1.00 ft	2		0.035	0.050		-3.15	3.15	152.50	91.32	1.00	1.00	3.18	94.50	63.00
+D+S+H														
Dsgn. L = 18.00 ft	1		0.094	0.051	8.56	-3.18	8.56	152.50	91.32	1.00	1.00	3.24	94.50	63.00
Dsgn. L = 1.00 ft	2		0.035	0.051		-3.18	3.18	152.50	91.32	1.00	1.00	3.24	94.50	63.00
+D+0.750Lr+0.750L+H, LL Comb F														
Dsgn. L = 18.00 ft	1		0.108	0.157	5.31	-9.85	9.85	152.50	91.32	1.00	1.00	9.87	94.50	63.00
Dsgn. L = 1.00 ft	2		0.108	0.157		-9.85	9.85	152.50	91.32	1.00	1.00	9.87	94.50	63.00
+D+0.750Lr+0.750L+H, LL Comb F														
Dsgn. L = 18.00 ft	1		0.206	0.077	18.80	-3.15	18.80	152.50	91.32	1.00	1.00	4.82	94.50	63.00
Dsgn. L = 1.00 ft	2		0.035	0.050		-3.15	3.15	152.50	91.32	1.00	1.00	3.18	94.50	63.00
+D+0.750Lr+0.750L+H, LL Comb F														
Dsgn. L = 18.00 ft	1		0.190	0.157	17.31	-9.85	17.31	152.50	91.32	1.00	1.00	9.87	94.50	63.00
Dsgn. L = 1.00 ft	2		0.108	0.157		-9.85	9.85	152.50	91.32	1.00	1.00	9.87	94.50	63.00
+D+0.750L+0.750S+H, LL Comb R														
Dsgn. L = 18.00 ft	1		0.108	0.157	6.62	-9.87	9.87	152.50	91.32	1.00	1.00	9.92	94.50	63.00
Dsgn. L = 1.00 ft	2		0.108	0.157		-9.87	9.87	152.50	91.32	1.00	1.00	9.92	94.50	63.00
+D+0.750L+0.750S+H, LL Comb R														
Dsgn. L = 18.00 ft	1		0.220	0.083	20.12	-3.18	20.12	152.50	91.32	1.00	1.00	5.24	94.50	63.00
Dsgn. L = 1.00 ft	2		0.035	0.051		-3.18	3.18	152.50	91.32	1.00	1.00	3.23	94.50	63.00
+D+0.750L+0.750S+H, LL Comb R														
Dsgn. L = 18.00 ft	1		0.204	0.157	18.62	-9.87	18.62	152.50	91.32	1.00	1.00	9.92	94.50	63.00
Dsgn. L = 1.00 ft	2		0.108	0.157		-9.87	9.87	152.50	91.32	1.00	1.00	9.92	94.50	63.00
+D+0.60W+H														
Dsgn. L = 18.00 ft	1		0.075	0.050	6.81	-3.15	6.81	152.50	91.32	1.00	1.00	3.18	94.50	63.00
Dsgn. L = 1.00 ft	2		0.035	0.050		-3.15	3.15	152.50	91.32	1.00	1.00	3.18	94.50	63.00
+D+0.750Lr+0.750L+0.450W+H, L														
Dsgn. L = 18.00 ft	1		0.108	0.157	5.31	-9.85	9.85	152.50	91.32	1.00	1.00	9.87	94.50	63.00
Dsgn. L = 1.00 ft	2		0.108	0.157		-9.85	9.85	152.50	91.32	1.00	1.00	9.87	94.50	63.00
+D+0.750Lr+0.750L+0.450W+H, L														
Dsgn. L = 18.00 ft	1		0.206	0.077	18.80	-3.15	18.80	152.50	91.32	1.00	1.00	4.82	94.50	63.00
Dsgn. L = 1.00 ft	2		0.035	0.050		-3.15	3.15	152.50	91.32	1.00	1.00	3.18	94.50	63.00
+D+0.750Lr+0.750L+0.450W+H, L														
Dsgn. L = 18.00 ft	1		0.190	0.157	17.31	-9.85	17.31	152.50	91.32	1.00	1.00	9.87	94.50	63.00
Dsgn. L = 1.00 ft	2		0.108	0.157		-9.85	9.85	152.50	91.32	1.00	1.00	9.87	94.50	63.00
+D+0.750L+0.750S+0.450W+H, LI														
Dsgn. L = 18.00 ft	1		0.108	0.157	6.62	-9.87	9.87	152.50	91.32	1.00	1.00	9.92	94.50	63.00
Dsgn. L = 1.00 ft	2		0.108	0.157		-9.87	9.87	152.50	91.32	1.00	1.00	9.92	94.50	63.00
+D+0.750L+0.750S+0.450W+H, LI														
Dsgn. L = 18.00 ft	1		0.220	0.083	20.12	-3.18	20.12	152.50	91.32	1.00	1.00	5.24	94.50	63.00
Dsgn. L = 1.00 ft	2		0.035	0.051		-3.18	3.18	152.50	91.32	1.00	1.00	3.23	94.50	63.00
+D+0.750L+0.750S+0.450W+H, LI														
Dsgn. L = 18.00 ft	1		0.204	0.157	18.62	-9.87	18.62	152.50	91.32	1.00	1.00	9.92	94.50	63.00
Dsgn. L = 1.00 ft	2		0.108	0.157		-9.87	9.87	152.50	91.32	1.00	1.00	9.92	94.50	63.00
+0.60D+0.60W+0.60H														
Dsgn. L = 18.00 ft	1		0.045	0.030	4.09	-1.89	4.09	152.50	91.32	1.00	1.00	1.91	94.50	63.00
Dsgn. L = 1.00 ft	2		0.021	0.030		-1.89	1.89	152.50	91.32	1.00	1.00	1.91	94.50	63.00
+D+0.70E+H														
Dsgn. L = 18.00 ft	1		0.143	0.050	13.07	-3.15	13.07	152.50	91.32	1.00	1.00	3.18	94.50	63.00
Dsgn. L = 1.00 ft	2		0.035	0.050		-3.15	3.15	152.50	91.32	1.00	1.00	3.18	94.50	63.00
+D+0.750L+0.750S+0.5250E+H, L														
Dsgn. L = 18.00 ft	1		0.115	0.157	10.50	-9.87	10.50	152.50	91.32	1.00	1.00	9.92	94.50	63.00
Dsgn. L = 1.00 ft	2		0.108	0.157		-9.87	9.87	152.50	91.32	1.00	1.00	9.92	94.50	63.00
+D+0.750L+0.750S+0.5250E+H, L														
Dsgn. L = 18.00 ft	1		0.257	0.096	23.43	-3.18	23.43	152.50	91.32	1.00	1.00	6.06	94.50	63.00
Dsgn. L = 1.00 ft	2		0.035	0.051		-3.18	3.18	152.50	91.32	1.00	1.00	3.23	94.50	63.00
+D+0.750L+0.750S+0.5250E+H, L														
Dsgn. L = 18.00 ft	1		0.240	0.157	21.93	-9.87	21.93	152.50	91.32	1.00	1.00	9.92	94.50	63.00
Dsgn. L = 1.00 ft	2		0.108	0.157		-9.87	9.87	152.50	91.32	1.00	1.00	9.92	94.50	63.00
+0.60D+0.70E+0.60H														
Dsgn. L = 18.00 ft	1		0.118	0.035	10.79	-1.89	10.79	152.50	91.32	1.00	1.00	2.18	94.50	63.00

Steel Beam

Project File: 5330 Butterworth Rd.ec6

LIC# : KW-06017913, Build:20.24.08.01

MULHERN & KULP STRUCTURAL ENGINEERING INC

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DESCRIPTION: B2-6

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios		Summary of Moment Values					Summary of Shear Values				
Segment Length	Span #	M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega Cb	Rm	Va Max	Vnx	Vnx/Omega	
Dsgn. L = 1.00 ft	2	0.021	0.030		-1.89	1.89	152.50	91.32	1.00	1.00	1.91	94.50	63.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+0.750L+0.750S+0.5250E+H	1	0.2360	8.064		0.0000	0.000
	2	0.0000	8.064	+D+0.750L+0.750S+0.5250E+H	-0.0328	1.000

Vertical Reactions

Load Combination	Support 1	Support 2	Support 3
Max Upward from all Load Conditions	6.062	14.845	
Max Upward from Load Combinations	6.062	14.845	
Max Upward from Load Cases	4.008	10.568	
Max Downward from all Load Conditions (Resistii	-0.496		
Max Downward from Load Cases (Resisting Uplii	-0.496		
+D+H	1.815	4.277	
+D+L+H, LL Comb Run (*L)	1.319	13.699	
+D+L+H, LL Comb Run (L*)	5.823	5.422	
+D+L+H, LL Comb Run (LL)	5.327	14.845	
+D+Lr+H, LL Comb Run (*L)	1.815	4.277	
+D+Lr+H, LL Comb Run (L*)	1.815	4.277	
+D+Lr+H, LL Comb Run (LL)	1.815	4.277	
+D+S+H	2.376	4.903	
+D+0.750Lr+0.750L+H, LL Comb Run (*L)	1.443	11.344	
+D+0.750Lr+0.750L+H, LL Comb Run (L*)	4.821	5.135	
+D+0.750Lr+0.750L+H, LL Comb Run (LL)	4.449	12.203	
+D+0.750L+0.750S+H, LL Comb Run (*L)	1.863	11.814	
+D+0.750L+0.750S+H, LL Comb Run (L*)	5.241	5.606	
+D+0.750L+0.750S+H, LL Comb Run (LL)	4.869	12.673	
+D+0.60W+H	1.815	4.277	
+D+0.750Lr+0.750L+0.450W+H, LL Comb Run	1.443	11.344	
+D+0.750Lr+0.750L+0.450W+H, LL Comb Run	4.821	5.135	
+D+0.750Lr+0.750L+0.450W+H, LL Comb Run	4.449	12.203	
+D+0.750L+0.750S+0.450W+H, LL Comb Run (	1.863	11.814	
+D+0.750L+0.750S+0.450W+H, LL Comb Run (	5.241	5.606	
+D+0.750L+0.750S+0.450W+H, LL Comb Run (	4.869	12.673	
+0.60D+0.60W+0.60H	1.089	2.566	
+D+0.70E+H	2.909	4.933	
+D+0.750L+0.750S+0.5250E+H, LL Comb Run	2.684	12.306	
+D+0.750L+0.750S+0.5250E+H, LL Comb Run	6.062	6.098	
+D+0.750L+0.750S+0.5250E+H, LL Comb Run	5.690	13.165	
+0.60D+0.70E+0.60H	2.183	3.222	
D Only	1.815	4.277	
L Only, LL Comb Run (*L)	-0.496	9.423	
L Only, LL Comb Run (L*)	4.008	1.145	
L Only, LL Comb Run (LL)	3.512	10.568	
S Only	0.561	0.627	
E Only	1.563	0.937	
H Only			

Support notation : Far left is #1

Values in KIPS

Steel Beam

Project File: 5330 Butterworth Rd.ec6

LIC# : KW-06017913, Build:20.24.08.01

MULHERN & KULP STRUCTURAL ENGINEERING INC

(c) ENERCALC INC 1983-2023

DESCRIPTION: B2-14

Maximum Forces & Stresses for Load Combinations

Load Combination	Max Stress Ratios		Summary of Moment Values						Summary of Shear Values					
	Segment Length	Span #	M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega
Dsgn. L = 14.00 ft	1	0.029	0.043	0.06	-2.69	2.69	152.50	91.32	1.00	1.00	2.71	94.50	63.00	
Dsgn. L = 1.00 ft	2	0.029	0.043		-2.69	2.69	152.50	91.32	1.00	1.00	2.71	94.50	63.00	
+D+S+H														
Dsgn. L = 14.00 ft	1	0.029	0.043	0.06	-2.69	2.69	152.50	91.32	1.00	1.00	2.71	94.50	63.00	
Dsgn. L = 1.00 ft	2	0.029	0.043		-2.69	2.69	152.50	91.32	1.00	1.00	2.71	94.50	63.00	
+D+0.750Lr+0.750L+H, LL Comb F														
Dsgn. L = 14.00 ft	1	0.093	0.135		-8.46	8.46	152.50	91.32	1.00	1.00	8.50	94.50	63.00	
Dsgn. L = 1.00 ft	2	0.093	0.135		-8.46	8.46	152.50	91.32	1.00	1.00	8.50	94.50	63.00	
+D+0.750Lr+0.750L+H, LL Comb F														
Dsgn. L = 14.00 ft	1	0.029	0.043	0.57	-2.69	2.69	152.50	91.32	1.00	1.00	2.71	94.50	63.00	
Dsgn. L = 1.00 ft	2	0.029	0.043		-2.69	2.69	152.50	91.32	1.00	1.00	2.71	94.50	63.00	
+D+0.750Lr+0.750L+H, LL Comb F														
Dsgn. L = 14.00 ft	1	0.093	0.135		-8.46	8.46	152.50	91.32	1.00	1.00	8.50	94.50	63.00	
Dsgn. L = 1.00 ft	2	0.093	0.135		-8.46	8.46	152.50	91.32	1.00	1.00	8.50	94.50	63.00	
+D+0.750L+0.750S+H, LL Comb R														
Dsgn. L = 14.00 ft	1	0.093	0.135		-8.46	8.46	152.50	91.32	1.00	1.00	8.50	94.50	63.00	
Dsgn. L = 1.00 ft	2	0.093	0.135		-8.46	8.46	152.50	91.32	1.00	1.00	8.50	94.50	63.00	
+D+0.750L+0.750S+H, LL Comb R														
Dsgn. L = 14.00 ft	1	0.029	0.043	0.57	-2.69	2.69	152.50	91.32	1.00	1.00	2.71	94.50	63.00	
Dsgn. L = 1.00 ft	2	0.029	0.043		-2.69	2.69	152.50	91.32	1.00	1.00	2.71	94.50	63.00	
+D+0.750L+0.750S+H, LL Comb R														
Dsgn. L = 14.00 ft	1	0.093	0.135		-8.46	8.46	152.50	91.32	1.00	1.00	8.50	94.50	63.00	
Dsgn. L = 1.00 ft	2	0.093	0.135		-8.46	8.46	152.50	91.32	1.00	1.00	8.50	94.50	63.00	
+D+0.60W+H														
Dsgn. L = 14.00 ft	1	0.029	0.043	0.06	-2.69	2.69	152.50	91.32	1.00	1.00	2.71	94.50	63.00	
Dsgn. L = 1.00 ft	2	0.029	0.043		-2.69	2.69	152.50	91.32	1.00	1.00	2.71	94.50	63.00	
+D+0.750Lr+0.750L+0.450W+H, L														
Dsgn. L = 14.00 ft	1	0.093	0.135		-8.46	8.46	152.50	91.32	1.00	1.00	8.50	94.50	63.00	
Dsgn. L = 1.00 ft	2	0.093	0.135		-8.46	8.46	152.50	91.32	1.00	1.00	8.50	94.50	63.00	
+D+0.750Lr+0.750L+0.450W+H, L														
Dsgn. L = 14.00 ft	1	0.029	0.043	0.57	-2.69	2.69	152.50	91.32	1.00	1.00	2.71	94.50	63.00	
Dsgn. L = 1.00 ft	2	0.029	0.043		-2.69	2.69	152.50	91.32	1.00	1.00	2.71	94.50	63.00	
+D+0.750Lr+0.750L+0.450W+H, L														
Dsgn. L = 14.00 ft	1	0.093	0.135		-8.46	8.46	152.50	91.32	1.00	1.00	8.50	94.50	63.00	
Dsgn. L = 1.00 ft	2	0.093	0.135		-8.46	8.46	152.50	91.32	1.00	1.00	8.50	94.50	63.00	
+D+0.750L+0.750S+0.450W+H, LI														
Dsgn. L = 14.00 ft	1	0.093	0.135		-8.46	8.46	152.50	91.32	1.00	1.00	8.50	94.50	63.00	
Dsgn. L = 1.00 ft	2	0.093	0.135		-8.46	8.46	152.50	91.32	1.00	1.00	8.50	94.50	63.00	
+D+0.750L+0.750S+0.450W+H, LI														
Dsgn. L = 14.00 ft	1	0.029	0.043	0.57	-2.69	2.69	152.50	91.32	1.00	1.00	2.71	94.50	63.00	
Dsgn. L = 1.00 ft	2	0.029	0.043		-2.69	2.69	152.50	91.32	1.00	1.00	2.71	94.50	63.00	
+D+0.750L+0.750S+0.450W+H, LI														
Dsgn. L = 14.00 ft	1	0.093	0.135		-8.46	8.46	152.50	91.32	1.00	1.00	8.50	94.50	63.00	
Dsgn. L = 1.00 ft	2	0.093	0.135		-8.46	8.46	152.50	91.32	1.00	1.00	8.50	94.50	63.00	
+0.60D+0.60W+0.60H														
Dsgn. L = 14.00 ft	1	0.018	0.026	0.03	-1.61	1.61	152.50	91.32	1.00	1.00	1.62	94.50	63.00	
Dsgn. L = 1.00 ft	2	0.018	0.026		-1.61	1.61	152.50	91.32	1.00	1.00	1.62	94.50	63.00	
+D+0.70E+H														
Dsgn. L = 14.00 ft	1	0.029	0.043	0.06	-2.69	2.69	152.50	91.32	1.00	1.00	2.71	94.50	63.00	
Dsgn. L = 1.00 ft	2	0.029	0.043		-2.69	2.69	152.50	91.32	1.00	1.00	2.71	94.50	63.00	
+D+0.750L+0.750S+0.5250E+H, L														
Dsgn. L = 14.00 ft	1	0.093	0.135		-8.46	8.46	152.50	91.32	1.00	1.00	8.50	94.50	63.00	
Dsgn. L = 1.00 ft	2	0.093	0.135		-8.46	8.46	152.50	91.32	1.00	1.00	8.50	94.50	63.00	
+D+0.750L+0.750S+0.5250E+H, L														
Dsgn. L = 14.00 ft	1	0.029	0.043	0.57	-2.69	2.69	152.50	91.32	1.00	1.00	2.71	94.50	63.00	
Dsgn. L = 1.00 ft	2	0.029	0.043		-2.69	2.69	152.50	91.32	1.00	1.00	2.71	94.50	63.00	
+D+0.750L+0.750S+0.5250E+H, L														
Dsgn. L = 14.00 ft	1	0.093	0.135		-8.46	8.46	152.50	91.32	1.00	1.00	8.50	94.50	63.00	
Dsgn. L = 1.00 ft	2	0.093	0.135		-8.46	8.46	152.50	91.32	1.00	1.00	8.50	94.50	63.00	
+0.60D+0.70E+0.60H														
Dsgn. L = 14.00 ft	1	0.018	0.026	0.03	-1.61	1.61	152.50	91.32	1.00	1.00	1.62	94.50	63.00	
Dsgn. L = 1.00 ft	2	0.018	0.026		-1.61	1.61	152.50	91.32	1.00	1.00	1.62	94.50	63.00	

Steel Beam

Project File: 5330 Butterworth Rd.ec6

LIC# : KW-06017913, Build:20.24.08.01

MULHERN & KULP STRUCTURAL ENGINEERING INC

(c) ENERCALC INC 1983-2023

DESCRIPTION: B2-14**Overall Maximum Deflections**

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
	1	0.0000	0.000	+D+L+H	-0.0398	8.288
+D+L+H	2	0.0167	1.000		0.0000	8.288

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Max Upward from all Load Conditions	0.345	11.707	
Max Upward from Load Combinations	0.345	11.707	
Max Upward from Load Cases	0.280	8.550	
Max Downward from all Load Conditions (Resisti	-0.550		
Max Downward from Load Combinations (Resisti	-0.485		
Max Downward from Load Cases (Resisting Uplii	-0.550		
+D+H	0.065	3.157	
+D+L+H, LL Comb Run (*L)	-0.485	11.427	
+D+L+H, LL Comb Run (L*)	0.345	3.437	
+D+L+H, LL Comb Run (LL)	-0.205	11.707	
+D+Lr+H, LL Comb Run (*L)	0.065	3.157	
+D+Lr+H, LL Comb Run (L*)	0.065	3.157	
+D+Lr+H, LL Comb Run (LL)	0.065	3.157	
+D+S+H	0.065	3.157	
+D+0.750Lr+0.750L+H, LL Comb Run (*L)	-0.348	9.360	
+D+0.750Lr+0.750L+H, LL Comb Run (L*)	0.275	3.367	
+D+0.750Lr+0.750L+H, LL Comb Run (LL)	-0.138	9.570	
+D+0.750L+0.750S+H, LL Comb Run (*L)	-0.348	9.360	
+D+0.750L+0.750S+H, LL Comb Run (L*)	0.275	3.367	
+D+0.750L+0.750S+H, LL Comb Run (LL)	-0.138	9.570	
+D+0.60W+H	0.065	3.157	
+D+0.750Lr+0.750L+0.450W+H, LL Comb Run	-0.348	9.360	
+D+0.750Lr+0.750L+0.450W+H, LL Comb Run	0.275	3.367	
+D+0.750Lr+0.750L+0.450W+H, LL Comb Run	-0.138	9.570	
+D+0.750L+0.750S+0.450W+H, LL Comb Run (	-0.348	9.360	
+D+0.750L+0.750S+0.450W+H, LL Comb Run (	0.275	3.367	
+D+0.750L+0.750S+0.450W+H, LL Comb Run (	-0.138	9.570	
+0.60D+0.60W+0.60H	0.039	1.894	
+D+0.70E+H	0.065	3.157	
+D+0.750L+0.750S+0.5250E+H, LL Comb Run	-0.348	9.360	
+D+0.750L+0.750S+0.5250E+H, LL Comb Run	0.275	3.367	
+D+0.750L+0.750S+0.5250E+H, LL Comb Run	-0.138	9.570	
+0.60D+0.70E+0.60H	0.039	1.894	
D Only	0.065	3.157	
L Only, LL Comb Run (*L)	-0.550	8.270	
L Only, LL Comb Run (L*)	0.280	0.280	
L Only, LL Comb Run (LL)	-0.270	8.550	
H Only			

Steel Beam

Project File: 5330 Butterworth Rd.ec6

LIC# : KW-06017913, Build:20.24.08.01

MULHERN & KULP STRUCTURAL ENGINEERING INC

(c) ENERCALC INC 1983-2023

DESCRIPTION: B2-15

CODE REFERENCES

Calculations per AISC 360-16, IBC 2021, ASCE 7-16

Load Combination Set : ASCE 7-16

Material Properties

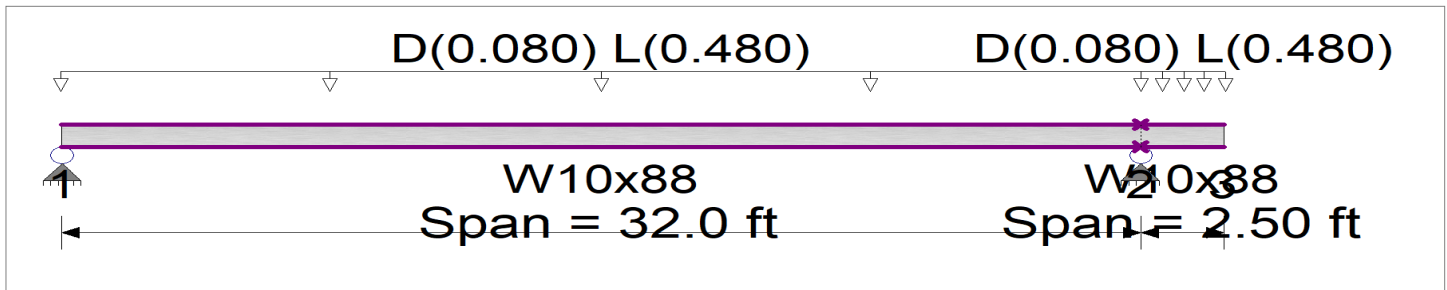
Analysis Method : Allowable Strength Design

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 = 0.010, L = 0.060 ksf, Tributary Width = 8.0 ft

Load for Span Number 2

Uniform Load : D = 0.010, L = 0.060 ksf, Tributary Width = 8.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.293 : 1	Maximum Shear Stress Ratio =	0.080 : 1
Section used for this span	W10x88	Section used for this span	W10x88
Ma : Applied	82.681 k-ft	Va : Applied	10.431 k
Mn / Omega : Allowable	281.936 k-ft	Vn/Omega : Allowable	130.680 k
Load Combination	+D+L+H, LL Comb Run (L*)	Load Combination	+D+L+H, LL Comb Run (LL)
Span # where maximum occurs	Span # 1	Location of maximum on span	32.000 ft
		Span # where maximum occurs	Span # 1
Maximum Deflection			
Max Downward Transient Deflection	0 in Ratio = 0 <360 n/a		
Max Upward Transient Deflection	0 in Ratio = 0 <360 n/a		
Max Downward Total Deflection	0.990 in Ratio = 388 >=180	Span: 2 : +D+L+H, LL Comb Run (L*)	
Max Upward Total Deflection	-0.245 in Ratio = 245 >=180	Span: 2 : +D+L+H, LL Comb Run (L*)	

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios		Summary of Moment Values						Summary of Shear Values			
			M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega
+D+H														
Dsgn. L = 32.00 ft		1	0.075	0.021	21.24	-0.53	21.24	470.83	281.94	1.00	1.00	2.70	196.02	130.68
Dsgn. L = 2.50 ft		2	0.002	0.003		-0.53	0.53	470.83	281.94	1.00	1.00	0.42	196.02	130.68
+D+L+H, LL Comb Run (*L)														
Dsgn. L = 32.00 ft		1	0.073	0.021	20.50	-2.03	20.50	470.83	281.94	1.00	1.00	2.75	196.02	130.68
Dsgn. L = 2.50 ft		2	0.007	0.012		-2.02	2.02	470.83	281.94	1.00	1.00	1.62	196.02	130.68
+D+L+H, LL Comb Run (L*)														
Dsgn. L = 32.00 ft		1	0.293	0.079	82.68	-0.53	82.68	470.83	281.94	1.00	1.00	10.38	196.02	130.68
Dsgn. L = 2.50 ft		2	0.002	0.003		-0.53	0.53	470.83	281.94	1.00	1.00	0.42	196.02	130.68
+D+L+H, LL Comb Run (LL)														
Dsgn. L = 32.00 ft		1	0.291	0.080	81.93	-2.03	81.93	470.83	281.94	1.00	1.00	10.43	196.02	130.68
Dsgn. L = 2.50 ft		2	0.007	0.012		-2.03	2.03	470.83	281.94	1.00	1.00	1.62	196.02	130.68
+D+Lr+H, LL Comb Run (*L)														
Dsgn. L = 32.00 ft		1	0.075	0.021	21.24	-0.53	21.24	470.83	281.94	1.00	1.00	2.70	196.02	130.68
Dsgn. L = 2.50 ft		2	0.002	0.003		-0.53	0.53	470.83	281.94	1.00	1.00	0.42	196.02	130.68
+D+Lr+H, LL Comb Run (L*)														
Dsgn. L = 32.00 ft		1	0.075	0.021	21.24	-0.53	21.24	470.83	281.94	1.00	1.00	2.70	196.02	130.68
Dsgn. L = 2.50 ft		2	0.002	0.003		-0.53	0.53	470.83	281.94	1.00	1.00	0.42	196.02	130.68
+D+Lr+H, LL Comb Run (LL)														
Dsgn. L = 32.00 ft		1	0.075	0.021	21.24	-0.53	21.24	470.83	281.94	1.00	1.00	2.70	196.02	130.68
Dsgn. L = 2.50 ft		2	0.002	0.003		-0.53	0.53	470.83	281.94	1.00	1.00	0.42	196.02	130.68

Steel Beam

Project File: 5330 Butterworth Rd.ec6

LIC#: KW-06017913, Build:20.24.08.01

MULHERN & KULP STRUCTURAL ENGINEERING INC

(c) ENERCALC INC 1983-2023

DESCRIPTION: B2-15

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios		Summary of Moment Values					Summary of Shear Values				
			M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega Cb	Rm	Va Max	Vnx	Vnx/Omega	
+D+S+H														
Dsgn. L = 32.00 ft	1		0.075	0.021	21.24	-0.53	21.24	470.83	281.94	1.00	1.00	2.70	196.02	130.68
Dsgn. L = 2.50 ft	2		0.002	0.003		-0.53	0.53	470.83	281.94	1.00	1.00	0.42	196.02	130.68
+D+0.750Lr+0.750L+H, LL Comb F														
Dsgn. L = 32.00 ft	1		0.073	0.021	20.69	-1.65	20.69	470.83	281.94	1.00	1.00	2.74	196.02	130.68
Dsgn. L = 2.50 ft	2		0.006	0.010		-1.65	1.65	470.83	281.94	1.00	1.00	1.32	196.02	130.68
+D+0.750Lr+0.750L+H, LL Comb F														
Dsgn. L = 32.00 ft	1		0.239	0.065	67.32	-0.53	67.32	470.83	281.94	1.00	1.00	8.46	196.02	130.68
Dsgn. L = 2.50 ft	2		0.002	0.003		-0.53	0.53	470.83	281.94	1.00	1.00	0.42	196.02	130.68
+D+0.750Lr+0.750L+H, LL Comb F														
Dsgn. L = 32.00 ft	1		0.237	0.065	66.76	-1.65	66.76	470.83	281.94	1.00	1.00	8.50	196.02	130.68
Dsgn. L = 2.50 ft	2		0.006	0.010		-1.65	1.65	470.83	281.94	1.00	1.00	1.32	196.02	130.68
+D+0.750L+0.750S+H, LL Comb R														
Dsgn. L = 32.00 ft	1		0.073	0.021	20.69	-1.65	20.69	470.83	281.94	1.00	1.00	2.74	196.02	130.68
Dsgn. L = 2.50 ft	2		0.006	0.010		-1.65	1.65	470.83	281.94	1.00	1.00	1.32	196.02	130.68
+D+0.750L+0.750S+H, LL Comb R														
Dsgn. L = 32.00 ft	1		0.239	0.065	67.32	-0.53	67.32	470.83	281.94	1.00	1.00	8.46	196.02	130.68
Dsgn. L = 2.50 ft	2		0.002	0.003		-0.53	0.53	470.83	281.94	1.00	1.00	0.42	196.02	130.68
+D+0.750L+0.750S+H, LL Comb R														
Dsgn. L = 32.00 ft	1		0.237	0.065	66.76	-1.65	66.76	470.83	281.94	1.00	1.00	8.50	196.02	130.68
Dsgn. L = 2.50 ft	2		0.006	0.010		-1.65	1.65	470.83	281.94	1.00	1.00	1.32	196.02	130.68
+D+0.60W+H														
Dsgn. L = 32.00 ft	1		0.075	0.021	21.24	-0.53	21.24	470.83	281.94	1.00	1.00	2.70	196.02	130.68
Dsgn. L = 2.50 ft	2		0.002	0.003		-0.53	0.53	470.83	281.94	1.00	1.00	0.42	196.02	130.68
+D+0.750Lr+0.750L+0.450W+H, L														
Dsgn. L = 32.00 ft	1		0.073	0.021	20.69	-1.65	20.69	470.83	281.94	1.00	1.00	2.74	196.02	130.68
Dsgn. L = 2.50 ft	2		0.006	0.010		-1.65	1.65	470.83	281.94	1.00	1.00	1.32	196.02	130.68
+D+0.750Lr+0.750L+0.450W+H, L														
Dsgn. L = 32.00 ft	1		0.239	0.065	67.32	-0.53	67.32	470.83	281.94	1.00	1.00	8.46	196.02	130.68
Dsgn. L = 2.50 ft	2		0.002	0.003		-0.53	0.53	470.83	281.94	1.00	1.00	0.42	196.02	130.68
+D+0.750Lr+0.750L+0.450W+H, L														
Dsgn. L = 32.00 ft	1		0.237	0.065	66.76	-1.65	66.76	470.83	281.94	1.00	1.00	8.50	196.02	130.68
Dsgn. L = 2.50 ft	2		0.006	0.010		-1.65	1.65	470.83	281.94	1.00	1.00	1.32	196.02	130.68
+D+0.750L+0.750S+0.450W+H, LI														
Dsgn. L = 32.00 ft	1		0.073	0.021	20.69	-1.65	20.69	470.83	281.94	1.00	1.00	2.74	196.02	130.68
Dsgn. L = 2.50 ft	2		0.006	0.010		-1.65	1.65	470.83	281.94	1.00	1.00	1.32	196.02	130.68
+D+0.750L+0.750S+0.450W+H, LI														
Dsgn. L = 32.00 ft	1		0.239	0.065	67.32	-0.53	67.32	470.83	281.94	1.00	1.00	8.46	196.02	130.68
Dsgn. L = 2.50 ft	2		0.002	0.003		-0.53	0.53	470.83	281.94	1.00	1.00	0.42	196.02	130.68
+D+0.750L+0.750S+0.450W+H, LI														
Dsgn. L = 32.00 ft	1		0.237	0.065	66.76	-1.65	66.76	470.83	281.94	1.00	1.00	8.50	196.02	130.68
Dsgn. L = 2.50 ft	2		0.006	0.010		-1.65	1.65	470.83	281.94	1.00	1.00	1.32	196.02	130.68
+0.60D+0.60W+0.60H														
Dsgn. L = 32.00 ft	1		0.045	0.012	12.75	-0.32	12.75	470.83	281.94	1.00	1.00	1.62	196.02	130.68
Dsgn. L = 2.50 ft	2		0.001	0.002		-0.32	0.32	470.83	281.94	1.00	1.00	0.25	196.02	130.68
+D+0.70E+H														
Dsgn. L = 32.00 ft	1		0.075	0.021	21.24	-0.53	21.24	470.83	281.94	1.00	1.00	2.70	196.02	130.68
Dsgn. L = 2.50 ft	2		0.002	0.003		-0.53	0.53	470.83	281.94	1.00	1.00	0.42	196.02	130.68
+D+0.750L+0.750S+0.5250E+H, L														
Dsgn. L = 32.00 ft	1		0.073	0.021	20.69	-1.65	20.69	470.83	281.94	1.00	1.00	2.74	196.02	130.68
Dsgn. L = 2.50 ft	2		0.006	0.010		-1.65	1.65	470.83	281.94	1.00	1.00	1.32	196.02	130.68
+D+0.750L+0.750S+0.5250E+H, L														
Dsgn. L = 32.00 ft	1		0.239	0.065	67.32	-0.53	67.32	470.83	281.94	1.00	1.00	8.46	196.02	130.68
Dsgn. L = 2.50 ft	2		0.002	0.003		-0.53	0.53	470.83	281.94	1.00	1.00	0.42	196.02	130.68
+D+0.750L+0.750S+0.5250E+H, L														
Dsgn. L = 32.00 ft	1		0.237	0.065	66.76	-1.65	66.76	470.83	281.94	1.00	1.00	8.50	196.02	130.68
Dsgn. L = 2.50 ft	2		0.006	0.010		-1.65	1.65	470.83	281.94	1.00	1.00	1.32	196.02	130.68
+0.60D+0.70E+0.60H														
Dsgn. L = 32.00 ft	1		0.045	0.012	12.75	-0.32	12.75	470.83	281.94	1.00	1.00	1.62	196.02	130.68
Dsgn. L = 2.50 ft	2		0.001	0.002		-0.32	0.32	470.83	281.94	1.00	1.00	0.25	196.02	130.68

Steel Beam

Project File: 5330 Butterworth Rd.ec6

LIC# : KW-06017913, Build:20.24.08.01

MULHERN & KULP STRUCTURAL ENGINEERING INC

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DESCRIPTION: B2-15**Overall Maximum Deflections**

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L+H	1	0.9898	16.000	+D+L+H	0.0000	0.000
	2	0.0000	16.000		-0.2452	2.500

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Max Upward from all Load Conditions	10.352	12.051	
Max Upward from Load Combinations	10.352	12.051	
Max Upward from Load Cases	7.680	8.927	
Max Downward from all Load Conditions (Resisting Uplift)	-0.047		
Max Downward from Load Cases (Resisting Uplift)	-0.047		
+D+H	2.672	3.124	
+D+L+H, LL Comb Run (*L)	2.625	4.371	
+D+L+H, LL Comb Run (L*)	10.352	10.804	
+D+L+H, LL Comb Run (LL)	10.305	12.051	
+D+Lr+H, LL Comb Run (*L)	2.672	3.124	
+D+Lr+H, LL Comb Run (L*)	2.672	3.124	
+D+Lr+H, LL Comb Run (LL)	2.672	3.124	
+D+S+H	2.672	3.124	
+D+0.750Lr+0.750L+H, LL Comb Run (*L)	2.636	4.060	
+D+0.750Lr+0.750L+H, LL Comb Run (L*)	8.432	8.884	
+D+0.750Lr+0.750L+H, LL Comb Run (LL)	8.396	9.820	
+D+0.750L+0.750S+H, LL Comb Run (*L)	2.636	4.060	
+D+0.750L+0.750S+H, LL Comb Run (L*)	8.432	8.884	
+D+0.750L+0.750S+H, LL Comb Run (LL)	8.396	9.820	
+D+0.60W+H	2.672	3.124	
+D+0.750Lr+0.750L+0.450W+H, LL Comb Run	2.636	4.060	
+D+0.750Lr+0.750L+0.450W+H, LL Comb Run	8.432	8.884	
+D+0.750Lr+0.750L+0.450W+H, LL Comb Run	8.396	9.820	
+D+0.750L+0.750S+0.450W+H, LL Comb Run (	2.636	4.060	
+D+0.750L+0.750S+0.450W+H, LL Comb Run (	8.432	8.884	
+D+0.750L+0.750S+0.450W+H, LL Comb Run (	8.396	9.820	
+0.60D+0.60W+0.60H	1.603	1.875	
+D+0.70E+H	2.672	3.124	
+D+0.750L+0.750S+0.5250E+H, LL Comb Run	2.636	4.060	
+D+0.750L+0.750S+0.5250E+H, LL Comb Run	8.432	8.884	
+D+0.750L+0.750S+0.5250E+H, LL Comb Run	8.396	9.820	
+0.60D+0.70E+0.60H	1.603	1.875	
D Only	2.672	3.124	
L Only, LL Comb Run (*L)	-0.047	1.247	
L Only, LL Comb Run (L*)	7.680	7.680	
L Only, LL Comb Run (LL)	7.633	8.927	
H Only			

Wood Beam

Project File: 5330 Butterworth Rd.ec6

LIC#: KW-06017913, Build:20.24.08.01

MULHERN & KULP STRUCTURAL ENGINEERING INC

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DESCRIPTION: B2-23 (SW #208)

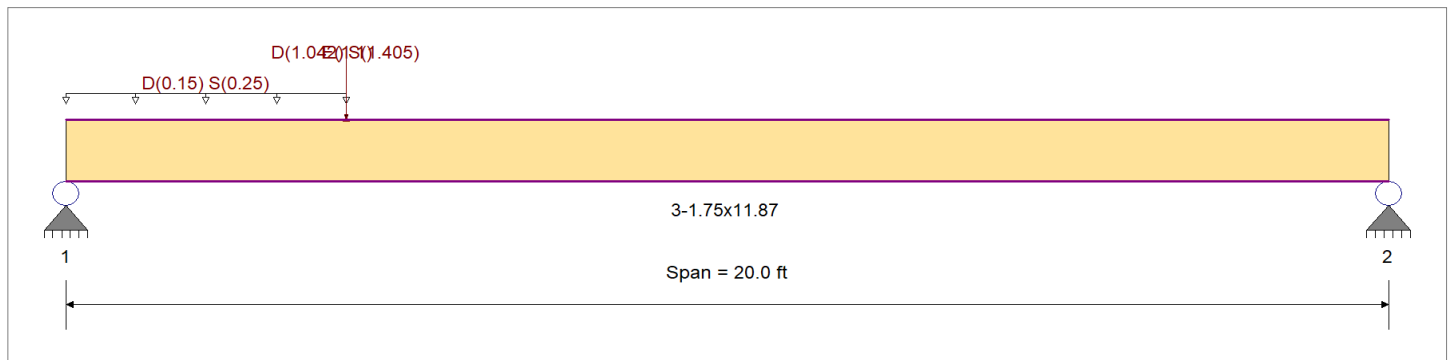
CODE REFERENCES

Calculations per NDS 2018, IBC 2021, ASCE 7-16

Load Combination Set : ASCE 7-16

Material Properties

Analysis Method : Allowable Stress Design	Fb +	3,120.0 psi	E : Modulus of Elasticity	
Load Combination : ASCE 7-16	Fb -	3,120.0 psi	Ebend- xx	2,000.0 ksi
	Fc - Prll	600.0 psi	Eminbend - xx	101,654 ksi
Wood Species : LVL OS	Fc - Perp	900.0 psi		
Wood Grade : Manufactured	Fv	342.0 psi		
	Ft	3,012.0 psi	Density	35.0pcf
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling				



Applied Loads

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

Beam self weight NOT internally calculated and added

Point Load : D = 1.042, S = 1.405 k @ 4.250 ft

Uniform Load : D = 0.150, S = 0.250 k/ft, Extent = 0.0 -->> 4.250 ft, Tributary Width = 1.0 ft

Point Load : E = 1.10 k @ 4.250 ft, (OS)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.298	1	Maximum Shear Stress Ratio	=	0.188	: 1
Section used for this span		3-1.75x11.87		Section used for this span		3-1.75x11.87	
fb: Actual	=	1,070.37 psi		fv: Actual	=	73.79 psi	
F'b	=	3,593.11 psi		F'v	=	393.30 psi	
Load Combination		+D+S		Load Combination		+D+S	
Location of maximum on span	=	4.234ft		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		0.236 in	Ratio =	1015	>=	360	Span: 1 : S Only
Max Upward Transient Deflection		0 in	Ratio =	0	<	360	n/a
Max Downward Total Deflection		0.413 in	Ratio =	581	>=	180	Span: 1 : +D+0.750S+0.5250E
Max Upward Total Deflection		0 in	Ratio =	0	<	180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios									Moment Values			Shear Values				
			M	V	CD	CM	C _t	CLx	C _F	C _{fu}	C _i	C _r	M	fb	F'b	V	fv	F'v	
D Only	Length = 20.0 ft	1	0.157	0.098	0.90	1.00	1.00	1.00	1.001	1.00	1.00	1.00	4.54	441.7	2,812.0	0.0	0.00	0.0	0.0
+D+S	Length = 20.0 ft	1	0.298	0.188	1.15	1.00	1.00	1.00	1.001	1.00	1.00	1.00	11.01	1,070.4	3,593.1	0.0	0.00	0.0	0.0
+D+0.750S	Length = 20.0 ft	1	0.254	0.160	1.15	1.00	1.00	1.00	1.001	1.00	1.00	1.00	9.39	913.2	3,593.1	0.0	0.00	0.0	0.0
+0.60D	Length = 20.0 ft	1	0.053	0.033	1.60	1.00	1.00	1.00	1.001	1.00	1.00	1.00	2.73	265.0	4,999.1	0.0	0.00	0.0	0.0

Wood Beam

Project File: 5330 Butterworth Rd.ec6

LIC# : KW-06017913, Build:20.24.08.01

MULHERN & KULP STRUCTURAL ENGINEERING INC

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DESCRIPTION: B2-23 (SW #208)**Maximum Forces & Stresses for Load Combinations**

Load Combination	Segment Length	Span #	Max Stress Ratios									Moment Values			Shear Values			
			M	V	CD	CM	C _t	CLx	C _F	C _{fu}	C _i	C _r	M	fb	F'b	V	fv	F'v
+D+0.70E						1.00	1.00	1.00	1.001	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 20.0 ft	1		0.138	0.082	1.60	1.00	1.00	1.00	1.001	1.00	1.00	1.00	7.11	691.4	4,999.1	1.85	44.6	547.2
+D+0.750S+0.5250E						1.00	1.00	1.00	1.001	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 20.0 ft	1		0.220	0.135	1.60	1.00	1.00	1.00	1.001	1.00	1.00	1.00	11.32	1,100.4	4,999.1	3.07	73.8	547.2
+0.60D+0.70E						1.00	1.00	1.00	1.001	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 20.0 ft	1		0.103	0.060	1.60	1.00	1.00	1.00	1.001	1.00	1.00	1.00	5.29	514.7	4,999.1	1.36	32.6	547.2

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+0.750S+0.5250E	1	0.4129	8.759		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	3.446	0.720
Max Upward from Load Combinations	3.446	0.720
Max Upward from Load Cases	2.056	0.411
D Only	1.390	0.289
+D+S	3.446	0.701
+D+0.750S	2.932	0.598
+0.60D	0.834	0.173
+D+0.70E	1.997	0.453
+D+0.750S+0.5250E	3.387	0.720
+0.60D+0.70E	1.441	0.337
S Only	2.056	0.411
E Only	0.866	0.234

Wood Beam

Project File: 5330 Butterworth Rd.ec6

LIC#: KW-06017913, Build:20.24.08.01

MULHERN & KULP STRUCTURAL ENGINEERING INC

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DESCRIPTION: B2-23 (SW #213)

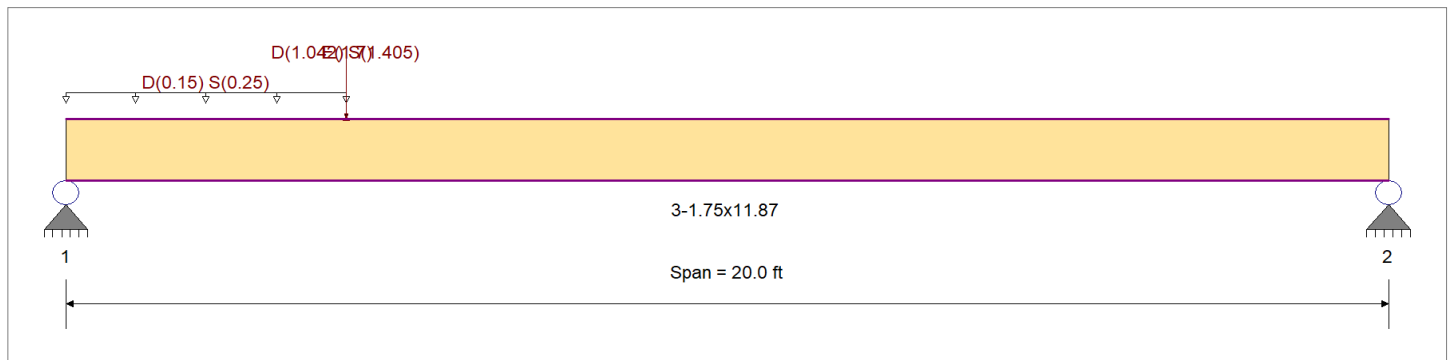
CODE REFERENCES

Calculations per NDS 2018, IBC 2021, ASCE 7-16

Load Combination Set : ASCE 7-16

Material Properties

Analysis Method : Allowable Stress Design	Fb +	3,120.0 psi	E : Modulus of Elasticity	
Load Combination : ASCE 7-16	Fb -	3,120.0 psi	Ebend- xx	2,000.0 ksi
	Fc - Prll	600.0 psi	Eminbend - xx	101,654 ksi
Wood Species : LVL OS	Fc - Perp	900.0 psi		
Wood Grade : Manufactured	Fv	342.0 psi		
	Ft	3,012.0 psi	Density	35.0pcf
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling				



Applied Loads

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

Beam self weight NOT internally calculated and added

Point Load : D = 1.042, S = 1.405 k @ 4.250 ft

Uniform Load : D = 0.150, S = 0.250 k/ft, Extent = 0.0 -->> 4.250 ft, Tributary Width = 1.0 ft

Point Load : E = 1.70 k @ 4.250 ft, (OS)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.298	1	Maximum Shear Stress Ratio	=	0.188	: 1
Section used for this span		3-1.75x11.87		Section used for this span		3-1.75x11.87	
fb: Actual	=	1,070.37 psi		fv: Actual	=	73.79 psi	
F'b	=	3,593.11 psi		F'v	=	393.30 psi	
Load Combination		+D+S		Load Combination		+D+S	
Location of maximum on span	=	4.234ft		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		0.236 in	Ratio =	1015	>=	360	Span: 1 : S Only
Max Upward Transient Deflection		0 in	Ratio =	0	<	360	n/a
Max Downward Total Deflection		0.451 in	Ratio =	532	>=	180	Span: 1 : +D+0.750S+0.5250E
Max Upward Total Deflection		0 in	Ratio =	0	<	180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios									Moment Values			Shear Values				
			M	V	CD	CM	C _t	CLx	C _F	C _{fu}	C _i	C _r	M	fb	F'b	V	fv	F'v	
D Only	Length = 20.0 ft	1	0.157	0.098	0.90	1.00	1.00	1.00	1.001	1.00	1.00	1.00	4.54	441.7	2,812.0	0.0	0.00	0.0	0.0
+D+S	Length = 20.0 ft	1	0.298	0.188	1.15	1.00	1.00	1.00	1.001	1.00	1.00	1.00	11.01	1,070.4	3,593.1	0.0	0.00	0.0	0.0
+D+0.750S	Length = 20.0 ft	1	0.254	0.160	1.15	1.00	1.00	1.00	1.001	1.00	1.00	1.00	9.39	913.2	3,593.1	0.0	0.00	0.0	0.0
+0.60D	Length = 20.0 ft	1	0.053	0.033	1.60	1.00	1.00	1.00	1.001	1.00	1.00	1.00	2.73	265.0	4,999.1	0.0	0.00	0.0	0.0

Wood Beam

Project File: 5330 Butterworth Rd.ec6

LIC# : KW-06017913, Build:20.24.08.01

MULHERN & KULP STRUCTURAL ENGINEERING INC

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DESCRIPTION: B2-23 (SW #213)**Maximum Forces & Stresses for Load Combinations**

Load Combination	Segment Length	Span #	Max Stress Ratios									Moment Values			Shear Values			
			M	V	CD	CM	C _t	CLx	C _F	C _{fu}	C _i	C _r	M	fb	F'b	V	fv	F'v
+D+0.70E						1.00	1.00	1.00	1.001	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 20.0 ft	1		0.166	0.096	1.60	1.00	1.00	1.00	1.001	1.00	1.00	1.00	8.51	827.6	4,999.1	2.19	52.6	547.2
+D+0.750S+0.5250E						1.00	1.00	1.00	1.001	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 20.0 ft	1		0.241	0.146	1.60	1.00	1.00	1.00	1.001	1.00	1.00	1.00	12.37	1,202.6	4,999.1	3.31	79.8	547.2
+0.60D+0.70E						1.00	1.00	1.00	1.001	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 20.0 ft	1		0.130	0.074	1.60	1.00	1.00	1.00	1.001	1.00	1.00	1.00	6.69	650.9	4,999.1	1.69	40.6	547.2

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+0.750S+0.5250E	1	0.4510	8.759		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	3.635	0.787
Max Upward from Load Combinations	3.635	0.787
Max Upward from Load Cases	2.056	0.411
D Only	1.390	0.289
+D+S	3.446	0.701
+D+0.750S	2.932	0.598
+0.60D	0.834	0.173
+D+0.70E	2.327	0.542
+D+0.750S+0.5250E	3.635	0.787
+0.60D+0.70E	1.771	0.426
S Only	2.056	0.411
E Only	1.339	0.361

Wood Beam

Project File: 5330 Butterworth Rd.ec6

LIC#: KW-06017913, Build:20.24.08.01

MULHERN & KULP STRUCTURAL ENGINEERING INC

(c) ENERCALC INC 1983-2023

DESCRIPTION: B2-25

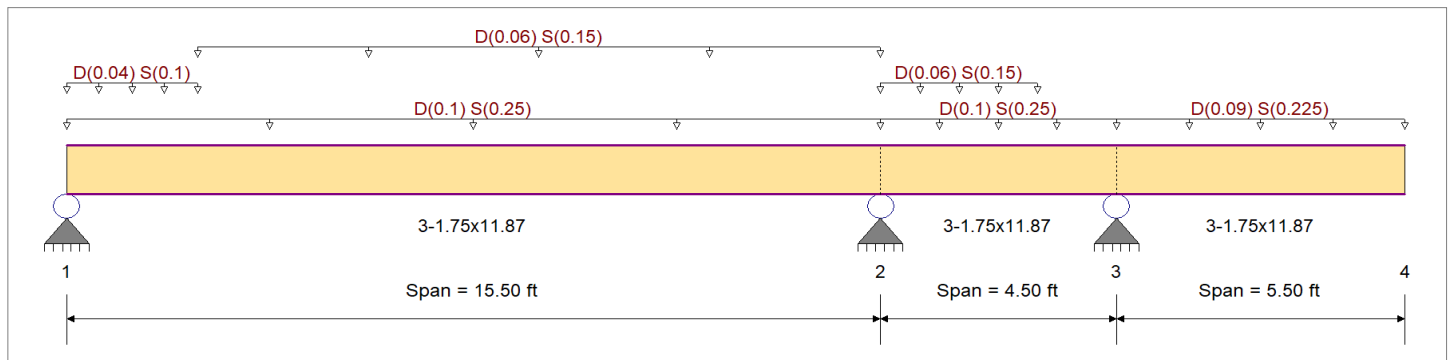
CODE REFERENCES

Calculations per NDS 2018, IBC 2021, ASCE 7-16

Load Combination Set : ASCE 7-16

Material Properties

Analysis Method : Allowable Stress Design	Fb +	2,600.0 psi	E : Modulus of Elasticity
Load Combination : ASCE 7-16	Fb -	2,600.0 psi	Ebend- xx
	Fc - Prll	2,510.0 psi	Eminbend - xx
Wood Species : iLevel Truss Joist	Fc - Perp	750.0 psi	
Wood Grade : MicroLam LVL 1.9 E	Fv	285.0 psi	
	Ft	1,555.0 psi	Density
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling			42.010pcf



Applied Loads

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

Beam self weight NOT internally calculated and added

Load for Span Number 1

Uniform Load : D = 0.010, S = 0.0250 ksf, Tributary Width = 10.0 ft

Uniform Load : D = 0.010, S = 0.0250 ksf, Extent = 0.0 --> 2.50 ft, Tributary Width = 4.0 ft

Uniform Load : D = 0.010, S = 0.0250 ksf, Extent = 2.50 --> 15.50 ft, Tributary Width = 6.0 ft

Load for Span Number 2

Uniform Load : D = 0.010, S = 0.0250 ksf, Tributary Width = 10.0 ft

Uniform Load : D = 0.010, S = 0.0250 ksf, Extent = 0.0 --> 3.0 ft, Tributary Width = 6.0 ft

Load for Span Number 3

Uniform Load : D = 0.010, S = 0.0250 ksf, Tributary Width = 9.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.413 : 1	Maximum Shear Stress Ratio	=	0.340 : 1
Section used for this span	=	3-1.75x11.87	Section used for this span	=	3-1.75x11.87
fb: Actual	=	1,235.87psi	fv: Actual	=	111.52 psi
F'b	=	2,994.26psi	F'v	=	327.75 psi
Load Combination	=	+D+S	Load Combination	=	+D+S
Location of maximum on span	=	15.500ft	Location of maximum on span	=	14.588 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1
Maximum Deflection					
Max Downward Transient Deflection	0.207 in	Ratio = 898 >=360	Span: 1 : S Only		
Max Upward Transient Deflection	-0.018 in	Ratio = 3055 >=360	Span: 2 : S Only		
Max Downward Total Deflection	0.290 in	Ratio = 641 >=180	Span: 1 : +D+S		
Max Upward Total Deflection	-0.025 in	Ratio = 2182 >=180	Span: 2 : +D+S		

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios										Moment Values			Shear Values				
			M	V	CD	CM	C _t	CLx	C _F	C _{fu}	C _i	C _r	M	fb	F'b	V	fv	F'v		
D Only																				
Length = 15.50 ft	1	0.151	0.124	0.90	1.00	1.00	1.00	1.001	1.00	1.00	1.00	3.63	353.1	2,343.3	0.00	0.00	0.00	1.32	31.9	256.5
Length = 4.50 ft	2	0.151	0.124	0.90	1.00	1.00	1.00	1.001	1.00	1.00	1.00	3.63	353.1	2,343.3	0.69	31.9	256.5			

Wood Beam

Project File: 5330 Butterworth Rd.ec6

LIC# : KW-06017913, Build:20.24.08.01

MULHERN & KULP STRUCTURAL ENGINEERING INC

(c) ENERCALC INC 1983-2023

DESCRIPTION: B2-25

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios									Moment Values			Shear Values			
			M	V	CD	CM	C _t	CLx	C _F	C _{fu}	C _i	C _r	M	fb	F'b	V	fv	F'v
+D+S	Length = 5.50 ft	3	0.056	0.124	0.90	1.00	1.00	1.00	1.001	1.00	1.00	1.00	1.36	132.4	2,343.3	0.41	31.9	256.5
															0.0	0.00	0.0	0.0
+D+0.750S	Length = 15.50 ft	1	0.413	0.340	1.15	1.00	1.00	1.00	1.001	1.00	1.00	1.00	12.71	1,235.9	2,994.3	4.64	111.5	327.8
	Length = 4.50 ft	2	0.413	0.340	1.15	1.00	1.00	1.00	1.001	1.00	1.00	1.00	12.71	1,235.9	2,994.3	2.42	111.5	327.8
	Length = 5.50 ft	3	0.155	0.340	1.15	1.00	1.00	1.00	1.001	1.00	1.00	1.00	4.76	463.4	2,994.3	1.43	111.5	327.8
+0.60D															0.0	0.00	0.0	0.0
	Length = 15.50 ft	1	0.339	0.280	1.15	1.00	1.00	1.00	1.001	1.00	1.00	1.00	10.44	1,015.2	2,994.3	3.81	91.6	327.8
	Length = 4.50 ft	2	0.339	0.280	1.15	1.00	1.00	1.00	1.001	1.00	1.00	1.00	10.44	1,015.2	2,994.3	1.99	91.6	327.8
+0.60D	Length = 5.50 ft	3	0.127	0.280	1.15	1.00	1.00	1.00	1.001	1.00	1.00	1.00	3.91	380.6	2,994.3	1.17	91.6	327.8
															0.0	0.00	0.0	0.0
	Length = 15.50 ft	1	0.051	0.042	1.60	1.00	1.00	1.00	1.001	1.00	1.00	1.00	2.18	211.9	4,165.9	0.79	19.1	456.0
+0.60D	Length = 4.50 ft	2	0.051	0.042	1.60	1.00	1.00	1.00	1.001	1.00	1.00	1.00	2.18	211.9	4,165.9	0.42	19.1	456.0
	Length = 5.50 ft	3	0.019	0.042	1.60	1.00	1.00	1.00	1.001	1.00	1.00	1.00	0.82	79.4	4,165.9	0.24	19.1	456.0

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.2898	7.034		0.0000	0.000
	2	0.0000	7.034	+D+S	-0.0247	2.080
+D+S	3	0.1455	5.500		0.0000	2.080

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2	Support 3	Support 4
Max Upward from all Load Conditions	3.359	8.118	0.965	
Max Upward from Load Combinations	3.359	8.118	0.965	
Max Upward from Load Cases	2.399	5.799	0.689	
D Only	0.960	2.320	0.276	
+D+S	3.359	8.118	0.965	
+D+0.750S	2.759	6.669	0.793	
+0.60D	0.576	1.392	0.165	
S Only	2.399	5.799	0.689	



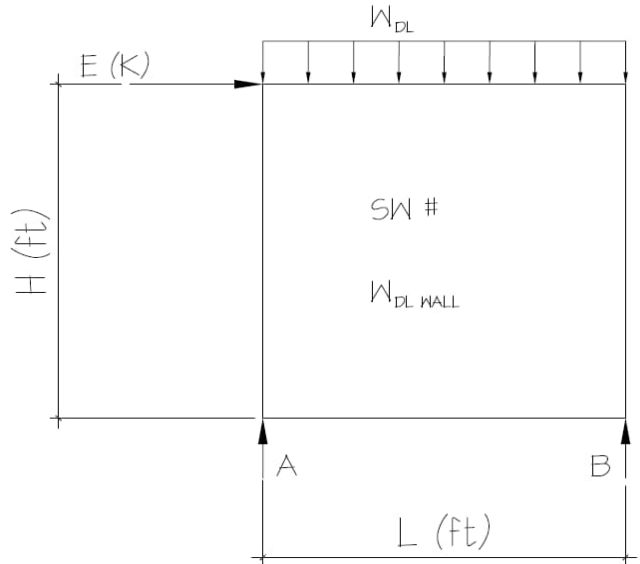
OVERSTRENGTH CALCULATIONS

WALL DESCRIPTION/SW #:

208

PARAMETERS:

- L = 19.8 FT
- H = 5.0 FT
- E = 1.10 K
- W_{DL WALL} = 0.05 KLF
- W_{DL} = 0.020 KLF
- Ω₀ = 2.5 (ASCE TABLE 12.2.1 FOOTNOTE)
- SDS = 1.293



ANALYSIS:

- E (UNFACTORED) = 1.57
- E_{MH} = Ω₀ * E = 3.93 K
- E_v = 0.2 * SDS * DL = 0.359 K
- E_M = E_{MH} + E_v = 4.288 K
- E_M = E_{MH} - E_v = 3.569 K

- E_M (MAX) = ΣMA = 0 = 4.29(5.0) - R_B(19.84) R_B = 1.1E
- RA = -1.1E
- E_M (MIN) = ΣMA = 0 = 3.57(5.0) - R_B(19.84) R_B = 0.9E
- RA = -0.9E

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

ALLOWABLE STRESS PERMITTED TO BE INCREASED BY 1.2

SEE FOLLOWING BEAM
CALCS FOR LOAD
APPLICATION



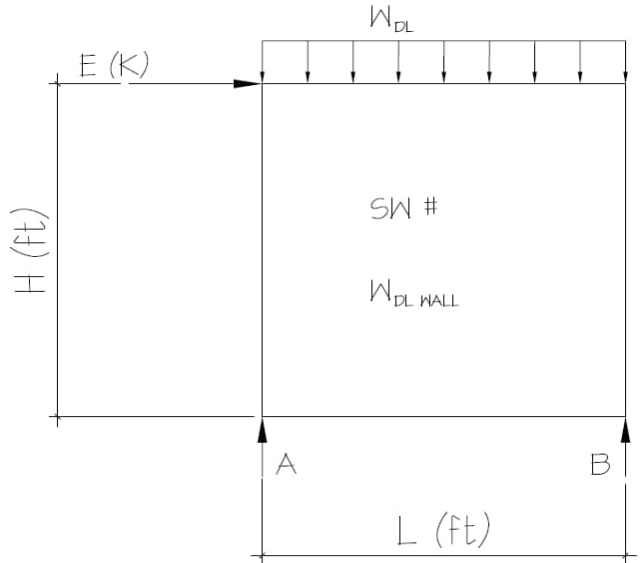
OVERSTRENGTH CALCULATIONS

WALL DESCRIPTION/SW #:

212

PARAMETERS:

- L = 17.5 FT
- H = 9.0 FT
- E = 1.10 K
- W_{DL WALL} = 0.10 KLF
- W_{DL} = 0.090 KLF
- Ω₀ = 2.5 (ASCE TABLE 12.2.1 FOOTNOTE)
- SDS = 1.293



ANALYSIS:

E (UNFACTORED) = 1.57

E_{MH} = Ω₀ * E = 3.93 K E_v = 0.2 * SDS * DL = 0.860 K

E_M = E_{MH} + E_v = 4.788 K

E_M = E_{MH} - E_v = 3.069 K

E_M (MAX) = ΣM_A = 0 = 4.79(9.0) - R_B(17.5) R_B = 2.5E

R_A = - 2.5E

E_M (MIN) = ΣM_A = 0 = 3.07(9.0) - R_B(17.5) R_B = 1.6E

R_A = - 1.6E

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

ALLOWABLE STRESS PERMITTED TO BE INCREASED BY 1.2

SEE FOLLOWING BEAM
CALCS FOR LOAD
APPLICATION



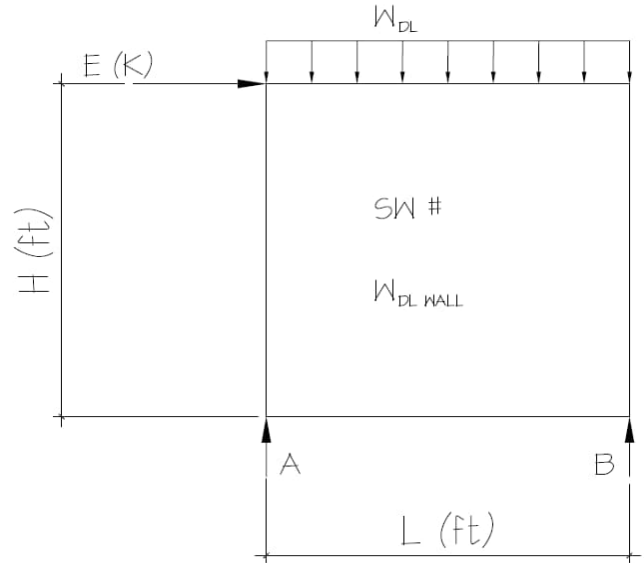
OVERSTRENGTH CALCULATIONS

WALL DESCRIPTION/SW #:

213

PARAMETERS:

- L = 4.7 FT
- H = 5.0 FT
- E = 0.40 K
- W_{DL WALL} = 0.05 KLF
- W_{DL} = 0.100 KLF
- Ω₀ = 2.5 (ASCE TABLE 12.2.1 FOOTNOTE)
- SDS = 1.293



ANALYSIS:

- E (UNFACTORED) = 0.57
- E_{MH} = Ω₀ * E = 1.43 K
- E_M = E_{MH} + E_v = 1.612 K
- E_M = E_{MH} - E_v = 1.245 K
- E_v = 0.2 * SDS * DL = 0.183 K
- E_M = E_{MH} + E_v = 1.612 K
- E_M = E_{MH} - E_v = 1.245 K

E_M (MAX) = ΣM_A = 0 = 1.61(5.0) - R_B(4.73) R_B = 1.7E

RA = - 1.7E

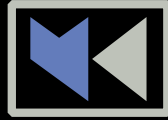
E_M (MIN) = ΣM_A = 0 = 1.25(5.0) - R_B(4.73) R_B = 1.3E

RA = - 1.3E

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

ALLOWABLE STRESS PERMITTED TO BE INCREASED BY 1.2

SEE FOLLOWING BEAM
CALCS FOR LOAD
APPLICATION



MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

SHEAR WALL CALCULATIONS - WIND

MACPHERSON CONSTRUCTION & DESIGN

5330 BUTTERWORTH RD - NORTH LOT

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., PROJECT MANAGER

BLAKE F. DURHAM, STAFF ENGINEER



WIND DESIGN SUMMARY PER ASCE 7-16

M+K PROJECT #: 306-25001
ENGINEER: BFD

PARAMETERS:

WIND SPEED	100
EXPOSURE CATEGORY	C
RISK CATEGORY	II
WIND DIRECTIONALITY FACTOR, K_d	0.85
TOPOGRAPHIC FACTOR, K_{zt}	1.00
GUST FACTOR, G	0.85
GROUND ELEV. ABOVE SEA LEVEL (FT)	0
DESIGN TYPE	ASD

0.60

ROOF GEOMETRY:

TRANS. ROOF PITCH	0.3	:12
LONG. ROOF PITCH	0.3	:12
MEAN ROOF HEIGHT, H	20.55	FT

BUILDING GEOMETRY:

LENGTH	1.48	FT
WIDTH	100	FT
NUMBER OF STORIES	2	

TRANSVERSE DIRECTION (PERPENDICULAR TO MAIN RIDGE LINE)

DIAPHRAGM LEVEL	FLOOR-TO-FLOOR HEIGHT	SECTION	TRIBUTARY DESIGN AREAS:			SQ FT	TRIBUTARY DESIGN LOADS: (0.6W)			KIPS	
			A	O	B		A	O	B		
2	9 FT	ROOF SURFACE	0	0	0		STORY SHEAR	0.00	7.23	0.00	
		WALL SURFACE	0	552.1	0		TOTAL SHEAR	0.00	7.23	0.00	
1	11.65 FT	ROOF SURFACE	0	0	0		STORY SHEAR	0.00	19.21	0.00	
		WALL SURFACE	0	1528	0		TOTAL SHEAR	0.00	26.44	0.00	
FND		ROOF SURFACE	0	0	0		STORY SHEAR	0.00	0.00	0.00	
		WALL SURFACE	0	0	0		TOTAL SHEAR	0.00	26.44	0.00	

LONGITUDINAL DIRECTION (PARALLEL TO MAIN RIDGE LINE)

DIAPHRAGM LEVEL	FLOOR-TO-FLOOR HEIGHT	SECTION	TRIBUTARY DESIGN AREAS:			SQ FT	TRIBUTARY DESIGN LOADS: (0.6W)			KIPS	
			A	O	B		A	O	B		
2	9 FT	ROOF SURFACE	0	0	0		STORY SHEAR	0.00	4.21	0.00	
		WALL SURFACE	0	346.9	0		TOTAL SHEAR	0.00	4.21	0.00	
1	11.65 FT	ROOF SURFACE	0	0	0		STORY SHEAR	0.00	11.86	0.00	
		WALL SURFACE	0	1022	0		TOTAL SHEAR	0.00	16.07	0.00	
FND		ROOF SURFACE	0	0	0		STORY SHEAR	0.00	0.00	0.00	
		WALL SURFACE	0	0	0		TOTAL SHEAR	0.00	16.07	0.00	

DATE	REV.	BY	DESCRIPTION
2/25/25		DAN	CONCEPT DESIGN

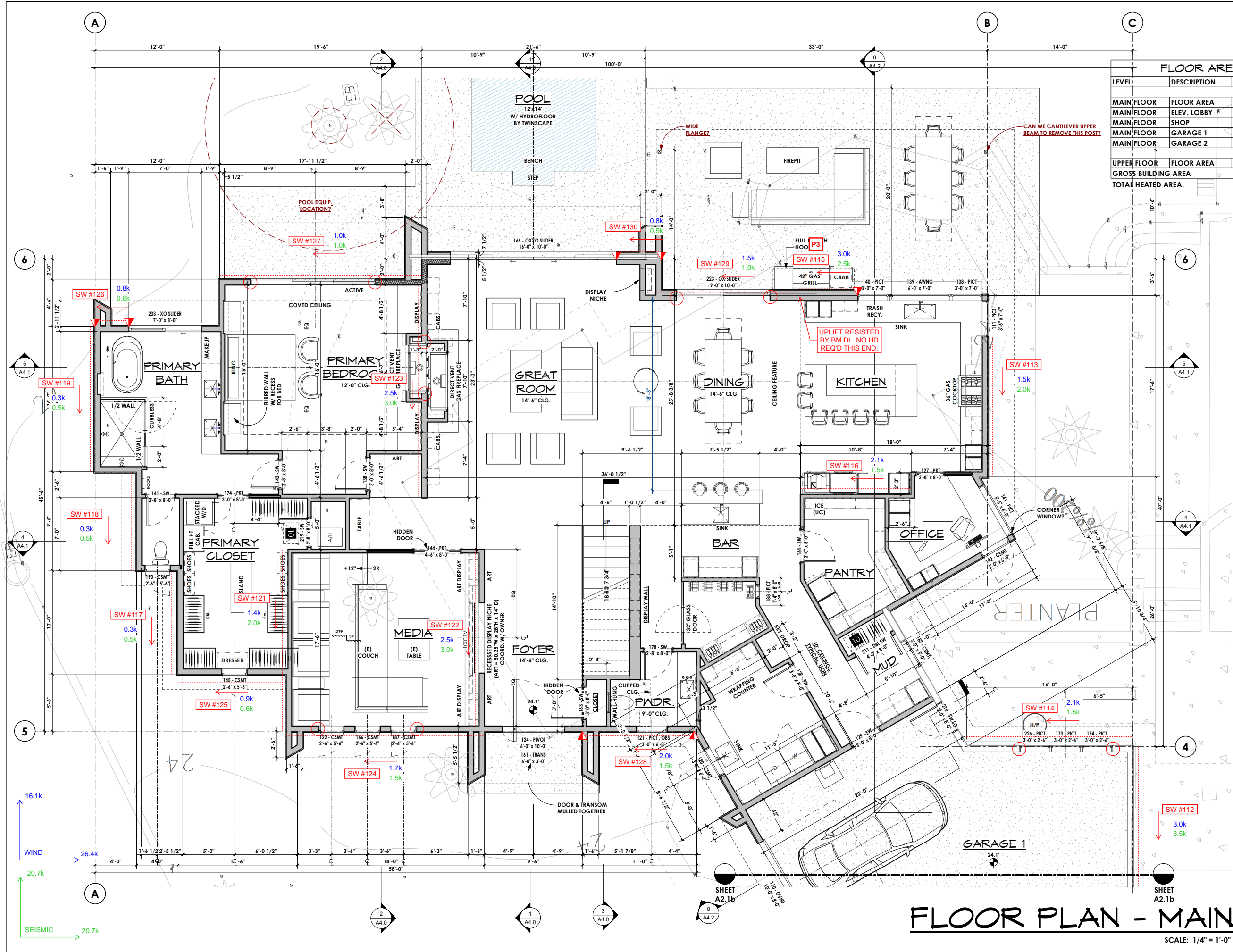
MACPHERSON RESIDENCE
 5320 BUTTERWORTH RD.
 MERCER ISLAND, WA 98040
 PARCEL #: 000000-0000
FLOOR PLAN - MAIN

MacPherson
 Construction & Design
 22405 SE 54th St Suite 140, Issaquah, WA 98029
 PH. 425.391.3333 FAX 425.557.2841

SHEET NUMBER
A2.1a

2/25/2025 12:30:24 PM

FLOOR AREAS			
LEVEL	DESCRIPTION	AREA	HEATED
MAIN FLOOR	FLOOR AREA	3,454 SF	YES
MAIN FLOOR	ELEV. LOBBY	202 SF	YES
MAIN FLOOR	SHOP	1,112 SF	
MAIN FLOOR	GARAGE 1	1,032 SF	
MAIN FLOOR	GARAGE 2	293 SF	
UPPER FLOOR	FLOOR AREA	2,523 SF	YES
GROSS BUILDING AREA		8,616 SF	
TOTAL HEATED AREA:		6,180 SF	



SCALE THIS DRAWING, IN FEET

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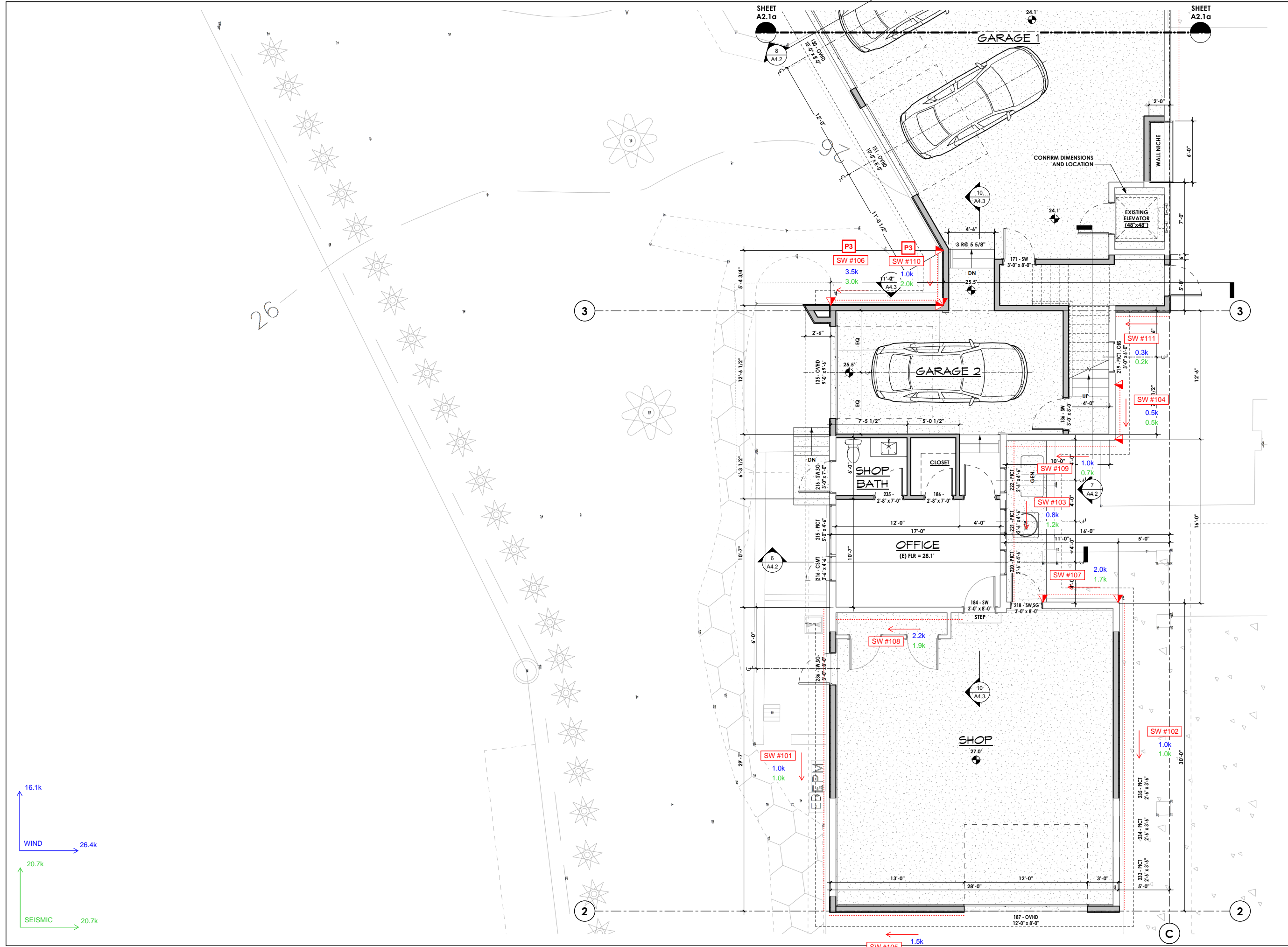
WIND 16.1k 26.4k

SEISMIC 20.7k

FLOOR PLAN - MAIN
 SCALE: 1/4" = 1'-0"
 NORTH



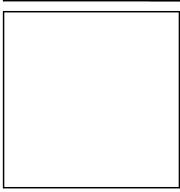
26



2" FULL SCALE

DATE	REV.	BY	DESCRIPTION
2/25/25	1	DAN	CONCEPT DESIGN

MACPHERSON RESIDENCE
 5320 BUTTERWORTH RD.
 MERCER ISLAND, WA 98040
 PARCEL #: 000000-0000
FLOOR PLAN - GARAGE



MacPherson
 Construction & Design
 22405 SE 54th St Suite 140, Issaquah, WA 98029
 PH. 425.391.3333 FAX 425.557.2841

SHEET NUMBER
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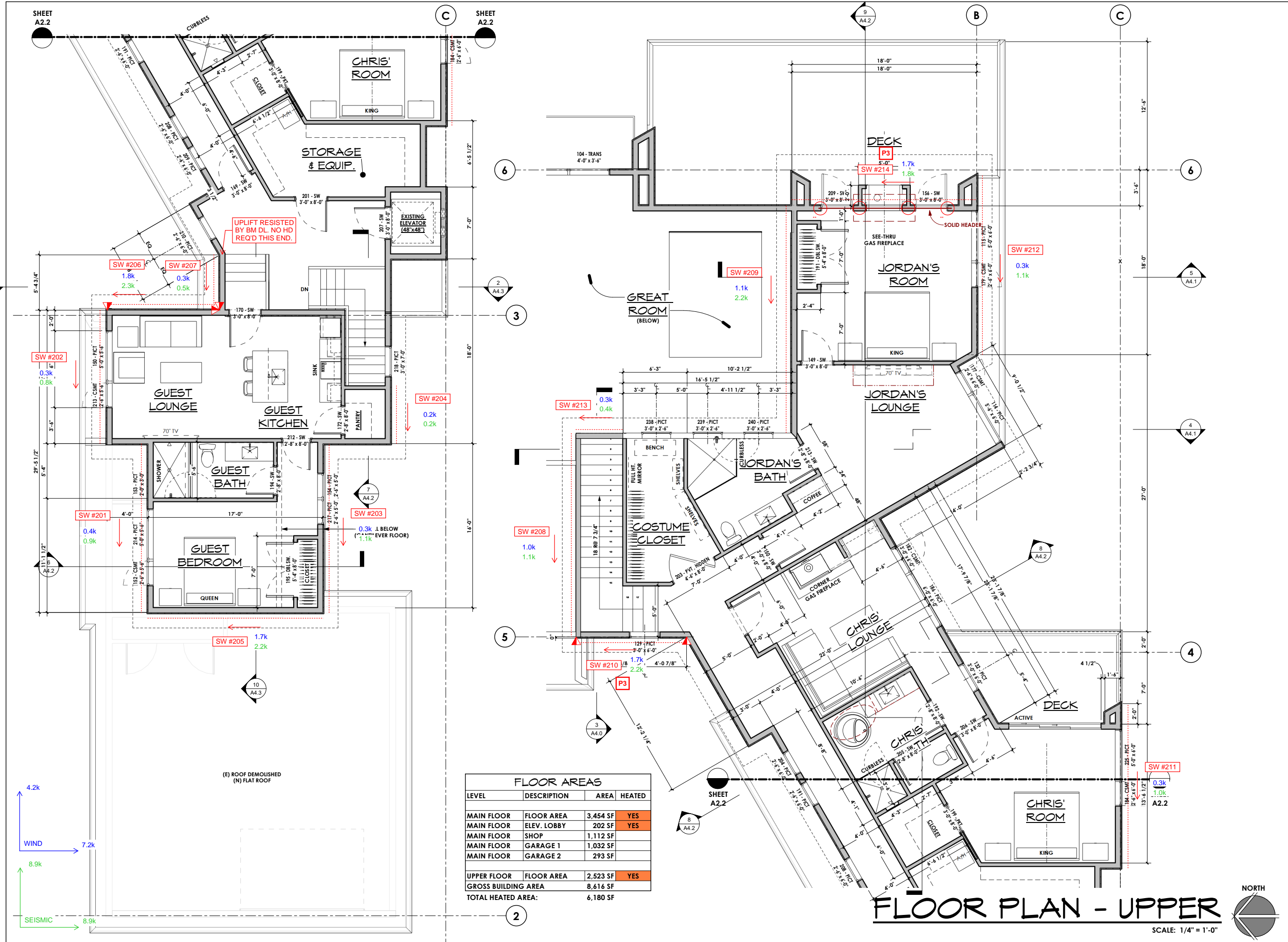
MACPHERSON RESIDENCE
 5320 BUTTERWORTH RD.
 MERCER ISLAND, WA 98040
 PARCEL #: 000000-0000
FLOOR PLAN - UPPER

MacPherson
 Construction & Design
 22405 SE 54th St Suite 140, Issaquah, WA 98029
 PH. 425.391.3333 FAX 425.557.2841

SHEET NUMBER
A2.2

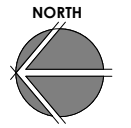
SCALE THIS DRAWING, IN FEET

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FLOOR AREAS			
LEVEL	DESCRIPTION	AREA	HEATED
MAIN FLOOR	FLOOR AREA	3,454 SF	YES
MAIN FLOOR	ELEV. LOBBY	202 SF	YES
MAIN FLOOR	SHOP	1,112 SF	
MAIN FLOOR	GARAGE 1	1,032 SF	
MAIN FLOOR	GARAGE 2	293 SF	
UPPER FLOOR	FLOOR AREA	2,523 SF	YES
GROSS BUILDING AREA		8,616 SF	
TOTAL HEATED AREA:		6,180 SF	

FLOOR PLAN - UPPER



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



SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 306-25001
ENGINEER: BFD

SHEARWALL 201: 2ND - NORTH EXT. WALL @ GUEST BED

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="9.0"/> FT.	MAX WALL OPENING HT, H _c	<input type="text" value="5.5"/> FT.	
WALL LENGTH, L	<input type="text" value="16.5"/> FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="9.0"/> FT.	SHEARWALL ASSEMBLY <input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="400"/> LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="3000"/> LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="120"/> PLF	OVERTURNING MOMENT	<input type="text" value="3.6"/> K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="0"/> LBS
DL AT ENDS OF WALL	<input type="text" value="400"/> LBS	RESISTIVE MOMENT	<input type="text" value="20.6"/> K-FT	HOLDDOWN CAPACITY	<input type="text" value="0"/> LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 202: 2ND - NORTH EXT. WALL @ GUEST LOUNGE

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="9.0"/> FT.	MAX WALL OPENING HT, H _c	<input type="text" value="5.5"/> FT.	
WALL LENGTH, L	<input type="text" value="13.0"/> FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="5.5"/> FT.	SHEARWALL ASSEMBLY <input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="300"/> LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="1784"/> LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="120"/> PLF	OVERTURNING MOMENT	<input type="text" value="2.7"/> K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="0"/> LBS
DL AT ENDS OF WALL	<input type="text" value="400"/> LBS	RESISTIVE MOMENT	<input type="text" value="13.8"/> K-FT	HOLDDOWN CAPACITY	<input type="text" value="0"/> LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED



SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 306-25001
ENGINEER: BFD

SHEARWALL 203: 2ND - SOUTH EXT. WALL @ GUEST BED

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="9.0"/> FT.	MAX WALL OPENING HT, H _c	<input type="text" value="5.0"/> FT.	
WALL LENGTH, L	<input type="text" value="16.5"/> FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="11.5"/> FT.	SHEARWALL ASSEMBLY <input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="300"/> LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="3862"/> LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="120"/> PLF	OVERTURNING MOMENT	<input type="text" value="2.7"/> K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="0"/> LBS
DL AT ENDS OF WALL	<input type="text" value="400"/> LBS	RESISTIVE MOMENT	<input type="text" value="20.6"/> K-FT	HOLD DOWN CAPACITY	<input type="text" value="0"/> LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 204: 2ND - SOUTH EXT. WALL @ PANTRY

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="9.0"/> FT.	MAX WALL OPENING HT, H _c	<input type="text" value="0.0"/> FT.	
WALL LENGTH, L	<input type="text" value="5.6"/> FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="5.6"/> FT.	SHEARWALL ASSEMBLY <input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="200"/> LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="1891"/> LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="120"/> PLF	OVERTURNING MOMENT	<input type="text" value="1.8"/> K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="0"/> LBS
DL AT ENDS OF WALL	<input type="text" value="400"/> LBS	RESISTIVE MOMENT	<input type="text" value="3.7"/> K-FT	HOLD DOWN CAPACITY	<input type="text" value="0"/> LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED



SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 306-25001
ENGINEER: BFD

SHEARWALL 205: 2ND - WEST EXT. WALL @ GUEST BED

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="9.0"/> FT.	MAX WALL OPENING HT, H _c	<input type="text" value="0.0"/> FT.	
WALL LENGTH, L	<input type="text" value="17.0"/> FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="17.0"/> FT.	SHEARWALL ASSEMBLY <input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="1700"/> LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="5722"/> LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="185"/> PLF	OVERTURNING MOMENT	<input type="text" value="15.3"/> K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="0"/> LBS
DL AT ENDS OF WALL	<input type="text" value="400"/> LBS	RESISTIVE MOMENT	<input type="text" value="30.3"/> K-FT	HOLD DOWN CAPACITY	<input type="text" value="0"/> LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 206: 2ND - EAST EXT. WALL @ GUEST LOUNGE

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="9.0"/> FT.	MAX WALL OPENING HT, H _c	<input type="text" value="0.0"/> FT.	
WALL LENGTH, L	<input type="text" value="11.0"/> FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="11.0"/> FT.	SHEARWALL ASSEMBLY <input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="1800"/> LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="3707"/> LBS
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SHEARWALL ASSEMBLY SPECIFICATION

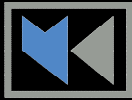
P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="165"/> PLF	OVERTURNING MOMENT	<input type="text" value="16.2"/> K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="288"/> LBS
DL AT ENDS OF WALL	<input type="text" value="400"/> LBS	RESISTIVE MOMENT	<input type="text" value="13.0"/> K-FT	HOLD DOWN CAPACITY	<input type="text" value="1705"/> LBS

HOLD-DOWN SPECIFICATION

SIMPSON CS16 STRAP TIE (14" END LENGTH)



SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 306-25001
ENGINEER: BFD

SHEARWALL 207: 2ND - NORTH EXT. WALL @ GUEST STAIRS

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="9.0"/>	FT.	MAX WALL OPENING HT, H _c	<input type="text" value="0.0"/>	FT.		
WALL LENGTH, L	<input type="text" value="5.4"/>	FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="5.4"/>	FT.	SHEARWALL ASSEMBLY	<input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="300"/>	LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="1807"/>	LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="120"/>	PLF	OVERTURNING MOMENT	<input type="text" value="2.7"/>	K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="0"/>	LBS
DL AT ENDS OF WALL	<input type="text" value="400"/>	LBS	RESISTIVE MOMENT	<input type="text" value="3.5"/>	K-FT	HOLD DOWN CAPACITY	<input type="text" value="1705"/>	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 208: 2ND - NORTH EXT. WALL @ STAIRS/FOYER

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="5.0"/>	FT.	MAX WALL OPENING HT, H _c	<input type="text" value="0.0"/>	FT.		
WALL LENGTH, L	<input type="text" value="19.8"/>	FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="19.8"/>	FT.	SHEARWALL ASSEMBLY	<input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="1000"/>	LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="6662"/>	LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="70"/>	PLF	OVERTURNING MOMENT	<input type="text" value="5.0"/>	K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="0"/>	LBS
DL AT ENDS OF WALL	<input type="text" value="400"/>	LBS	RESISTIVE MOMENT	<input type="text" value="19.5"/>	K-FT	HOLD DOWN CAPACITY	<input type="text" value="0"/>	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED



SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 306-25001
ENGINEER: BFD

SHEARWALL 209: 2ND - NORTH EXT. WALL @ JORDAN'S ROOM/LOUNGE

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="9.0"/>	FT.	MAX WALL OPENING HT, H _c	<input type="text" value="0.0"/>	FT.		
WALL LENGTH, L	<input type="text" value="22.2"/>	FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="22.2"/>	FT.	SHEARWALL ASSEMBLY	<input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="1100"/>	LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="7441"/>	LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="190"/>	PLF	OVERTURNING MOMENT	<input type="text" value="9.9"/>	K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="0"/>	LBS
DL AT ENDS OF WALL	<input type="text" value="400"/>	LBS	RESISTIVE MOMENT	<input type="text" value="50.0"/>	K-FT	HOLDDOWN CAPACITY	<input type="text" value="0"/>	LBS

HOLD-DOWN SPECIFICATION

NO HOLDDOWN REQUIRED

SHEARWALL 210: 2ND - WEST EXT. WALL @ STAIRS

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="9.0"/>	FT.	MAX WALL OPENING HT, H _c	<input type="text" value="6.0"/>	FT.		
WALL LENGTH, L	<input type="text" value="10.6"/>	FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="7.6"/>	FT.	SHEARWALL ASSEMBLY	<input type="text" value="P3"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="1700"/>	LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="4815"/>	LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P3 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 3"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="200"/>	PLF	OVERTURNING MOMENT	<input type="text" value="15.3"/>	K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="120"/>	LBS
DL AT ENDS OF WALL	<input type="text" value="400"/>	LBS	RESISTIVE MOMENT	<input type="text" value="14.0"/>	K-FT	HOLDDOWN CAPACITY	<input type="text" value="1705"/>	LBS

HOLD-DOWN SPECIFICATION

SIMPSON CS16 STRAP TIE (14" END LENGTH)



SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 306-25001
ENGINEER: BFD

SHEARWALL 211: 2ND - SOUTH EXT. WALL @ CHRIS' ROOM/DECK

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="9.0"/> FT.	MAX WALL OPENING HT, H _c	<input type="text" value="6.0"/> FT.	
WALL LENGTH, L	<input type="text" value="16.0"/> FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="8.5"/> FT.	SHEARWALL ASSEMBLY <input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="300"/> LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="2812"/> LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="130"/> PLF	OVERTURNING MOMENT	<input type="text" value="2.7"/> K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="0"/> LBS
DL AT ENDS OF WALL	<input type="text" value="400"/> LBS	RESISTIVE MOMENT	<input type="text" value="20.7"/> K-FT	HOLD DOWN CAPACITY	<input type="text" value="0"/> LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 212: 2ND - SOUTH EXT. WALL @ JORDAN'S ROOM

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="9.0"/> FT.	MAX WALL OPENING HT, H _c	<input type="text" value="6.0"/> FT.	
WALL LENGTH, L	<input type="text" value="17.5"/> FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="10.0"/> FT.	SHEARWALL ASSEMBLY <input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="300"/> LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="3358"/> LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="190"/> PLF	OVERTURNING MOMENT	<input type="text" value="2.7"/> K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="0"/> LBS
DL AT ENDS OF WALL	<input type="text" value="400"/> LBS	RESISTIVE MOMENT	<input type="text" value="32.5"/> K-FT	HOLD DOWN CAPACITY	<input type="text" value="0"/> LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED



SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 306-25001
ENGINEER: BFD

SHEARWALL 213: 2ND - EAST EXT. WALL @ STAIRS/ GREAT ROOM

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="5.0"/>	FT.	MAX WALL OPENING HT, H _c	<input type="text" value="0.0"/>	FT.		
WALL LENGTH, L	<input type="text" value="4.7"/>	FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="4.7"/>	FT.	SHEARWALL ASSEMBLY	<input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="300"/>	LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="1588"/>	LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="150"/>	PLF	OVERTURNING MOMENT	<input type="text" value="1.5"/>	K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="0"/>	LBS
DL AT ENDS OF WALL	<input type="text" value="400"/>	LBS	RESISTIVE MOMENT	<input type="text" value="3.2"/>	K-FT	HOLD DOWN CAPACITY	<input type="text" value="0"/>	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 214: 2ND - EAST EXT. WALL @ JORDAN'S ROOM/DECK

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="9.0"/>	FT.	MAX WALL OPENING HT, H _c	<input type="text" value="8.0"/>	FT.		
WALL LENGTH, L	<input type="text" value="18.0"/>	FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="5.6"/>	FT.	SHEARWALL ASSEMBLY	<input type="text" value="P3"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="1700"/>	LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="3183"/>	LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P3 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 3"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="120"/>	PLF	OVERTURNING MOMENT	<input type="text" value="15.3"/>	K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="0"/>	LBS
DL AT ENDS OF WALL	<input type="text" value="400"/>	LBS	RESISTIVE MOMENT	<input type="text" value="24.0"/>	K-FT	HOLD DOWN CAPACITY	<input type="text" value="0"/>	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED



SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 306-25001
ENGINEER: BFD

SHEARWALL 101: 1ST - NORTH EXT. WALL @ SHOP

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="10.0"/> FT.	MAX WALL OPENING HT, H _c	<input type="text" value="8.0"/> FT.	
WALL LENGTH, L	<input type="text" value="29.1"/> FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="25.9"/> FT.	SHEARWALL ASSEMBLY <input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL LBS < ALLOWABLE SHEARWALL CAPACITY LBS

SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="120"/> PLF	OVERTURNING MOMENT	<input type="text" value="10.0"/> K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="0"/> LBS
DL AT ENDS OF WALL	<input type="text" value="400"/> LBS	RESISTIVE MOMENT	<input type="text" value="56.3"/> K-FT	HOLD DOWN CAPACITY	<input type="text" value="0"/> LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 102: 1ST - SOUTH EXT. WALL @ SHOP

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="10.0"/> FT.	MAX WALL OPENING HT, H _c	<input type="text" value="0.0"/> FT.	
WALL LENGTH, L	<input type="text" value="30.0"/> FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="30.0"/> FT.	SHEARWALL ASSEMBLY <input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL LBS < ALLOWABLE SHEARWALL CAPACITY LBS

SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="120"/> PLF	OVERTURNING MOMENT	<input type="text" value="10.0"/> K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="0"/> LBS
DL AT ENDS OF WALL	<input type="text" value="400"/> LBS	RESISTIVE MOMENT	<input type="text" value="59.4"/> K-FT	HOLD DOWN CAPACITY	<input type="text" value="0"/> LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED



SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 306-25001
ENGINEER: BFD

SHEARWALL 103: 1ST - SOUTH EXT. WALL @ OFFICE

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="10.0"/> FT.	MAX WALL OPENING HT, H _c	<input type="text" value="3.5"/> FT.	
WALL LENGTH, L	<input type="text" value="16.0"/> FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="5.5"/> FT.	SHEARWALL ASSEMBLY <input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="800"/> LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="1847"/> LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="120"/> PLF	OVERTURNING MOMENT	<input type="text" value="8.0"/> K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="0"/> LBS
DL AT ENDS OF WALL	<input type="text" value="400"/> LBS	RESISTIVE MOMENT	<input type="text" value="19.6"/> K-FT	HOLDDOWN CAPACITY	<input type="text" value="0"/> LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 104: 1ST - SOUTH EXT. WALL @ GUEST STAIRS

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="11.5"/> FT.	MAX WALL OPENING HT, H _c	<input type="text" value="0.0"/> FT.	
WALL LENGTH, L	<input type="text" value="5.6"/> FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="5.6"/> FT.	SHEARWALL ASSEMBLY <input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="500"/> LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="1885"/> LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="240"/> PLF	OVERTURNING MOMENT	<input type="text" value="7.6"/> K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="10"/> LBS
DL AT ENDS OF WALL	<input type="text" value="800"/> LBS	RESISTIVE MOMENT	<input type="text" value="7.5"/> K-FT	HOLDDOWN CAPACITY	<input type="text" value="4935"/> LBS

HOLD-DOWN SPECIFICATION

SIMPSON STHD14RJ HOLDOWN



SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 306-25001
ENGINEER: BFD

SHEARWALL 105: 1ST - WEST EXT. WALL @ SHOP

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="10.0"/>	FT.	MAX WALL OPENING HT, H _c	<input type="text" value="0.0"/>	FT.		
WALL LENGTH, L	<input type="text" value="13.0"/>	FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="13.0"/>	FT.	SHEARWALL ASSEMBLY	<input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="1500"/>	LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="4365"/>	LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="175"/>	PLF	OVERTURNING MOMENT	<input type="text" value="15.0"/>	K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="0"/>	LBS
DL AT ENDS OF WALL	<input type="text" value="400"/>	LBS	RESISTIVE MOMENT	<input type="text" value="18.0"/>	K-FT	HOLDDOWN CAPACITY	<input type="text" value="0"/>	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 106: 1ST - EAST EXT. WALL @ GARAGE 2

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="11.5"/>	FT.	MAX WALL OPENING HT, H _c	<input type="text" value="0.0"/>	FT.		
WALL LENGTH, L	<input type="text" value="11.0"/>	FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="11.0"/>	FT.	SHEARWALL ASSEMBLY	<input type="text" value="P3"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="3500"/>	LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="6932"/>	LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P3 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 3"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="330"/>	PLF	OVERTURNING MOMENT	<input type="text" value="56.4"/>	K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="2773"/>	LBS
DL AT ENDS OF WALL	<input type="text" value="800"/>	LBS	RESISTIVE MOMENT	<input type="text" value="25.9"/>	K-FT	HOLDDOWN CAPACITY	<input type="text" value="4935"/>	LBS

HOLD-DOWN SPECIFICATION

SIMPSON STHD14RJ HOLDOWN



SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 306-25001
ENGINEER: BFD

SHEARWALL 107: 1ST - EAST EXT. WALL @ SHOP

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="10.0"/> FT.	MAX WALL OPENING HT, H _c	<input type="text" value="0.0"/> FT.	
WALL LENGTH, L	<input type="text" value="7.3"/> FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="7.3"/> FT.	SHEARWALL ASSEMBLY <input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="2000"/> LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="2451"/> LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="175"/> PLF	OVERTURNING MOMENT	<input type="text" value="20.0"/> K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="1805"/> LBS
DL AT ENDS OF WALL	<input type="text" value="400"/> LBS	RESISTIVE MOMENT	<input type="text" value="6.8"/> K-FT	HOLDDOWN CAPACITY	<input type="text" value="4935"/> LBS

HOLD-DOWN SPECIFICATION

SIMPSON STDH14RJ HOLDOWN

SHEARWALL 108: 1ST - WEST INT. WALL @ SHOP/OFFICE

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="9.0"/> FT.	MAX WALL OPENING HT, H _c	<input type="text" value="0.0"/> FT.	
WALL LENGTH, L	<input type="text" value="12.4"/> FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="12.4"/> FT.	SHEARWALL ASSEMBLY <input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="2200"/> LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="4171"/> LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="445"/> PLF	OVERTURNING MOMENT	<input type="text" value="19.8"/> K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="0"/> LBS
DL AT ENDS OF WALL	<input type="text" value="800"/> LBS	RESISTIVE MOMENT	<input type="text" value="39.8"/> K-FT	HOLDDOWN CAPACITY	<input type="text" value="0"/> LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED



SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 306-25001
ENGINEER: BFD

SHEARWALL 109: 1ST - WEST EXT. WALL @ STAIRS/GARAGE 2

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="11.5"/> FT.	MAX WALL OPENING HT, H _c	<input type="text" value="0.0"/> FT.	
WALL LENGTH, L	<input type="text" value="10.6"/> FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="10.6"/> FT.	SHEARWALL ASSEMBLY <input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="1000"/> LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="3549"/> LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="143"/> PLF	OVERTURNING MOMENT	<input type="text" value="11.5"/> K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="0"/> LBS
DL AT ENDS OF WALL	<input type="text" value="800"/> LBS	RESISTIVE MOMENT	<input type="text" value="14.8"/> K-FT	HOLD DOWN CAPACITY	<input type="text" value="0"/> LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 110: 1ST - NORTH EXT. WALL @ GARAGE 1

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="10.0"/> FT.	MAX WALL OPENING HT, H _c	<input type="text" value="0.0"/> FT.	
WALL LENGTH, L	<input type="text" value="5.4"/> FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="5.4"/> FT.	SHEARWALL ASSEMBLY <input type="text" value="P3"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="1000"/> LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="3397"/> LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P3 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 3"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="280"/> PLF	OVERTURNING MOMENT	<input type="text" value="12.7"/> K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="958"/> LBS
DL AT ENDS OF WALL	<input type="text" value="800"/> LBS	RESISTIVE MOMENT	<input type="text" value="7.5"/> K-FT	HOLD DOWN CAPACITY	<input type="text" value="4935"/> LBS

HOLD-DOWN SPECIFICATION

SIMPSON STHD14RJ HOLDOWN



SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 306-25001
ENGINEER: BFD

SHEARWALL 111: 1ST - WEST EXT. WALL @ GUEST STAIRS

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="10.0"/> FT.	MAX WALL OPENING HT, H _c	<input type="text" value="0.0"/> FT.	
WALL LENGTH, L	<input type="text" value="5.3"/> FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="5.3"/> FT.	SHEARWALL ASSEMBLY <input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="300"/> LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="1783"/> LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="128"/> PLF	OVERTURNING MOMENT	<input type="text" value="3.0"/> K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="0"/> LBS
DL AT ENDS OF WALL	<input type="text" value="400"/> LBS	RESISTIVE MOMENT	<input type="text" value="3.5"/> K-FT	HOLDDOWN CAPACITY	<input type="text" value="0"/> LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 112: 1ST - SOUTH EXT. WALL @ GARAGE 1

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="10.0"/> FT.	MAX WALL OPENING HT, H _c	<input type="text" value="0.0"/> FT.	
WALL LENGTH, L	<input type="text" value="21.0"/> FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="21.0"/> FT.	SHEARWALL ASSEMBLY <input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="3000"/> LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="7052"/> LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="270"/> PLF	OVERTURNING MOMENT	<input type="text" value="30.0"/> K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="0"/> LBS
DL AT ENDS OF WALL	<input type="text" value="400"/> LBS	RESISTIVE MOMENT	<input type="text" value="61.1"/> K-FT	HOLDDOWN CAPACITY	<input type="text" value="0"/> LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED



SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 306-25001
ENGINEER: BFD

SHEARWALL 113: 1ST - SOUTH EXT. WALL @ KITCHEN

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="10.0"/> FT.	MAX WALL OPENING HT, H _c	<input type="text" value="0.0"/> FT.	
WALL LENGTH, L	<input type="text" value="13.5"/> FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="13.5"/> FT.	SHEARWALL ASSEMBLY <input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="1500"/> LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="4533"/> LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="320"/> PLF	OVERTURNING MOMENT	<input type="text" value="15.0"/> K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="0"/> LBS
DL AT ENDS OF WALL	<input type="text" value="400"/> LBS	RESISTIVE MOMENT	<input type="text" value="31.1"/> K-FT	HOLD DOWN CAPACITY	<input type="text" value="0"/> LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 114: 1ST - EAST EXT. WALL @ GARAGE 1

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="10.0"/> FT.	MAX WALL OPENING HT, H _c	<input type="text" value="2.5"/> FT.	
WALL LENGTH, L	<input type="text" value="16.0"/> FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="7.0"/> FT.	SHEARWALL ASSEMBLY <input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="2100"/> LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="2351"/> LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="140"/> PLF	OVERTURNING MOMENT	<input type="text" value="21.0"/> K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="0"/> LBS
DL AT ENDS OF WALL	<input type="text" value="400"/> LBS	RESISTIVE MOMENT	<input type="text" value="21.9"/> K-FT	HOLD DOWN CAPACITY	<input type="text" value="0"/> LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED



SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 306-25001
ENGINEER: BFD

SHEARWALL 115: 1ST - EAST EXT. WALL @ KITCHEN/PATIO

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="10.0"/>	FT.	MAX WALL OPENING HT, H _c	<input type="text" value="0.0"/>	FT.		
WALL LENGTH, L	<input type="text" value="5.6"/>	FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="5.6"/>	FT.	SHEARWALL ASSEMBLY	<input type="text" value="P3"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="3000"/>	LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="3504"/>	LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P3 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 3"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="443"/>	PLF	OVERTURNING MOMENT	<input type="text" value="30.0"/>	K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="2489"/>	LBS
DL AT ENDS OF WALL	<input type="text" value="2000"/>	LBS	RESISTIVE MOMENT	<input type="text" value="16.2"/>	K-FT	HOLDDOWN CAPACITY	<input type="text" value="4935"/>	LBS

HOLD-DOWN SPECIFICATION

SIMPSON STDH14RJ HOLDOWN

SHEARWALL 116: 1ST - EAST INT. WALL @ KITCHEN/PANTRY

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="10.0"/>	FT.	MAX WALL OPENING HT, H _c	<input type="text" value="0.0"/>	FT.		
WALL LENGTH, L	<input type="text" value="10.7"/>	FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="10.7"/>	FT.	SHEARWALL ASSEMBLY	<input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="2100"/>	LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="3583"/>	LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="325"/>	PLF	OVERTURNING MOMENT	<input type="text" value="21.0"/>	K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="0"/>	LBS
DL AT ENDS OF WALL	<input type="text" value="600"/>	LBS	RESISTIVE MOMENT	<input type="text" value="22.4"/>	K-FT	HOLDDOWN CAPACITY	<input type="text" value="0"/>	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED



SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 306-25001
ENGINEER: BFD

SHEARWALL 117: 1ST - NORTH EXT. WALL @ PRIMARY CLOSET

SHEARWALL PROPERTIES:

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

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL LBS < ALLOWABLE SHEARWALL CAPACITY LBS

SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL PLF OVERTURNING MOMENT K-FT HOLD DOWN DESIGN LOAD LBS
DL AT ENDS OF WALL LBS RESISTIVE MOMENT K-FT HOLDDOWN CAPACITY LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 118: 1ST - NORTH EXT. WALL @ PRIMARY BATH

SHEARWALL PROPERTIES:

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

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL LBS < ALLOWABLE SHEARWALL CAPACITY LBS

SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL PLF OVERTURNING MOMENT K-FT HOLD DOWN DESIGN LOAD LBS
DL AT ENDS OF WALL LBS RESISTIVE MOMENT K-FT HOLDDOWN CAPACITY LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED



SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 306-25001
ENGINEER: BFD

SHEARWALL 119: 1ST - NORTH EXT. WALL @ PRIMARY BATH

SHEARWALL PROPERTIES:

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

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL LBS < ALLOWABLE SHEARWALL CAPACITY LBS

SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL PLF OVERTURNING MOMENT K-FT HOLD DOWN DESIGN LOAD LBS
DL AT ENDS OF WALL LBS RESISTIVE MOMENT K-FT HOLDDOWN CAPACITY LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 120: 1ST - NORTH INT./EXT. WALL @ PRIMARY BATH/BED

SHEARWALL PROPERTIES:

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

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL LBS < ALLOWABLE SHEARWALL CAPACITY LBS

SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL PLF OVERTURNING MOMENT K-FT HOLD DOWN DESIGN LOAD LBS
DL AT ENDS OF WALL LBS RESISTIVE MOMENT K-FT HOLDDOWN CAPACITY LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED



SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 306-25001
ENGINEER: BFD

SHEARWALL 121: 1ST - NORTH INT./EXT. WALL @ PRIMARY CLOSET/MEDIA

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="10.0"/>	FT.	MAX WALL OPENING HT, H _c	<input type="text" value="0.0"/>	FT.		
WALL LENGTH, L	<input type="text" value="20.0"/>	FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="20.0"/>	FT.	SHEARWALL ASSEMBLY	<input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="1400"/>	LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="6716"/>	LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="245"/>	PLF	OVERTURNING MOMENT	<input type="text" value="14.0"/>	K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="0"/>	LBS
DL AT ENDS OF WALL	<input type="text" value="400"/>	LBS	RESISTIVE MOMENT	<input type="text" value="51.3"/>	K-FT	HOLDDOWN CAPACITY	<input type="text" value="0"/>	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 122: 1ST - NORTH INT. WALL @ MEDIA/FOYER

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="10.0"/>	FT.	MAX WALL OPENING HT, H _c	<input type="text" value="2.5"/>	FT.		
WALL LENGTH, L	<input type="text" value="21.6"/>	FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="14.6"/>	FT.	SHEARWALL ASSEMBLY	<input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="2500"/>	LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="4909"/>	LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="240"/>	PLF	OVERTURNING MOMENT	<input type="text" value="25.0"/>	K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="0"/>	LBS
DL AT ENDS OF WALL	<input type="text" value="400"/>	LBS	RESISTIVE MOMENT	<input type="text" value="58.3"/>	K-FT	HOLDDOWN CAPACITY	<input type="text" value="0"/>	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED



SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 306-25001
ENGINEER: BFD

SHEARWALL 123: 1ST - NORTH INT. WALL @ GREAT ROOM/PRIMARY BED

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="12.0"/> FT.	MAX WALL OPENING HT, H _c	<input type="text" value="8.0"/> FT.	
WALL LENGTH, L	<input type="text" value="20.5"/> FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="15.5"/> FT.	SHEARWALL ASSEMBLY <input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	=	ALLOWABLE SHEARWALL CAPACITY
<input type="text" value="2500"/> LBS		<input type="text" value="5205"/> 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	<input type="text" value="300"/> PLF	OVERTURNING MOMENT	<input type="text" value="30.0"/> K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="0"/> LBS
DL AT ENDS OF WALL	<input type="text" value="400"/> LBS	RESISTIVE MOMENT	<input type="text" value="64.1"/> K-FT	HOLD DOWN CAPACITY	<input type="text" value="0"/> LBS

HOLD-DOWN SPECIFICATION

NO HOLD DOWN REQUIRED

SHEARWALL 124: 1ST - WEST EXT. WALL @ MEDIA

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="10.0"/> FT.	MAX WALL OPENING HT, H _c	<input type="text" value="5.5"/> FT.	
WALL LENGTH, L	<input type="text" value="19.0"/> FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="9.5"/> FT.	SHEARWALL ASSEMBLY <input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<	ALLOWABLE SHEARWALL CAPACITY
<input type="text" value="1700"/> LBS		<input type="text" value="3190"/> 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	<input type="text" value="120"/> PLF	OVERTURNING MOMENT	<input type="text" value="17.0"/> K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="0"/> LBS
DL AT ENDS OF WALL	<input type="text" value="400"/> LBS	RESISTIVE MOMENT	<input type="text" value="26.3"/> K-FT	HOLD DOWN CAPACITY	<input type="text" value="0"/> LBS

HOLD-DOWN SPECIFICATION

NO HOLD DOWN REQUIRED



SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 306-25001
ENGINEER: BFD

SHEARWALL 125: 1ST - WEST EXT. WALL @ PRIMARY CLOSET

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="10.0"/>	FT.	MAX WALL OPENING HT, H _c	<input type="text" value="5.5"/>	FT.		
WALL LENGTH, L	<input type="text" value="10.5"/>	FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="8.0"/>	FT.	SHEARWALL ASSEMBLY	<input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="900"/>	LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="2686"/>	LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="120"/>	PLF	OVERTURNING MOMENT	<input type="text" value="9.0"/>	K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="0"/>	LBS
DL AT ENDS OF WALL	<input type="text" value="400"/>	LBS	RESISTIVE MOMENT	<input type="text" value="9.7"/>	K-FT	HOLDDOWN CAPACITY	<input type="text" value="0"/>	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 126: 1ST - EAST EXT. WALL @ PRIMARY BATH

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="10.0"/>	FT.	MAX WALL OPENING HT, H _c	<input type="text" value="0.0"/>	FT.		
WALL LENGTH, L	<input type="text" value="3.1"/>	FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="3.1"/>	FT.	SHEARWALL ASSEMBLY	<input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="800"/>	LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="869"/>	LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="120"/>	PLF	OVERTURNING MOMENT	<input type="text" value="8.0"/>	K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="2080"/>	LBS
DL AT ENDS OF WALL	<input type="text" value="400"/>	LBS	RESISTIVE MOMENT	<input type="text" value="1.6"/>	K-FT	HOLDDOWN CAPACITY	<input type="text" value="4935"/>	LBS

HOLD-DOWN SPECIFICATION

SIMPSON STHD14RJ HOLDOWN



SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 306-25001
ENGINEER: BFD

SHEARWALL 127: 1ST - EAST EXT. WALL @ PRIMARY BED

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="12.0"/> FT.	MAX WALL OPENING HT, H _c	<input type="text" value="9.0"/> FT.	
WALL LENGTH, L	<input type="text" value="19.5"/> FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="7.5"/> FT.	SHEARWALL ASSEMBLY <input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="1000"/> LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="2393"/> LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="120"/> PLF	OVERTURNING MOMENT	<input type="text" value="12.0"/> K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="0"/> LBS
DL AT ENDS OF WALL	<input type="text" value="400"/> LBS	RESISTIVE MOMENT	<input type="text" value="27.6"/> K-FT	HOLDDOWN CAPACITY	<input type="text" value="0"/> LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 128: 1ST - WEST EXT. WALL @ POWDER

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="10.0"/> FT.	MAX WALL OPENING HT, H _c	<input type="text" value="6.0"/> FT.	
WALL LENGTH, L	<input type="text" value="10.7"/> FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="7.7"/> FT.	SHEARWALL ASSEMBLY <input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="2000"/> LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="2576"/> LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="320"/> PLF	OVERTURNING MOMENT	<input type="text" value="35.3"/> K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="1056"/> LBS
DL AT ENDS OF WALL	<input type="text" value="800"/> LBS	RESISTIVE MOMENT	<input type="text" value="24.1"/> K-FT	HOLDDOWN CAPACITY	<input type="text" value="4935"/> LBS

HOLD-DOWN SPECIFICATION

SIMPSON STHD14RJ HOLDOWN



SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 306-25001
ENGINEER: BFD

SHEARWALL 129: 1ST - EAST EXT. WALL @ DINING

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="14.5"/>	FT.	MAX WALL OPENING HT, H _c	<input type="text" value="10.0"/>	FT.	SHEARWALL ASSEMBLY	<input type="text" value="P1"/>
WALL LENGTH, L	<input type="text" value="15.5"/>	FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="6.5"/>	FT.		

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="1500"/>	LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="1788"/>	LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="230"/>	PLF	OVERTURNING MOMENT	<input type="text" value="21.8"/>	K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="0"/>	LBS
DL AT ENDS OF WALL	<input type="text" value="400"/>	LBS	RESISTIVE MOMENT	<input type="text" value="30.4"/>	K-FT	HOLDDOWN CAPACITY	<input type="text" value="0"/>	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 130: 1ST - EAST EXT. WALL @ GREAT ROOM

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="14.5"/>	FT.	MAX WALL OPENING HT, H _c	<input type="text" value="0.0"/>	FT.	SHEARWALL ASSEMBLY	<input type="text" value="P1"/>
WALL LENGTH, L	<input type="text" value="4.3"/>	FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="4.3"/>	FT.		

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="800"/>	LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="1192"/>	LBS
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SHEARWALL ASSEMBLY SPECIFICATION

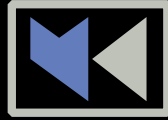
P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="170"/>	PLF	OVERTURNING MOMENT	<input type="text" value="11.6"/>	K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="2016"/>	LBS
DL AT ENDS OF WALL	<input type="text" value="400"/>	LBS	RESISTIVE MOMENT	<input type="text" value="3.0"/>	K-FT	HOLDDOWN CAPACITY	<input type="text" value="4935"/>	LBS

HOLD-DOWN SPECIFICATION

SIMPSON STHD14RJ HOLDOWN



MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

SHEAR WALL CALCULATIONS - SEISMIC

MACPHERSON CONSTRUCTION & DESIGN

5330 BUTTERWORTH RD - NORTH LOT

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., PROJECT MANAGER

BLAKE F. DURHAM, STAFF ENGINEER



SEISMIC CALCULATION - ASCE 7-16

M+K PROJECT #: 306-25001
ENGINEER: BFD

SEISMIC DESIGN CATEGORY:

USER INPUTS:

SITE CLASS	F
SPECTRAL RESPONSE ACCELERATION 0.2 SEC, $S_{0.2}$	1.437
SPECTRAL RESPONSE ACCELERATION 1.0 SEC, $S_{1.0}$	0.499
OCCUPANCY CATEGORY	II

VARIABLES:

SITE COEFFICIENT, F_A	x
SITE COEFFICIENT, F_V	x

CALCULATED VALUES:

MAXIMUM SPECTRAL RESPONSE ACCELERATION, S_{M0}	1.940
MAXIMUM SPECTRAL RESPONSE ACCELERATION, S_{M1}	0.674
DESIGN SPECTRAL RESPONSE ACCELERATION, S_{D0}	1.293
DESIGN SPECTRAL RESPONSE ACCELERATION, S_{D1}	0.499
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)	8
HT. ABV BASE TO HIGHEST LEVEL, h_N	21

CALCULATED VALUES:

APPROXIMATE FUNDAMENTAL PERIOD, T_a	0.193
T_D	0.077
T_B	0.386
SPECTRAL RESPONSE ACC., S_s (G)	1.293

SITE CLASS ASSUMPTION

No	PER ASCE 7-16 SECTION 11.4.3 THE SITE CLASS MAY BE ASSUMED TO BE D
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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	11.6	5129	15	26.8	104 K
2	9.0	3454	10	10.0	45 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 148 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	0.199	0.199

BASE SHEARS:

	TRANSVERSE	LONGITUDINAL	TRANSVERSE	LONGITUDINAL
ULTIMATE LOADS	30 K	30 K	ALLOWABLE LOADS	20.7 K

STORY SHEAR CALCULATION:

DISTRIBUTION EXPONENT, α 1.00

LEVEL	VERT. DIST. FACTOR, C_{dh}	ULTIMATE LOADS		ALLOWABLE LOADS			
		TRANSVERSE STORY SHEAR, F_x	LONGITUDINAL STORY SHEAR, F_y	TRANSVERSE STORY SHEAR, F_x	\sum STORY SHEAR	LONGITUDINAL STORY SHEAR, F_y	\sum STORY SHEAR
1	0.567	16.7 K	16.7 K	11.7 K	20.7 K	11.7 K	20.7 K
2	0.433	12.8 K	12.8 K	8.9 K	8.9 K	8.9 K	8.9 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

DATE	REV.	BY	DESCRIPTION
2/25/25		DAN	CONCEPT DESIGN

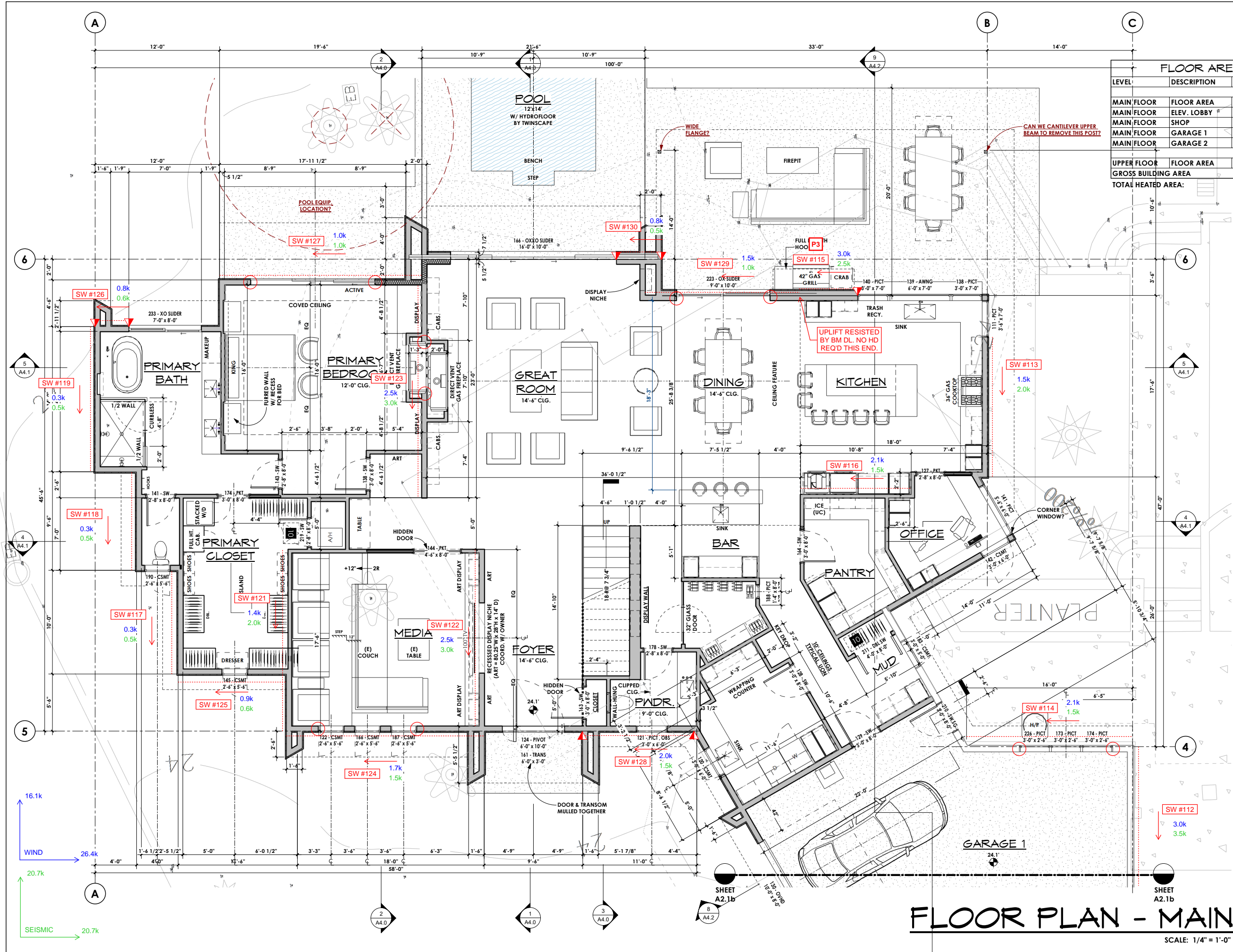
MACPHERSON RESIDENCE
 5320 BUTTERWORTH RD.
 MERCER ISLAND, WA 98040
 PARCEL #: 000000-0000
FLOOR PLAN - MAIN

MacPherson
 Construction & Design
 22405 SE 54th St Suite 140, Issaquah, WA 98029
 PH. 425.391.3333 FAX 425.557.2841

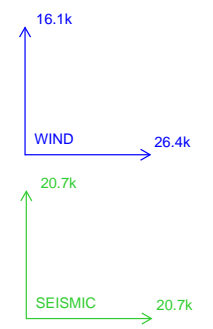
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A2.1a

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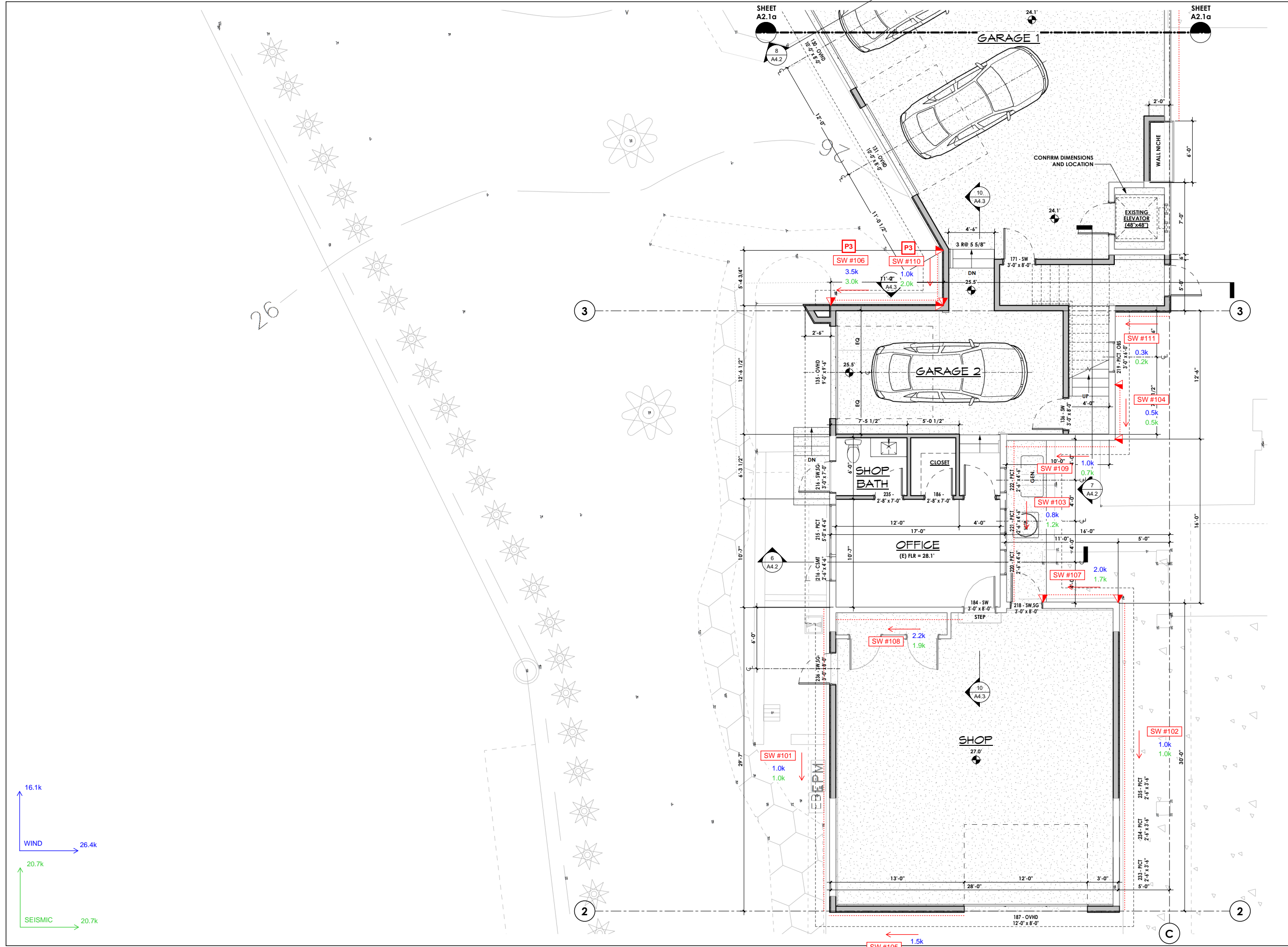
FLOOR AREAS			
LEVEL	DESCRIPTION	AREA	HEATED
MAIN FLOOR	FLOOR AREA	3,454 SF	YES
MAIN FLOOR	ELEV. LOBBY	202 SF	YES
MAIN FLOOR	SHOP	1,112 SF	
MAIN FLOOR	GARAGE 1	1,032 SF	
MAIN FLOOR	GARAGE 2	293 SF	
UPPER FLOOR	FLOOR AREA	2,523 SF	YES
GROSS BUILDING AREA		8,616 SF	
TOTAL HEATED AREA:		6,180 SF	



FLOOR PLAN - MAIN
 SCALE: 1/4" = 1'-0"
 NORTH



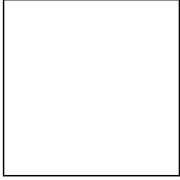
26



2" FULL SCALE

DATE	REV.	BY	DESCRIPTION
2/25/25	1	DAN	CONCEPT DESIGN

MACPHERSON RESIDENCE
 5320 BUTTERWORTH RD.
 MERCER ISLAND, WA 98040
 PARCEL #: 000000-0000
FLOOR PLAN - GARAGE



MacPherson
 Construction & Design
 22405 SE 54th St Suite 140, Issaquah, WA 98029
 PH. 425.391.3333 FAX 425.557.2841

SHEET NUMBER
A2.1b
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DATE	REV.	BY	DESCRIPTION
2/25/25	1	DAN	CONCEPT DESIGN

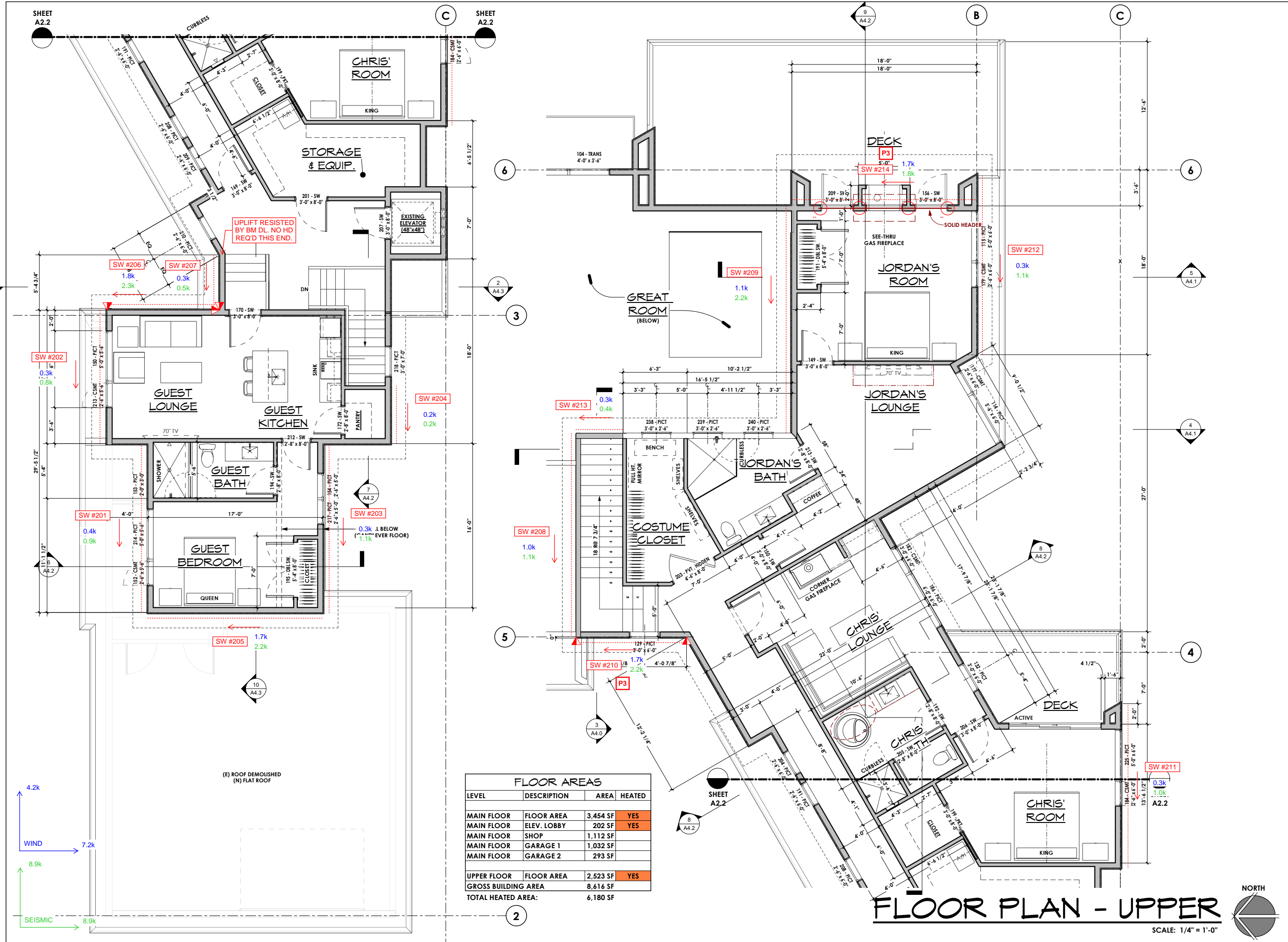
MACPHERSON RESIDENCE
 5320 BUTTERWORTH RD.
 MERCER ISLAND, WA 98040
 PARCEL #: 000000-0000
FLOOR PLAN - UPPER

MacPherson
 Construction & Design
 22405 SE 54th St Suite 140, Issaquah, WA 98029
 PH. 425.391.3333 FAX 425.557.2841

SHEET NUMBER
A2.2

SCALE THIS DRAWING, IN FEET

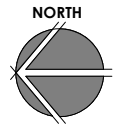
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FLOOR AREAS			
LEVEL	DESCRIPTION	AREA	HEATED
MAIN FLOOR	FLOOR AREA	3,454 SF	YES
MAIN FLOOR	ELEV. LOBBY	202 SF	YES
MAIN FLOOR	SHOP	1,112 SF	
MAIN FLOOR	GARAGE 1	1,032 SF	
MAIN FLOOR	GARAGE 2	293 SF	
UPPER FLOOR	FLOOR AREA	2,523 SF	YES
GROSS BUILDING AREA		8,616 SF	
TOTAL HEATED AREA:		6,180 SF	

FLOOR PLAN - UPPER

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





SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 306-25001

ENGINEER: BFD

SHEARWALL 201: 2ND - NORTH EXT. WALL @ GUEST BED

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="9.0"/> FT.	MAX WALL OPENING HT, H _c	<input type="text" value="5.5"/> FT.	
WALL LENGTH, L	<input type="text" value="16.5"/> FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="9.0"/> FT.	SHEARWALL ASSEMBLY <input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="900"/> LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="2143"/> LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="120"/> PLF	OVERTURNING MOMENT	<input type="text" value="8.1"/> K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="0"/> LBS
DL AT ENDS OF WALL	<input type="text" value="400"/> LBS	RESISTIVE MOMENT	<input type="text" value="14.4"/> K-FT	HOLDOWN CAPACITY	<input type="text" value="0"/> LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 202: 2ND - NORTH EXT. WALL @ GUEST LOUNGE

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="9.0"/> FT.	MAX WALL OPENING HT, H _c	<input type="text" value="5.5"/> FT.	
WALL LENGTH, L	<input type="text" value="13.0"/> FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="5.5"/> FT.	SHEARWALL ASSEMBLY <input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="800"/> LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="1274"/> LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="120"/> PLF	OVERTURNING MOMENT	<input type="text" value="7.2"/> K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="0"/> LBS
DL AT ENDS OF WALL	<input type="text" value="400"/> LBS	RESISTIVE MOMENT	<input type="text" value="9.6"/> K-FT	HOLDOWN CAPACITY	<input type="text" value="0"/> LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED



SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 306-25001
ENGINEER: BFD

SHEARWALL 203: 2ND - SOUTH EXT. WALL @ GUEST BED

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="9.0"/>	FT.	MAX WALL OPENING HT, H _c	<input type="text" value="5.0"/>	FT.		
WALL LENGTH, L	<input type="text" value="16.5"/>	FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="11.5"/>	FT.	SHEARWALL ASSEMBLY	<input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="1100"/>	LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="2758"/>	LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="120"/>	PLF	OVERTURNING MOMENT	<input type="text" value="9.9"/>	K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="0"/>	LBS
DL AT ENDS OF WALL	<input type="text" value="400"/>	LBS	RESISTIVE MOMENT	<input type="text" value="14.4"/>	K-FT	HOLDDOWN CAPACITY	<input type="text" value="0"/>	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 204: 2ND - SOUTH EXT. WALL @ PANTRY

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="9.0"/>	FT.	MAX WALL OPENING HT, H _c	<input type="text" value="0.0"/>	FT.		
WALL LENGTH, L	<input type="text" value="5.6"/>	FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="5.6"/>	FT.	SHEARWALL ASSEMBLY	<input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="200"/>	LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="1350"/>	LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="120"/>	PLF	OVERTURNING MOMENT	<input type="text" value="1.8"/>	K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="0"/>	LBS
DL AT ENDS OF WALL	<input type="text" value="400"/>	LBS	RESISTIVE MOMENT	<input type="text" value="2.6"/>	K-FT	HOLDDOWN CAPACITY	<input type="text" value="0"/>	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED



SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 306-25001
ENGINEER: BFD

SHEARWALL 205: 2ND - WEST EXT. WALL @ GUEST BED

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="9.0"/>	FT.	MAX WALL OPENING HT, H _c	<input type="text" value="0.0"/>	FT.		
WALL LENGTH, L	<input type="text" value="17.0"/>	FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="17.0"/>	FT.	SHEARWALL ASSEMBLY	<input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="2200"/>	LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="4087"/>	LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="185"/>	PLF	OVERTURNING MOMENT	<input type="text" value="19.8"/>	K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="0"/>	LBS
DL AT ENDS OF WALL	<input type="text" value="400"/>	LBS	RESISTIVE MOMENT	<input type="text" value="21.2"/>	K-FT	HOLDDOWN CAPACITY	<input type="text" value="0"/>	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 206: 2ND - EAST EXT. WALL @ GUEST LOUNGE

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="9.0"/>	FT.	MAX WALL OPENING HT, H _c	<input type="text" value="0.0"/>	FT.		
WALL LENGTH, L	<input type="text" value="11.0"/>	FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="11.0"/>	FT.	SHEARWALL ASSEMBLY	<input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="2300"/>	LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="2648"/>	LBS
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SHEARWALL ASSEMBLY SPECIFICATION

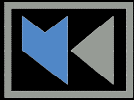
P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="165"/>	PLF	OVERTURNING MOMENT	<input type="text" value="20.7"/>	K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="1051"/>	LBS
DL AT ENDS OF WALL	<input type="text" value="400"/>	LBS	RESISTIVE MOMENT	<input type="text" value="9.1"/>	K-FT	HOLDDOWN CAPACITY	<input type="text" value="1705"/>	LBS

HOLD-DOWN SPECIFICATION

SIMPSON CS16 STRAP TIE (14" END LENGTH)



SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 306-25001
ENGINEER: BFD

SHEARWALL 207: 2ND - NORTH EXT. WALL @ GUEST STAIRS

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="9.0"/>	FT.	MAX WALL OPENING HT, H _c	<input type="text" value="0.0"/>	FT.		
WALL LENGTH, L	<input type="text" value="5.4"/>	FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="5.4"/>	FT.	SHEARWALL ASSEMBLY	<input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="500"/>	LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="1290"/>	LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="120"/>	PLF	OVERTURNING MOMENT	<input type="text" value="4.5"/>	K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="382"/>	LBS
DL AT ENDS OF WALL	<input type="text" value="400"/>	LBS	RESISTIVE MOMENT	<input type="text" value="2.4"/>	K-FT	HOLDDOWN CAPACITY	<input type="text" value="1705"/>	LBS

HOLD-DOWN SPECIFICATION

SIMPSON CS16 STRAP TIE (14" END LENGTH)

SHEARWALL 208: 2ND - NORTH EXT. WALL @ STAIRS/FOYER

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="5.0"/>	FT.	MAX WALL OPENING HT, H _c	<input type="text" value="0.0"/>	FT.		
WALL LENGTH, L	<input type="text" value="19.8"/>	FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="19.8"/>	FT.	SHEARWALL ASSEMBLY	<input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="1100"/>	LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="4759"/>	LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="70"/>	PLF	OVERTURNING MOMENT	<input type="text" value="5.5"/>	K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="0"/>	LBS
DL AT ENDS OF WALL	<input type="text" value="400"/>	LBS	RESISTIVE MOMENT	<input type="text" value="13.6"/>	K-FT	HOLDDOWN CAPACITY	<input type="text" value="0"/>	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED



SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 306-25001
ENGINEER: BFD

SHEARWALL 209: 2ND - NORTH EXT. WALL @ JORDAN'S ROOM/LOUNGE

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="9.0"/>	FT.	MAX WALL OPENING HT, H _c	<input type="text" value="0.0"/>	FT.		
WALL LENGTH, L	<input type="text" value="22.2"/>	FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="22.2"/>	FT.	SHEARWALL ASSEMBLY	<input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="2200"/>	LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="5315"/>	LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="190"/>	PLF	OVERTURNING MOMENT	<input type="text" value="19.8"/>	K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="0"/>	LBS
DL AT ENDS OF WALL	<input type="text" value="400"/>	LBS	RESISTIVE MOMENT	<input type="text" value="34.9"/>	K-FT	HOLDDOWN CAPACITY	<input type="text" value="0"/>	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 210: 2ND - WEST EXT. WALL @ STAIRS

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="9.0"/>	FT.	MAX WALL OPENING HT, H _c	<input type="text" value="6.0"/>	FT.		
WALL LENGTH, L	<input type="text" value="10.6"/>	FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="7.6"/>	FT.	SHEARWALL ASSEMBLY	<input type="text" value="P3"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="2200"/>	LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="3439"/>	LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P3 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 3"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="200"/>	PLF	OVERTURNING MOMENT	<input type="text" value="19.8"/>	K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="941"/>	LBS
DL AT ENDS OF WALL	<input type="text" value="400"/>	LBS	RESISTIVE MOMENT	<input type="text" value="9.8"/>	K-FT	HOLDDOWN CAPACITY	<input type="text" value="1705"/>	LBS

HOLD-DOWN SPECIFICATION

SIMPSON CS16 STRAP TIE (14" END LENGTH)



SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 306-25001
ENGINEER: BFD

SHEARWALL 211: 2ND - SOUTH EXT. WALL @ CHRIS' ROOM/DECK

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="9.0"/> FT.	MAX WALL OPENING HT, H _c	<input type="text" value="6.0"/> FT.	
WALL LENGTH, L	<input type="text" value="16.0"/> FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="8.5"/> FT.	SHEARWALL ASSEMBLY <input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="1000"/> LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="2009"/> LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="130"/> PLF	OVERTURNING MOMENT	<input type="text" value="9.0"/> K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="0"/> LBS
DL AT ENDS OF WALL	<input type="text" value="400"/> LBS	RESISTIVE MOMENT	<input type="text" value="14.5"/> K-FT	HOLDDOWN CAPACITY	<input type="text" value="0"/> LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 212: 2ND - SOUTH EXT. WALL @ JORDAN'S ROOM

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="9.0"/> FT.	MAX WALL OPENING HT, H _c	<input type="text" value="6.0"/> FT.	
WALL LENGTH, L	<input type="text" value="17.5"/> FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="10.0"/> FT.	SHEARWALL ASSEMBLY <input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="1100"/> LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="2399"/> LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="190"/> PLF	OVERTURNING MOMENT	<input type="text" value="9.9"/> K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="0"/> LBS
DL AT ENDS OF WALL	<input type="text" value="400"/> LBS	RESISTIVE MOMENT	<input type="text" value="22.7"/> K-FT	HOLDDOWN CAPACITY	<input type="text" value="0"/> LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED



SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 306-25001
ENGINEER: BFD

SHEARWALL 213: 2ND - EAST EXT. WALL @ STAIRS/ GREAT ROOM

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="5.0"/>	FT.	MAX WALL OPENING HT, H _c	<input type="text" value="0.0"/>	FT.	SHEARWALL ASSEMBLY	<input type="text" value="P1"/>
WALL LENGTH, L	<input type="text" value="4.7"/>	FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="4.7"/>	FT.		

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="400"/>	LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="1135"/>	LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="150"/>	PLF	OVERTURNING MOMENT	<input type="text" value="2.0"/>	K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="0"/>	LBS
DL AT ENDS OF WALL	<input type="text" value="400"/>	LBS	RESISTIVE MOMENT	<input type="text" value="2.2"/>	K-FT	HOLDDOWN CAPACITY	<input type="text" value="0"/>	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 214: 2ND - EAST EXT. WALL @ JORDAN'S ROOM/DECK

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="9.0"/>	FT.	MAX WALL OPENING HT, H _c	<input type="text" value="8.0"/>	FT.	SHEARWALL ASSEMBLY	<input type="text" value="P3"/>
WALL LENGTH, L	<input type="text" value="18.0"/>	FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="5.6"/>	FT.		

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="1800"/>	LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="2273"/>	LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P3 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 3"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="120"/>	PLF	OVERTURNING MOMENT	<input type="text" value="16.2"/>	K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="0"/>	LBS
DL AT ENDS OF WALL	<input type="text" value="400"/>	LBS	RESISTIVE MOMENT	<input type="text" value="16.7"/>	K-FT	HOLDDOWN CAPACITY	<input type="text" value="0"/>	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED



SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 306-25001
ENGINEER: BFD

SHEARWALL 101: 1ST - NORTH EXT. WALL @ SHOP

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="10.0"/> FT.	MAX WALL OPENING HT, H _c	<input type="text" value="8.0"/> FT.	
WALL LENGTH, L	<input type="text" value="29.1"/> FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="25.9"/> FT.	SHEARWALL ASSEMBLY <input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="1000"/> LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="6201"/> LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="120"/> PLF	OVERTURNING MOMENT	<input type="text" value="10.0"/> K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="0"/> LBS
DL AT ENDS OF WALL	<input type="text" value="400"/> LBS	RESISTIVE MOMENT	<input type="text" value="39.3"/> K-FT	HOLDDOWN CAPACITY	<input type="text" value="0"/> LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 102: 1ST - SOUTH EXT. WALL @ SHOP

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="10.0"/> FT.	MAX WALL OPENING HT, H _c	<input type="text" value="0.0"/> FT.	
WALL LENGTH, L	<input type="text" value="30.0"/> FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="30.0"/> FT.	SHEARWALL ASSEMBLY <input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="1000"/> LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="7196"/> LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="120"/> PLF	OVERTURNING MOMENT	<input type="text" value="10.0"/> K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="0"/> LBS
DL AT ENDS OF WALL	<input type="text" value="400"/> LBS	RESISTIVE MOMENT	<input type="text" value="41.5"/> K-FT	HOLDDOWN CAPACITY	<input type="text" value="0"/> LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED



SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 306-25001
ENGINEER: BFD

SHEARWALL 103: 1ST - SOUTH EXT. WALL @ OFFICE

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="10.0"/> FT.	MAX WALL OPENING HT, H _c	<input type="text" value="3.5"/> FT.		
WALL LENGTH, L	<input type="text" value="16.0"/> FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="5.5"/> FT.	SHEARWALL ASSEMBLY	<input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="1200"/> LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="1319"/> LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="120"/> PLF	OVERTURNING MOMENT	<input type="text" value="12.0"/> K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="0"/> LBS
DL AT ENDS OF WALL	<input type="text" value="400"/> LBS	RESISTIVE MOMENT	<input type="text" value="13.7"/> K-FT	HOLD DOWN CAPACITY	<input type="text" value="0"/> LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 104: 1ST - SOUTH EXT. WALL @ GUEST STAIRS

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="11.5"/> FT.	MAX WALL OPENING HT, H _c	<input type="text" value="0.0"/> FT.		
WALL LENGTH, L	<input type="text" value="5.6"/> FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="5.6"/> FT.	SHEARWALL ASSEMBLY	<input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="500"/> LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="1346"/> LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="240"/> PLF	OVERTURNING MOMENT	<input type="text" value="7.6"/> K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="411"/> LBS
DL AT ENDS OF WALL	<input type="text" value="800"/> LBS	RESISTIVE MOMENT	<input type="text" value="5.2"/> K-FT	HOLD DOWN CAPACITY	<input type="text" value="3695"/> LBS

HOLD-DOWN SPECIFICATION

SIMPSON STHD14RJ HOLDOWN



SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 306-25001
ENGINEER: BFD

SHEARWALL 105: 1ST - WEST EXT. WALL @ SHOP

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="10.0"/>	FT.	MAX WALL OPENING HT, H _c	<input type="text" value="0.0"/>	FT.		
WALL LENGTH, L	<input type="text" value="13.0"/>	FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="13.0"/>	FT.	SHEARWALL ASSEMBLY	<input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="1000"/>	LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="3118"/>	LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="175"/>	PLF	OVERTURNING MOMENT	<input type="text" value="10.0"/>	K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="0"/>	LBS
DL AT ENDS OF WALL	<input type="text" value="400"/>	LBS	RESISTIVE MOMENT	<input type="text" value="12.6"/>	K-FT	HOLDDOWN CAPACITY	<input type="text" value="0"/>	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 106: 1ST - EAST EXT. WALL @ GARAGE 2

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="11.5"/>	FT.	MAX WALL OPENING HT, H _c	<input type="text" value="0.0"/>	FT.		
WALL LENGTH, L	<input type="text" value="11.0"/>	FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="11.0"/>	FT.	SHEARWALL ASSEMBLY	<input type="text" value="P3"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="3000"/>	LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="4952"/>	LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P3 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 3"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="330"/>	PLF	OVERTURNING MOMENT	<input type="text" value="55.1"/>	K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="3368"/>	LBS
DL AT ENDS OF WALL	<input type="text" value="800"/>	LBS	RESISTIVE MOMENT	<input type="text" value="18.1"/>	K-FT	HOLDDOWN CAPACITY	<input type="text" value="3740"/>	LBS

HOLD-DOWN SPECIFICATION

SIMPSON HTT5 HOLDOWN



SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 306-25001
ENGINEER: BFD

SHEARWALL 107: 1ST - EAST EXT. WALL @ SHOP

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="10.0"/>	FT.	MAX WALL OPENING HT, H _c	<input type="text" value="0.0"/>	FT.		
WALL LENGTH, L	<input type="text" value="7.3"/>	FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="7.3"/>	FT.	SHEARWALL ASSEMBLY	<input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="1700"/>	LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="1751"/>	LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="175"/>	PLF	OVERTURNING MOMENT	<input type="text" value="17.0"/>	K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="1676"/>	LBS
DL AT ENDS OF WALL	<input type="text" value="400"/>	LBS	RESISTIVE MOMENT	<input type="text" value="4.8"/>	K-FT	HOLDDOWN CAPACITY	<input type="text" value="3695"/>	LBS

HOLD-DOWN SPECIFICATION

SIMPSON STDH14RJ HOLDOWN

SHEARWALL 108: 1ST - WEST INT. WALL @ SHOP/OFFICE

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="9.0"/>	FT.	MAX WALL OPENING HT, H _c	<input type="text" value="0.0"/>	FT.		
WALL LENGTH, L	<input type="text" value="12.4"/>	FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="12.4"/>	FT.	SHEARWALL ASSEMBLY	<input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="1900"/>	LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="2979"/>	LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="445"/>	PLF	OVERTURNING MOMENT	<input type="text" value="17.1"/>	K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="0"/>	LBS
DL AT ENDS OF WALL	<input type="text" value="800"/>	LBS	RESISTIVE MOMENT	<input type="text" value="27.8"/>	K-FT	HOLDDOWN CAPACITY	<input type="text" value="0"/>	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED



SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 306-25001
ENGINEER: BFD

SHEARWALL 109: 1ST - WEST EXT. WALL @ STAIRS/GARAGE 2

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="11.5"/> FT.	MAX WALL OPENING HT, H _c	<input type="text" value="0.0"/> FT.	
WALL LENGTH, L	<input type="text" value="10.6"/> FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="10.6"/> FT.	SHEARWALL ASSEMBLY <input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="700"/> LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="2535"/> LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="143"/> PLF	OVERTURNING MOMENT	<input type="text" value="8.1"/> K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="0"/> LBS
DL AT ENDS OF WALL	<input type="text" value="800"/> LBS	RESISTIVE MOMENT	<input type="text" value="10.3"/> K-FT	HOLD DOWN CAPACITY	<input type="text" value="0"/> LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 110: 1ST - NORTH EXT. WALL @ GARAGE 1

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="10.0"/> FT.	MAX WALL OPENING HT, H _c	<input type="text" value="0.0"/> FT.	
WALL LENGTH, L	<input type="text" value="5.4"/> FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="5.4"/> FT.	SHEARWALL ASSEMBLY <input type="text" value="P3"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="2000"/> LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="2426"/> LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P3 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 3"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="280"/> PLF	OVERTURNING MOMENT	<input type="text" value="24.5"/> K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="3570"/> LBS
DL AT ENDS OF WALL	<input type="text" value="800"/> LBS	RESISTIVE MOMENT	<input type="text" value="5.3"/> K-FT	HOLD DOWN CAPACITY	<input type="text" value="3740"/> LBS

HOLD-DOWN SPECIFICATION

SIMPSON HTT5 HOLDOWN



SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 306-25001
ENGINEER: BFD

SHEARWALL 111: 1ST - WEST EXT. WALL @ GUEST STAIRS

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="10.0"/> FT.	MAX WALL OPENING HT, H _c	<input type="text" value="0.0"/> FT.	
WALL LENGTH, L	<input type="text" value="5.3"/> FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="5.3"/> FT.	SHEARWALL ASSEMBLY <input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="200"/> LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="1274"/> LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="128"/> PLF	OVERTURNING MOMENT	<input type="text" value="2.0"/> K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="0"/> LBS
DL AT ENDS OF WALL	<input type="text" value="400"/> LBS	RESISTIVE MOMENT	<input type="text" value="2.5"/> K-FT	HOLDDOWN CAPACITY	<input type="text" value="0"/> LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 112: 1ST - SOUTH EXT. WALL @ GARAGE 1

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="10.0"/> FT.	MAX WALL OPENING HT, H _c	<input type="text" value="0.0"/> FT.	
WALL LENGTH, L	<input type="text" value="21.0"/> FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="21.0"/> FT.	SHEARWALL ASSEMBLY <input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="3500"/> LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="5037"/> LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="270"/> PLF	OVERTURNING MOMENT	<input type="text" value="35.0"/> K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="0"/> LBS
DL AT ENDS OF WALL	<input type="text" value="400"/> LBS	RESISTIVE MOMENT	<input type="text" value="42.7"/> K-FT	HOLDDOWN CAPACITY	<input type="text" value="0"/> LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED



SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 306-25001
ENGINEER: BFD

SHEARWALL 113: 1ST - SOUTH EXT. WALL @ KITCHEN

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="10.0"/>	FT.	MAX WALL OPENING HT, H _c	<input type="text" value="0.0"/>	FT.		
WALL LENGTH, L	<input type="text" value="13.5"/>	FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="13.5"/>	FT.	SHEARWALL ASSEMBLY	<input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="2000"/>	LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="3238"/>	LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="320"/>	PLF	OVERTURNING MOMENT	<input type="text" value="20.0"/>	K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="0"/>	LBS
DL AT ENDS OF WALL	<input type="text" value="400"/>	LBS	RESISTIVE MOMENT	<input type="text" value="21.7"/>	K-FT	HOLDDOWN CAPACITY	<input type="text" value="0"/>	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 114: 1ST - EAST EXT. WALL @ GARAGE 1

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="10.0"/>	FT.	MAX WALL OPENING HT, H _c	<input type="text" value="2.5"/>	FT.		
WALL LENGTH, L	<input type="text" value="16.0"/>	FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="7.0"/>	FT.	SHEARWALL ASSEMBLY	<input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="1500"/>	LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="1679"/>	LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="140"/>	PLF	OVERTURNING MOMENT	<input type="text" value="15.0"/>	K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="0"/>	LBS
DL AT ENDS OF WALL	<input type="text" value="400"/>	LBS	RESISTIVE MOMENT	<input type="text" value="15.3"/>	K-FT	HOLDDOWN CAPACITY	<input type="text" value="0"/>	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED



SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 306-25001
ENGINEER: BFD

SHEARWALL 115: 1ST - EAST EXT. WALL @ KITCHEN/PATIO

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="10.0"/>	FT.	MAX WALL OPENING HT, H _c	<input type="text" value="0.0"/>	FT.		
WALL LENGTH, L	<input type="text" value="5.6"/>	FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="5.6"/>	FT.	SHEARWALL ASSEMBLY	<input type="text" value="P3"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="2500"/>	LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="2503"/>	LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P3 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 3"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="443"/>	PLF	OVERTURNING MOMENT	<input type="text" value="25.0"/>	K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="2466"/>	LBS
DL AT ENDS OF WALL	<input type="text" value="2000"/>	LBS	RESISTIVE MOMENT	<input type="text" value="11.3"/>	K-FT	HOLDDOWN CAPACITY	<input type="text" value="3695"/>	LBS

HOLD-DOWN SPECIFICATION

SIMPSON STDH14RJ HOLDOWN

SHEARWALL 116: 1ST - EAST INT. WALL @ KITCHEN/PANTRY

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="10.0"/>	FT.	MAX WALL OPENING HT, H _c	<input type="text" value="0.0"/>	FT.		
WALL LENGTH, L	<input type="text" value="10.7"/>	FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="10.7"/>	FT.	SHEARWALL ASSEMBLY	<input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="1500"/>	LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="2559"/>	LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="325"/>	PLF	OVERTURNING MOMENT	<input type="text" value="15.0"/>	K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="0"/>	LBS
DL AT ENDS OF WALL	<input type="text" value="600"/>	LBS	RESISTIVE MOMENT	<input type="text" value="15.7"/>	K-FT	HOLDDOWN CAPACITY	<input type="text" value="0"/>	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED



SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 306-25001
ENGINEER: BFD

SHEARWALL 117: 1ST - NORTH EXT. WALL @ PRIMARY CLOSET

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="10.0"/> FT.	MAX WALL OPENING HT, H _c	<input type="text" value="0.0"/> FT.	
WALL LENGTH, L	<input type="text" value="10.0"/> FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="10.0"/> FT.	SHEARWALL ASSEMBLY <input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="500"/> LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="2399"/> LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="155"/> PLF	OVERTURNING MOMENT	<input type="text" value="5.0"/> K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="0"/> LBS
DL AT ENDS OF WALL	<input type="text" value="400"/> LBS	RESISTIVE MOMENT	<input type="text" value="7.4"/> K-FT	HOLDDOWN CAPACITY	<input type="text" value="0"/> LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 118: 1ST - NORTH EXT. WALL @ PRIMARY BATH

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="10.0"/> FT.	MAX WALL OPENING HT, H _c	<input type="text" value="0.0"/> FT.	
WALL LENGTH, L	<input type="text" value="9.5"/> FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="9.5"/> FT.	SHEARWALL ASSEMBLY <input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="500"/> LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="2279"/> LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="175"/> PLF	OVERTURNING MOMENT	<input type="text" value="5.0"/> K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="0"/> LBS
DL AT ENDS OF WALL	<input type="text" value="400"/> LBS	RESISTIVE MOMENT	<input type="text" value="7.4"/> K-FT	HOLDDOWN CAPACITY	<input type="text" value="0"/> LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED



SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 306-25001
ENGINEER: BFD

SHEARWALL 119: 1ST - NORTH EXT. WALL @ PRIMARY BATH

SHEARWALL PROPERTIES:

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

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL LBS < ALLOWABLE SHEARWALL CAPACITY LBS

SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL PLF OVERTURNING MOMENT K-FT HOLD DOWN DESIGN LOAD LBS
DL AT ENDS OF WALL LBS RESISTIVE MOMENT K-FT HOLDDOWN CAPACITY LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 120: 1ST - NORTH INT./EXT. WALL @ PRIMARY BATH/BED

SHEARWALL PROPERTIES:

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

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL LBS < ALLOWABLE SHEARWALL CAPACITY LBS

SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL PLF OVERTURNING MOMENT K-FT HOLD DOWN DESIGN LOAD LBS
DL AT ENDS OF WALL LBS RESISTIVE MOMENT K-FT HOLDDOWN CAPACITY LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED



SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 306-25001
ENGINEER: BFD

SHEARWALL 121: 1ST - NORTH INT./EXT. WALL @ PRIMARY CLOSET/MEDIA

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="10.0"/>	FT.	MAX WALL OPENING HT, H _c	<input type="text" value="0.0"/>	FT.		
WALL LENGTH, L	<input type="text" value="20.0"/>	FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="20.0"/>	FT.	SHEARWALL ASSEMBLY	<input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="2000"/>	LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="4797"/>	LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="245"/>	PLF	OVERTURNING MOMENT	<input type="text" value="20.0"/>	K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="0"/>	LBS
DL AT ENDS OF WALL	<input type="text" value="400"/>	LBS	RESISTIVE MOMENT	<input type="text" value="35.8"/>	K-FT	HOLDDOWN CAPACITY	<input type="text" value="0"/>	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 122: 1ST - NORTH INT. WALL @ MEDIA/FOYER

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="10.0"/>	FT.	MAX WALL OPENING HT, H _c	<input type="text" value="2.5"/>	FT.		
WALL LENGTH, L	<input type="text" value="21.6"/>	FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="14.6"/>	FT.	SHEARWALL ASSEMBLY	<input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="3000"/>	LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="3507"/>	LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="240"/>	PLF	OVERTURNING MOMENT	<input type="text" value="30.0"/>	K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="0"/>	LBS
DL AT ENDS OF WALL	<input type="text" value="400"/>	LBS	RESISTIVE MOMENT	<input type="text" value="40.7"/>	K-FT	HOLDDOWN CAPACITY	<input type="text" value="0"/>	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED



SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 306-25001
ENGINEER: BFD

SHEARWALL 123: 1ST - NORTH INT. WALL @ GREAT ROOM/PRIMARY BED

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="12.0"/> FT.	MAX WALL OPENING HT, H _c	<input type="text" value="8.0"/> FT.	
WALL LENGTH, L	<input type="text" value="20.5"/> FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="15.5"/> FT.	SHEARWALL ASSEMBLY <input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="3000"/> LBS	=	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="3718"/> LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="300"/> PLF	OVERTURNING MOMENT	<input type="text" value="36.0"/> K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="0"/> LBS
DL AT ENDS OF WALL	<input type="text" value="400"/> LBS	RESISTIVE MOMENT	<input type="text" value="44.8"/> K-FT	HOLDDOWN CAPACITY	<input type="text" value="0"/> LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 124: 1ST - WEST EXT. WALL @ MEDIA

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="10.0"/> FT.	MAX WALL OPENING HT, H _c	<input type="text" value="5.5"/> FT.	
WALL LENGTH, L	<input type="text" value="19.0"/> FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="9.5"/> FT.	SHEARWALL ASSEMBLY <input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="1500"/> LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="2279"/> LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="120"/> PLF	OVERTURNING MOMENT	<input type="text" value="15.0"/> K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="0"/> LBS
DL AT ENDS OF WALL	<input type="text" value="400"/> LBS	RESISTIVE MOMENT	<input type="text" value="18.4"/> K-FT	HOLDDOWN CAPACITY	<input type="text" value="0"/> LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED



SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 306-25001
ENGINEER: BFD

SHEARWALL 125: 1ST - WEST EXT. WALL @ PRIMARY CLOSET

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="10.0"/>	FT.	MAX WALL OPENING HT, H _c	<input type="text" value="5.5"/>	FT.	SHEARWALL ASSEMBLY	<input type="text" value="P1"/>
WALL LENGTH, L	<input type="text" value="10.5"/>	FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="8.0"/>	FT.		

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="600"/>	LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="1919"/>	LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="120"/>	PLF	OVERTURNING MOMENT	<input type="text" value="6.0"/>	K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="0"/>	LBS
DL AT ENDS OF WALL	<input type="text" value="400"/>	LBS	RESISTIVE MOMENT	<input type="text" value="6.8"/>	K-FT	HOLDDOWN CAPACITY	<input type="text" value="0"/>	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 126: 1ST - EAST EXT. WALL @ PRIMARY BATH

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="10.0"/>	FT.	MAX WALL OPENING HT, H _c	<input type="text" value="0.0"/>	FT.	SHEARWALL ASSEMBLY	<input type="text" value="P1"/>
WALL LENGTH, L	<input type="text" value="3.1"/>	FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="3.1"/>	FT.		

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="600"/>	LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="621"/>	LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="120"/>	PLF	OVERTURNING MOMENT	<input type="text" value="6.0"/>	K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="1587"/>	LBS
DL AT ENDS OF WALL	<input type="text" value="400"/>	LBS	RESISTIVE MOMENT	<input type="text" value="1.1"/>	K-FT	HOLDDOWN CAPACITY	<input type="text" value="3695"/>	LBS

HOLD-DOWN SPECIFICATION

SIMPSON STHD14RJ HOLDOWN



SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 306-25001
ENGINEER: BFD

SHEARWALL 127: 1ST - EAST EXT. WALL @ PRIMARY BED

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="12.0"/> FT.	MAX WALL OPENING HT, H _c	<input type="text" value="9.0"/> FT.	
WALL LENGTH, L	<input type="text" value="19.5"/> FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="7.5"/> FT.	SHEARWALL ASSEMBLY <input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="1000"/> LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="1709"/> LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="120"/> PLF	OVERTURNING MOMENT	<input type="text" value="12.0"/> K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="0"/> LBS
DL AT ENDS OF WALL	<input type="text" value="400"/> LBS	RESISTIVE MOMENT	<input type="text" value="19.2"/> K-FT	HOLDDOWN CAPACITY	<input type="text" value="0"/> LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 128: 1ST - WEST EXT. WALL @ POWDER

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="10.0"/> FT.	MAX WALL OPENING HT, H _c	<input type="text" value="6.0"/> FT.	
WALL LENGTH, L	<input type="text" value="10.7"/> FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="7.7"/> FT.	SHEARWALL ASSEMBLY <input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="1500"/> LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="1840"/> LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="320"/> PLF	OVERTURNING MOMENT	<input type="text" value="34.9"/> K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="1691"/> LBS
DL AT ENDS OF WALL	<input type="text" value="800"/> LBS	RESISTIVE MOMENT	<input type="text" value="16.8"/> K-FT	HOLDDOWN CAPACITY	<input type="text" value="3695"/> LBS

HOLD-DOWN SPECIFICATION

SIMPSON STHD14RJ HOLDOWN



SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 306-25001
ENGINEER: BFD

SHEARWALL 129: 1ST - EAST EXT. WALL @ DINING

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="14.5"/>	FT.	MAX WALL OPENING HT, H _c	<input type="text" value="10.0"/>	FT.		
WALL LENGTH, L	<input type="text" value="15.5"/>	FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="6.5"/>	FT.	SHEARWALL ASSEMBLY	<input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="1000"/>	LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="1277"/>	LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="230"/>	PLF	OVERTURNING MOMENT	<input type="text" value="14.5"/>	K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="0"/>	LBS
DL AT ENDS OF WALL	<input type="text" value="400"/>	LBS	RESISTIVE MOMENT	<input type="text" value="21.3"/>	K-FT	HOLDDOWN CAPACITY	<input type="text" value="0"/>	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 130: 1ST - EAST EXT. WALL @ GREAT ROOM

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="14.5"/>	FT.	MAX WALL OPENING HT, H _c	<input type="text" value="0.0"/>	FT.		
WALL LENGTH, L	<input type="text" value="4.3"/>	FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="4.3"/>	FT.	SHEARWALL ASSEMBLY	<input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="500"/>	LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="851"/>	LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="170"/>	PLF	OVERTURNING MOMENT	<input type="text" value="7.3"/>	K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="1209"/>	LBS
DL AT ENDS OF WALL	<input type="text" value="400"/>	LBS	RESISTIVE MOMENT	<input type="text" value="2.1"/>	K-FT	HOLDDOWN CAPACITY	<input type="text" value="3695"/>	LBS

HOLD-DOWN SPECIFICATION

SIMPSON STHD14RJ HOLDOWN

Concrete Beam

Project File: 5330 Butterworth Rd.ec6

LIC#: KW-06017913, Build:20.24.08.01

MULHERN & KULP STRUCTURAL ENGINEERING INC

(c) ENERCALC INC 1983-2023

DESCRIPTION: TYP. GRADE BM (WORST CASE LOAD)

CODE REFERENCES

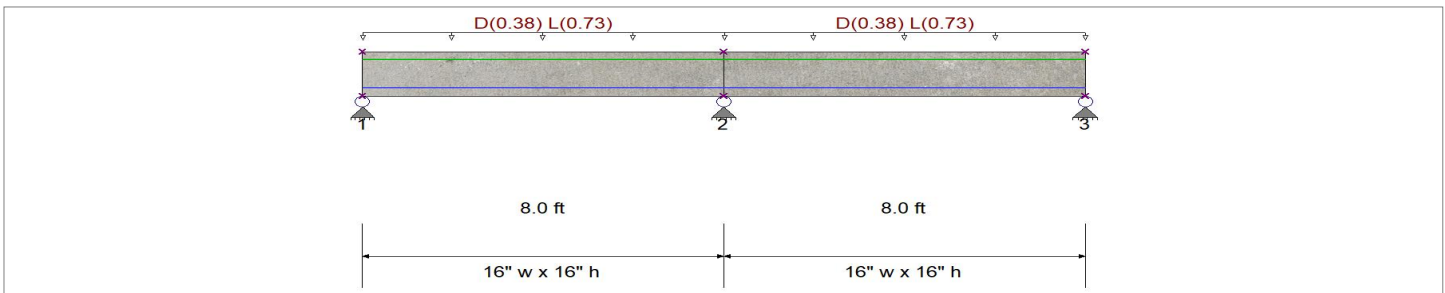
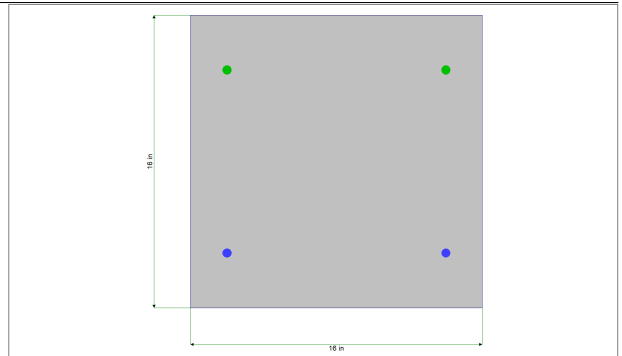
Calculations per ACI 318-19, IBC 2021, ASCE 7-16

Load Combination Set : ASCE 7-16

General Information

f'_c	=	3.0 ksi	ϕ Phi Values	Flexure :	0.90
$f_r = f'_c^{1/2} * 7.50$	=	410.792 psi		Shear :	0.750
ψ Density	=	145.0 pcf	β_1	=	0.850
λ LtWt Factor	=	1.0			
Elastic Modulus	=	3,122.0 ksi	Fy - Stirrups	=	40.0 ksi
f_y - Main Rebar	=	60.0 ksi	E - Stirrups	=	29,000.0 ksi
E - Main Rebar	=	29,000.0 ksi	Stirrup Bar Size #	=	3
			Number of Resisting Legs Per Stirrup	=	2

Seismic Design Category = A



Cross Section & Reinforcing Details

Rectangular Section, Width = 16.0 in, Height = 16.0 in

Span #1 Reinforcing....

2-#4 at 3.0 in from Bottom, from 0.0 to 8.0 ft in this span

2-#4 at 3.0 in from Top, from 0.0 to 8.0 ft in this span

Span #2 Reinforcing....

2-#4 at 3.0 in from Bottom, from 0.0 to 8.0 ft in this span

2-#4 at 3.0 in from Top, from 0.0 to 8.0 ft in this span

Beam self weight calculated and added to loads

Load for Span Number 1

Uniform Load : D = 0.380, L = 0.730 k/ft, Tributary Width = 1.0 ft

Load for Span Number 2

Uniform Load : D = 0.380, L = 0.730 k/ft, Tributary Width = 1.0 ft

DESIGN SUMMARY

Maximum Bending Stress Ratio =	0.580 : 1
Section used for this span	Typical Section
Mu : Applied	-15.467 k-ft
Mn * Phi : Allowable	26.682 k-ft
Location of maximum on span	0.000 ft
Span # where maximum occurs	Span # 2

Maximum Deflection

Max Downward Transient Deflection	0.002 in	Ratio =	58587 >=360.0	L Only
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360.0	L Only
Max Downward Total Deflection	0.003 in	Ratio =	31268 >=180.0	Span: 2 : +D+L
Max Upward Total Deflection	0.000 in	Ratio =	0 <180.0	Span: 2 : +D+L

Vertical Reactions

Support notation : Far left is #1

Load Combination	Support 1	Support 2	Support 3
Max Upward from all Load Conditions	4.103	13.678	4.103
Max Upward from Load Combinations	4.103	13.678	4.103
Max Upward from Load Cases	2.190	7.300	2.190

Concrete Beam

Project File: 5330 Butterworth Rd.ec6

LIC#: KW-06017913, Build:20.24.08.01

MULHERN & KULP STRUCTURAL ENGINEERING INC

(c) ENERCALC INC 1983-2023

DESCRIPTION: TYP. GRADE BM (WORST CASE LOAD)

Vertical Reactions

Support notation : Far left is #1

Load Combination	Support 1	Support 2	Support 3
D Only	1.913	6.378	1.913
+D+L	4.103	13.678	4.103
+D+0.750L	3.556	11.853	3.556
+0.60D	1.148	3.827	1.148
L Only	2.190	7.300	2.190

Shear Stirrup Requirements

Between 0.00 to 7.09 ft, Ties Not Req'd, Stirrups are not required.

Between 7.12 to 8.88 ft, Max spacing per T9.7.6.2.2, use #3 stirrups spaced at 6 in

Between 8.91 to 15.97 ft, Ties Not Req'd, Stirrups are not required.

Detailed Shear Information

Load Combination	Span Number	Distance (ft)	'd' (in)	Vu (k)	Av, min Req'd?	Spacing Req'd (in)	Φ Vc (k)	Φ Vs (k)	Φ Vn (k)	Vu / Φ Vn	Vc Eqn (T22.5.5.1)	Spacing Provision
+1.20D+1.60L	1	0.00	13.00	5.80	No	N/A	7.93	0.00	7.93	0.732	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	0.20	13.00	5.42	No	N/A	7.93	0.00	7.93	0.684	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	0.39	13.00	5.04	No	N/A	7.93	0.00	7.93	0.636	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	0.59	13.00	4.66	No	N/A	7.93	0.00	7.93	0.588	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	0.78	13.00	4.28	No	N/A	7.93	0.00	7.93	0.541	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	0.98	13.00	3.91	No	N/A	7.93	0.00	7.93	0.493	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	1.18	13.00	3.53	No	N/A	7.93	0.00	7.93	0.445	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	1.37	13.00	3.15	No	N/A	7.93	0.00	7.93	0.397	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	1.57	13.00	2.77	No	N/A	7.93	0.00	7.93	0.349	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	1.76	13.00	2.39	No	N/A	7.93	0.00	7.93	0.302	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	1.96	13.00	2.01	No	N/A	7.93	0.00	7.93	0.254	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	2.16	13.00	1.63	No	N/A	7.93	0.00	7.93	0.206	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	2.35	13.00	1.25	No	N/A	7.93	0.00	7.93	0.158	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	2.55	13.00	0.88	No	N/A	7.93	0.00	7.93	0.111	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	2.74	13.00	0.50	No	N/A	7.93	0.00	7.93	0.063	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	2.94	13.00	0.12	No	N/A	7.93	0.00	7.93	0.015	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	3.13	13.00	-0.26	No	N/A	7.93	0.00	7.93	0.033	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	3.33	13.00	-0.64	No	N/A	7.93	0.00	7.93	0.081	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	3.53	13.00	-1.02	No	N/A	7.93	0.00	7.93	0.128	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	3.72	13.00	-1.40	No	N/A	7.93	0.00	7.93	0.176	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	3.92	13.00	-1.78	No	N/A	7.93	0.00	7.93	0.224	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	4.11	13.00	-2.15	No	N/A	7.93	0.00	7.93	0.272	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	4.31	13.00	-2.53	No	N/A	7.93	0.00	7.93	0.320	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	4.51	13.00	-2.91	No	N/A	7.93	0.00	7.93	0.367	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	4.70	13.00	-3.29	No	N/A	7.93	0.00	7.93	0.415	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	4.90	13.00	-3.67	No	N/A	7.93	0.00	7.93	0.463	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	5.09	13.00	-4.05	No	N/A	7.93	0.00	7.93	0.511	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	5.29	13.00	-4.43	No	N/A	7.93	0.00	7.93	0.558	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	5.49	13.00	-4.81	No	N/A	7.93	0.00	7.93	0.606	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	5.68	13.00	-5.18	No	N/A	7.93	0.00	7.93	0.654	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	5.88	13.00	-5.56	No	N/A	7.93	0.00	7.93	0.702	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	6.07	13.00	-5.94	No	N/A	7.93	0.00	7.93	0.750	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	6.27	13.00	-6.32	No	N/A	7.93	0.00	7.93	0.797	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	6.47	13.00	-6.70	No	N/A	7.93	0.00	7.93	0.845	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	6.66	13.00	-7.08	No	N/A	7.93	0.00	7.93	0.893	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	6.86	13.00	-7.46	No	N/A	7.93	0.00	7.93	0.941	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	7.05	13.00	-7.84	No	N/A	7.93	0.00	7.93	0.989	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	7.25	13.00	-8.21	No	6.50	17.09	13.20	30.29	0.271	Eqn (a)	Max spacing per T9.7.6.2
+1.20D+1.60L	1	7.44	13.00	-8.59	Yes	6.50	17.09	13.20	30.29	0.284	Eqn (a)	Max spacing per T9.7.6.2
+1.20D+1.60L	1	7.64	13.00	-8.97	Yes	6.50	17.09	13.20	30.29	0.296	Eqn (a)	Max spacing per T9.7.6.2
+1.20D+1.60L	1	7.84	13.00	-9.35	Yes	6.50	17.09	13.20	30.29	0.309	Eqn (a)	Max spacing per T9.7.6.2
+1.20D+1.60L	2	8.03	13.00	9.60	Yes	6.50	17.09	13.20	30.29	0.317	Eqn (a)	Max spacing per T9.7.6.2
+1.20D+1.60L	2	8.23	13.00	9.22	Yes	6.50	17.09	13.20	30.29	0.305	Eqn (a)	Max spacing per T9.7.6.2
+1.20D+1.60L	2	8.42	13.00	8.85	Yes	6.50	17.09	13.20	30.29	0.292	Eqn (a)	Max spacing per T9.7.6.2
+1.20D+1.60L	2	8.62	13.00	8.47	No	6.50	17.09	13.20	30.29	0.280	Eqn (a)	Max spacing per T9.7.6.2
+1.20D+1.60L	2	8.82	13.00	8.09	No	6.50	17.09	13.20	30.29	0.267	Eqn (a)	Max spacing per T9.7.6.2
+1.20D+1.60L	2	9.01	13.00	7.71	No	N/A	7.93	0.00	7.93	0.973	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	2	9.21	13.00	7.33	No	N/A	7.93	0.00	7.93	0.925	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	2	9.40	13.00	6.95	No	N/A	7.93	0.00	7.93	0.877	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	2	9.60	13.00	6.57	No	N/A	7.93	0.00	7.93	0.829	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	2	9.80	13.00	6.19	No	N/A	7.93	0.00	7.93	0.781	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	2	9.99	13.00	5.82	No	N/A	7.93	0.00	7.93	0.734	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	2	10.19	13.00	5.44	No	N/A	7.93	0.00	7.93	0.686	Eqn (c)	Ties Not Req'd

Concrete Beam

Project File: 5330 Butterworth Rd.ec6

LIC# : KW-06017913, Build:20.24.08.01

MULHERN & KULP STRUCTURAL ENGINEERING INC

(c) ENERCALC INC 1983-2023

DESCRIPTION: TYP. GRADE BM (WORST CASE LOAD)

Detailed Shear Information

Load Combination	Span Number	Distance (ft)	'd' (in)	Vu (k)	Av, min Req'd?	Spacing Req'd (in)	ϕV_c (k)	ϕV_s (k)	ϕV_n (k)	Vu / ϕV_n	Vc Eqn (T22.5.5.1)	Spacing Provision
+1.20D+1.60L	2	10.38	13.00	5.06	No	N/A	7.93	0.00	7.93	0.638	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	2	10.58	13.00	4.68	No	N/A	7.93	0.00	7.93	0.590	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	2	10.78	13.00	4.30	No	N/A	7.93	0.00	7.93	0.543	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	2	10.97	13.00	3.92	No	N/A	7.93	0.00	7.93	0.495	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	2	11.17	13.00	3.54	No	N/A	7.93	0.00	7.93	0.447	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	2	11.36	13.00	3.16	No	N/A	7.93	0.00	7.93	0.399	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	2	11.56	13.00	2.79	No	N/A	7.93	0.00	7.93	0.351	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	2	11.76	13.00	2.41	No	N/A	7.93	0.00	7.93	0.304	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	2	11.95	13.00	2.03	No	N/A	7.93	0.00	7.93	0.256	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	2	12.15	13.00	1.65	No	N/A	7.93	0.00	7.93	0.208	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	2	12.34	13.00	1.27	No	N/A	7.93	0.00	7.93	0.160	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	2	12.54	13.00	0.89	No	N/A	7.93	0.00	7.93	0.112	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	2	12.73	13.00	0.51	No	N/A	7.93	0.00	7.93	0.065	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	2	12.93	13.00	0.13	No	N/A	7.93	0.00	7.93	0.017	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	2	13.13	13.00	-0.24	No	N/A	7.93	0.00	7.93	0.031	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	2	13.32	13.00	-0.62	No	N/A	7.93	0.00	7.93	0.079	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	2	13.52	13.00	-1.00	No	N/A	7.93	0.00	7.93	0.126	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	2	13.71	13.00	-1.38	No	N/A	7.93	0.00	7.93	0.174	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	2	13.91	13.00	-1.76	No	N/A	7.93	0.00	7.93	0.222	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	2	14.11	13.00	-2.14	No	N/A	7.93	0.00	7.93	0.270	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	2	14.30	13.00	-2.52	No	N/A	7.93	0.00	7.93	0.318	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	2	14.50	13.00	-2.90	No	N/A	7.93	0.00	7.93	0.365	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	2	14.69	13.00	-3.27	No	N/A	7.93	0.00	7.93	0.413	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	2	14.89	13.00	-3.65	No	N/A	7.93	0.00	7.93	0.461	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	2	15.09	13.00	-4.03	No	N/A	7.93	0.00	7.93	0.509	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	2	15.28	13.00	-4.41	No	N/A	7.93	0.00	7.93	0.556	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	2	15.48	13.00	-4.79	No	N/A	7.93	0.00	7.93	0.604	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	2	15.67	13.00	-5.17	No	N/A	7.93	0.00	7.93	0.652	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	2	15.87	13.00	-5.55	No	N/A	7.93	0.00	7.93	0.700	Eqn (c)	Ties Not Req'd

Maximum Forces & Stresses for Load Combinations

Load Combination Segment	Span #	Location (ft) along Beam	Bending Stress Results (k-ft)		
			Mu : Max	Phi*Mnx	Stress Ratio
MAXimum BENDING Envelope					
Span # 1	1	8.000	-15.15	26.68	0.57
Span # 2	2	8.000	-15.47	26.68	0.58
+1.40D					
Span # 1	1	8.000	-7.00	26.68	0.26
Span # 2	2	8.000	-7.14	26.68	0.27
+1.20D+1.60L					
Span # 1	1	8.000	-15.15	26.68	0.57
Span # 2	2	8.000	-15.47	26.68	0.58
+1.20D+L					
Span # 1	1	8.000	-11.72	26.68	0.44
Span # 2	2	8.000	-11.96	26.68	0.45
+1.20D					
Span # 1	1	8.000	-6.00	26.68	0.22
Span # 2	2	8.000	-6.12	26.68	0.23
+0.90D					
Span # 1	1	8.000	-4.50	26.68	0.17
Span # 2	2	8.000	-4.59	26.68	0.17

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl (in)	Location in Span (ft)	Load Combination	Max. "+" Defl (in)	Location in Span (ft)
+D+L	1	0.0031	3.314		0.0000	0.000
+D+L	2	0.0031	4.686		0.0000	0.000

Concrete Beam

Project File: 5330 Butterworth Rd.ec6

LIC# : KW-06017913, Build:20.24.08.01

MULHERN & KULP STRUCTURAL ENGINEERING INC

(c) ENERCALC INC 1983-2023

DESCRIPTION: TYP. GRADE BM (WORST CASE LENGTH)

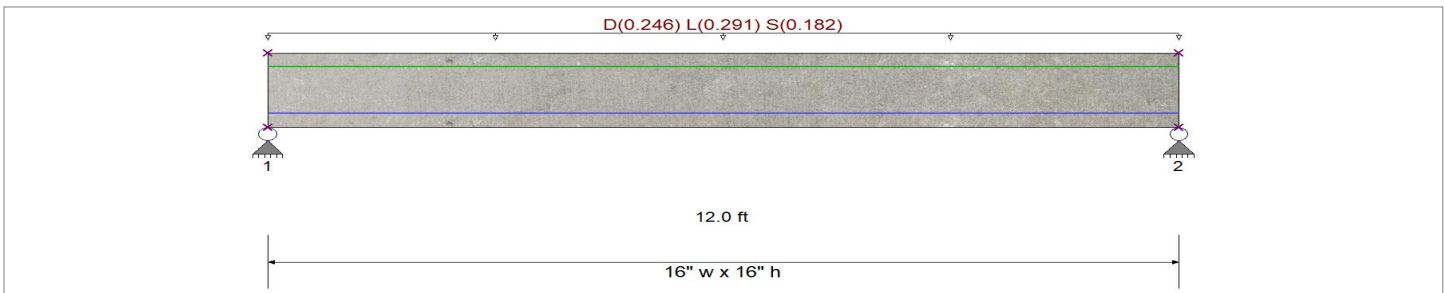
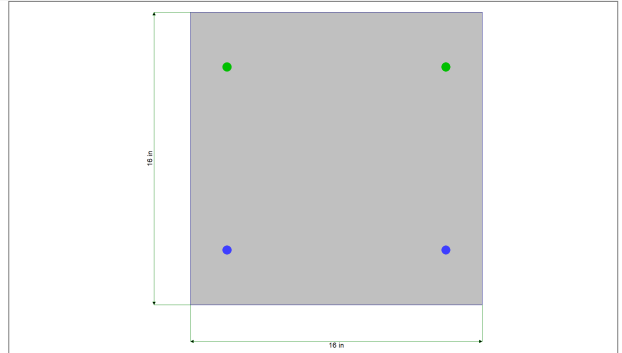
CODE REFERENCES

Calculations per ACI 318-19, IBC 2021, ASCE 7-16

Load Combination Set : IBC 2021

General Information

f'_c	=	3.0 ksi	ϕ Phi Values	Flexure :	0.90
$f_r = f'_c^{1/2} * 7.50$	=	410.792 psi		Shear :	0.750
ψ Density	=	145.0 pcf	β_1	=	0.850
λ LtWt Factor	=	1.0			
Elastic Modulus	=	3,122.0 ksi	Fy - Stirrups	=	40.0 ksi
f_y - Main Rebar	=	60.0 ksi	E - Stirrups	=	29,000.0 ksi
E - Main Rebar	=	29,000.0 ksi	Stirrup Bar Size #	=	3
			Number of Resisting Legs Per Stirrup	=	2
Seismic Design Category	=	A			



Cross Section & Reinforcing Details

Rectangular Section, Width = 16.0 in, Height = 16.0 in

Span #1 Reinforcing....

2-#4 at 3.0 in from Bottom, from 0.0 to 12.0 ft in this span

2-#4 at 3.0 in from Top, from 0.0 to 12.0 ft in this span

Beam self weight calculated and added to loads

Load for Span Number 1

Uniform Load : D = 0.2460, L = 0.2910, S = 0.1820 k/ft, Tributary Width = 1.0 ft

DESIGN SUMMARY

Maximum Bending Stress Ratio	=	0.783	: 1
Section used for this span		Typical Section	
Mu : Applied		20.90	k-ft
Mn * Phi : Allowable		26.682	k-ft
Location of maximum on span		6.011	ft
Span # where maximum occurs		Span # 1	

Maximum Deflection

Max Downward Transient Deflection	0.008 in	Ratio =	18089	>=360.0	S Only
Max Upward Transient Deflection	0.000 in	Ratio =	0	<360.0	L Only
Max Downward Total Deflection	0.023 in	Ratio =	6131	>=180.0	Span: 1 : +D+0.750L+0.750S
Max Upward Total Deflection	0.000 in	Ratio =	0	<180.0	Span: 1 : +D+0.750L+0.750S

Vertical Reactions

Support notation : Far left is #1

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	5.151	5.151
Max Upward from Load Combinations	5.151	5.151
Max Upward from Load Cases	3.023	3.023
D Only	3.023	3.023
+D+L	4.769	4.769
+D+S	4.115	4.115
+D+0.750L	4.332	4.332

Concrete Beam

Project File: 5330 Butterworth Rd.ec6

LIC#: KW-06017913, Build:20.24.08.01

MULHERN & KULP STRUCTURAL ENGINEERING INC

(c) ENERCALC INC 1983-2023

DESCRIPTION: TYP. GRADE BM (WORST CASE LENGTH)

Vertical Reactions

Support notation : Far left is #1

Load Combination	Support 1	Support 2
+D+0.750L+0.750S	5.151	5.151
+0.60D	1.814	1.814
L Only	1.746	1.746
S Only	1.092	1.092

Shear Stirrup Requirements

Entire Beam Span Length : Ties Not Req'd, Stirrups are not required.

Detailed Shear Information

Load Combination	Span Number	Distance (ft)	'd' (in)	Vu (k)	Av, min Req'd?	Spacing Req'd (in)	ϕV_c (k)	ϕV_s (k)	ϕV_n (k)	Vu / ϕV_n	Vc Eqn (T22.5.5.1)	Spacing Provision
+1.20D+1.60L+0.50S	1	0.00	13.00	6.97	No	N/A	7.93	0.00	7.93	0.879	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	0.13	13.00	6.81	No	N/A	7.93	0.00	7.93	0.860	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	0.26	13.00	6.66	No	N/A	7.93	0.00	7.93	0.840	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	0.39	13.00	6.51	No	N/A	7.93	0.00	7.93	0.821	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	0.52	13.00	6.36	No	N/A	7.93	0.00	7.93	0.802	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	0.66	13.00	6.21	No	N/A	7.93	0.00	7.93	0.783	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	0.79	13.00	6.05	No	N/A	7.93	0.00	7.93	0.764	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	0.92	13.00	5.90	No	N/A	7.93	0.00	7.93	0.744	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	1.05	13.00	5.75	No	N/A	7.93	0.00	7.93	0.725	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	1.18	13.00	5.60	No	N/A	7.93	0.00	7.93	0.706	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	1.31	13.00	5.44	No	N/A	7.93	0.00	7.93	0.687	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	1.44	13.00	5.29	No	N/A	7.93	0.00	7.93	0.668	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	1.57	13.00	5.14	No	N/A	7.93	0.00	7.93	0.648	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	1.70	13.00	4.99	No	N/A	7.93	0.00	7.93	0.629	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	1.84	13.00	4.83	No	N/A	7.93	0.00	7.93	0.610	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	1.97	13.00	4.68	No	N/A	7.93	0.00	7.93	0.591	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	2.10	13.00	4.53	No	N/A	7.93	0.00	7.93	0.572	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	2.23	13.00	4.38	No	N/A	7.93	0.00	7.93	0.552	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	2.36	13.00	4.23	No	N/A	7.93	0.00	7.93	0.533	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	2.49	13.00	4.07	No	N/A	7.93	0.00	7.93	0.514	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	2.62	13.00	3.92	No	N/A	7.93	0.00	7.93	0.495	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	2.75	13.00	3.77	No	N/A	7.93	0.00	7.93	0.475	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	2.89	13.00	3.62	No	N/A	7.93	0.00	7.93	0.456	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	3.02	13.00	3.46	No	N/A	7.93	0.00	7.93	0.437	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	3.15	13.00	3.31	No	N/A	7.93	0.00	7.93	0.418	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	3.28	13.00	3.16	No	N/A	7.93	0.00	7.93	0.399	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	3.41	13.00	3.01	No	N/A	7.93	0.00	7.93	0.379	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	3.54	13.00	2.86	No	N/A	7.93	0.00	7.93	0.360	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	3.67	13.00	2.70	No	N/A	7.93	0.00	7.93	0.341	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	3.80	13.00	2.55	No	N/A	7.93	0.00	7.93	0.322	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	3.93	13.00	2.40	No	N/A	7.93	0.00	7.93	0.303	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	4.07	13.00	2.25	No	N/A	7.93	0.00	7.93	0.283	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	4.20	13.00	2.09	No	N/A	7.93	0.00	7.93	0.264	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	4.33	13.00	1.94	No	N/A	7.93	0.00	7.93	0.245	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	4.46	13.00	1.79	No	N/A	7.93	0.00	7.93	0.226	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	4.59	13.00	1.64	No	N/A	7.93	0.00	7.93	0.207	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	4.72	13.00	1.48	No	N/A	7.93	0.00	7.93	0.187	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	4.85	13.00	1.33	No	N/A	7.93	0.00	7.93	0.168	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	4.98	13.00	1.18	No	N/A	7.93	0.00	7.93	0.149	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	5.11	13.00	1.03	No	N/A	7.93	0.00	7.93	0.130	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	5.25	13.00	0.88	No	N/A	7.93	0.00	7.93	0.110	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	5.38	13.00	0.72	No	N/A	7.93	0.00	7.93	0.091	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	5.51	13.00	0.57	No	N/A	7.93	0.00	7.93	0.072	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	5.64	13.00	0.42	No	N/A	7.93	0.00	7.93	0.053	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	5.77	13.00	0.27	No	N/A	7.93	0.00	7.93	0.034	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	5.90	13.00	0.11	No	N/A	7.93	0.00	7.93	0.014	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	6.03	13.00	-0.04	No	N/A	7.93	0.00	7.93	0.005	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	6.16	13.00	-0.19	No	N/A	7.93	0.00	7.93	0.024	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	6.30	13.00	-0.34	No	N/A	7.93	0.00	7.93	0.043	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	6.43	13.00	-0.49	No	N/A	7.93	0.00	7.93	0.062	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	6.56	13.00	-0.65	No	N/A	7.93	0.00	7.93	0.082	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	6.69	13.00	-0.80	No	N/A	7.93	0.00	7.93	0.101	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	6.82	13.00	-0.95	No	N/A	7.93	0.00	7.93	0.120	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	6.95	13.00	-1.10	No	N/A	7.93	0.00	7.93	0.139	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	7.08	13.00	-1.26	No	N/A	7.93	0.00	7.93	0.158	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	7.21	13.00	-1.41	No	N/A	7.93	0.00	7.93	0.178	Eqn (c)	Ties Not Req'd

Concrete Beam

Project File: 5330 Butterworth Rd.ec6

LIC# : KW-06017913, Build:20.24.08.01

MULHERN & KULP STRUCTURAL ENGINEERING INC

(c) ENERCALC INC 1983-2023

DESCRIPTION: TYP. GRADE BM (WORST CASE LENGTH)

Detailed Shear Information

Load Combination	Span Number	Distance (ft)	'd' (in)	Vu (k)	Av, min Req'd?	Spacing Req'd (in)	ϕV_c (k)	ϕV_s (k)	ϕV_n (k)	Vu / ϕV_n	Vc Eqn (T22.5.5.1)	Spacing Provision
+1.20D+1.60L+0.50S	1	7.34	13.00	-1.56	No	N/A	7.93	0.00	7.93	0.197	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	7.48	13.00	-1.71	No	N/A	7.93	0.00	7.93	0.216	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	7.61	13.00	-1.87	No	N/A	7.93	0.00	7.93	0.235	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	7.74	13.00	-2.02	No	N/A	7.93	0.00	7.93	0.255	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	7.87	13.00	-2.17	No	N/A	7.93	0.00	7.93	0.274	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	8.00	13.00	-2.32	No	N/A	7.93	0.00	7.93	0.293	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	8.13	13.00	-2.47	No	N/A	7.93	0.00	7.93	0.312	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	8.26	13.00	-2.63	No	N/A	7.93	0.00	7.93	0.331	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	8.39	13.00	-2.78	No	N/A	7.93	0.00	7.93	0.351	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	8.52	13.00	-2.93	No	N/A	7.93	0.00	7.93	0.370	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	8.66	13.00	-3.08	No	N/A	7.93	0.00	7.93	0.389	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	8.79	13.00	-3.24	No	N/A	7.93	0.00	7.93	0.408	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	8.92	13.00	-3.39	No	N/A	7.93	0.00	7.93	0.427	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	9.05	13.00	-3.54	No	N/A	7.93	0.00	7.93	0.447	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	9.18	13.00	-3.69	No	N/A	7.93	0.00	7.93	0.466	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	9.31	13.00	-3.85	No	N/A	7.93	0.00	7.93	0.485	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	9.44	13.00	-4.00	No	N/A	7.93	0.00	7.93	0.504	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	9.57	13.00	-4.15	No	N/A	7.93	0.00	7.93	0.524	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	9.70	13.00	-4.30	No	N/A	7.93	0.00	7.93	0.543	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	9.84	13.00	-4.45	No	N/A	7.93	0.00	7.93	0.562	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	9.97	13.00	-4.61	No	N/A	7.93	0.00	7.93	0.581	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	10.10	13.00	-4.76	No	N/A	7.93	0.00	7.93	0.600	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	10.23	13.00	-4.91	No	N/A	7.93	0.00	7.93	0.620	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	10.36	13.00	-5.06	No	N/A	7.93	0.00	7.93	0.639	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	10.49	13.00	-5.22	No	N/A	7.93	0.00	7.93	0.658	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	10.62	13.00	-5.37	No	N/A	7.93	0.00	7.93	0.677	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	10.75	13.00	-5.52	No	N/A	7.93	0.00	7.93	0.696	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	10.89	13.00	-5.67	No	N/A	7.93	0.00	7.93	0.716	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	11.02	13.00	-5.82	No	N/A	7.93	0.00	7.93	0.735	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	11.15	13.00	-5.98	No	N/A	7.93	0.00	7.93	0.754	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	11.28	13.00	-6.13	No	N/A	7.93	0.00	7.93	0.773	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	11.41	13.00	-6.28	No	N/A	7.93	0.00	7.93	0.792	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	11.54	13.00	-6.43	No	N/A	7.93	0.00	7.93	0.812	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	11.67	13.00	-6.59	No	N/A	7.93	0.00	7.93	0.831	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	11.80	13.00	-6.74	No	N/A	7.93	0.00	7.93	0.850	Eqn (c)	Ties Not Req'd
+1.20D+1.60L+0.50S	1	11.93	13.00	-6.89	No	N/A	7.93	0.00	7.93	0.869	Eqn (c)	Ties Not Req'd

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment	Span #	Location (ft) along Beam	Bending Stress Results (k-ft)		
				Mu : Max	Phi*Mnx	Stress Ratio
MAXimum BENDING Envelope						
+1.40D	Span # 1	1	12.000	20.90	26.68	0.78
+1.20D+1.60L	Span # 1	1	12.000	12.70	26.68	0.48
+1.20D+1.60L+0.50S	Span # 1	1	12.000	19.26	26.68	0.72
+1.20D+0.50L	Span # 1	1	12.000	20.90	26.68	0.78
+1.20D	Span # 1	1	12.000	13.50	26.68	0.51
+1.20D+0.50L+1.60S	Span # 1	1	12.000	10.88	26.68	0.41
+1.20D+1.60S	Span # 1	1	12.000	18.74	26.68	0.70
+1.20D+0.50L+0.50S	Span # 1	1	12.000	16.12	26.68	0.60
+1.20D+0.50L+0.70S	Span # 1	1	12.000	15.14	26.68	0.57
+0.90D	Span # 1	1	12.000	15.79	26.68	0.59
	Span # 1	1	12.000	8.16	26.68	0.31

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl (in)	Location in Span (ft)	Load Combination	Max. "+" Defl (in)	Location in Span (ft)
+D+0.750L+0.750S	1	0.0235	6.000		0.0000	0.000

Concrete Beam

Project File: 5330 Butterworth Rd.ec6

LIC#: KW-06017913, Build:20.24.08.01

MULHERN & KULP STRUCTURAL ENGINEERING INC

(c) ENERCALC INC 1983-2023

DESCRIPTION: TYP. GRADE BM @ CRAWL

CODE REFERENCES

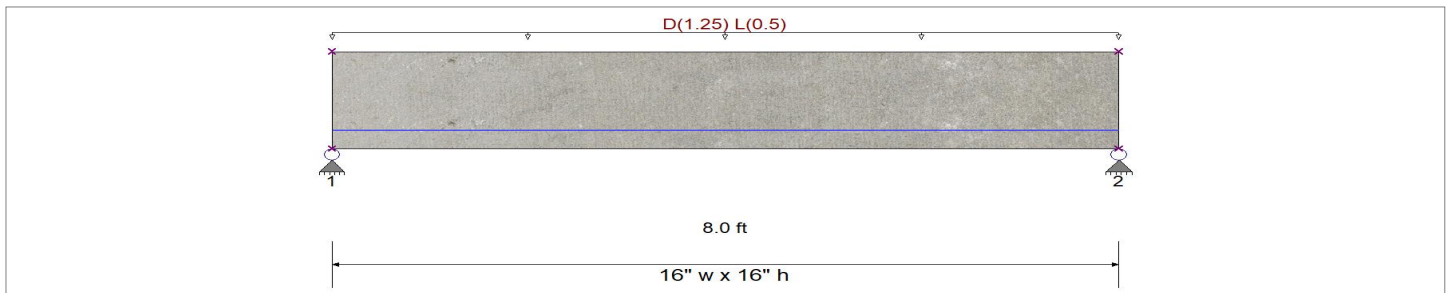
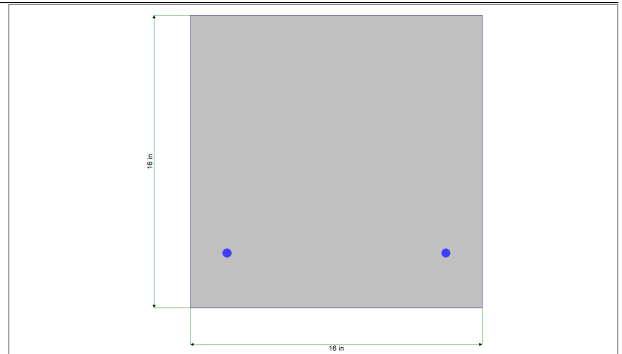
Calculations per ACI 318-19, IBC 2021, ASCE 7-16

Load Combination Set : ASCE 7-16

General Information

f'_c	=	3.0 ksi	ϕ Phi Values	Flexure :	0.90
$f_r = f'_c^{1/2} * 7.50$	=	410.792 psi		Shear :	0.750
ψ Density	=	145.0 pcf	β_1	=	0.850
λ LtWt Factor	=	1.0	Fy - Stirrups	=	40.0 ksi
Elastic Modulus	=	3,122.0 ksi	E - Stirrups	=	29,000.0 ksi
f_y - Main Rebar	=	60.0 ksi	Stirrup Bar Size #	=	3
E - Main Rebar	=	29,000.0 ksi	Number of Resisting Legs Per Stirrup	=	2

Seismic Design Category = A



Cross Section & Reinforcing Details

Rectangular Section, Width = 16.0 in, Height = 16.0 in

Span #1 Reinforcing....

2-#4 at 3.0 in from Bottom, from 0.0 to 8.0 ft in this span

Beam self weight calculated and added to loads

Load for Span Number 1

Uniform Load : D = 0.10, L = 0.040 ksf, Tributary Width = 12.50 ft

DESIGN SUMMARY

Maximum Bending Stress Ratio	=	0.913	: 1
Section used for this span		Typical Section	
Mu : Applied		20.875	k-ft
Mn * Phi : Allowable		22.871	k-ft
Location of maximum on span		3.993	ft
Span # where maximum occurs		Span # 1	

Maximum Deflection

Max Downward Transient Deflection	0.003 in	Ratio =	35532	>=360.0	L Only
Max Upward Transient Deflection	0.000 in	Ratio =	0	<360.0	L Only
Max Downward Total Deflection	0.011 in	Ratio =	8848	>=180.0	Span: 1 : +D+L
Max Upward Total Deflection	0.000 in	Ratio =	0	<180.0	Span: 1 : +D+L

Vertical Reactions

Support notation : Far left is #1

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	8.031	8.031
Max Upward from Load Combinations	8.031	8.031
Max Upward from Load Cases	6.031	6.031
D Only	6.031	6.031
+D+L	8.031	8.031
+D+0.750L	7.531	7.531
+0.60D	3.619	3.619

Concrete Beam

Project File: 5330 Butterworth Rd.ec6

LIC#: KW-06017913, Build:20.24.08.01

MULHERN & KULP STRUCTURAL ENGINEERING INC

(c) ENERCALC INC 1983-2023

DESCRIPTION: TYP. GRADE BM @ CRAWL

Vertical Reactions

Support notation : Far left is #1

Load Combination	Support 1	Support 2
L Only	2.000	2.000

Shear Stirrup Requirements

Between 0.00 to 0.96 ft, Max spacing per T9.7.6.2.2, use #3 stirrups spaced at 6 in
 Between 0.98 to 7.02 ft, Ties Not Req'd, Stirrups are not required.
 Between 7.04 to 7.99 ft, Max spacing per T9.7.6.2.2, use #3 stirrups spaced at 6 in

Detailed Shear Information

Load Combination	Span Number	Distance (ft)	'd' (in)	Vu (k)	Av, min Req'd?	Spacing Req'd (in)	Φ Vc (k)	Φ Vs (k)	Φ Vn (k)	Vu / Φ Vn	Vc Eqn (T22.5.5.1)	Spacing Provision
+1.20D+1.60L	1	0.00	13.00	10.44	Yes	6.50	17.09	13.20	30.29	0.345	Eqn (a)	Max spacing per T9.7.6.2
+1.20D+1.60L	1	0.09	13.00	10.21	Yes	6.50	17.09	13.20	30.29	0.337	Eqn (a)	Max spacing per T9.7.6.2
+1.20D+1.60L	1	0.17	13.00	9.98	Yes	6.50	17.09	13.20	30.29	0.330	Eqn (a)	Max spacing per T9.7.6.2
+1.20D+1.60L	1	0.26	13.00	9.75	Yes	6.50	17.09	13.20	30.29	0.322	Eqn (a)	Max spacing per T9.7.6.2
+1.20D+1.60L	1	0.35	13.00	9.52	Yes	6.50	17.09	13.20	30.29	0.314	Eqn (a)	Max spacing per T9.7.6.2
+1.20D+1.60L	1	0.44	13.00	9.30	Yes	6.50	17.09	13.20	30.29	0.307	Eqn (a)	Max spacing per T9.7.6.2
+1.20D+1.60L	1	0.52	13.00	9.07	Yes	6.50	17.09	13.20	30.29	0.299	Eqn (a)	Max spacing per T9.7.6.2
+1.20D+1.60L	1	0.61	13.00	8.84	Yes	6.50	17.09	13.20	30.29	0.292	Eqn (a)	Max spacing per T9.7.6.2
+1.20D+1.60L	1	0.70	13.00	8.61	Yes	6.50	17.09	13.20	30.29	0.284	Eqn (a)	Max spacing per T9.7.6.2
+1.20D+1.60L	1	0.79	13.00	8.38	No	6.50	17.09	13.20	30.29	0.277	Eqn (a)	Max spacing per T9.7.6.2
+1.20D+1.60L	1	0.87	13.00	8.16	No	6.50	17.09	13.20	30.29	0.269	Eqn (a)	Max spacing per T9.7.6.2
+1.20D+1.60L	1	0.96	13.00	7.93	No	6.50	17.09	13.20	30.29	0.262	Eqn (a)	Max spacing per T9.7.6.2
+1.20D+1.60L	1	1.05	13.00	7.70	No	N/A	7.93	0.00	7.93	0.971	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	1.14	13.00	7.47	No	N/A	7.93	0.00	7.93	0.943	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	1.22	13.00	7.24	No	N/A	7.93	0.00	7.93	0.914	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	1.31	13.00	7.02	No	N/A	7.93	0.00	7.93	0.885	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	1.40	13.00	6.79	No	N/A	7.93	0.00	7.93	0.856	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	1.49	13.00	6.56	No	N/A	7.93	0.00	7.93	0.827	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	1.57	13.00	6.33	No	N/A	7.93	0.00	7.93	0.799	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	1.66	13.00	6.10	No	N/A	7.93	0.00	7.93	0.770	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	1.75	13.00	5.87	No	N/A	7.93	0.00	7.93	0.741	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	1.84	13.00	5.65	No	N/A	7.93	0.00	7.93	0.712	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	1.92	13.00	5.42	No	N/A	7.93	0.00	7.93	0.684	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	2.01	13.00	5.19	No	N/A	7.93	0.00	7.93	0.655	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	2.10	13.00	4.96	No	N/A	7.93	0.00	7.93	0.626	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	2.19	13.00	4.73	No	N/A	7.93	0.00	7.93	0.597	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	2.27	13.00	4.51	No	N/A	7.93	0.00	7.93	0.568	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	2.36	13.00	4.28	No	N/A	7.93	0.00	7.93	0.540	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	2.45	13.00	4.05	No	N/A	7.93	0.00	7.93	0.511	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	2.54	13.00	3.82	No	N/A	7.93	0.00	7.93	0.482	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	2.62	13.00	3.59	No	N/A	7.93	0.00	7.93	0.453	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	2.71	13.00	3.37	No	N/A	7.93	0.00	7.93	0.425	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	2.80	13.00	3.14	No	N/A	7.93	0.00	7.93	0.396	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	2.89	13.00	2.91	No	N/A	7.93	0.00	7.93	0.367	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	2.97	13.00	2.68	No	N/A	7.93	0.00	7.93	0.338	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	3.06	13.00	2.45	No	N/A	7.93	0.00	7.93	0.309	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	3.15	13.00	2.22	No	N/A	7.93	0.00	7.93	0.281	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	3.23	13.00	2.00	No	N/A	7.93	0.00	7.93	0.252	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	3.32	13.00	1.77	No	N/A	7.93	0.00	7.93	0.223	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	3.41	13.00	1.54	No	N/A	7.93	0.00	7.93	0.194	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	3.50	13.00	1.31	No	N/A	7.93	0.00	7.93	0.165	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	3.58	13.00	1.08	No	N/A	7.93	0.00	7.93	0.137	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	3.67	13.00	0.86	No	N/A	7.93	0.00	7.93	0.108	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	3.76	13.00	0.63	No	N/A	7.93	0.00	7.93	0.079	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	3.85	13.00	0.40	No	N/A	7.93	0.00	7.93	0.050	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	3.93	13.00	0.17	No	N/A	7.93	0.00	7.93	0.022	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	4.02	13.00	-0.06	No	N/A	7.93	0.00	7.93	0.007	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	4.11	13.00	-0.29	No	N/A	7.93	0.00	7.93	0.036	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	4.20	13.00	-0.51	No	N/A	7.93	0.00	7.93	0.065	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	4.28	13.00	-0.74	No	N/A	7.93	0.00	7.93	0.094	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	4.37	13.00	-0.97	No	N/A	7.93	0.00	7.93	0.122	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	4.46	13.00	-1.20	No	N/A	7.93	0.00	7.93	0.151	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	4.55	13.00	-1.43	No	N/A	7.93	0.00	7.93	0.180	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	4.63	13.00	-1.65	No	N/A	7.93	0.00	7.93	0.209	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	4.72	13.00	-1.88	No	N/A	7.93	0.00	7.93	0.237	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	4.81	13.00	-2.11	No	N/A	7.93	0.00	7.93	0.266	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	4.90	13.00	-2.34	No	N/A	7.93	0.00	7.93	0.295	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	4.98	13.00	-2.57	No	N/A	7.93	0.00	7.93	0.324	Eqn (c)	Ties Not Req'd

Concrete Beam

Project File: 5330 Butterworth Rd.ec6

LIC# : KW-06017913, Build:20.24.08.01

MULHERN & KULP STRUCTURAL ENGINEERING INC

(c) ENERCALC INC 1983-2023

DESCRIPTION: TYP. GRADE BM @ CRAWL

Detailed Shear Information

Load Combination	Span Number	Distance (ft)	'd' (in)	Vu (k)	Av, min Req'd?	Spacing Req'd (in)	ϕV_c (k)	ϕV_s (k)	ϕV_n (k)	Vu / ϕV_n	Vc Eqn (T22.5.5.1)	Spacing Provision
+1.20D+1.60L	1	5.07	13.00	-2.79	No	N/A	7.93	0.00	7.93	0.353	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	5.16	13.00	-3.02	No	N/A	7.93	0.00	7.93	0.381	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	5.25	13.00	-3.25	No	N/A	7.93	0.00	7.93	0.410	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	5.33	13.00	-3.48	No	N/A	7.93	0.00	7.93	0.439	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	5.42	13.00	-3.71	No	N/A	7.93	0.00	7.93	0.468	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	5.51	13.00	-3.94	No	N/A	7.93	0.00	7.93	0.496	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	5.60	13.00	-4.16	No	N/A	7.93	0.00	7.93	0.525	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	5.68	13.00	-4.39	No	N/A	7.93	0.00	7.93	0.554	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	5.77	13.00	-4.62	No	N/A	7.93	0.00	7.93	0.583	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	5.86	13.00	-4.85	No	N/A	7.93	0.00	7.93	0.612	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	5.95	13.00	-5.08	No	N/A	7.93	0.00	7.93	0.640	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	6.03	13.00	-5.30	No	N/A	7.93	0.00	7.93	0.669	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	6.12	13.00	-5.53	No	N/A	7.93	0.00	7.93	0.698	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	6.21	13.00	-5.76	No	N/A	7.93	0.00	7.93	0.727	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	6.30	13.00	-5.99	No	N/A	7.93	0.00	7.93	0.756	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	6.38	13.00	-6.22	No	N/A	7.93	0.00	7.93	0.784	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	6.47	13.00	-6.44	No	N/A	7.93	0.00	7.93	0.813	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	6.56	13.00	-6.67	No	N/A	7.93	0.00	7.93	0.842	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	6.64	13.00	-6.90	No	N/A	7.93	0.00	7.93	0.871	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	6.73	13.00	-7.13	No	N/A	7.93	0.00	7.93	0.899	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	6.82	13.00	-7.36	No	N/A	7.93	0.00	7.93	0.928	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	6.91	13.00	-7.59	No	N/A	7.93	0.00	7.93	0.957	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	6.99	13.00	-7.81	No	N/A	7.93	0.00	7.93	0.986	Eqn (c)	Ties Not Req'd
+1.20D+1.60L	1	7.08	13.00	-8.04	No	6.50	17.09	13.20	30.29	0.266	Eqn (a)	Max spacing per T9.7.6.2
+1.20D+1.60L	1	7.17	13.00	-8.27	No	6.50	17.09	13.20	30.29	0.273	Eqn (a)	Max spacing per T9.7.6.2
+1.20D+1.60L	1	7.26	13.00	-8.50	No	6.50	17.09	13.20	30.29	0.281	Eqn (a)	Max spacing per T9.7.6.2
+1.20D+1.60L	1	7.34	13.00	-8.73	Yes	6.50	17.09	13.20	30.29	0.288	Eqn (a)	Max spacing per T9.7.6.2
+1.20D+1.60L	1	7.43	13.00	-8.95	Yes	6.50	17.09	13.20	30.29	0.296	Eqn (a)	Max spacing per T9.7.6.2
+1.20D+1.60L	1	7.52	13.00	-9.18	Yes	6.50	17.09	13.20	30.29	0.303	Eqn (a)	Max spacing per T9.7.6.2
+1.20D+1.60L	1	7.61	13.00	-9.41	Yes	6.50	17.09	13.20	30.29	0.311	Eqn (a)	Max spacing per T9.7.6.2
+1.20D+1.60L	1	7.69	13.00	-9.64	Yes	6.50	17.09	13.20	30.29	0.318	Eqn (a)	Max spacing per T9.7.6.2
+1.20D+1.60L	1	7.78	13.00	-9.87	Yes	6.50	17.09	13.20	30.29	0.326	Eqn (a)	Max spacing per T9.7.6.2
+1.20D+1.60L	1	7.87	13.00	-10.10	Yes	6.50	17.09	13.20	30.29	0.333	Eqn (a)	Max spacing per T9.7.6.2
+1.20D+1.60L	1	7.96	13.00	-10.32	Yes	6.50	17.09	13.20	30.29	0.341	Eqn (a)	Max spacing per T9.7.6.2

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment	Span #	Location (ft) along Beam	Bending Stress Results (k-ft)		
				Mu : Max	Phi*Mnx	Stress Ratio
MAXimum BENDING Envelope						
+1.40D	Span # 1	1	8.000	20.87	22.87	0.91
+1.20D+1.60L	Span # 1	1	8.000	16.89	22.87	0.74
+1.20D+L	Span # 1	1	8.000	20.87	22.87	0.91
+1.20D	Span # 1	1	8.000	18.47	22.87	0.81
+0.90D	Span # 1	1	8.000	14.47	22.87	0.63
	Span # 1	1	8.000	10.86	22.87	0.47

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl (in)	Location in Span (ft)	Load Combination	Max. "+" Defl (in)	Location in Span (ft)
+D+L	1	0.0108	4.000		0.0000	0.000

Cantilevered Retaining Wall

Project File: 5330 Butterworth Rd.ec6

LIC# : KW-06017913, Build:20.24.08.01

MULHERN & KULP STRUCTURAL ENGINEERING INC

(c) ENERCALC INC 1983-2023

DESCRIPTION: Pool Retaining Wall (Empty)

Code Reference

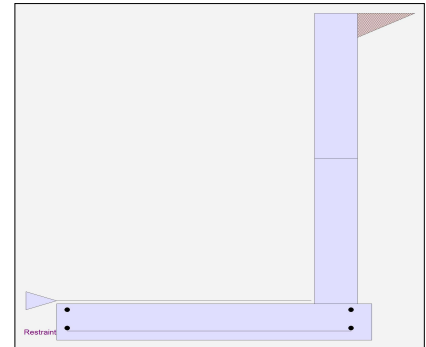
Calculations per IBC 2021 1807.3, ASCE 7-16

Criteria

Retained Height	=	8.00 ft
Wall height above soil	=	0.00 ft
Slope Behind Wall	=	0.00
Height of Soil over Toe	=	0.00 in
Water table above bottom of footing	=	0.0 ft

Soil Data

Allow Soil Bearing	=	1,500.0 psf
Equivalent Fluid Pressure Method		
Active Heel Pressure	=	35.0 psf/ft
Passive Pressure	=	250.0 psf/ft
Soil Density, Heel	=	110.0 pcf
Soil Density, Toe	=	110.0 pcf
Footing||Soil Friction	=	0.400
Soil height to ignore for passive pressure	=	12.00 in



Surcharge Loads

Surcharge Over Heel	=	0.0 psf
Used To Resist Sliding & Overturning		
Surcharge Over Toe	=	0.0 psf
Used for Sliding & Overturning		

Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

Earth Pressure Seismic Load

Method	:	Uniform
Multiplier Used	=	7.000
(Multiplier used on soil density)		

Lateral Load Applied to Stem

Lateral Load	=	0.0 #/ft
...Height to Top	=	0.00 ft
...Height to Bottom	=	0.00 ft
Load Type	=	Wind (W) (Service Level)
Wind on Exposed Stem	=	0.0 psf (Strength Level)

Uniform Seismic Force	=	63.000
Total Seismic Force	=	567.000

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type	=	Spread Footing
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Cantilevered Retaining Wall

Project File: 5330 Butterworth Rd.ec6

LIC# : KW-06017913, Build:20.24.08.01

MULHERN & KULP STRUCTURAL ENGINEERING INC

(c) ENERCALC INC 1983-2023

DESCRIPTION: Pool Retaining Wall (Empty)

Design Summary

Wall Stability Ratios			
Overturning	=	2.31	OK
Slab Resists All Sliding !			
Global Stability	=	1.21	
Total Bearing Load	=	3,219 lbs	
...resultant ecc.	=	7.46 in	
Eccentricity within middle third			
Soil Pressure @ Toe	=	534 psf	OK
Soil Pressure @ Heel	=	174 psf	OK
Allowable	=	1,500 psf	
Soil Pressure Less Than Allowable			
ACI Factored @ Toe	=	747 psf	
ACI Factored @ Heel	=	243 psf	
Footing Shear @ Toe	=	20.0 psi	OK
Footing Shear @ Heel	=	2.7 psi	OK
Allowable	=	75.0 psi	
Sliding Calcs			
Lateral Sliding Force	=	1,814.4 lbs	

Stem Construction

		2nd	Bottom		
Design Height Above Ftg	ft =	Stem OK	Stem OK		
		4.00	0.00		
Wall Material Above "Ht"	=	Concrete	Concrete		
Design Method	=	SD	SD	SD	SD
Thickness	=	12.00	12.00		
Rebar Size	=	# 5	# 5		
Rebar Spacing	=	12.00	12.00		
Rebar Placed at	=	Edge	Edge		
Design Data					
fb/FB + fa/Fa	=	0.080	0.495		
Total Force @ Section					
Service Level	lbs =				
Strength Level	lbs =	700.0	2,296.0		
Moment....Actual					
Service Level	ft-# =				
Strength Level	ft-# =	1,101.3	6,794.7		
Moment....Allowable	ft-# =	13,701.3	13,701.3		
Shear.....Actual					
Service Level	psi =				
Strength Level	psi =	5.7	18.8		
Shear.....Allowable	psi =	40.7	40.7		
Anet (Masonry)	in2 =				
Wall Weight	psf =	150.0	150.0		
Rebar Depth 'd'	in =	10.19	10.19		

Masonry Data

f'm	psi =	
Fs	psi =	
Solid Grouting	=	
Modular Ratio 'n'	=	
Equiv. Solid Thick.	=	
Masonry Block Type	=	
Masonry Design Method	=	ASD

Concrete Data

f'c	psi =	2,500.0	2,500.0
Fy	psi =	60,000.0	60,000.0

Vertical component of active lateral soil pressure IS NOT considered in the calculation of soil bearing pressures.

Load Factors

Building Code	
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.600
Seismic, E	1.000

Cantilevered Retaining Wall

Project File: 5330 Butterworth Rd.ec6

LIC#: KW-06017913, Build:20.24.08.01

MULHERN & KULP STRUCTURAL ENGINEERING INC

(c) ENERCALC INC 1983-2023

DESCRIPTION: Pool Retaining Wall (Empty)

Concrete Stem Rebar Area Details

2nd Stem	<u>Vertical Reinforcing</u>	<u>Horizontal Reinforcing</u>
As (based on applied moment) :	0.0248 in2/ft	
0.0018bh : 0.0018(12)(12) :	0.2592 in2/ft	Horizontal Reinforcing Options :
	=====	<u>One layer of :</u> <u>Two layers of :</u>
Required Area :	0.2592 in2/ft	#4@ 9.26 in #4@ 18.52 in
Provided Area :	0.31 in2/ft	#5@ 14.35 in #5@ 28.70 in
Maximum Area :	1.3801 in2/ft	#6@ 20.37 in #6@ 40.74 in

Bottom Stem	<u>Vertical Reinforcing</u>	<u>Horizontal Reinforcing</u>
As (based on applied moment) :	0.153 in2/ft	
0.0018bh : 0.0018(12)(12) :	0.2592 in2/ft	Horizontal Reinforcing Options :
	=====	<u>One layer of :</u> <u>Two layers of :</u>
Required Area :	0.2592 in2/ft	#4@ 9.26 in #4@ 18.52 in
Provided Area :	0.31 in2/ft	#5@ 14.35 in #5@ 28.70 in
Maximum Area :	1.3801 in2/ft	#6@ 20.37 in #6@ 40.74 in

Footing Data

Toe Width	=	6.00 ft
Heel Width	=	1.33
Total Footing Width	=	7.33
Footing Thickness	=	12.00 in

f'c =	2,500 psi	Fy =	60,000 psi
Footing Concrete Density	=	150.00 pcf	
Min. As %	=	0.0018	
Cover @ Top	2.00	@ Btm.=	3.00 in

Footing Design Results

	<u>Toe</u>	<u>Heel</u>	
Factored Pressure	=	747	243 psf
Mu' : Upward	=	10,972	14 ft-#
Mu' : Downward	=	3,240	69 ft-#
Mu: Design	=	7,732	55 ft-#
ϕ Mn	=	11,610	2,500 ft-#
Actual 1-Way Shear	=	19.98	2.72 psi
Allow 1-Way Shear	=	43.14	40.00 psi
Toe Reinforcing	=	# 5 @ 12.00 in	
Heel Reinforcing	=	None Spec'd	
Key Reinforcing	=	None Spec'd	
Footing Torsion, Tu	=		0.00 ft-lbs
Footing Allow. Torsion, ϕ Tn	=		0.00 ft-lbs

If torsion exceeds allowable, provide supplemental design for footing torsion.

Other Acceptable Sizes & Spacings

Toe: #4@ 8.57 in, #5@ 13.28 in, #6@ 18.85 in, #7@ 25.71 in, #8@ 33.85 in, #9@ 42.85 in, #10@ 54.42 in

Heel: $\phi Mn = \phi * 5 * \lambda * \sqrt{fc} * Sm$

Key: No key defined

Min footing T&S reinf Area	1.90	in2
Min footing T&S reinf Area per foot	0.26	in2 /ft

If one layer of horizontal bars:

#4@ 9.26 in
#5@ 14.35 in
#6@ 20.37 in

If two layers of horizontal bars:

#4@ 18.52 in
#5@ 28.70 in
#6@ 40.74 in

Cantilevered Retaining Wall

Project File: 5330 Butterworth Rd.ec6

LIC# : KW-06017913, Build:20.24.08.01

MULHERN & KULP STRUCTURAL ENGINEERING INC

(c) ENERCALC INC 1983-2023

DESCRIPTION: Pool Retaining Wall (Empty)

Summary of Overturning & Resisting Forces & Moments

Item	.....OVERTURNING.....			.....RESISTING.....			
	Force lbs	Distance ft	Moment ft-#	Force lbs	Distance ft	Moment ft-#		
HL Act Pres (ab water tbl)	1,417.5	3.00	4,252.5	Soil Over HL (ab. water tbl)	293.0	7.17	2,100.1	
HL Act Pres (be water tbl)				Soil Over HL (bel. water tbl)		7.17	2,100.1	
Hydrostatic Force				Water Table				
Buoyant Force	=			Sloped Soil Over Heel	=			
Surcharge over Heel	=			Surcharge Over Heel	=			
Surcharge Over Toe	=			Adjacent Footing Load	=			
Adjacent Footing Load	=			Axial Dead Load on Stem	=			
Added Lateral Load	=			* Axial Live Load on Stem	=			
Load @ Stem Above Soil	=			Soil Over Toe	=			
Seismic Earth Load	=	396.9	4.50	Surcharge Over Toe	=			
	=			Stem Weight(s)	=	1,200.0	6.50	7,800.0
				Earth @ Stem Transitions	=			
Total	=	1,814.4	O.T.M. =	Footing Weight	=	1,100.0	3.67	4,033.0
				Key Weight	=			
				Vert. Component	=			
				Total =	2,593.0 lbs	R.M.=	13,933.0	

Resisting/Overturning Ratio

= **2.31**
Vertical Loads used for Soil Pressure = 3,218.7 lbs

* Axial live load NOT included in total displayed, or used for overturning resistance, but is included for soil pressure calculation.

If seismic is included, the OTM and sliding ratios may be 1.1 per section 1807.2.3 of IBC.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Sliding Resistance.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Overturning Resistance.

Tilt

Horizontal Deflection at Top of Wall due to settlement of soil

(Deflection due to wall bending not considered)

Soil Spring Reaction Modulus 250.0 pci
Horizontal Defl @ Top of Wall (approximate only) 0.016 in

The above calculation is not valid if the heel soil bearing pressure exceeds that of the toe, because the wall would then tend to rotate into the retained soil.

Cantilevered Retaining Wall

Project File: 5330 Butterworth Rd.ec6

LIC# : KW-06017913, Build:20.24.08.01

MULHERN & KULP STRUCTURAL ENGINEERING INC

(c) ENERCALC INC 1983-2023

DESCRIPTION: Pool Retaining Wall (Empty)

Rebar Lap & Embedment Lengths Information

Stem Design Segment: 2nd

Stem Design Height: 4.00 ft above top of footing

Lap Splice length for #5 bar specified in this stem design segment (25.4.2.4a) = 23.40 in
Development length for #5 bar specified in this stem design segment = 18.00 in

Stem Design Segment: Bottom

Stem Design Height: 0.00 ft above top of footing

Lap Splice length for #5 bar specified in this stem design segment (25.4.2.4a) = 23.40 in
Development length for #5 bar specified in this stem design segment = 18.00 in

Hooked embedment length into footing for #5 bar specified in this stem design segment = 8.27 in
As Provided = 0.3100 in²/ft
As Required = 0.2592 in²/ft

Cantilevered Retaining Wall

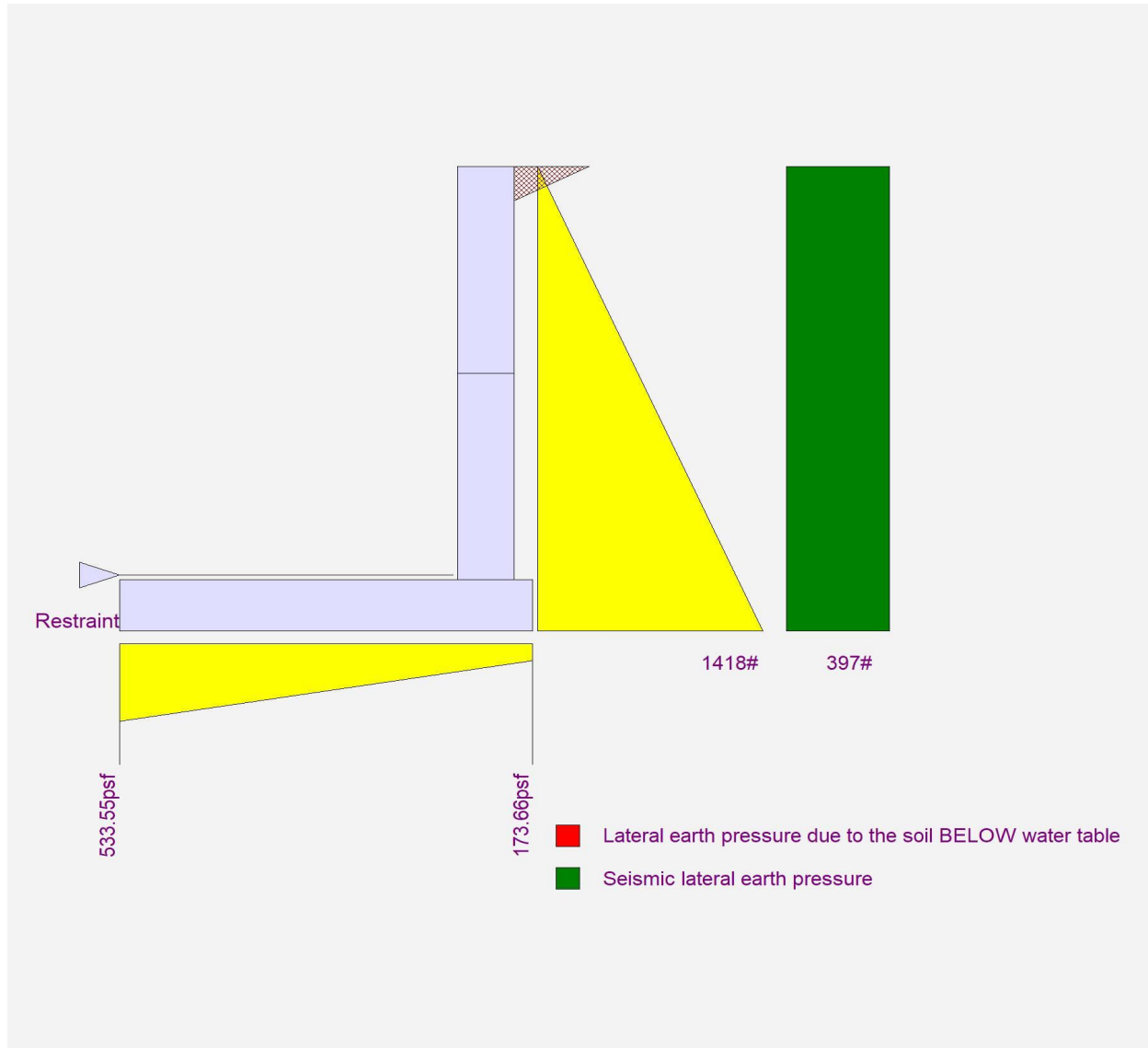
Project File: 5330 Butterworth Rd.ec6

LIC# : KW-06017913, Build:20.24.08.01

MULHERN & KULP STRUCTURAL ENGINEERING INC

(c) ENERCALC INC 1983-2023

DESCRIPTION: Pool Retaining Wall (Empty)



Cantilevered Retaining Wall

Project File: 5330 Butterworth Rd.ec6

LIC# : KW-06017913, Build:20.24.08.01

MULHERN & KULP STRUCTURAL ENGINEERING INC

(c) ENERCALC INC 1983-2023

DESCRIPTION: Pool Retaining Wall (Filled)

Code Reference

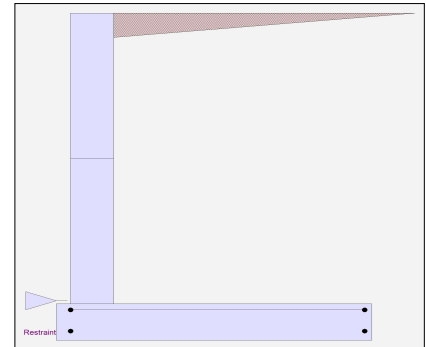
Calculations per IBC 2021 1807.3, ASCE 7-16

Criteria

Retained Height	=	8.00 ft
Wall height above soil	=	0.00 ft
Slope Behind Wall	=	0.00
Height of Soil over Toe	=	0.00 in
Water table above bottom of footing	=	0.0 ft

Soil Data

Allow Soil Bearing	=	1,500.0 psf
Equivalent Fluid Pressure Method		
Active Heel Pressure	=	27.4 psf/ft
Passive Pressure	=	250.0 psf/ft
Soil Density, Heel	=	110.00 pcf
Soil Density, Toe	=	110.00 pcf
Footing||Soil Friction	=	0.400
Soil height to ignore for passive pressure	=	12.00 in



Surcharge Loads

Surcharge Over Heel	=	0.0 psf
Used To Resist Sliding & Overturning		
Surcharge Over Toe	=	0.0 psf
Used for Sliding & Overturning		

Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

Earth Pressure Seismic Load

Method	:	Uniform
Multiplier Used	=	7.000
(Multiplier used on soil density)		

Lateral Load Applied to Stem

Lateral Load	=	0.0 #/ft
...Height to Top	=	0.00 ft
...Height to Bottom	=	0.00 ft
Load Type	=	Wind (W) (Service Level)
Wind on Exposed Stem	=	0.0 psf (Strength Level)

Uniform Seismic Force	=	63.000
Total Seismic Force	=	567.000

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type	=	Spread Footing
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

1/3 INCREASE PERMITTED FOR SOIL BEARING CAPACITY WHEN SUPPORTING TRANSIENT SEISMIC LOAD

Cantilevered Retaining Wall

Project File: 5330 Butterworth Rd.ec6

LIC# : KW-06017913, Build:20.24.08.01

MULHERN & KULP STRUCTURAL ENGINEERING INC

(c) ENERCALC INC 1983-2023

DESCRIPTION: Pool Retaining Wall (Filled)

Design Summary

Wall Stability Ratios			
Overturning	=	5.46	OK
Slab Resists All Sliding !			
Global Stability	=	3.16	
Total Bearing Load	=	8,137 lbs	
...resultant ecc.	=	7.91 in	
Eccentricity within middle third			
Soil Pressure @ Toe	=	1,591 psf	NG
Soil Pressure @ Heel	=	476 psf	OK
Allowable	=	1,500 psf	
Soil Pressure Exceeds Allowable!			
ACI Factored @ Toe	=	2,227 psf	
ACI Factored @ Heel	=	667 psf	
Footing Shear @ Toe	=	0.6 psi	OK
Footing Shear @ Heel	=	3.6 psi	OK
Allowable	=	75.0 psi	

Sliding Calcs

Lateral Sliding Force	=	1,506.6 lbs
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Vertical component of active lateral soil pressure IS NOT considered in the calculation of soil bearing pressures.

Load Factors

Building Code	
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.600
Seismic, E	1.000

Stem Construction

		2nd	Bottom		
Design Height Above Ftg	ft =	Stem OK 4.00	Stem OK 0.00		
Wall Material Above "Ht"	=	Concrete	Concrete		
Design Method	=	SD	SD	SD	SD
Thickness	=	12.00	12.00		
Rebar Size	=	# 5	# 5		
Rebar Spacing	=	12.00	12.00		
Rebar Placed at	=	Edge	Edge		
Design Data					
fb/FB + fa/Fa	=	0.070	0.420		
Total Force @ Section					
Service Level	lbs =				
Strength Level	lbs =	602.7	1,906.9		
Moment....Actual					
Service Level	ft-# =				
Strength Level	ft-# =	971.6	5,757.0		
Moment....Allowable	ft-# =	13,701.3	13,701.3		
Shear....Actual					
Service Level	psi =				
Strength Level	psi =	4.9	15.6		
Shear....Allowable	psi =	40.7	40.7		
Anet (Masonry)	in2 =				
Wall Weight	psf =	150.0	150.0		
Rebar Depth 'd'	in =	10.19	10.19		

Masonry Data

f'm	psi =	
Fs	psi =	
Solid Grouting	=	
Modular Ratio 'n'	=	
Equiv. Solid Thick.	=	
Masonry Block Type	=	
Masonry Design Method	=	ASD

Concrete Data

f'c	psi =	2,500.0	2,500.0
Fy	psi =	60,000.0	60,000.0

Cantilevered Retaining Wall

Project File: 5330 Butterworth Rd.ec6

LIC# : KW-06017913, Build:20.24.08.01

MULHERN & KULP STRUCTURAL ENGINEERING INC

(c) ENERCALC INC 1983-2023

DESCRIPTION: Pool Retaining Wall (Filled)

Concrete Stem Rebar Area Details

2nd Stem	<u>Vertical Reinforcing</u>	<u>Horizontal Reinforcing</u>
As (based on applied moment) :	0.0219 in2/ft	
0.0018bh : 0.0018(12)(12) :	0.2592 in2/ft	Horizontal Reinforcing Options :
	=====	<u>One layer of :</u> <u>Two layers of :</u>
Required Area :	0.2592 in2/ft	#4@ 9.26 in #4@ 18.52 in
Provided Area :	0.31 in2/ft	#5@ 14.35 in #5@ 28.70 in
Maximum Area :	1.3801 in2/ft	#6@ 20.37 in #6@ 40.74 in

Bottom Stem	<u>Vertical Reinforcing</u>	<u>Horizontal Reinforcing</u>
As (based on applied moment) :	0.1296 in2/ft	
0.0018bh : 0.0018(12)(12) :	0.2592 in2/ft	Horizontal Reinforcing Options :
	=====	<u>One layer of :</u> <u>Two layers of :</u>
Required Area :	0.2592 in2/ft	#4@ 9.26 in #4@ 18.52 in
Provided Area :	0.31 in2/ft	#5@ 14.35 in #5@ 28.70 in
Maximum Area :	1.3801 in2/ft	#6@ 20.37 in #6@ 40.74 in

Footing Data

Toe Width	=	0.33 ft
Heel Width	=	7.00
Total Footing Width	=	7.33
Footing Thickness	=	12.00 in

f'c =	2,500 psi	Fy =	60,000 psi
Footing Concrete Density	=	150.00 pcf	
Min. As %	=	0.0018	
Cover @ Top	2.00	@ Btm.=	3.00 in

Footing Design Results

	<u>Toe</u>	<u>Heel</u>	
Factored Pressure	=	2,227	667 psf
Mu' : Upward	=	122	19,664 ft-#
Mu' : Downward	=	10	22,248 ft-#
Mu: Design	=	112	2,584 ft-#
φ Mn	=	2,500	13,005 ft-#
Actual 1-Way Shear	=	0.56	3.64 psi
Allow 1-Way Shear	=	40.00	41.60 psi
Toe Reinforcing	=	None Spec'd	
Heel Reinforcing	=	# 5 @ 12.00 in	
Key Reinforcing	=	None Spec'd	
Footing Torsion, Tu	=		0.00 ft-lbs
Footing Allow. Torsion, φ Tn	=		0.00 ft-lbs

If torsion exceeds allowable, provide supplemental design for footing torsion.

Other Acceptable Sizes & Spacings

Toe: $\phi Mn = \phi * 5 * \lambda * \sqrt{fc} * Sm$

Heel: #4@ 9.25 in, #5@ 14.35 in, #6@ 20.37 in, #7@ 27.77 in, #8@ 36.57 in, #9@ 46.29 in, #10@ 58.79 in

Key: No key defined

Min footing T&S reinf Area	1.90	in2
Min footing T&S reinf Area per foot	0.26	in2 /ft

If one layer of horizontal bars:

#4@ 9.26 in
#5@ 14.35 in
#6@ 20.37 in

If two layers of horizontal bars:

#4@ 18.52 in
#5@ 28.70 in
#6@ 40.74 in

Cantilevered Retaining Wall

Project File: 5330 Butterworth Rd.ec6

LIC# : KW-06017913, Build:20.24.08.01

MULHERN & KULP STRUCTURAL ENGINEERING INC

(c) ENERCALC INC 1983-2023

DESCRIPTION: Pool Retaining Wall (Filled)

Summary of Overturning & Resisting Forces & Moments

Item	.....OVERTURNING.....				.....RESISTING.....		
	Force lbs	Distance ft	Moment ft-#		Force lbs	Distance ft	Moment ft-#
HL Act Pres (ab water tbl)	1,109.7	3.00	3,329.1	Soil Over HL (ab. water tbl)	5,280.0	4.33	22,879.8
HL Act Pres (be water tbl)				Soil Over HL (bel. water tbl)		4.33	22,879.8
Hydrostatic Force				Water Table			
Buoyant Force	=			Sloped Soil Over Heel	=		
Surcharge over Heel	=			Surcharge Over Heel	=		
Surcharge Over Toe	=			Adjacent Footing Load	=		
Adjacent Footing Load	=			Axial Dead Load on Stem	=		
Added Lateral Load	=			* Axial Live Load on Stem	=		
Load @ Stem Above Soil	=			Soil Over Toe	=		
Seismic Earth Load	=	396.9	4.50	Surcharge Over Toe	=		
	=			Stem Weight(s)	=	1,200.0	0.83
				Earth @ Stem Transitions	=		
Total	=	1,506.6	O.T.M. =	Footing Weight	=	1,100.0	3.67
				Key Weight	=		
				Vert. Component	=		
				Total =	7,580.0 lbs	R.M.=	27,913.1
Resisting/Overturning Ratio			= 5.46				
Vertical Loads used for Soil Pressure =			8,136.9 lbs				

* Axial live load NOT included in total displayed, or used for overturning resistance, but is included for soil pressure calculation.

If seismic is included, the OTM and sliding ratios may be 1.1 per section 1807.2.3 of IBC.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Sliding Resistance.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Overturning Resistance.

Tilt

Horizontal Deflection at Top of Wall due to settlement of soil

(Deflection due to wall bending not considered)

Soil Spring Reaction Modulus 250.0 pci
Horizontal Defl @ Top of Wall (approximate only) 0.048 in

The above calculation is not valid if the heel soil bearing pressure exceeds that of the toe, because the wall would then tend to rotate into the retained soil.

Cantilevered Retaining Wall

Project File: 5330 Butterworth Rd.ec6

LIC# : KW-06017913, Build:20.24.08.01

MULHERN & KULP STRUCTURAL ENGINEERING INC

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DESCRIPTION: Pool Retaining Wall (Filled)

Rebar Lap & Embedment Lengths Information

Stem Design Segment: 2nd

Stem Design Height: 4.00 ft above top of footing

Lap Splice length for #5 bar specified in this stem design segment (25.4.2.4a) = 23.40 in
Development length for #5 bar specified in this stem design segment = 18.00 in

Stem Design Segment: Bottom

Stem Design Height: 0.00 ft above top of footing

Lap Splice length for #5 bar specified in this stem design segment (25.4.2.4a) = 23.40 in
Development length for #5 bar specified in this stem design segment = 18.00 in

Hooked embedment length into footing for #5 bar specified in this stem design segment = 8.27 in
As Provided = 0.3100 in²/ft
As Required = 0.2592 in²/ft

Cantilevered Retaining Wall

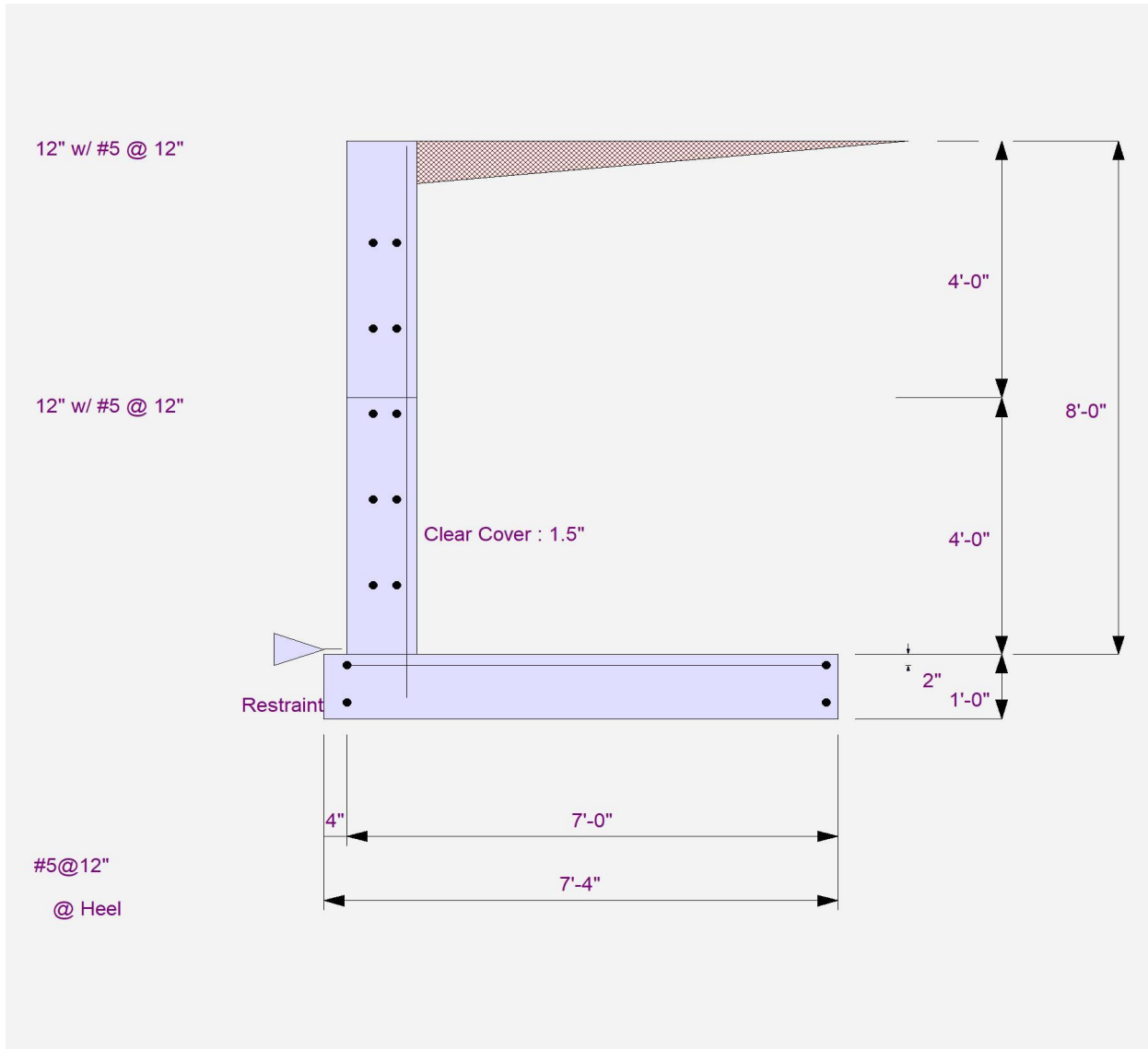
Project File: 5330 Butterworth Rd.ec6

LIC# : KW-06017913, Build:20.24.08.01

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Cantilevered Retaining Wall

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